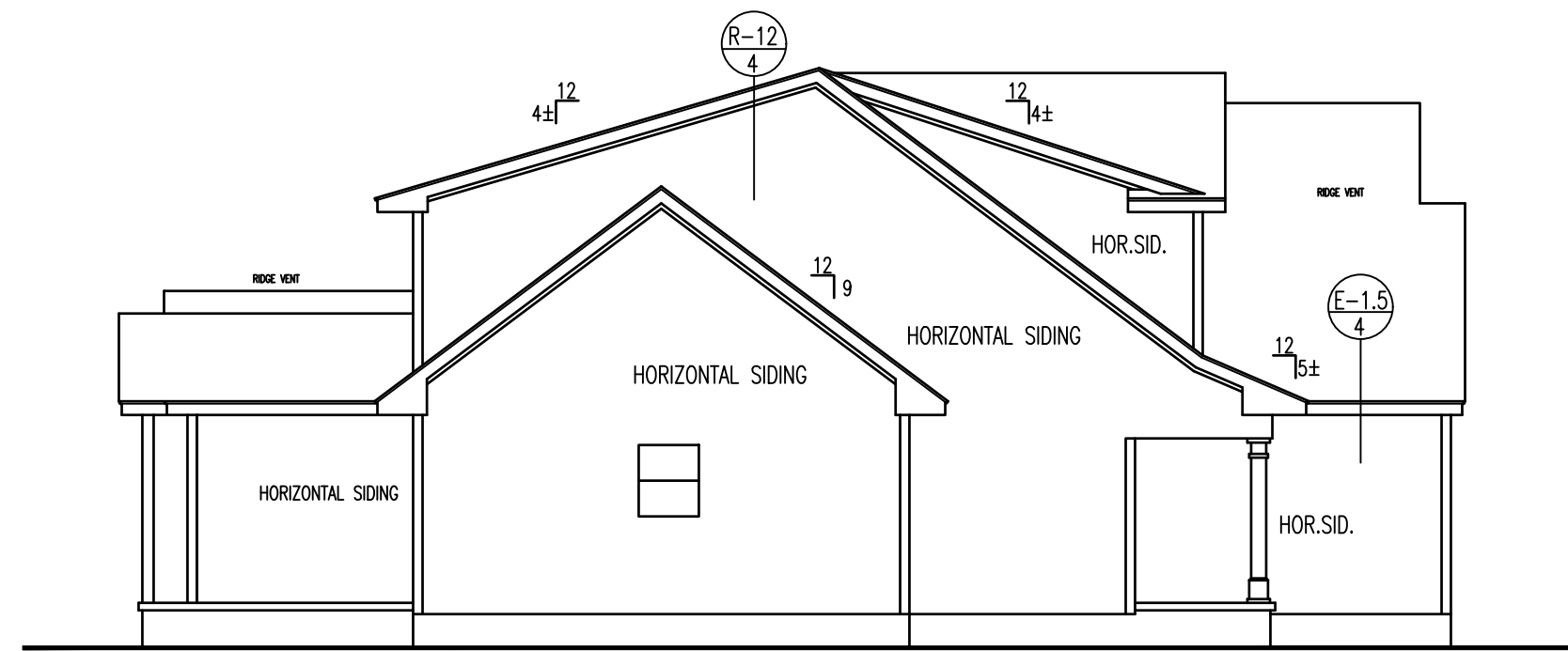




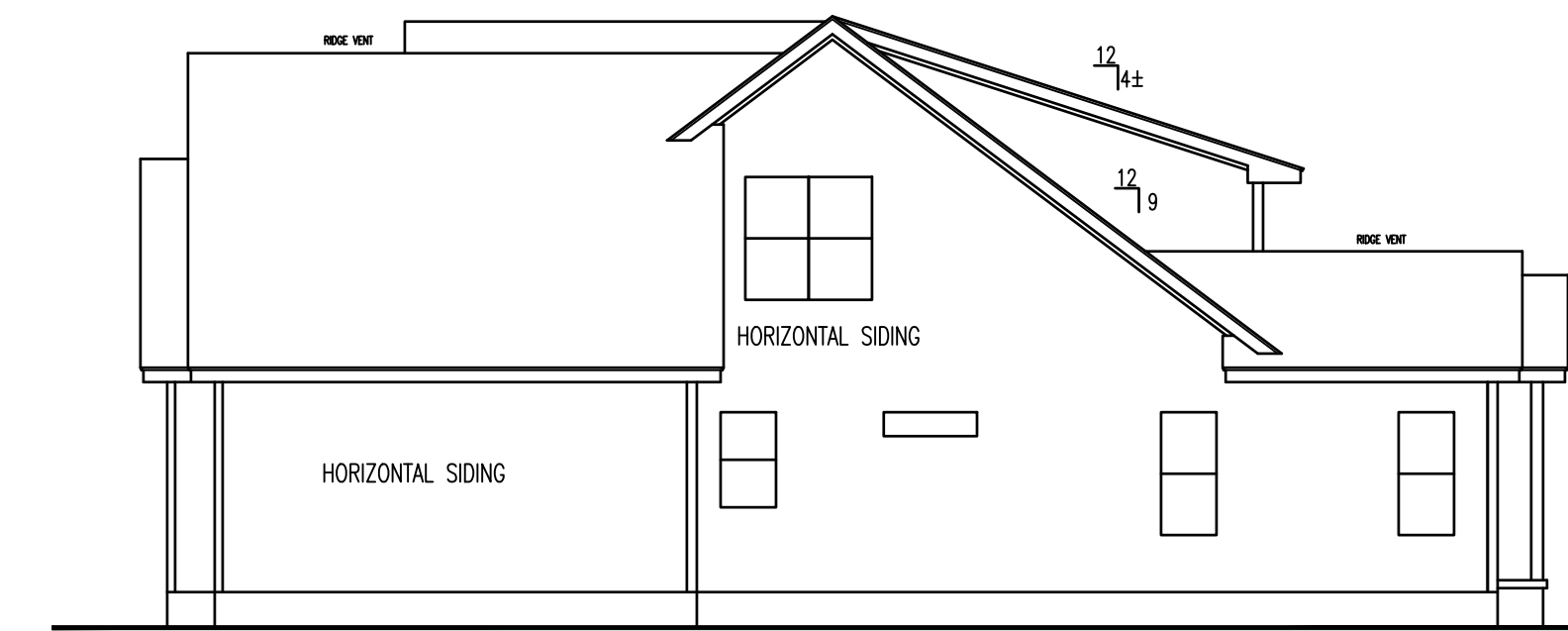
FRONT ELEVATION
SCALE: 1/4" = 1'-0"



ATTIC VENTILATION CALCULATIONS	
ATTIC AREA	2378 SQ.FT. (AREA VENTILATION REQUIRED 16.6 SQ.FT.)
? EACH ? FT. BASE GABLE LOUVER @ ?	SQ.FT. NET FREE AREA
? EACH ? FT. BASE GABLE LOUVER @ ?	SQ.FT. NET FREE AREA
? EACH ? FT. LOUVER @ ?	SQ.FT. NET FREE AREA
130 LIN.FT. EAVE VENT @ 11 SQ.IN./FT. =	3.9 SQ.FT. NET FREE AREA
102 LIN.FT. RIDGE VENT @ 18 SQ.IN./FT. =	12.8 SQ.FT. NET FREE AREA

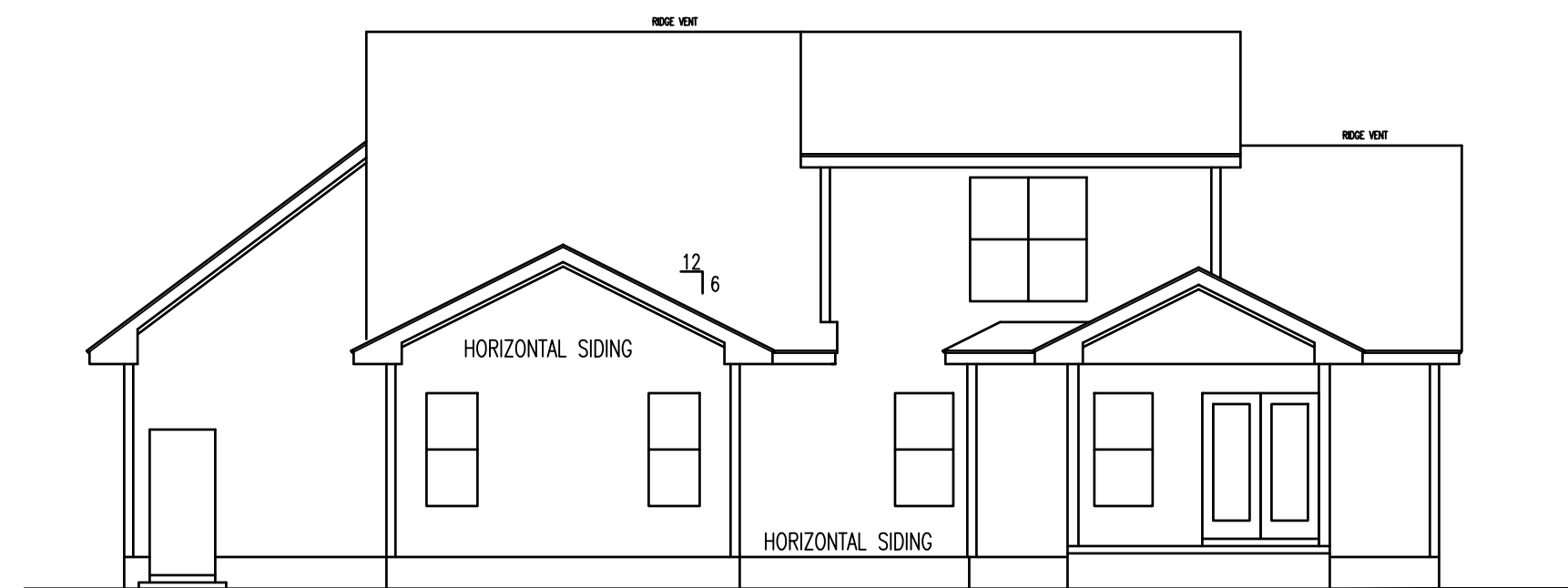
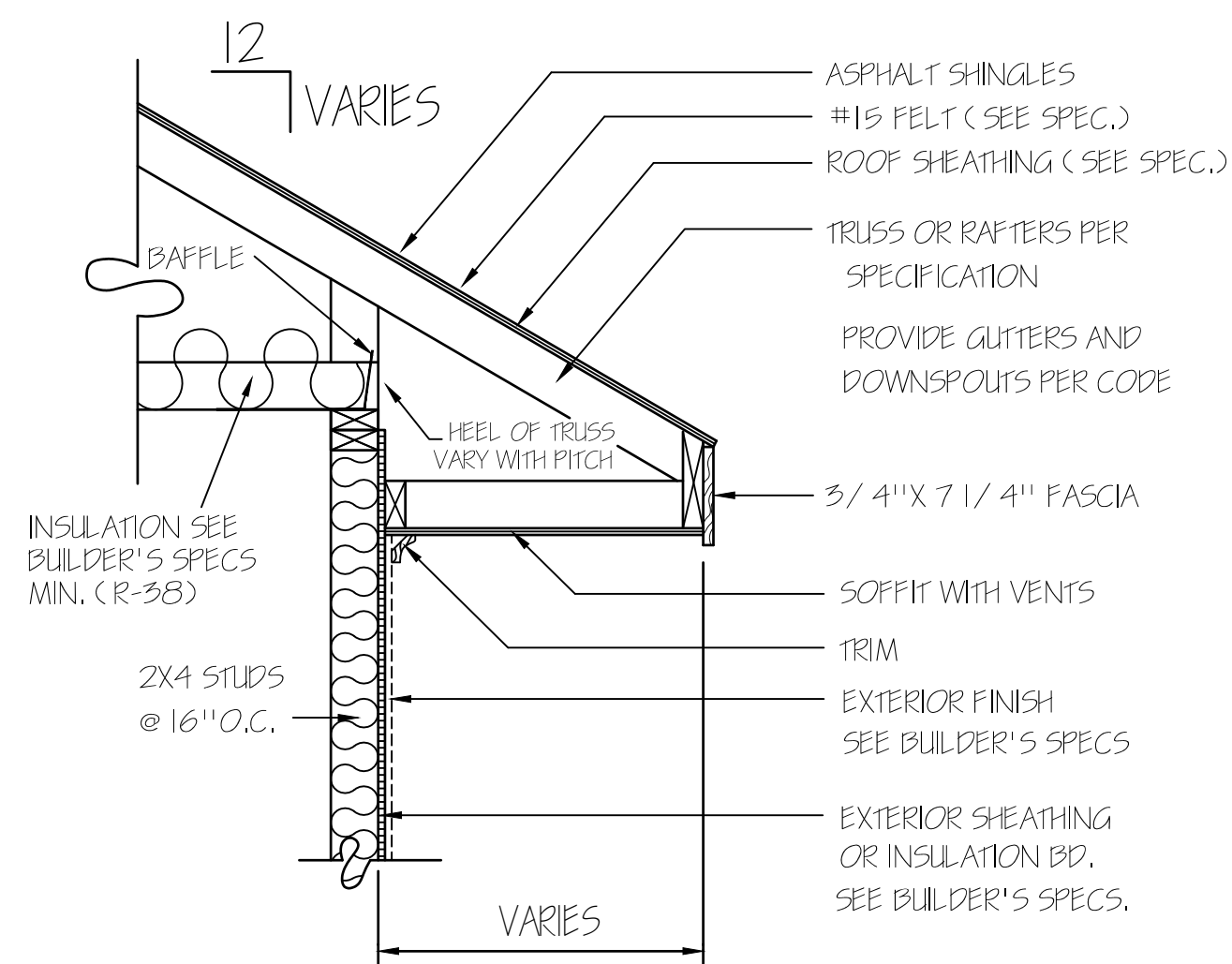


LEFT ELEVATION

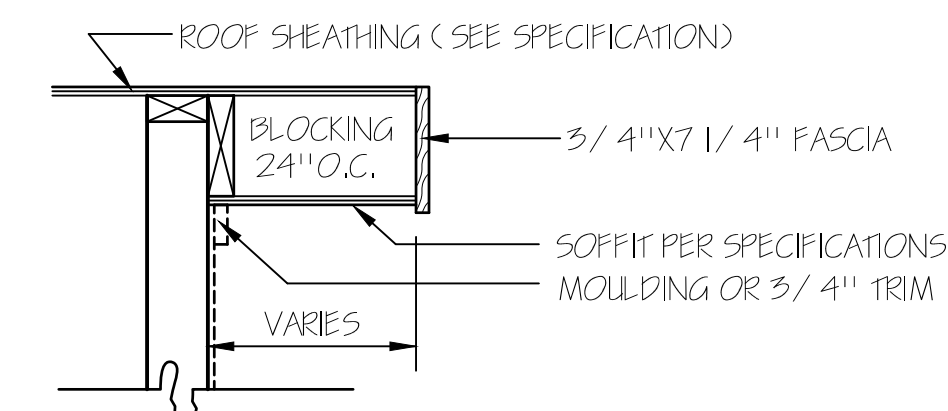


RIGHT ELEVATION

HERO PACKAGE



REAR ELEVATION
SCALE: 1/8" = 1'-0"



RAKE DETAIL FOR GABLE ENDS

T M DESIGNS
RESIDENTIAL PLANS BY TINA MCFADDEN
(910) 354-4736 TMDDESIGNS2016@GMAIL.COM

EXCLUSIVE RESIDENCE DESIGN FOR:
WATERMARK HOMES
NAME: THE GINKGO III
LOT: 35 OAK HAVEN

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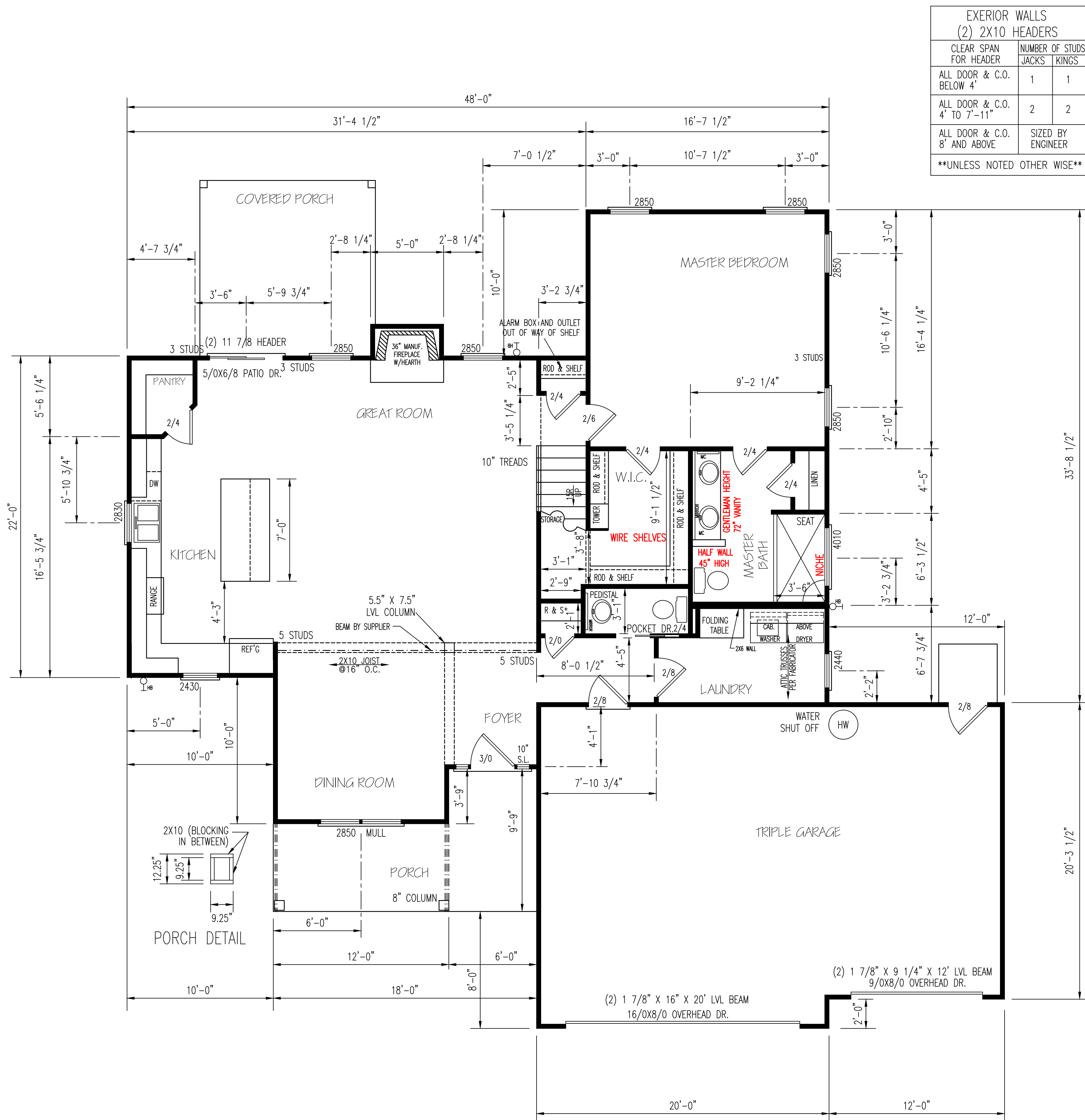
I HEREBY CERTIFY THAT THIS DRAWING MEETS LOCAL CODES, 2012 INTERNATIONAL BUILDING CODES

