## Double Stud Wall Net Zero Assembly

See ***Appendix A: Double Stud Wall Net Zero Assembly Construction Details*** for plans and construction details.

### *Description & Overview*

The design of this assembly utilizes two 2x4 stud walls spaced apart by 3". This entire 10" cavity is then filled with insulation. The construction method is very similar to "Business as Usual" as it is essentially just a thick wall. The interior of the two walls was made the structural wall. This allowed for the floor joists to land on this interior wall and insulation to fill the cavity from the rim board to the exterior of the assembly. The air control layer for this assembly was the VB, detailed in the same manner as the "Business as Usual" assembly. The wall assembly, from exterior to interior, contains:

- Exterior Cladding
- WRB, vapour open
- Structural sheathing
- 2x4 stud wall @ 24" O.C. with fibreglass batt cavity insulation
- 3" cavity with fibreglass batt insulation
- 2x4 stud wall @ 24" O.C. with fibreglass batt cavity insulation
- Airtight variable vapour barrier
- ½" gypsum board
- Interior finish

The roof for drafting and details is the same as with the Tier1 2x6 Assembly. The foundation was drawn as an ICF foundation as is used by many builders utilizing this assembly.

The window installed in the mock-up was the same window as the Tier 1 2x6 Assembly. It was installed to the exterior of the structural sheathing.

The decision to select this assembly was primarily influenced by the fact that multiple high-performance builders in Alberta and across North America have utilized this assembly and it has been replicated many times. This, combined with the relative ease of construction and material availability confirmed that this assembly would be one of the selections to showcase.

### *Materials*

Materials used for mock-up wall construction are as follows:

- **WRB**
  - Membrane – Typar Building Wrap – mechanically fastened
  - Sill Pan Flashing – Henry – BlueSkin Butyl Flash
- **Stud Walls**
  - 3/8" OSB structural sheathing
  - 2 walls - 2x4 SPF lumber
- **Cavity Insulation**
  - 3 rows of Owens Corning R-12 Pink Next Gen Fiberglass Insulation
- **Airtight Vapour Barrier**
  - Membrane - Siga Majrex moisture variable VB
  - Sealing Tape – Siga Fentrim VB tape
- **Assembly Effective Thermal Performance**
  - RSI-5.73 or R-32.52

### *Construction*

Construction of this assembly was again very similar to the Tier 1 2x6 Assembly. Framing consisted of two 2x4 stud walls, framed utilizing current code compliant, industry standard techniques. These walls have a 3" space between them, so a plywood or OSB spacer that is ripped to the width of the overall assembly thickness was installed to the top of the walls cap plate. This kept the walls held the correct distance apart. While building, 3" blocks were utilized to keep the two walls spread apart while securing them together. A ¾" plywood buck was installed around the perimeter of the window and door R.O. to maintain proper spacing and provide a solid R.O. surface.

R-12 fibreglass batt insulation was installed in the exterior 2x4 wall cavity first. The fibreglass batts were then installed in the 3" cavity space horizontally. Installing this layer horizontally allowed the insulation to span across several stud spaces which helped hold the insulation in place the interior wall insulation is then installed. This process, especially installing the insulation in the 3" cavity space, was time consuming but very straightforward and simple.

The air control layer for this assembly was the Siga Majrex Moisture Variable VB. Maintaining a continuous air control layer was achieved with this membrane along with the following materials and methods:

- Taping any joints and openings in the VB and taping the VB to the floor under the wall bottom plate.
- Airtight electrical boxes with gasket seals at the face.
- Foam backer rod and caulking to connect the VB to the window frame.
- Expanding spray foam insulation.
- Taping WRB to mechanical penetrations

### Assembly Advantages

- Easy to build as it was essentially just building a second wall compared to "Business as Usual"
- Materials used were easily accessible at a hardware or building supply store, aside from the Siga membrane and tape.
- WRB used was more affordable compared to the Tier 3 assembly.
- Did not require specialized professionals outside the norm to design or build.
- Building two walls with a space between significantly reduces the amount of thermal bridges compared to "Business as Usual".
- The spacing between the walls can be as large or small as needed or wanted.

