

The structural engineer shall arrange a pre-construction meeting to discuss various design requirements and expectations. The owner, superintendent, framer and other design consultants will be required to attend.

The uses of these drawings is limited to that identified in the revision column. Any revisions made to the design drawings prior to "issue for tender" & "issued for construction" resulting in construction cost changes are the responsibility of the owner/contractor.

Contractors are to ensure they are working from current "Issued for Construction" plans.

The contractor shall check and verify all dimensions and details on the structural drawings for compatibility with architectural and other consultants' drawings before commencing with the work.

These drawings are to be read in conjunction with Architectural drawings provided by Moore Wilson Architects Inc.

All structural specifications to take precedence over architectural specifications.

The contractor shall inform the engineer in writing during the bidding period of any discrepancies or omissions noted on the drawings or in the specifications. Upon receipt of such information the engineer will provide additional instructions. Any such discrepancy, omission, or variation not reported shall be the responsibility of the contractor, and corrective work shall be performed as directed by the engineer.

The contractor is responsible for all costs associated with the correction of deficiencies, as determined by the engineer.

All dimensions to take precedence over scale shown on plans, sections, and details.

Engineering services presented on these drawings are for permanent structure only. The contractor is responsible for all temporary bracing required for structure stability and for construction loading until the project is completed.

Refer to architectural/building envelope consultant drawings for all specifications regarding water proofing/roof, exterior walls, below grade foundation walls, suspended slabs, etc.). Any special concrete mix designs required for water proofing is the responsibility of the materials consultant.

Architectural Design, Electrical, Mechanical, Civil, and Geotechnical Engineering are the responsibility of others.

All formwork, shoring for the excavation, and underpinning of adjacent structures, if required, is the responsibility of the contractor and shall be designed and inspected by others under current Worker's Compensation Board regulations.

The contractor is responsible for safety on the job site during construction and shall ensure compliance to current WorkSafe BC regulations.

See mechanical, electrical, and/or manufacturer's drawings for size, location, and anchor bolt requirements of all machine bases and holes in walls and floors. All design of machine and equipment bases responsibility of others, unless specifically detailed on formwork templates to furnish templates to general contractor showing anchor bolt location for equipment furnished by them. Co-ordinate with architectural, mechanical, and electrical drawings for openings, slopes, curbs, drainage, and waterproofing, etc.

In cases of discrepancies on structural drawings, the more stringent requirements shall govern.

The completed base structural components have been designed to Part 4/Part 9 of B.C. Building Code 2012.

Refer to additional notes regarding "Elements Designed By Others" for items not the direct responsibility of Kerkhoff Engineering.

#### Design Loads

This structure has been designed for the following superimposed, service loads:

Roof Snow	Live Loads(psf) Ss = 66.8 (3.2 kPa) Sr = 4.2 (0.2 kPa) Snow Drift as per plans	Dead Loads (psf) 37 (1.77kPa)
Main Floor	LL = 100 (4.8 kPa)	37 (1.70kPa)
Wind (g50)	8.4 (0.40 kPa)	
Seismic	Sa (0.2) = 0.11 Sa (0.5) = 0.08 Sa (1.0) = 0.053 Sa (2.0) = 0.034 PGA = 0.059	Rd = 1.5 Ro = 1.3 IE = 1.0

## ELEMENTS DESIGNED BY OTHERS

The architectural specifications require the review of a professional engineer for the structural capacity of all non-structural components. These components include interior & exterior steel cladding, glazing & windows frames, skylights, guardrails/handrails, and masonry veneer. The design of these components is the responsibility of the general contractor's subtrades professional engineers. All shop drawings for these items are to be sealed and signed by the professional engineer who is responsible for these items.

Canopies may be specified as steel or aluminum framed in accordance with architectural specifications. All canopies to be designed by canopy contractor, to resist code snow loads and wind loads. Sealed shop drawings shall be submitted for review prior to fabrication.

All shop drawings shall be submitted to Kerkhoff Engineering for review prior to fabrication. Shop drawings not bearing the seal of a Professional Engineer Registered in B.C. will not be reviewed. The sub-consultant shall submit schedules B & C-B upon satisfactory completion.

Kerkhoff Engineering has designed the base structure to support the intended load of the secondary elements assuming generally accepted construction practices. Adequate separation shall be provided between the base structure and secondary components so as not to provide additional rigidity to the primary structural resisting system. Expansion & deflection mechanisms shall be built into the structure, and shall be clearly shown on component drawings.

## FOUNDATIONS

Foundation design based on the following Geotechnical report provided by GeoNorth Engineering Ltd.

Soil bearing pressure	SLS = 3133 psf (150 kPa) ULS = 4700 psf (225 kPa)
Site Class	D

Prepare site for foundations in accordance with geotechnical report recommendations.

Copies of all field review reports and materials testing (compaction tests, etc.) shall be forwarded to Kerkhoff Engineer minimum 24hrs. prior to placement of concrete and/or backfilling.

Soil conditions to be inspected by the geotechnical engineer to verify the conditions and confirm the allowable bearing pressure after excavation and prior to construction of formwork for foundations. Site report and recommendations shall be forwarded to Structural Engineer.

Approval to pour concrete during an inspection does not imply assurance of assumed bearing capacity or subgrade conditions used in the structural design of footings and foundations for this project.

Bottom of footings to be minimum 18" below final finished grade for frost cover.

Footing elevations and sizes are subject to revision where site conditions differ from anticipated soil conditions. Where footings are stepped down for mechanical and electrical services (where allowances have not been provided for in the drawings), additional structural requirements may be required at the discretion of the engineer.

All footings to bear on firm, undisturbed material. Grass, roots, top soil, etc., are to be removed from foundation area.

Footings or slab-on-grade bearing on compacted, granular structural fill shall be compacted to a standard proctor as outlined in the geotechnical engineer's report. Standard proctor value to be verified by compaction testing and results to be submitted to the engineer.

All footings shall be centred below walls and columns unless detailed otherwise. Dowels to match vertical bars.

Backfilled walls only after a minimum of 7 days following the completion of interior level floor system (unless walls are adequately braced) with clean, free-draining, moderately compacted, granular material or as specified by the geotechnical engineer and slope grade to drain away from building.

Coordinate with architectural and other consultants' drawings for ground elevations, openings, drainage slopes, waterproofing, etc.

Inspection of foundation drainage, waterproofing, excavation and shoring is the responsibility of others.

## CONCRETE EMBEDMENTS

Install conduits and ducts embedded in concrete in accordance with the following guidelines except with the approval of the Structural Engineer.

- Conduits
  - Locate between reinforcing steel layers.
  - Maximum size in one layer to be 1/3 of the concrete slab thickness.
  - Maximum size in two layers crossing to be 1/4 of the slab thickness.
  - Crossing of three layers will not be permitted.
  - Clear space between parallel conduits shall be one diameter or 1 1/2" minimum horizontally and vertically.
- Ducts
  - Locate between reinforcing steel layers.
  - Maximum size to be 1/3 of the slab thickness.
  - Crossing of ducts will not be permitted.
  - Clear space between parallel conduits shall be 12".
- Columns
  - The maximum size of conduit or fittings not to exceed 4 percent of the column area. Embedded piping will not be allowed unless approved by Engineer.
- Beams
  - The maximum size of conduit not to exceed 4 percent of the area. Sleeves and embedded piping as directed by Engineer.

Co-ordinate with architectural and mechanical drawings for openings, curbs, sleeves, waterproofing, etc.

The contractor shall provide 1000 pounds of 15M steel reinforcement for the engineer to use at his discretion during construction. The contractor shall reimburse the owner for the unused portion.

## CONCRETE

Provide concrete and perform work to CAN/CSA A23-1.4. Provide copy of standard at site for reference.

The contractor shall arrange for the taking and testing of concrete cylinders by an independent testing agency in accordance with CAN/CSA A23-1.4. A minimum of 3 test cylinders shall be cast for each 100 c.m. (minimum 3 test cylinders for each day's pour), and each class of concrete. Test 1 cylinder at 7 days and 2 cylinders at 28 days. One cylinder shall be field cured and tested at 7 days. Copies of all concrete test results to be sent to the structural engineer.

#### CONCRETE MIX REQUIREMENTS

LOCATION	COMPRESSIVE STRENGTH	SLUMP +/- 19 mm (3/4")	MAX AGG. SIZE	AIR	EXP CLASS
Foundation & footings	3600 PSI (25MPa)	19 mm (3/4")	3/4"	4-7%	F2
Intr Columns & Walls	3600 PSI (25MPa)	19 mm (3/4")	3/4"	1-4%	F2
Extr Columns & Walls	3600 PSI (25MPa)	19 mm (3/4")	3/4"	4-7%	F2
Intr S.O.G. General	4350 PSI (30MPa)	19 mm (3/4")	3/4"	1-4%	—
Tilt	4350 PSI (30MPa)	19 mm (3/4")	3/4"	4-7%	F2

All concrete normal weight 2400 kg/m3, type 50 sulphate resistance cement, type F flyash, unless otherwise noted.

Slumps noted are before the addition of superplasticizer.

No more than 120 minutes shall elapse between concrete batching and concrete placement unless approved by the testing agency and the structural engineer. Contractor's superintendent to monitor this period. Testing agency has the authority to reject concrete if not in accordance with specifications.

Do not use admixtures other than air entrainment and standard water reducers or superplasticizers.

Maximum chloride as to CAN/CSA-A23-1.4. Concrete temperatures as delivered shall comply with Table 14 of CAN/CSA-A23-1.4.

Provide storage facility on site for the initial 24 hour curing of test cylinders.

The contractor shall be responsible for design of all formwork. Forms shall be built of sufficient strength and rigidity to carry the weight or fluid pressure of the concrete and additionally all construction loads including those due to wind, equipment, and runways. The forms shall be clean and free of any accumulation of debris. All water shall be removed from the place of concrete deposit.

Provide 19 mm (3/4") chamfer on all exposed column corners. Unless noted otherwise, slabs and beams shall be cambered 3 mm (1/8") for each 2400 mm (8'-0") of span.

Compact concrete throughout with mechanical vibrators. Work concrete around all embedded material and into corners of forms. Embedded material shall be free from grease, scale and other coatings.

All hot and cold weather concrete work to be carried out in accordance with CAN/CSA-A23-1.4. When temperature is expected to fall below 0 degrees Celsius within 3 days of pouring concrete, the Contractor shall notify the Engineer of the following:

- Provisions for heating fresh concrete
- Provisions for heating concrete in forms
- Alterations to mix design
- Provisions for curing

Concrete shall be protected from all harmful effects during construction. Concrete shall be cured by approved means for at least 5 days subsequent to pour.

#### Cold Weather Requirements:

- Place and protect concrete in accordance with CAN/CSA-A23-1:2000.
- Air Temperature not below 5 degrees Celsius
  - If concrete temperature drops below 10 degrees C at point of pouring, the mixing water shall be heated to maintain a minimum concrete temperature of 10 degrees C. Concrete shall not be placed on or against any surface which is at a temperature less than 5 degrees C.
  - Concrete shall be prepared to cover slab if air temperature falls below 5 degrees C
  - Air Temperature below 5 degrees C but not below 0 degrees C
    - Forms and steel shall be free from ice and snow.
    - Mixing water shall be heated to give to a minimum concrete temperature of 10 degrees C at point of pour.
    - Concrete shall not be placed on or against any surface which is at a temperature less than 5 degrees C.
    - Slabs shall be covered with canvas or similar, keep a few inches clear of surface.
    - Store below slab shall be enclosed.
    - Protection shall be maintained for at least 5 days.
  - Temperatures below 0 degrees C (See Item II above for a, b, c, d.)
    - Storey below shall be enclosed and supplementary heat provided.
    - Heating to be started at least one hour ahead of pouring and maintained for a minimum of 3 days after.
    - Temperature of the concrete at all surfaces shall be kept at 10 degrees C for 7 days.
    - Enclosure to be constructed so that air can circulate around all structural members.

#### Hot Weather Requirements

- Place and protect concrete in accordance with CAN/CSA-A23-1:2000. When air temperature is greater than 25 degrees C, protect concrete so that its temperature does not exceed 30 degrees C.
- Protect from drying, which causes shrinkage cracking, by effective means as required by conditions. Effective measures include windshield, dampen, cover, place and finish at night.

Do not remove forms for footings and walls until a minimum of 48 hours after placing concrete and after the concrete has attained a strength of at least 10 MPa. Forms for suspended slabs may be removed and restoring installed after the concrete has attained at least 75% of the specified strength. Strength of concrete at time of stripping forms to be determined by testing field cured concrete cylinders.

Recess walls to full width of where required to support beams.

Construction joints to be keyed and dowelled. Joints below grade to have continuous 150 mm (6") P.V.C. "RB6-316" waterstop. The location of construction joints shall be approved by the engineer and additional reinforcement and keys added as requested.

All concrete slabs on grade shall be placed on 6 mil polyethylene lapped 300 mm (12") on 150 mm (6") minimum approved granular material conforming to geotechnical engineer's recommendations (minimum 85% standard proctor density). Provide 3 mm (1/8") by 32 mm (1 1/4") DP, perforated or sawcut joint around columns and at 6000 mm (20'-0") o/c maximum spacing.

Openings in slabs to be as far away as possible from columns. No openings or cans for pipes in any case to be closer than 400 mm (16") to face of column without prior approval from the engineer. Reinforcing at openings shall not be cut or bent but shall be fanned where necessary or crowded to either side to clear opening.

#### REINFORCING REQUIREMENTS

Use clean new deformed reinforcing bars conforming to CSA G30.18, grade 400A unless noted. Welded wire fabrics to CSA G30.5. At the engineer's discretion, rebar mill certificates shall be provided. Reinforcement that is suspect may be required to be tested as directed by the engineer at the expense of the contractor.

Fabricate and place reinforcing steel to CAN/CSA-A23-1.14.

All reinforcing steel to be secured in final position before concrete is placed. Support reinforcing steel on approved supports, spacers, or hangers provided. Maximum free end of reinforcing bars to be 1200 mm (4'-0"). Where concrete surfaces are to be exposed, only non-corrosive type reinforcing chains shall be used to support reinforcing. Reinforcing steel must be inspected by the Engineer before concrete is placed. Formwork shall be inspected by Temporary Works Engineer and copies of report to be forwarded to Kerkhoff Engineering Ltd.

Any reinforcing substitutions to welded wire mesh must be reviewed and confirmed by Kerkhoff Engineering Ltd.

Clear concrete cover for reinforcing (unless otherwise noted):

Footings (Top and sides) .....	50 mm (2")
(Bottom) .....	75 mm (3")
Walls inside face .....	25 mm (1")
Walls outside face and exposed surfaces .....	50 mm (2")
Beams to stirrups .....	32 mm (1 1/2")
Column to ties .....	32 mm (1 1/2")
Slabs top and bottom .....	19 mm (3/4")

#### Designation of reinforcing bars:

———— (solid line) denotes top steel or near face of wall

----- (dashed line) denotes bottom steel or far face of wall

Straight bar lengths: 4-15M bars 5000 long (metric)  
4-15M 10.9 meters 4-15M bars 10'-9" long (imperial)

Splice Reinforcement as follows (unless otherwise noted):

Bar Size	Comp Splice	Tension Splice Concrete Strength
10M	450 mm (18")	20MPa
15M	475 mm (19")	25MPa
20M	575 mm (23")	30MPa
25M	725 mm (29")	35MPa
30M	875 mm (35")	40MPa
35M	1050 mm (42")	45MPa

Welded wire mesh ----- 2100 mm (12").

No splices are permitted without the engineer's approval where the length of bars has been given on the drawings.

All slabs to have temperature steel perpendicular to and immediately above slab bottom reinforcing as follows:

greater than 150mm-180 mm (6"-7") slab	10M @ 300 mm (12") o/c 15M @ 500 mm (20") o/c
greater than 180 mm-200 mm (7"-8") slab	10M @ 10" o/c 15M @ 500 mm (20") o/c
greater than 200 mm-230 mm (8"-9") slab	10M @ 430 mm (17") o/c
greater than 230 mm-250 mm (9"-10") slab	15M @ 380 mm (15") o/c
greater than 250 mm-280 mm (10"-11") slab	15M @ 350 mm (14") o/c
greater than 280 mm-300 mm (11"-12") slab	15M @ 300 mm (12") o/c

Temperature reinforcement shall have a lap of 18" and splices in adjacent bars shall be staggered to be no less than 1200 mm (4'-0") apart.

All concrete to be reinforced. Reinforce unsuspended slabs with 15M @ 450 mm (18") o/c each way bottom. Minimum wall reinforcing (including planters, steps, pits, trenches, architectural walls, etc.) unless noted otherwise:

150 mm (6") wall	10M @ 450 mm (18") E.W.
200 mm (8") wall	15M @ 500 mm (20") E.W.
250 mm (10") wall	15M @ 400 mm (16") E.W.
300 mm (12") wall	15M @ 500 mm (20") E.W. E.F.

Cross-lap strip footing steel 300 mm (12") minimum at corners or provide corner bars.

All walls and columns shall be dowelled into footings, walls, beams, or slabs with bars of the same size and spacing as the bars above the construction. The contractor shall ensure that the substituted product is capable of achieving the performance values of the specified product. Substitutions will be evaluated by their having an ic

- Corner bars to match horizontal wall reinforcement at all wall intersections.
- Two 15M bars at ends of walls.
- Two 15M bars at all free edges of suspended slab.
- Two 15M bars around all wall and slab openings extending 600 mm (2'-0") past corners, plus 2-15M by 1200 mm (4'-0") diagonal bars at corners and placed at center of wall or slab.

Install column reinforcement accurately with templates.

Hooks shown are to be CSA standard hooks, unless otherwise noted.

Unless shown otherwise:

- Top reinforcing in slabband to be centered over columns.
- Top slab reinforcing to be centered over slabband.
- Bottom reinforcing to be centered between supports except at end spans where all bars shall extend a minimum of 150 mm (6") into exterior supports.

## PLYWOOD & SAWN TIMBER

Plywood sheathing (Roof, Floor, Walls) Structural or approved equal.	Grade	Thickness (Min)
Roof	D Fir	13 mm (1/2") * H" clips
Floor	D	16 mm (5/8") T&G
Walls	OSB (structural)	10 mm (3/8")

All D Fir plywood shall conform to requirements of CSA Standard 0121, and softwood to CSA Standard 0151. Design rated OSB shall conform to CSA Standard 0437

All wall and roof sheathing material and thickness to be confirmed satisfactory for architectural, building envelope, and warranty requirements prior to pricing or construction. All thicknesses/grades specified on structural drawings are minimum requirements.

Equivalent panel marks for CSA 0325 construction sheathing	Minimum nominal thickness (mm)	Minimum panel mark
10	2R24	
13	2R32/2F16 or 1F16	
16	2R40/2F20	

Provide a minimum gap of 2mm shall be left between panels to accommodate swelling.

Minimum nailing of plywood sheathing on walls, roofs and floors (unless noted otherwise on plans):  
60 mm (2 1/2") nails @ 150 mm (6") o/c at all perimeter edges  
63 mm (2 1/2") nails @ 300 mm (12") o/c intermediate support members  
(Staples are not permitted u.o.o.)

Sawn timber to be SPF #2 or better u.o.o.

All sawn timber exposed to the exterior or in contact with concrete to be given a preservative treatment approved by the designer. (This treatment to be a minimum of 2 coats of green cuprinol or equivalent).

Building Movements: Although attempts of specifying and designing with all structural wood components to be 19% or less in moisture content, wood will dry up to 9% in services. Under these circumstances, wood will shrink. Also under load conditions, structural elements will deflect. Although within the allowable limits as outline in the Building Code, the movements induced by loads or shrinkage will cause brittle finishes attached directly to structural elements. Movement joints including water proofing for these brittle finishes shall be provided by a building envelope specialist.

Any lumber not grade marked will be rejected.

## PRE-FABRICATED WOOD TRUSSES/JOISTS

Design prefabricated wood trusses in accordance with B.C. Building Code 2012 Part 4, CSA 086, TPIC standards, and Local Bylaws. Design trusses for unbalanced loading in accordance with B.C.B.C Structural Engineers Association of BC.

Prefabricated wood trusses and built-up areas on wood trusses not detailed on structural drawings, joists, and/or beams to be engineered by manufacturer to design loads specified plus snow build up as per B.C.B.C. 2012

See General notes for design load requirements.

In addition, the Truss manufacturer shall design trusses for:  
Live load deflections shall not exceed span/260 for roof trusses u.o.o.  
All canopy areas to be designed for a minimum net uplift pressure of 0.96 kPa (20 psf).

Truss tie-down clips to be provided at ends of all roof trusses as spec'd by Engineer. Minimum H2.5A (SST) tie down unless noted on structural drawings.

Manufacturer is responsible for design and supply of all bridging, blocking accessories, and metal connection hardware required for stability of the truss or joist assembly, including details for bearing, where required. Truss bearing lengths exceed those given on the structural drawings.

Submit 2 sets of shop drawings and layout drawings to engineer for review minimum 10 working days prior to fabrication and start of any framing. Drawings must include:

- Project name and location.
- Design loads and all applicable details.

Truss/joist layout cross referenced to individual shop drawings.  
Professional Engineer's original seal registered in B.C.

Changes to truss/joist types and layouts to those indicated on drawings may require additional review and structural revisions at the expense of the contractor.

The manufacturer shall inspect the truss/joist installation and provide sealed engineer's certificate, certifying that the trusses and joists have been manufactured in accordance with the truss design and CSA standards and that all bracing, hangers, lintel and applicable details have been installed as per approved shop drawings.

## GLUE LAMINATED TIMBER (GLULAM)

Glulam members shall be Douglas Fir 24F-E stress grade with quality appearance grade. Industrial appearance grade may be used where beams are to be concealed

Glulam shall be manufactured in conformance with CAN/CSA 0177

Camber simple span beams 10 mm (3/8") per 3000 mm (10'-0") span

Affix authorized label to all members supplied. Also identify each member with mark number.

Store glulam off the ground with spacer blocks placed between members. Keep wrapping on the members until permanent protection from the weather is in place, but cut holes on underside of wrapping to prevent the accumulation of condensation

All pressure treated glulam to be treated according to CAN/CSA 080 Series M-89 "Wood Preservation". Treat using VAC Vacuum Pressure impregnation to be 0.4 psi or to refusal. All cutting and drilling to be completed before the treatment. Field apply preservative to equivalent standard to all areas to be cut or drilled.

## GENERAL NOTES FOR POST-INSTALLED ANCHORS

- Except where indicated on the drawings, post-installed anchors shall consist of the following anchor types as provided by hilti, inc. Contact hilti at (800) 879-8000 for product related questions.
  - Anchorage to concrete**
    - Adhesive anchors for cracked and uncracked concrete use:
      - HILTI HIT-HY 200 safe set system with hilti hitz rod per icc esr-3187
      - HILTI HIT-HY 200 safe set system with hilti hollow drill bit (te-cd or te-yd) and vc 2040 vacuum (vc 20+ or vc 40+)
    - Adhesive anchors for cracked and uncracked concrete use:
      - HILTI HIT-RE 500V3 safe set system with hilti hollow drill bit (te-cd or te-yd) and vc 2040 vacuum (vc 20+ or vc 40+)
      - HILTI hit-re 500v3 safe set system with hilti roughening tool (hit tr) with has-e threaded rod per icc esr-3814 for diamond cored holes
    - Medium duty mechanical anchors for cracked and uncracked concrete use:
      - HILTI KWIK HUS EZ and KWIK HUS EZ-I screw anchors per icc esr-3187
      - HILTI KWIK BOLT-TZ expansion anchors per icc esr-1917
      - HILTI KWIK BOLT-3 expansion anchors (uncracked concrete only) per icc esr-2302
    - Heavy duty mechanical anchors for cracked and uncracked concrete use:
      - HILTI HDA undercut anchors per icc esr 1546
      - HILTI HSL-3 expansion anchors per icc esr 1545
  - Rebar doweling into concrete**
    - Adhesive anchors for cracked and uncracked concrete use:
      - HILTI HIT-HY 200 safe set system with hilti hollow drill bit (te-cd or te-yd) and vc 2040 vacuum (vc 20+ or vc 40+)
      - HILTI HIT-HY 500V3 safe set system with hilti hollow drill bit (te-cd or te-yd) and vc 2040 vacuum (vc 20+ or vc 40+)
      - HILTI HIT-RE 500V3 safe set system with hilti roughening tool (hit tr) with continuously deformed rebar per icc esr-3814 in diamond cored holes
    - Adhesive anchors use:
      - HILTI HIT-HY 70 masonry adhesive anchoring system (icc pending)
    - Steel anchor element shall be hilti has-e continuously threaded rod or continuously deformed steel rebar
  - Mechanical anchors use:**
    - HILTI KWIK BOLT-3 expansion anchors per icc esr 1385
  - Anchorage to hollow / multi-wythe masonry**
    - Adhesive anchors use:
      - HILTI HIT-HY 70 masonry adhesive anchoring system per icc esr-3342
    - Steel anchor element shall be hilti has-e continuously threaded rod or continuously deformed steel rebar
    - The appropriate size screen tube shall be used per adhesive manufacturer's recommendation

- Anchor capacity used in design shall be based on the technical data published by hilti or such other method as approved by the structural engineer of record. Substitution requests for alternate products must be approved in writing by the structural engineer of record prior to use. Contractor shall provide the technical data showing that the substituted product is capable of achieving the performance values of the specified product. Substitutions will be evaluated by their having an icc esr showing compliance with the relevant building code for seismic uses, load resistance, installation category, and availability of comprehensive installation instructions. Adhesive anchor evaluation will also consider creep, in-service temperature and installation temperature.
- Install anchors per the manufacturer instructions, as included in the anchor packaging.
- Overhead adhesive anchors must be installed using the hilti proli system.
- The contractor shall arrange an anchor manufacturer's representative to provide onsite installation training for all of their anchoring products specified. The structural engineer of record must receive documented confirmation that all of the contractor's personnel who install anchors are trained prior to the commencement of installing anchors.
- Anchor capacity is dependent upon spacing between adjacent anchors and proximity of anchors to edge of concrete. Install anchors in accordance with spacing and edge clearances indicated on the drawings.
- Existing reinforcing bars in the concrete structure may conflict with specific anchor locations. Unless noted on the drawings that the bars can be cut, the contractor shall review the existing structural drawings and shall undertake to locate the position of the reinforcing bars at the locations of the concrete anchors, by hilti ferroscan, gpr, x-ray, chipping or other means.

## FRAMING

All timber work shall conform to the requirements of CAN/CSA 086-14.



STRUCTURAL FOUNDATION LEGEND

SF\_ STRIP FOOTING TAG (SEE SCHEDULE)

PF\_ PAD FOOTING TAG (SEE SCHEDULE)

TOP OF SPOT ELEVATION

RWL RAIN WATER LEADER

1 DETAIL NUMBER

S1.1 SHEET NO. WHERE SECTION IS LOCATED

EXTEND (AREA) OF DETAIL

1 SECTION NUMBER

S1.1 DIRECTION OF SECTION

SHEET NO. WHERE SECTION IS LOCATED

LINE WHERE SECTION IS CUT

EXTEND (END) OF SECTION

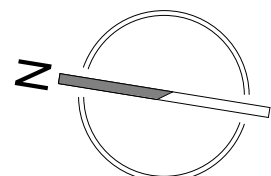
REV.	DATE	DESCRIPTION
1	2017/01/30	ISSUED FOR COORDINATION - 30%
2	2017/02/17	ISSUED FOR COORDINATION - 60%
3	2017/03/17	ISSUED FOR COORDINATION - 90%
4	2017/04/11	ISSUED FOR TENDER
5	2017/05/04	ISSUED FOR BUILDING PERMIT
6	2017/08/09	ISSUED FOR CONSTRUCTION

The contractor shall verify and accept responsibility for all dimensions. Do NOT scale the drawing. All errors or omissions shall be reported without delay to Moore Wilson Architects Inc.