THIS IS FOR THE CONSTRUCTION OF ONE HOUSE ON A SINGLE LOT, NOT TO BE REUSED

PLAN NUMBER
BQ22-B19

OPTION #4

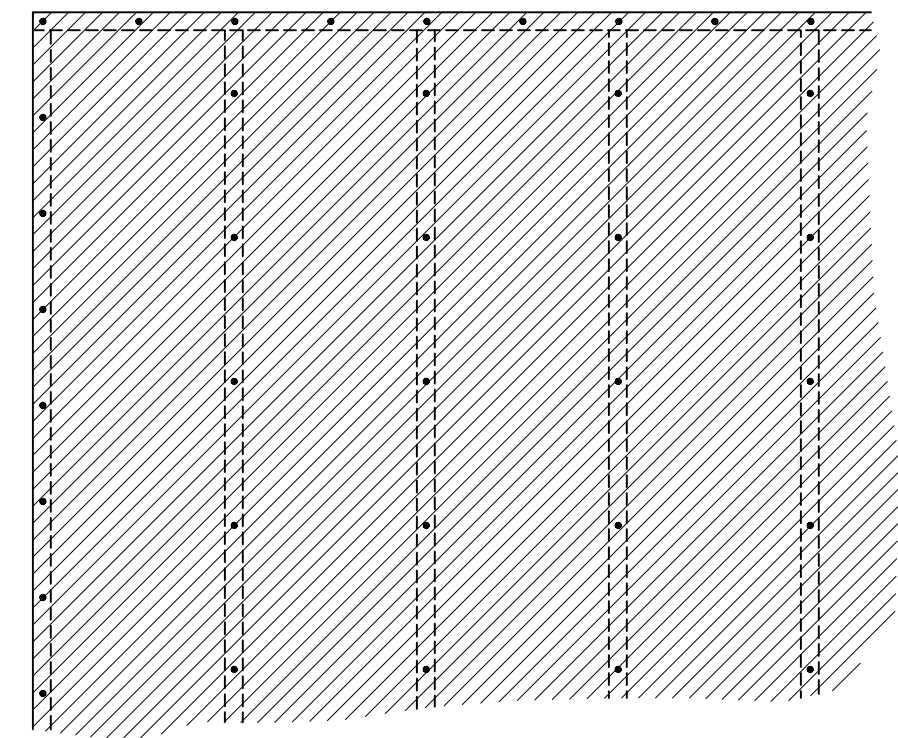
1	GARAGE	R	F
	DATE:	1/26/18	



EXTERIOR WALLS (2) 2X10 HEADERS		
CLEAR SPAN FOR HEADER	NUMBER OF STUDS	
	JACKS	KINGS
ALL DOOR & C.O. BELOW 4'	1	1
ALL DOOR & C.O. 4' TO 7'-11"	2	2
ALL DOOR & C.O. 8' AND ABOVE	SIZED BY ENGINEER	

UNLESS NOTED OTHER WISE

BRACING METHOD

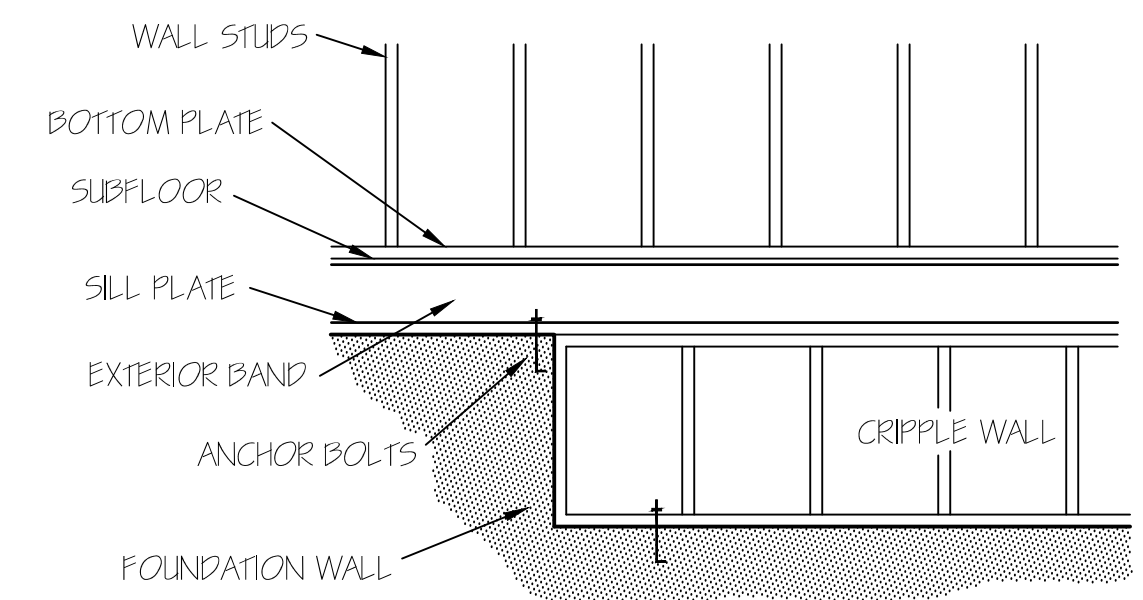


EXTERIOR WALL TO BE FULLY SHEATHED WITH 7/16" OSB. NAILING PATTERN TO BE 8" ON ALL EDGES AND 12" IN FIELD, WITH 8d NAILS.

ENERGY TABLE
 UFACTOR OF WINDOWS .30
 CLIMATE ZONE 3
 INSULATION: WALLS 15
 CEILING 38
 FLOORS 19

GARAGE PANEL WALL

GARAGE PANEL WALLS UNDER 24" WIDE SHOULD BE EITHER PORTAL FRAMED OR 7/16" OSB ON BOTH SIDES WITH A NAILING PATTERN OF 3" ON ALL PANEL EDGES AND 6" IN THE FIELD.



FOUNDATION CRIPPLE WALLS SHALL BE FRAMED OF STUDS NOT SMALLER THAN THE STUDDING ABOVE. WHEN EXCEEDING 4 FT. IN HEIGHT, SUCH WALLS SHALL BE FRAMED OF STUDS HAVING THE SIZE REQUIRED FOR AN ADDITIONAL STORY. CRIPPLE WALLS WITH A STUD HEIGHT LESS THAN 14 INCHES SHALL BE CONTINUOUSLY SHEATHED ON ONE SIDE WITH WOOD STRUCTURAL PANELS FASTENED TO BOTH THE TOP AND BOTTOM PLATES IN ACCORDANCE WITH TABLE R602.3(1), OR CRIPPLE WALLS SHALL BE CONSTRUCTED OF SOLID BLOCKING.

NOTE:
 CEILINGS ARE 9'-0"
 UNLESS NOTED.
 SET WINDOWS @ 7'-4"
 UNLESS NOTED.

HERO PACKAGE

FIRST FLOOR PLAN

SCALE: 1/4"=1'-0"

HEATED AREA	
1ST FL	1421 SQ FT
2ND FL	910 SQ FT
TOTAL	2331 SQ FT

OTHER AREAS

GARAGE	683 SQ FT
F.PORCH	131 SQ FT
R.PORCH	143 SQ FT
TOTAL	957 SQ FT

T M DESIGNS
 RESIDENTIAL PLANS BY TINA MCFADDEN
 (910) 354-4736 TMDDESIGNS2016@GMAIL.COM

EXCLUSIVE RESIDENCE DESIGN FOR:
WATERMARK HOMES
 NAME: THE GINKGO
 LOT: 35 OAK HAVEN

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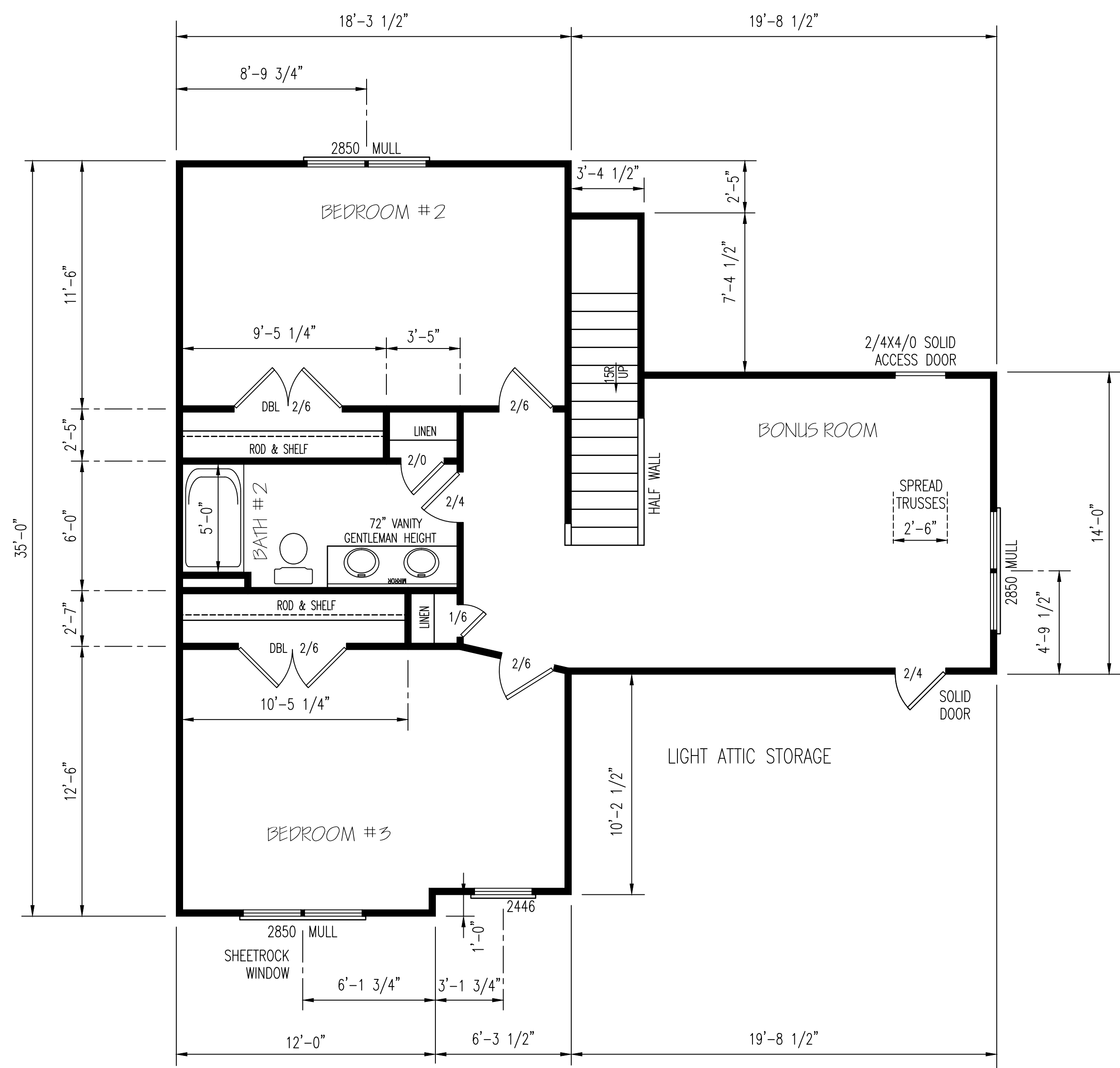
I HEREBY CERTIFY THAT THIS DRAWING MEETS LOCAL CODES, 2012 INTERNATIONAL BUILDING CODES

THIS IS FOR THE CONSTRUCTION OF ONE HOUSE ON A SINGLE LOT. NOT TO BE REUSED

PLAN NUMBER
 BG22-B19

OPTION #4

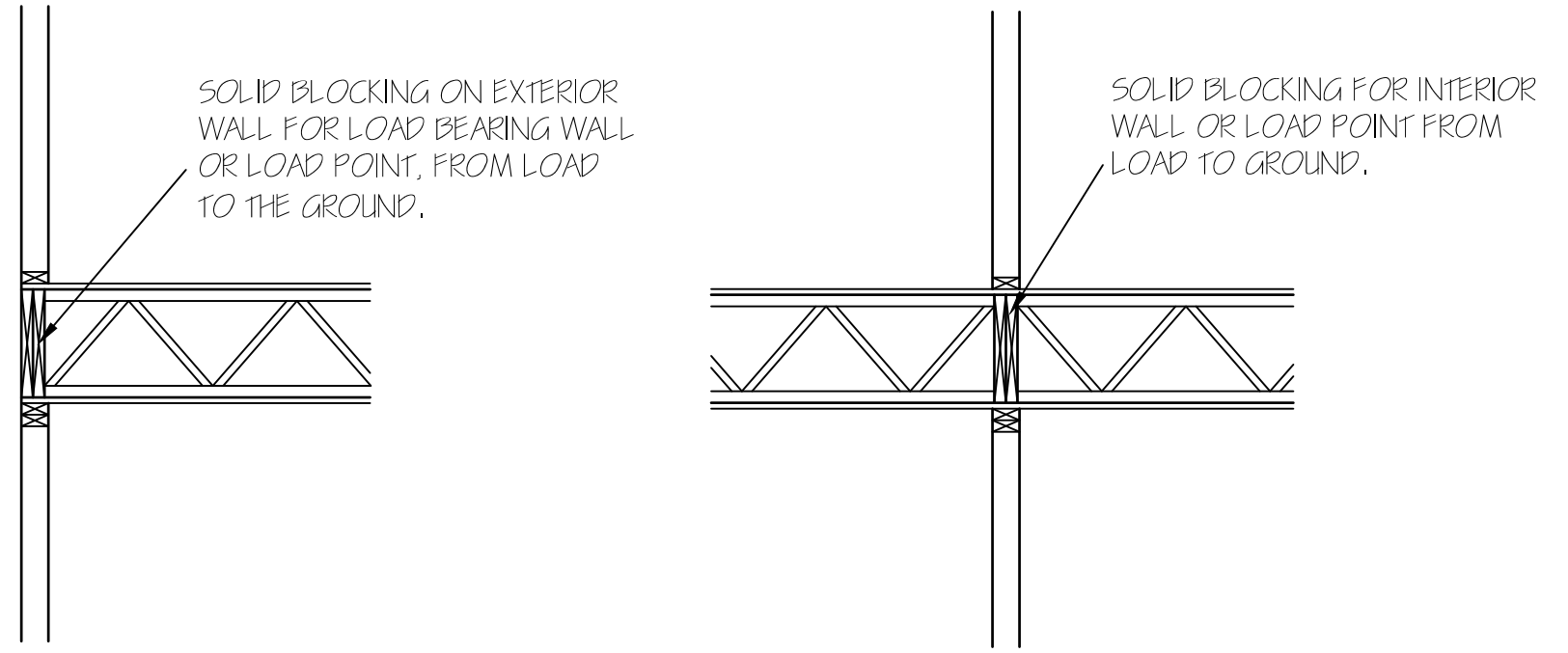
2	GARAGE	R F
	DATE:	1/29/18



CENTERED AT FRONT OF GARAGE
2032

HERO PACKAGE

SECOND FLOOR PLAN
SCALE: 1/4" = 1'-0"



EXTERIOR WALLS (2) 2X10 HEADERS		
CLEAR SPAN FOR HEADER	NUMBER OF STUDS	
	JACKS	KINGS
ALL DOOR & C.O. BELOW 4'	1	1
ALL DOOR & C.O. 4' TO 7'-11"	2	2
ALL DOOR & C.O. 8' AND ABOVE	SIZED BY ENGINEER	
UNLESS NOTED OTHER WISE		

EXCLUSIVE RESIDENCE DESIGN FOR:

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I HEREBY CERTIFY THAT THIS DRAWING MEETS LOCAL CODES, 2012 INTERNATIONAL BUILDING CODES

THIS IS FOR THE CONSTRUCTION OF ONE HOUSE ON A SINGLE LOT, NOT TO BE REUSED

PLAN NUMBER
BG22-B19

OPTION #4

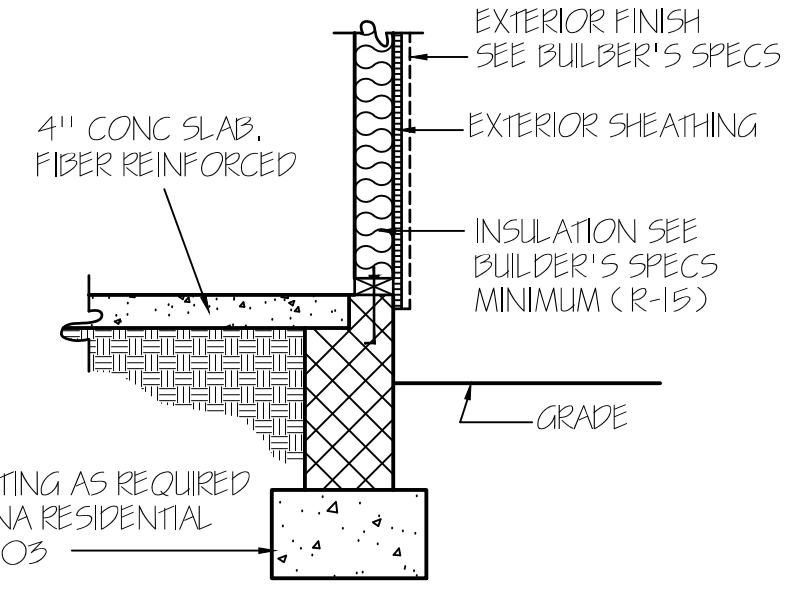
3 GARAGE R F
DATE: 1/29/18

TABLE 403.1(1)				
MINIMUM WIDTH OF CONCRETE, PRECAST OR MASONRY FOOTINGS (INCHES)				
	LOAD BEARING VALUE OF SOIL (psf)			
	1,500	2,000	3,000	4,000
CONVENTIONAL LIGHT-FRAME CONSTRUCTION				
1 STORY	12	12	12	12
2 STORY	15	15	12	12
3 STORY	25	17	12	12
4-INCH BRICK VENEER OVER LIGHT FRAME OR 8-INCH HOLLOW CONCRETE MASONRY				
1 STORY	12	12	12	12
2 STORY	15	15	12	12
3 STORY	32	24	16	12
8-INCH SOLID OR FULLY CURVED MASONRY				
1 STORY	16	12	12	12
2 STORY	29	21	14	12
3 STORY	42	32	21	16

NOTE:
FOUNDATION DETAILS SHOWN ARE BASED ON ASSUMED SOIL BEARING CAPACITY OF 2000 PSF. LOCAL SITE CONDITIONS MUST BE INVESTIGATED. ALL FOOTING TO BE LOCATED BELOW FROST DEPTH.

