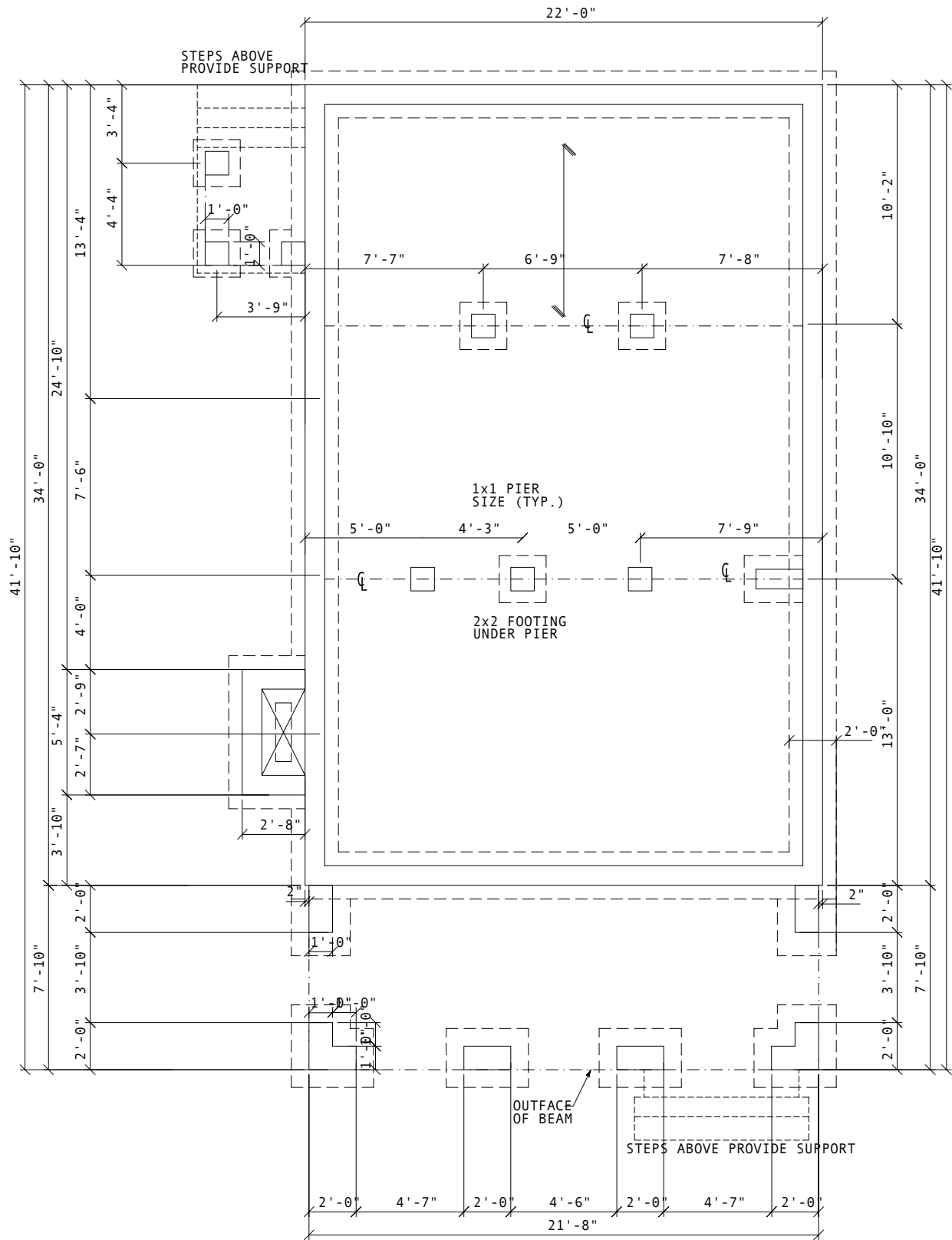
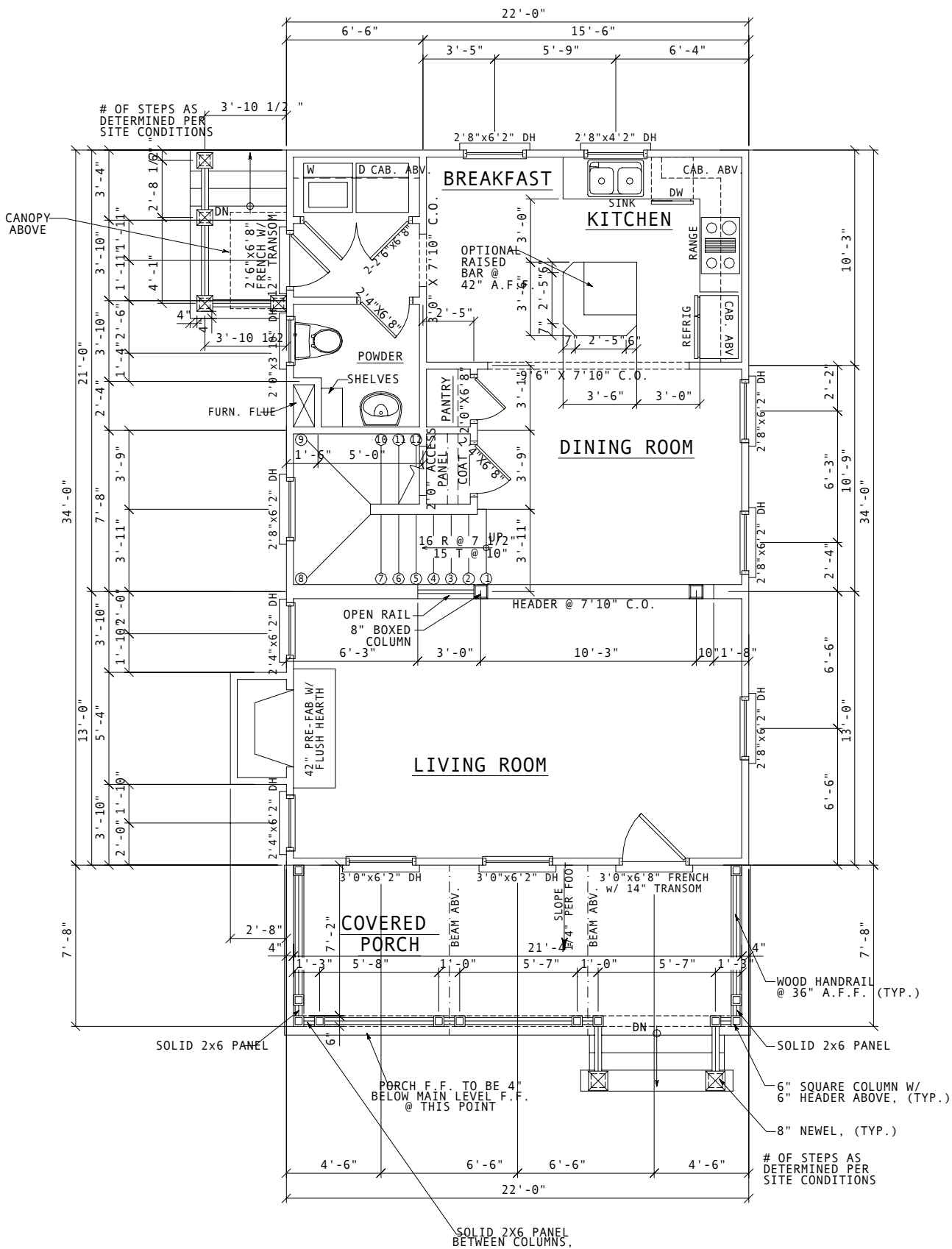


