

Structural, LLC Design Standards

Revised 01/24/24

Roof Trusses

- Deflection Limits
 - Roofs
 - SLLC Standards: L/360 or 1.75" Live Load; L/240 or 2.25" Total Load (All Residential)
 - For Agricultural Pole Barn Trusses refer to document on Agricultural Pole Barn Trusses Loading for SLLC on M: Drive - M:\Design Dept\Resources
 - Code Limits: L/240 Live; L/180 Total (Agricultural Buildings)
- Lumber Upgrade for Length of Trusses
 - Over 45'-0" Trusses – Upgrade to 2x6 top chord (especially flat top sections)
 - 50'-0" Trusses – Upgrade to 2x6 top and bottom chord
 - Over 60'-0" Trusses – Upgrade to 2x6 top chord and 2x8 bottom chord
 - **Trusses between 60'-0" and 70'-0" must be reviewed by Senior Designer**
 - **Additional Delivery fees will apply**
- Max Height and Length of Trusses
 - Roof Trusses
 - Length – 60'-0"
 - **Trusses between 60'-0" and 70'-0" must be reviewed by Senior Designer**
 - Height – 12'-0" (all other states)
 - 8'-6" for DC
 - 10'-5" for WV
- Maximum span to Depth ratio of 20
 - Length of Floor / Depth of Floor < 20
- Girders/Beams
 - Multiply Fastening for 3 ply and 4 ply LVL
 - 3 ply & 4 ply LVL provide screw connection detail on layout
 - include screw qty in material list
 - If bolt connection is required per plan put detail on layout
 - Note by others
 - Beams provided in material list
 - Flush beams will not be included with the roof system
 - These will be broken out as optional in a separate quote for pricing purposes.
 - Dropped beams and EWP posts will not be included with the roof system
 - These will be broken out as optional in a separate quote for pricing purposes.
 - Girders 3ply and 4 ply bolting is required
- Party Walls / Common Bearing walls
 - Trusses span should be shortened ½" (1/4" each side) where they bear on a party wall or share a common bearing at each instance. **(ALWAYS check with sale 1st)**
- Symmetry with Hip Roofs
 - Make designs as symmetrical as possible. If similar trusses in a run can be matched, match the portion that is the same, within reason.
 - Disregard hitting ridges to eliminate an extra truss and keep jacks the same on each side.
- Drop flat top chords on hip step down trusses for lay down framing.
- Standard Hip jack framing
 - Atlantic Hip
- Framing Valley trusses from Peak down when all valleys are same pitch and sit on the same pitch to optimize truss types.
- Jack/Mono Trusses
 - Remove end verticals when heel does not exceed 1'-0", truss does not exceed a span of 3'-0", and the height is not over 3'-0".
 - Use Ledger notch or Toenail connections when possible. See below.
 - 400lb max load on 2x4 ledger notches.
 - 300lb max load on toenail connections.

- Piggyback Trusses
 - Gable spacing at 4'-0" on center.
 - Piggyback trusses 16'-0" and over should have diagonal webs added for stability.
 - Caps on Girders
 - Ridge beams or others loads applied to the cap must transfer to the girder truss below.
 - Unloaded caps may be a single ply
 - Hip Caps – make sure there is a vertical at each pitch break and add any other necessary verticals as needed to not exceed max panel length.
- Gable Trusses
 - Eliminate structural gables when applicable by adding a common truss next to the gable to support.
 - Gable truss must be less than 45'-0".
 - Stud gables from peak out or center out so that gable studs stay symmetrical.
 - Gable trusses need to match the profile of the adjacent trusses next to them for bracing purposes.
 - i.e. Attics, Scissors, Vaults
- Labeling
 - Re-label trusses in a manner that is easy for the builder to follow.
 - Ex: Main House Trusses (A1, A1A, A1B, A1G), Bump out (B1, B1A, B1G), Valley Set (V1, V2, V3)
 - Try to keep this labeling sequence in mind. Label in the order the builder will put the roof on the building. This will also, in theory, be how it is batched, built, loaded on the truck and delivered to the site.
 - Please refrain from using the following truss labels:
 - Also, keep in mind that Q and O, 1 and I look very similar on small sheets of paper.
 - Use common sense when labeling your trusses.
- Soffit Adjusting
 - Overhangs: Adjust High pitches to the lowest Pitch
 - Cantilevers: Adjust Low pitches to the Highest Pitch