CONSULTANT

**kerkhoff**  
Engineering Ltd.

#101 - 5622 VEDDER RD.  
CHILLIWACK, BC V2R 3N1



SEAL

**SMITHERS  
AIRPORT**

6421 AIRPORT ROAD, SMITHERS, BC



DRAWN BY KN  
CHECKED TK

P: 604-558-3730  
E: info@kerkhoffeng.ca  
W: kerkhoffeng.ca

SCALE AS NOTED DATE 2017/08/09  
FILE NAME

ISSUED FOR CONSTRUCTION

ISSUED FOR TENDER

ISSUED FOR BUILDING PERMIT

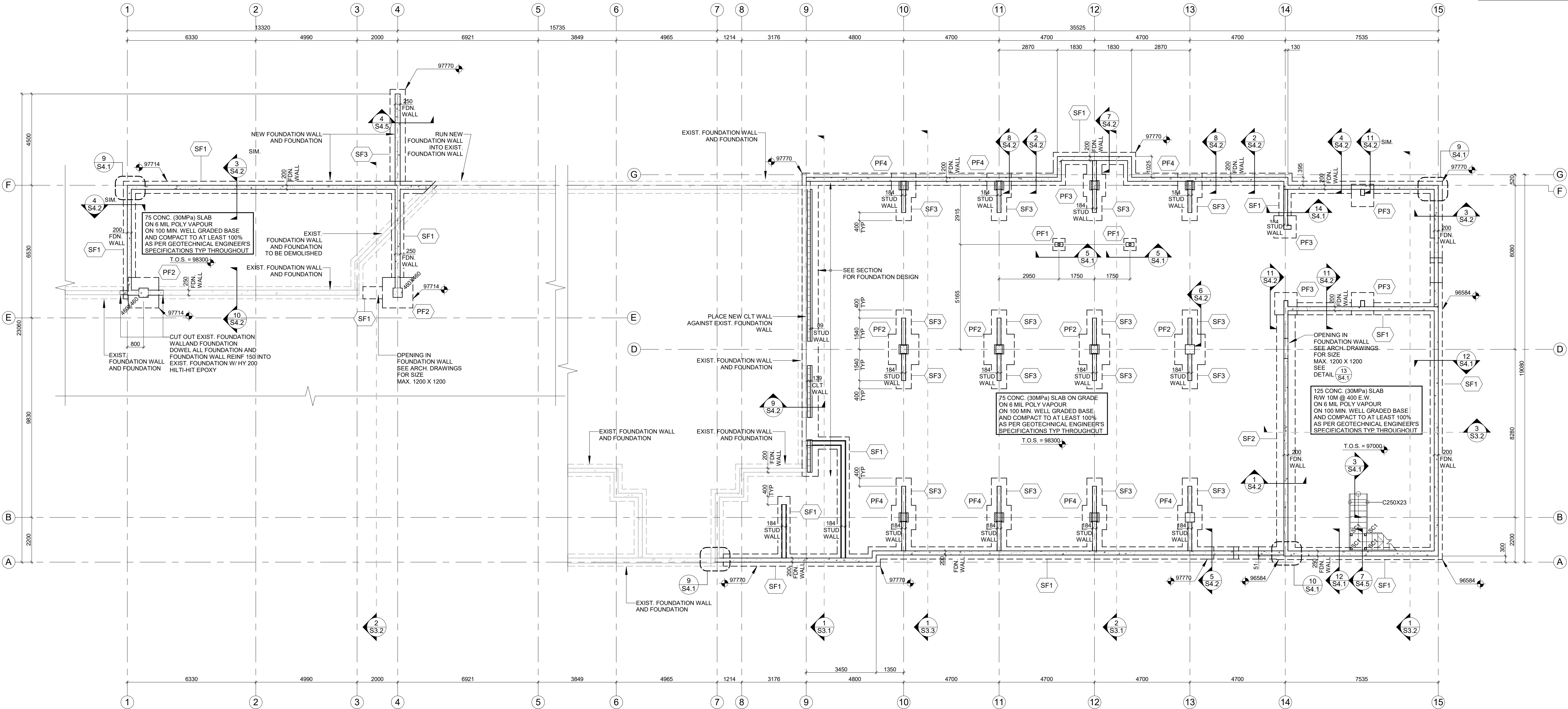
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**FOUNDATION PLAN**

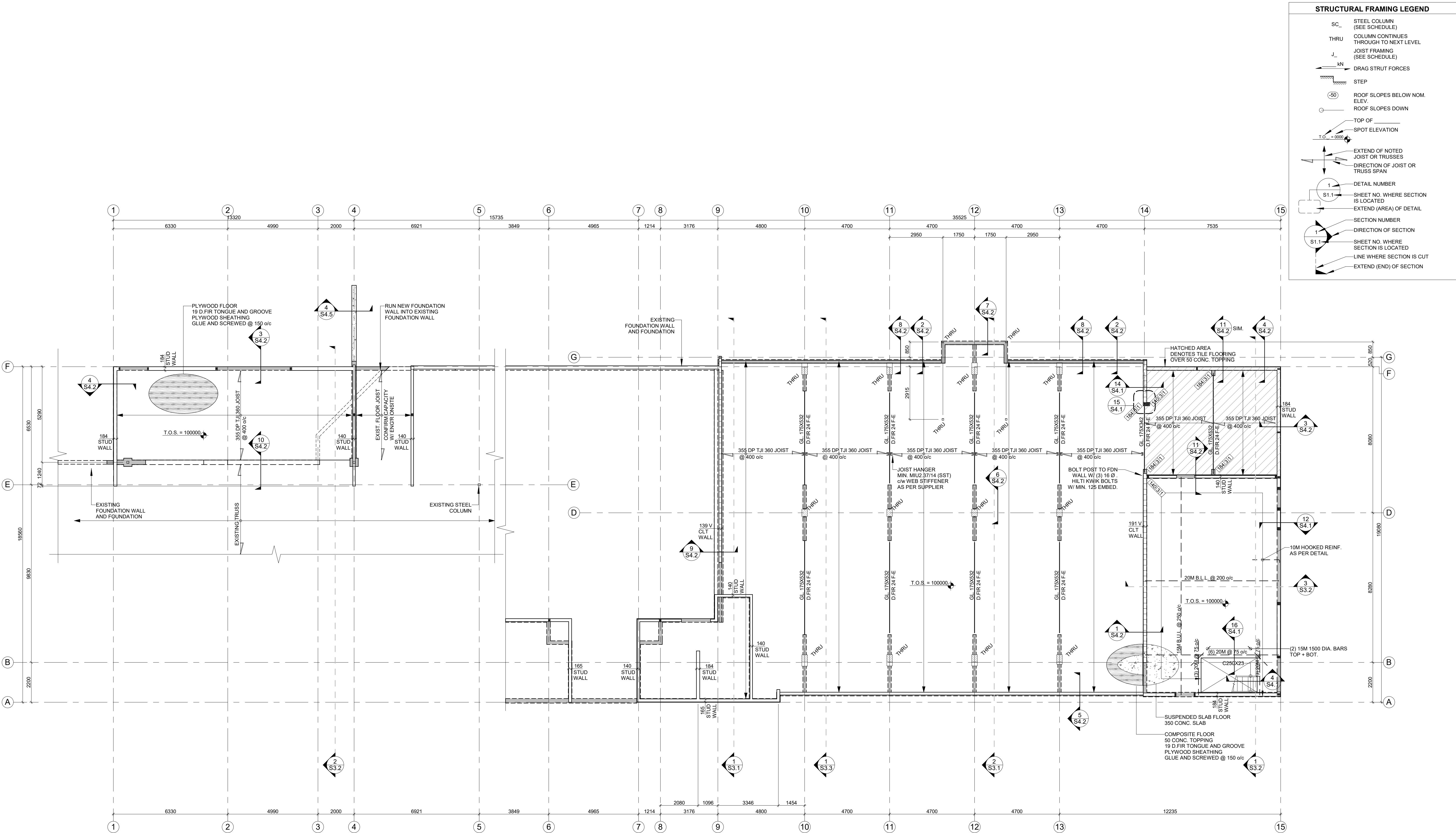
PROJECT SHEET

**16-107 S2.1**

REVISION No. 6

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1 LEVEL 1 FRAMING PLAN  
S2.2 1 : 100

**STRUCTURAL FRAMING LEGEND**

- SC. STEEL COLUMN (SEE SCHEDULE)
- THRU COLUMN CONTINUES THROUGH TO NEXT LEVEL
- J. JOIST FRAMING (SEE SCHEDULE)
- KN DRAG STRUT FORCES
- STEP
- 50 ROOF SLOPES BELOW NOM. ELEV.
- ROOF SLOPES DOWN
- TOP OF SPOT ELEVATION
- T.O. = 10000
- EXTEND OF NOTED JOIST OR TRUSSES
- DIRECTION OF JOIST OR TRUSS SPAN
- 1 DETAIL NUMBER
- S1.1 SHEET NO. WHERE SECTION IS LOCATED
- EXTEND (AREA) OF DETAIL
- SECTION NUMBER
- 1 DIRECTION OF SECTION
- S1.1 SHEET NO. WHERE SECTION IS LOCATED
- LINE WHERE SECTION IS CUT
- EXTEND (END) OF SECTION

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3	2017/03/17	ISSUED FOR COORDINATION - 90%
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5	2017/05/04	ISSUED FOR BUILDING PERMIT
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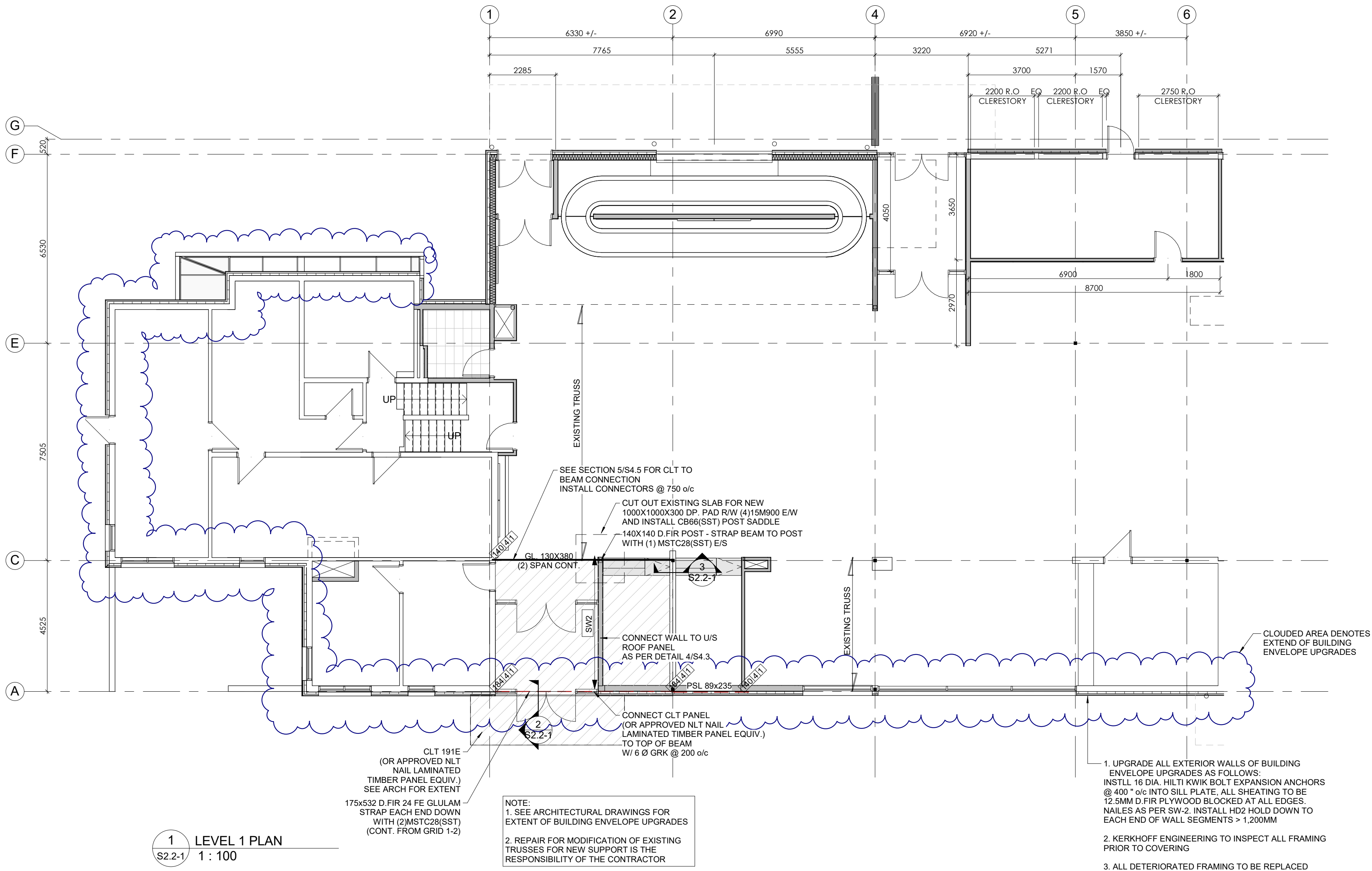
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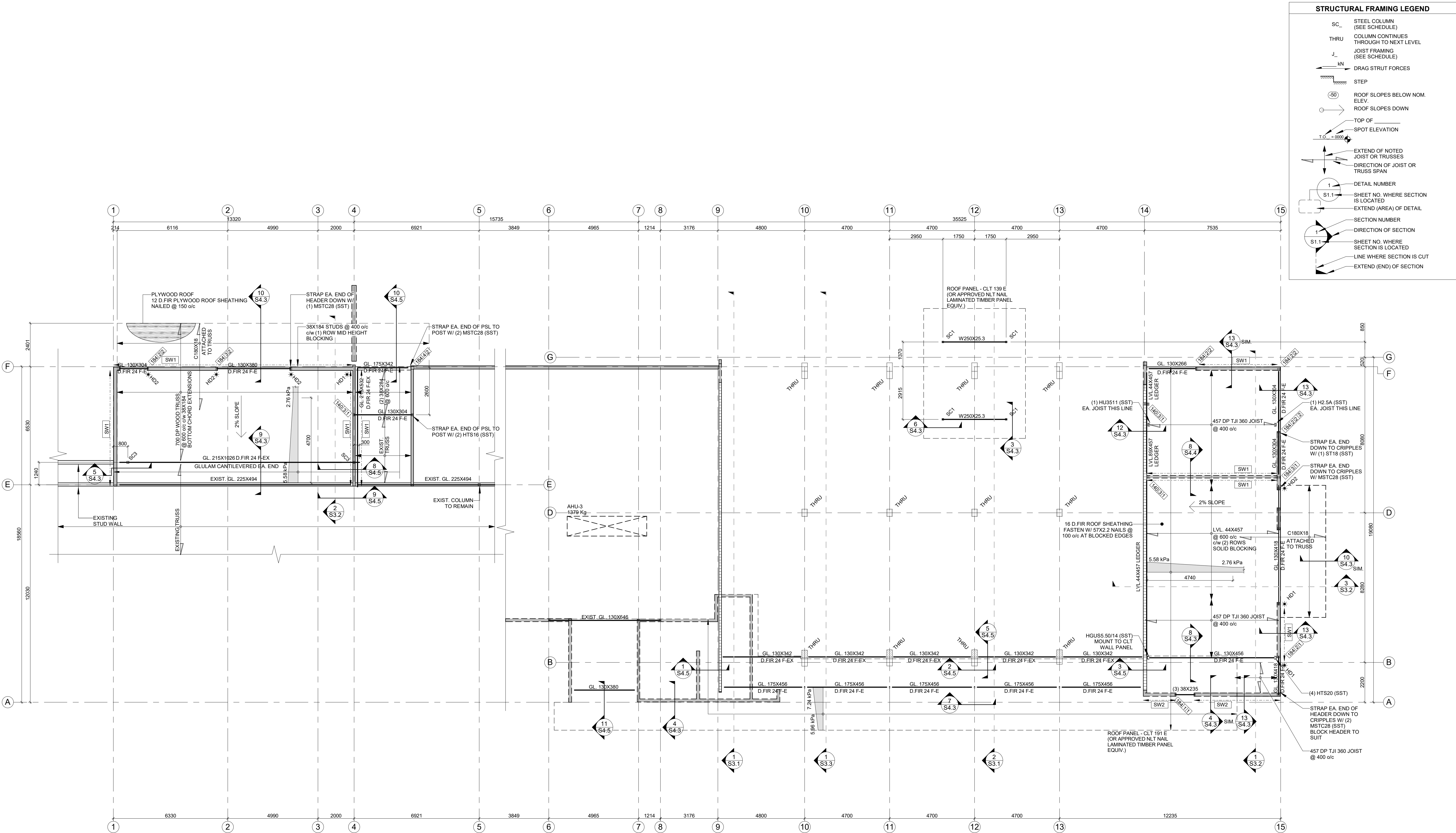
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<b>LEVEL 1 FRAMING PLAN</b>		
PROJECT		SHEET
<b>16-107</b>		<b>S2.2</b>
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**STRUCTURAL FRAMING LEGEND**

- SC - STEEL COLUMN (SEE SCHEDULE)
- THRU - COLUMN CONTINUES THROUGH TO NEXT LEVEL
- J - JOIST FRAMING (SEE SCHEDULE)
- KN - DRAG STRUT FORCES
- STEP
- ROOF SLOPES BELOW NOM. ELEV.
- ROOF SLOPES DOWN
- TOP OF
- SPOT ELEVATION
- EXTEND OF NOTED JOIST OR TRUSSES
- DIRECTION OF JOIST OR TRUSS SPAN
- DETAIL NUMBER
- SHEET NO. WHERE SECTION IS LOCATED
- EXTEND (AREA) OF DETAIL
- SECTION NUMBER
- DIRECTION OF SECTION
- SHEET NO. WHERE SECTION IS LOCATED
- LINE WHERE SECTION IS CUT
- EXTEND (END) OF SECTION

1 LOW ROOF FRAMING PLAN  
1 : 100

SHEARWALL SCHEDULE						
MARK	PLYWOOD	BLOCKING	NAILS	NAILING		ANCHOR BOLTS
				EDGE	INTERMEDIATE	
SW1	13 D.FIR	SOLID	57X2.52 Ø	100	150	22 Ø
SW2	13 D.FIR	SOLID	57X2.52 Ø	75	100	16 Ø

HOLD DOWN SCHEDULE				
MARK	SST TYPE	Ø	ANCHOR BOLTS	
			GRADE	EMBED.
HD1	H06 (SST)	22 Ø	B7	300
HD2	H04 (SST)	16 Ø	B7	300

STRUCTURAL COLUMN SCHEDULE		
MARK	TYPE	COMMENTS
SC1	HSS102X102X6.4	SEE DETAIL FOR BASE PLATE
SC3	HSS127X127X6.4	BASE PLATE TYPE 1

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**LOW ROOF FRAMING PLAN**

PROJECT SHEET

16-107 S2.3

REVISION No. 7

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Cross Laminated Timber General Notes

All Cross Laminated Timber (CLT) Panels as shown on structural drawings are to be supplied by Structurlam wood products.  
Alternative equivalent products are allowed, and supplier is to incur all costs of redesign. All panels are to support snow, wind and dead loads as noted. Design specifications for alternative products to be forwarded to Kerkhoff Engineering.

Unsolicited alternative proposals, and unsolicited substitutions of materials, structure, connections or otherwise, must be submitted with sketches and calculations sealed by a Professional Engineer registered in the Province/State of British Columbia and will require review by the consultants. Detailed reviews such as these, including changes to construction drawings and coordination, will be undertaken on an additional fee basis, at the Contractor's cost. This cost must be included in the proposal by the Contractor. Such review does not guarantee acceptance of the unsolicited alternative proposal(s).

CLT panels shall meet the following standards

- A. CAN/CSA O122-06, ANSI D3737-07 Structural Glued Laminated Timber.  
B. CSA C88-14, Engineering Design in Wood, including Annex B.  
C. CSA O112 SERIES-M1977 (R2008), CSA Standards for Wood Adhesives.  
D. CSA O177-16, Qualification Code for Manufacturers of Structural Glued Laminated Timber.  
E. APA Standard for Performance Rated CLT ANSI/APA PRG 320/2012

The general contractor is responsible for ensuring all product handling and construction site safety is in conformance with Worksafe BC guidelines.

Shop Drawings - Clearly indicate stress grade, service grade, appearance grade, connection details, shop applied finishes, shop and erection details, including cuts, holes, fastenings, camber and connection hardware.

Submit PDF shop drawings showing all applicable details and material specifications to the Engineer for review prior to fabrication. Shop drawings shall be accompanied by a certificate of conformance to manufacturing standard.

Cross Laminated Timber (CLT) manufacturer certified by CSA Administrative Board, Structure Glued Laminated Timber Division in accordance with CAN/CSA O177- to manufacture:

1. Class 1 interior softwood glued laminated members.  
2. Class X extenor softwood glued laminated members.

Submit certificate in accordance with CAN/CSA O177.

Storage and Protection

- Sit underside of membrane covering during storage at site. Do not deface members.  
Store CLT panels, blocked off ground and separated with striping, so air may circulate around all faces of members.  
Cover top and sides with opaque moisture resistant membrane if outside.  
Maintain protection of CLT panels during construction.

Materials

Laminating Stock for Cross Laminated Timber (CLT) panels: Spruce Pine #1/2 to CSA- 0122 - 06 or CSA 086 - 09. Underside of all roof panels to be D-Fir grade. See Architectural Division 6 specifications for finishing requirements.

Adhesives: To CSA 0112-10, and Sections 2.1.3 and 3.3 (ASTM D7247 heat durability) of AITC 405.  
Acceptable Product: Purbond HB E452 (or approved equivalent).

Fabrication

Fabricate Cross Laminated Timber (CLT) panels in accordance with ANSI/APA PRG 320/2012 except where specified otherwise and to following classifications. Use multiple layers of 19mm minimum to 38mm maximum thick laminations. Exceptions only with written consent of the Consultant.

CLT grade: as indicated on drawings and referenced by APA/PRG 320 and APA PR-L314C.

Appearance Classification:

Exposed – where panels are in view in final construction. Exposed face to utilize "J" grade SPF Lumber, or L3 & Btr D, fir.

- Shake and checks allowed up to 610mm long, none through
- Up to a maximum of 5% Blue stain allowed, heart stain permitted.
- Knots – firm and tight (NLGA #2)
- Pitch streaks not limited
- Wane on face not permitted
- Side pressure on exposed faces required

Erection

Erect CLT panels in accordance with final reviewed shop drawings.

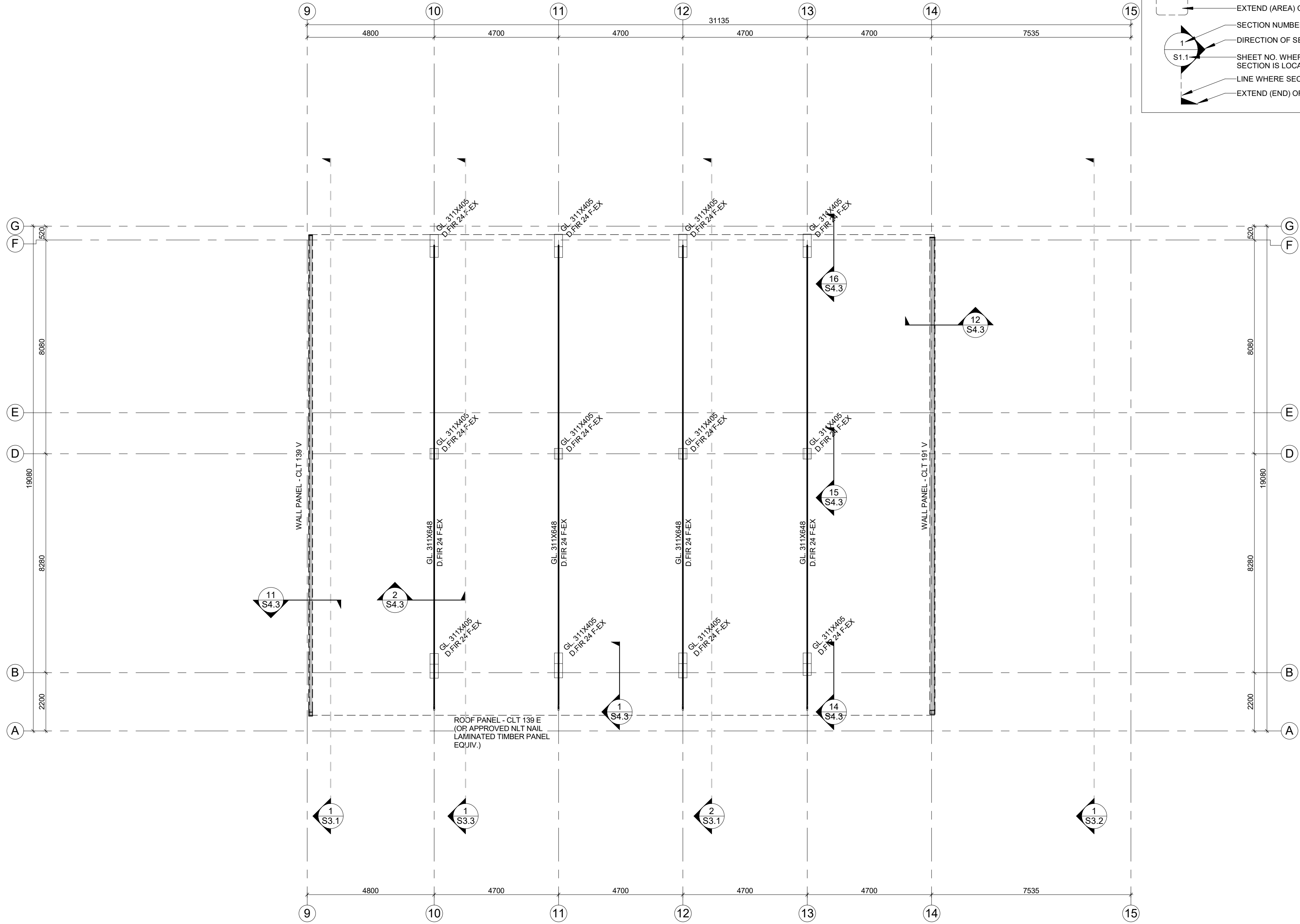
Make adequate provision for possible erection stresses. Set panels level and plumb to correct positions. Securely brace panels and anchor in place to maintain plumb until permanently secured by finished structure.

Fit CLT panels closely and accurately, without trimming, cutting or other modifications, unless approved in writing by Engineer.

Site cutting or boring of CLT panels, other than shown on shop drawings not permitted without written consent of Engineer.

2 CLT SPECIFICATIONS

S2.4 1 : 25



1 HIGH ROOF FRAMING PLAN

S2.4 1 : 100

STRUCTURAL FRAMING LEGEND

- SC STEEL COLUMN (SEE SCHEDULE)  
THRU COLUMN CONTINUES THROUGH TO NEXT LEVEL  
J JOIST FRAMING (SEE SCHEDULE)  
KN DRAG STRUT FORCES  
STEP  
(-50) ROOF SLOPES BELOW NOM. ELEV.  
ROOF SLOPES DOWN  
TOP OF SPOT ELEVATION  
T.O. = 0000  
EXTEND OF NOTED JOIST OR TRUSSES  
DIRECTION OF JOIST OR TRUSS SPAN  
DETAIL NUMBER  
S1.1 SHEET NO. WHERE SECTION IS LOCATED  
EXTEND (AREA) OF DETAIL  
SECTION NUMBER  
DIRECTION OF SECTION  
S1.1 SHEET NO. WHERE SECTION IS LOCATED  
LINE WHERE SECTION IS CUT  
EXTEND (END) OF SECTION

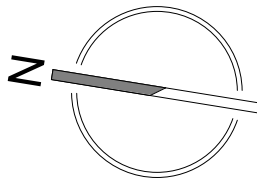
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**PLAN**