APPENDIX A

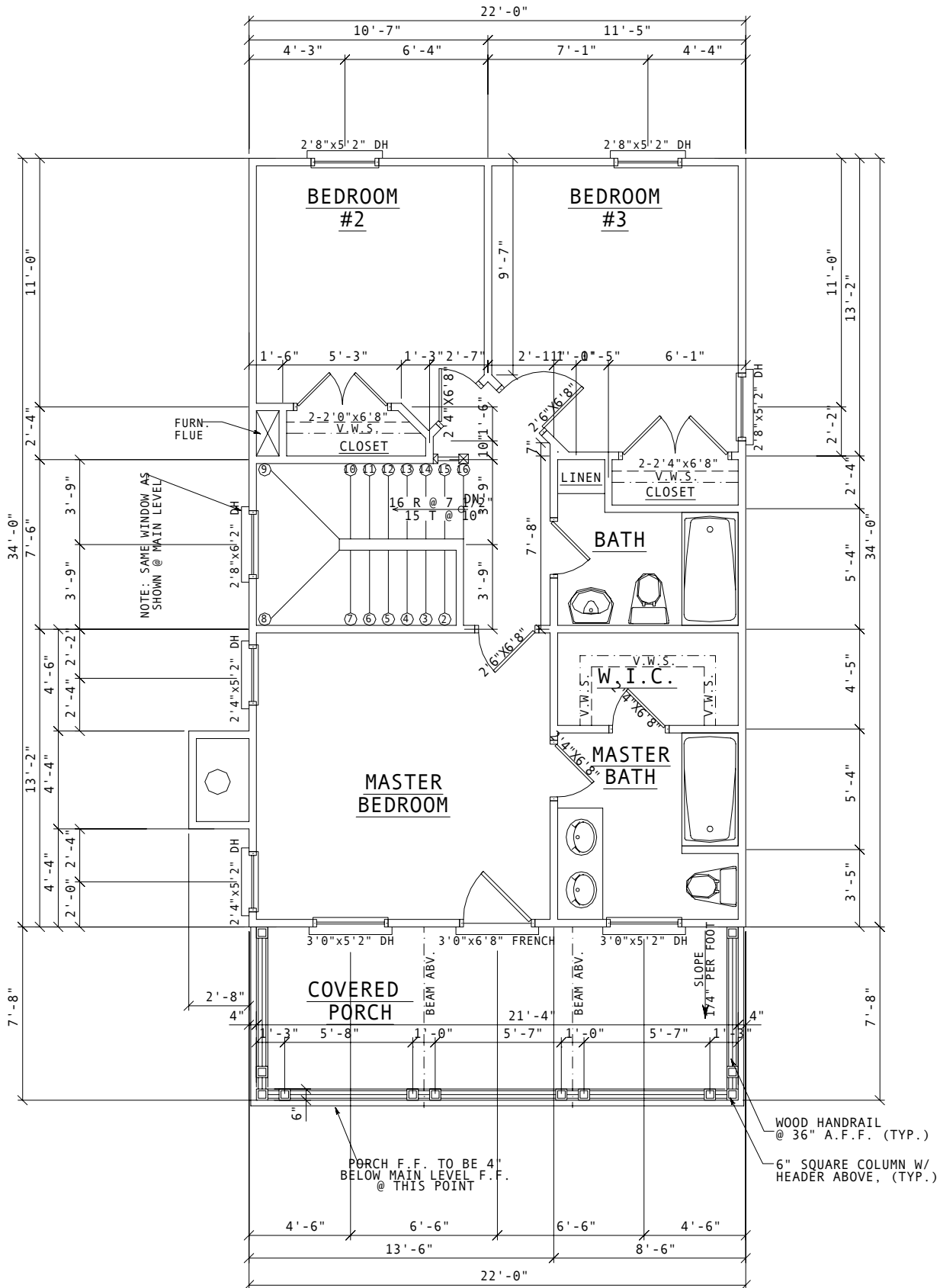
DEMONSTRATION HOMES PLANS



Crawl Space / Foundation Plan
Wood Demonstration Home

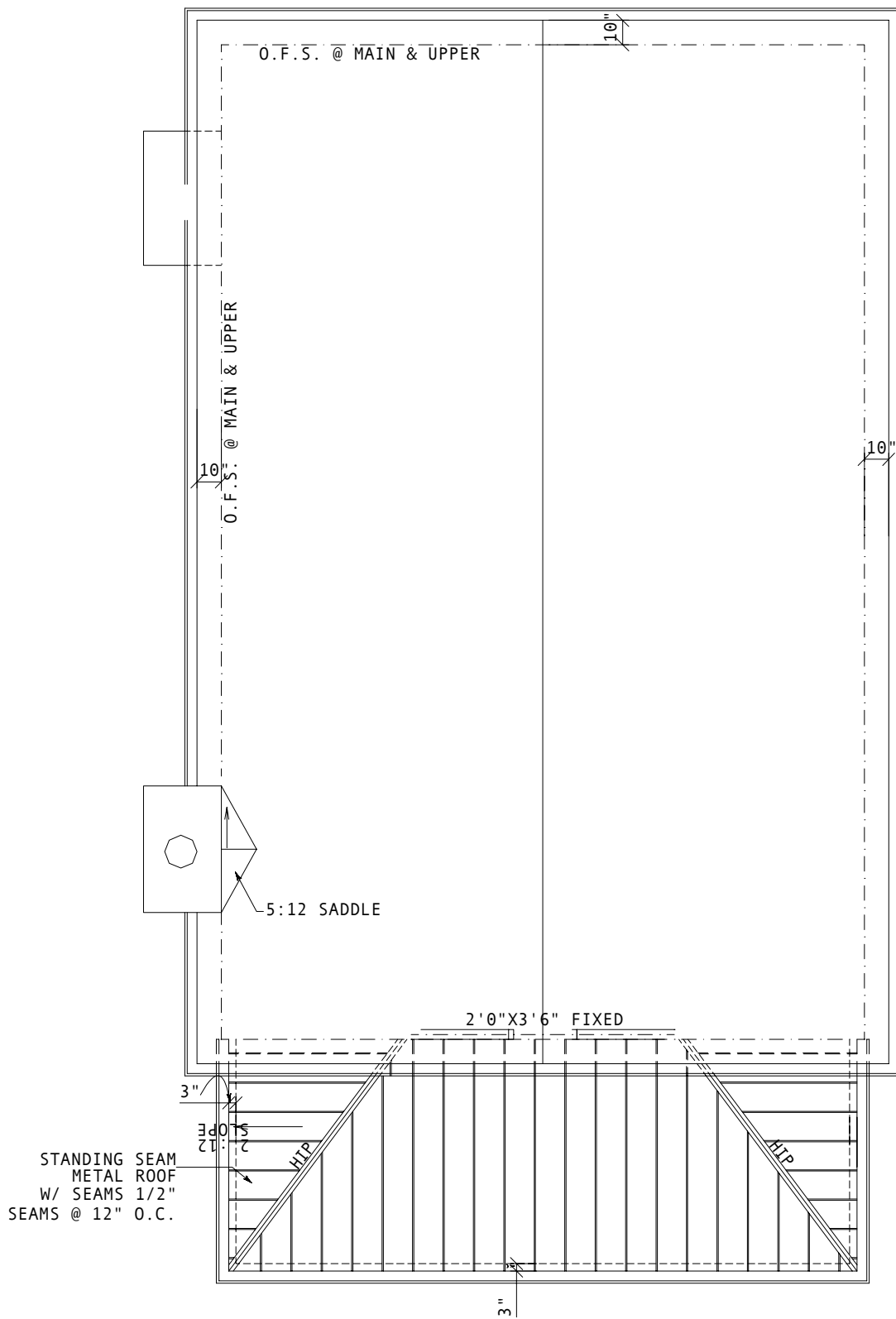