### Assembly Disadvantages

- Airtightness detailing was similar to the "Business as Usual Assembly" and was more challenging compared to the Tier 3 assembly as has been discussed.
- Lifting and moving the connected framed walls was more difficult due to the weight of the increased framing.
- Custom interior jamb finishing, or a custom ordered jamb extension from the window manufacturer was required.

*Cost Analysis*

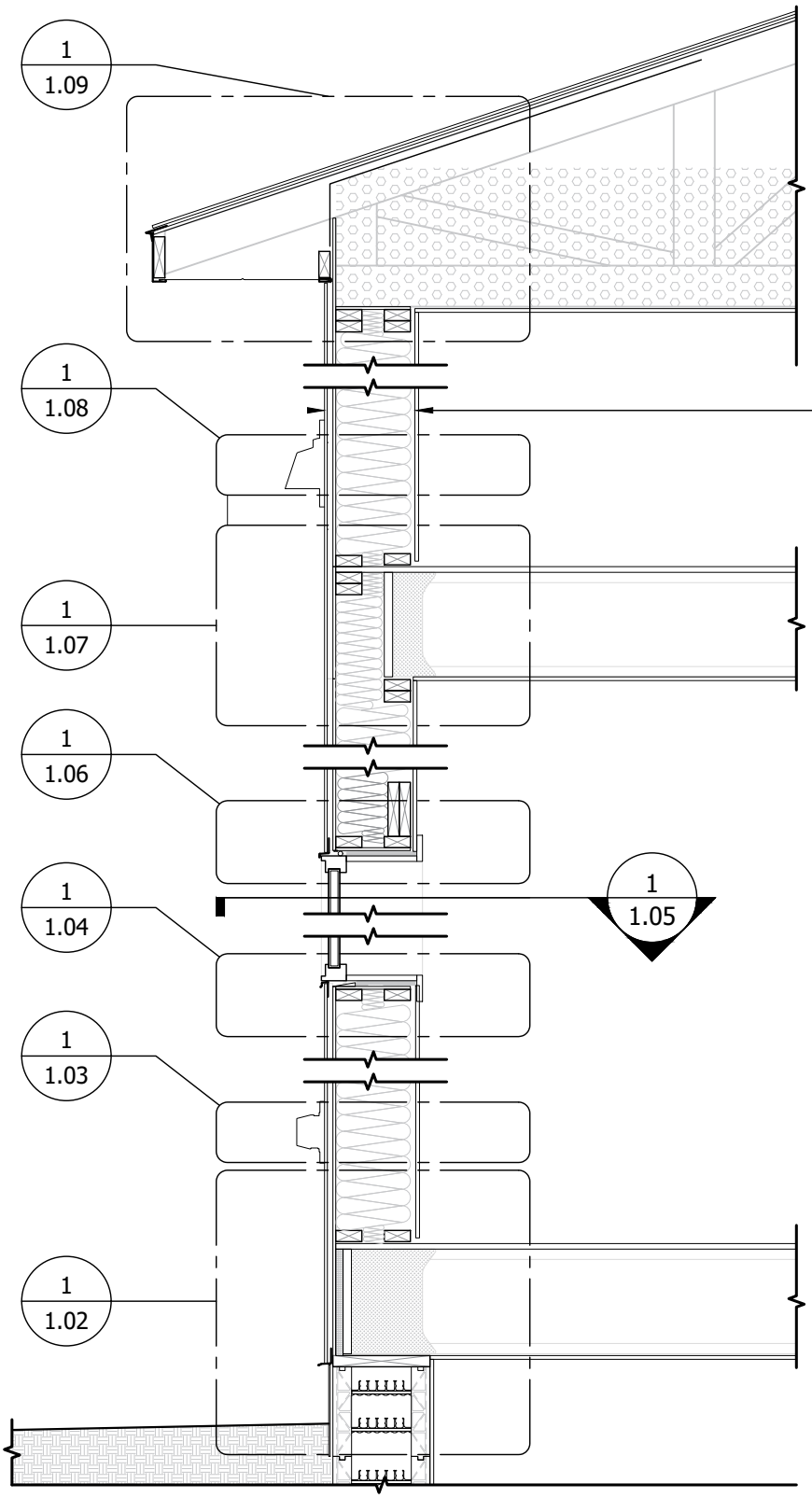
Upon completing a cost analysis of this assembly compared to the Tier 1 2x6 Assembly, the cost to construct this assembly for the model home came out to roughly 23% more.

