Low-Rise Residential Construction Details

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Introduction

These details were developed by the Light Gauge Steel Engineers Association (LGSEA) for the North American Steel Framing Alliance (NASFA). They are intended to provide designers and contractors with guidance on design, detailing, and construction of low-rise residential buildings that utilize cold-formed steel framing members. Details contained in this document were selected based on their cost effectiveness at the time of this publication. Efforts have been made to present accurate, reliable, and useful information. The connections between members are shown as screw connections; other types of connections such as welds, bolts, powder-acted fasteners, clinches, or pneumatically driven fasteners are acceptable. Although it is common for cold-formed steel framing members to have web “punchouts” for passing bracing or utilities, punchouts are shown in some details only. Punchouts are acceptable and vary in size, configuration, and spacing depending on the manufacturer and/or design. NASFA acknowledges Nader Elhajj, P.E., for assembling and drafting the details. Special appreciation is extended to Kevin Bielat of the American Iron and Steel Institute (AISI) and Tim Waite of NASFA for their assistance and guidance. NASFA recognizes the following LGSEA committee members who helped select the details contained in this document:

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Definitions
Anchor: Metal rod, wire, strap, or bolt that secures structural members (such as joists and tracks) to its structural supports (such as foundation).
Axial Load: The longitudinal force acting on a member. Examples are the gravity loads carried by columns or studs.
Blocking: Solid block or piece of material placed between structural members to provide lateral bracing as in bridging and/or edge support for sheathing.
Bridging: Cross bracing or blocking placed between joists to provide lateral support.
C-Shape: A basic cold-formed steel shape used for framing members (such as studs, joists, headers, and rafters). It consists of a web, flange, and lip. It is also called a “C-section.”
Cantilever: An extension of roof or floor framing members without a direct support.
Ceiling Joist: A horizontal structural framing member that supports a ceiling and attic loads.
Clip Angle: An L-shaped short piece of metal (normally with a 90-degree bend). It is typically used for connections.
Continuous Joist: A joist that spans over interior supports.
Collar Tie: Brace member used to brace roof rafters near the top.
Cripple Stud: A stud that is placed between a header and a window sill (or jamb) or a windowsill and a bottom track to provide a backing to attach finishing and sheathing material.
Diaphragm: A roof or floor system designed to transmit lateral forces to shear walls or other vertical resisting elements.
Flange: The part of a C-Shape or track that is perpendicular to the web.

Flat Strap: Sheet steel cut to a specified width without any bends. Typically used for bracing and transfer of loads by tension.

Floor Joist: A horizontal structural framing member that supports floor loads.

Gable End: Where the triangular upward extension of either side walls or the front walls of the house provide the end supports for the two sloping roof planes.

Header: A horizontal built-up structural framing member used over wall or roof openings to transfer loads above the opening to adjacent vertical framing members.

Heel Joint: The connection between the roof rafter and the ceiling joist.

In-Line Framing: Framing method where all vertical and horizontal load carrying members are aligned when required to properly transfer loads.

Jack Stud: A vertical structural member that does not span the full height of the wall and provides bearing for headers. Sometimes referred to as trimmer studs.

King Stud: A vertical structural member that spans the full height of the wall and supports vertical loads and lateral loads. Usually located at both ends of a header adjacent to the jack studs.

Lip: The part of a C-Shape that extends from the flange at the open end. The lip increases the strength characteristics of the member and acts as a stiffener to the flange.

Material Thickness (steel): The base metal thickness excluding any protective coatings. Thickness is now commonly expressed in mils (1/1000 of an inch).

Mil: A unit of measurement used in measuring the thickness of thin steel elements. One mil equals 1/1000 of an inch (e.g. 33 mil = 0.033 inch).

Multiple-Span: The span made by a continuous member having intermediate supports.

Non-Load Bearing Walls (non-structural walls): Refer to Walls.

Overlap Joists: Two or more joists extending over a common support where the end of one joist is fastened to the end of another joist.

Overhang: See cantilever.

Punchout (or hole): An opening in the web of a steel-framing member allowing for the installation of plumbing, electrical, and utilities. A punchout or hole may be made during the manufacturing process or in the field with a hand punch, hole saw, or other suitable tool.