First Floor – Floor Plan
Wood Demonstration Home



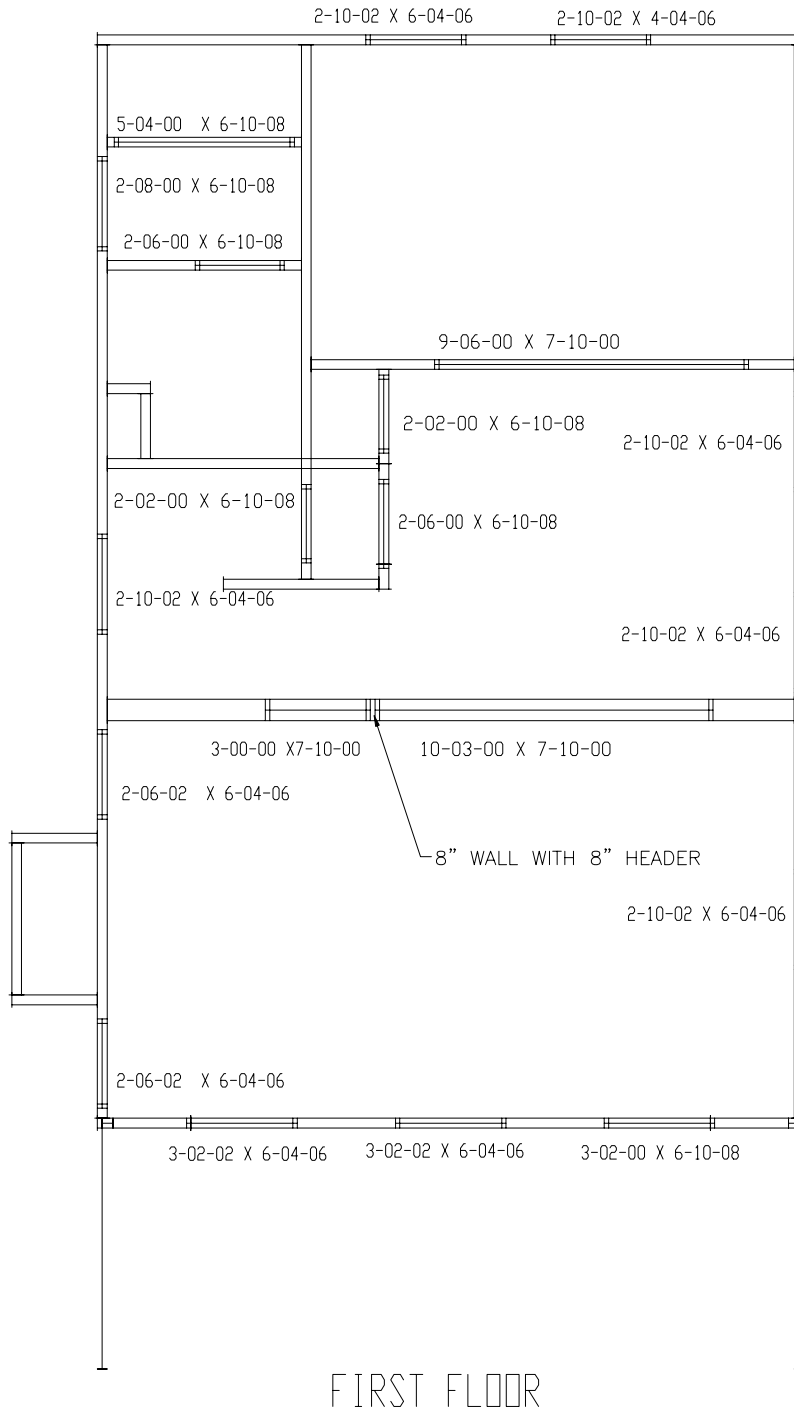
Second Floor – Floor Plan

Wood Demonstration Home

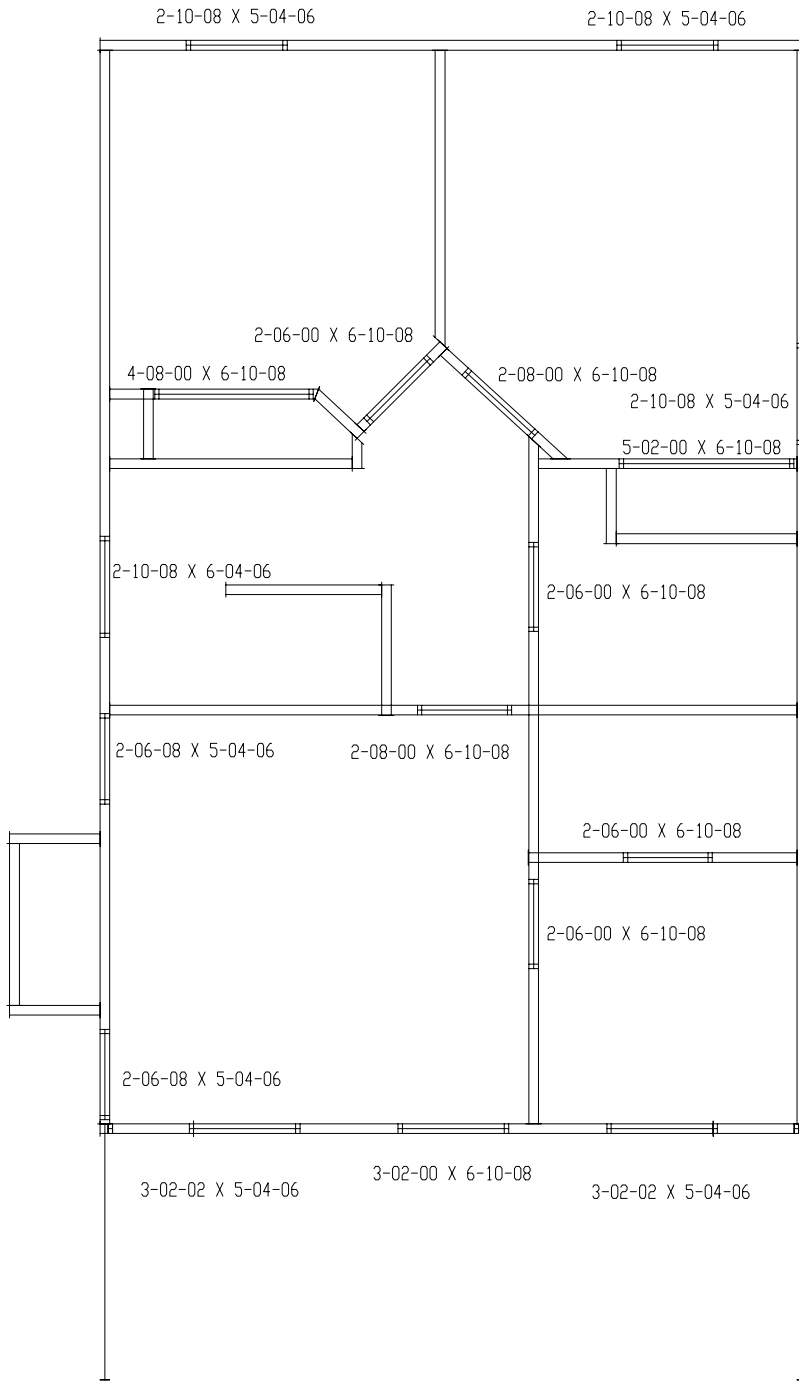


Roof Plan