PROJECT SHEET

**16-107** **S2.4**

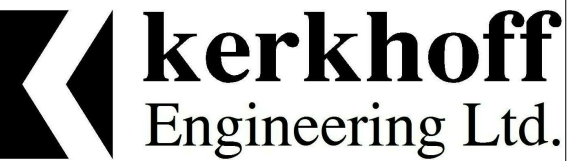
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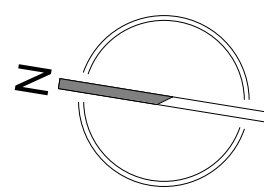
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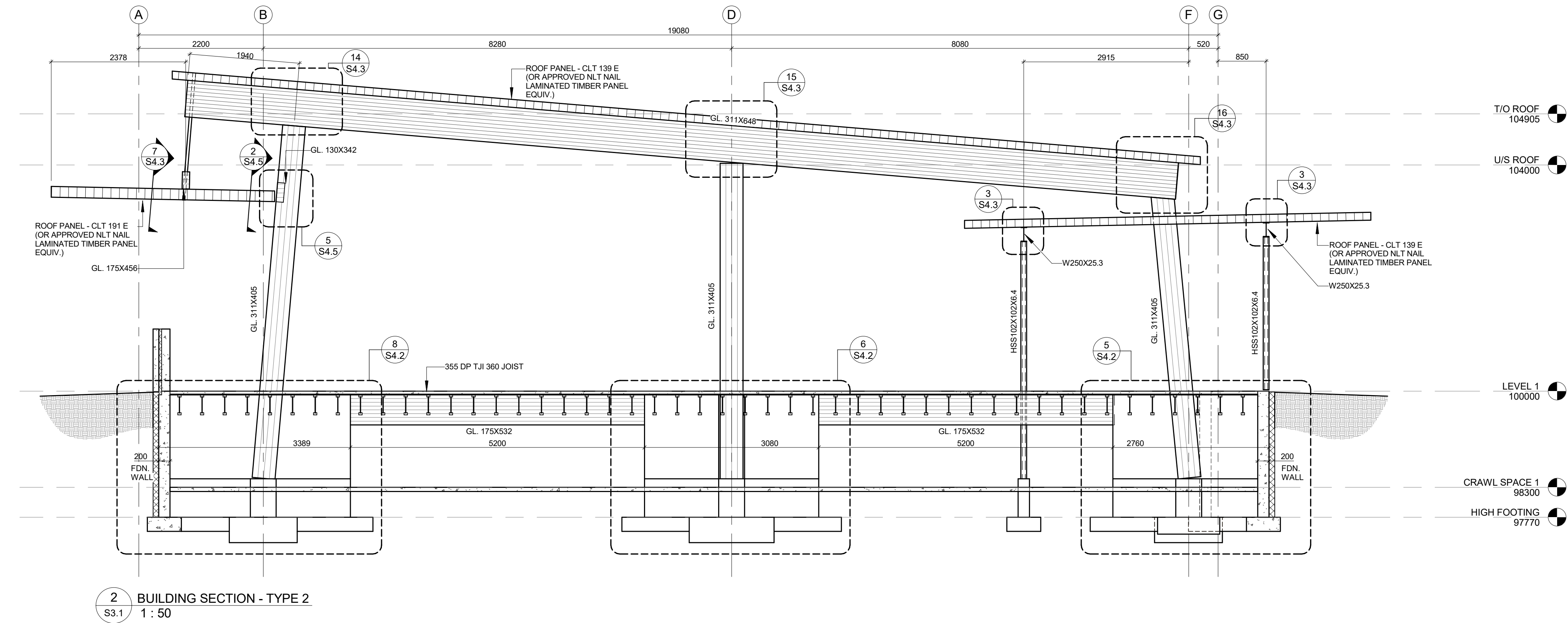
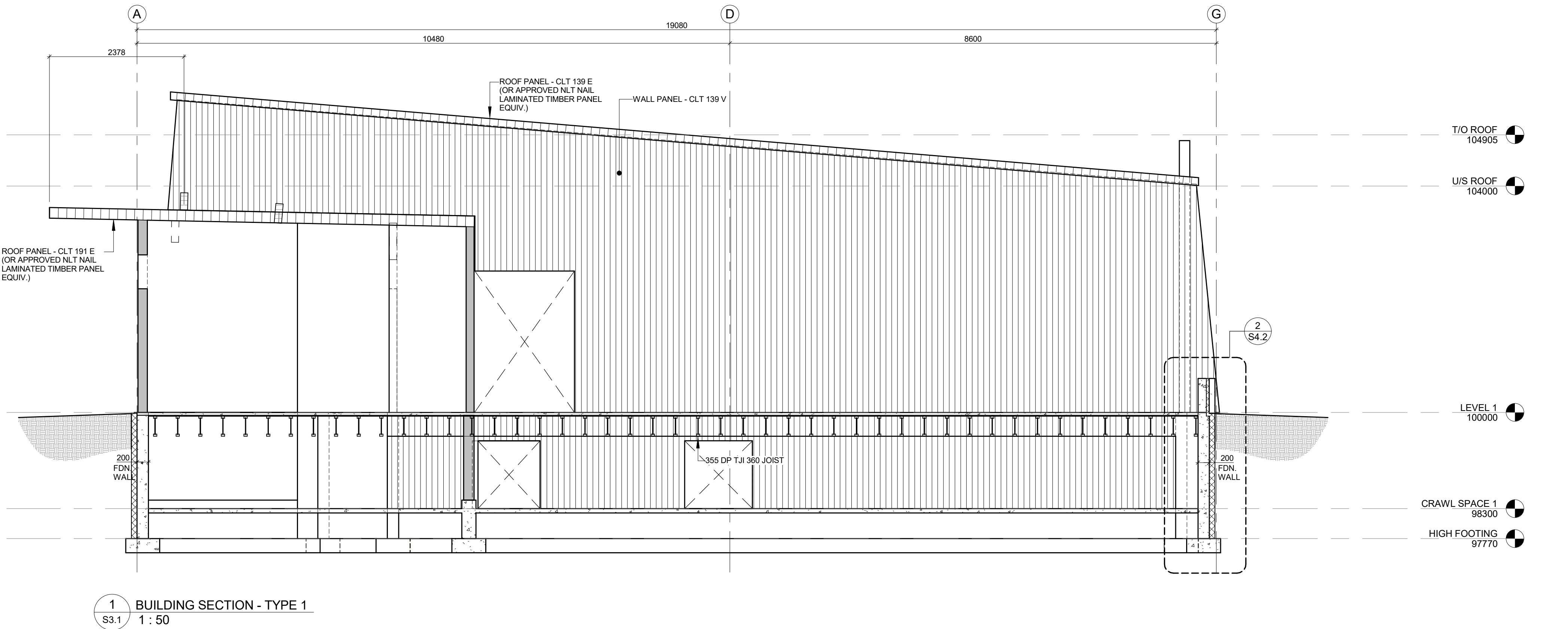
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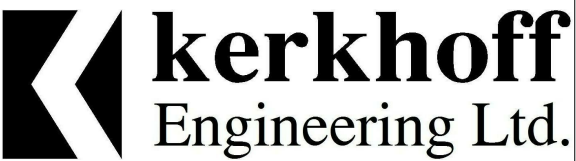
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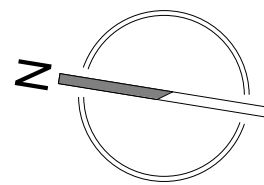
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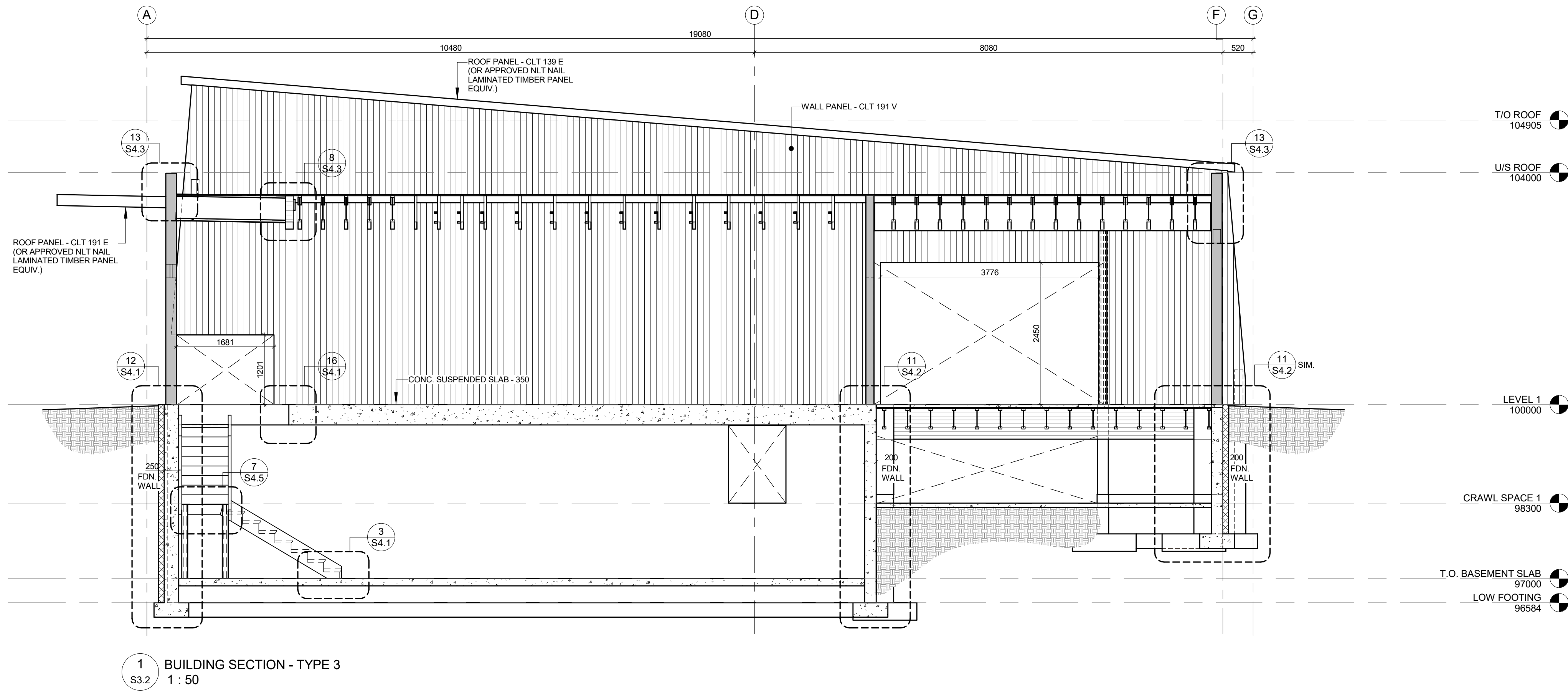
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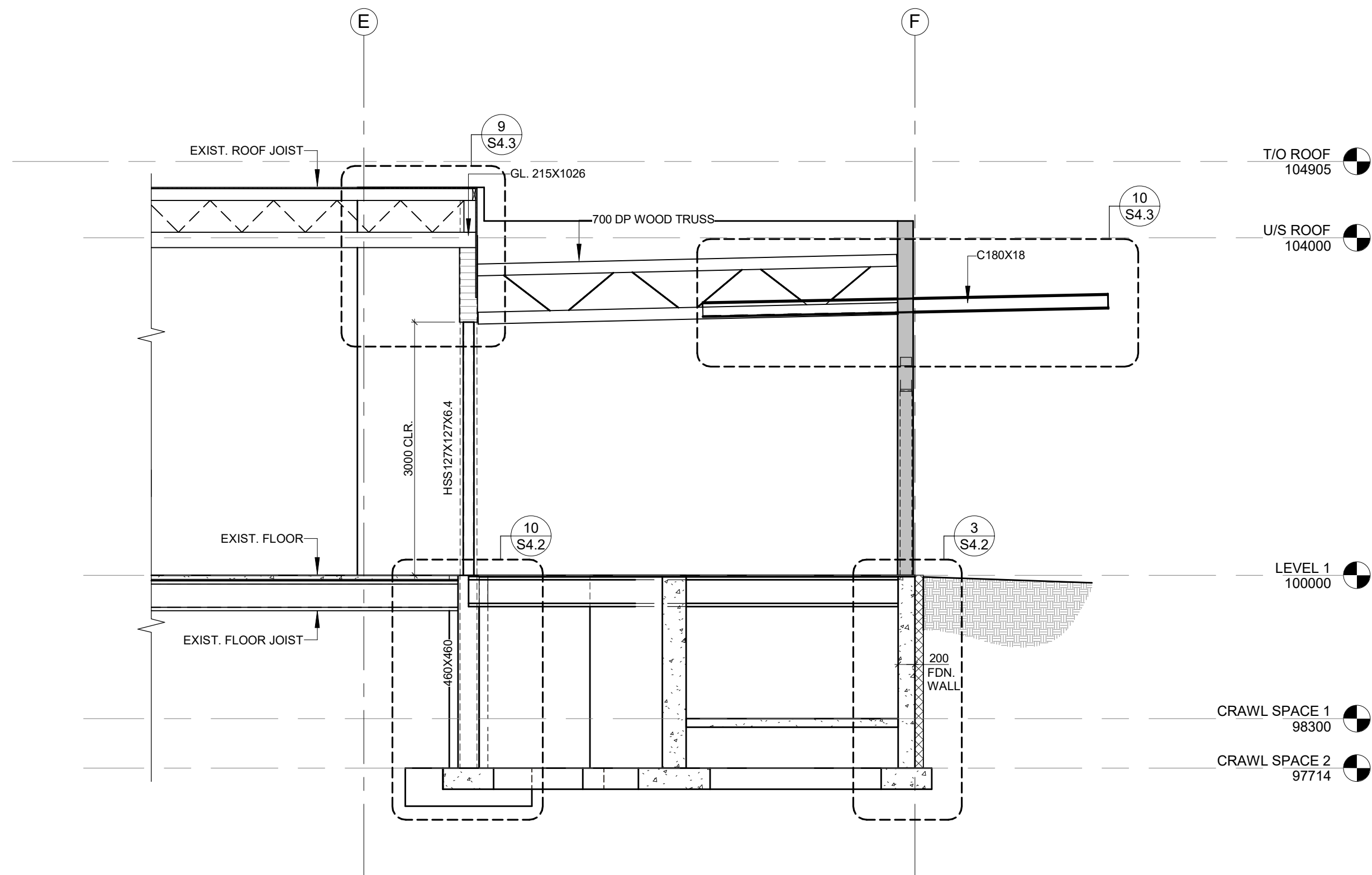
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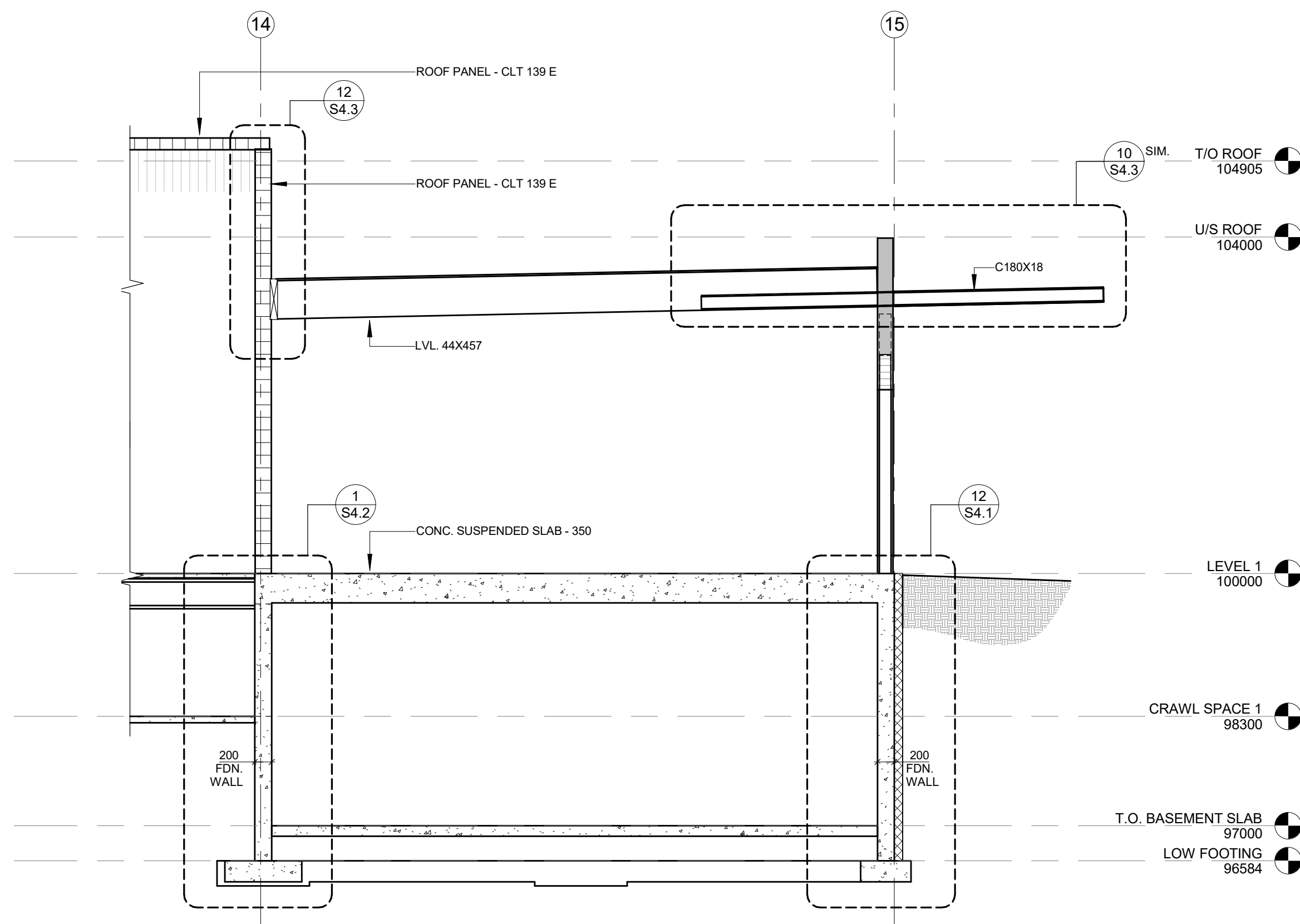
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2 BUILDING SECTION - TYPE 4  
S3.2 1 : 50



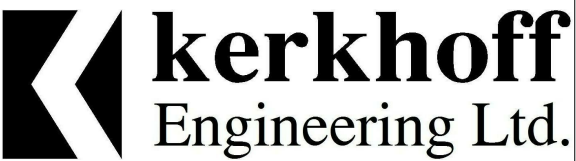
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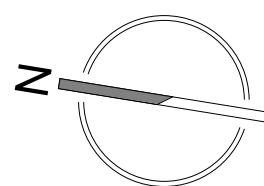
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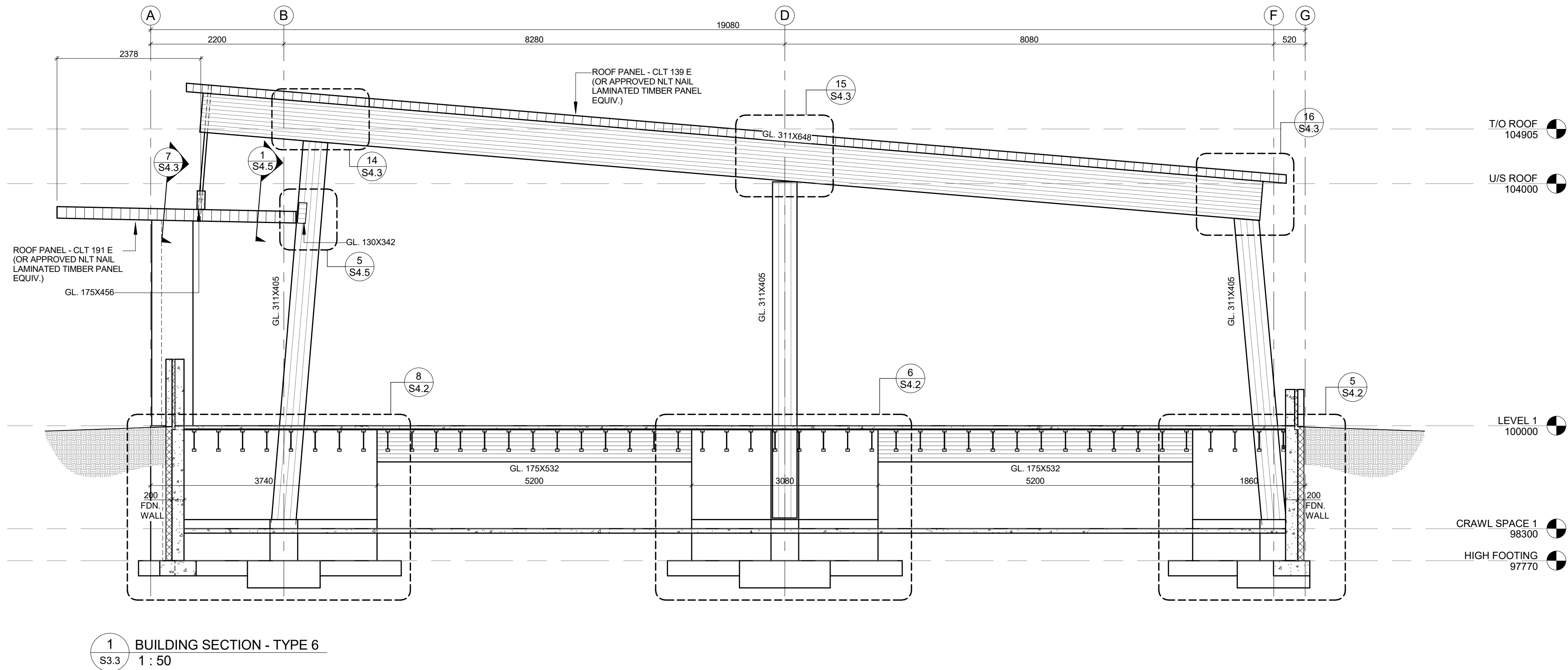
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**16-107 S3.3**

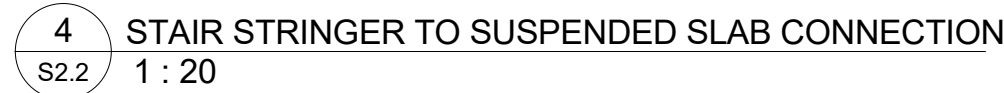
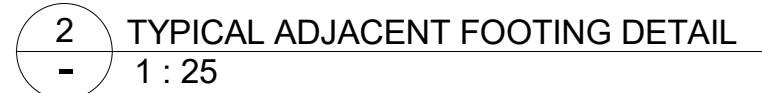
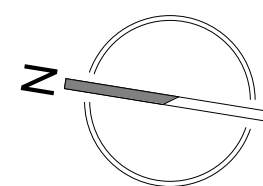
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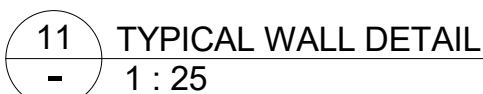
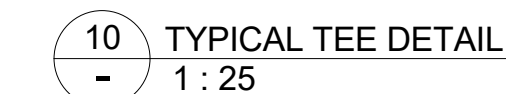
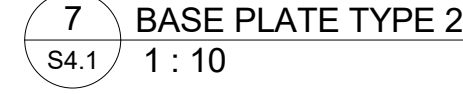
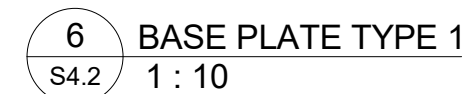
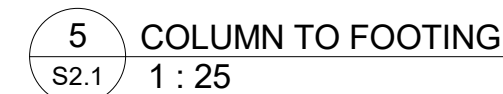


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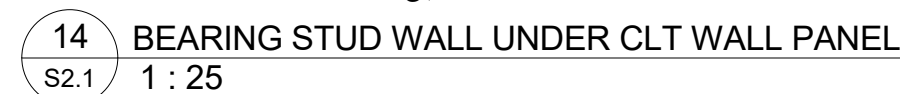
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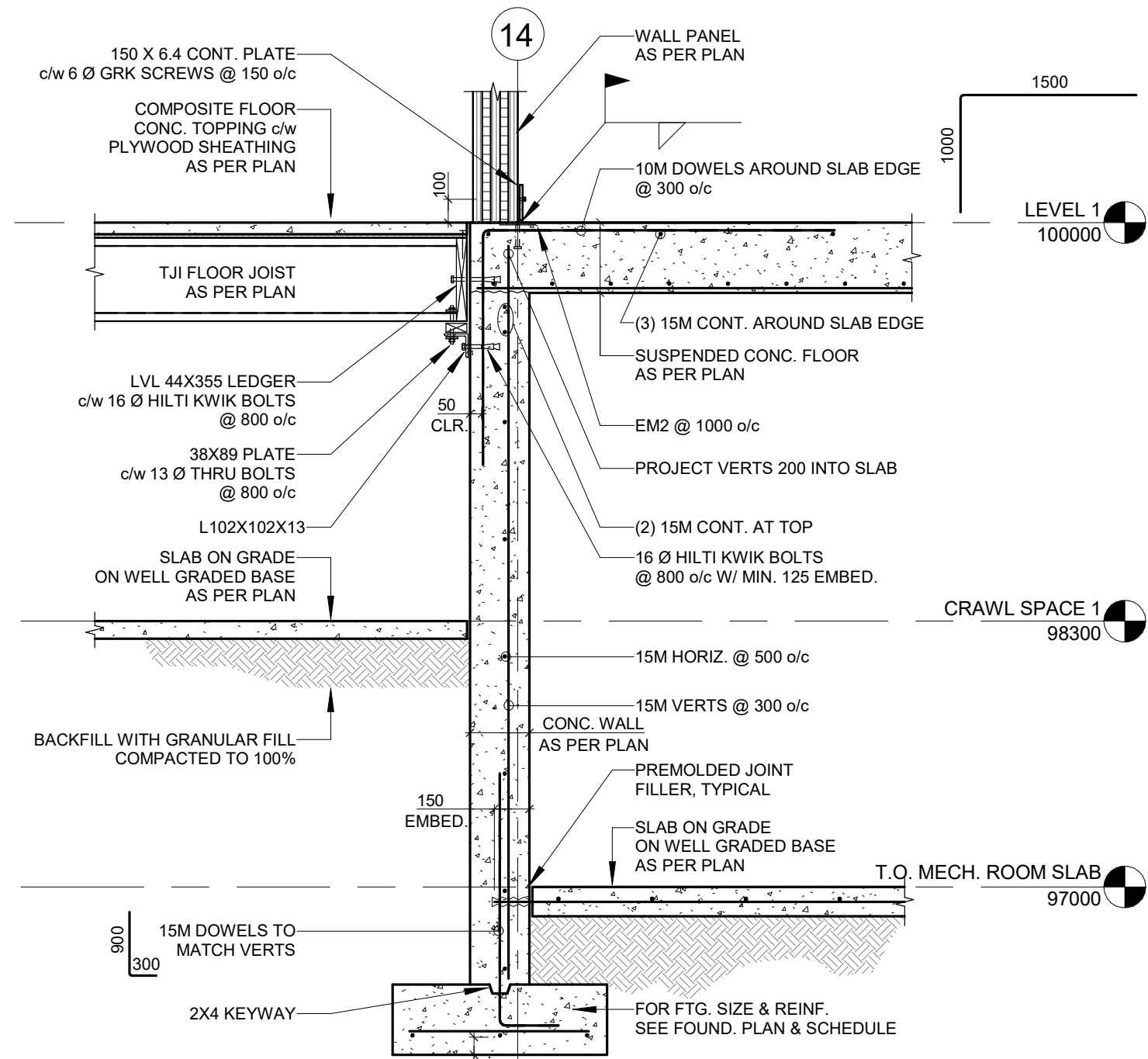
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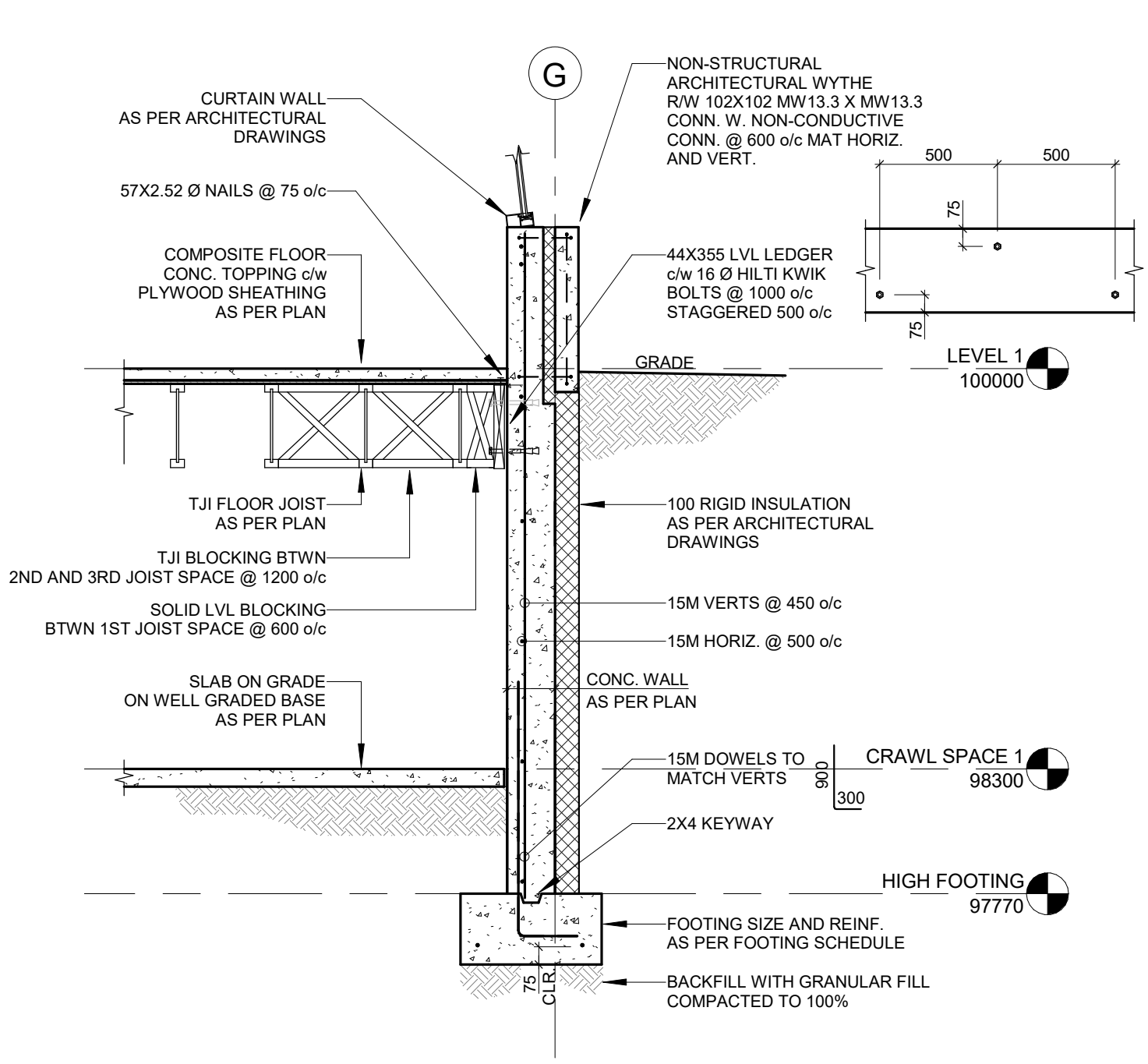
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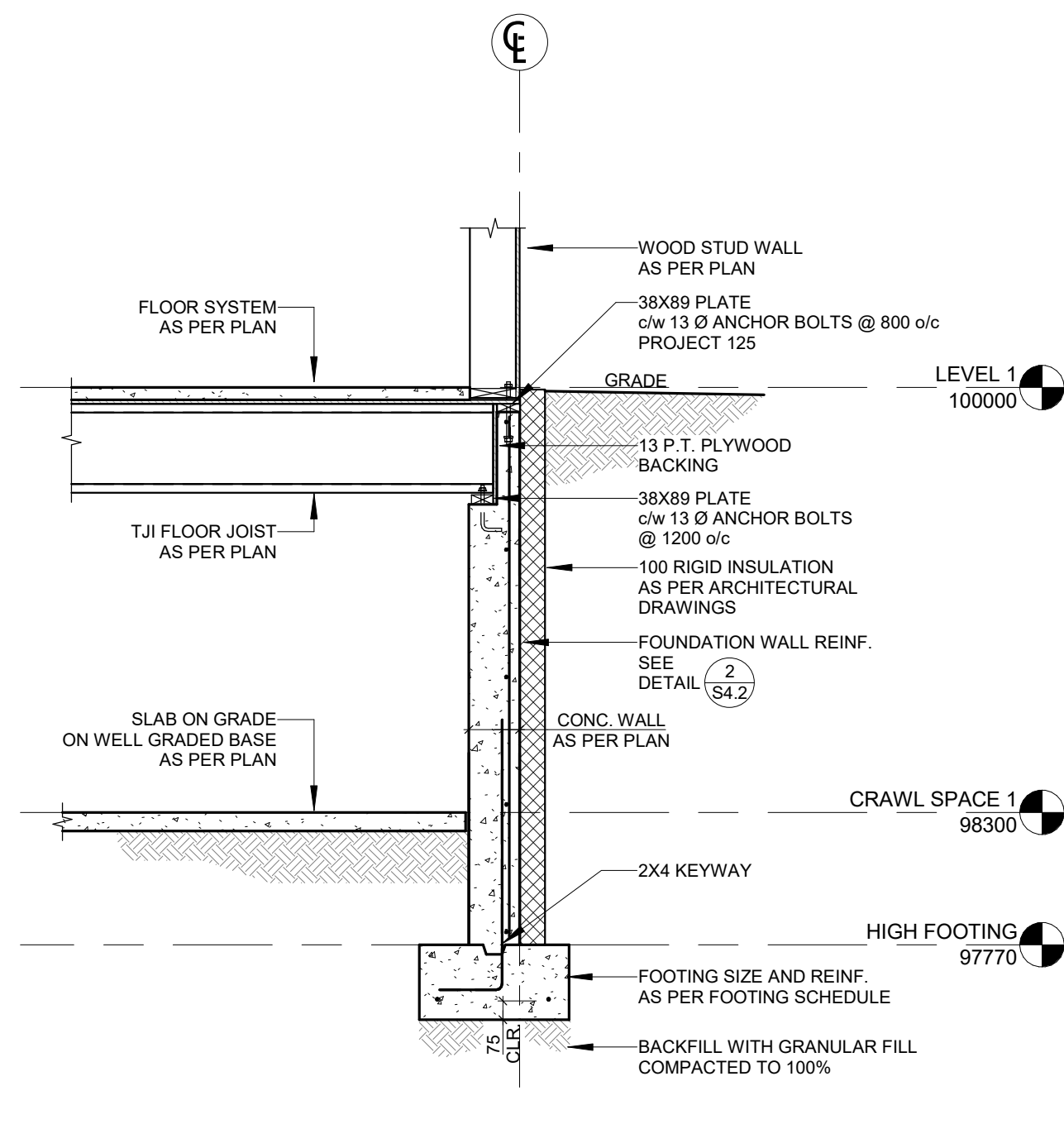