Of the new build assemblies that were selected, this assembly was the most affordable compared to the Tier 1 2x6 Assembly. The materials utilized in the mock-up construction were similar to the Tier 1 assembly, aside from the VB.

GBTAC found that the largest cause of additional costs was due to framing of two walls instead of one, the use of a more expensive high-quality VB, and the added insulation.

# Appendix A:

## Double Stud Wall Net Zero Assembly Construction Details




1 ENVELOPE SECTION

1/2" = 1'-0"

# DOUBLE STUD WALL NZ ASSEMBLY

EFFECTIVE RSI = 5.73; R-VALUE = 32.52

- EXTERIOR CLADDING
- ¾" RAINSCREEN STRAPPING (OPTIONAL)
- WATER RESISTANT BARRIER, SHEET APPLIED MEMBRANE, VAPOUR OPEN
- ⅜" EXTERIOR SHEATHING
- 2X4 WOOD STUDS w/ FIBREGLASS BATT INSULATION
- 3" VOID w/ FIBREGLASS BATT INSULATION
- 2X4 WOOD STUDS w/ FIBREGLASS BATT INSULATION
- AIRTIGHT VARIABLE VAPOUR BARRIER
- ½" GYPSUM BOARD
- INTERIOR FINISHING

## NOTES

- NZ = NET ZERO

SAIT

1301-16 AVENUE NW CALGARY AB, T2M 0L4

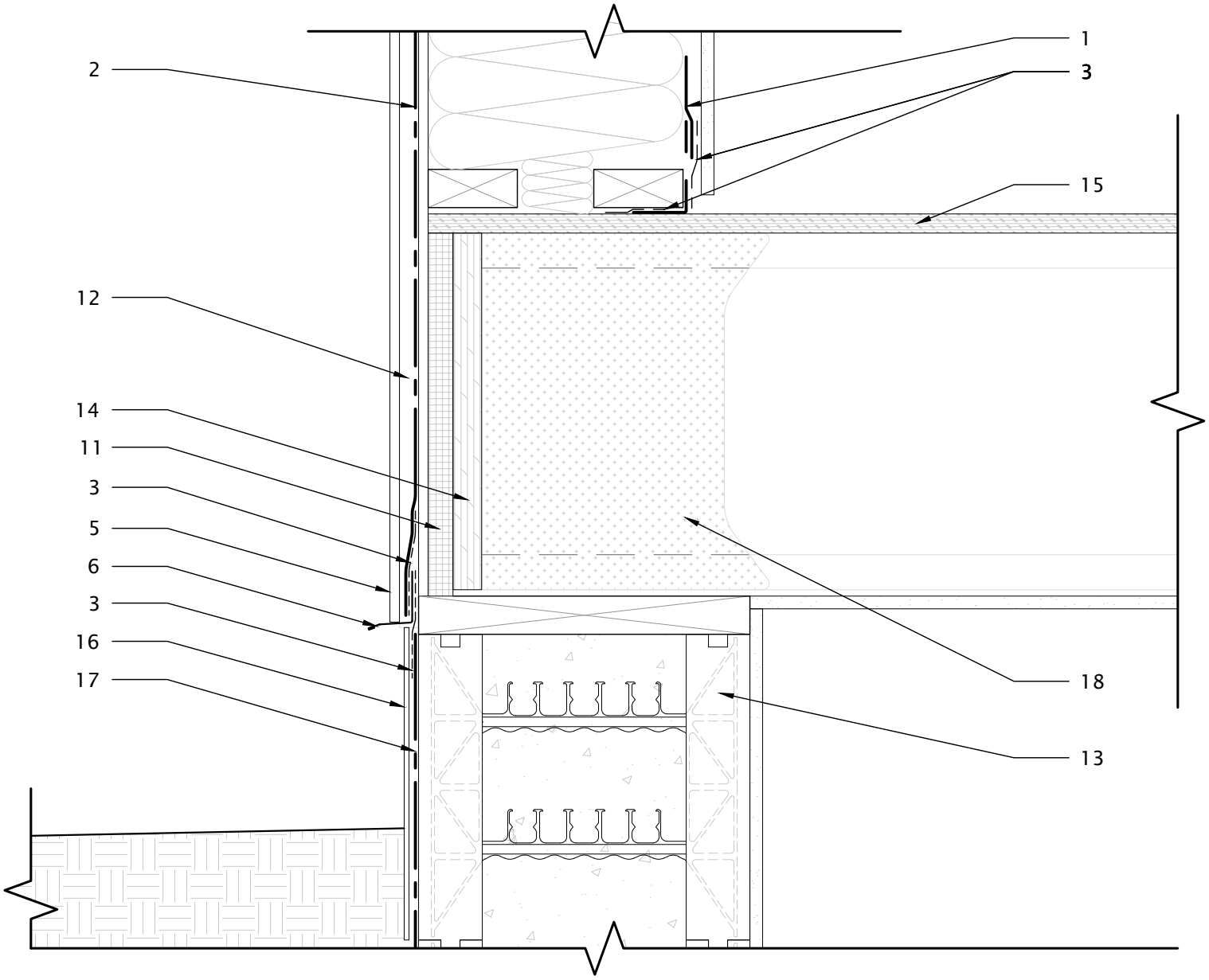


Drawing Title