Wood Demonstration Home

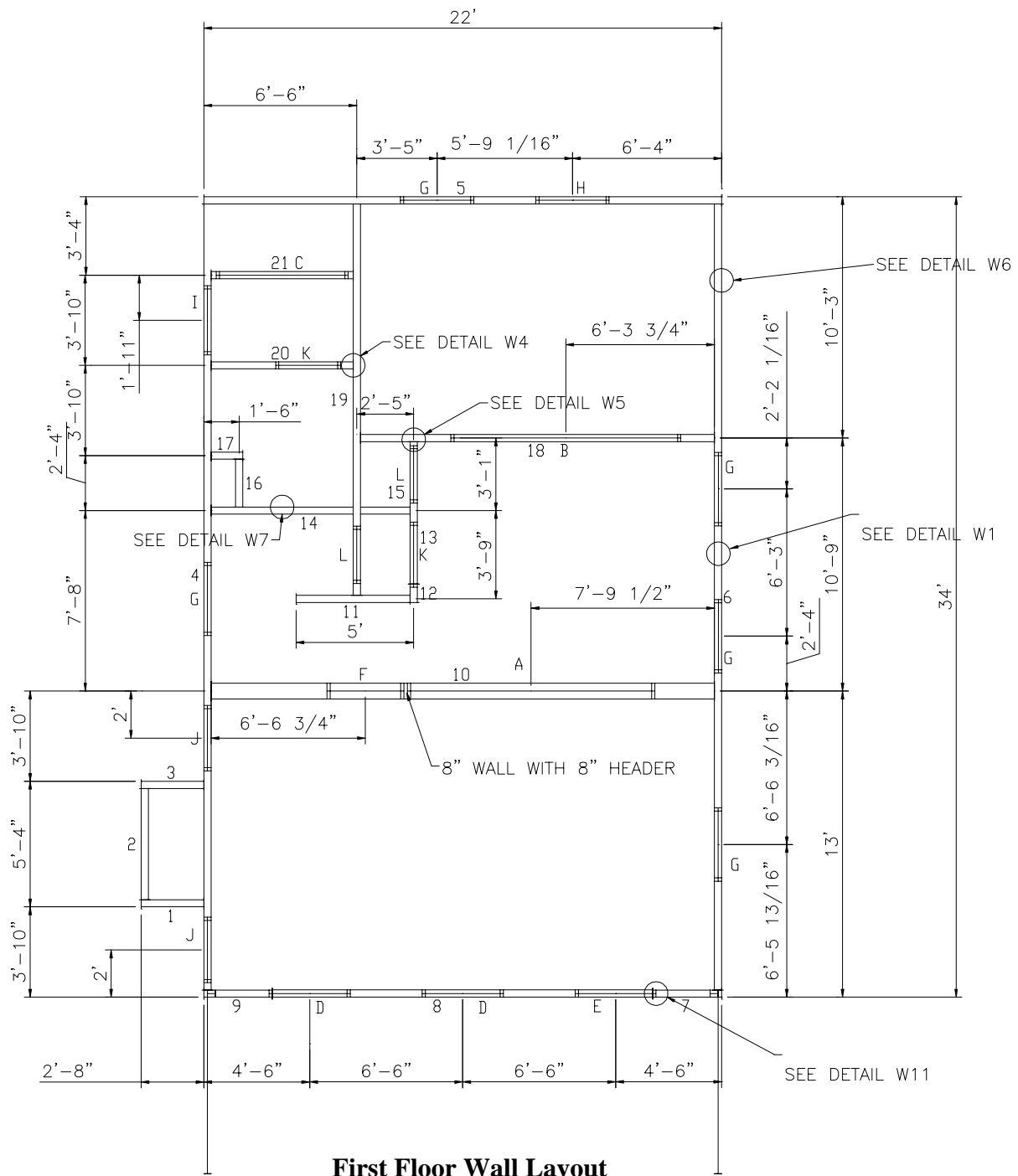


Steel Demonstration Home

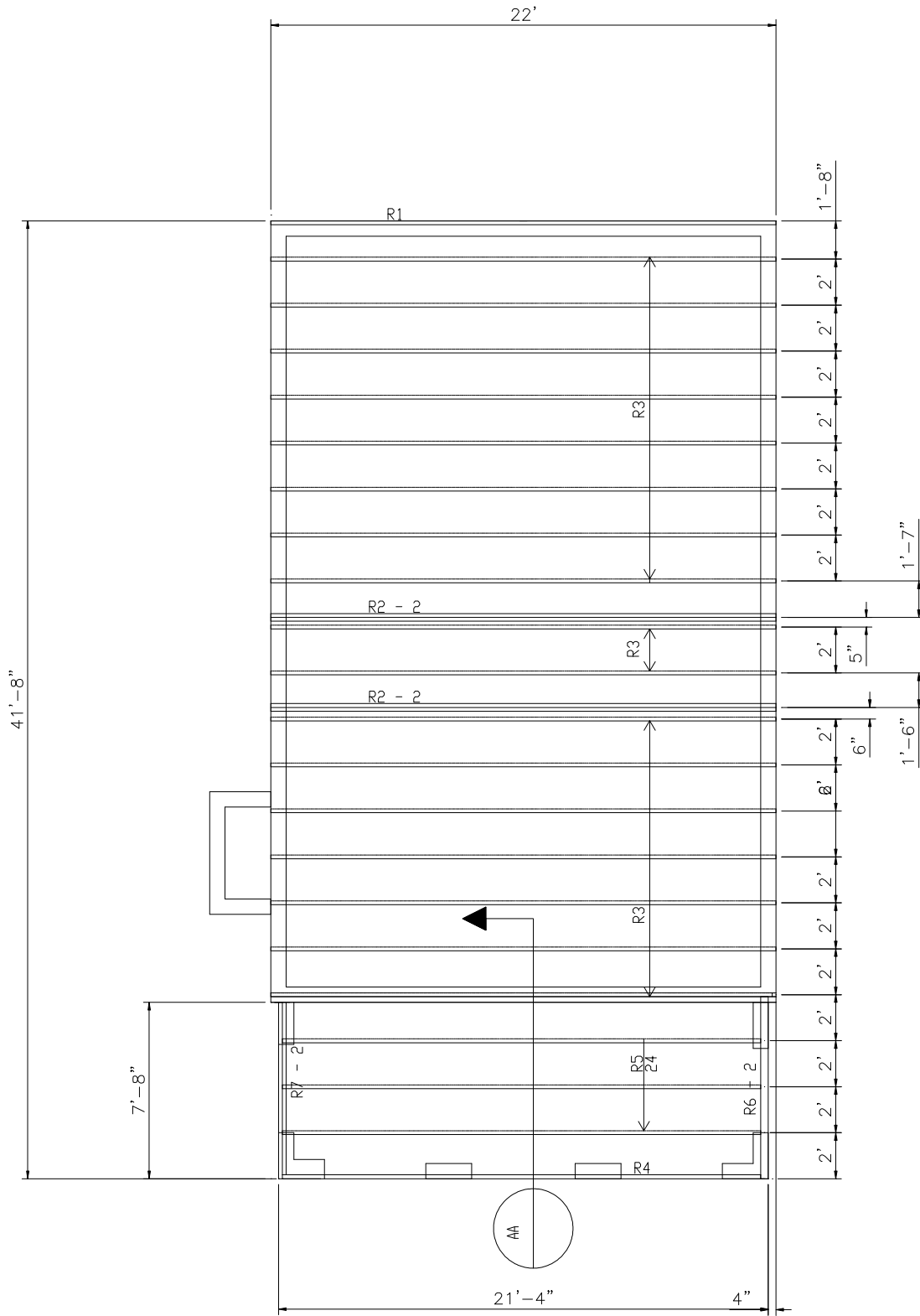


2ND FLOOR

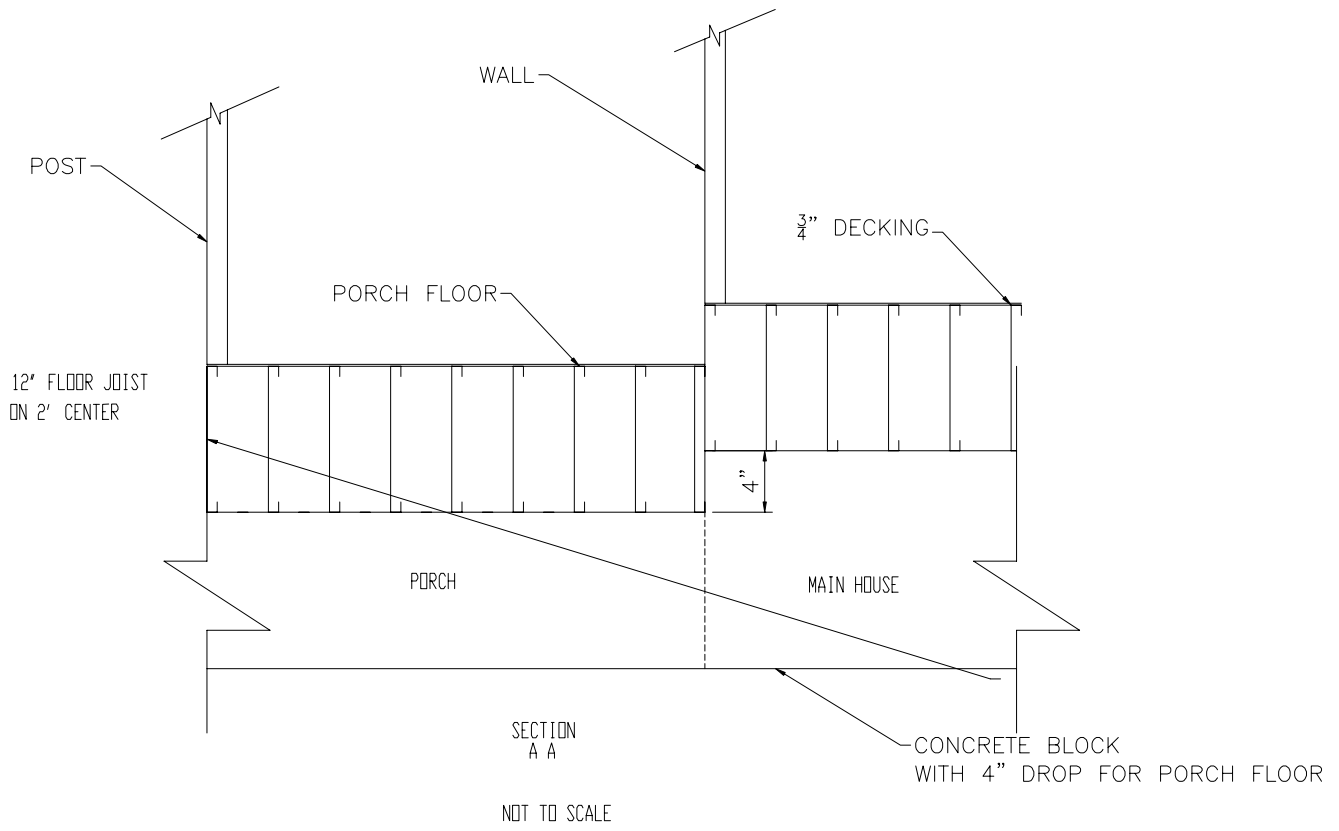