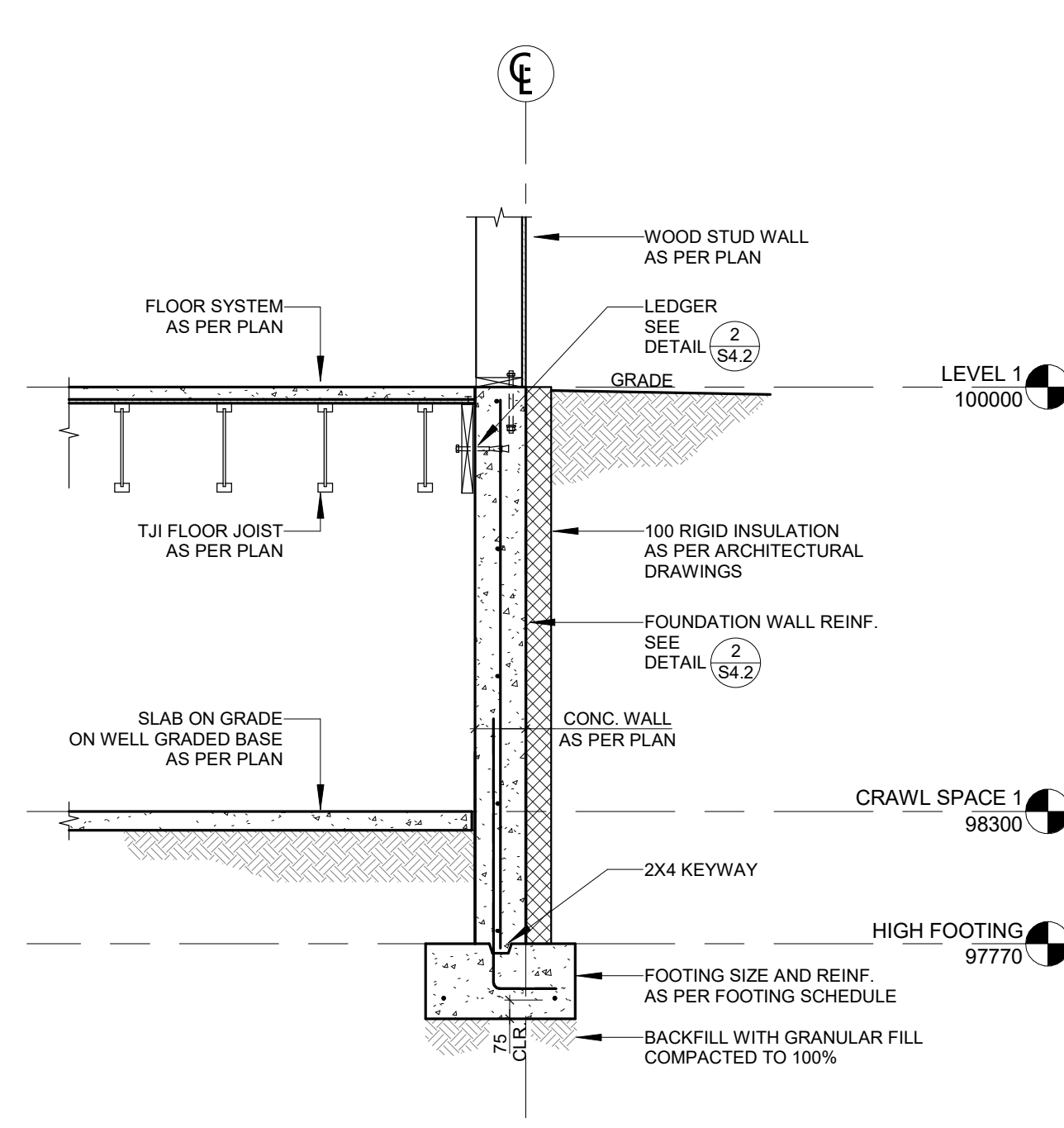
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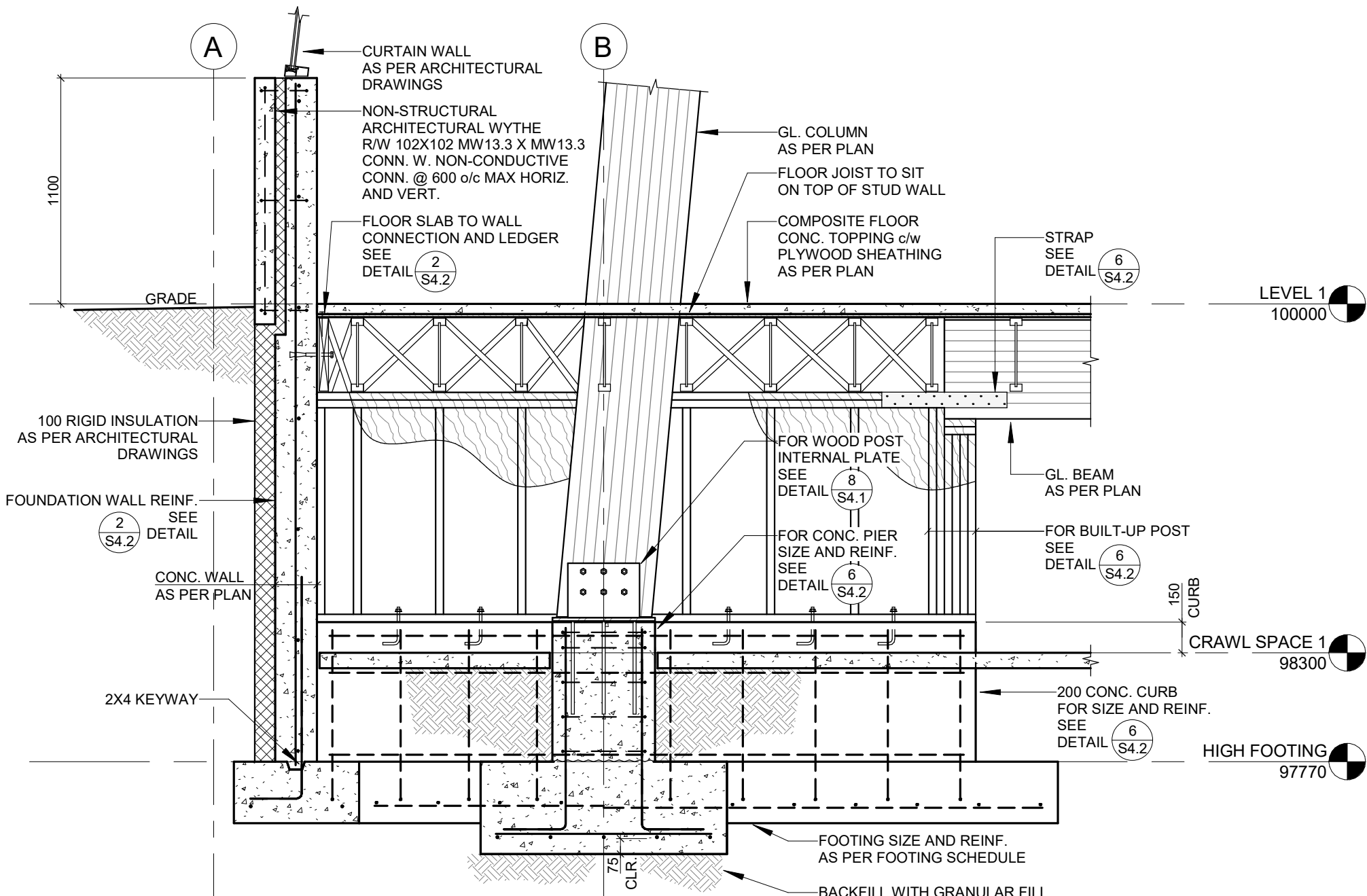
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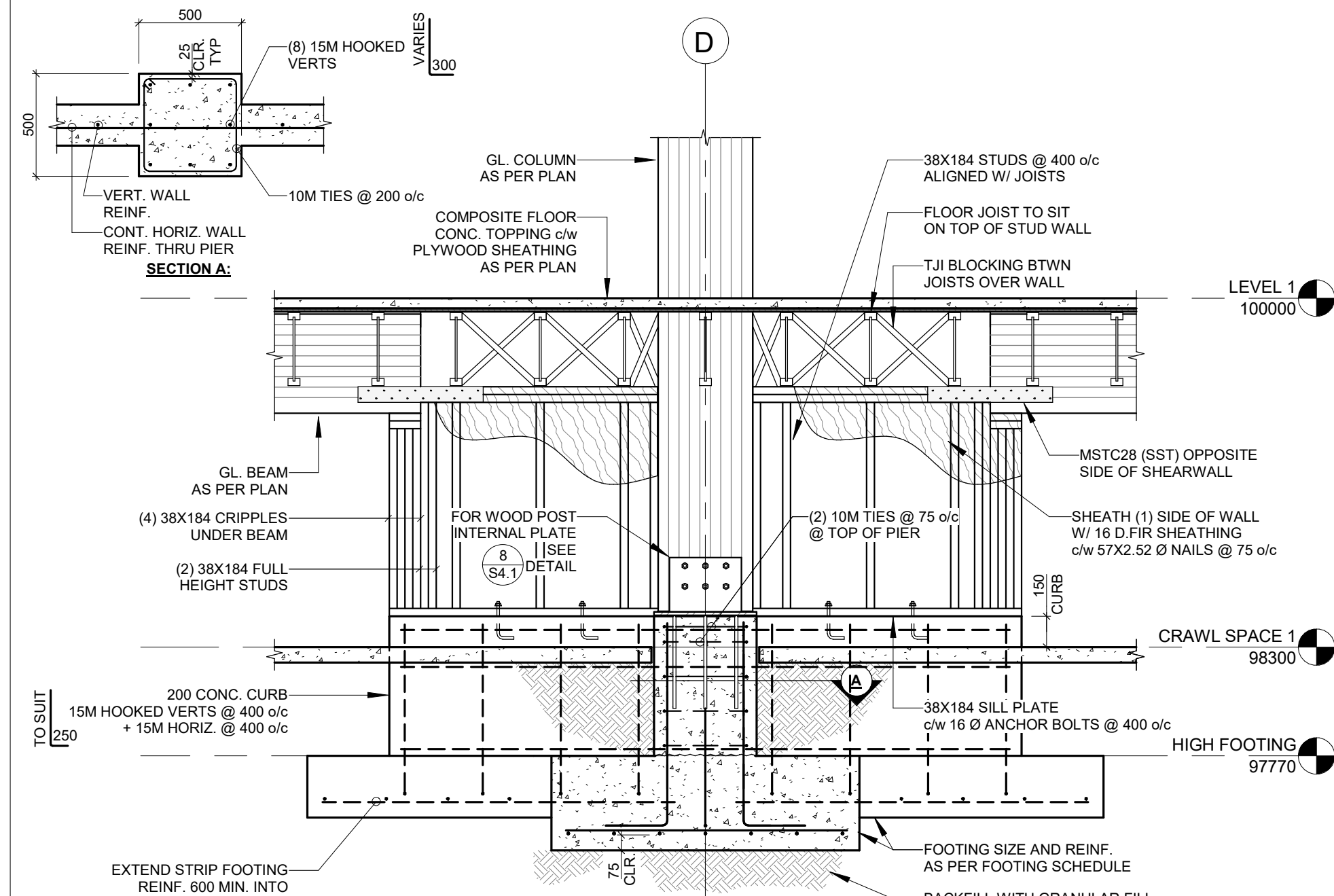
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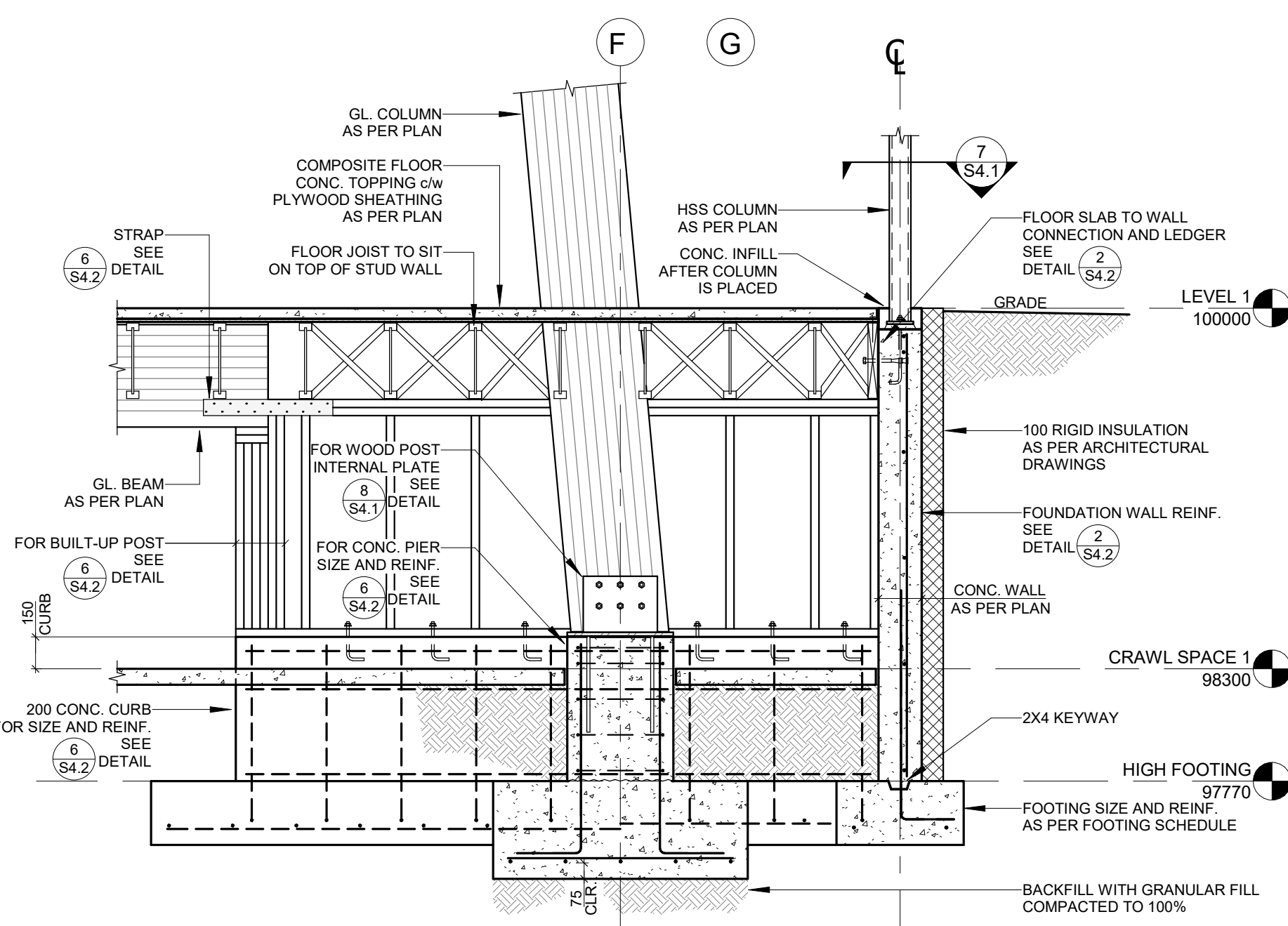
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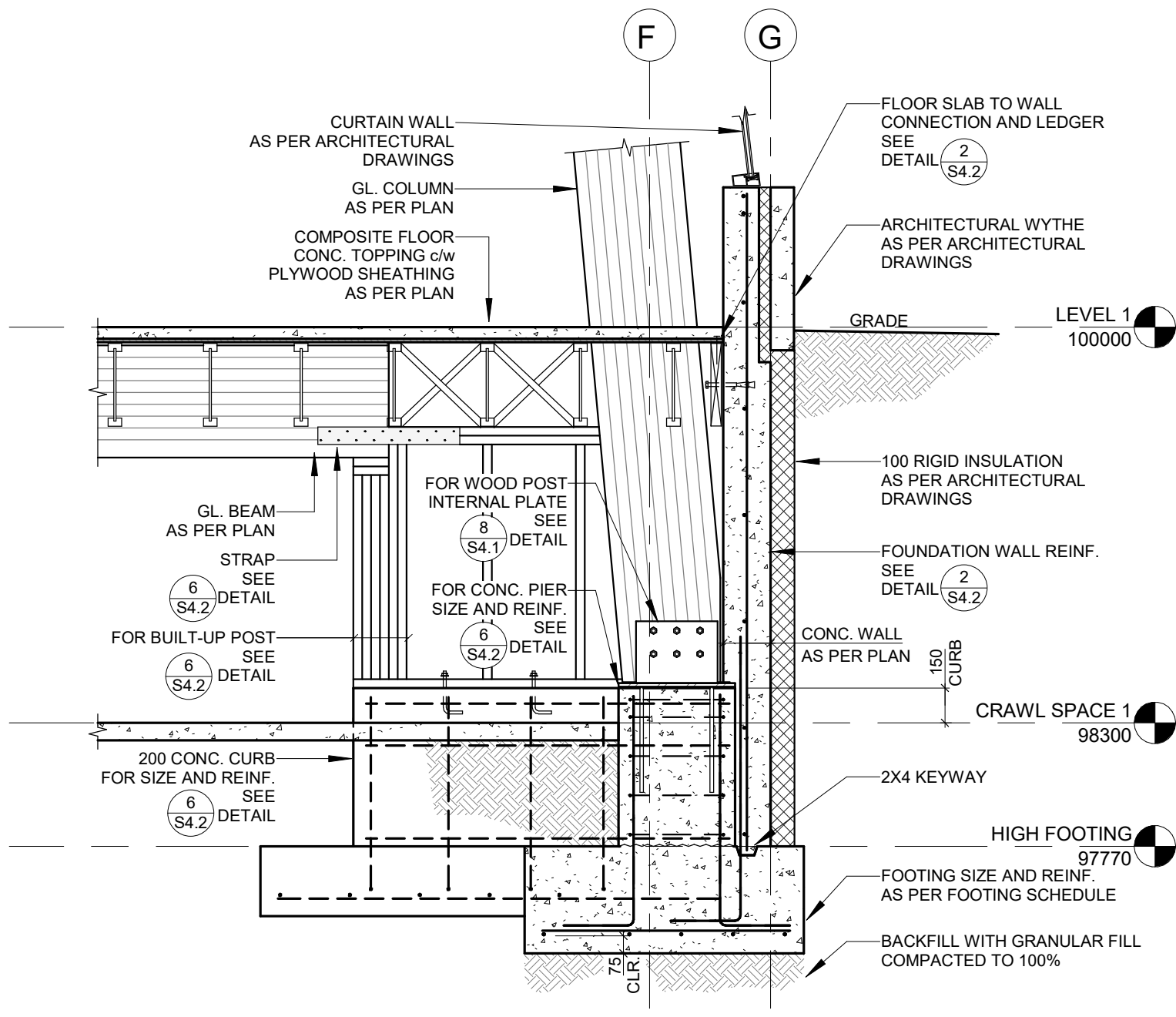
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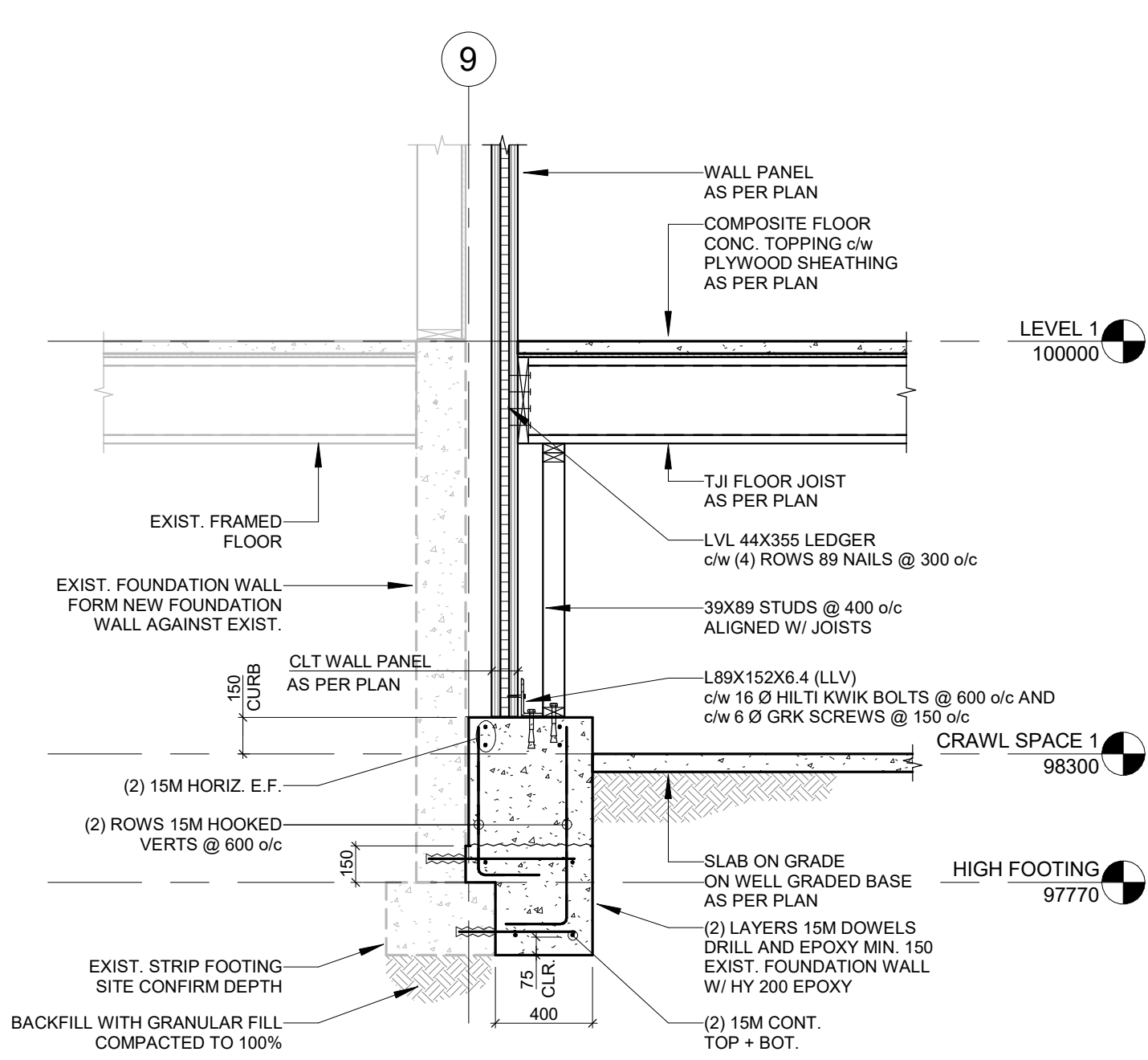
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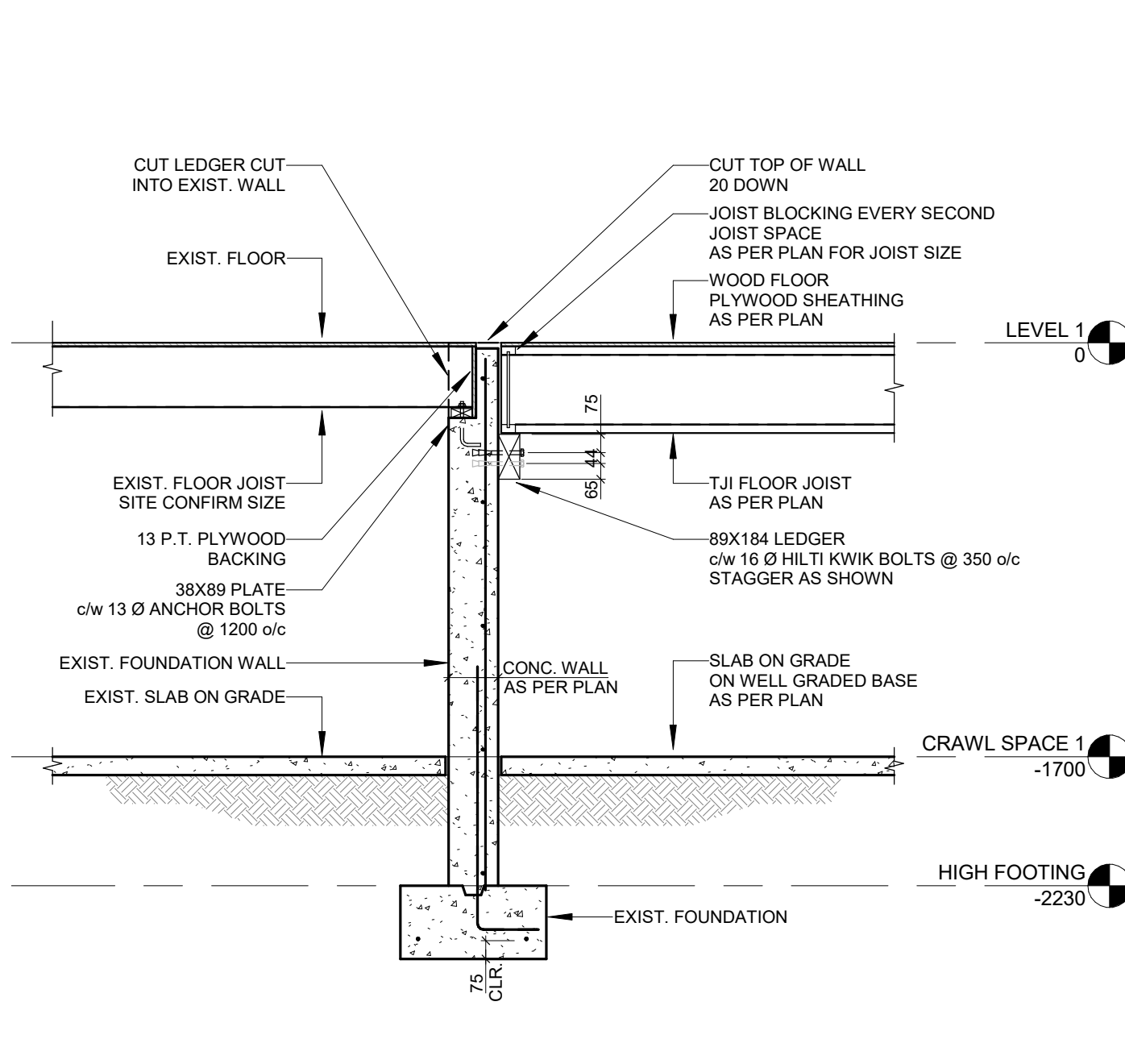
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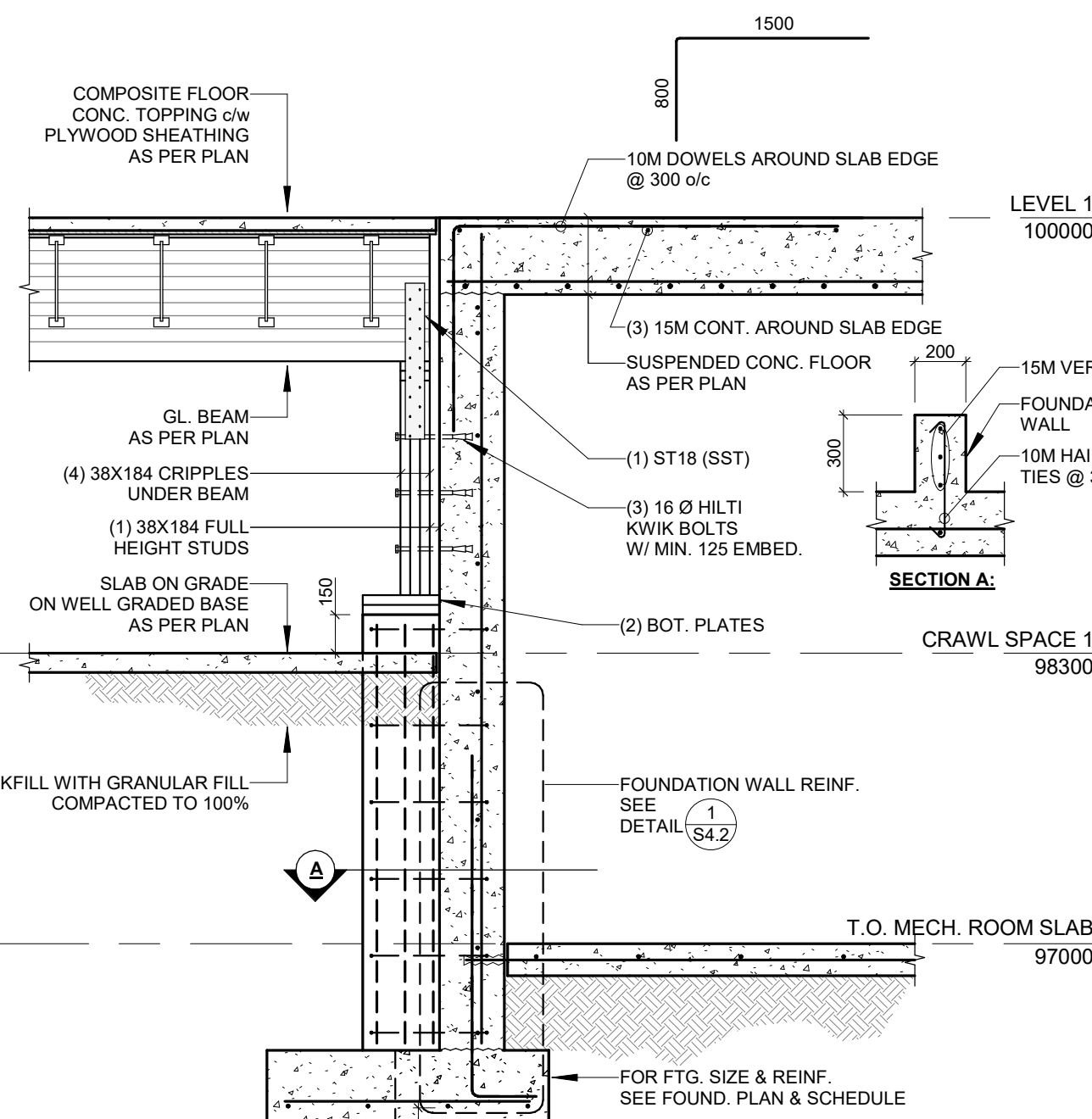
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S2.1 1 : 25