Floor Trusses

- Deflection Limits
 - Floors:
 - SLLC Standards: L/480 or .5" Live Load; L/360 or 1.5" Total Load
 - Code Limits: L/360 Live; L/240 Total
 - Marble/Tile: L/720 or .25" Max
- Max Height and Length of Trusses
 - Floor Trusses
 - Length – 40'-0" (**Max length but try not to design at this length**)
 - Height – 24"
- Standard web patterns:
 - Single Families and Townhouse projects
 - Warren pattern – 1'-3" web with verticals at 5'-0" for strong backs
 - Commercial projects
 - K-web pattern – 2'-6" web with verticals at 5'-0" for strong backs
- HVAC (vertical return air chases)
 - Need to allow on 1st level a location for a vertical chase in floor system regardless if Arch/Eng has made accommodations in the plans.
- Maximum span to Depth ration of 20
 - Length of Floor / Depth of Floor < 20
- Beams
 - Multiply Fastening for 3 ply and 4 ply LVL
 - 3 ply & 4 ply LVL provide screw connection detail on layout
 - include screw qty in material list
 - If bolt connection is required per plan put detail on layout
 - Note by others
 - Beams provided in material list
 - Flush beams will be included with the floor system, unless directed by sales not to include.
 - These may be broken out as optional in a separate quote for pricing purposes.

- Dropped beams and EWP posts will be included with the floor system, unless directed by sales not to include.
 - These may be broken out as optional in a separate quote for pricing purposes.
- Hangers
 - Use THA hanger's 1st before using IUS hangers.
 - Top Mount hangers
 - Provide at the following situations:
 - Double Truss to Double Truss
 - Face Mount hangers
 - Provide at the following situations:
 - Truss to Truss
 - Truss/LVL to LVL
 - Trusses hanging from both sides of Double Truss or LVL
- Spacing
 - Foundation Walls
 - Need at least 1'-0" off the inside of Foundation walls for insulation
 - Plumbing Drops
 - Shift truss minimum of 4" to avoid drops and allow odd spacing to avoid adding additional truss
 - Bump Outs/Projections
 - If truss falls about 2"/3" from corner of bump out/projection, shift truss to extend for bump out to avoid adding additional truss
 - Stair Openings
 - Design stair header with standard on center spacing and fill in with small truss at top of stairs for flexibility
 - Turned trusses @ Cantilevers
 - Make Double truss or LVL at standard on center spacing or 3 to 1 back span, whichever works out better
 - Truss Starting Point
 - Start truss run at longest length; this should add any extra trusses on the shorter side of house, typically behind the garage
- Party Walls / Common Bearing walls
 - Trusses span should be shortened ½" (1/4" each side) where they bear on a party wall or share a common bearing at each instance. **(ALWAYS check with sale 1st)**
 - Shorten trusses butting to LVL or Steel by ¼" for flexibility.

I – Joists

- Deflection Limits
 - I-Joist:
 - SLLC Standards: L/480 and 0.5" Live Load; L/240 and 0.5" Total Load
 - Code Limits: L/360 Live; L/240 Total
- Max Joist/LVL Length
 - Length – 48'-0"
- Maximum span to Depth ration of 20
 - Length of Floor / Depth of Floor < 20
- Rimboard
 - Provide Rimboard at all exterior walls for floor enclosure
- Blocking Panels
 - Provide at the following situations only:
 - Cantilevers
 - Split joists at bearing walls
 - Wind Bracing Detail @ parallel walls
 - On 1st floor when there is bearing load from above. (Squash block can be used as well)
- Beams
 - Portal Frame Walls
 - Double check Wind Bracing Details vs Structural drawings for correct beam sizes and length
 - Multiply Fastening for 3 ply and 4 ply LVL

- 3 ply & 4 ply LVL provide screw connection detail on layout
 - include screw qty in material list
 - If bolt connection is required per plan put detail on layout
 - Note by others
 - Beams provided in material list
 - Flush beams will always be included with floor system
 - Dropped beams and EWP posts will always be included with floor system (**unless told otherwise**)
 - Roof Level beams and EWP posts will always be included with floor system (**unless told otherwise**)
- HVAC (vertical return air chases)
 - Need to allow on 1st level a location for a vertical chase in floor system even if Arch/Eng has made accommodations in the plans.
- Hangers
 - Face Mount hangers
 - Provide at the following situations:
 - Joist/LVL to LVL
 - Joists hanging from both sides of Double Joist or LVL
 - Top Mount hangers (only use if specially requested)
 - Provide at the following situations:
 - Joist to Joist
 - Double Joist to Double Joist
- Spacing
 - Foundation Walls
 - Need at least 1'-0" off the inside of Foundation walls
 - Plumbing Drops
 - Shift joist minimum of 4" to avoid drops and allow odd spacing to avoid adding additional joist
 - Bump Outs/Projections
 - If joist falls about 2"/3" from corner of bump out/projection, shift joist to extend for bump out to avoid adding additional joist
 - Stair Openings
 - Design stair header with standard on center spacing and fill in with small joist at top of stairs for flexibility
 - Turned Joists @ Cantilevers
 - Make Double Joist or LVL at standard on center spacing or 3 to 1 back span, whichever works out better
 - Joist Starting Point
 - Start joist run at longest length; this should add any extra joist on the shorter side of house, typically behind the garage