DOUBLE STUD WALL NZ

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project Number | 2024-009 | Project Name | HIGH PERFORMANCE WALL ASSEMBLY | | | | |
| Drawn by | LL | Checked by | BH, NM | Date | 2025-04-30 | Scale | 1/2" = 1'- 0" |
| Project Address | N/A | | | | | | |
| Issued For | ALBERTA ECOTRUST FOUNDATION | | | | | | |

1.01




# 1 FOUNDATION TRANSITION SECTION DETAIL

2" = 1'-0"

1 AIRTIGHT VAPOUR BARRIER
2 WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 EPS INSULATION
12 RAINSCREEN STRAPPING
13 ICF BLOCK
14 RIM BOARD
15 SUBFLOOR
16 PARGING
17 DAMPPROOFING
18 SPRAY FOAM INSULATION

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1301-16 AVENUE NW CALGARY AB, T2M 0L4



Drawing Title: DOUBLE STUD WALL NZ

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project Number | 2024-009 | Project Name | HIGH PERFORMANCE WALL ASSEMBLY | | | | |
| Drawn by | LL | Checked by | BH, NM | Date | 2025-04-30 | Scale | 2" = 1'- 0" |
| Project Address | N/A | | | | | | |
| Issued For | ALBERTA ECOTRUST FOUNDATION | | | | | | |