9 FOUNDATION WALL AT EXIST. FOUNDATION WALL  
S2.1 1 : 25



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S2.1 1 : 25



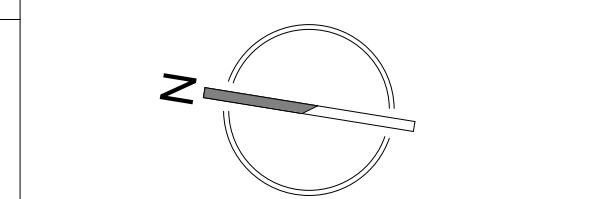
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2	2017/02/17	ISSUED FOR COORDINATION - 60%
3	2017/03/17	ISSUED FOR COORDINATION - 90%
4	2017/04/11	ISSUED FOR TENDER
5	2017/05/04	ISSUED FOR BUILDING PERMIT
6	2017/08/09	ISSUED FOR CONSTRUCTION

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**SECTIONS AND DETAILS**

PROJECT SHEET

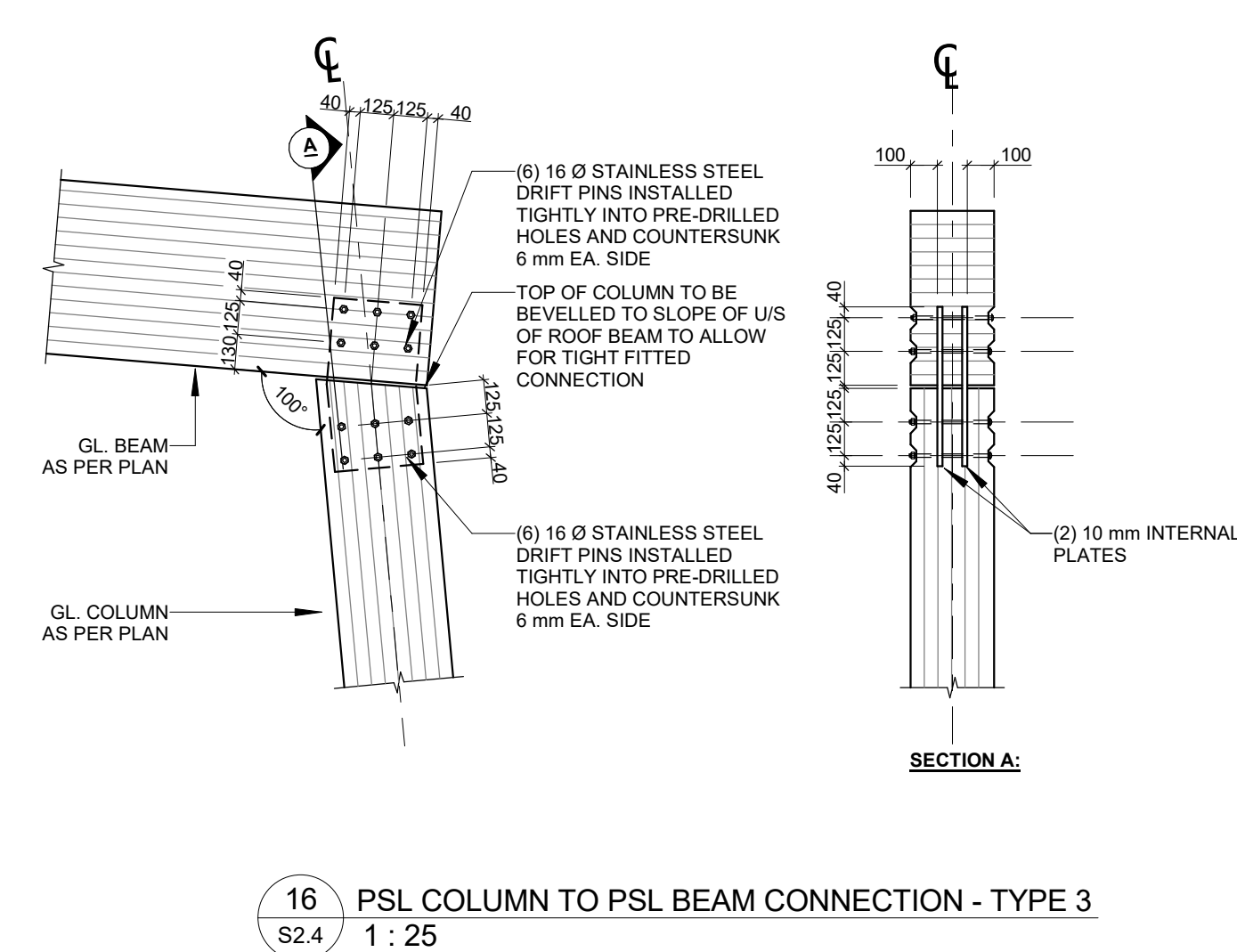
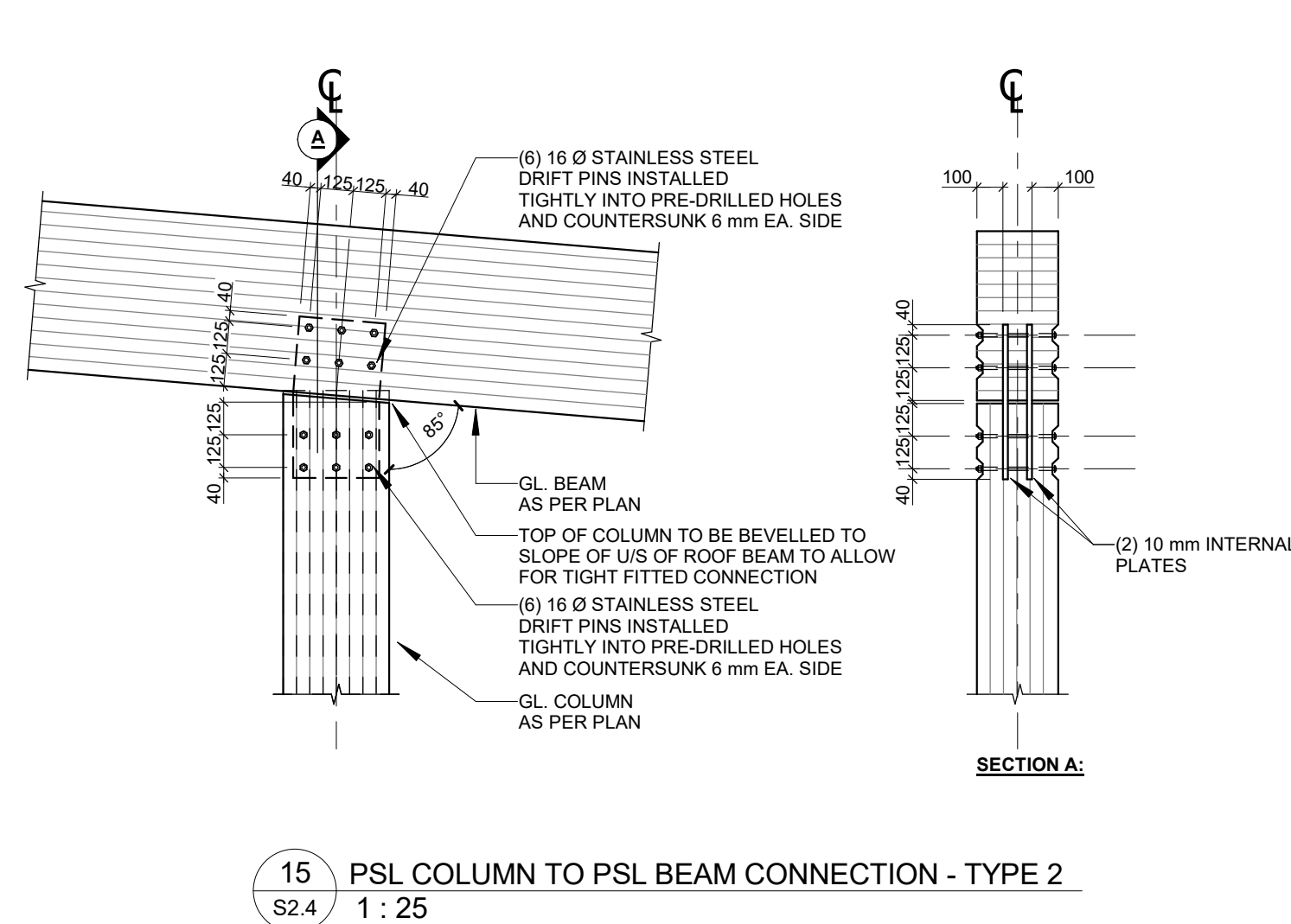
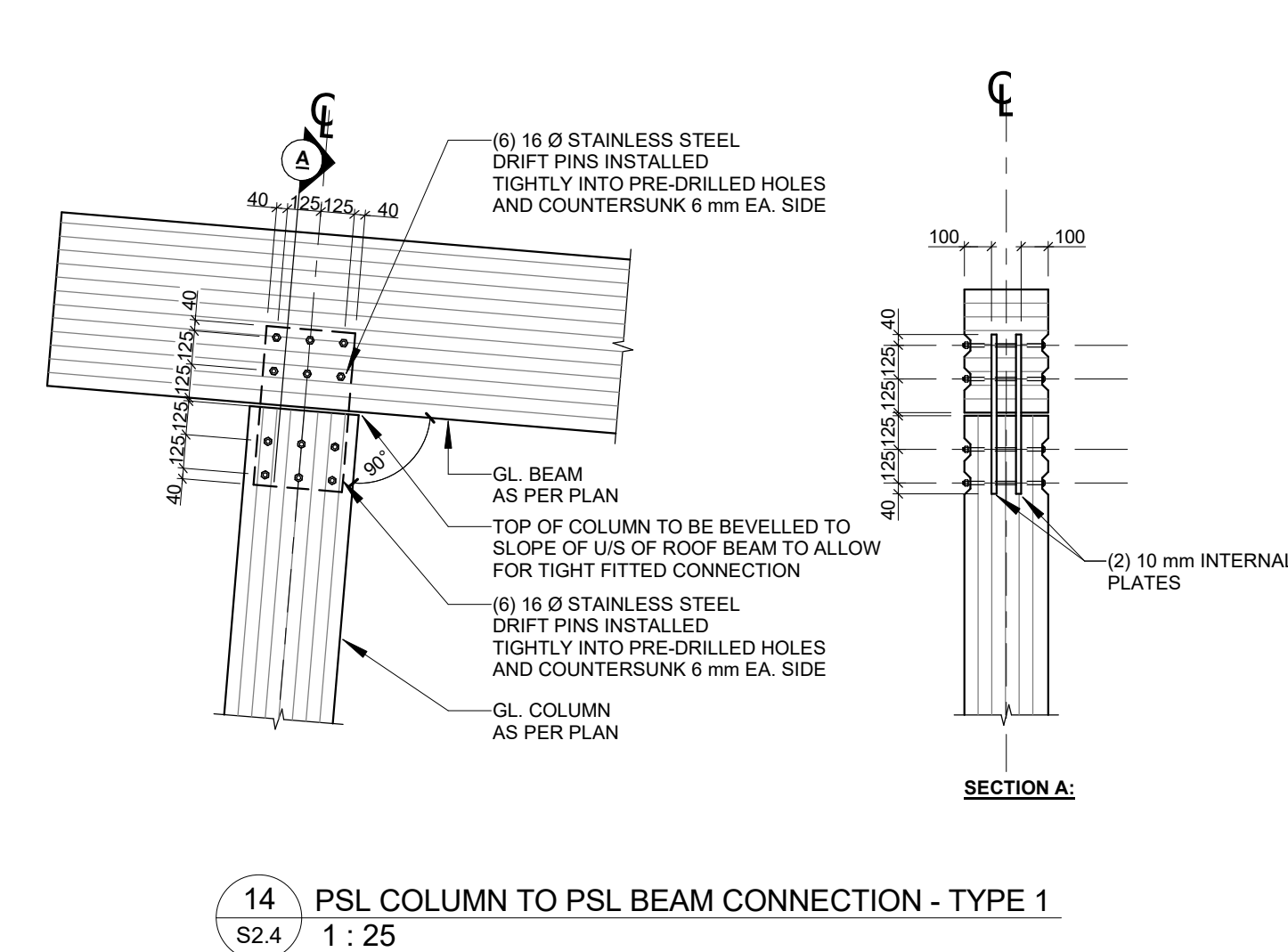
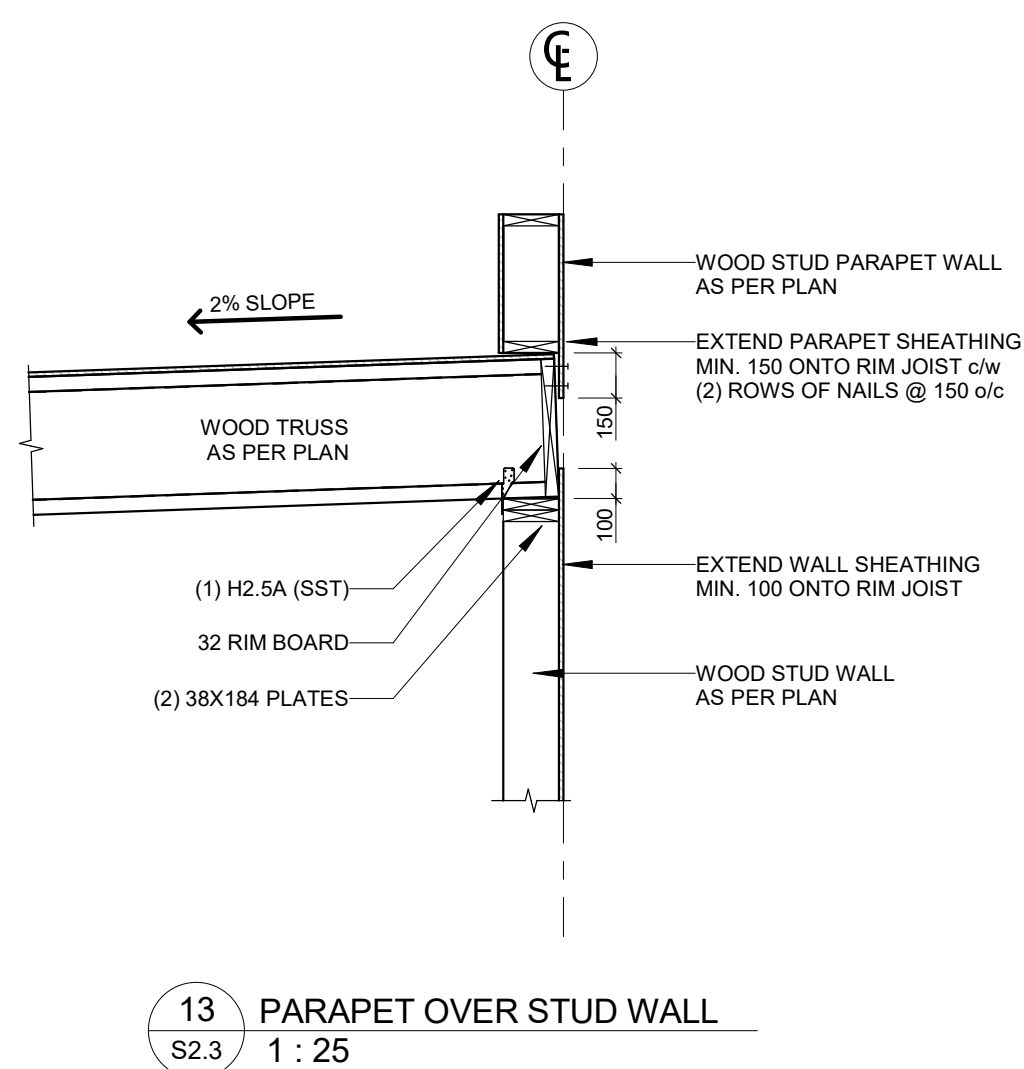
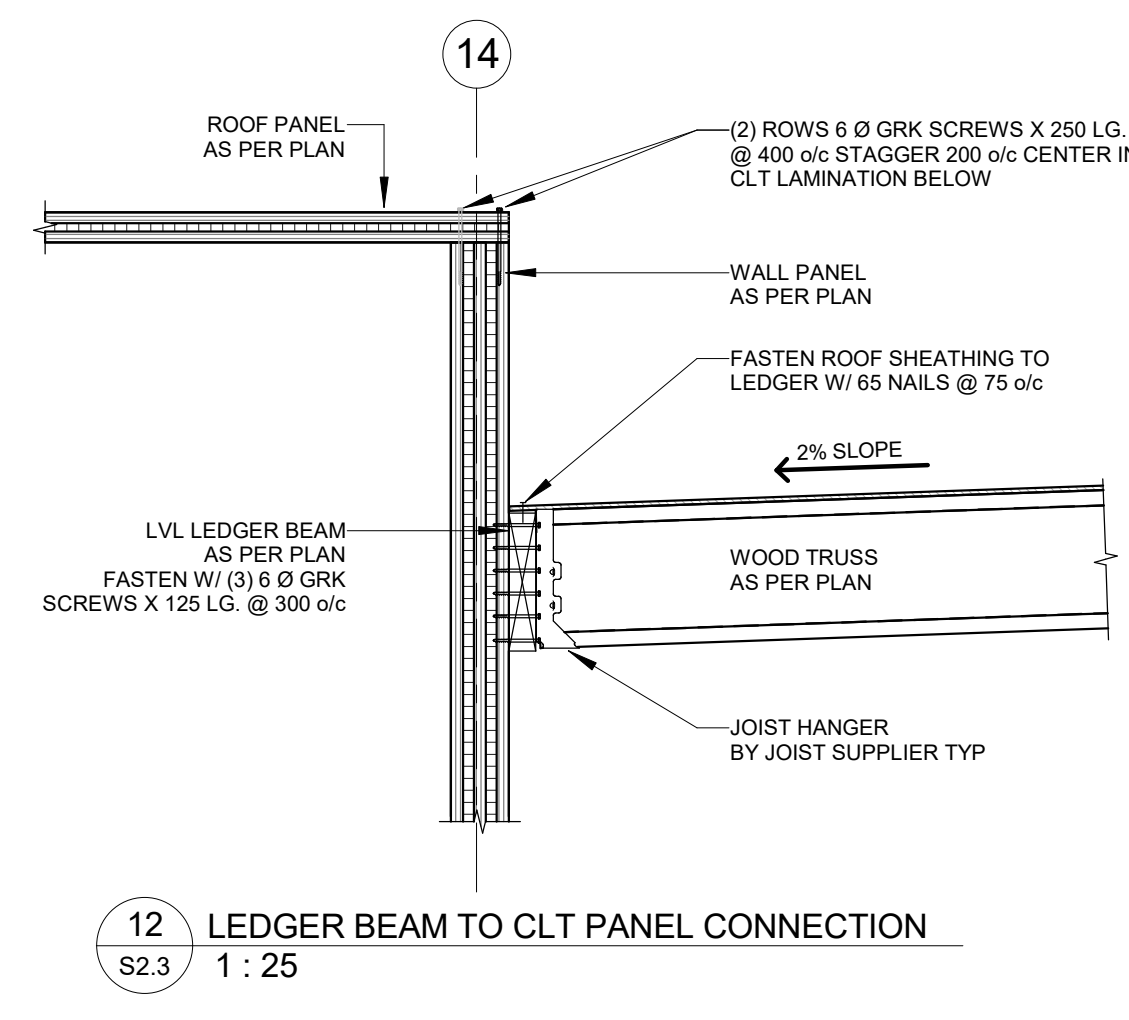
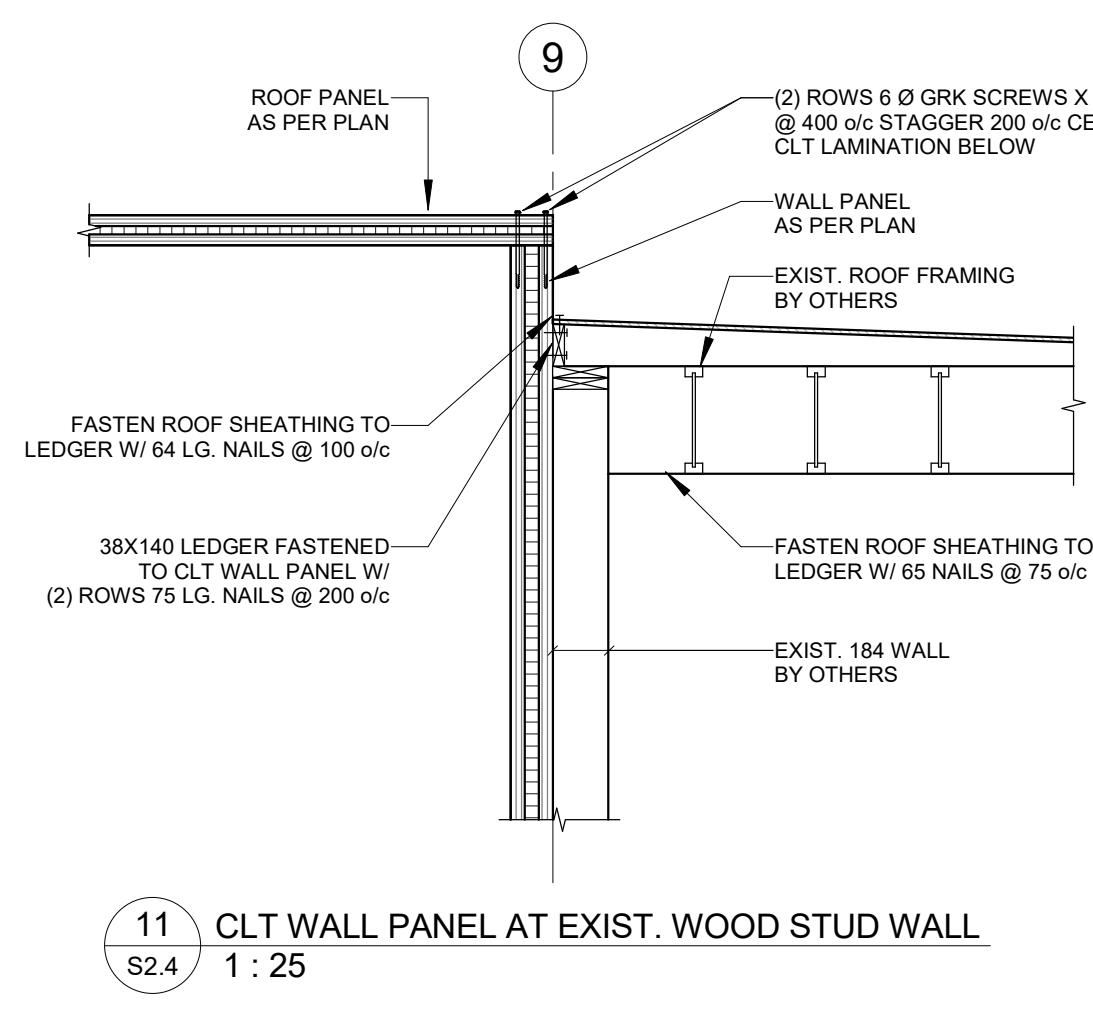
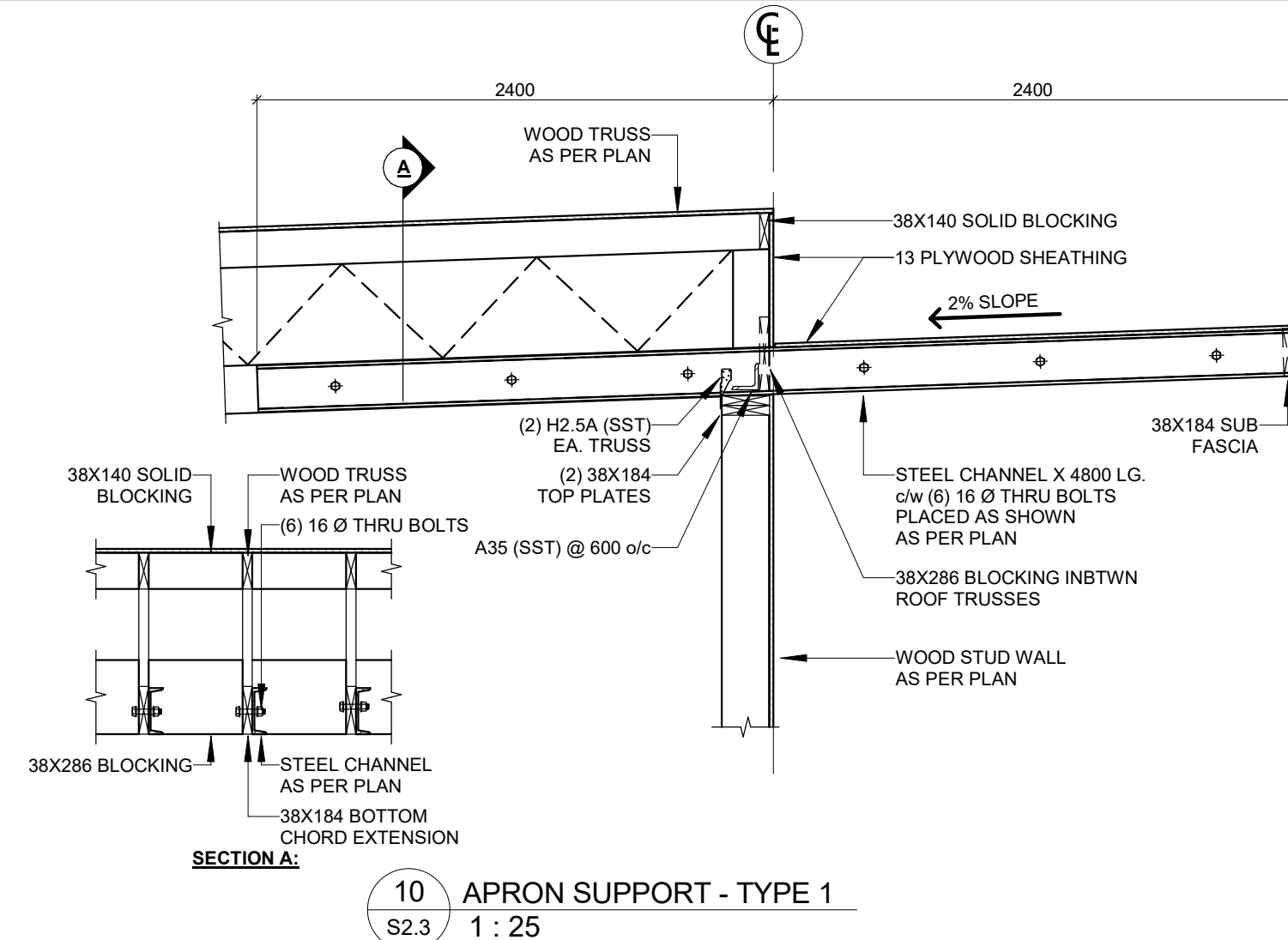
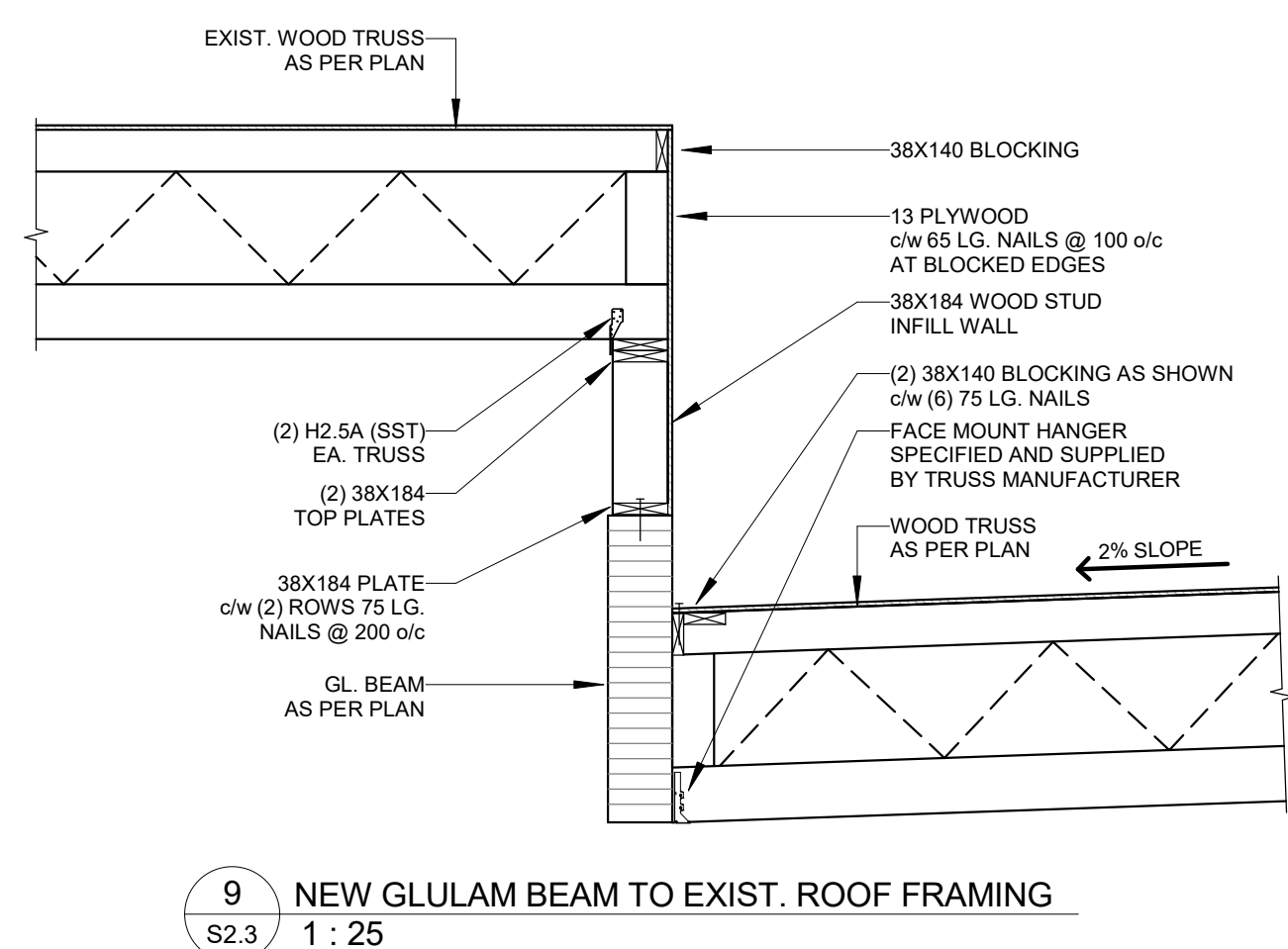
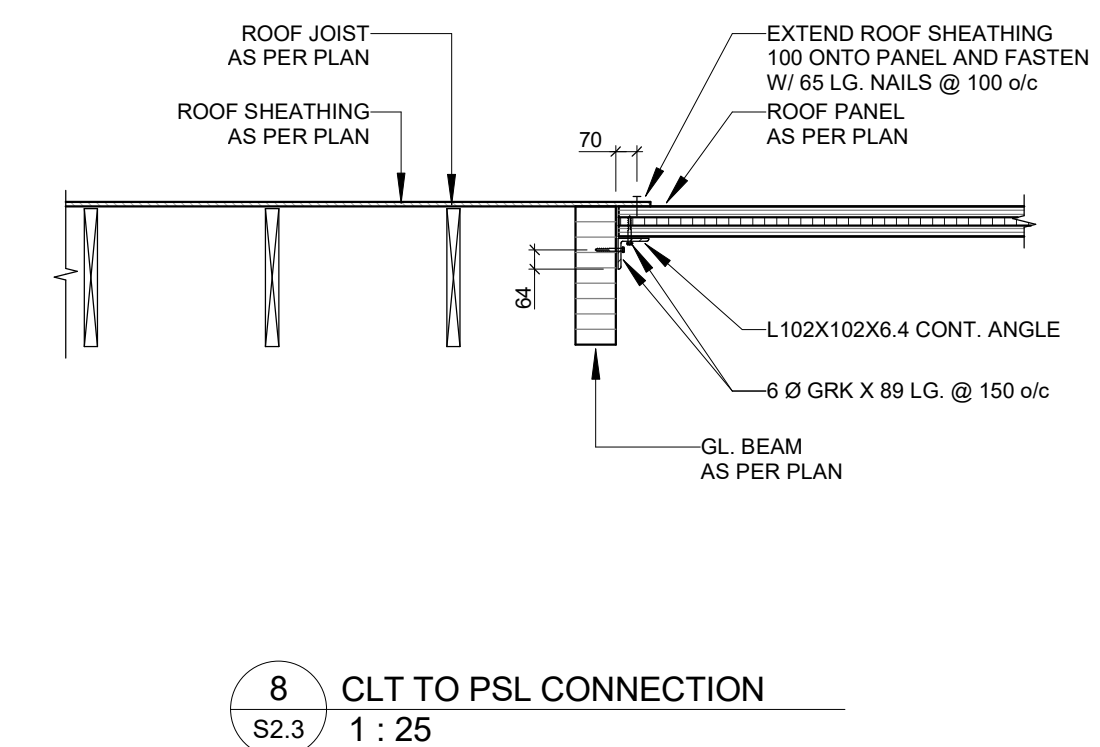
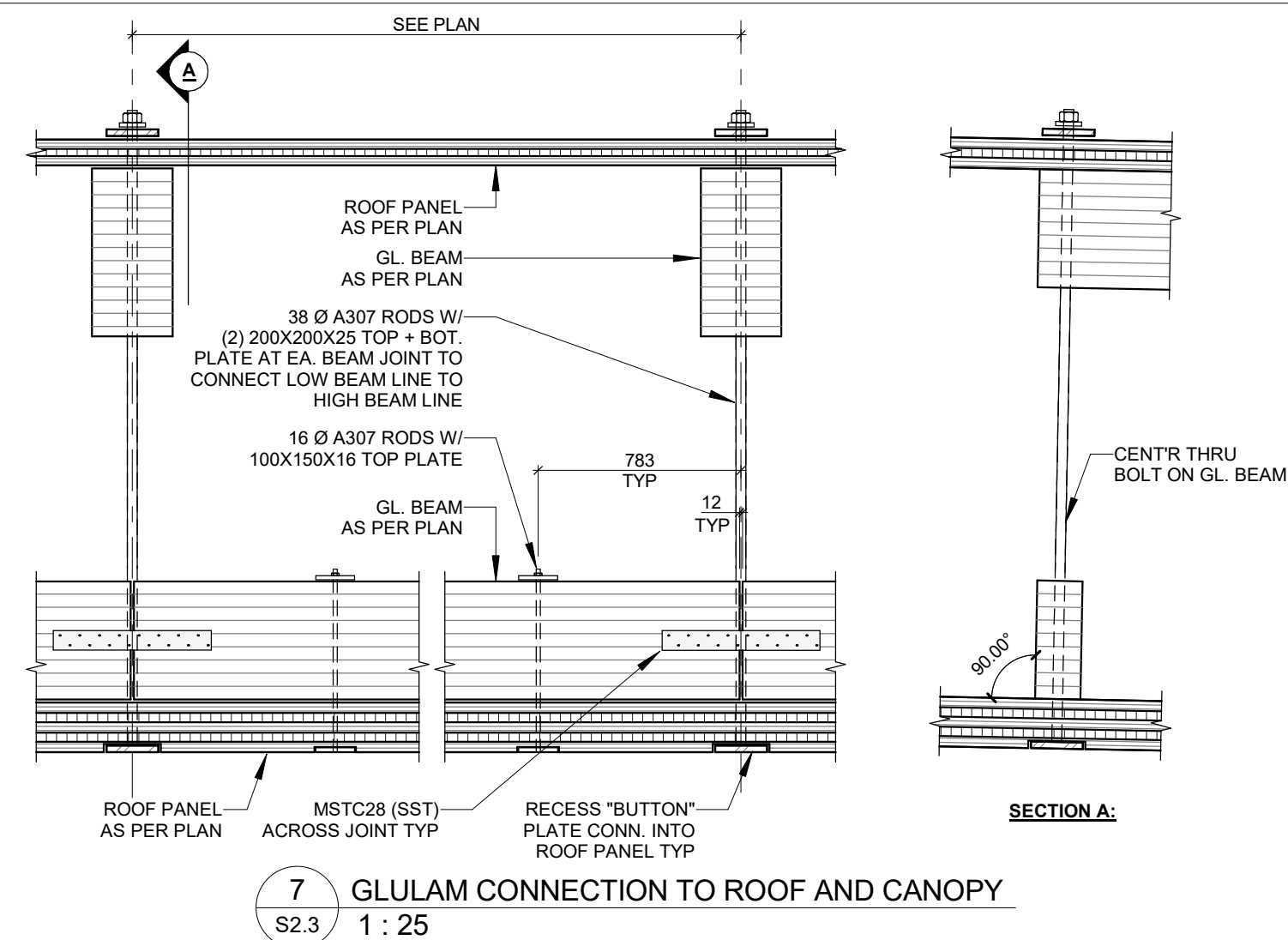
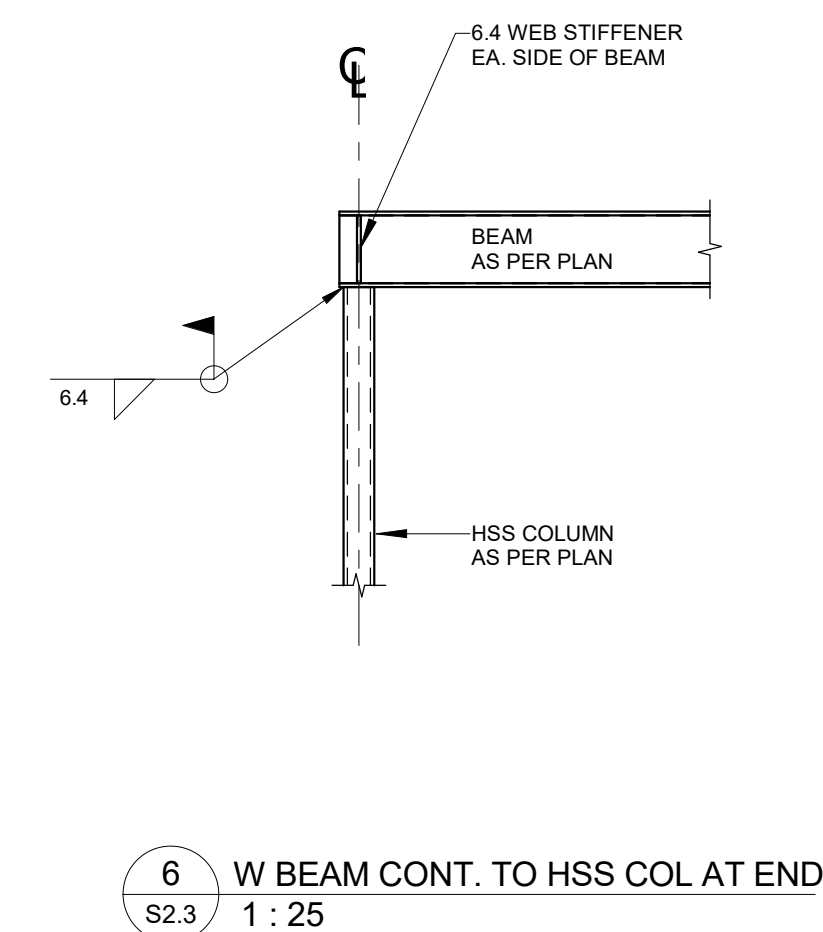