WALL ANCHOR OPTIONS

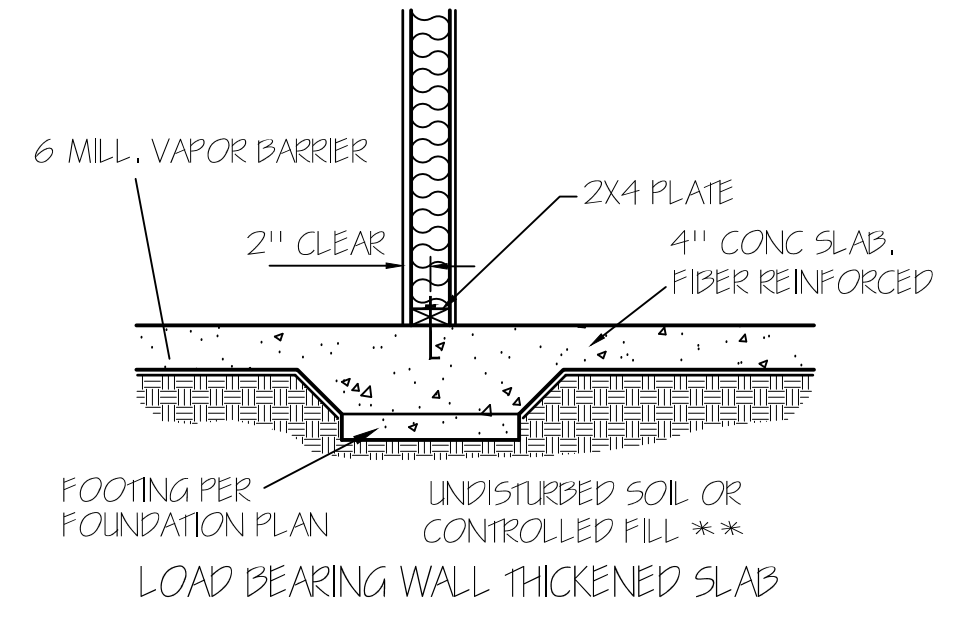
- USE EITHER ANCHOR BOLTS OR ANCHOR STRAPS
- ANCHOR BOLTS: 1/2" DIA. BOLTS AT 6'-0" O.C. AND NOT MORE THAN 12" FROM CORNERS, EMBEDDED MIN. 7" INTO FOUNDATION
- ANCHOR STRAP: ATTACHED TO BOTTOM PLATE AT 6'-0" O.C. AND NOT MORE THAN 12" FROM CORNERS, PER MANUFACTURER.



CONTINUOUS FOOTING AS REQUIRED BY NORTH CAROLINA RESIDENTIAL CODE SECTION R403

NOTE:
PERIMETER INSUL. MAY EXTEND HORIZ. UNDER SLAB 24" OR VERTICAL 24" BELOW SLAB FLOOR

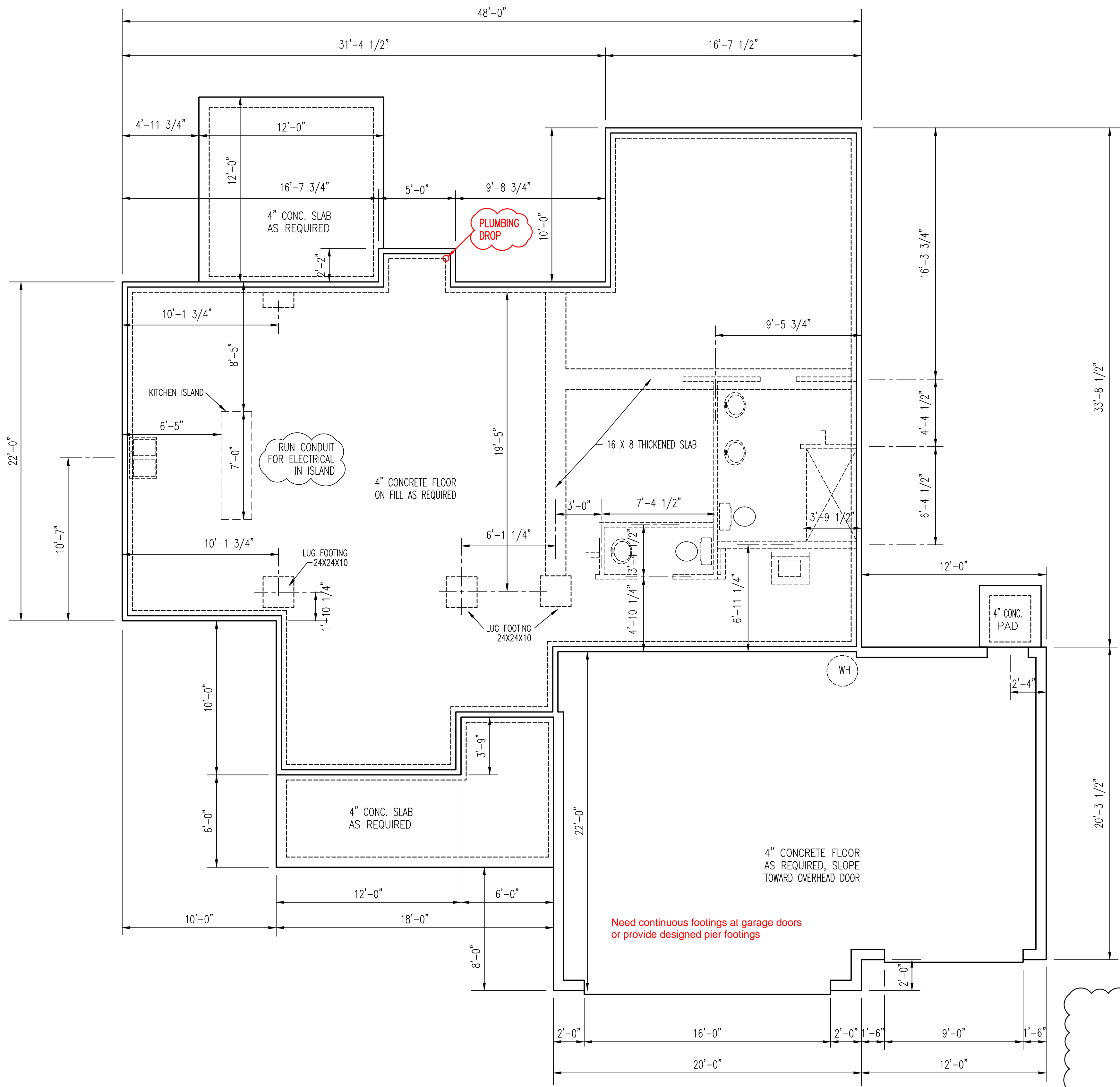
CONCRETE SLAB FLOOR



CONTINUOUS FOOTING AS REQUIRED BY NORTH CAROLINA RESIDENTIAL CODE SECTION R403

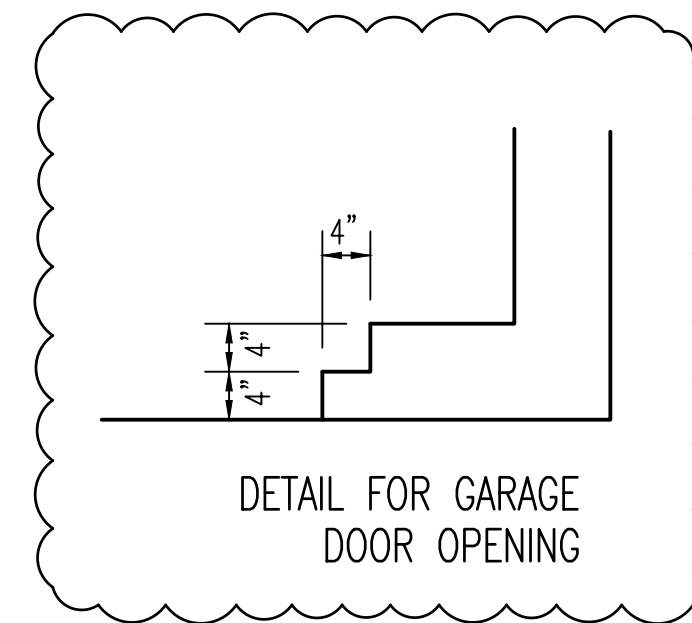
NOTE:
PERIMETER INSUL. MAY EXTEND HORIZ. UNDER SLAB 24" OR VERTICAL 24" BELOW SLAB FLOOR

GARAGE WALL



ALL FOOTINGS ARE 16" X 8" UNLESS NOTED OTHERWISE.

Need continuous footings at garage doors or provide designed pier footings



DETAIL FOR GARAGE DOOR OPENING

FOUNDATION PLAN
SCALE: 1/4" = 1'-0"



ROOF & FLOOR TRUSSES & BEAMS

Reilly Road Industrial Park
Fayetteville, N.C. 28309
Phone: (910) 864-8787
Fax: (910) 864-4444

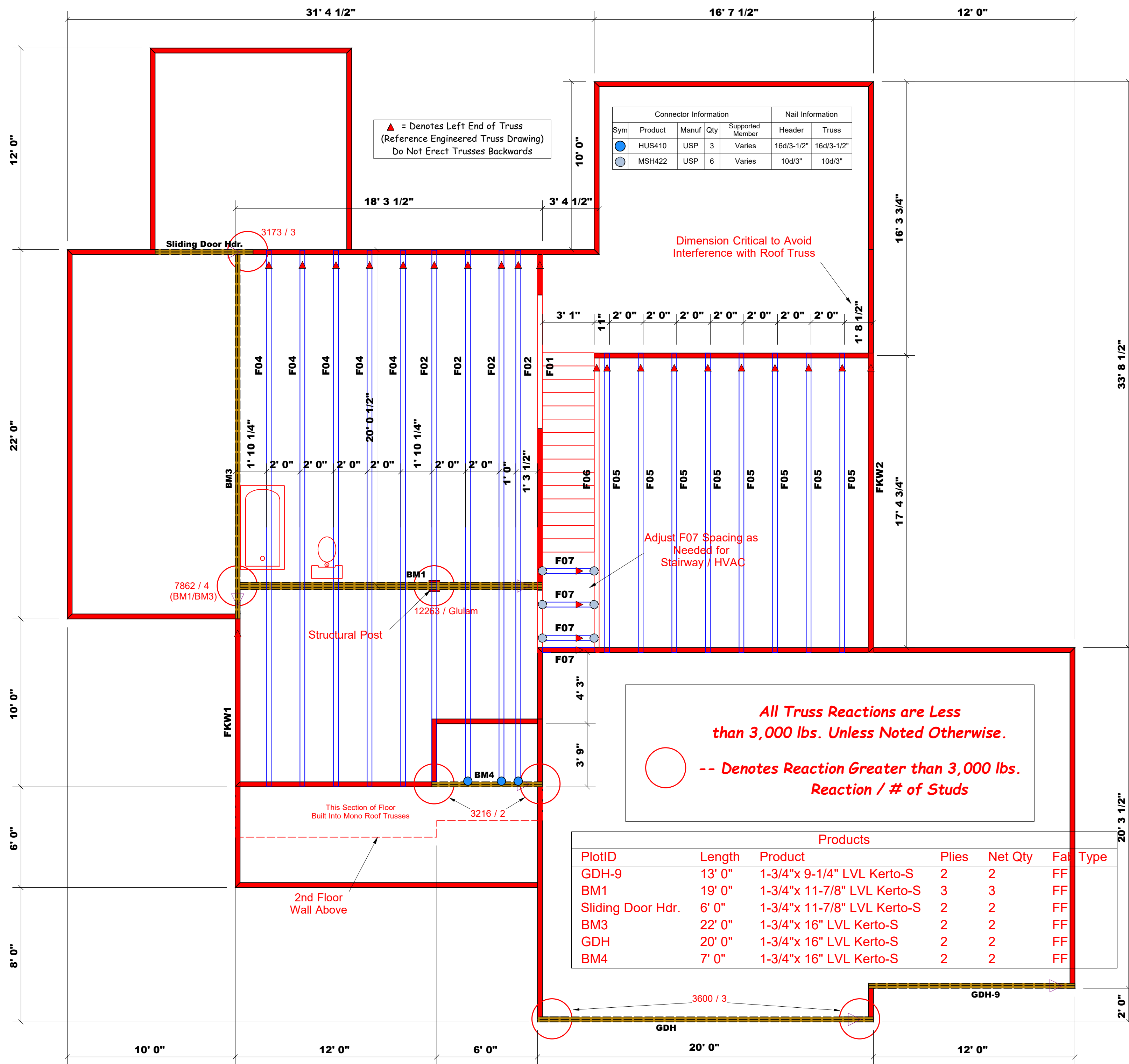
Bearing reactions less than or equal to 3000# are deemed to comply with the prescriptive Code requirements. The contractor shall refer to the attached Tables (derived from the prescriptive Code requirements) to determine the minimum foundation size and number of wood studs required to support reactions greater than 3000# but not greater than 15000#. A registered design professional shall be retained to design the support system for any reaction that exceeds those specified in the attached Tables. A registered design professional shall be retained to design the support system for all reactions that exceed 15000#.

Signature
Anthony Williams

LOAD CHART FOR JACK STUDS

(BASED ON TABLES R502.5(1) & (b))
NUMBER OF JACK STUDS REQUIRED @ EA END OF HEADER/GIRDER

END REACTION (UP TO)	REQ'D STUDS FOR (1)PLY HEADER	END REACTION (UP TO)	REQ'D STUDS FOR (1)PLY HEADER	END REACTION (UP TO)	REQ'D STUDS FOR (1)PLY HEADER
1700	1	2550	1	3400	1
3400	2	5100	2	6800	2
5100	3	7650	3	10200	3
6800	4	10200	4	13600	4
8500	5	12750	5	17000	5
10200	6	15300	6		
11900	7				
13600	8				
15300	9				



BUILDER	JOB NAME	PLAN	SEAL DATE	QUOTE #	JOB #
Watermark Homes	Lot 35 Oak Haven	The Ginko	1/26/18		J0322-1086
Johnston	Lot 35 Oak Haven	Floor	11/27/18	Anthony Williams	Anthony Williams
COUNTY	ADDRESS	MODEL	DATE REV.	DRAWN BY	SALESMAN
Johnston	Lot 35 Oak Haven	Floor	11/27/18	Anthony Williams	Anthony Williams

THIS IS A TRUSS PLACEMENT DIAGRAM ONLY. These trusses are designed as individual building components to be incorporated into the building design at the specification of the building designer. See individual design sheets for each truss design identified on the placement drawing. The building designer is responsible for temporary and permanent bracing of the roof and floor system and for the overall structure. The design of the truss support structure including headers, beams, walls, and columns is the responsibility of the building designer. For general guidance regarding bracing, consult BCSI-B1 and BCSI-B3 provided with the truss delivery package or online @ sbcindustry.com



ROOF & FLOOR TRUSSES & BEAMS

Reilly Road Industrial Park
Fayetteville, N.C. 28309
Phone: (910) 864-8787
Fax: (910) 864-4444

Bearing reactions less than or equal to 3000# are deemed to comply with the prescriptive Code requirements. The contractor shall refer to the attached Tables (derived from the prescriptive Code requirements) to determine the minimum foundation size and number of wood studs required to support reactions greater than 3000# but not greater than 15000#. A registered design professional shall be retained to design the support system for any reaction that exceeds those specified in the attached Tables. A registered design professional shall be retained to design the support system for all reactions that exceed 15000#.

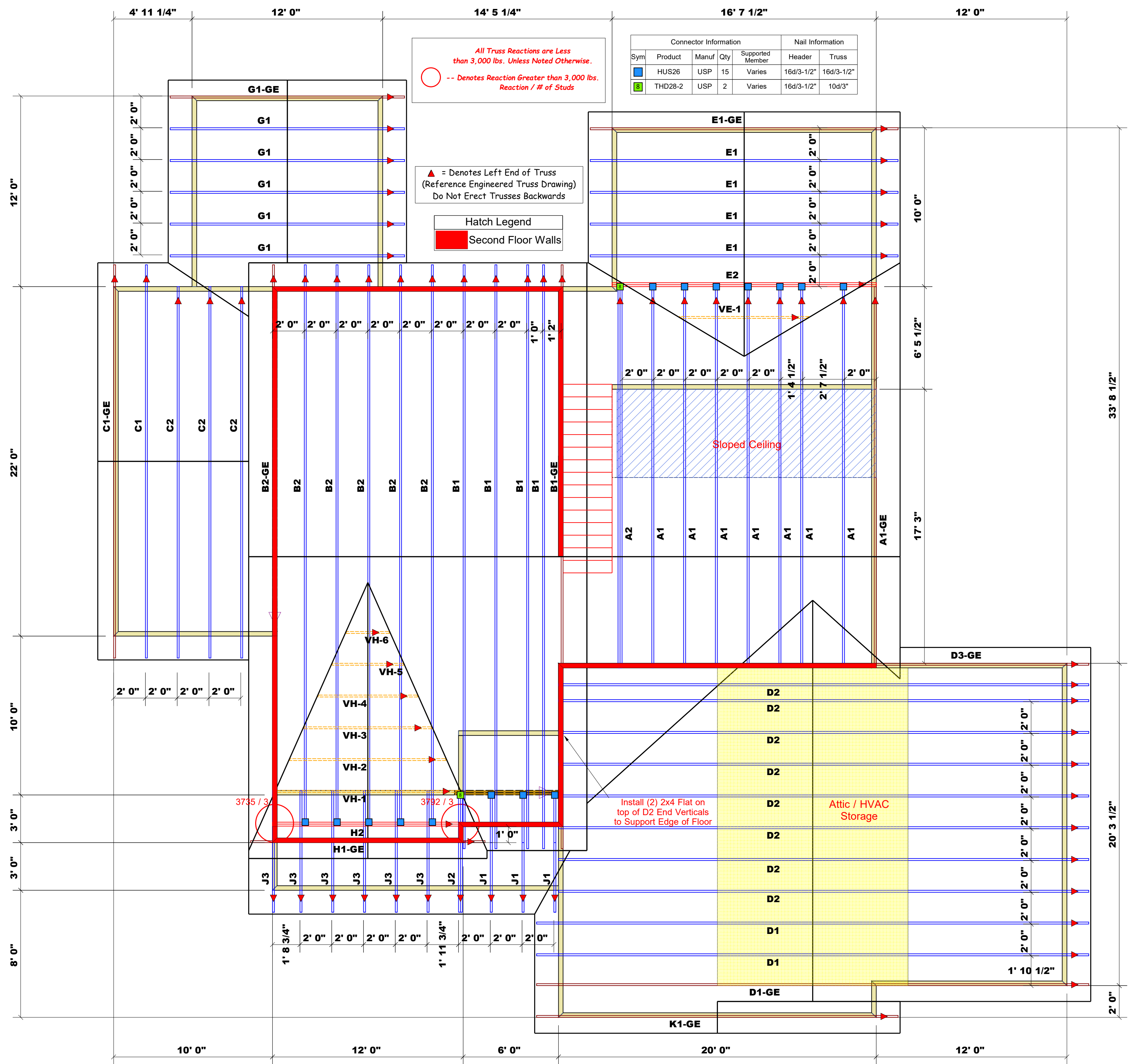
Signature
Anthony Williams

LOAD CHART FOR JACK STUDS

(BASED ON TABLES R502.5(1) & (b))

NUMBER OF JACK STUDS REQUIRED @ EA END OF HEADER/GIRDER

END REACTION (UP TO)	REQ'D STUDS FOR (1)PLY HEADER	END REACTION (UP TO)	REQ'D STUDS FOR (1)PLY HEADER	END REACTION (UP TO)	REQ'D STUDS FOR (1)PLY HEADER
1700	1	2550	1	3400	1
3400	2	5100	2	6800	2
5100	3	7650	3	10200	3
6800	4	10200	4	13600	4
8500	5	12750	5	17000	5
10200	6	15300	6		
11900	7				
13600	8				
15300	9				



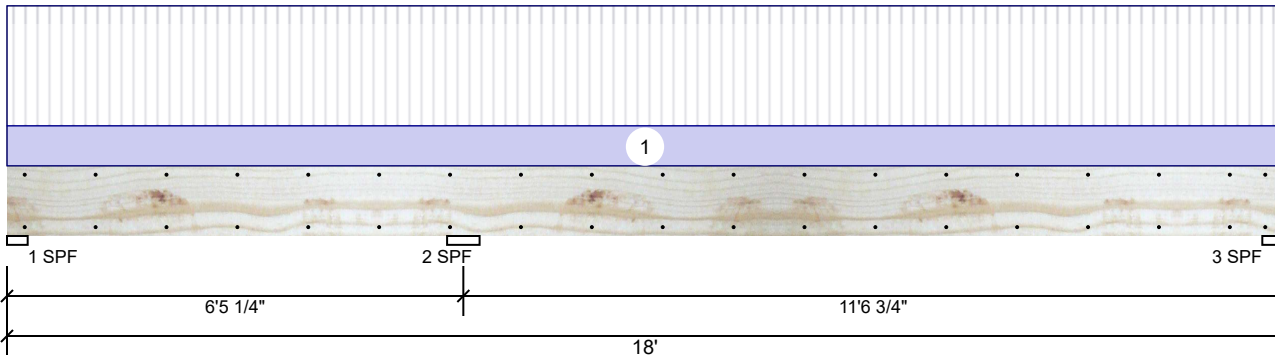
Truss Placement Plan
SCALE: 1/4" = 1'-0"