Rafter: A structural framing member (usually sloped) that supports roof loads.
Ridge: The horizontal line formed by the joining of the top edges of two sloping roof surfaces.

Shearwall: A vertical wall assembly capable of resisting lateral forces to prevent racking from wind or seismic loads acting parallel to the plane of the wall.

Single Span: The span made by one continuous structural member without any intermediate supports.

Splice: A joint at which two pieces are joined to each other.

Span: The clear horizontal distance between bearing supports.

Structural Sheathing: The covering (e.g. plywood or oriented strand board) used directly over structural members (e.g. studs or joists) to distribute loads, brace walls, and generally strengthen the assembly.

Stud: Vertical structural element of a wall assembly that supports vertical loads and/or transfers lateral loads.

Track: Used for applications such as top and bottom plate for walls and band or rim joists for flooring systems. A track has a web and two flanges, but no lips. Track web depth measurements are taken to the inside of the flanges.

Truss: An engineered structural component designed to efficiently carry its own weight and superimposed design loads. The truss members form a triangular structural framework.

Walls:

Load Bearing: Wall systems subject to loads that exceed the limits for a non-structural system (e.g. wall studs).

Non-Load Bearing: Wall systems that are limited to 10 psf maximum lateral (transverse) load and/or limited, exclusive of sheathing materials, to 100 pounds per lineal foot or 200 pounds maximum superimposed vertical load per member (e.g. interior partitions).

Web: The part of a C-Shape or track section that connects the two flanges.

Web Opening: See “Punchout.”

Web Perforation: See “Punchout.”

Web Stiffener: Additional material that is attached to the web to strengthen the member against web crippling. Also called a bearing stiffener.
Detail G1
Schematic of Typical Steel-Framed House
Detail G2
C-Shape Configuration

Detail G3
Track Configuration
Detail G4
Joist Web Holes

Detail G5
Stud Web Holes
Detail G6
Joist Web Hole Patch

Detail G7
Stud Web Hole Patch
Detail G8
In-Line Framing Detail

- STUD
- TRACK
- HORIZONTAL FRAMING MEMBER
- VERTICAL FRAMING MEMBER
- PER DESIGN
Detail G9
Web Stiffener Detail 1

Detail G10
Web Stiffener Detail 2
Detail G11
Web Stiffener Detail 3

WEB STIFFENER WITH SCREWS AS REQUIRED

JOIST
Detail G12
Track Splice Detail

C-SHAPE INSIDE TRACK

SCREWS THROUGH WEB OR FLANGES @ EACH SIDE OF SPLICE

SPlice LENGTH AS REQUIRED

TRACK
Detail G13
Screw Attachment Detail

- SHEATHING THICKNESS
- EXPOSED THREADS AS REQUIRED
- FRAMING MEMBER

- HEX HEAD
- LOW PROFILE HEAD
- TYPICALLY SCREW FASTENED THRU THINNER STEEL TO THICKER STEEL AS SHOWN.
- EXPOSED THREADS AS REQUIRED
Detail F2
Floor to Foundation Connection

- **WEB STIFFENER**
  - (AS REQUIRED)
- **TRACK**
- **SILL SEALER**
  - AS REQUIRED
- **SHEATHING**
- **JOIST**
- **FOUNDATION**
- **ANCHOR BOLT OR OTHER CONNECTION AS REQUIRED**

CLIP ANGLE FASTENED TO TRACK,
SIZE, THICKNESS, SPACING & NO.
OF FASTENERS AS REQUIRED
Detail F3
Floor to Wood Sill Connection

- SHEATHING
- WEB STIFFENER AS REQUIRED
- TRACK
- SCREWS AS REQUIRED
- COMMON NAILS AS REQUIRED
- STEEL PLATE (SIZE & SPACING AS REQUIRED)
- ANCHOR BOLT OR OTHER CONNECTION AS REQUIRED
- WOOD SILL AS REQUIRED
- FOUNDATION
- SILL SEALER AS REQUIRED
Detail F4
Floor to Load Bearing Wall Connection