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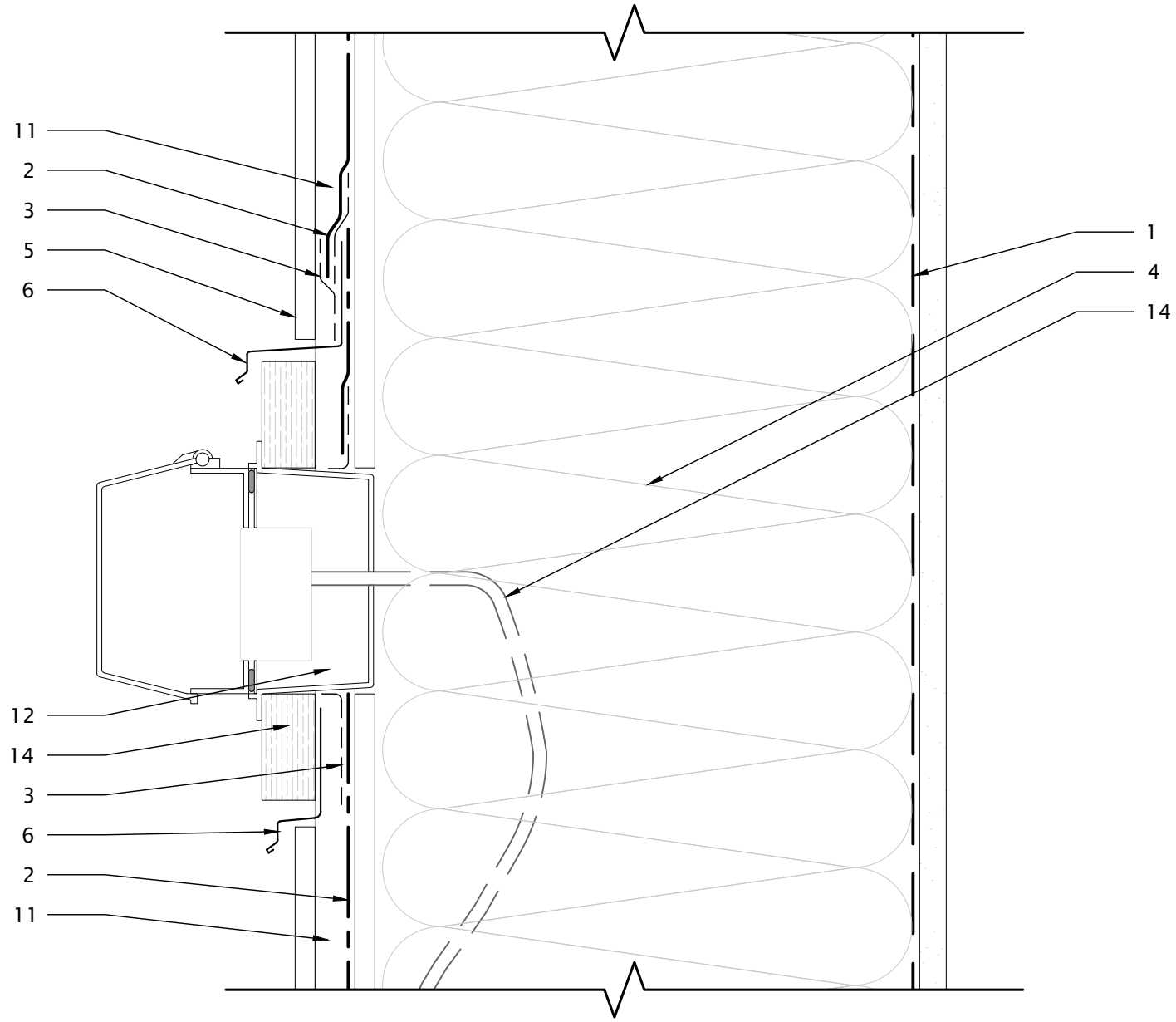


# 1 RECEPTACLE SECTION DETAIL

4" = 1'-0"

1 AIRTIGHT VAPOUR BARRIER
2 WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 IN USE RECEPTACLE ASSEMBLY
13 ELECTRICAL WIRE
14 BATTEN

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4



Drawing Title
DOUBLE STUD WALL NZ

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project Number | 2024-009 | Project Name | HIGH PERFORMANCE WALL ASSEMBLY | | | | |
| Drawn by | LL | Checked by | BH, NM | Date | 2025-04-30 | Scale | 4" = 1'- 0" |
| Project Address | N/A | | | | | | |
| Issued For | ALBERTA ECOTRUST FOUNDATION | | | | | | |