BUILDER	COUNTY	Johnston
Watermark Homes	ADDRESS	Lot 35 Oak Haven
JOB NAME	MODEL	Roof
PLAN	DATE REV.	11/27/18
SEAL DATE	DRAWN BY	Anthony Williams
QUOTE #	SALESMAN	Anthony Williams
JOB #		J0322-1085

THIS IS A TRUSS PLACEMENT DIAGRAM ONLY. These trusses are designed as individual building components to be incorporated into the building design at the specification of the building designer. See individual design sheets for each truss design identified on the placement drawing. The building designer is responsible for temporary and permanent bracing of the roof and floor system and for the overall structure. The design of the truss support structure including headers, beams, walls, and columns is the responsibility of the building designer. For general guidance regarding bracing, consult BCSI-B1 and BCSI-B3 provided with the truss delivery package or online @ sbcindustry.com

BM1 Kerto-S LVL 1.750" X 11.875" 3-Ply - PASSED

Level: Level



Member Information

Type:	Girder	Application:	Roof
Plies:	3	Slope:	0/12
Moisture Condition:	Dry	Design Method:	ASD
Deflection LL:	480	Building Code:	IBC 2012
Deflection TL:	360	Load Sharing:	Yes
Importance:	Normal - II	Deck:	Not Checked
Temperature:	Temp <= 100°F		

Reactions UNPATTERNED lb (Uplift)

Brg	Direction	Live	Dead	Snow	Wind	Const
1	Vertical	1162	409	0	0	0
2	Vertical	8927	3140	0	0	0
3	Vertical	3771	1326	0	0	0

Bearings

Bearing	Length	Dir.	Cap.	React D/L lb	Total	Ld. Case	Ld. Comb.
1 - SPF	3.500"	Vert	35%	376 / 2355	2731 (-734)	L_	D+L(D+L)
2 - SPF	5.500"	Vert	100%	3191 / 9072	12263	LL	D+L
3 - SPF	3.500"	Vert	66%	1308 / 3835	5143	_L	D+L

Analysis Results

Analysis	Actual	Location	Allowed	Capacity	Comb.	Case
Neg Moment	-12572 ft-lb	6'5 1/4"	31060 ft-lb	0.405 (40%)	D+L	LL
Unbraced	-12572 ft-lb	6'5 1/4"	12575 ft-lb	1.000 (100%)	D+L	LL
Pos Moment	11556 ft-lb	13' 11/16"	31060 ft-lb	0.372 (37%)	D+L	_L
Unbraced	11556 ft-lb	13' 11/16"	11563 ft-lb	0.999 (100%)	D+L	_L
Shear	5753 lb	7'7 7/8"	13300 lb	0.433 (43%)	D+L	LL
LL Defl inch	0.148 (L/920)	12'5 1/2"	0.283 (L/480)	0.522 (52%)	L	_L
TL Defl inch	0.196 (L/695)	12'5 13/16"	0.378 (L/360)	0.518 (52%)	D+L	_L

Design Notes

- 1 Provide support to prevent lateral movement and rotation at the end bearings. Lateral support may also be required at the interior bearings by the building code.
- 2 Fasten all plies using 2 rows of 10d Box nails (.128x3") at 12" o.c. Maximum end distance not to exceed 6".
- 3 Refer to last page of calculations for fasteners required for specified loads.
- 4 Girders are designed to be supported on the bottom edge only.
- 5 Top loads must be supported equally by all plies.
- 6 Tie-down connection required at bearing 1 for uplift 734 lb (Combination D+L, Load Case _L).
- 7 Top must be laterally braced at a maximum of 12'7 5/16" o.c.
- 8 Bottom must be laterally braced at a maximum of 11'4 11/16" o.c.
- 9 Lateral slenderness ratio based on single ply width.

Notes

Calculated Structured Designs is responsible only of the structural adequacy of this component based on the design criteria and loadings shown. It is the responsibility of the customer and/or the contractor to ensure the component suitability of the intended application, and to verify the dimensions and loads.

Lumber

1. Dry service conditions, unless noted otherwise
2. LVL not to be treated with fire retardant or corrosive chemicals

chemicals

Handling & Installation

1. LVL beams must not be cut or drilled
2. Refer to manufacturer's product information regarding installation requirements, multi-ply fastening details, beam strength values, and code approvals
3. Damaged Beams must not be used
4. Design assumes top edge is laterally restrained
5. Provide lateral support at bearing points to avoid lateral displacement and rotation

6. For flat roofs provide proper drainage to prevent ponding

This design is valid until 3/30/2024

Manufacturer Info

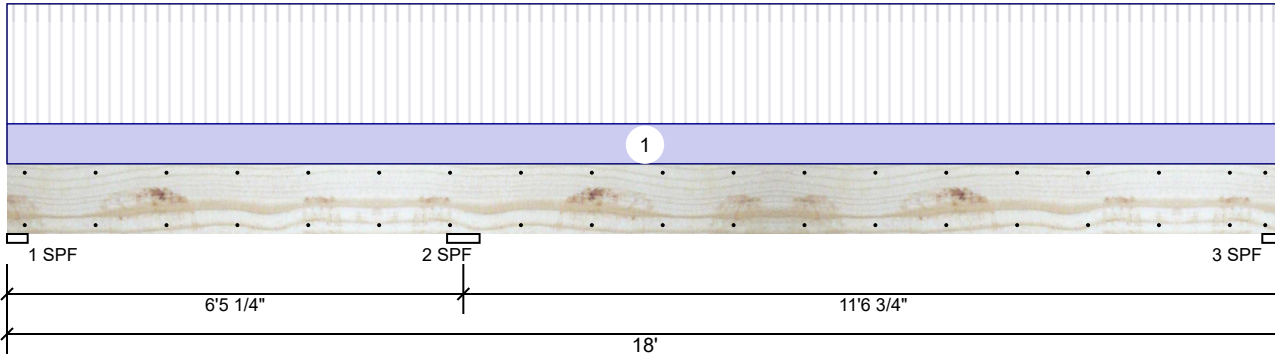
Metsä Wood
 301 Merritt 7 Building, 2nd Floor
 Norwalk, CT 06851
 (800) 622-5850
www.metsawood.com/us
 ICC-ES: ESR-3633

Comtech, Inc.
 1001 S. Reilly Road, Suite #639
 Fayetteville, NC
 USA
 28314
 910-864-TRUS



BM1 Kerto-S LVL 1.750" X 11.875" 3-Ply - PASSED

Level: Level



ID	Load Type	Location	Trib Width	Side	Dead 0.9	Live 1	Snow 1.15	Wind 1.6	Const. 1.25	Comments
1	Uniform Self Weight			Top	257 PLF 14 PLF	770 PLF	0 PLF	0 PLF	0 PLF	F04

Notes

Calculated Structured Designs is responsible only of the structural adequacy of this component based on the design criteria and loadings shown. It is the responsibility of the customer and/or the contractor to ensure the component suitability of the intended application, and to verify the dimensions and loads.

Lumber

1. Dry service conditions, unless noted otherwise
2. LVL not to be treated with fire retardant or corrosive

Handling & Installation

1. LVL beams must not be cut or drilled
2. Refer to manufacturer's product information regarding installation requirements, multi-ply fastening details, beam strength values, and code approvals
3. Damaged Beams must not be used
4. Design assumes top edge is laterally restrained
5. Provide lateral support at bearing points to avoid lateral displacement and rotation

6. For flat roofs provide proper drainage to prevent ponding

This design is valid until 3/30/2024

Manufacturer Info

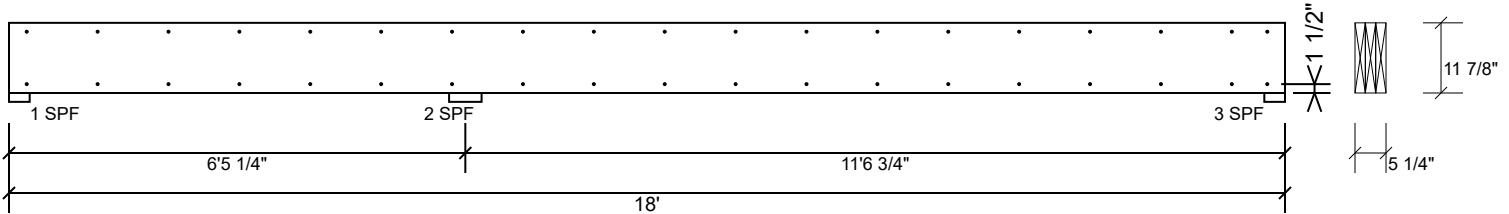
Metsä Wood
 301 Merritt 7 Building, 2nd Floor
 Norwalk, CT 06851
 (800) 622-5850
www.metsawood.com/us
 ICC-ES: ESR-3633

Comtech, Inc.
 1001 S. Reilly Road, Suite #639
 Fayetteville, NC
 USA
 28314
 910-864-TRUS



BM1 Kerto-S LVL 1.750" X 11.875" 3-Ply - PASSED

Level: Level



Multi-Ply Analysis

Fasten all plies using 2 rows of 10d Box nails (.128x3") at 12" o.c.. Nail from both sides. Maximum end distance not to exceed 6".

Capacity	0.0 %
Load	0.0 PLF
Yield Limit per Foot	163.7 PLF
Yield Limit per Fastener	81.9 lb.
Yield Mode	IV
Edge Distance	1 1/2"
Min. End Distance	3"
Load Combination	
Duration Factor	1.00

Notes

Calculated Structured Designs is responsible only of the structural adequacy of this component based on the design criteria and loadings shown. It is the responsibility of the customer and/or the contractor to ensure the component suitability of the intended application, and to verify the dimensions and loads.

Lumber

1. Dry service conditions, unless noted otherwise
2. LVL not to be treated with fire retardant or corrosive chemicals

Handling & Installation

1. LVL beams must not be cut or drilled
2. Refer to manufacturer's product information regarding installation requirements, multi-ply fastening details, beam strength values, and code approvals
3. Damaged Beams must not be used
4. Design assumes top edge is laterally restrained
5. Provide lateral support at bearing points to avoid lateral displacement and rotation

6. For flat roofs provide proper drainage to prevent ponding

This design is valid until 3/30/2024

Manufacturer Info

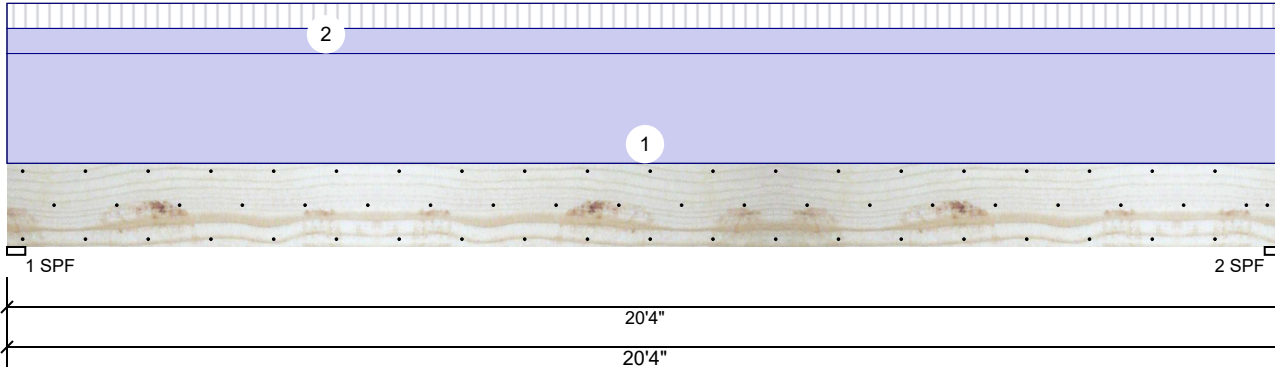
Metsä Wood
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 Norwalk, CT 06851
 (800) 622-5850
 www.metsawood.com/us
 ICC-ES: ESR-3633

Comtech, Inc.
 1001 S. Reilly Road, Suite #639
 Fayetteville, NC
 USA
 28314
 910-864-TRUS



BM3 Kerto-S LVL 1.750" X 16.000" 2-Ply - PASSED

Level: Level



Member Information

Type:	Girder	Application:	Roof
Plies:	2	Slope:	0/12
Moisture Condition:	Dry	Design Method:	ASD
Deflection LL:	480	Building Code:	IBC 2012
Deflection TL:	360	Load Sharing:	No
Importance:	Normal - II	Deck:	Not Checked
Temperature:	Temp <= 100°F		

Reactions UNPATTERNED Ib (Uplift)

Brg	Direction	Live	Dead	Snow	Wind	Const
1	Vertical	407	2312	0	0	0
2	Vertical	407	2312	0	0	0

Bearings

Bearing	Length	Dir.	Cap.	React D/L lb	Total	Ld. Case	Ld. Comb.
1 - SPF	3.500"	Vert	52%	2312 / 407	2719	L	D+L
2 - SPF	3.500"	Vert	52%	2312 / 407	2719	L	D+L

Analysis Results

Analysis	Actual	Location	Allowed	Capacity	Comb.	Case
Moment	13233 ft-lb	10'2"	34565 ft-lb	0.383 (38%)	D+L	L
Unbraced	13233 ft-lb	10'2"	13276 ft-lb	0.997 (100%)	D+L	L
Shear	2301 lb	1'7 1/2"	11947 lb	0.193 (19%)	D+L	L
LL Defl inch	0.063 (L/3784)	10'2 1/16"	0.497 (L/480)	0.127 (13%)	L	L
TL Defl inch	0.422 (L/566)	10'2 1/16"	0.663 (L/360)	0.636 (64%)	D+L	L

Design Notes

- Provide support to prevent lateral movement and rotation at the end bearings. Lateral support may also be required at the interior bearings by the building code.
- Fasten all plies using 3 rows of 10d Box nails (.128x3") at 12" o.c. Maximum end distance not to exceed 6".
- Refer to last page of calculations for fasteners required for specified loads.
- Girders are designed to be supported on the bottom edge only.
- Top loads must be supported equally by all plies.
- Top must be laterally braced at a maximum of 8'11 1/4" o.c.
- Bottom must be laterally braced at end bearings.
- Lateral slenderness ratio based on single ply width.

ID	Load Type	Location	Trib Width	Side	Dead 0.9	Live 1	Snow 1.15	Wind 1.6	Const. 1.25	Comments
1	Uniform			Top	175 PLF	0 PLF	0 PLF	0 PLF	0 PLF	WALL
2	Uniform			Top	40 PLF	40 PLF	0 PLF	0 PLF	0 PLF	ROOF
	Self Weight				12 PLF					

Notes

Calculated Structured Designs is responsible only of the structural adequacy of this component based on the design criteria and loadings shown. It is the responsibility of the customer and/or the contractor to ensure the component suitability of the intended application, and to verify the dimensions and loads.

Lumber

- Dry service conditions, unless noted otherwise
- LVL not to be treated with fire retardant or corrosive chemicals

chemicals

Handling & Installation

- LVL beams must not be cut or drilled
- Refer to manufacturer's product information regarding installation requirements, multi-ply fastening details, beam strength values, and code approvals
- Damaged Beams must not be used
- Design assumes top edge is laterally restrained
- Provide lateral support at bearing points to avoid lateral displacement and rotation

6. For flat roofs provide proper drainage to prevent ponding

This design is valid until 3/30/2024

Manufacturer Info

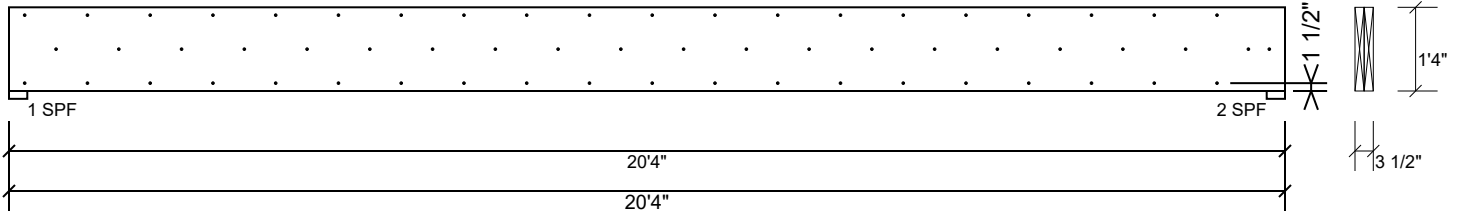
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BM3 Kerto-S LVL 1.750" X 16.000" 2-Ply - PASSED

Level: Level



Multi-Ply Analysis

Fasten all plies using 3 rows of 10d Box nails (.128x3") at 12" o.c.. Maximum end distance not to exceed 6".

Capacity	0.0 %
Load	0.0 PLF
Yield Limit per Foot	245.6 PLF
Yield Limit per Fastener	81.9 lb.
Yield Mode	IV
Edge Distance	1 1/2"
Min. End Distance	3"
Load Combination	
Duration Factor	1.00

Notes

Calculated Structured Designs is responsible only of the structural adequacy of this component based on the design criteria and loadings shown. It is the responsibility of the customer and/or the contractor to ensure the component suitability of the intended application, and to verify the dimensions and loads.

Lumber

1. Dry service conditions, unless noted otherwise
2. LVL not to be treated with fire retardant or corrosive

Handling & Installation

1. LVL beams must not be cut or drilled
2. Refer to manufacturer's product information regarding installation requirements, multi-ply fastening details, beam strength values, and code approvals
3. Damaged Beams must not be used
4. Design assumes top edge is laterally restrained
5. Provide lateral support at bearing points to avoid lateral displacement and rotation

6. For flat roofs provide proper drainage to prevent ponding

This design is valid until 3/30/2024

Manufacturer Info

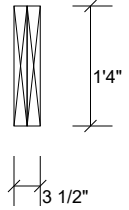
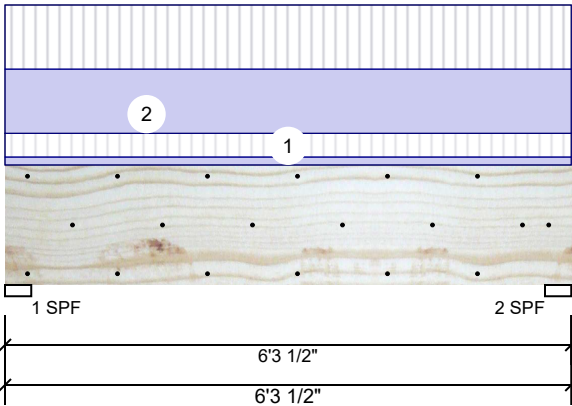
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BM4 Kerto-S LVL 1.750" X 16.000" 2-Ply - PASSED

Level: Level



Member Information

Type:	Girder	Application:	Roof
Plies:	2	Slope:	0/12
Moisture Condition:	Dry	Design Method:	ASD
Deflection LL:	480	Building Code:	IBC 2012
Deflection TL:	360	Load Sharing:	No
Importance:	Normal - II	Deck:	Not Checked
Temperature:	Temp <= 100°F		

Reactions UNPATTERNED lb (Uplift)

Brg	Direction	Live	Dead	Snow	Wind	Const
1	Vertical	1746	1471	0	0	0
2	Vertical	1746	1471	0	0	0

Bearings

Bearing	Length	Dir.	Cap.	React D/L lb	Total	Ld. Case	Ld. Comb.
1 - SPF	3.500"	Vert	62%	1471 / 1746	3216	L	D+L
2 - SPF	3.500"	Vert	62%	1471 / 1746	3216	L	D+L

Analysis Results

Analysis	Actual	Location	Allowed	Capacity	Comb.	Case
Moment	4380 ft-lb	3'1 3/4"	34565 ft-lb	0.127 (13%)	D+L	L
Unbraced	4380 ft-lb	3'1 3/4"	19678 ft-lb	0.223 (22%)	D+L	L
Shear	1572 lb	1'7 1/2"	11947 lb	0.132 (13%)	D+L	L
LL Defl inch	0.011 (L/6369)	3'1 3/4"	0.146 (L/480)	0.075 (8%)	L	L
TL Defl inch	0.020 (L/3457)	3'1 3/4"	0.195 (L/360)	0.104 (10%)	D+L	L

Design Notes

- 1 Provide support to prevent lateral movement and rotation at the end bearings. Lateral support may also be required at the interior bearings by the building code.
- 2 Fasten all plies using 3 rows of 10d Box nails (.128x3") at 12" o.c. Maximum end distance not to exceed 6".
- 3 Refer to last page of calculations for fasteners required for specified loads.
- 4 Girders are designed to be supported on the bottom edge only.
- 5 Top loads must be supported equally by all plies.
- 6 Top must be laterally braced at end bearings.
- 7 Bottom must be laterally braced at end bearings.
- 8 Lateral slenderness ratio based on single ply width.