WEB STIFFENER
AS REQUIRED

TRACK

SCREWS THROUGH
CLIP ANGLE OR
BENT STIFFENER
AS REQUIRED

SHEATHING

JOIST

SCREWS THROUGH
FLANGES
AS REQUIRED

LOAD BEARING STUD

FASTEN RIM TRACK TO
WALL TRACK WITH SCREWS
AS REQUIRED
Detail F5
Floor Bearing on I-Beam Connection

- Clip Angle
- Steel Beam or Built-up Cold-Formed Member
- Fastener as Required
- Web Stiffener as Required (This side or fit between joist flanges)
- Joist
Detail F6
Lapped Joists

JOIST

SCREWS AS REQUIRED

TRACK

LOAD BEARING STUD

SCREWS THROUGH FLANGES AS REQUIRED

AS REQ'D
Detail F7
Continuous Joist

- Joist
- Web stiffener as required (this side or fit between joist flanges)
- Screws through joist langle, clip angle or bent stiffener
- Top track
- Screws through flanges as required
- Load bearing stud
Detail F8
Floor to I-Beam Side Connection

- Weld size & length or fasteners as required
- Track section attached to joist through top & bottom flanges
- Structural I-beam
- Screws as required
- Joist hanger as required
- Wood blocking secured to I-beam
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Joists Supported by Shallow I-Beam

JOIST

FASTENERS AS REQUIRED

JOIST HANGER: SIZE AS REQUIRED BY DESIGN

HORIZONTALLY STABILIZE HANGER AS REQUIRED

STEEL BEAM OR BUILT-UP COLD-FORMED MEMBER
Detail F10
Joists Supported by Deep I-Beam

JOIST

FASTENERS AS REQ'D.

JOIST HANGER: SIZE AS REQUIRED BY DESIGN

HORIZONTALLY STABILIZE HANGER AS REQUIRED

STEEL BEAM OR BUILT-UP COLD-FORMED MEMBER
Detail F11
Floor Joists at Interior Bearing Wall

- JOIST TRACKS
- SHEATHING
- SCREWS AS REQUIRED
- JOIST
- TRACK
- SCREW AS REQ'D, ADJACENT TO STUD
- WEB STIFFENER AS REQUIRED (THIS SIDE OR FIT BETWEEN JOIST FLANGES)
- WALL STUD
Detail F12
Joists Bearing on Foundation at Opening

WEB STIFFENER AS REQUIRED
RIM TRACK

JOIST SECTION INSERTED IN RIM TRACK OVER OPENING BETWEEN FLOOR JOISTS

FOUNDATION
JOIST
SILL SEALER AS REQUIRED
Detail F13
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Web Stiffener at Load Bearing Wall
Detail F15
Alternate Pony Wall Detail

JOIST

SCREWS AS REQUIRED

STUD

SCREWS AS REQUIRED

ANCHOR(S)
AS REQUIRED
Detail F16
Cantilevered Joist to Foundation Connection

- Blocking as required
- Track
- Sheathing
  - Connection of blocking to joist through each leg of web stiffener or clip angle with screws as required
- Screws as required
- Stiffener can be installed on either side of web, as required
- Floor joist
- Clip angle (spacing as required)
- Sill sealer as required
- Anchor bolt or other connection as required
- Foundation
Detail F17
Cantilevered Joist to Wood Sill Connection

- Blocking as required
- Blocking connected to joist with screws through web stiffener or clip angle on each side
- Web stiffener as required
- Anchoring bolt
- Screw(s) through flanges (as required)
- Screws as required
- Steel plate (spacing as required)
- Common nails as required
- Wood sill
- Foundation
- Sill sealer as required
- Sheathing
Detail F18
Cantilevered Joist to Bearing Wall Connection

TRACK

WEB STIFFENER AS REQUIRED

SHEATHING

JOIST

TOP TRACK

LOAD BEARING STUD

SCREWS THROUGH FLANGES AS REQUIRED

SCREWS THROUGH CLIP ANGLE OR BENT STIFFENER AS REQUIRED
Detail F19
Cantilevered Joist to Wood Top Plate Connection