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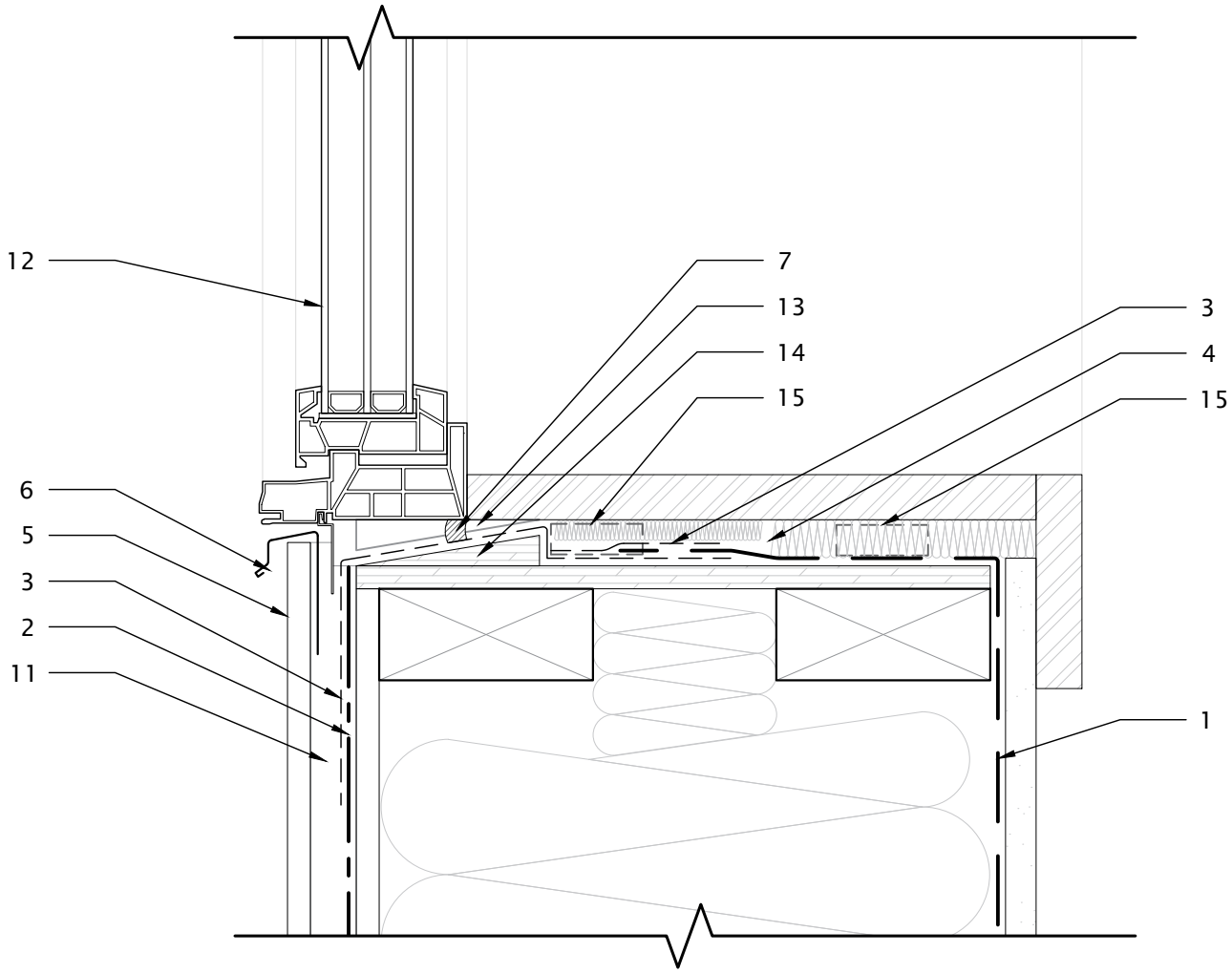


# 1 WINDOW SILL SECTION DETAIL

4" = 1'-0"

1 AIRTIGHT VAPOUR BARRIER
2 WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 GLAZING UNIT
13 WINDOW SUPPORT SHIM
14 BEVELED SIDING SLOPED DAM
15 BLOCKING

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4



Drawing Title: DOUBLE STUD WALL NZ

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project Number | 2024-009 | Project Name | HIGH PERFORMANCE WALL ASSEMBLY | | | | |
| Drawn by | LL | Checked by | BH, NM | Date | 2025-04-30 | Scale | 4" = 1'- 0" |
| Project Address | N/A | | | | | | |
| Issued For | ALBERTA ECOTRUST FOUNDATION | | | | | | |