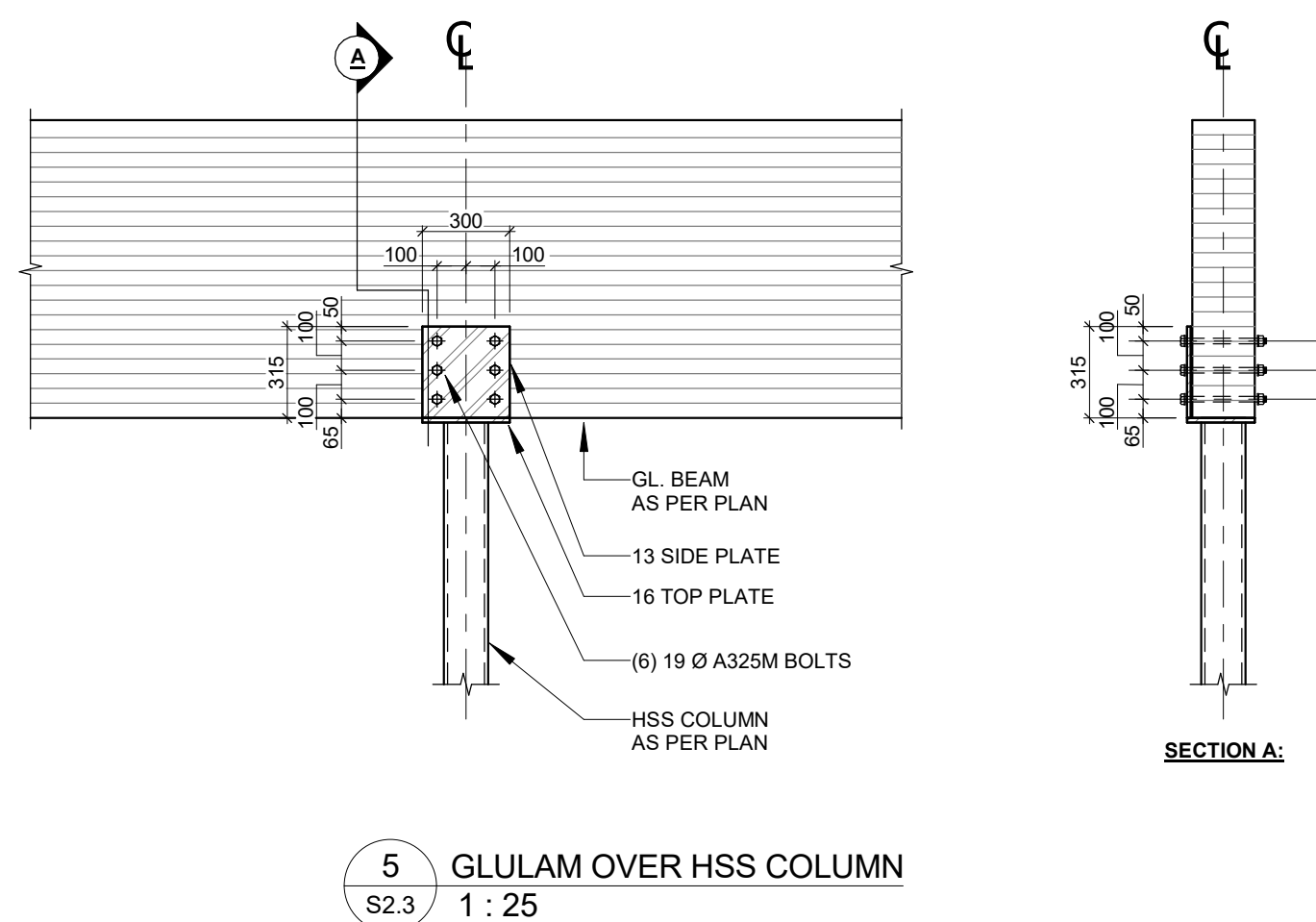
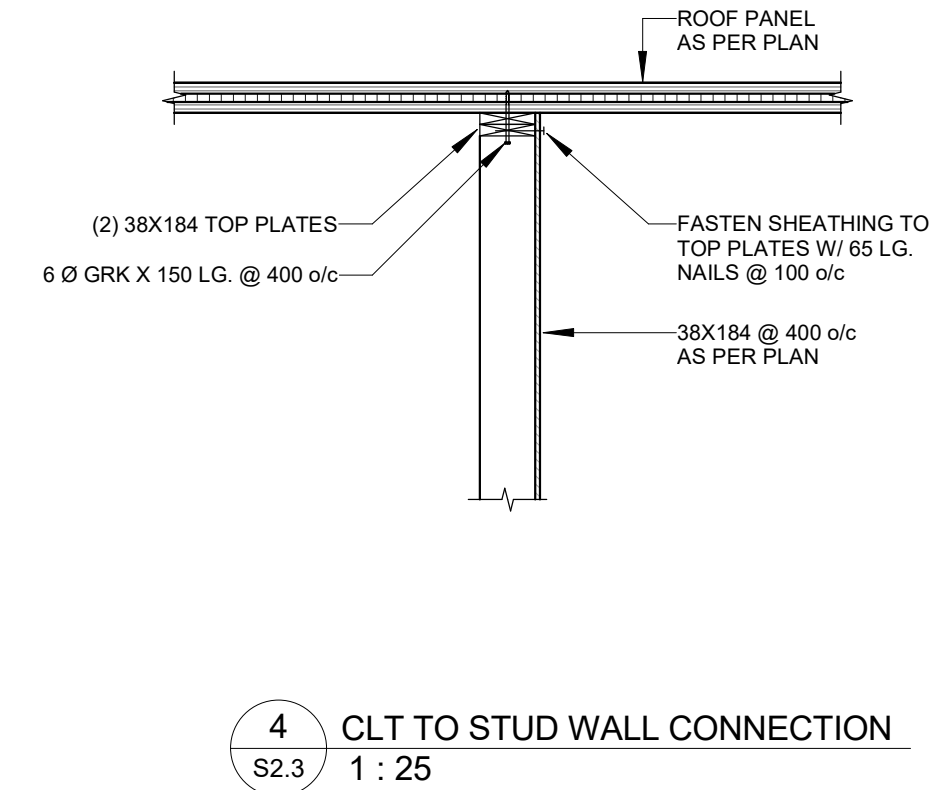
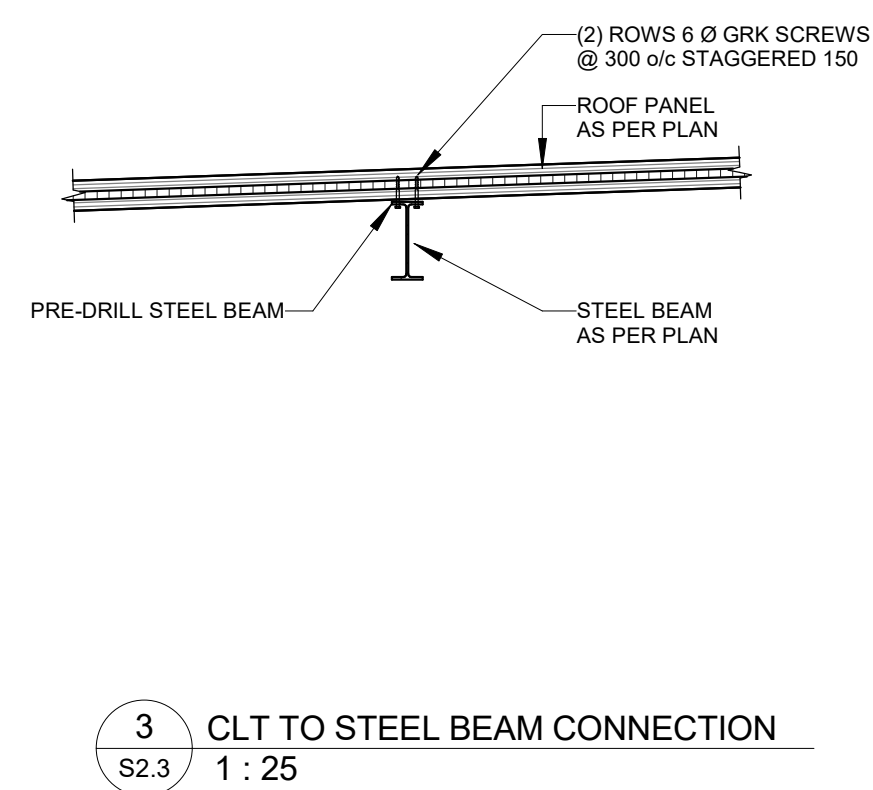
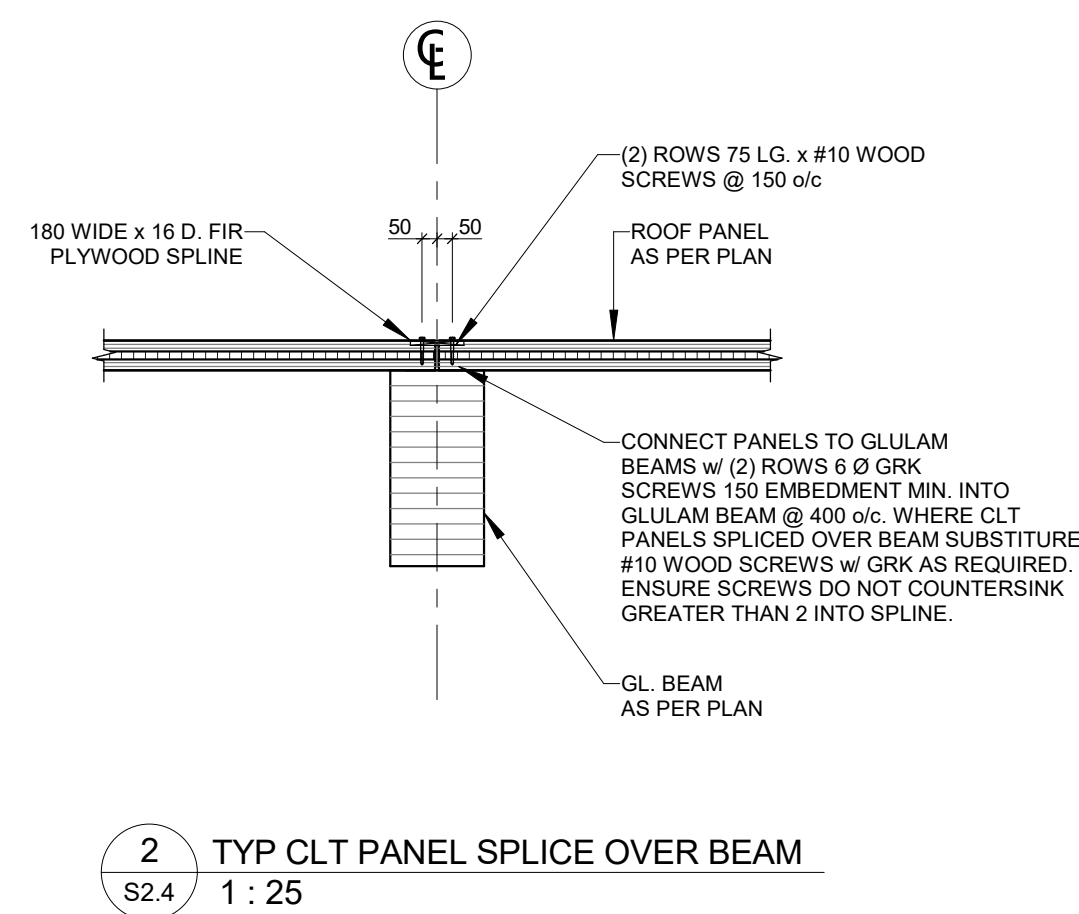
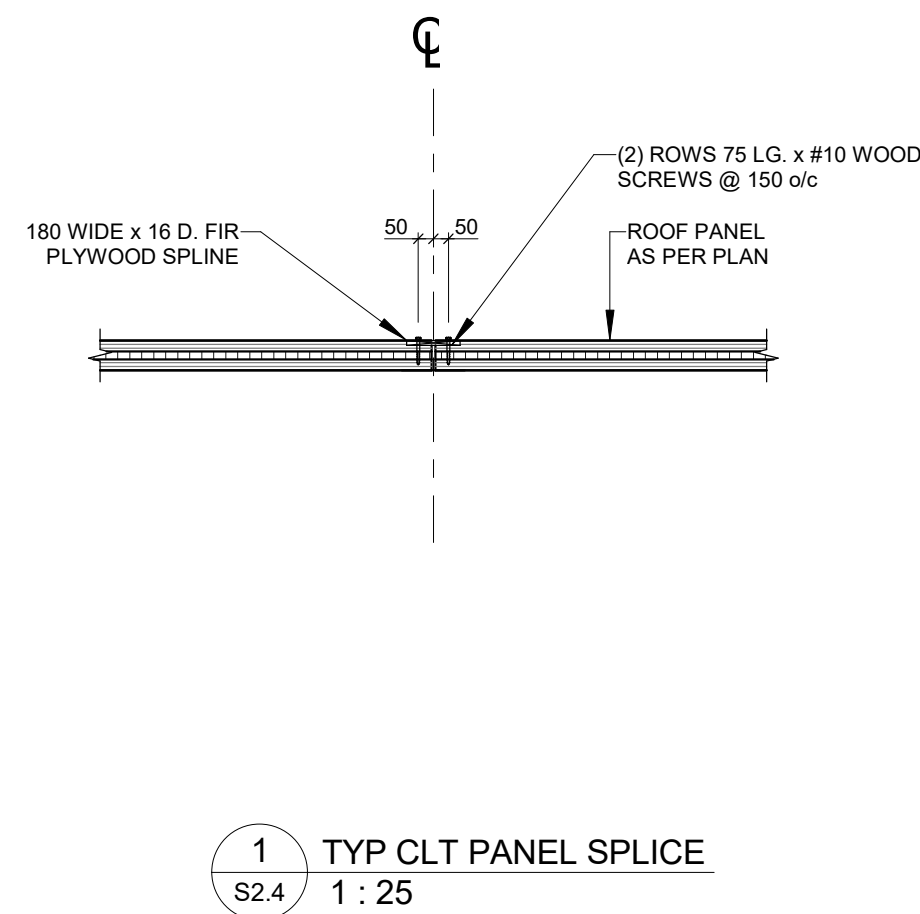
**16-107** **S4.2**

REVISION No. 6

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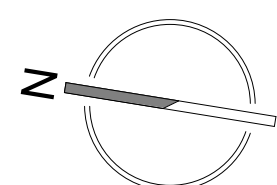
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2	2017/03/17	ISSUED FOR COORDINATION - 90%
3	2017/04/11	ISSUED FOR TENDER
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5	2017/07/19	POST TENDER ADDENDUM No. 1
6	2017/08/09	ISSUED FOR CONSTRUCTION

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		W. kerkhoffeng.ca

SCALE	AS NOTED	DATE	2017/08/09
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- ISSUED FOR CONSTRUCTION
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## DRAWING TITLE

# SECTIONS AND DETAILS

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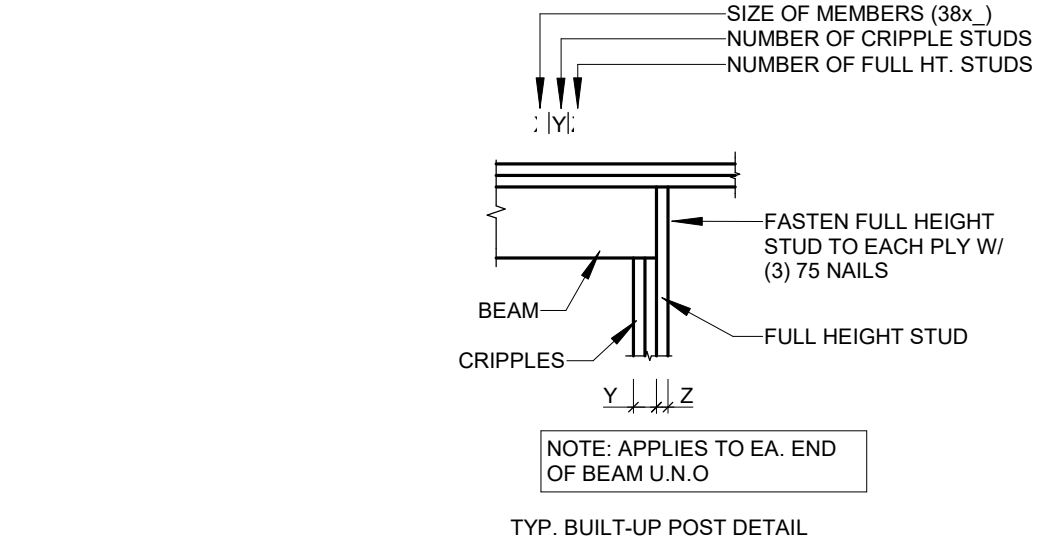
16-107 S4.3