Steel Demonstration Home



Steel Demonstration Home

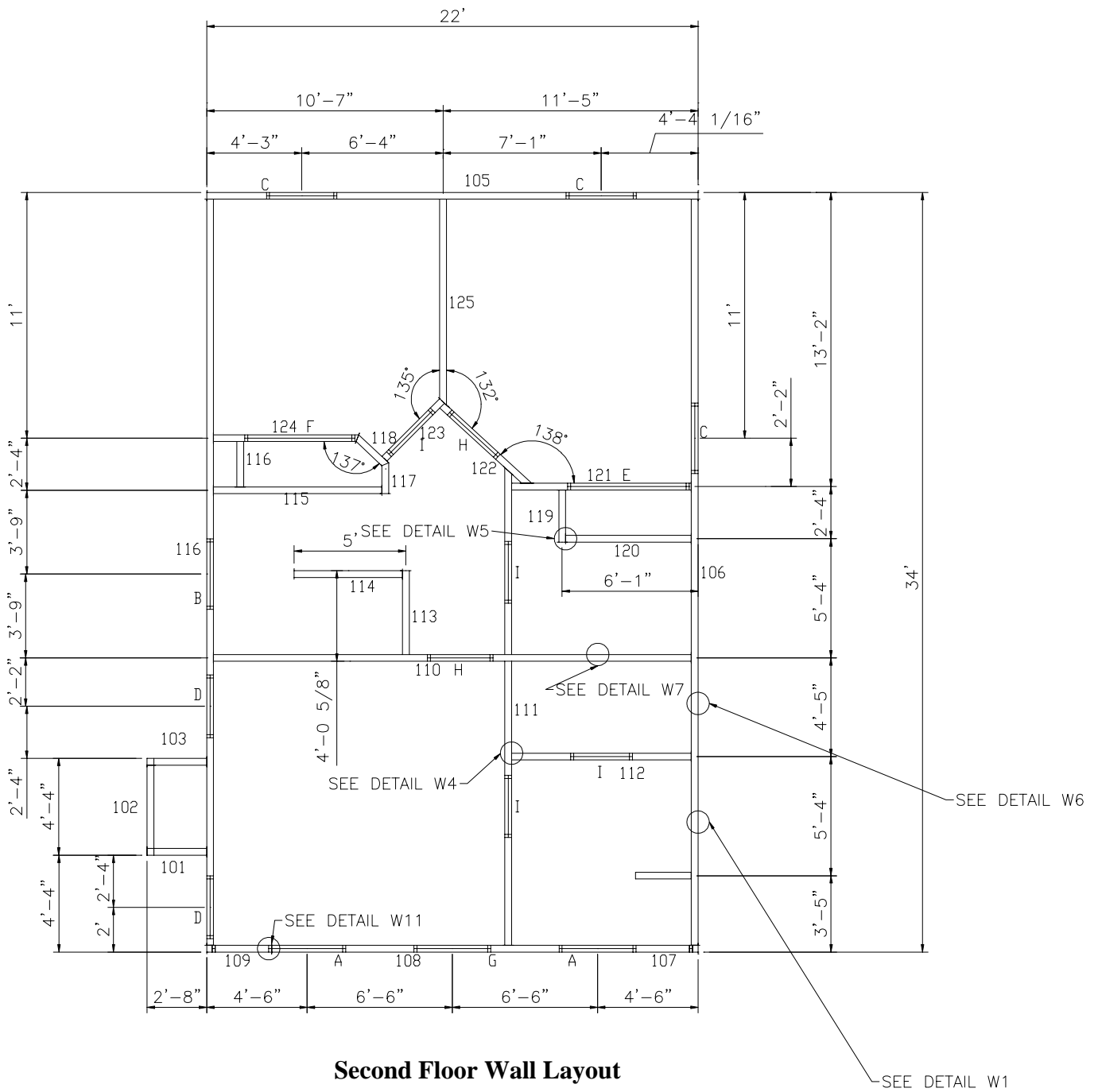


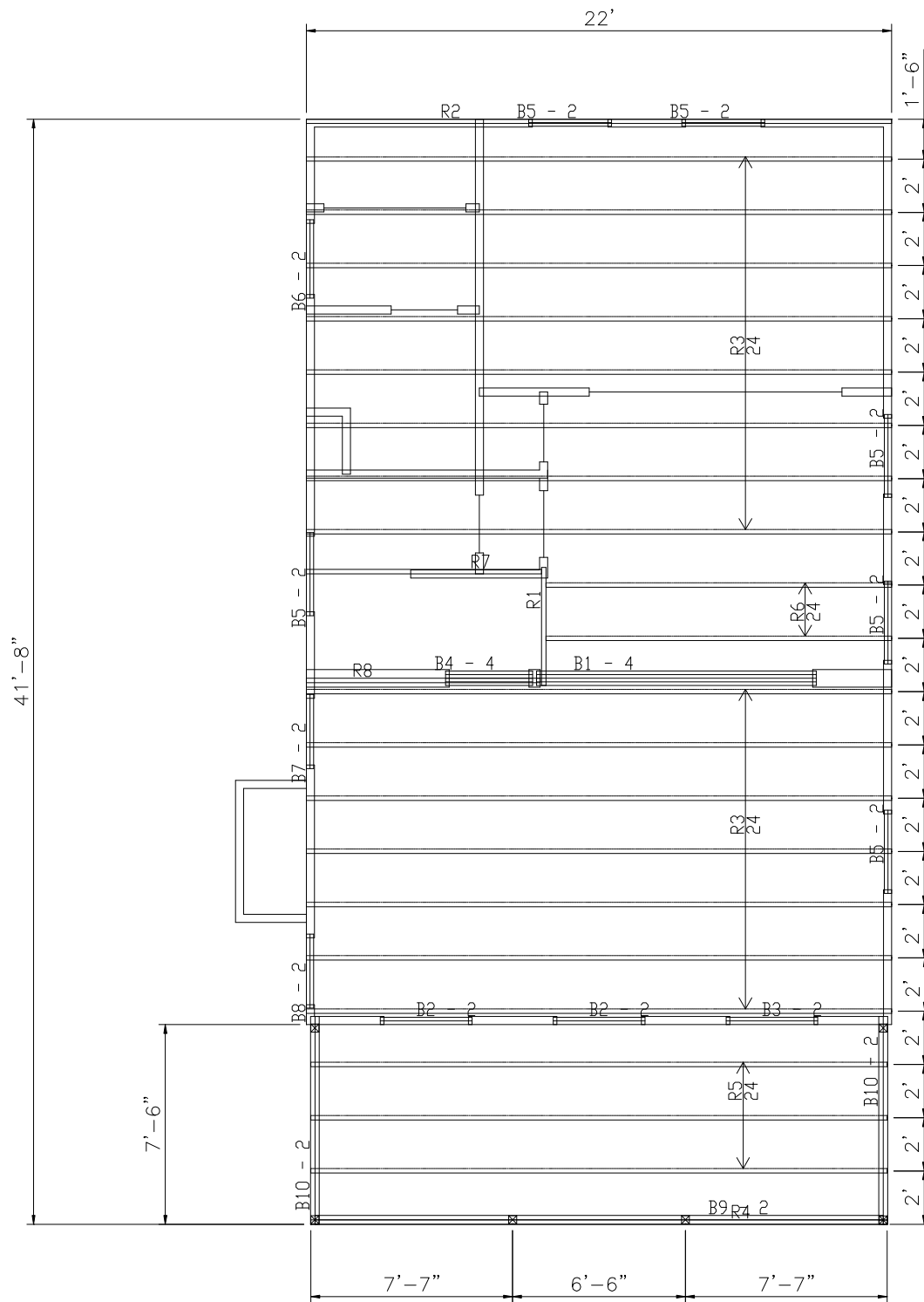
First Floor – Floor Plan
Steel Demonstration Home