ID	Load Type	Location	Trib Width	Side	Dead 0.9	Live 1	Snow 1.15	Wind 1.6	Const. 1.25	Comments
1	Uniform			Top	50 PLF	150 PLF	0 PLF	0 PLF	0 PLF	FLOOR
2	Uniform			Top	405 PLF	405 PLF	0 PLF	0 PLF	0 PLF	J1
	Self Weight				12 PLF					

Notes

Calculated Structured Designs is responsible only of the structural adequacy of this component based on the design criteria and loadings shown. It is the responsibility of the customer and/or the contractor to ensure the component suitability of the intended application, and to verify the dimensions and loads.

Lumber

1. Dry service conditions, unless noted otherwise
2. LVL not to be treated with fire retardant or corrosive

chemicals

Handling & Installation

1. LVL beams must not be cut or drilled
2. Refer to manufacturer's product information regarding installation requirements, multi-ply fastening details, beam strength values, and code approvals
3. Damaged Beams must not be used
4. Design assumes top edge is laterally restrained
5. Provide lateral support at bearing points to avoid lateral displacement and rotation

6. For flat roofs provide proper drainage to prevent ponding

This design is valid until 3/30/2024

Manufacturer Info

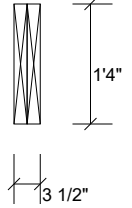
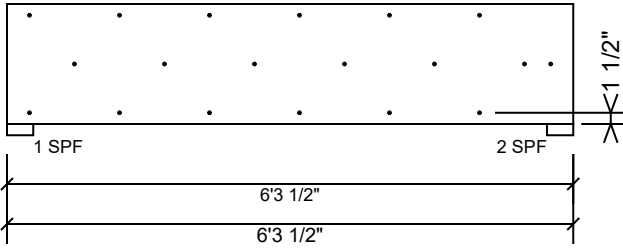
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BM4 Kerto-S LVL 1.750" X 16.000" 2-Ply - PASSED

Level: Level



Multi-Ply Analysis

Fasten all plies using 3 rows of 10d Box nails (.128x3") at 12" o.c.. Maximum end distance not to exceed 6".

Capacity	0.0 %
Load	0.0 PLF
Yield Limit per Foot	245.6 PLF
Yield Limit per Fastener	81.9 lb.
Yield Mode	IV
Edge Distance	1 1/2"
Min. End Distance	3"
Load Combination	
Duration Factor	1.00

Notes

Calculated Structured Designs is responsible only of the structural adequacy of this component based on the design criteria and loadings shown. It is the responsibility of the customer and/or the contractor to ensure the component suitability of the intended application, and to verify the dimensions and loads.

Lumber

1. Dry service conditions, unless noted otherwise
2. LVL not to be treated with fire retardant or corrosive

chemicals

Handling & Installation

1. LVL beams must not be cut or drilled
2. Refer to manufacturer's product information regarding installation requirements, multi-ply fastening details, beam strength values, and code approvals
3. Damaged Beams must not be used
4. Design assumes top edge is laterally restrained
5. Provide lateral support at bearing points to avoid lateral displacement and rotation

6. For flat roofs provide proper drainage to prevent ponding

This design is valid until 3/30/2024

Manufacturer Info

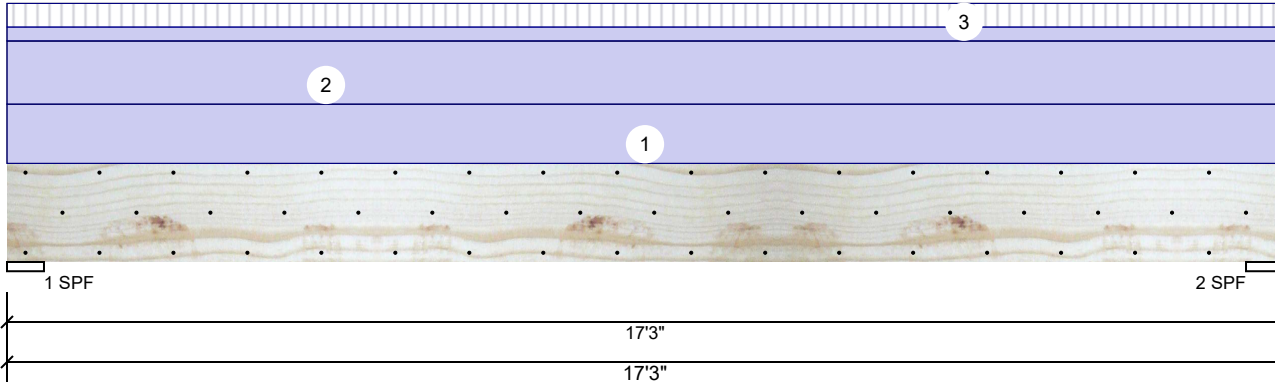
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GDH Kerto-S LVL 1.750" X 16.000" 2-Ply - PASSED

Level: Level



Member Information

Type:	Girder	Application:	Roof
Plies:	2	Slope:	0/12
Moisture Condition:	Dry	Design Method:	ASD
Deflection LL:	480	Building Code:	IBC 2012
Deflection TL:	600	Load Sharing:	No
Importance:	Normal - II	Deck:	Not Checked
Temperature:	Temp <= 100°F		

Reactions UNPATTERNED lb (Uplift)

Brg	Direction	Live	Dead	Snow	Wind	Const
1	Vertical	518	3083	0	0	0
2	Vertical	518	3083	0	0	0

Bearings

Bearing	Length	Dir.	Cap.	React D/L lb	Total	Ld. Case	Ld. Comb.
1 - SPF	6.000"	Vert	40%	3083 / 518	3600	L	D+L
2 - SPF	6.000"	Vert	40%	3083 / 518	3600	L	D+L

Analysis Results

Analysis	Actual	Location	Allowed	Capacity	Comb.	Case
Moment	14027 ft-lb	8'7 1/2"	34565 ft-lb	0.406 (41%)	D+L	L
Unbraced	14027 ft-lb	8'7 1/2"	14050 ft-lb	0.998 (100%)	D+L	L
Shear	2852 lb	1'10"	11947 lb	0.239 (24%)	D+L	L
LL Defl inch	0.045 (L/4374)	8'7 9/16"	0.410 (L/480)	0.110 (11%)	L	L
TL Defl inch	0.313 (L/629)	8'7 9/16"	0.328 (L/600)	0.954 (95%)	D+L	L

Design Notes

- 1 Provide support to prevent lateral movement and rotation at the end bearings. Lateral support may also be required at the interior bearings by the building code.
- 2 Fasten all plies using 3 rows of 10d Box nails (.128x3") at 12" o.c. Maximum end distance not to exceed 6".
- 3 Refer to last page of calculations for fasteners required for specified loads.
- 4 Girders are designed to be supported on the bottom edge only.
- 5 Top loads must be supported equally by all plies.
- 6 Top must be laterally braced at a maximum of 8'5 1/16" o.c.
- 7 Bottom must be laterally braced at end bearings.
- 8 Lateral slenderness ratio based on single ply width.

ID	Load Type	Location	Trib Width	Side	Dead 0.9	Live 1	Snow 1.15	Wind 1.6	Const. 1.25	Comments
1	Uniform			Top	150 PLF	0 PLF	0 PLF	0 PLF	0 PLF	WALL
2	Uniform			Top	160 PLF	0 PLF	0 PLF	0 PLF	0 PLF	BRICK
3	Uniform			Top	35 PLF	60 PLF	0 PLF	0 PLF	0 PLF	Roof/Floor
	Self Weight				12 PLF					

Notes

Calculated Structured Designs is responsible only of the structural adequacy of this component based on the design criteria and loadings shown. It is the responsibility of the customer and/or the contractor to ensure the component suitability of the intended application, and to verify the dimensions and loads.

Lumber

1. Dry service conditions, unless noted otherwise
2. LVL not to be treated with fire retardant or corrosive

chemicals

Handling & Installation

1. LVL beams must not be cut or drilled
2. Refer to manufacturer's product information regarding installation requirements, multi-ply fastening details, beam strength values, and code approvals
3. Damaged Beams must not be used
4. Design assumes top edge is laterally restrained
5. Provide lateral support at bearing points to avoid lateral displacement and rotation

6. For flat roofs provide proper drainage to prevent ponding

This design is valid until 3/30/2024

Manufacturer Info

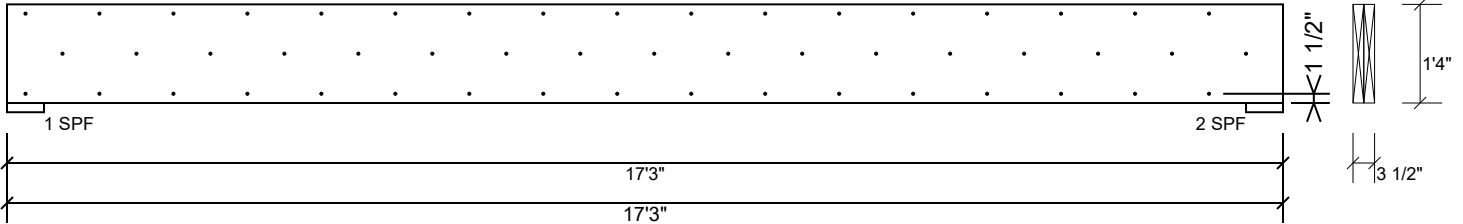
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GDH Kerto-S LVL 1.750" X 16.000" 2-Ply - PASSED

Level: Level



Multi-Ply Analysis

Fasten all plies using 3 rows of 10d Box nails (.128x3") at 12" o.c.. Maximum end distance not to exceed 6".

Capacity	0.0 %
Load	0.0 PLF
Yield Limit per Foot	245.6 PLF
Yield Limit per Fastener	81.9 lb.
Yield Mode	IV
Edge Distance	1 1/2"
Min. End Distance	3"
Load Combination	
Duration Factor	1.00

Notes

Calculated Structured Designs is responsible only of the structural adequacy of this component based on the design criteria and loadings shown. It is the responsibility of the customer and/or the contractor to ensure the component suitability of the intended application, and to verify the dimensions and loads.

Lumber

1. Dry service conditions, unless noted otherwise
2. LVL not to be treated with fire retardant or corrosive

chemicals

Handling & Installation

1. LVL beams must not be cut or drilled
2. Refer to manufacturer's product information regarding installation requirements, multi-ply fastening details, beam strength values, and code approvals
3. Damaged Beams must not be used
4. Design assumes top edge is laterally restrained
5. Provide lateral support at bearing points to avoid lateral displacement and rotation

6. For flat roofs provide proper drainage to prevent ponding

This design is valid until 3/30/2024

Manufacturer Info

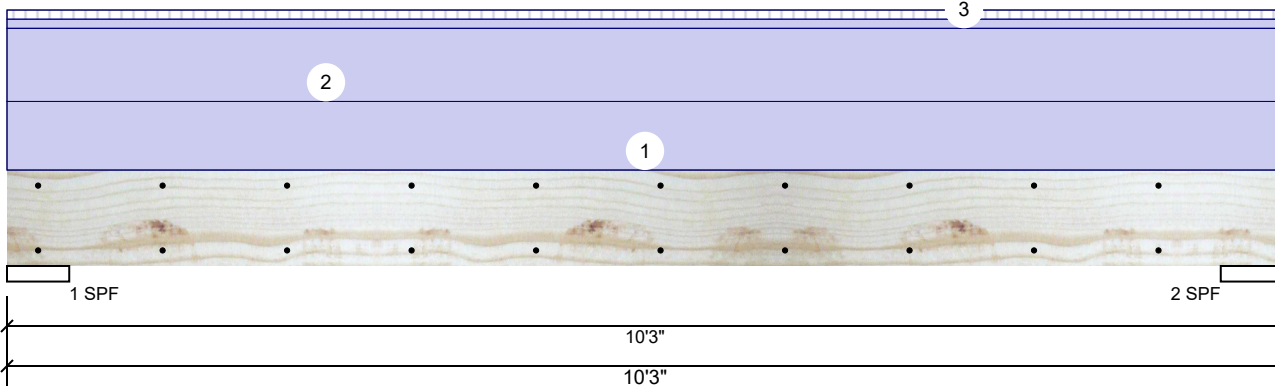
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GDH-9 Kerto-S LVL 1.750" X 9.250" 2-Ply - PASSED

Level: Level



Member Information

Type:	Girder	Application:	Roof
Plies:	2	Slope:	0/12
Moisture Condition:	Dry	Design Method:	ASD
Deflection LL:	480	Building Code:	IBC 2012
Deflection TL:	600	Load Sharing:	No
Importance:	Normal - II	Deck:	Not Checked
Temperature:	Temp <= 100°F		

Reactions UNPATTERNED lb (Uplift)

Brg	Direction	Live	Dead	Snow	Wind	Const
1	Vertical	103	1728	0	0	0
2	Vertical	103	1728	0	0	0

Bearings

Bearing	Length	Dir.	Cap.	React D/L lb	Total	Ld. Case	Ld. Comb.
1 - SPF	6.000"	Vert	21%	1728 / 103	1831	L	D+L
2 - SPF	6.000"	Vert	21%	1728 / 103	1831	L	D+L

Analysis Results

Analysis	Actual	Location	Allowed	Capacity	Comb.	Case
Moment	3705 ft-lb	5'1 1/2"	11288 ft-lb	0.328 (33%)	D	Uniform
Unbraced	3924 ft-lb	5'1 1/2"	7663 ft-lb	0.512 (51%)	D+L	L
Shear	1305 lb	8'11 3/4"	6216 lb	0.210 (21%)	D	Uniform
LL Defl inch (L/13536)	0.008	5'1 1/2"	0.234 (L/480)	0.035 (4%)	L	L
TL Defl inch (L/758)	0.148	5'1 1/2"	0.188 (L/600)	0.792 (79%)	D+L	L

Design Notes

- Provide support to prevent lateral movement and rotation at the end bearings. Lateral support may also be required at the interior bearings by the building code.
- Fasten all plies using 2 rows of 10d Box nails (.128x3") at 12" o.c. Maximum end distance not to exceed 6".
- Refer to last page of calculations for fasteners required for specified loads.
- Girders are designed to be supported on the bottom edge only.
- Top loads must be supported equally by all plies.
- Top must be laterally braced at end bearings.
- Bottom must be laterally braced at end bearings.
- Lateral slenderness ratio based on single ply width.

ID	Load Type	Location	Trib Width	Side	Dead 0.9	Live 1	Snow 1.15	Wind 1.6	Const. 1.25	Comments
1	Uniform			Top	150 PLF	0 PLF	0 PLF	0 PLF	0 PLF	WALL
2	Uniform			Top	160 PLF	0 PLF	0 PLF	0 PLF	0 PLF	BRICK
3	Uniform			Top	20 PLF	20 PLF	0 PLF	0 PLF	0 PLF	Roof
	Self Weight				7 PLF					

Notes

Calculated Structured Designs is responsible only of the structural adequacy of this component based on the design criteria and loadings shown. It is the responsibility of the customer and/or the contractor to ensure the component suitability of the intended application, and to verify the dimensions and loads.

Lumber

- Dry service conditions, unless noted otherwise
- LVL not to be treated with fire retardant or corrosive chemicals

chemicals

Handling & Installation

- LVL beams must not be cut or drilled
- Refer to manufacturer's product information regarding installation requirements, multi-ply fastening details, beam strength values, and code approvals
- Damaged Beams must not be used
- Design assumes top edge is laterally restrained
- Provide lateral support at bearing points to avoid lateral displacement and rotation

6. For flat roofs provide proper drainage to prevent ponding

Manufacturer Info

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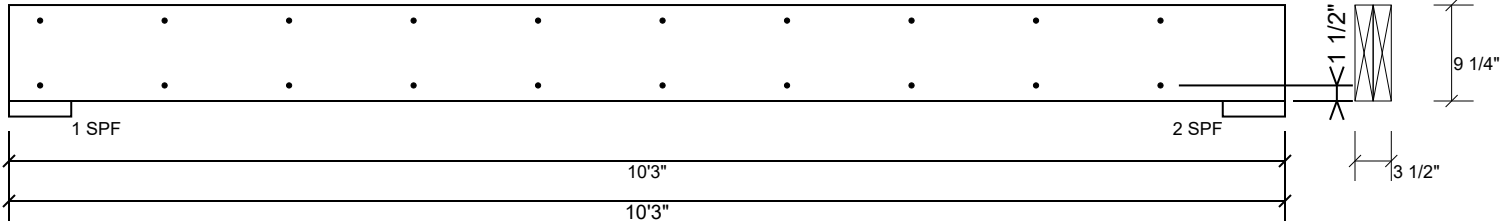
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This design is valid until 3/30/2024

GDH-9 Kerto-S LVL 1.750" X 9.250" 2-Ply - PASSED

Level: Level



Multi-Ply Analysis

Fasten all plies using 2 rows of 10d Box nails (.128x3") at 12" o.c.. Maximum end distance not to exceed 6".

Capacity	0.0 %
Load	0.0 PLF
Yield Limit per Foot	163.7 PLF
Yield Limit per Fastener	81.9 lb.
Yield Mode	IV
Edge Distance	1 1/2"
Min. End Distance	3"
Load Combination	
Duration Factor	1.00

Notes

Calculated Structured Designs is responsible only of the structural adequacy of this component based on the design criteria and loadings shown. It is the responsibility of the customer and/or the contractor to ensure the component suitability of the intended application, and to verify the dimensions and loads.