REVISION No.	6
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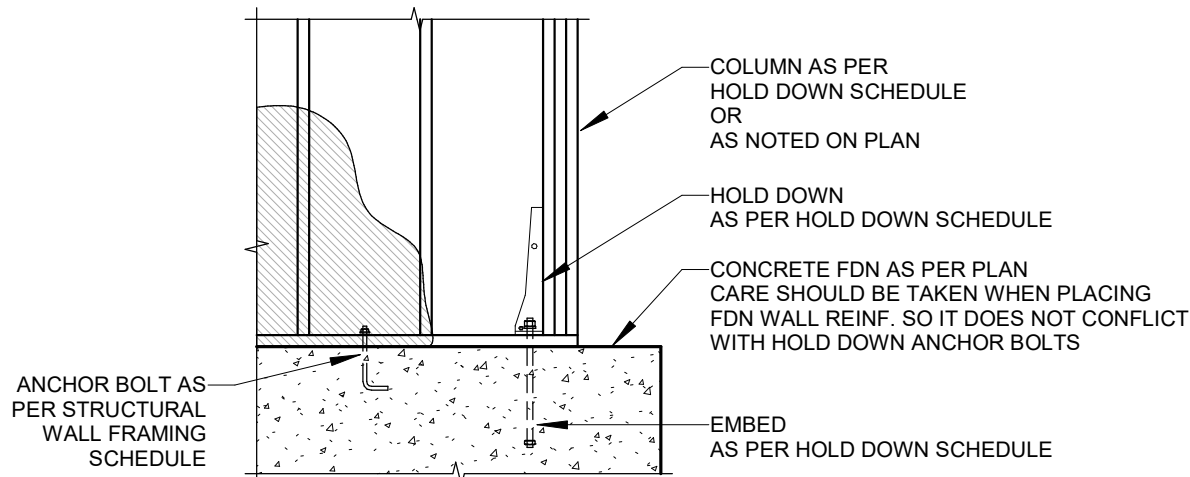
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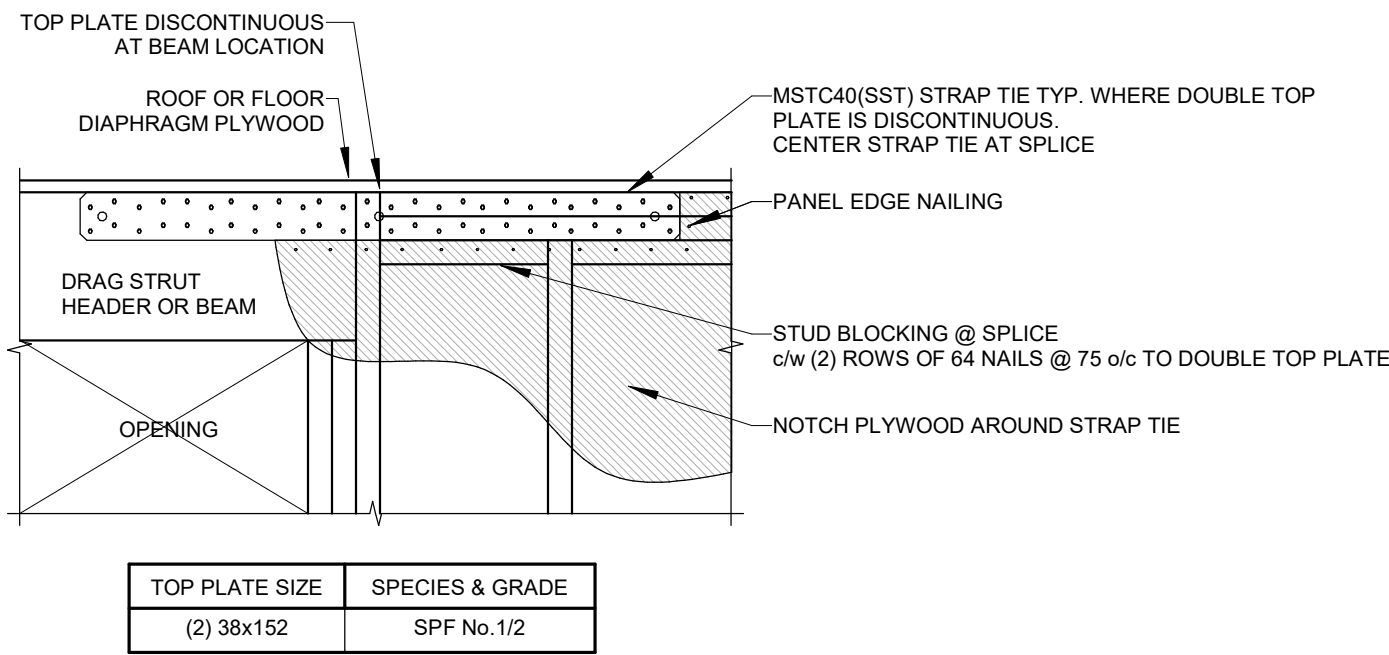




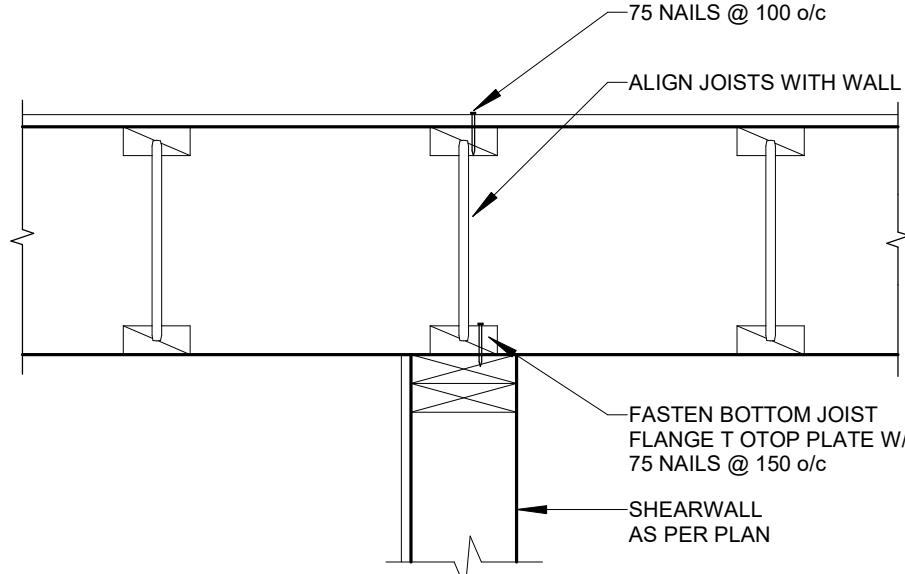
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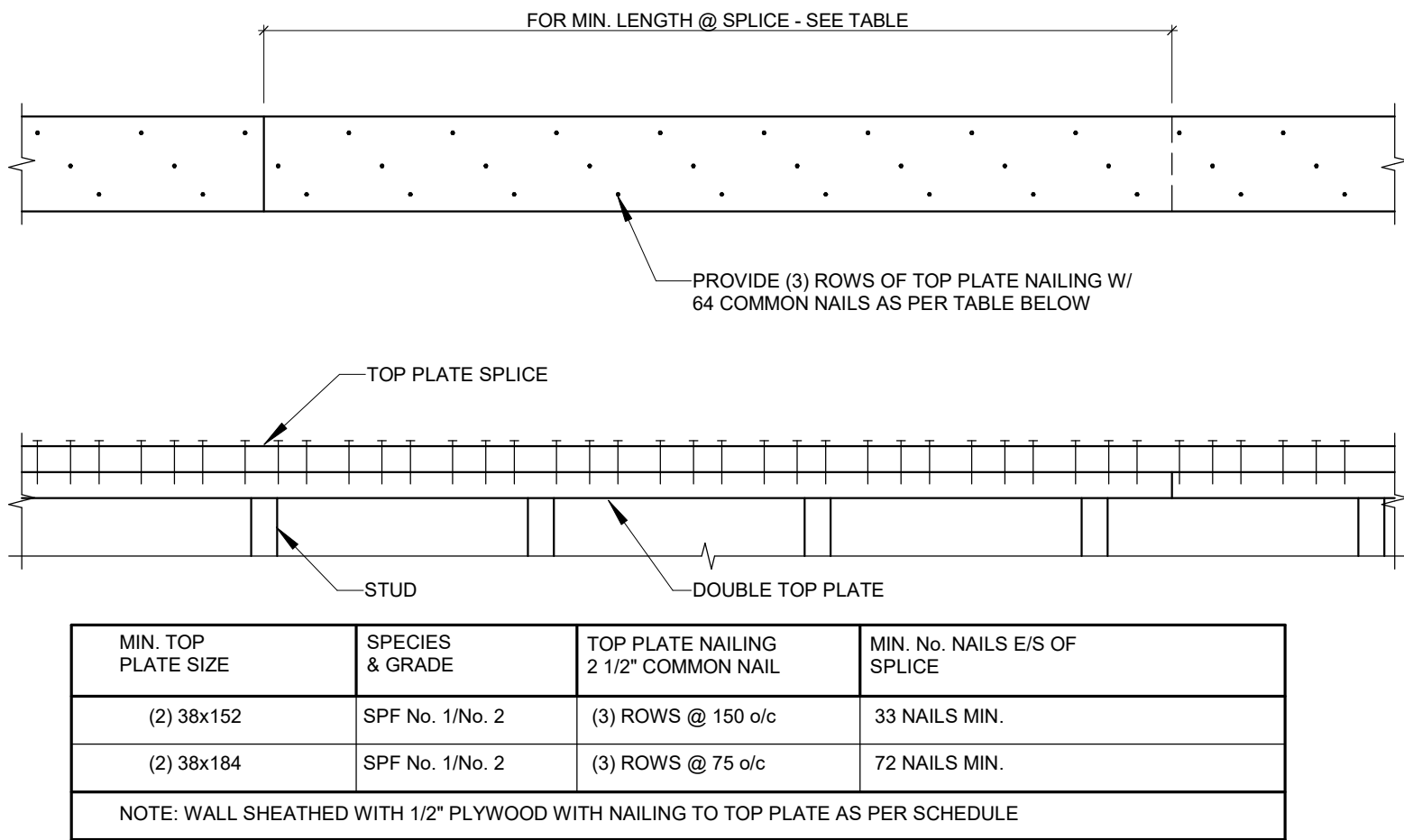
2 FRA. SHEARWALL HDU(SST) HOLD DOWN AT FOUNDATION LEVEL  
1 : 25



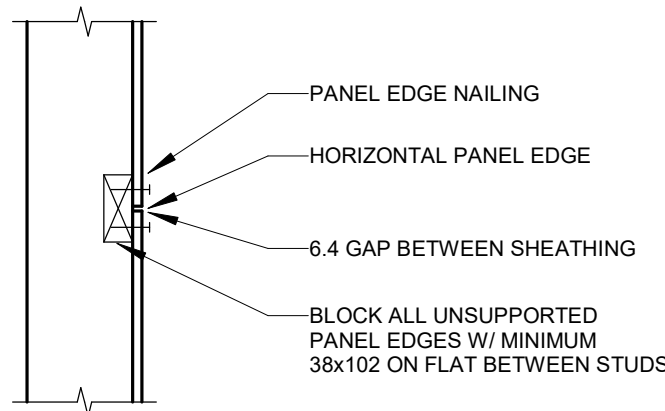
3 FRA. SPLICE CONNECTION AT DISCONTINUOUS TOP PLATE  
1 : 12



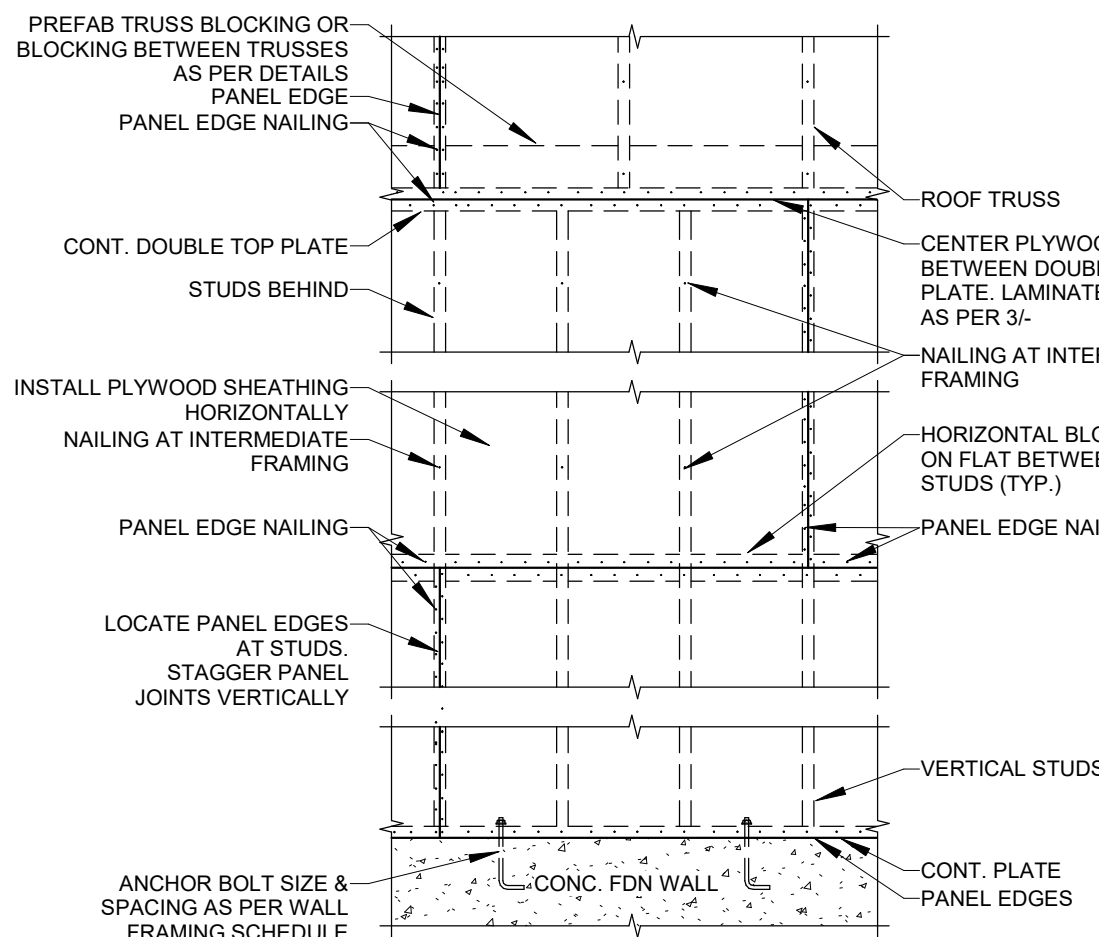
4 FRA. TJI JOIST TO WALL CONN  
1 : 10



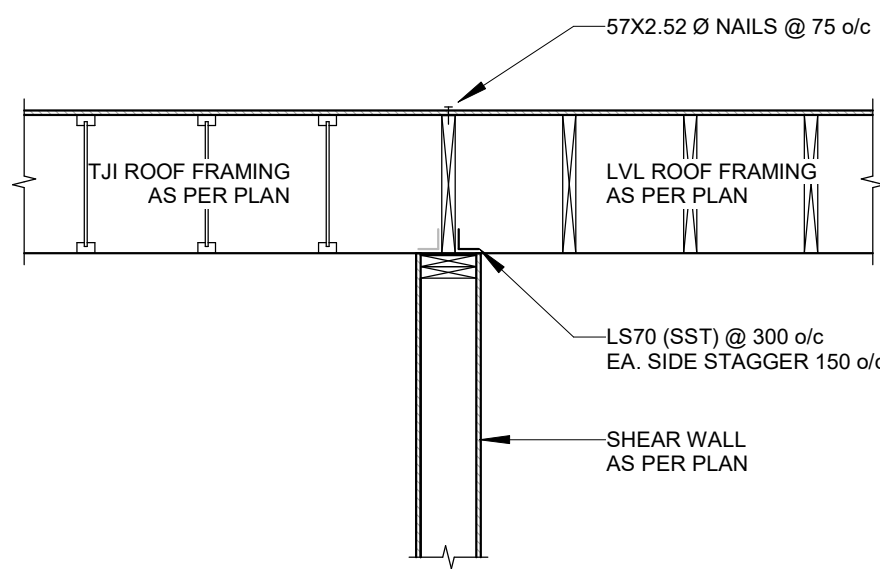
5 FRA. TYP. DOUBLE TOP PLATE SPLICE DETAIL  
1 : 10



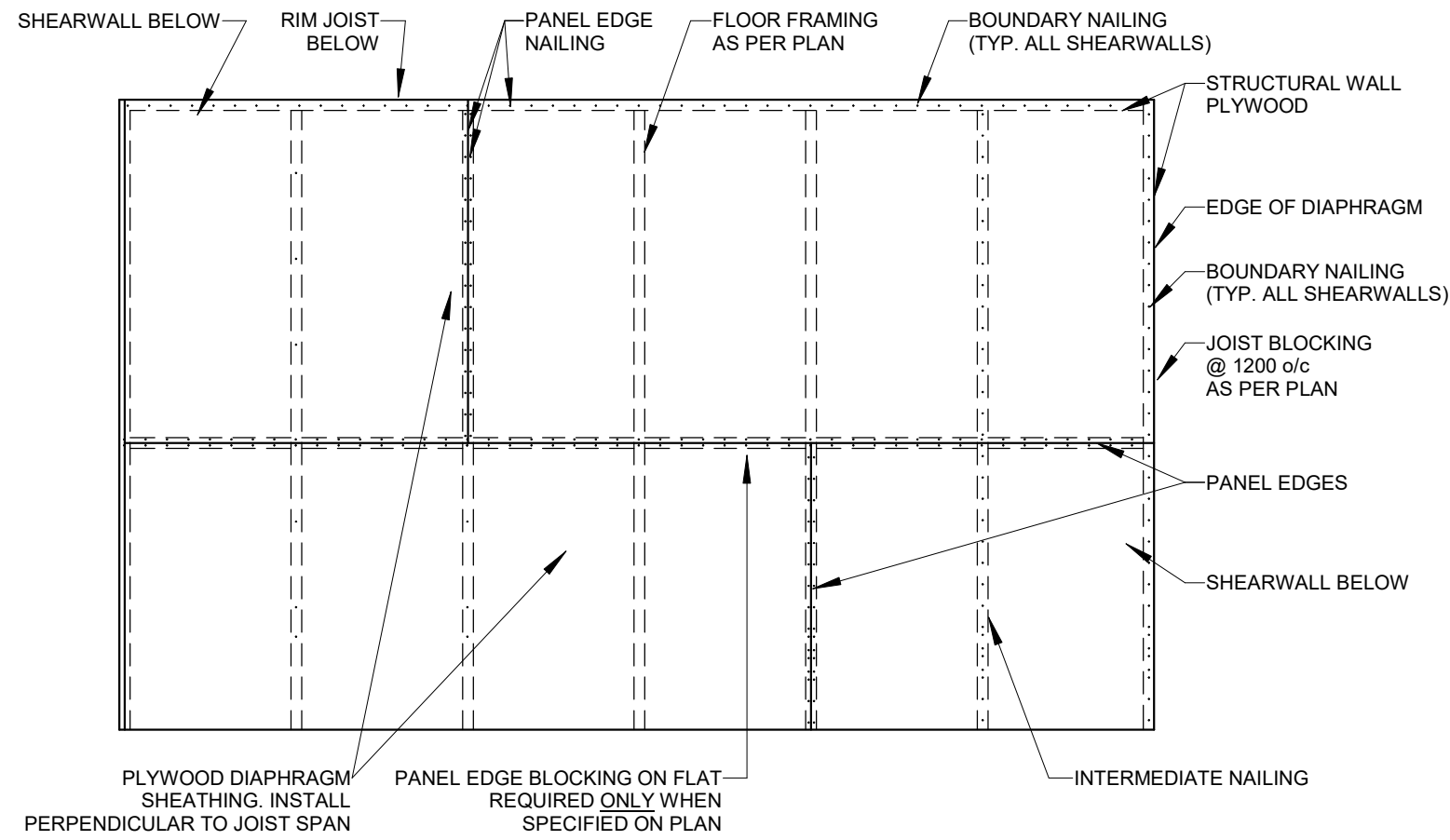
6 FRA. TYP. SHEARWALL PANEL EDGE NAILING TO BLOCKING  
1 : 10



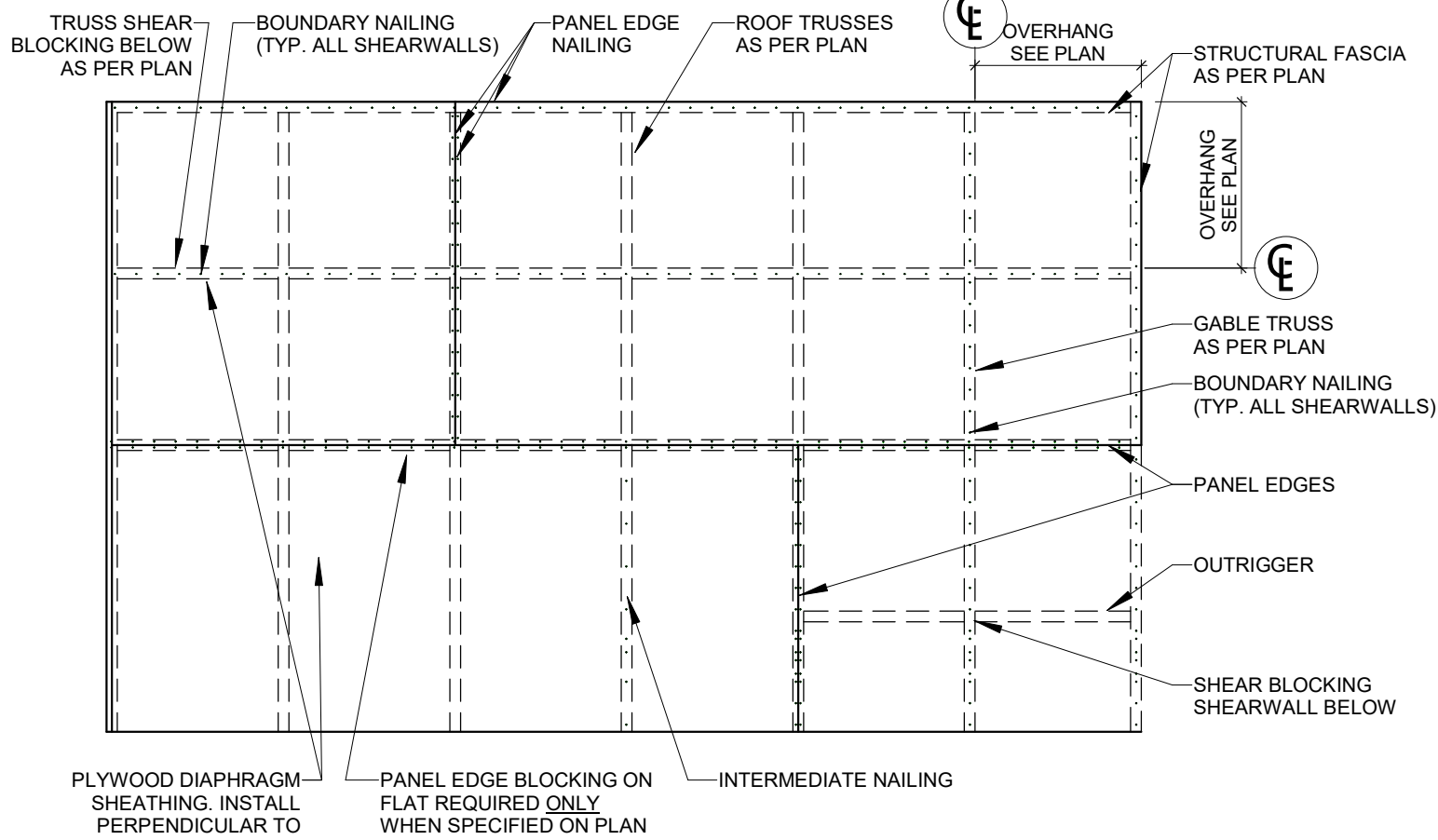
7 TYP. SHEARWALL PANEL NAILING DETAILS  
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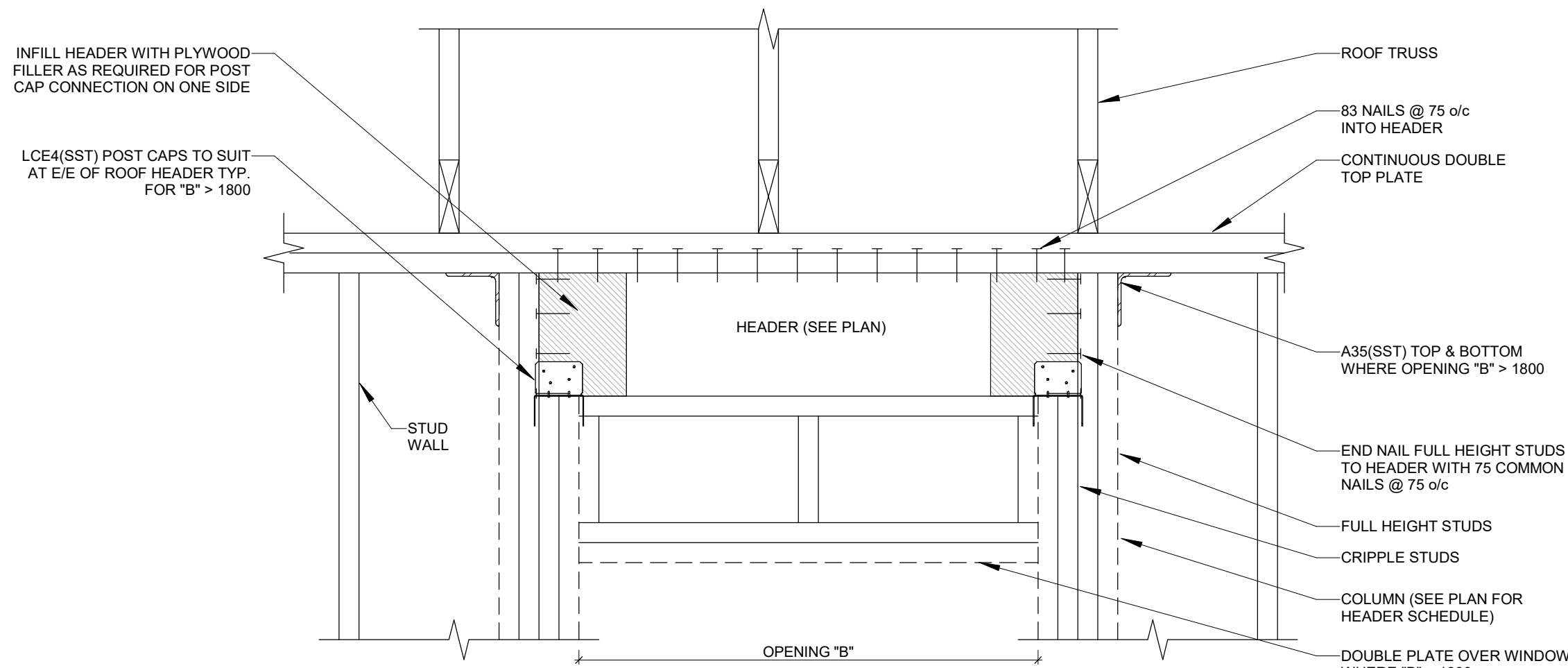
8 SHEARWALL TO ROOF FRAMING CONNECTION  
S2.3 1 : 25



9 FRA. TYP. FLOOR DIAPHRAGM NAILING PLAN U.N.O.  
1 : 25



10 FRA. TYP. ROOF DIAPHRAGM NAILING PLAN U.N.O.  
1 : 25



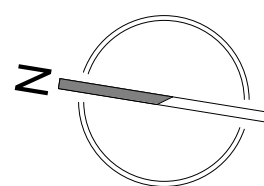
11 FRA. WALL/HEADER FRAMING DETAIL  
1 : 10

REV.	DATE	DESCRIPTION
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2	2017/03/17	ISSUED FOR COORDINATION - 90%
3	2017/04/11	ISSUED FOR TENDER
4	2017/05/04	ISSUED FOR BUILDING PERMIT
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DATE 2017/08/09  
FILE NAME

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DRAWING TITLE  
**SECTIONS AND  
DETAILS**