Section A-A

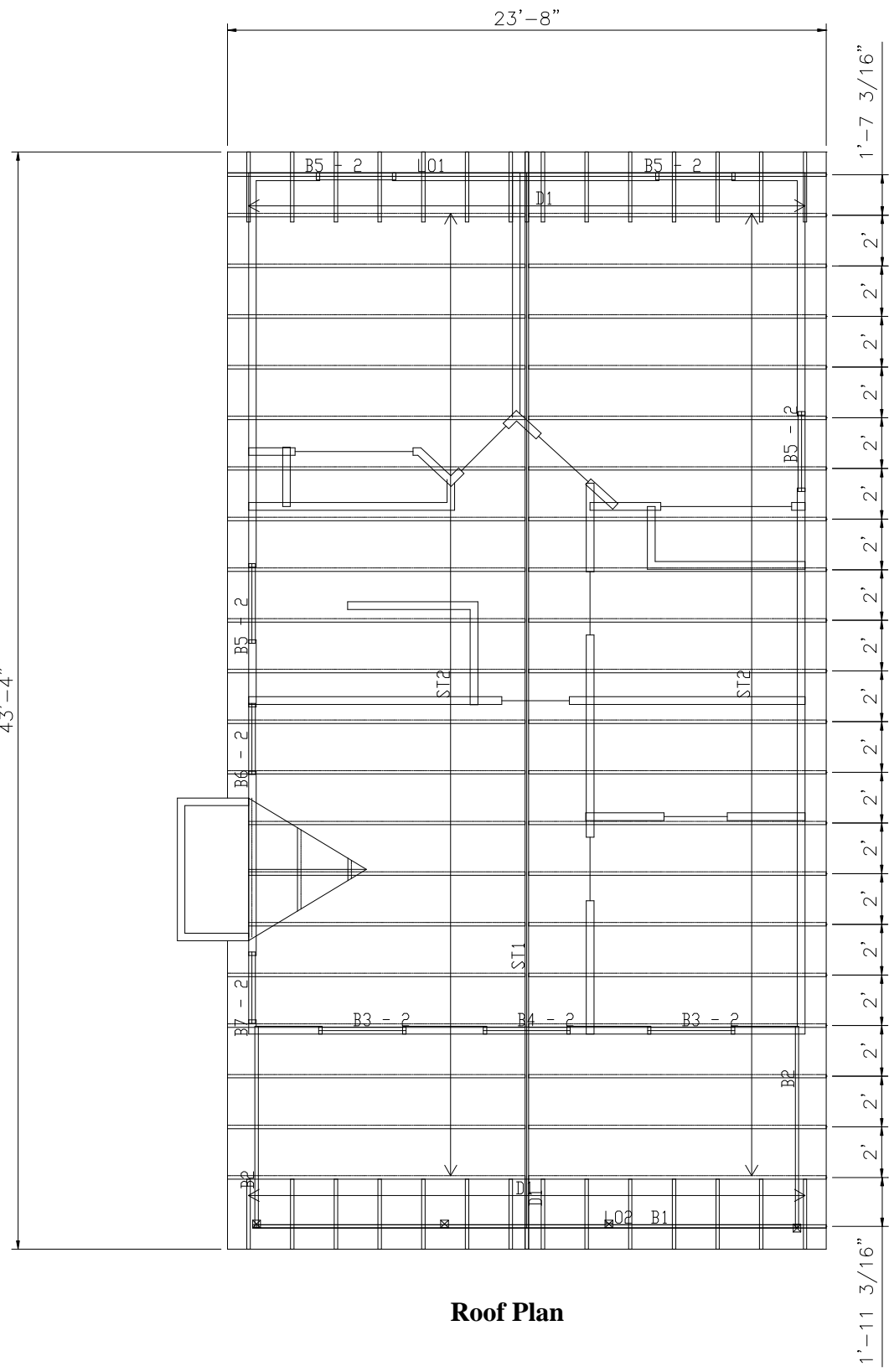
Steel Demonstration Home





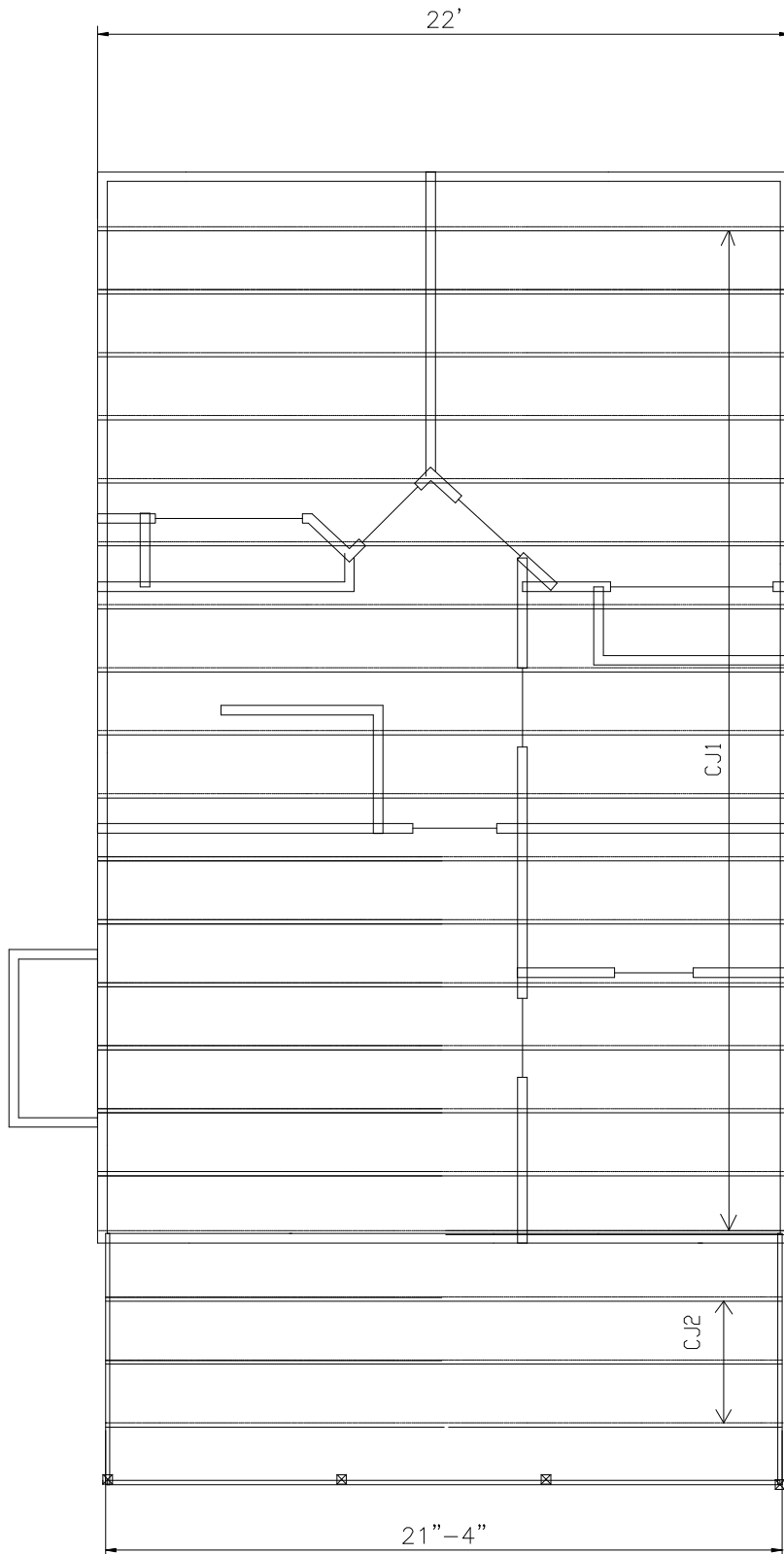
Second Floor – Floor Plan

Steel Demonstration Home

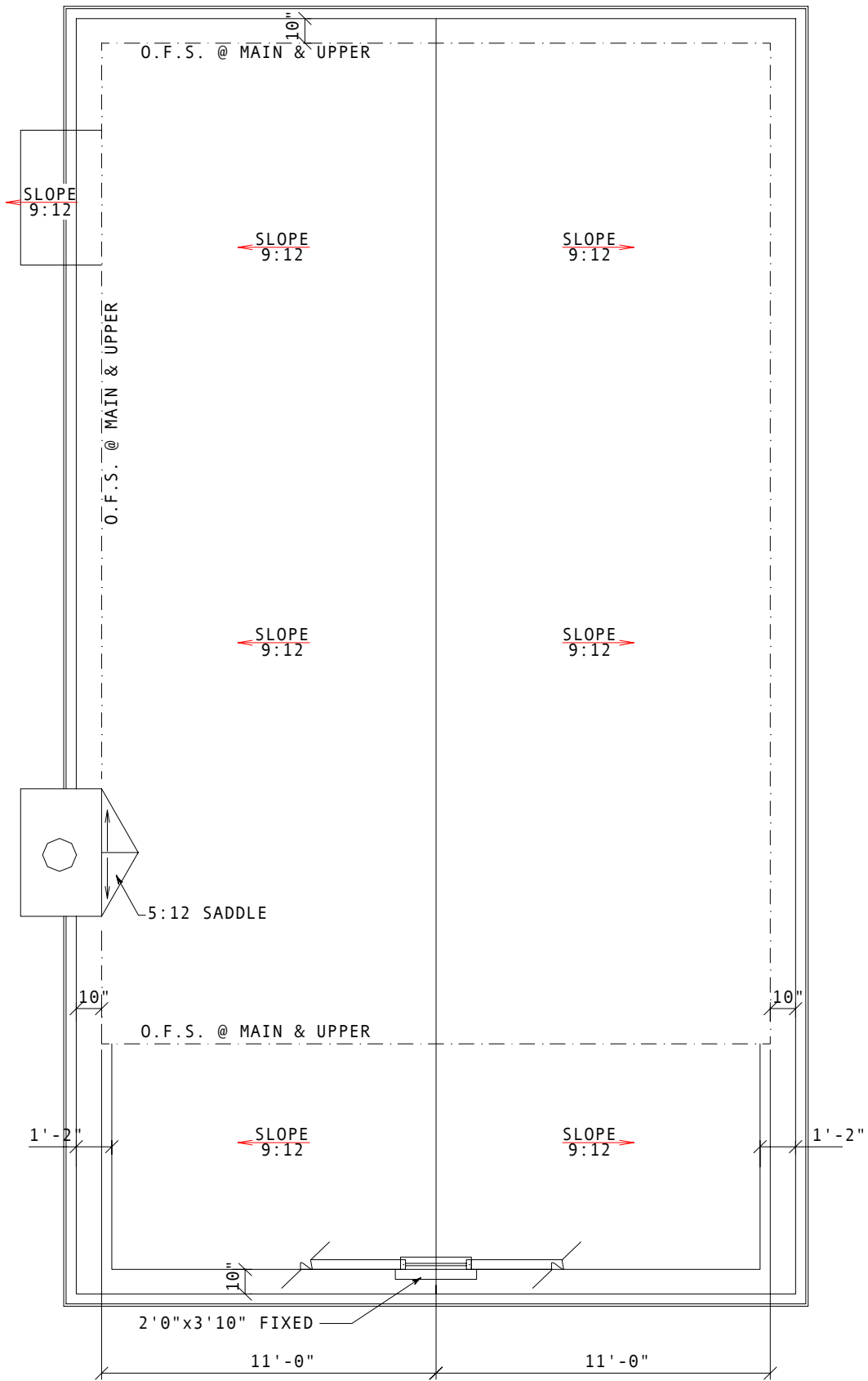


Roof Plan

Steel Demonstration Home



Ceiling Joist Plan
Steel Demonstration Home



Roof Plan

Steel Demonstration Home

APPENDIX B

LABOR MAN-MINUTES

**Summary of Floor Framing Labor Time by Subcomponent
Man-Minutes**

Component/Subcomponent	Steel House	Wood House
First Floor-Floor Framing		
Read Plans	30	30
Layout	90	30
Snap Lines	30	15
Obtain/Organize Materials	45	45
Mark/Position	60	60
Measure	45	30
Sill Plate/Bottom Track	315	180
Sill Sealer	45	30
Cut Joists and Tracks	90	60
Install Joists	420	360
Cut Web Stiffeners	60	-
Install Web Stiffeners	30	-
Cut Blockings	-	90
Install Blockings/Strapping	150	90
Cut OSB Sheathing	65	150
Install OSB Sheathing	240	330
Job Site Cleaning	75	105
Total	1790	1605
Second Floor – Floor Framing		
Read Plans	45	15
Layout	90	15
Snap Lines	30	15
Obtain/Organize Materials	45	30
Mark	45	15
Position	60	45
Measure	60	30
Top Plate	255	225
Cut Joists and Tracks	165	150
Install Joists	915	720
Cut Web Stiffeners	75	-
Install Web Stiffeners	60	-
Cut Blockings	45	30
Install Blockings/Strapping	315	210
Re-install Floor Headers ¹	-	315
Cut OSB Sheathing	150	255
Install OSB Sheathing ¹	450	705
Job Site Cleaning	60	60
Total	2865	2835

¹ Floor header and floor sheathing around it in wood home had to be removed and re-installed because of improper installation the first time.

**Summary of Load Bearing Walls Framing Labor Time by Subcomponent
Man-Minutes**

Component/Subcomponent	Steel House	Wood House
First Story Load Bearing Walls		
Read Plans	45	15
Layout	30	15
Snap Lines	45	15
Obtain/Organize Materials	45	30
Mark/Position	45	45
Measure	45	30
Cut Studs and Tracks	135	90
Frame Walls	1845	1530
Brace Walls	195	165
Construct Headers	420	360
Cut Blockings/Strapping	45	30
Install Blockings/Strapping	120	150
Framing for Fire Place	315	255
Correct One Wall	705	810
Measure/Cut OSB Sheathing	165	345
Install OSB Sheathing	585	390
Install House Wrap (Tyvek)	150	150
Job Site Cleaning	90	270
Total	5025	4695
Second Story Load-Bearing Walls		
Read Plans	45	15
Layout	45	15
Snap Lines	30	15
Obtain/Organize Materials	45	45
Mark/Position	30	15
Measure	45	30
Cut Studs and Tracks	105	150
Frame Walls	795	690
Brace Walls	180	150
Construct Headers	180	105
Cut Blockings/Strapping	60	75
Install Blockings/Strapping	135	105
Measure/Cut OSB Sheathing	210	240
Install OSB Sheathing	735	690
Correct One Wall	270	240
Install House Wrap (Tyvek)	270	300
Job Site Cleaning	60	90
Total	3240	2970