WEB STIFFENER AS REQUIRED

TRACK

SCREWS THROUGH CLIP ANGLE OR BENT STIFFENER

TOP WOOD PLATE(S) AS REQUIRED

LOAD BEARING STUD

SHEATHING

JOIST
Detail F20
Double Cantilevered Joists

- Screws as required
- Clip angle fastened to joist as required
- Flat strap
- Floor joist blocking fastened to flat strap (as required)
- As required
Detail F21
Wood Deck Balcony

WOOD PLANKING (BY OTHERS)

WOOD JOIST(S) AS REQUIRED

SOLID BLOCKING BETWEEN JOISTS AS REQUIRED

SCREWS AS REQUIRED

CLIP ANGLE AT EACH END FOR BLOCKING AS REQUIRED

SHEATHING

WALL STUD

JOIST HANGER OR CLIP ANGLES

MULTIPLE JOIST MEMBERS AS REQUIRED
Detail F22
Beam Support with Column

- Rim Joist
- Drill Screws as Required
- Clip Flange of Track
- I-Beam
- Track
- Wall Stud ea. Side of Beam
- Pipe Column
Detail F23
Beam Support

- CLIP FLANGE OF TRACK
- WOOD BEAM

- PROVIDE TRACK ON TOP OF POST, CLIP FLANGES OF TRACK AND FASTEN TO STUDS

- WOOD BEAM

- BACK TO BACK POST

- STUD • EACH SIDE OF BEAM
Detail F24
Floor Opening Detail
Detail F25
Floor Header and Trimmer Detail

- Screws as required top & bottom (typ.)
- Header joist C-shape inside a track
- Screws through each leg of clip angle (one side of connection) length as required
- Clip angle with screws through each leg, both sides of connection (as required)
- Joist
- Trimmer joist C-shape inside a track (typ.)
Detail F26
Floor Blocking Detail 1

- **SUBFLOOR SHEATHING**
- **SOLID BLOCKING AS REQUIRED**
- **JOIST**
- **CLIP ANGLE WITH SCREWS THROUGH EACH LEG. (ANGLE DEPTH AS REQUIRED)**
- **SCREW(S) THROUGH STRAP TO JOIST AS REQUIRED**
- **CONTINUOUS STEEL STRAP TO BOTTOM OF JOIST**
Detail F27
Floor Blocking Detail 2

SUBFLOOR SHEATHING

JOIST

BLOCKING

C-SHAPE OR TRACK SECTION
Detail F28
Floor Blocking Detail 3

- JOIST
- TRACK OR C-SHAPE
  DEPTH AS REQUIRED
- SCREWS THROUGH
  EACH LEG OF CLIP
  ANGLE, BOTH ENDS
  LENGTH AS REQUIRED
- FLAT STRAP
Detail F29
Floor Blocking Detail 4

TRACK OR C-SHAPE
(SIZE AS REQUIRED)

JOIST

FLAT STRAP FASTENED
TO BLOCKING AND JOIST
AS REQUIRED

FASTEN BLOCKING
TO JOIST WITH SCREWS
AS REQUIRED
Detail F30
X-Bracing Detail

SCREW(S) THROUGH BRACE @ EACH FLANGE (AS REQUIRED)

JOIST

FLAT STRAP

JOIST
Detail F31
Blocking Connection Detail

CUT TRACK FLANGES AND
BEND TRACK WEB TO ALLOW
CONNECTION. FASTEN TO
JOIST WITH SCREWS AS
REQUIRED

CUT TRACK FLANGES
BEND PORTION
OF WEB DOWN
AND FASTEN TO
JOIST WITH SCREWS
AS REQUIRED
Detail F32
Floor Sheathing Connection Detail

- O.C. PERIMETER FASTENERS
  AS REQUIRED

- FLOOR SHEATHING

- O.C. INTERMEDIATE FASTENERS
  AS REQUIRED

- JOIST SPACING

- JOIST FRAMING
Detail W1
Wall Framing
Detail W2
Wall Framing Elevation

- BOX HEADER (W10, W11)
- BACK-TO-BACK HEADER (W12, W13)
- INTERIOR CORNER
- L-HEADER (W14–W16)
- TRACK SPLICE (G12)
- EXTERIOR CORNER (PLAN VIEW)
- CORNER (W29)
- SHEAR BRACING (W24–W28)
Detail W3
Wall to Foundation/Slab on Grade Connection 1