Lumber

1. Dry service conditions, unless noted otherwise
2. LVL not to be treated with fire retardant or corrosive

chemicals

Handling & Installation

1. LVL beams must not be cut or drilled
2. Refer to manufacturer's product information regarding installation requirements, multi-ply fastening details, beam strength values, and code approvals
3. Damaged Beams must not be used
4. Design assumes top edge is laterally restrained
5. Provide lateral support at bearing points to avoid lateral displacement and rotation

6. For flat roofs provide proper drainage to prevent ponding

This design is valid until 3/30/2024

Manufacturer Info

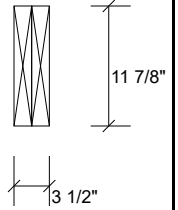
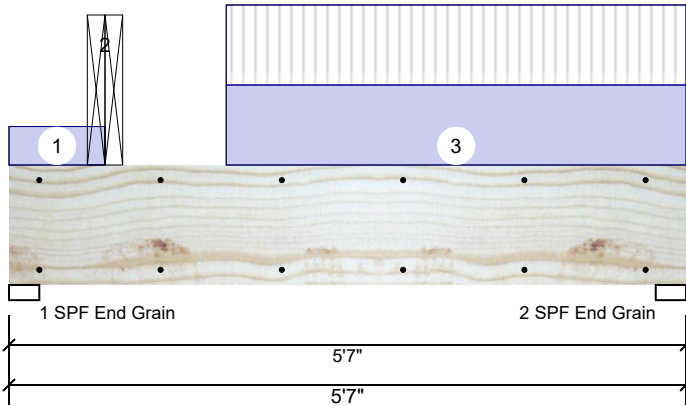
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Sliding Door Header Kerto-S LVL 1.750" X 11.875" 2-Ply - PASSED

Level: Level



Member Information

Type:	Girder	Application:	Floor
Plies:	2	Design Method:	ASD
Moisture Condition:	Dry	Building Code:	IBC 2012
Deflection LL:	360	Load Sharing:	No
Deflection TL:	240	Deck:	Not Checked
Importance:	Normal - II		
Temperature:	Temp <= 100°F		

Reactions UNPATTERNED lb (Uplift)

Brg	Direction	Live	Dead	Snow	Wind	Const
1	Vertical	684	2489	0	0	0
2	Vertical	709	960	0	0	0

Bearings

Bearing	Length	Dir.	Cap.	React D/L lb	Total	Ld. Case	Ld. Comb.
1 - SPF End Grain	3.000"	Vert	35%	2489 / 684	3173	L	D+L
2 - SPF End Grain	3.000"	Vert	18%	960 / 709	1669	L	D+L

Analysis Results

Analysis	Actual	Location	Allowed	Capacity	Comb.	Case
Moment	2327 ft-lb	2'5 3/16"	19911 ft-lb	0.117 (12%)	D+L	L
Unbraced	2327 ft-lb	2'5 3/16"	15061 ft-lb	0.155 (15%)	D+L	L
Shear	1840 lb	1'2 7/8"	8867 lb	0.208 (21%)	D+L	L
LL Defl inch	0.007 (L/9597)	2'9 7/8"	0.174 (L/360)	0.038 (4%)	L	L
TL Defl inch	0.018 (L/3391)	2'7 1/2"	0.260 (L/240)	0.071 (7%)	D+L	L

Design Notes

- 1 Provide support to prevent lateral movement and rotation at the end bearings. Lateral support may also be required at the interior bearings by the building code.
- 2 Fasten all plies using 2 rows of 10d Box nails (.128x3") at 12" o.c. Maximum end distance not to exceed 6".
- 3 Refer to last page of calculations for fasteners required for specified loads.
- 4 Girders are designed to be supported on the bottom edge only.
- 5 Top loads must be supported equally by all plies.
- 6 Top must be laterally braced at end bearings.
- 7 Bottom must be laterally braced at end bearings.
- 8 Lateral slenderness ratio based on single ply width.

ID	Load Type	Location	Trib Width	Side	Dead 0.9	Live 1	Snow 1.15	Wind 1.6	Const. 1.25	Comments
1	Part. Uniform	0-0-0 to 0-9-8		Top	125 PLF	0 PLF	0 PLF	0 PLF	0 PLF	Wall Load
2	Point	0-9-8		Top	2312 lb	407 lb	0 lb	0 lb	0 lb	BM3 Brg 1
	Bearing Length	0-3-8								
3	Part. Uniform	1-9-8 to 5-7-0		Top	260 PLF	260 PLF	0 PLF	0 PLF	0 PLF	C2
	Self Weight				9 PLF					

Notes

Calculated Structural Designs is responsible only of the structural adequacy of this component based on the design criteria and loadings shown. It is the responsibility of the customer and/or the contractor to ensure the component suitability of the intended application, and to verify the dimensions and loads.

Lumber

1. Dry service conditions, unless noted otherwise
2. LVL not to be treated with fire retardant or corrosive chemicals

chemicals

Handling & Installation

1. LVL beams must not be cut or drilled
2. Refer to manufacturer's product information regarding installation requirements, multi-ply fastening details, beam strength values, and code approvals
3. Damaged Beams must not be used
4. Design assumes top edge is laterally restrained
5. Provide lateral support at bearing points to avoid lateral displacement and rotation

6. For flat roofs provide proper drainage to prevent ponding

This design is valid until 3/30/2024

Manufacturer Info

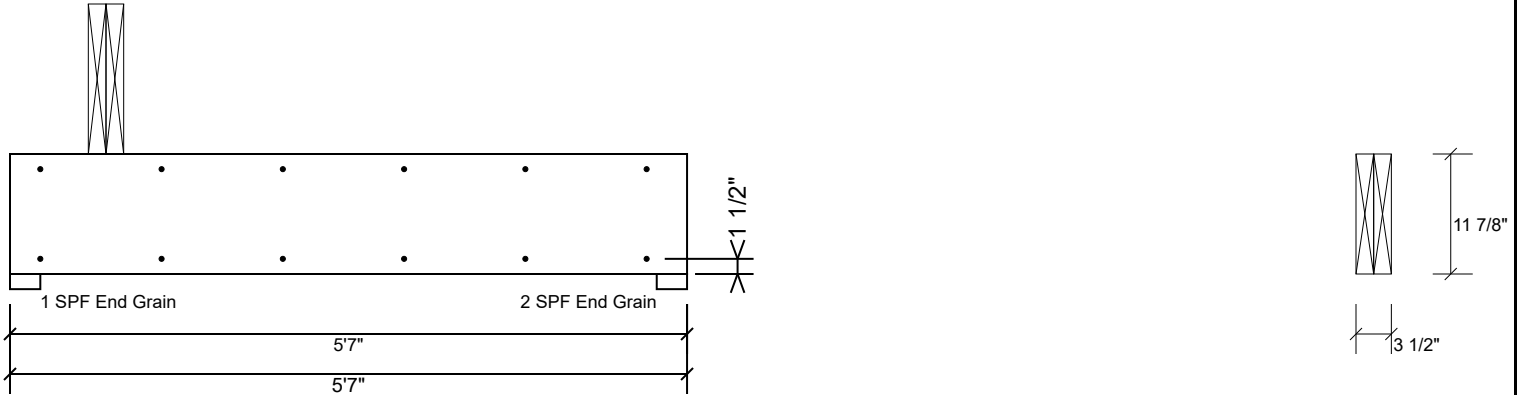
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Sliding Door Header Kerto-S LVL 1.750" X 11.875" 2-Ply - PASSED

Level: Level



Multi-Ply Analysis

Fasten all plies using 2 rows of 10d Box nails (.128x3") at 12" o.c.. Maximum end distance not to exceed 6".

Capacity	0.0 %
Load	0.0 PLF
Yield Limit per Foot	163.7 PLF
Yield Limit per Fastener	81.9 lb.
Yield Mode	IV
Edge Distance	1 1/2"
Min. End Distance	3"
Load Combination	
Duration Factor	1.00

Notes

Calculated Structured Designs is responsible only of the structural adequacy of this component based on the design criteria and loadings shown. It is the responsibility of the customer and/or the contractor to ensure the component suitability of the intended application, and to verify the dimensions and loads.

Lumber

1. Dry service conditions, unless noted otherwise
2. LVL not to be treated with fire retardant or corrosive

Handling & Installation

1. LVL beams must not be cut or drilled
2. Refer to manufacturer's product information regarding installation requirements, multi-ply fastening details, beam strength values, and code approvals
3. Damaged Beams must not be used
4. Design assumes top edge is laterally restrained
5. Provide lateral support at bearing points to avoid lateral displacement and rotation

6. For flat roofs provide proper drainage to prevent ponding

This design is valid until 3/30/2024

Manufacturer Info

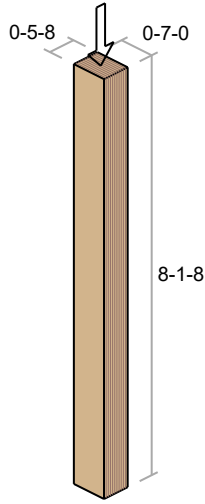
Metsä Wood
 301 Merritt 7 Building, 2nd Floor
 Norwalk, CT 06851
 (800) 622-5850
 www.metsawood.com/us
 ICC-ES: ESR-3633

Comtech, Inc.
 1001 S. Reilly Road, Suite #639
 Fayetteville, NC
 USA
 28314
 910-864-TRUS



C1 Anthony Power Column 5.500" X 7.000" - PASSED

Level: Level



Design Method: ASD
 Building Code: IBC 2012
 Importance: Normal - II
 Application: Column Free Standing
 Service Condition: Dry
 Load Sharing: No

Design OK.
 Design Notes
 1. Axial load eccentricity of 1/6 side dimension in both cross-section axes, each axis analyzed separately.
 2. Designed in accordance with NDS 2012, ASCE7 and IBC 2012.
 3. Top and bottom ends of the member must be supported to prevent lateral movement and rotation.
 4. Holes and notches are not allowed in member.

Analysis

Design Properties

	Actual	Allowed	Capacity	Load Combination	E:	1900000	Fc:	2300
Slenderness	17.7	50.0	35%		Ey:	1900000	Fv:	0
Axial (lb.)	12263	71395	17%	D+L	Fb:	2100	Fvy:	0
Axial + Bending	0.20	1	20%	D+L	Fby:	2300		
Bearing SPF (lb.)	12348	16363	75%	D+L				
LL Deflection	0.056 (in.) L/1731	0.271 (in.) L/360	21%	L				

Applied Loads

ID	Load Type	Location	Dead 0.9	Live 1	Snow 1.15	Wind 1.6	Const. 1.25	Comments
Axial								
1	Point	8-1-8	3191 lb	9072 lb	0 lb	0 lb	0 lb	BM1

Manufacturer Info

Anthony Forest Products Co
 309 North Washington
 El Dorado, AR 71730
 (800) 221-2326
 www.anthonyforest.com

Comtech, Inc.
 1001 S. Reilly Road, Suite #639
 Fayetteville, NC
 USA
 28314
 910-864-TRUS



This design is valid until 3/30/2024

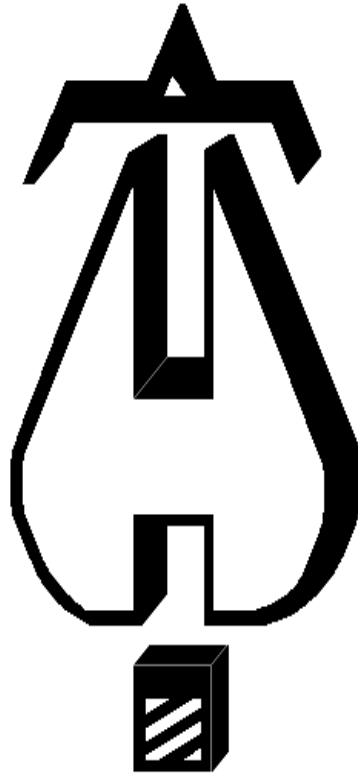


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OAK HAVEN LOT 35

HYDRAULIC CALCULATIONS

12/22/2021



Hydraulic calculations using HydraCALC

FIRE & LIFE SAFETY AMERICA
1731 ROUND ROCK DRIVE
RALEIGH, NC 27615
919-872-3250

Job Name : OAK HAVEN LOT 35
Drawing : FP1
Location : 49 BUCKHAVEN DR.
Remote Area : RA1
Contract : 22NC1557
Data File : RA1.WXF

HYDRAULIC CALCULATIONS
for

Project name: OAK HAVEN LOT 35 - RA1

Location: 49 BUCKHAVEN DR.

Drawing no: FP1

Date: 12/21/2021

Design

Remote area number: RA1

Remote area location: BEDROOM #2

Occupancy classification: RESIDENTIAL

Density: .05 - Gpm/SqFt

Area of application: 2 HEADS - SqFt

Coverage per sprinkler: 256 - SqFt

Type of sprinklers calculated: VK494

No. of sprinklers calculated: 2

In-rack demand: N/A - GPM

Hose streams: 3 - GPM

Total water required (including hose streams): 29.000 - GPM @ 29.526 - Psi

Type of system: WET CPVC 13D

Volume of dry or preaction system: N/A - Gal

Water supply information

Date: 4/21/2021

Location: NC42, NC 27540

Source: FIRE & LIFE SAFETY AMERICA

Name of contractor: FIRE & LIFE SAFETY AMERICA

Address: 1731 ROUND ROCK DRIVE / RALEIGH, NC 27615 / 919-872-3250

Phone number: (919) 872-3250

Name of designer: R. COLLINS

Authority having jurisdiction: HARNETT COUNTY

Notes: (Include peaking information or gridded systems here.)

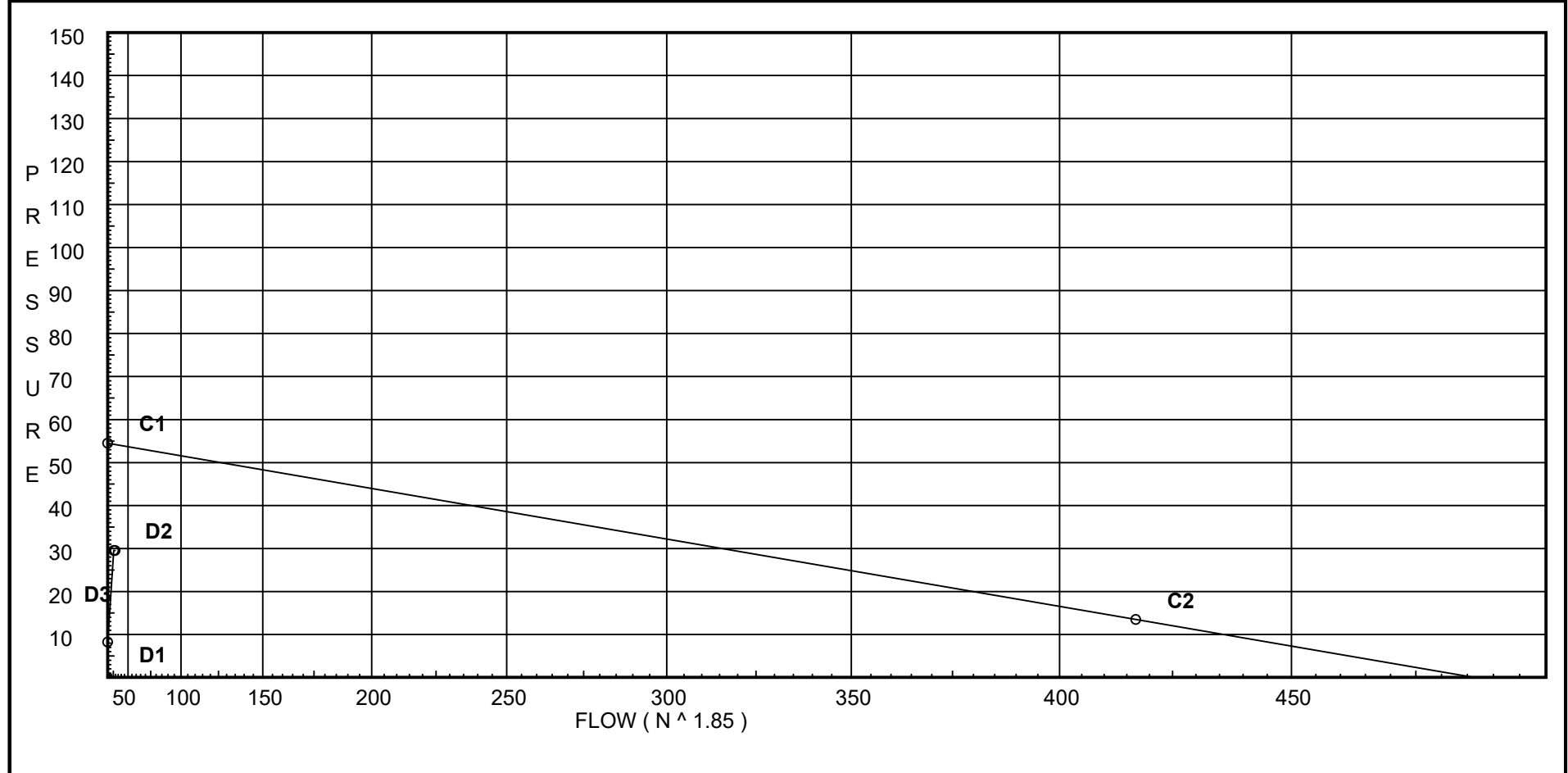
Water Supply Curve C

FIRE & LIFE SAFETY AMERICA
OAK HAVEN LOT 35

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City Water Supply:
C1 - Static Pressure : 54.5
C2 - Residual Pressure: 13.5
C2 - Residual Flow : 417

Demand:
D1 - Elevation : 8.229
D2 - System Flow : 26
D2 - System Pressure : 29.526
Hose (Demand) : 3
D3 - System Demand : 29
Safety Margin : 24.678



Fittings Used Summary

FIRE & LIFE SAFETY AMERICA
OAK HAVEN LOT 35

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Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
N *	CPVC 90'El Harvel-Spears		7	7	8	9	11	12	13	0	0	0	0	0	0	0	0	0	0	0	0
O *	CPVC Tee - Branch	3	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
T	NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121

Units Summary

Diameter Units Inches
Length Units Feet
Flow Units US Gallons per Minute
Pressure Units Pounds per Square Inch

Note: Fitting Legend provides equivalent pipe lengths for fittings types of various diameters. Equivalent lengths shown are standard for actual diameters of Sched 40 pipe and CFactors of 120 except as noted with *. The fittings marked with a * show equivalent lengths values supplied by manufacturers based on specific pipe diameters and CFactors and they require no adjustment. All values for fittings not marked with a * will be adjusted in the calculation for CFactors of other than 120 and diameters other than Sched 40 per NFPA.