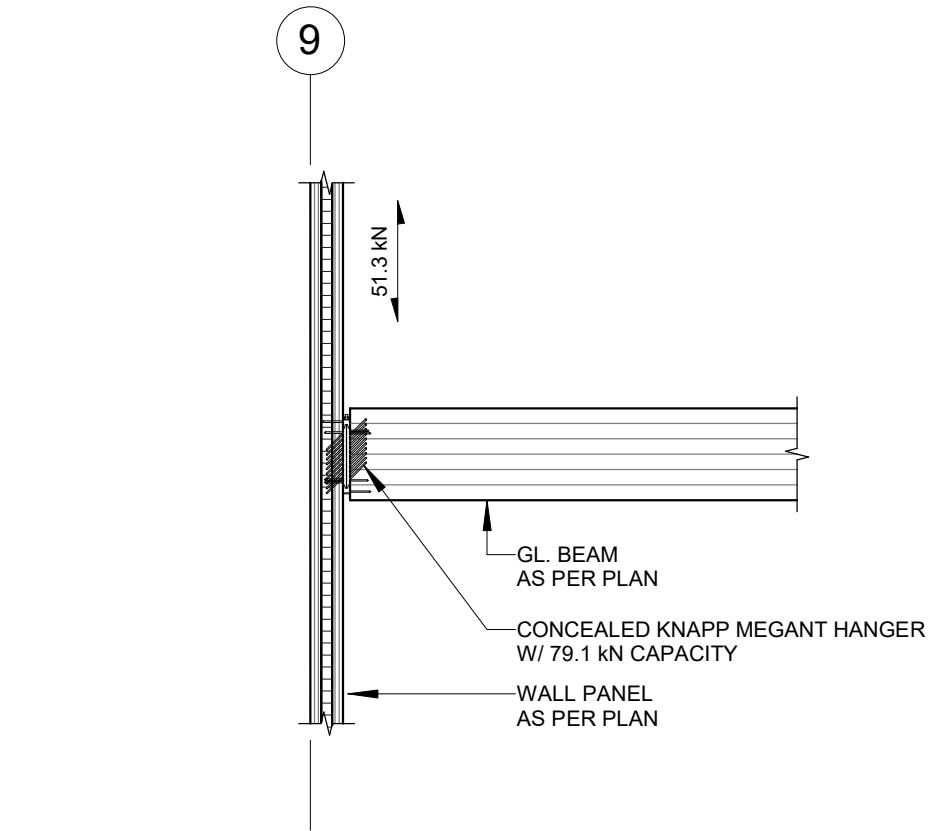
PROJECT SHEET

**16-107 S4.4**

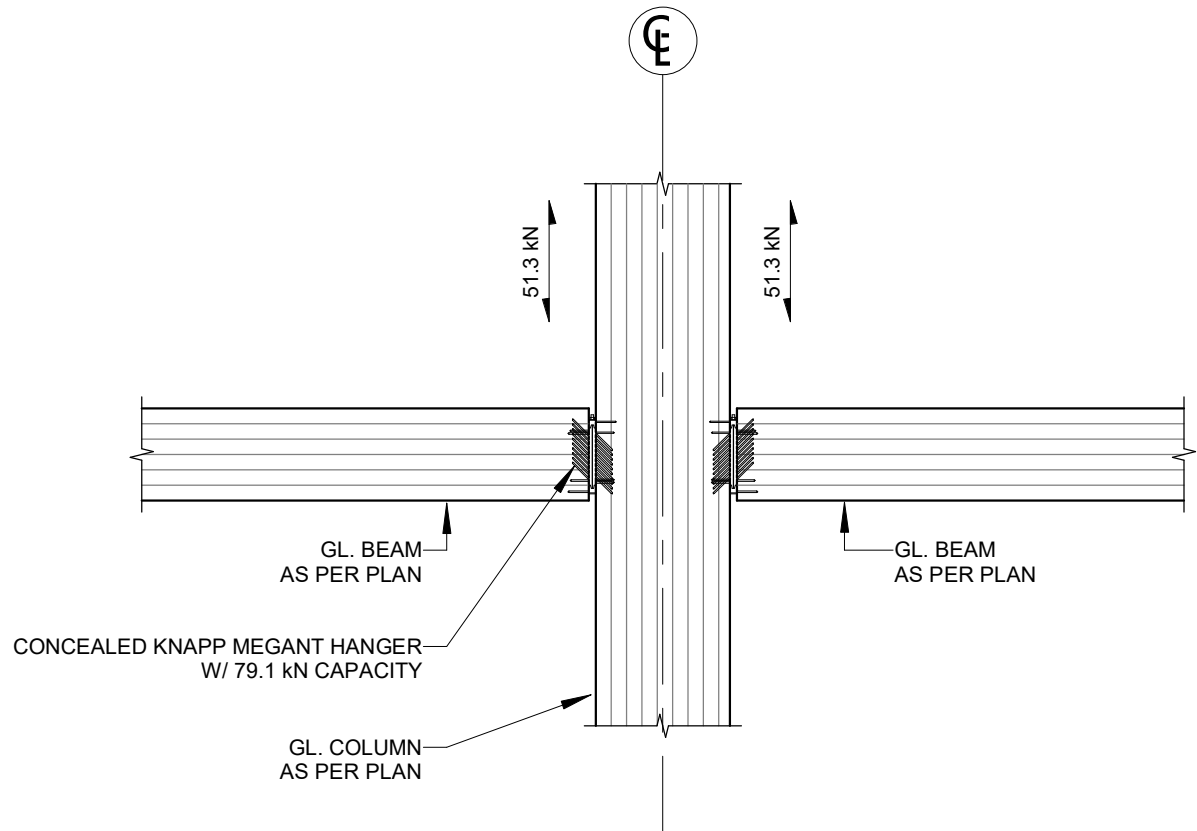
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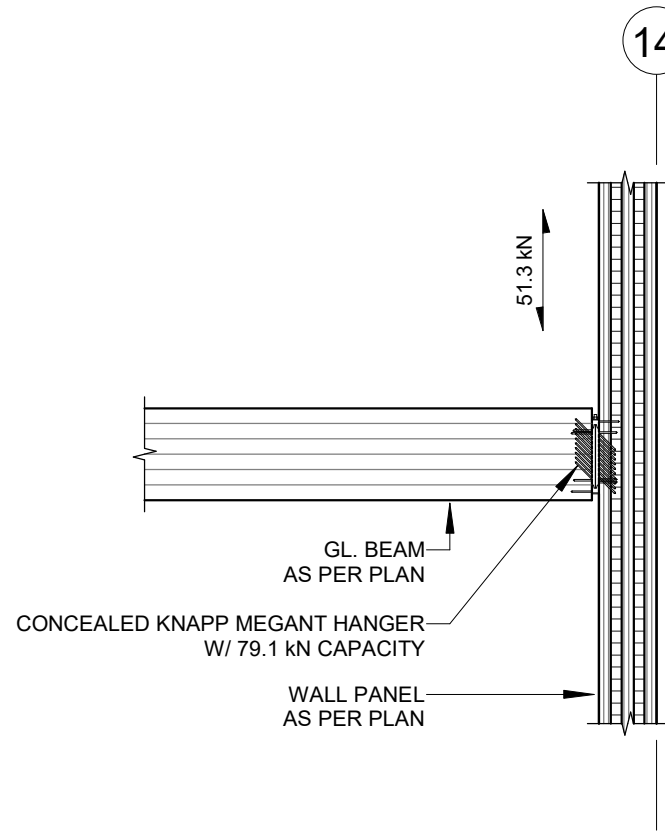




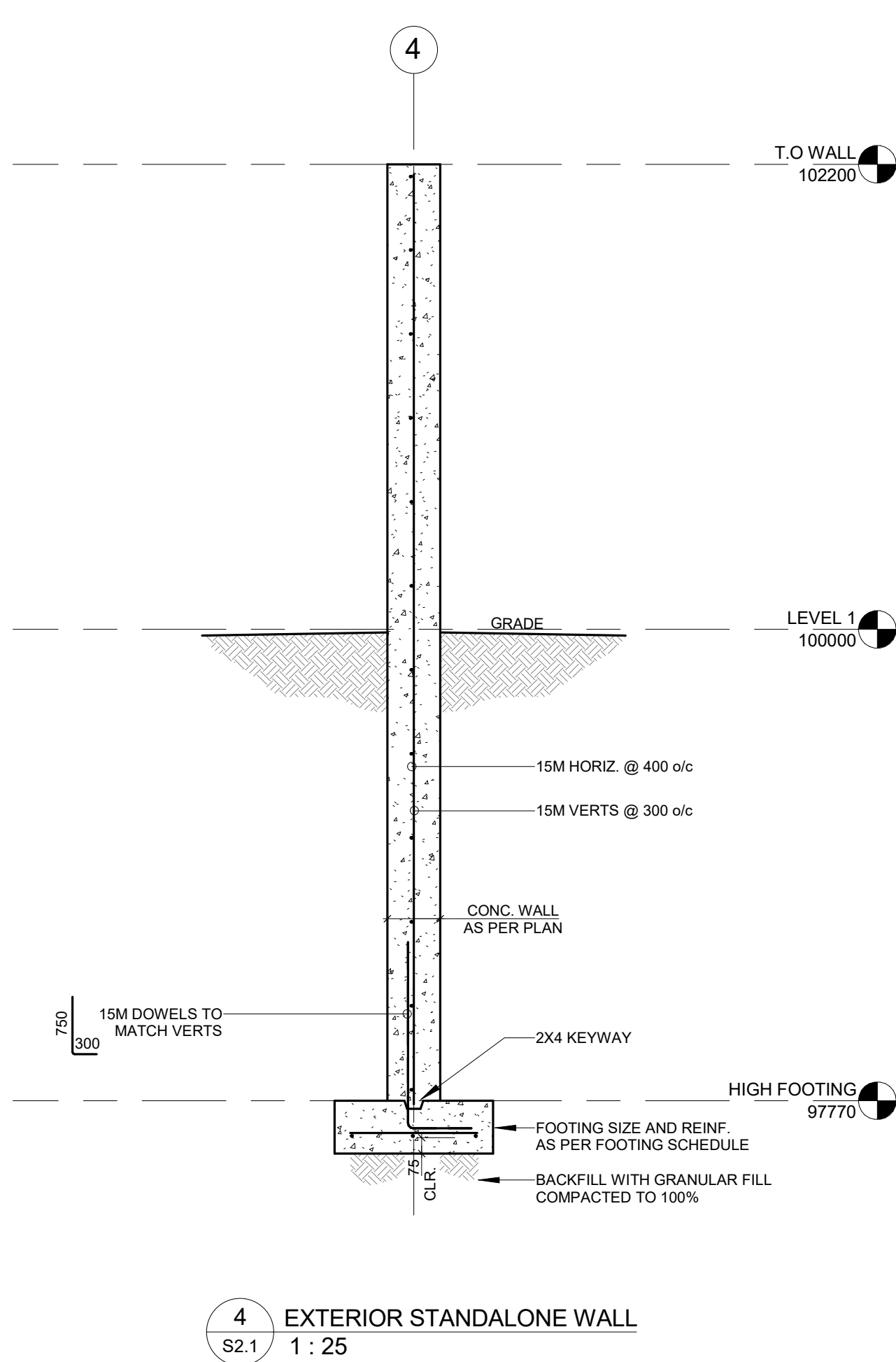
1 GLULAM TO CLT WALL PANEL MYTICON CONNECTION - TYPE 1  
S4.5 1 : 25



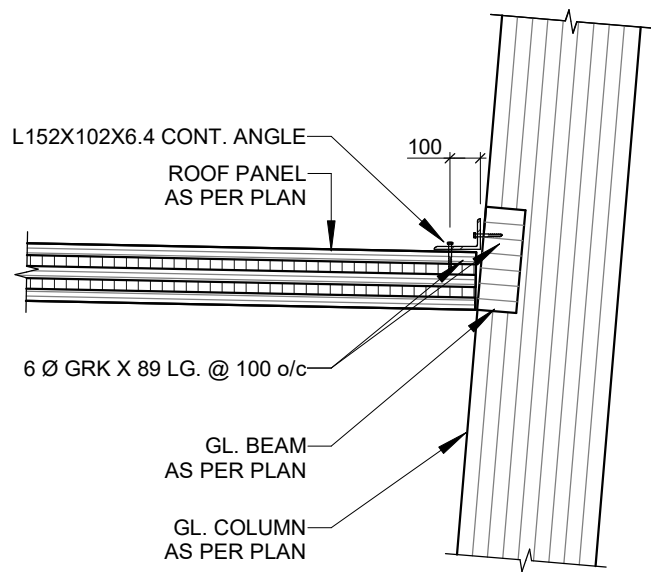
2 GLULAM TO PSL COLUMN MYTICON CONNECTION  
S2.3 1 : 25



3 GLULAM TO CLT WALL PANEL MYTICON CONNECTION - TYPE 1  
S2.3 1 : 25

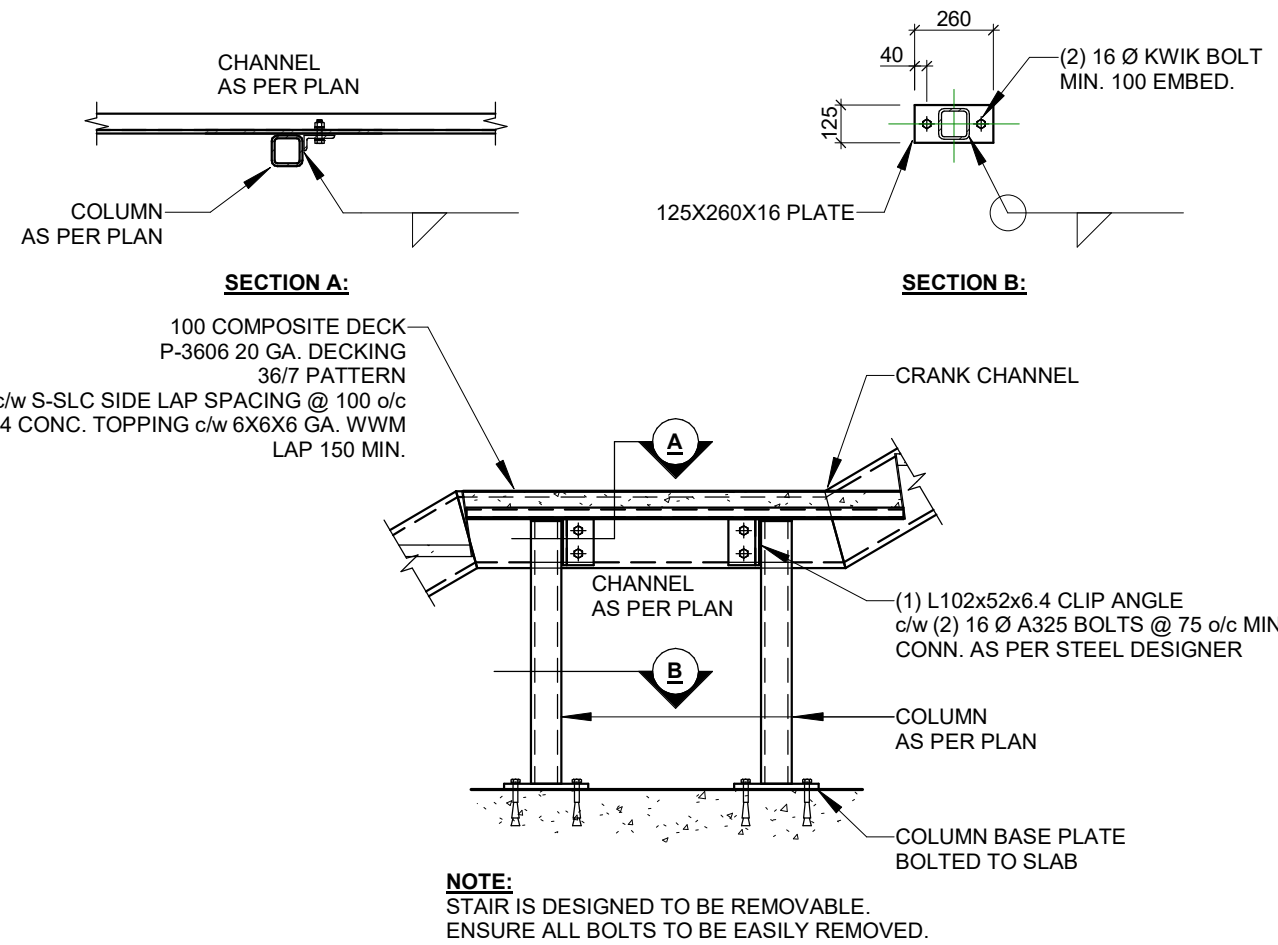


4 EXTERIOR STANDALONE WALL  
S2.1 1 : 25

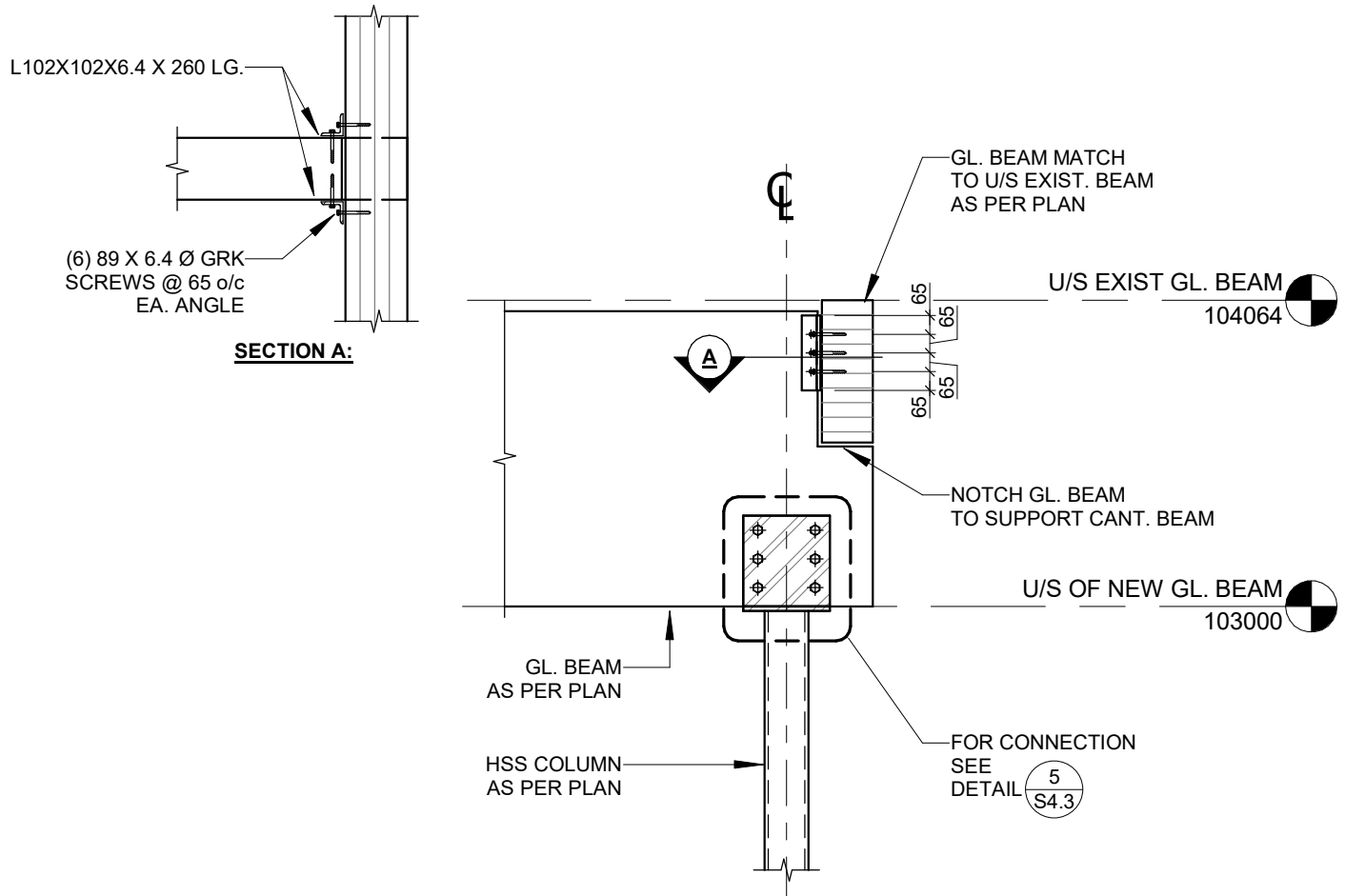


5 ROOF PANEL TO GLULAM BEAM CONNECTION  
S2.3 1 : 25

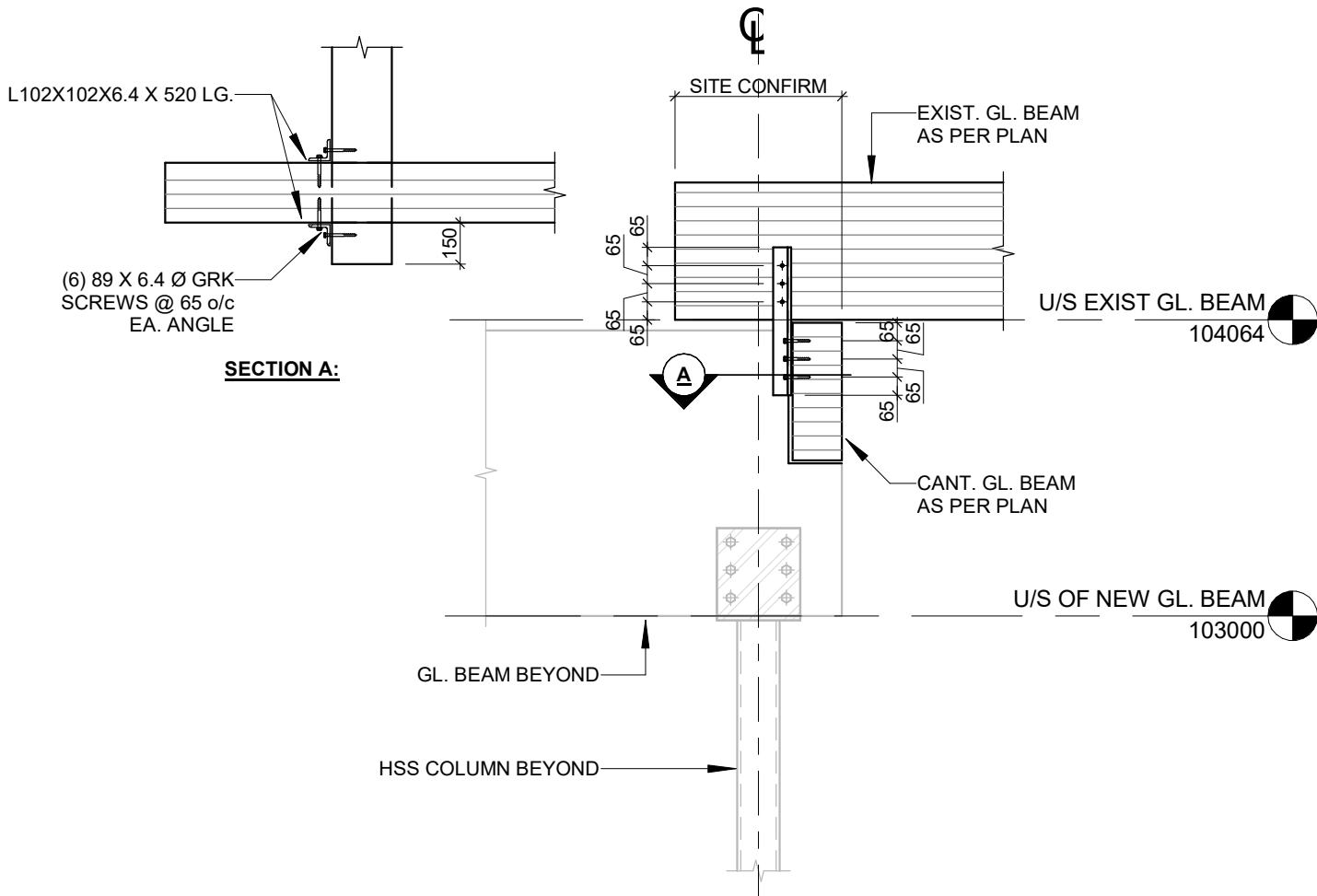
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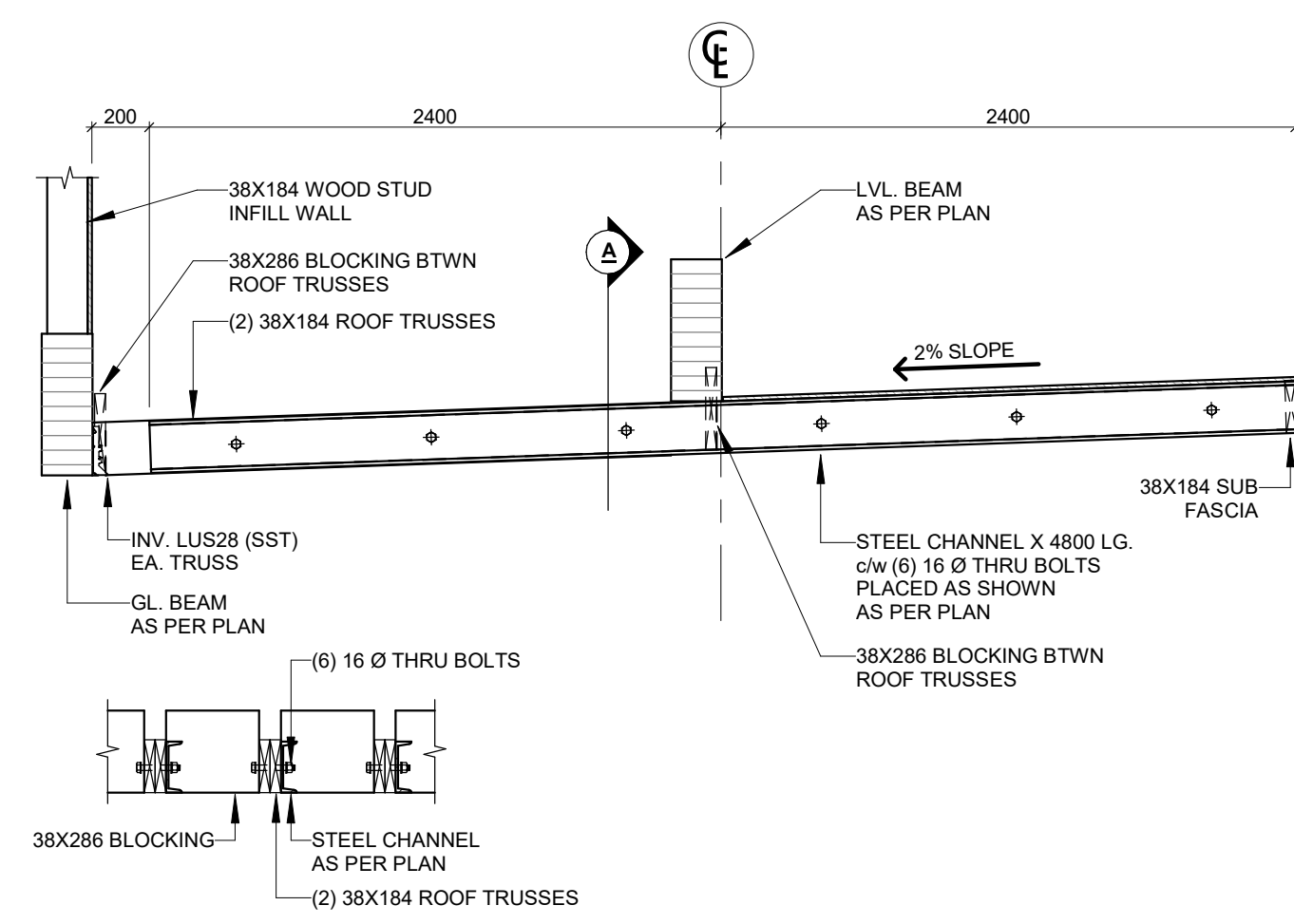
7 MID STAIR STRINGER TO COLUMN CONNECTION  
S4.5 1 : 25



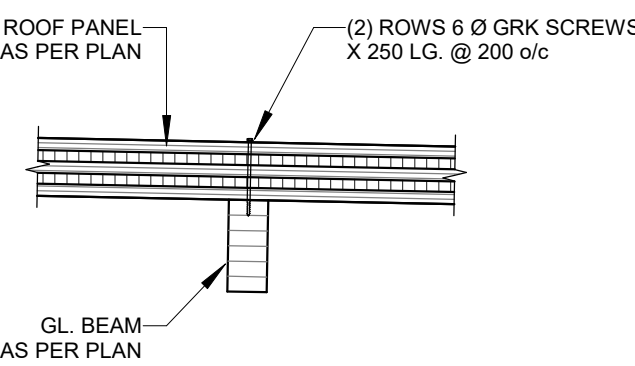
8 GLULAM BEAM NOTCH TO SUPPORT GLULAM BEAM  
S2.3 1 : 25



9 CANTILEVER GLULAM SUPPORT TO EXIST. BEAM  
S2.3 1 : 25



10 APRON SUPPORT - TYPE 2  
S2.3 1 : 25



11 CLT ROOF PANEL TO PSL CONNECTION  
S4.5 1 : 25

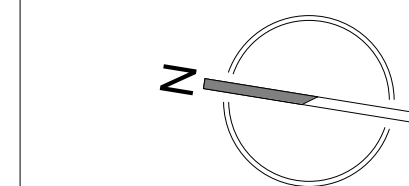
REV.	DATE	DESCRIPTION
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2	2017/04/11	ISSUED FOR TENDER
3	2017/05/04	ISSUED FOR BUILDING PERMIT
4	2017/07/19	POST TENDER ADDENDUM No. 1
5	2017/08/09	ISSUED FOR CONSTRUCTION

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