WHERE LEDGER IS PROVIDED FOR THE SUPPORT OF A VENEER, THE LEDGE SHALL BE LOCATED AT LEAST ONE COURSE OR 1-1/2" BELOW THE SLAB ELEVATION
Detail W4
Wall to Foundation/Slab on Grade Connection 2

- STUD
- TRACK
- SCREW(S) THROUGH FLANGES AS REQUIRED
- SCREWS THROUGH FLANGES, AS REQUIRED
- STUD BLOCKING INSIDE WALL TRACK AS REQUIRED
- ANCHOR BOLT OR OTHER CONNECTION AS REQUIRED
- FOUNDATION OR SLAB ON GRADE
- SILL SEALER AS REQUIRED
Detail W5
Wall to Foundation/Slab on Grade Connection 3

WHERE LEDGER IS PROVIDED FOR THE SUPPORT OF A VENEER, THE LEDGE SHALL BE LOCATED AT LEAST ONE COURSE OR 1-1/2" BELOW THE SLAB ELEVATION.
Detail W6
Wall to Foundation/Slab on Grade Connection 4

- Screws as required
- Stud
- Track
- Structural angle welded to vertical track segment as required
- Screw through flanges as required
- Anchor bolt with washer or other connection as required (adjacent to stud)
Detail W7
Wall to Wood Sill Connection

- Metal plate as required
- Common nails as required
- Screws through flanges as required
- Screws as required
- Anchor bolt through wood sill or other connection as required
- Wood sill
- Foundation or slab on grade
- Spacing as required
- Stud
- Track
Detail W8
Hold-Down Connection Detail 1

STUD(S) AS REQUIRED

SCREWS AS REQUIRED

TRACK

CONNECTOR AS REQUIRED

FOUNDATION
Detail W9
Hold-Down Connection Detail 2

STUDS AS REQUIRED

C-SHAPE NESTED INSIDE TRACK

SCREWS AS REQUIRED

CONNECTOR AS REQUIRED
Detail W10
Box Beam Header with Jack Stud

- SCREWS AS REQUIRED (BOTH FLANGES)
- C-SHAPES
- TRACK OR C-SHAPE ATTACHED WITH SCREWS (AS REQUIRED)
- FASTEN TRACK TO STUD(S) THROUGH FLANGES
- KING STUD(S) (AS REQUIRED)
- FASTEN TRACK TO STUD THROUGH FLANGES OR BENT WEB
- JACK STUD(S) AS REQUIRED

- FASTEN TRACK TO CRIPPLE STUD WITH SCREW(S) @ TOP & BOTTOM (BOTH SIDES)
Detail W11
Box Beam Header

- SCREWS AS REQUIRED (BOTH FLANGES)
- C-SHAPES
- TRACK OR C-SHAPE ATTACHED WITH SCREWS (AS REQUIRED)
- FASTEN TRACK TO STUD(S) THROUGH FLANGES
- KING & TRIMMER STUD(S) (AS REQUIRED)
- FASTEN TRACK TO STUD THROUGH FLANGES OR BENT WEB AS REQUIRED
- FASTEN TRACK TO CRIPPLE STUD WITH SCREW(S) @ TOP & BOTTOM (BOTH SIDES)
Detail W12
Back-to-Back Header with Jack Stud

- Screws through top and bottom flanges as required
- Clip angle fastened to header with screws as required, minimum length as required
- Jack stud(s) as required
- Screw(s) through each flange of jack and king stud(s) as required
- King stud(s) as required
- Screws through top & bottom of cripple stud (each side) as required
Detail W13
Back-to-Back Header

- **Screws through top and bottom flanges as required**
- **Back-to-back C-shapes**
- **Screws as required**
- **Cripple stud**
- **Screw(s) through each flange of King stud(s) as required**
- **Track**
- **Clip angle fastened to header with screws as required, minimum length as required**
- **Track**
- **KING & TRIMMER STUD(S) as required**
- **Screw(s) @ top & bottom of cripple stud (each side) as required**
Detail W14
L-Header Detail