SUPPLY ANALYSIS

<i>Node at Source</i>	<i>Static Pressure</i>	<i>Residual Pressure</i>	<i>Flow</i>	<i>Available Pressure</i>	<i>Total Demand</i>	<i>Required Pressure</i>
TEST	54.5	13.5	417.0	54.204	29.0	29.526

NODE ANALYSIS

<i>Node Tag</i>	<i>Elevation</i>	<i>Node Type</i>	<i>Pressure at Node</i>	<i>Discharge at Node</i>	<i>Notes</i>
A1	22.0	4.9	7.08	13.04	
A2	22.0	4.9	7.0	12.96	
101	22.0		7.31		
102	22.0		7.23		
103	22.0		7.48		
104	22.0		9.47		
105	11.0		15.45		
M1	11.0		16.31		
M2	11.0		18.14		
TOR	11.0		19.85		
BOR	3.0		24.98		
UG1	3.0		26.27	3.0	
UG2	-3.0		32.04		
UG3	-3.0		32.05		
UG4	-3.0		32.09		
TEST	3.0		29.53		

Final Calculations : Hazen-Williams

FIRE & LIFE SAFETY AMERICA
OAK HAVEN LOT 35

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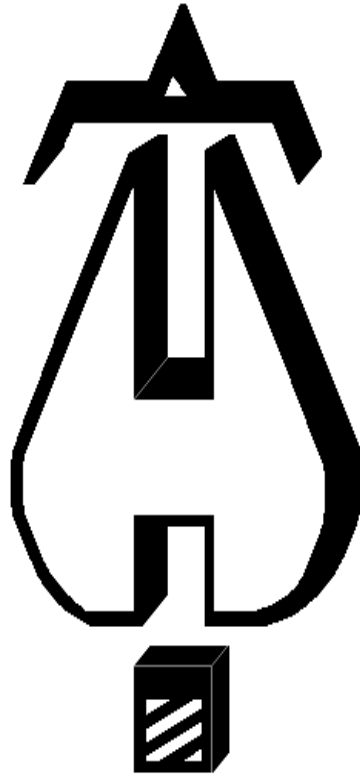
Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
A1 to 101	22 22	4.90	13.04 13.04	1 1.101	N	7.0 0.0 0.0	0.500 7.000 7.500	150 0.0308	7.077 0.0 0.231		Vel = 4.39	
101			0.0 13.04						7.308		K Factor = 4.82	
A2 to 102	22 22	4.90	12.96 12.96	1 1.101	N	7.0 0.0 0.0	0.500 7.000 7.500	150 0.0305	7.000 0.0 0.229		Vel = 4.37	
102			0.0 12.96						7.229		K Factor = 4.82	
101 to 103	22 22		13.04 13.04	1 1.101		0.0 0.0 0.0	5.583 0.0 5.583	150 0.0310	7.308 0.0 0.173		Vel = 4.39	
103			0.0 13.04						7.481		K Factor = 4.77	
102 to 103	22 22		12.96 12.96	1 1.101	O	5.0 0.0 0.0	3.250 5.000 8.250	150 0.0305	7.229 0.0 0.252		Vel = 4.37	
103 to 104	22 22		13.04 26.0	1 1.101		0.0 0.0 0.0	18.000 0.0 18.000	150 0.1105	7.481 0.0 1.989		Vel = 8.76	
104 to 105	22 11		0.0 26.0	1 1.101		0.0 0.0 0.0	11.000 0.0 11.000	150 0.1106	9.470 4.764 1.217		Vel = 8.76	
105 to M1	11 11		0.0 26.0	1 1.101	O	5.0 0.0 0.0	2.750 5.000 7.750	150 0.1105	15.451 0.0 0.856		Vel = 8.76	
M1 to M2	11 11		0.0 26.0	1 1.101		0.0 0.0 0.0	16.583 0.0 16.583	150 0.1106	16.307 0.0 1.834		Vel = 8.76	
M2 to TOR	11 11		0.0 26.0	1 1.101	N	7.0 0.0 0.0	8.500 7.000 15.500	150 0.1105	18.141 0.0 1.713		Vel = 8.76	
TOR			0.0 26.00						19.854		K Factor = 5.84	
TOR to BOR	11 3		26.00 26.0	1 1.101	N	7.0 0.0 0.0	8.000 7.000 15.000	150 0.1105	19.854 3.465 1.658		Vel = 8.76	
BOR to UG1	3 3		0.0 26.0	1 1.101	2E	7.65 0.0 0.0	4.000 7.650 11.650	150 0.1106	24.977 0.0 1.288		Vel = 8.76	
UG1 to UG2	3 -3	H3	3.00 29.0	1.25 1.394	T 2E	9.523 9.523 0.0	55.000 19.046 74.046	150 0.0429	26.265 2.599 3.175		Vel = 6.10	
UG2 to UG3	-3 -3		0.0 29.0	6 6.09	3E 2F	64.749 21.583 0.0	326.000 86.332 412.332	150 0	32.039 0.0 0.013		Vel = 0.32	
UG3 to UG4	-3 -3		0.0 29.0	6 6.09	2G 3F	9.25 32.374 0.0	1149.000 41.623 1190.623	150 0	32.052 0.0 0.039		Vel = 0.32	

Final Calculations : Hazen-Williams

FIRE & LIFE SAFETY AMERICA
OAK HAVEN LOT 35

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
UG4 to TEST	-3 3		0.0 29.0	6 6.16	T 2E G	48.896 45.637 4.89	1000.000 99.422 1099.422	150 0	32.091 -2.599 0.034		Vel = 0.31	
TEST			0.0 29.00						29.526		K Factor = 5.34	



Hydraulic calculations using HydraCALC

FIRE & LIFE SAFETY AMERICA
1731 ROUND ROCK DRIVE
RALEIGH, NC 27615
919-872-3250

Job Name : OAK HAVEN LOT 35 - RA2
Drawing : FP1
Location : 49 BUCKHAVEN DR.
Remote Area : RA2
Contract : 22NC1557
Data File : RA2.WXF

HYDRAULIC CALCULATIONS
for

Project name: OAK HAVEN LOT 35 - RA2
Location: 49 BUCKHAVEN DR.
Drawing no: FP1
Date: 12/21/2021

Design

Remote area number: RA2
Remote area location: BEDROOM #2
Occupancy classification: RESIDENTIAL
Density: .05 - Gpm/SqFt
Area of application: 2 HEADS - SqFt
Coverage per sprinkler: 324 - SqFt
Type of sprinklers calculated: VK494
No. of sprinklers calculated: 2
In-rack demand: N/A - GPM
Hose streams: 3 - GPM
Total water required (including hose streams): 37.116 - GPM @ 34.223 - Psi
Type of system: WET CPVC 13D
Volume of dry or preaction system: N/A - Gal

Water supply information

Date: 4/21/2021
Location: NC42, NC 27540
Source: FIRE & LIFE SAFETY AMERICA

Name of contractor: FIRE & LIFE SAFETY AMERICA
Address: 1731 ROUND ROCK DRIVE / RALEIGH, NC 27615 / 919-872-3250
Phone number: (919) 872-3250
Name of designer: R. COLLINS
Authority having jurisdiction: HARNETT COUNTY
Notes: (Include peaking information or gridded systems here.)

Water Supply Curve C

FIRE & LIFE SAFETY AMERICA
OAK HAVEN LOT 35 - RA2

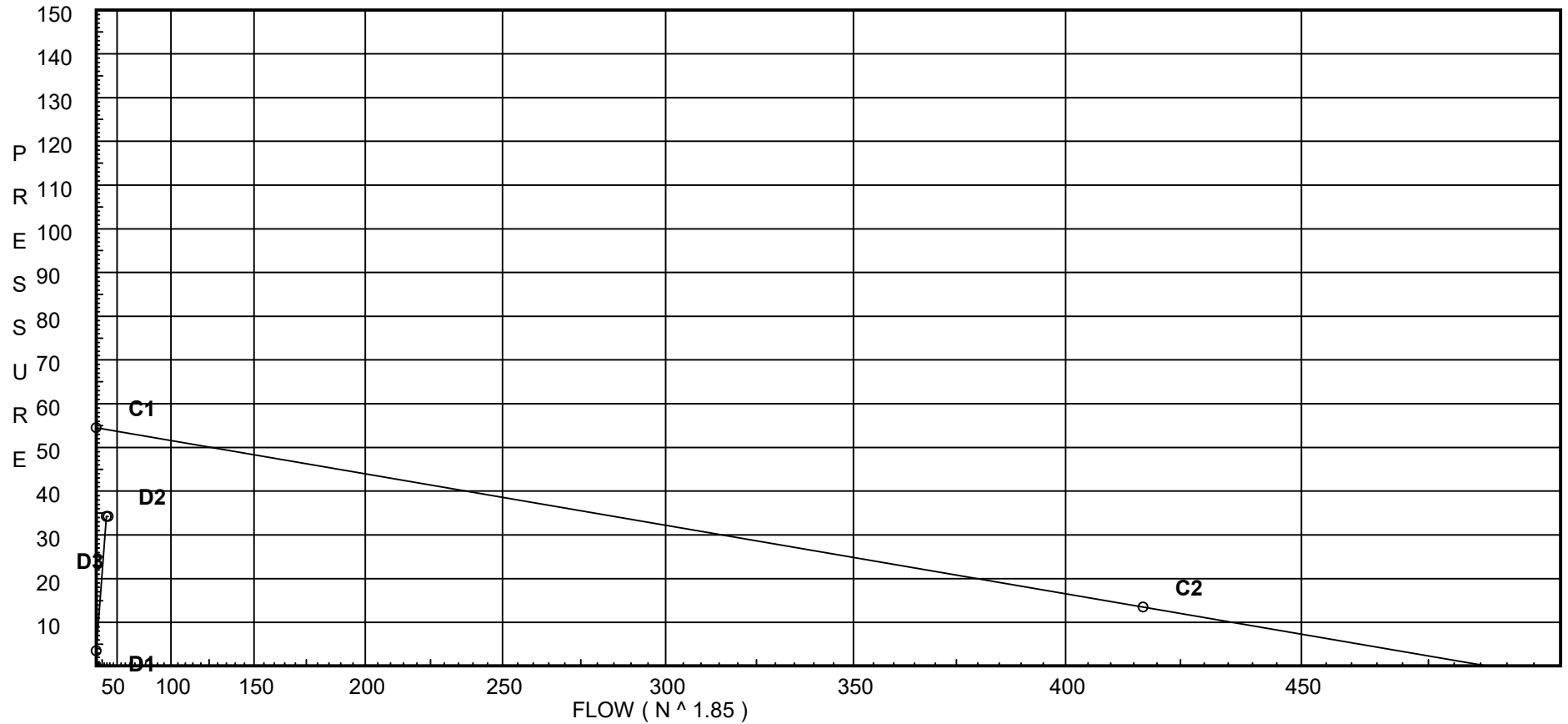
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City Water Supply:

C1 - Static Pressure : 54.5
C2 - Residual Pressure: 13.5
C2 - Residual Flow : 417

Demand:

D1 - Elevation : 3.465
D2 - System Flow : 34.116
D2 - System Pressure : 34.223
Hose (Demand) : 3
D3 - System Demand : 37.116
Safety Margin : 19.810



Fittings Used Summary

FIRE & LIFE SAFETY AMERICA
OAK HAVEN LOT 35 - RA2

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Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
N*	CPVC 90'El Harvel-Spears		7	7	8	9	11	12	13	0	0	0	0	0	0	0	0	0	0	0	0
O*	CPVC Tee - Branch	3	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
T	NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121

Units Summary

Diameter Units Inches
Length Units Feet
Flow Units US Gallons per Minute
Pressure Units Pounds per Square Inch

Note: Fitting Legend provides equivalent pipe lengths for fittings types of various diameters. Equivalent lengths shown are standard for actual diameters of Sched 40 pipe and CFactors of 120 except as noted with *. The fittings marked with a * show equivalent lengths values supplied by manufacturers based on specific pipe diameters and CFactors and they require no adjustment. All values for fittings not marked with a * will be adjusted in the calculation for CFactors of other than 120 and diameters other than Sched 40 per NFPA.

Flow Summary - NFPA

FIRE & LIFE SAFETY AMERICA
 OAK HAVEN LOT 35 - RA2

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 Date 12/22/2021

SUPPLY ANALYSIS

<i>Node at Source</i>	<i>Static Pressure</i>	<i>Residual Pressure</i>	<i>Flow</i>	<i>Available Pressure</i>	<i>Total Demand</i>	<i>Required Pressure</i>
TEST	54.5	13.5	417.0	54.033	37.12	34.223

NODE ANALYSIS

<i>Node Tag</i>	<i>Elevation</i>	<i>Node Type</i>	<i>Pressure at Node</i>	<i>Discharge at Node</i>	<i>Notes</i>
B1	11.0	4.9	12.24	17.14	
B2	11.0	4.9	12.0	16.97	
201	11.0		12.62		
202	11.0		12.38		
203	11.0		12.9		
M2	11.0		17.91		
TOR	11.0		20.74		
BOR	3.0		26.95		
UG1	-3.0		31.67	3.0	
UG2	-3.0		36.68		
UG3	-3.0		36.71		
UG4	-3.0		36.77		
TEST	3.0		34.22		

Final Calculations : Hazen-Williams

FIRE & LIFE SAFETY AMERICA
OAK HAVEN LOT 35 - RA2

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Date 12/22/2021

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
B1 to 201	11 11	4.90	17.14 17.14	1 1.101	N 0.0	7.0 0.0 7.500	150 0.0512	12.239 0.0 0.384		Vel = 5.78	
201			0.0 17.14					12.623		K Factor = 4.82	
B2 to 202	11 11	4.90	16.97 16.97	1 1.101	N 0.0	7.0 0.0 7.500	150 0.0503	12.000 0.0 0.377		Vel = 5.72	
202			0.0 16.97					12.377		K Factor = 4.82	
201 to 203	11 11		17.14 17.14	1 1.101	0.0 0.0	5.500 0.0 5.500	150 0.0511	12.623 0.0 0.281		Vel = 5.78	
203			0.0 17.14					12.904		K Factor = 4.77	
202 to 203	11 11		16.97 16.97	1 1.101	O 0.0	5.0 0.0 10.500	150 0.0502	12.377 0.0 0.527		Vel = 5.72	
203			0.0 16.97					12.904		K Factor = 4.72	
203 to M2	11 11		34.12 34.12	1 1.101	O 0.0	5.0 0.0 27.375	150 0.1828	12.904 0.0 5.003		Vel = 11.50	
M2 to TOR	11 11		0.0 34.12	1 1.101	N 0.0	7.0 0.0 15.500	150 0.1827	17.907 0.0 2.832		Vel = 11.50	
TOR			0.0 34.12					20.739		K Factor = 7.49	
TOR to BOR	11 3		34.12 34.12	1 1.101	N 0.0	7.0 0.0 15.000	150 0.1827	20.739 3.465 2.741		Vel = 11.50	
BOR to UG1	3 -3		0.0 34.12	1 1.101	2E 0.0	7.65 0.0 11.650	150 0.1827	26.945 2.599 2.129		Vel = 11.50	
UG1 to UG2	-3 -3	H3	3.00 37.12	1.25 1.394	T 2E 0.0	9.523 9.523 74.046	150 0.0677	31.673 0.0 5.012		Vel = 7.80	
UG2 to UG3	-3 -3		0.0 37.12	6 6.09	3E 2F 0.0	64.749 21.583 412.332	150 0.0001	36.685 0.0 0.021		Vel = 0.41	
UG3 to UG4	-3 -3		0.0 37.12	6 6.09	2G 3F 0.0	9.25 32.374 1190.623	150 0.0001	36.706 0.0 0.062		Vel = 0.41	
UG4 to TEST	-3 3		0.0 37.12	6 6.16	T 2E G 0.0	48.896 45.637 4.89 1099.422	150 0	36.768 -2.599 0.054		Vel = 0.40	
TEST			0.0 37.12					34.223		K Factor = 6.35	

Final Calculations : Hazen-Williams

FIRE & LIFE SAFETY AMERICA
OAK HAVEN LOT 35 - RA2

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Node1	Elev1	K	Qa	Nom	Fitting		Pipe	CFact	Pt			
to					or		Ftngs		Pe	*****	Notes	*****
Node2	Elev2	Fact	Qt	Act	Equiv	Len	Total	Pf/Ft	Pf			



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OAK HAVEN LOT 35

FIRE SPRINKLER PRODUCT DATA

12/21/2021

Steel Pipe Submittal Data for Fire Sprinkler System

See Chart For Inside Diameters and Wall Thickness

All piping to be one or more of the following: (Refer to checked for submittal items).

- Schedule 40 Steel pipe conforming to ASTM A-135 or A-795 using Cast Iron, Malleable Iron or Ductile Iron screw fittings in accordance with standard ANSI B16.3 or ANSI B16.4. Pipe may also be joined by grooved fittings approved for fire protection use.
- Schedule 7 or 10 Steel Pipe conforming to ASTM A-135 or A-795 using grooved fittings listed for fire protection use.
- All welding will comply with the applicable requirements of AWS B2.1, Specification for Welding Procedure and Performance Qualification. This will be limited to pipe outlets and flanged end treatments.

All materials to be used in the installation of sprinkler system are to conform to NFPA 13, Local Authorities Having Jurisdiction and any applicable referenced codes and standards.

Steel Pipe Dimensions per NFPA 13:

Pipe		Sch 40		Sch 10		Sch 07	
Nom. Dia.	O.D (in)	I.D. (in)	Wall (in)	I.D. (in)	Wall (in)	I.D. (in)	Wall (in)
1"	1.315	1.049	0.133	1.097	0.109	n/a	n/a
1¼"	1.660	1.380	0.140	1.442	0.109	1.536	0.062
1½"	1.900	1.610	0.145	1.682	0.109	1.728	0.086
2"	2.375	2.067	0.154	2.157	0.109	2.203	0.086
2½"	2.875	2.469	0.203	2.635	0.120	2.703	0.086
3"	3.500	3.068	0.216	3.260	0.120	3.314	0.093
4"	4.500	4.026	0.237	4.260	0.120	4.310	0.095
6"	6.625	6.065	0.280	6.357	0.134	n/a	n/a
8"	8.625	7.981	0.322	8.249	0.188	n/a	n/a
10"	10.750	10.020	0.365	n/a	n/a	n/a	n/a
12"	12.750	11.938	0.406	n/a	n/a	n/a	n/a

This submittal shall include the following checked items.

	<i>Domestic</i>	<i>Foreign</i>		<i>Black</i>	<i>Galvanized</i>	
Origin of Manufacture	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Exterior Finish	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<i>Sch. 40</i>	<i>Sch. 10</i>	<i>Sch. 7</i>	<i>A-135</i>	<i>A-795</i>	<i>A-53</i>
Schedule	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ASTM	<input checked="" type="checkbox"/>	<input type="checkbox"/>



Submittal Data CPVC Pipe and Fittings

Listings:

- Light hazard occupancies as defined in the standard for “Installation of Sprinkler Systems”, NFPA 13.
- Residential occupancies as defined in the standard for “Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height”, NFPA 13R.
- Residential occupancies as defined in the standard for “Installation of Sprinkler Systems in One and Two Family Dwellings and Manufactured Homes”, NFPA 13D. - Underground fire service systems as described in the “Installation of Sprinkler
- Systems”, NFPA 13 2007 Edition, and where appropriate the “Standard for Installation of Private Service Mains & Their Appurtenances”, NFPA 24
- Local Authorities having jurisdiction and any applicable referenced
- codes and standards.

Approvals:

UL, FM, CUL, NSF, Dade County, LPCB, MEA, and the City of Los Angeles.

Material Specifications:

Pipe: ASTM F442, SDR 13.5

Fittings: ASTM F438, (Sch. 40) and ASTM F439 (Sch. 80)

Maximum Working Pressure of 175 PSI



Straight Elbow



Reducing Elbow



Straight Tee



Reducing Tee



Cross



Reducing Cross



45 Elbow



Coupling



Sprinkler Adapter
w/ Brass Insert



Slip-Thread Adapter



Sprinkler Head Adapter 90° Ell



Sprinkler Head Adapter Tee



Back-to-Back Tee



Grooved Coupling Adapter



Reducer Bushing



Cap

CPVC Pipe Submittal Data for Fire Sprinkler Systems

All material used in the installation of the sprinkler system conforms to:

NFPA 13

NFPA 13R

NFPA 13D



- All CPVC piping should be pressure tested at 200 PSI for 2 hours.
- Chemical compatibility should be checked per manufacturer.
- Glycerin antifreeze solutions are acceptable and installation of antifreeze systems should comply with NFPA Section 7.6.2 of NFPA 13 (2007 Edition).