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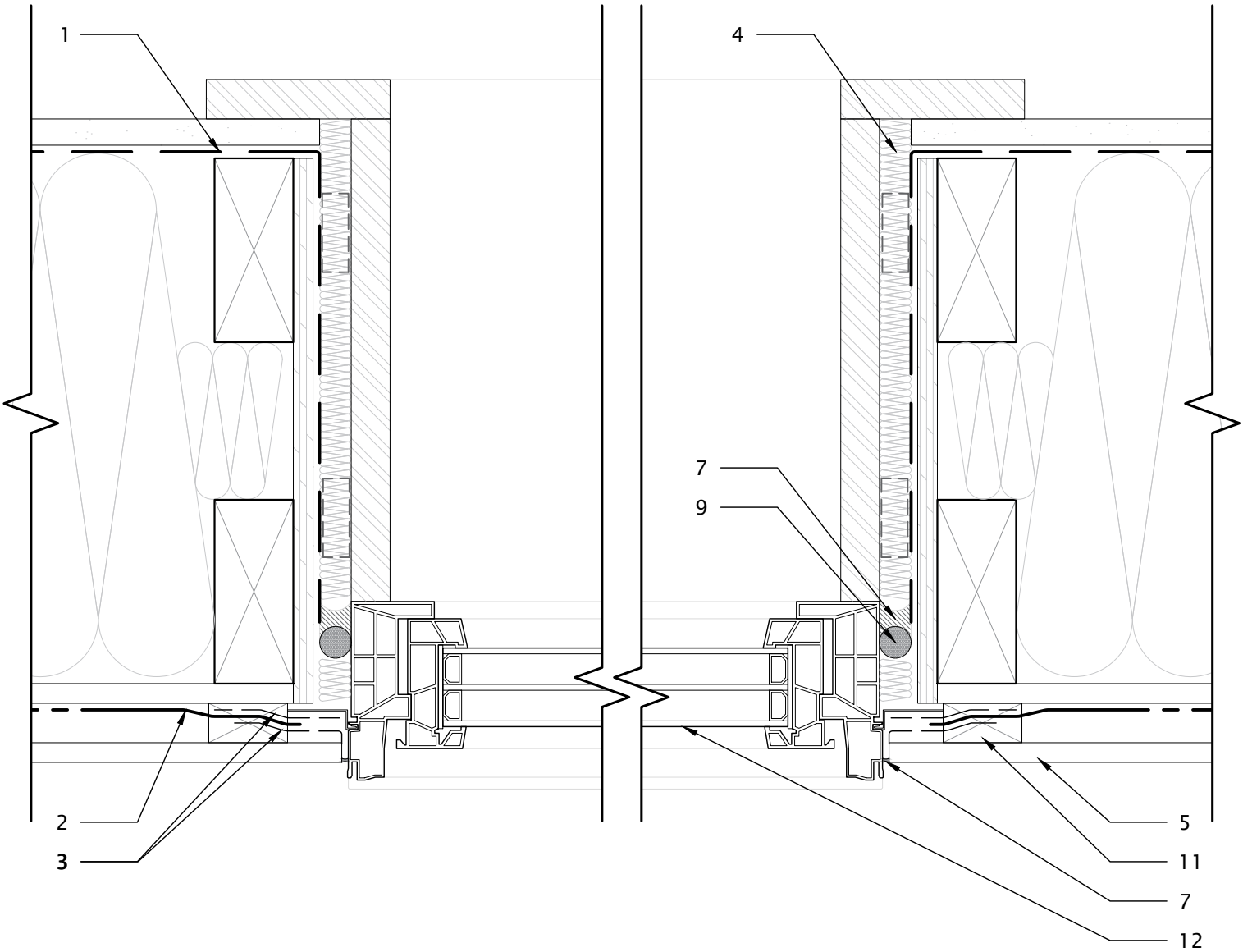


# 1 WINDOW JAMB PLAN DETAIL

4" = 1'-0"

1 AIRTIGHT VAPOUR BARRIER
2 WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 GLAZING UNIT

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4



Drawing Title

## DOUBLE STUD WALL NZ

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project Number | 2024-009 | Project Name | HIGH PERFORMANCE WALL ASSEMBLY | | | | |
| Drawn by | LL | Checked by | BH, NM | Date | 2025-04-30 | Scale | 4" = 1'- 0" |
| Project Address | N/A | | | | | | |
| Issued For | ALBERTA ECOTRUST FOUNDATION | | | | | | |