CONTINUOUS TOP TRACK
"L" ANGLE
HEAD TRACK BEYOND
KING STUD
EXTERIOR

SECTION A

KING STUD(S) AS REQUIRED
HEAD TRACK
WINDOW/DOOR OPENING
CONTINUOUS TOP TRACK
O.C. STUD
CRIPPLE STUD BEYOND
"L" HEADER (AS REQUIRED)

Low-Rise Residential Construction Details
Detail W15
Single L-Header Detail

- Top of Wall Track
- Screw as required (each end)
- Screws as required
- L-Header
- Screw(s) (each stud as required)
- O.C. Stud
- Opening Width
- Head Track (opening)
- Cripple stud(s) at load points

Low-Rise Residential Construction Details
Detail W16
Double L-Header Detail

- **TOP OF WALL TRACK**
- **SCREW AS REQUIRED @ EACH END**
- **SCREWS AS REQUIRED**
- **L-HEADER**
- **O.C. STUD**
- **SCREWS AS REQUIRED**
- **OPENING WIDTH**
- **HEAD TRACK @ OPENING**
- **KING STUD(S) AS REQUIRED**
- **CRIPPLE STUD(S) AT LOAD POINTS**
Detail W17
Stud Bracing with Cold-Rolled Channel

COLD-ROLLED CHANNEL.  HORIZONTAL BRIDGING TO BE SPACED AS REQ’D. BY DESIGN

CLIP ANGLE FASTENED TO STUD AND CHANNEL AS REQUIRED

STUD
Detail W18
Stud Bracing with Sheathing

WALL FRAMING

SHEATHING MATERIAL
(SUCH AS GYPSUM BOARD, OSB, OR PLYWOOD)
Detail W19
Stud Bracing with Strapping and Sheathing

- STUD/TRACK BLOCKING
  - EACH END OF STRAP
  - INTERMITTENTLY AS REQUIRED

- WALL SHEATHING

- WALL FRAMING

- BEND SECTION OR CLIP
  - FLANGE TO FORM VERTICAL

- FLAT STRAP

- SCREWS AS REQUIRED
  - STRAP TO BLOCKING
  - EACH STUD

- SCREW(S) AS REQUIRED
Detail W20
Stud Bracing with Strapping and Blocking

BEND SECTION OR CLIP FLANGE TO FORM VERTICAL

FLAT STRAP

WALL FRAMING

BLOCKING @ ENDS OF STRAP & INTERMITTENTLY AS REQUIRED

SCREW(S) AS REQUIRED @ EACH STRAP TO STUD
Detail W21
Structural Sheathing Fastening to Wall Studs
Detail W22
Shearwall and Diaphragm Details
Detail W23
Sheathed Wall with Openings

1. Hold-down Connector
   As Required

2. Bottom Track Anchor (Typ.)
   As Required

3. Screws As Required
Detail W24
Single Story X-Brace Detail

NOTE: PRETENSION STRAPS
Detail W25
Two Story X-Brace Detail

NOTE: PRETENSION STRAPS
Detail W26
Two Story Sheathed Wall Detail
Detail W27
X-Brace Detail

DIAGONAL STRAP FASTENED TO
TO EACH STUD W/SCREWS
AS REQUIRED

STUD

MULTIPLE STUDS & ENDS
AS REQUIRED

HOLDOWN BRACKET
(MAY BE PLACED ON
OTHER SIDE OF STUDS)

NOTE: PRETENSION STRAPS

FASTEN STRAP TO TRACK
W/SCREWS AS REQUIRED

BOTTOM TRACK
Detail W28
X-Brace with Gusset Detail

DIAGONAL STRAP FASTENED TO
GUSSET PLATE & EACH STUD
W/SCREWS AS REQUIRED

STUD

MULTIPLE STUDS
AT ENDS
(AS REQUIRED)

GUSSET PLATE WITH
SCREWS AS REQUIRED

HOLDOWN BRACKET
(MAY BE PLACED
ON OTHER SIDE
OF STUDS)