BlazeMaster® Pipe Dimensions and Weights SDR 13.5 (ASTM F 442)									
Nominal Size		Average OD		Average ID		Pounds Per Foot	Kilograms Per Meter	Pounds Per Foot	Kilograms Per Meter
Inches	mm	Inches	mm	Inches	mm	Empty	Empty	H ₂ O Filled	H ₂ O Filled
3/4	20.0	1.050	26.7	.874	22.2	0.168	0.250	0.428	0.637
1	25.0	1.315	33.4	1.101	28.0	0.262	0.390	0.675	1.005
1 1/4	32.0	1.660	42.2	1.394	35.4	0.418	0.622	1.079	1.606
1 1/2	40.0	1.900	48.3	1.598	40.6	0.548	0.816	1.417	2.109
2	50.0	2.375	60.3	2.003	50.9	0.859	1.278	2.224	3.310
2 1/2	65.0	2.875	73.0	2.423	61.5	1.257	1.871	3.255	4.844
3	80.0	3.500	88.9	2.950	75.0	1.867	2.778	4.829	7.186

Note: The above average OD and average ID information is per ASTM F442. Check with individual manufacturers for actual OD and ID information.

Allowance for Friction Loss in Fittings (Equivalent Feet of Pipe)								
Fitting Size (In.)	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	
Tee Branch	3	5	6	8	10	12	15	
Elbow 90° *	4	5	6	7	9	12	13	
Elbow 45°	1	1	2	2	2	3	4	
Coupling	1	1	1	1	1	2	2	
Tee Run	1	1	1	1	1	2	2	



Submittal Data for CPVC Strap Hangers

All materials to be used in the installation of sprinkler system are to conform to NFPA 13, 13R and 13D, Local Authorities having Jurisdiction and any applicable referenced codes and standards.

UL Listed in the USA and Canada to support fire sprinkler piping.

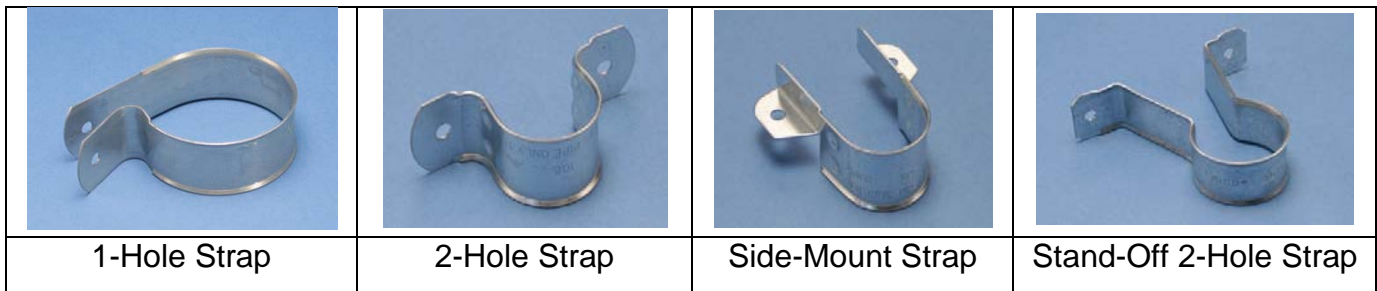
- A “one-hole strap” can function as a hanger and restraining device. It supports CPVC pipe horizontally from top or side of beam. As a restraining device, the hanger will be inverted so the fastener is downward. This installation will prevent upward movement of the sprinkler during activation.
- A “two-hole strap” can function as a hanger and restraining device. It supports CPVC pipe horizontally from top, bottom, or side of beam. A hex-head self-threading screw (furnished with most CPVC hangers) is easily installed using an electric drill. No pre-drilling pilot hole is required.
- A “side-mount strap” supports the CPVC pipe horizontally from top or bottom of beam
- A “stand-off 2-hole strap” supports the CPVC pipe off of the vertical face of the structural or composite wood joists.

Hangers must be clean, free of burrs, and all surface oils. Any contaminants must be removed from the hanger.

The pipe size of the hanger shall be the same size as the supported pipe.

Pipe hangers must have a load bearing surface at least ½” inch wide.

Examples of CPVC Hangers



This submittal shall include the following checked items:

Product	
<input type="checkbox"/>	¾” Hangers
<input checked="" type="checkbox"/>	1” Hangers
<input type="checkbox"/>	1-1/4” Hangers
<input type="checkbox"/>	1-1/2” Hangers
<input type="checkbox"/>	2” Hangers

Origin of Manufacture	
Domestic	Foreign
<input checked="" type="checkbox"/>	<input type="checkbox"/>



TECHNICAL DATA

FREEDOM® RESIDENTIAL CONCEALED PENDENT SPRINKLER VK494 (K4.9)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

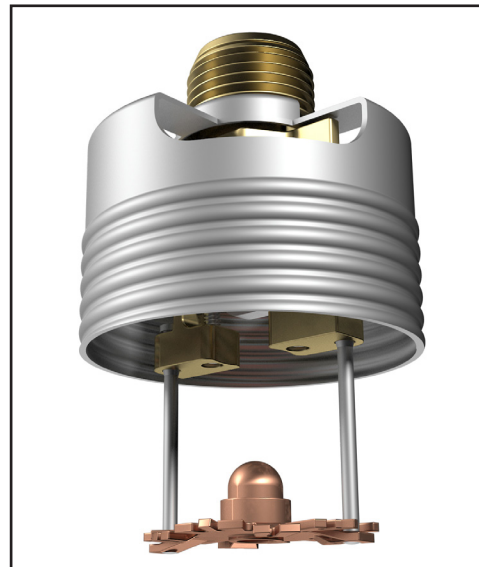
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Visit the Viking website for the latest edition of this technical data page www.vikinggroupinc.com

1. DESCRIPTION

Viking Freedom® Residential Concealed Pendent Sprinkler VK494 is a small thermosensitive, glass-bulb residential sprinkler designed for installation on concealed pipe systems where the appearance of a smooth ceiling is desired. The orifice design, with a K-factor of 4.9 (70.6 metric*), allows the sprinkler's efficient use of available water supplies for the hydraulically designed fire-protection system. The fast response glass bulb operating element and special deflector characteristics meet the challenges of residential sprinkler standards.

The sprinkler is pre-assembled with a threaded adapter for installation with a low-profile small-diameter cover assembly installed flush to the ceiling. The two-piece design allows installation and testing of the sprinkler prior to installation of the cover plate. The "push-on" and "thread-on" designs of the concealed cover plate assemblies allow easy installation of the cover plate after the system has been tested and the ceiling finish has been applied, while also providing up to 1/2" (13 mm) of vertical adjustment. The cover assembly can be removed and reinstalled, allowing temporary removal of ceiling panels without taking the sprinkler system out of service or removing the sprinkler. The Electroless Nickel PTFE (ENT) coating has been investigated for installation in corrosive atmospheres and is C-UL-US-EU Listed as indicated in the Approval Charts. The ENT finish is only available for the sprinkler assembly, the cover plate is not plated.



2. LISTINGS AND APPROVALS



cULusEU Listed: Category VKKW

Refer to the Approval Charts and Design Criteria for C-UL-US-EU Listing requirements that must be followed.



WARNING: Cancer and Reproductive Harm-
www.P65Warnings.ca.gov

3. TECHNICAL DATA

Specifications:

Minimum Operating Pressure: Refer to the Approval Chart.

Maximum Working Pressure: 175 psi (12 bar). Factory tested hydrostatically to 500 psi (34.5 bar).

Thread size: 1/2" (15 mm) NPT

Nominal K-factor: 4.9 U.S. (70.6 metric*)

Glass-bulb fluid temperature rating: to -65 °F (-55 °C)

* Metric K-factor measurement shown is in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

Material Standards:

Sprinkler Body: Brass UNS-C84400 or QM Brass

Deflector: Phosphor Bronze UNS-C51000

Deflector Pins: Stainless Steel UNS-S30200

Button: Brass UNS-C36000

Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400

Compression Screw: 18-8 Stainless Steel

Yoke: Phosphor Bronze UNS-C51000

Belleville Spring Sealing Assembly: Beryllium Nickel Alloy, coated on both sides with PTFE Tape

Cover Adapter: Cold Rolled Steel UNS-G10080, Finish: Clear Chromate over Zinc Plating

Shipping Cap: High Density Polyethylene

Cover Plate Materials:

Cover Plate Assembly: Copper UNS-C11000 and Brass UNS-C26800 or Stainless Steel UNS-S30400

Spring: Beryllium Nickel

Solder: Eutectic

Ordering Information: The sprinkler and cover plate must be ordered separately. Refer to Tables 1 and 2.

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

5. OPERATION

During fire conditions, when the temperature around the sprinkler approaches the cover plate's nominal temperature rating, the cover plate detaches and releases the deflector. Continued heating of the exposed sprinkler causes the heat-sensitive liquid in the glass bulb to expand. When the temperature reaches the sprinkler's nominal temperature rating, the glass bulb shatters releasing the yoke, pip cap assembly and sealing spring. Water begins flowing through the sprinkler orifice and strikes the deflector forming a uniform spray pattern over a specific area of coverage, which is determined by the water supply pressure at the sprinkler, in order to extinguish or control the fire.



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6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

Viking Sprinkler Model VK494 is available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.

TABLE 1: SPRINKLER ORDERING INFORMATION

Instructions:

- (1) Select a Sprinkler Base Part Number
- (2) Add the suffix for the desired Finish
- (3) Add the suffix for the desired Sprinkler Temperature Rating
- (4) Order a cover plate (refer to Table 2)

Example:

20759AE = 200 °F (93 °C) Temperature Rated Sprinkler with a standard Brass finish.

Sprinkler Base Part Number ¹	Size	1: Finishes		2: Temperature Ratings ⁷			
	NPT Inch	Description	Suffix	Nominal Rating	Bulb Color	Max. Ambient Ceiling Temperature ²	Suffix
20759	1/2	Brass	A	155 °F (68 °C)	Red	100 °F (38 °C)	B
		ENT ^{5,6}	JN	200 °F (93 °C)	Green	150 °F (65 °C)	E
		Corrosion Resistant Sprinkler Finish: ENT					

Accessories

Sprinkler Wrenches and tools:

- A. Heavy Duty Part Number: 14047W/B³ (available since 2006)
- B. Head Cabinet Wrench Part Number: 14031^{3,4} (available since 2006)
- C. Optional Concealed Cover Plate Installer Tool Part Number: 14412⁸ (available since 2007)
- D. Optional Large Concealed Cover Plate Installer Tool Part No. 14867⁸ (available since 2007)

Sprinkler Cabinet:

Holds up to 6 sprinklers: Part number 01731A (available since 1971).

Footnotes

1. Part number shown is the base part number. For complete part number, refer to the current Viking price list schedule.
2. Based on NFPA 13, NFPA 13R, and NFPA 13D. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.
3. Requires a 1/2" ratchet (not available from Viking).
4. Also optional for removal of the protective cap. Ideal for sprinkler cabinets.
5. cULus Listed as corrosion resistant.
6. The corrosion resistant coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Charts. These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For automatic sprinklers, the ENT coating is applied to all exposed exterior surfaces, including the waterway. For ENT coated sprinklers, the Belleville spring is exposed.
7. The sprinkler temperature rating is stamped on the deflector.
8. The installer tool is for push-on style cover plates only.



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TABLE 2: COVER PLATE ORDERING INFORMATION

Instructions:

- (1) Select a Cover Plate Base Part Number
- (2) Add the suffix for the desired Finish
- (3) Add the suffix for the required Cover Plate Nominal Rating.

Example:

23190MC/W = 165 °F (74 °C) Temperature Rated, 2-3/4" (70 mm) diameter, Thread-On style, Round Cover Plate with a Painted White finish.

1: Select a Cover Plate Base Part Number ³						2: Select a Finish	
Thread-On Style			Push-On Style			Description	Suffix ⁵
Base Part Number ¹	Size Inch (mm)	Type	Base Part Number	Size Inch (mm)	Type		
23190	2-3/4 (70)	Round	23447	2-3/4 (70)	Round	Polished Chrome	F
23174	3-5/16 (84)	Round	23463	3-5/16 (84)	Round	Brushed Chrome	F-/B
23179	3-5/16 (84)	Square	23482	3-5/16 (84)	Square	Bright Brass	B
23193 ⁵	2-3/4 (70)	Stainless Steel Round	23455 ⁵	2-3/4 (70)	Stainless Steel Round	Antique Brass	B-/A
						Brushed Brass	B-/B
23183 ⁵	3-5/16 (84)	Stainless Steel Round	23473 ⁵	3-5/16 (84)	Stainless Steel Round	Brushed Copper	E-/B
						Painted White	M-/W
						Painted Ivory	M-/I
						Painted Black	M-/B

3: Temperature Rating Matrix ^{1,2}				
Cover Plate Nominal Rating (Required)	Temperature Classification	Sprinkler Nominal Rating	Sprinkler Maximum Ambient Ceiling Temperature ²	Suffix
135 °F (57 °C)	Ordinary	155 °F (68 °C)	100 °F (38 °C)	A
165 °F (74 °C)	Intermediate	200 °F (93 °C)	150 °F (65 °C)	C

Footnotes

1. Part number shown is the base part number. For complete part number, refer to the current Viking price list schedule.
2. The sprinkler temperature rating is stamped on the deflector.
3. Based on NFPA-13, NFPA 13R, and NFPA 13D. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.
4. Where a dash (-) is shown in the Finish suffix designation, insert the desired Temperature Rating suffix. See example above.
5. Stainless Steel versions are not available with any finishes or paint.




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Approval Chart Viking VK494, 4.9 K-factor Residential Concealed Pendent Sprinkler

For systems designed to NFPA 13D or NFPA 13R. For systems designed to NFPA 13, refer to the Design Criteria. For Ceiling types refer to current editions of NFPA 13, 13R or 13D

Sprinkler Base Part Number ¹	SIN	NPT Thread Size		Nominal K-factor		Maximum Water Working Pressure
		Inches	mm	U.S.	metric ²	
20759	VK494	1/2	15	4.9	70.6	175 psi (12 bar)
Max. Coverage Area ⁶ W X L Ft. X Ft. (m X m)	Flow GPM (LPM)	Pressure PSI (bar)	Deflector to Ceiling	Installation Type	Listings and Approvals ^{3,5} 	Minimum Spacing Ft. (m)
12 X 12 (3.7 X 3.7)	13 (49.2)	7.0 (0.48)	Refer to Figure 2	Concealed with Cover Plate Assembly. See Footnote 7.	See Footnotes 8, & 9	8 (2.4)
14 X 14 (4.3 X 4.3)	13 (49.2)	7.0 (0.48)				
16 X 16 (4.9 X 4.9)	13 (49.2)	7.0 (0.48)				
18 X 18 (5.5 X 5.5)	17 (64.4)	12.0 (0.83)				
20 X 20 (6.1 X 6.1)	20 (75.7)	16.7 (1.15)				

Footnotes

- Part number shown is the base part number. For complete part number, refer to the current Viking price schedule.
- Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.
- This chart shows the listings and approvals available at the time of printing. Other approvals may be in process. Check with the manufacturer for any additional approvals. Refer also to Design Criteria.
- Listed by Underwriter's Laboratories, Inc. for use in the U.S., Canada, and European Union.
- Meets New York City requirements, effective July 1, 2008.
- For areas of coverage smaller than shown, use the "Flow" and "Pressure" for the next larger area listed. Flows and pressures listed are per sprinkler. The distance from sprinklers to walls shall not exceed one-half the sprinkler spacing indicated for the minimum "Flow" and "Pressure" used.
- Other paint colors are available on request with the same listings as the standard finish colors. Stainless Steel cover plates are not available with any finishes or paint. Listings and approvals apply for any paint manufacturer. Contact Viking for additional information. Custom colors are indicated on a label inside the cover assembly. Refer to Figure 3.
- Accepted Cover Plate Finishes are: Polished Chrome, Brushed Chrome, Bright Brass, Antique Brass, Brushed Brass, Brushed Copper, Painted White, Painted Ivory, or Painted Black.
- C-UL-US-EU Listed as corrosion resistant - Electroless Nickel PTFE (ENT)



TECHNICAL DATA

**FREEDOM® RESIDENTIAL
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SPRINKLER VK494 (K4.9)**

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DESIGN CRITERIA

(Also refer to the Approval Chart.)

UL Listing Requirements (C-UL-US-EU):

When using Viking Residential Concealed Pendent Sprinkler VK494 for systems designed to NFPA 13D or NFPA 13R, apply the listed areas of coverage and minimum water supply requirements shown in the Approval Chart.

For systems designed to NFPA 13: The number of design sprinklers is to be the four contiguous most hydraulically demanding sprinklers. The minimum required discharge from each of the four sprinklers is to be the greater of the following:

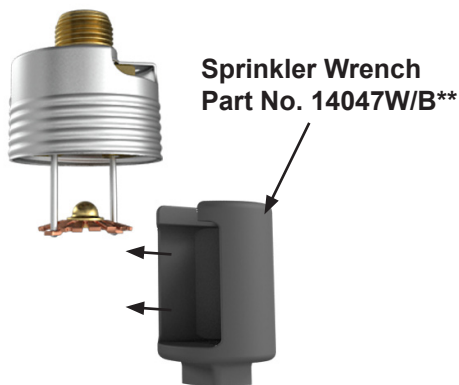
- The flow rates given in the Approval Chart for NFPA 13D and NFPA 13R applications for each listed area of coverage, or
- Calculated based on a minimum discharge of 0.1 gpm/sq. ft. over the “design area” in accordance with sections 9.5.2.1 or 10.2.4.1.2 of the current edition of NFPA 13.
- Minimum distance between residential sprinklers: 8 ft. (2.4 m).

NOTE: Concealed sprinklers must be installed in neutral or negative pressure plenums only.

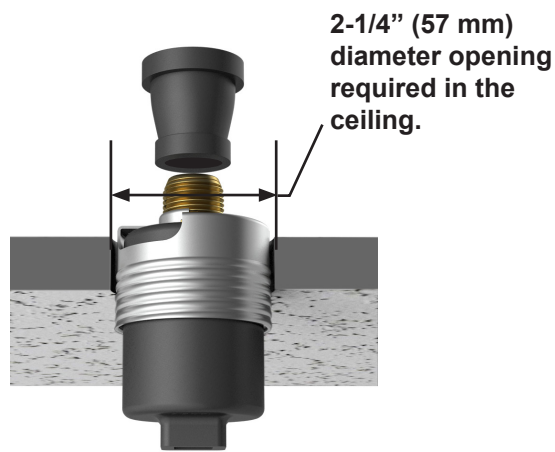
IMPORTANT: Always refer to Bulletin Form No. F_080415 - Best Practices for Residential Sprinkler Handling and Installation. Also refer to Form No. F_080614 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA and any other similar Authorities Having Jurisdiction, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable. Final approval and acceptance of all residential sprinkler installations must be obtained from the Authorities Having Jurisdiction.

Sprinkler and Adapter Assembly

- Protective cap removed
- Use wrench 14047W/B**



Step 1:
Carefully slide the wrench sideways around the deflector and pins



Step 2:
Carefully press the wrench upward and turn slightly to ensure engagement with the sprinkler wrench flats.

NEVER install the sprinkler by applying the installation wrench across the frame arms. **DO NOT** overtighten. Use only the designated sprinkler wrenches, Viking Part Numbers 14047W/B** or 14031**. A leak tight seal should be achieved by turning the sprinkler clockwise 1 to 1-1/2 turns beyond finger tight.

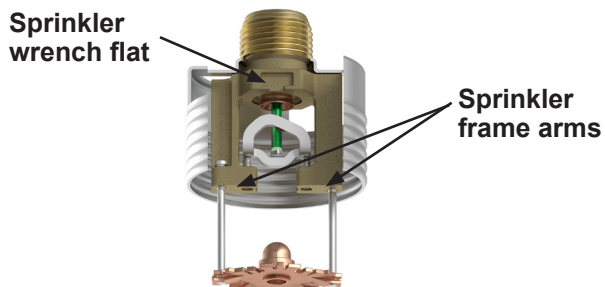


Figure 1: Sprinkler Installation and Proper Wrench Usage
 ** A 1/2" ratchet is required (Not available from Viking)



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