**Summary of Roof Framing Labor Time by Subcomponent
Man-Minutes**

Component/Subcomponent	Steel House	Wood House
Ceiling Joists		
Read Plans	45	15
Layout	45	30
Snap Lines	30	15
Obtain/Organize Materials	45	60
Mark	30	15
Position	15	15
Measure	15	15
Cut Joists and Tracks	60	105
Install Ceiling Joists	810	705
Cut/Install Web Stiffeners	195	-
Cut Blockings	15	195
Install Blockings/Strapping	75	90
Cut OSB Sheathing	60	75
Install OSB in Attic	225	195
Job Site Cleaning	30	45
Total	1695	1575
Roof Rafters		
Read Plans	30	30
Layout/Snap Lines	45	30
Obtain/Organize Materials	45	45
Mark/Position	15	15
Measure	30	15
Cut Rafters	135	390
Install Rafters	735	705
Construct Ridge Member	270	120
Cut Blockings	90	90
Install Blockings/Strapping	120	210
Install Collar Ties	30	45
Cut Roof Sheathing	135	240
Install Roof Sheathing	630	600
Sub Facia	1605	1530
Job Site Cleaning	45	60
Total	3960	4125

**Summary of Non-Load Bearing Walls Framing Labor Time by Subcomponent
Man-Minutes**

Component/Subcomponent	Steel House	Wood House
First Story Non-Load Bearing Walls		
Read Plans	30	30
Layout	45	30
Snap Lines	15	15
Obtain/Organize Materials	30	30
Measure/Mark/Position	75	60
Cut Studs and Tracks	60	75
Frame Walls	360	390
Brace Walls	30	45
Cut Blockings/Strapping	45	60
Install Blockings/Strapping	90	105
Frame Headers	60	75
Job Site Cleaning	45	60
Total	885	975
Second Story Non-Load-Bearing Walls		
Read Plans	45	30
Layout	45	30
Snap Lines	30	30
Obtain/Organize Materials	30	30
Measure/Mark/Position	90	75
Cut Studs and Tracks	210	195
Frame Walls	645	615
Frame Headers	180	225
Brace Walls	120	150
Cut Blockings/Strapping	90	105
Install Blockings/Strapping	45	60
Job Site Cleaning	45	60
Total	1575	1605

**Summary of HVAC and Electrical Trades Installation Labor Time by Subcomponent
Man-Minutes**

Component/Subcomponent	Steel House	Wood House
HVAC		
Read Plans	15	30
Layout	30	30
Obtain/Organize Material	45	45
Measure	45	45
Cut Tracks/Top Plates	135	75
Install Ducts	1755	1860
Install Furnace	240	300
Install A/C Unit	195	180
Install Thermostat & Wires	240	240
Tape/Mask Ducts	225	240
Run Refrigerant Pipes	300	285
Job Site Cleaning	30	45
Total	3255	3375
Electrical		
Read Plans, Mark	45	30
Layout	45	30
Measure	15	15
Punch Studs/Tracks	270	120
Run Electrical Wires	1125	990
Install Electrical Boxes	225	180
Install receptacles, Connect Wires & Install Cover Plates for Boxes	690	660
Install Lighting Fixtures	150	175
Run Power Supply to House	165	180
Install Electrical Panel	135	90
Ceiling Fans Installation	390	465
Run Phone & TV Wires	240	255
Job Site Cleaning	45	45
Total	3540	3210

**Summary of Plumbing, Insulation and Siding Trades Installation Labor Time by Subcomponent
Man-Minutes**

Component/Subcomponent	Steel House	Wood House
Plumbing		
Read Plans	15	15
Layout	15	15
Obtain/Organize Material	30	30
Measure	60	45
Punch Studs/Tracks	345	300
Run Piping	1695	1665
Install Kitchen Plumbing Fixtures	160	175
Install Bathrooms Plumbing Fixtures	360	330
Install Gas Meter	30	30
Install Toilets	105	90
Install Showers	325	290
Install Vanities and Sinks	135	120
Dig Ground for Waste Pipe	165	195
Job Site Cleaning	30	30
Total	3470	3330
Insulation		
Read Plans/Layout	45	45
Obtain/Organize Material	45	45
Measure/Cut insulation	30	30
Install Wall Cavity Cellulose Insulation	1020	975
Install Batt Insulation (Crawl Space)	135	150
Install Cellulose Attic Insulation	345	285
Install Furring Channels for Rafters	420	-
Install Vinyl Cover for Rafters	720	630
Install Rafters Batt Insulation	345	300
Total	3105	2460
Siding		
Read Plans/Layout	60	60
Obtain/Organize Material	60	45
Measure/Cut Siding	2310	2205
Install Siding	5055	4995
Total	7485	7305

**Summary of Drywall, Windows/Doors, Drywall Finishing, Painting and Kitchen Cabinets Trades
Installation Labor Time by Subcomponent
Man-Minutes**

Component/Subcomponent	Steel House	Wood House
Drywall		
Layout	30	30
Obtain/Organize Materials	75	75
Measure	30	30
Cut Drywall Sheets	180	210
First Floor Drywall Installation	660	585
Second Floor Drywall Installation	720	645
First Floor Ceiling Drywall Installation	420	285
Second Floor Ceiling Drywall Installation	510	405
Job Site Cleaning	210	255
Total	2835	2520
Windows and Doors		
Layout	15	15
Obtain/Organize Materials	90	90
Measure	105	135
Install Windows	615	585
Install Exterior Doors	210	180
Install Interior Doors	375	390
Install Window Flashing	795	750
Cut OSB around Windows	210	210
Total	2415	2355
Kitchen Cabinets		
Layout	15	15
Obtain/Organize Materials	45	45
Measure	30	30
Install Cabinets	180	165
Install Kitchen Counter	240	210
Job Site Cleaning	15	15
Total	525	480
Drywall Finishing and Painting		
Obtain/Organize Materials	45	45
Measure	30	30
Tape Joints, Mug it & Install the corners	1410	1770
Sanding	270	405
First Paint Coat	420	450
Final Paint Coat	285	300
Wash & Paint the House from the outside	4260	5025
Job Site Cleaning	60	75
Total	6780	8100

**Summary of Baseboard Trim, Flooring, and Porch Installation Labor Time by Subcomponent
Man-Minutes**

Component/Subcomponent	Steel House	Wood House
Baseboard Trim		
Layout	15	15
Obtain/Organize Materials	30	30
Measure	165	195
Cut Trim	1005	1050
Install Trim	2310	2205
Stair Trim (Internal)	870	945
External Trim	2610	2250
Total	7005	6690
Flooring (Floor Covering)		
Layout	15	15
Obtain/Organize Materials	30	30
Measure	330	345
Carpet Installation	390	360
Hardwood Floors Installation	1215	1125
Job Site Cleaning	30	30
Total	2010	1905
Front Porch (Top Floor)		
Layout	1080	1110
Organize/Obtain Materials	60	45
Measure	195	180
Cut Joists/Studs	240	180
Frame Front Porch	3030	2850
Frame the Rear Porch	585	660
	5190	5025
Front Porch (Bottom Floor)		
Layout	1065	1305
Frame The Side Deck	1080	1050
Organize/Obtain Materials	60	45
Cut Joists/Studs/Roof Planks	570	645
Frame Porch	1275	1065
Job Site Cleaning	60	60
Total	4110	4170

**Summary of Stairs and Miscellaneous Installations Labor Time by Subcomponent
Man-Minutes**

Component/Subcomponent	Steel House	Wood House
<i>Interior Stairs</i>		
Layout	45	60
Obtain/Organize Materials	30	30
Measure	30	45
Cut Framing Members	210	195
Frame Stairs	420	405
Job Site Cleaning	30	45
<i>Total</i>	765	780
<i>Exterior Stairs</i>		
Layout	30	15
Obtain/Organize Materials	45	45
Measure	45	30
Cut Framing Members	225	210
Frame Stairs	375	345
Job Site Cleaning	30	45
<i>Total</i>	750	690
<i>Other Miscellaneous Components</i>		
Fire Place Installation	540	570
Vinyl Facia	180	195
Apply Stucco	2430	2325
Install Felt Paper	285	300
Chimney Installation	2205	2490
Roof Shingles	1260	1290
Run Gas Pipe to House	285	255
<i>Total</i>	7185	7425

APPENDIX C

NORMALIZED LABOR MAN-MINUTES

Normalized Labor Time

Summary of Floor Framing Labor Time by Subcomponent Man-Minutes

Component/Subcomponent	Steel House	Wood House
First Floor-Floor Framing		
Read Plans	30	30
Layout	90	30
Snap Lines	30	15
Obtain/Organize Materials	45	45
Mark/Position	60	60
Measure	45	30
Sill Plate/Bottom Track	315	180
Sill Sealer	30	30
Cut Joists and Tracks	90	60
Install Joists	420	360
Cut Web Stiffeners	60	0
Install Web Stiffeners	30	0
Cut Blockings	0	90
Install Blockings/Strapping	150	90
Cut OSB Sheathing	150	150
Install OSB Sheathing	240	330
Job Site Cleaning	75	105
Total	1860	1605
Second Floor – Floor Framing		
Read Plans	45	15
Layout	90	15
Snap Lines	30	15
Obtain/Organize Materials	45	30
Mark	45	15
Position	60	45
Measure	60	30
Top Plate	255	225
Cut Joists and Tracks	165	150
Install Joists	915	720
Cut Web Stiffeners	75	0
Install Web Stiffeners	60	0
Cut Blockings	45	30
Install Blockings/Strapping	315	210
Re-install Floor Headers	0	315
Cut OSB Sheathing	255	255
Install OSB Sheathing	450	705
Job Site Cleaning	60	60
Total	2970	2835