FASTEN GUSSET PLATE TO
TRACK W/SCREWS AS REQUIRED

BOTTOM TRACK

NOTE: PRETENSION STRAPS
Detail W29
Corner Framing Detail

EXTERIOR SHEATHING

TRACK

DRYWALL

STUD

SCREWS AS REQUIRED
Figure NL1
Non-Load Bearing Wall Framing

- Corner Framing (NL3)
- Opening (NL4–NL6)
- Blocking when Wall is Parallel to Joists/Trusses (NL7)
- Sill & Head Track (NL2)
- Corner Framing (Plan View)
- Cabinet Blocking (M1)
- Stud-Track Connection
- Intersecting Walls
Figure NL2
Sill and Head Track Connection Detail

- Cut track flange and bend to allow connection
- Bend portion of web down and fasten to jamb stud
- Cut track and bend to allow extension of flanges for connection
- C-shape fastened to jamb stud with screws as required
Figure NL3
Corner Framing Detail

Figure NL4
Slammer Stud Detail
Figure NL5
Window Opening Framing Detail

- Top Track
- One screw per flange or two screws per web
- King Stud
- Door rough opening
- Bottom Track
Figure NL6
Door Opening Framing Detail
Figure NL7
Non-Load Bearing Opening

- **TOP TRACK**
- **CRIPPLE STUD**
- **HEAD & SILL TRACKS:**
  - BEND TO ALLOW EXTENSION
  - OF FLANGES FOR CONNECTION
- **WALL STUD**
Figure NL8
Non-Load Bearing Wall Parallel to Joist

SHEATHING

SCREWS AS REQUIRED

JOISTS

SECTION OF STUD OR TRACK FOR CROSS MEMBER AS REQUIRED TO BRACE WALL—SCREW AS REQUIRED

COPE FLANGES OF CROSS MEMBER

NON-LOAD BEARING WALL
Detail R1
Roof Framing

CEILING JOIST TOP
FLANGE BRACING WITH
C-SHAPE, TRACK SECTION
OR FLAT STRAP

RAFTER BOTTOM FLANGE
BRACING AS REQUIRED

RAFTER SUPPORT
BRACE AS REQUIRED

RAFTER (TYP.)

RAFTER BOTTOM FLANGE
BRACING AS REQUIRED

COLLECTOR BLOCK
(R13)

RIDGE MEMBER
(R5,R6)

HEEL JOINT
(R4)

CEILING FINISH

DISTANCE TO
CENTER OF
SCREW PATTERN
PER DESIGN

CANTILEVER

CEILING JOIST

LOAD BEARING WALL

LOAD BEARING WALL

LOAD BEARING WALL

WHEN INSTALLED, RAFTER
SUPPORT BRACE SHOULD
BE CONNECTED TO EACH
CEILING JOIST AND RAFTER
WITH SCREWS (AS REQUIRED)

@ EACH END (COPE FLANGES
OF BRACE AT CEILING JOIST
CONNECTION OR USE GUSSET
PLATE). (R10)
Detail R2
Joist and Rafter Detail

COLLAR TIE CONNECTION (R9)
RAFTER (G2)

EAVE (R7)
JOIST BRIDGING (G8)

CEILING JOIST (G2)
RIDGE MEMBER (R5,R6)
RAFTER BRIDGING (G8)

RAFTER BRACE CONNECTION (R10)
RAFTER (G2)

RAFTER BRIDGE (G8)

EAVE (R7)
CEILING JOIST (G2)
BEARING WALL
Detail R3
Roof Framing Isometric View

- SHEATHING
- RIDGE MEMBER
- Rafter
- CEILING JOIST
- GABLE END
- LOOKOUT
- FLY RAFTER
- OVERHANG
Detail R4
Heel Joint Connection Detail

- Fasten rafter to ceiling joist with screws as required or through clip angle, plate or other connector (when required).
- Fasten roof to wall with screws through ceiling joist flange, clip angle, steel plate or other connector, as required.

Diagram notes:
- RAFTER
- CEILING JOIST
- TRACK
- LOAD BEARING STUD
Detail R5
Ridge Member Connection Detail

CLIP ANGLE

RAFTER (TYP.)

SCREWS IN EACH LEG OF CLIP ANGLE AS REQUIRED

RIDGE MEMBER: C-SHAPE INSIDE A TRACK SECTION FASTENED WITH SCREWS THROUGH TOP & BOTTOM FLANGES, AS REQUIRED
Detail R6
Ridge Member with Coped Rafters

RIDGE MEMBER: C-SHAPE INSIDE A TRACK SECTION FASTENED WITH SCREWS THROUGH TOP & BOTTOM FLANGES, AS REQUIRED

RAFTER (TYP.)
BRACE
COPE RAFTER AND SCREW AS REQUIRED
Detail R7
Roof Eave and Soffit Detail

- Continuous Bridging as required.
- Rafter or Top Chord
- Continuous Angles Fasten w/ Screw at Each Member (Typ.)
- Soffit Framing as Required
- Sheathing
- Joist or Bottom Chord
- Clip Angle Between Members
- Wall Stud
Detail R8
Rafter and Joist Bridging

- Solid blocking or X-bridging as required
- JOISTS OR RAFTERS
- Flat strap, notched channel, X-bridging or proprietary bridging: attach to joist as required
- Transfer bridging forces into lateral stability system as required
- Anchor bridging to solid blocking as required
Detail R9
Collar Tie at Rafter Detail

Detail R10
Rafter Brace Connection Detail
Detail R11
Roof Framing with Wood Tail Extension

2x BLOCKING BETWEEN ROOF MEMBERS

PER DESIGN

2x WOOD JOIST EXTENSION
NESTED INSIDE ROOF RAFTER
Detail R12
Wood Truss Bearing on Steel Wall

WOOD TRUSS
(BY OTHERS)

2x TOP PLATE AS REQUIRED
SCREWS AS REQUIRED

UPLIFT CONNECTOR
AS REQUIRED
Detail R13
Collector Block Detail

- Tensioned Flat Strap
- Roof Truss
- O.C. Framing
- Brake Shape
  Thickness as Required
- Location and Spacing
  Per Roof Plan
- Screws as Required
- Hurricane Clip
  As Required
- Align W/Truss
  Layout
Detail R14  
Non-Aligned Roof-Wall Framing

- TENSIONED FLAT STRAP
- ROOF TRUSS OR FLOOR JOIST
- PER DESIGN
- O.C. FRAMING
- SCREWS AS REQUIRED
- UPLIFT CONNECTOR AS REQUIRED
- CLIP FLANGES @ EACH END
Detail R15
Hip Beam

1/2 TRUSS OR DOUBLE TRUSS

BREAK SHAPE TO EACH MEMBER

CARRIER TRUSS

ROOF RAFTER

TRACK (HIP BEAM)

ATTACH 1/2 TRUSS TO CARRIER TRUSS (DOUBLE TOP CHORD)

1-1/2" BREAK SHAPE TIE TO HIP BEAM

FASTEN EACH LEG TO HIP BEAM WITH SCREWS AS REQUIRED

CAP TRACK

SCREWS AS REQUIRED

HIP WEDGE @ EACH RAFTER
Figure M1
Cabinet Blocking Detail

Figure M2
Wiring and Piping Installation Detail
Figure M3
Stair Framing Detail

GLUE & SCREW WITH BUGLE HEAD SCREWS AS REQUIRED

APA RATED SHEATHING (TREDS AND RISERS)

BACK-TO-BACK STUDS
Figure M4
Stair Framing Detail 2

1. Joist per plan at top floor
2. Clip angle fastened to joist and stringer as required
3. Joist fastened to stringer (clip flanges as required)
4. Continuous clip angle across stringer(s), fasten as required to each stringer
5. Stringer at each side of stair and in center as required
6. Clip angle fastened to stringer and base as required
7. Clip angle fastened riser as required
Figure M5
Stair Landing Detail

TRACK

JOIST FASTENED TO TRACK
AS REQUIRED

JOIST
Figure M6
Wind Sill Details

DEEP LEG TRACK
FASTENED TO STUD
WITH SCREWS
AS REQUIRED

SCREW(S)
THROUGH FLANGE
AS REQUIRED

STUD
TRACK

DEEP LEG TRACK
FASTENED TO STUD
WITH SCREWS
AS REQUIRED

SCREW(S)
THROUGH FLANGE
AS REQUIRED

STUD
C-SHAPE