**Summary of Load Bearing Walls Framing Labor Time by Subcomponent
Man-Minutes**

Component/Subcomponent	Steel House	Wood House
First Story Load Bearing Walls		
Read Plans	45	15
Layout	30	15
Snap Lines	45	15
Obtain/Organize Materials	45	30
Mark/Position	45	45
Measure	45	30
Cut Studs and Tracks	135	90
Frame Walls	1845	1530
Brace Walls	195	165
Construct Headers	420	360
Cut Blockings/Strapping	45	30
Install Blockings/Strapping	120	150
Framing for Fire Place	315	255
Correct One Wall	705	810
Measure/Cut OSB Sheathing	165	345
Install OSB Sheathing	585	390
Install House Wrap	150	150
Job Site Cleaning	90	270
Total	5025	4695
Second Story Load-Bearing Walls		
Read Plans	45	15
Layout	45	15
Snap Lines	30	15
Obtain/Organize Materials	45	45
Mark/Position	30	15
Measure	45	30
Cut Studs and Tracks	105	150
Frame Walls	795	690
Brace Walls	180	150
Construct Headers	180	105
Cut Blockings/Strapping	60	75
Install Blockings/Strapping	135	105
Measure/Cut OSB Sheathing	210	240
Install OSB Sheathing	735	690
Correct One Wall	270	240
Install House Wrap	270	300
Job Site Cleaning	60	90
Total	3240	2970

**Summary of Roof Framing Labor Time by Subcomponent
Man-Minutes**

Component/Subcomponent	Steel House	Wood House
Ceiling Joists		
Read Plans	45	15
Layout	45	30
Snap Lines	30	15
Obtain/Organize Materials	45	60
Mark	30	15
Position	15	15
Measure	15	15
Cut Joists and Tracks	60	105
Install Ceiling Joists	810	705
Cut/Install Web Stiffeners	195	0
Cut Blockings	15	195
Install Blockings/Strapping	75	90
Cut OSB Sheathing	75	75
Install OSB in Attic	225	195
Job Site Cleaning	30	45
Total	1710	1575
Roof Rafters		
Read Plans	30	30
Layout/Snap Lines	45	30
Obtain/Organize Materials	45	45
Mark/Position	15	15
Measure	30	15
Cut Rafters	135	390
Install Rafters	735	705
Construct Ridge Member	270	120
Cut Blockings	90	90
Install Blockings/Strapping	120	210
Install Collar Ties	30	45
Cut Roof Sheathing	240	240
Install Roof Sheathing	630	600
Sub Facia	1605	1530
Job Site Cleaning	45	60
Total	4065	4125

**Summary of Non-Load Bearing Walls Framing Labor Time by Subcomponent
Man-Minutes**

Component/Subcomponent	Steel House	Wood House
First Story Non-Load Bearing Walls		
Read Plans	30	30
Layout	45	30
Snap Lines	15	15
Obtain/Organize Materials	30	30
Measure/Mark/Position	75	60
Cut Studs and Tracks	60	75
Frame Walls	360	390
Brace Walls	30	45
Cut Blockings/Strapping	45	60
Install Blockings/Strapping	90	105
Frame Headers	60	75
Job Site Cleaning	45	60
Total	885	975
Second Story Non-Load-Bearing Walls		
Read Plans	45	30
Layout	45	30
Snap Lines	30	30
Obtain/Organize Materials	30	30
Measure/Mark/Position	90	75
Cut Studs and Tracks	210	195
Frame Walls	645	615
Frame Headers	180	225
Brace Walls	120	150
Cut Blockings/Strapping	90	105
Install Blockings/Strapping	45	60
Job Site Cleaning	45	60
Total	1575	1605

**Summary of HVAC and Electrical Trades Installation Labor Time by Subcomponent
Man-Minutes**

Component/Subcomponent	Steel House	Wood House
HVAC		
Read Plans	15	30
Layout	30	30
Obtain/Organize Material	45	45
Measure	45	45
Cut Tracks/Top Plates	135	75
Install Ducts	1755	1860
Install Furnace	300	300
Install A/C Unit	180	180
Install Thermostat & Wires	240	240
Tape/Mask Ducts	225	240
Run Refrigerant Pipes	300	285
Job Site Cleaning	30	45
Total	3300	3375
Electrical		
Read Plans, Mark	45	30
Layout	45	30
Measure	15	15
Punch Studs/Tracks	270	120
Run Electrical Wires	1125	990
Install Electrical Boxes	225	180
Install receptacles, Connect Wires & Install Cover Plates for Boxes	690	660
Install Lighting Fixtures	175	175
Run Power Supply to House	150	150
Install Electrical Panel	90	90
Ceiling Fans Installation	390	465
Run Phone & TV Wires	240	255
Job Site Cleaning	45	45
Total	3510	3210

**Summary of Plumbing, Insulation and Siding Trades Installation Labor Time by Subcomponent
Man-Minutes**

Component/Subcomponent	Steel House	Wood House
Plumbing		
Read Plans	15	15
Layout	15	15
Obtain/Organize Material	30	30
Measure	45	45
Punch Studs/Tracks	345	300
Run Piping	1695	1665
Install Kitchen Plumbing Fixtures	175	175
Install Bathrooms Plumbing Fixtures	330	330
Install Gas Meter	30	30
Install Toilets	90	90
Install Showers	290	290
Install Vanities and Sinks	120	120
Dig Ground for Waste Pipe	195	195
Job Site Cleaning	30	30
Total	3405	3330
Insulation		
Read Plans/Layout	45	45
Obtain/Organize Material	45	45
Measure/Cut insulation	30	30
Install Wall Cavity Cellulose Insulation	1020	975
Install Batt Insulation (Crawl Space)	135	150
Install Cellulose Attic Insulation	345	285
Install Furring Channels for Rafters	420	-
Install Vinyl Cover for Rafters	720	630
Install Rafters Batt Insulation	345	300
Total	3105	2460
Siding		
Read Plans/Layout	60	60
Obtain/Organize Material	45	45
Measure/Cut Siding	2205	2205
Install Siding	5055	4995
Total	7365	7305

**Summary of Drywall, Windows/Doors, Drywall Finishing, and Painting Trades Installation Labor
Time by Subcomponent
Man-Minutes**

Component/Subcomponent	Steel House	Wood House
Drywall		
Layout	30	30
Obtain/Organize Materials	75	75
Measure	30	30
Cut Drywall Sheets	210	210
First Floor Drywall Installation	660	585
Second Floor Drywall Installation	720	645
First Floor Ceiling Drywall Installation	420	285
Second Floor Ceiling Drywall Installation	510	405
Job Site Cleaning	210	255
Total	2865	2520
Windows and Doors		
Layout	15	15
Obtain/Organize Materials	90	90
Measure	135	135
Install Windows	585	585
Install Exterior Doors	180	180
Install Interior Doors	390	390
Install Window Flashing	750	750
Cut OSB around Windows	210	210
Total	2355	2355
Kitchen Cabinets		
Layout	15	15
Obtain/Organize Materials	45	45
Measure	30	30
Install Cabinets	180	165
Install Kitchen Counter	210	210
Job Site Cleaning	15	15
Total	495	480
Drywall Finishing and Painting		
Obtain/Organize Materials	45	45
Measure	30	30
Tape Joints, Mug it & Install Corners	1410	1770
Sanding	270	405
First Paint Coat	420	450
Final Paint Coat	300	300
Wash & Paint the House (from outside)	5025	5025
Job Site Cleaning	60	75
Total	7560	8100

**Summary of Baseboard Trim, Flooring, and Porch Installation Labor Time by Subcomponent
Man-Minutes**

Component/Subcomponent	Steel House	Wood House
Baseboard Trim		
Layout	15	15
Obtain/Organize Materials	30	30
Measure	195	195
Cut Trim	1050	1050
Install Trim	2310	2205
Stair Trim (Internal)	870	945
External Trim	2250	2250
Total	6720	6690
Flooring (Floor Covering)		
Layout	15	15
Obtain/Organize Materials	30	30
Measure	345	345
Carpet Installation	360	360
Hardwood Floors Installation	1125	1125
Job Site Cleaning	30	30
Total	1905	1905
Porch (Top Floor)		
Layout	1080	1110
Organize/Obtain Materials	60	45
Measure	195	180
Cut Joists/Studs	240	180
Frame Front Porch	3030	2850
Frame the Rear Porch	585	660
Total	5190	5025
Porch (Bottom Floor)		
Layout	1065	1305
Frame The Side Deck	1080	1050
Organize/Obtain Materials	60	45
Cut Joists/Studs/Roof Planks	570	650
Frame Porch	1275	1065
Job Site Cleaning	60	60
Total	4110	4170

**Summary of Stairs and Miscellaneous Components Installation Labor Time by Subcomponent
Man-Minutes**

Component/Subcomponent	Steel House	Wood House
<i>Interior Stairs</i>		
Layout	60	60
Obtain/Organize Materials	30	30
Measure	45	45
Cut Framing Members	195	195
Frame Stairs	420	405
Job Site Cleaning	30	45
<i>Total</i>	780	780
<i>Exterior Stairs</i>		
Layout	15	15
Obtain/Organize Materials	45	45
Measure	30	30
Cut Framing Members	210	210
Frame Stairs	375	345
Job Site Cleaning	30	45
<i>Total</i>	705	690
<i>Other Miscellaneous Components</i>		
Fire Place Installation	570	570
Vinyl Facia	195	195
Apply Stucco	2325	2325
Install Felt Paper	300	300
Chimney Installation	2490	2490
Roof Shingles	1290	1290
Run Gas Pipe to House	255	255
<i>Total</i>	7425	7425