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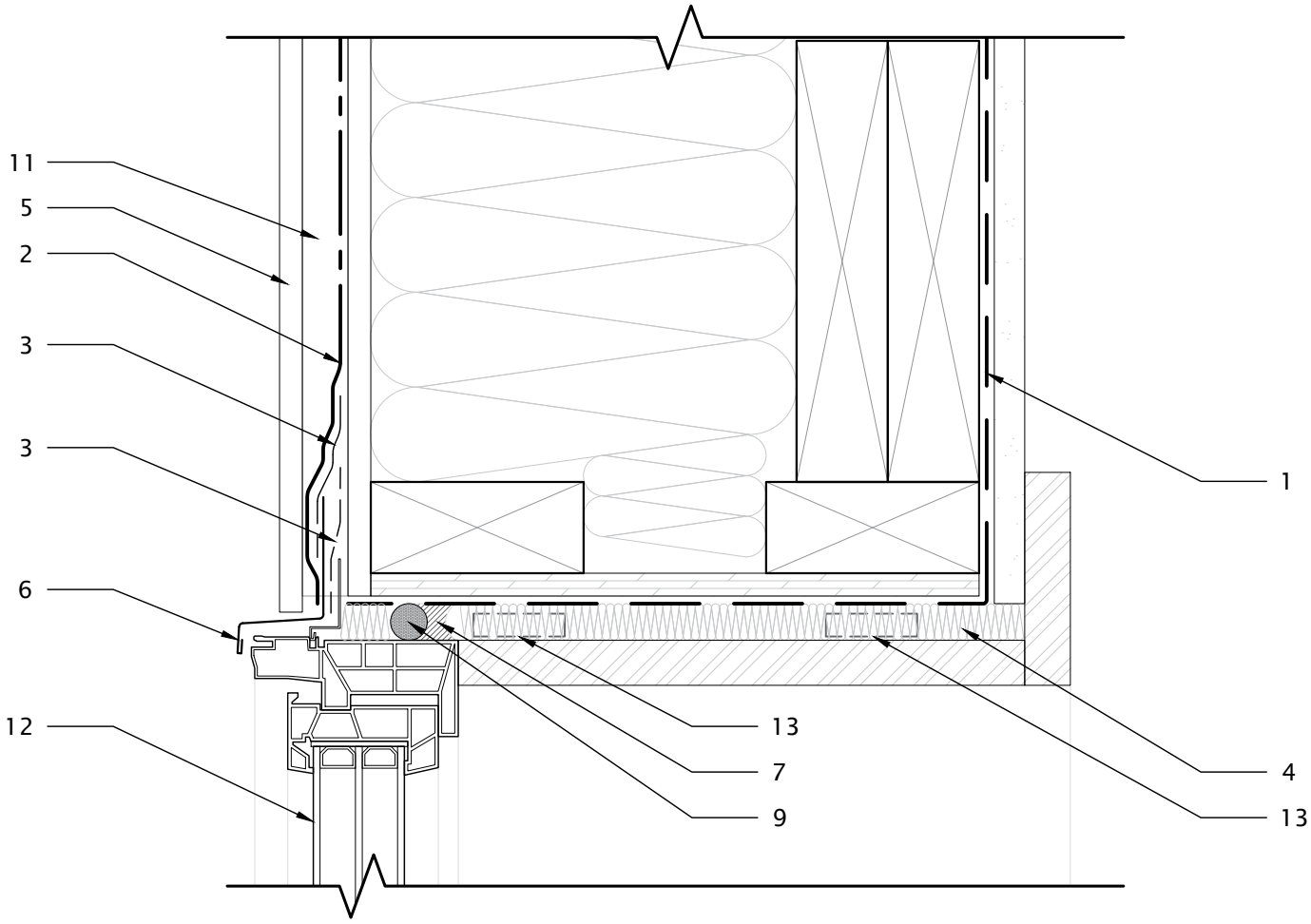


# 1 WINDOW HEAD SECTION DETAIL

4" = 1'-0"

1 AIRTIGHT VAPOUR BARRIER
2 WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 GLAZING UNIT
13 BLOCKING

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4



Drawing Title
DOUBLE STUD WALL NZ

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project Number | 2024-009 | Project Name | HIGH PERFORMANCE WALL ASSEMBLY | | | | |
| Drawn by | LL | Checked by | BH, NM | Date | 2025-04-30 | Scale | 4" = 1'- 0" |
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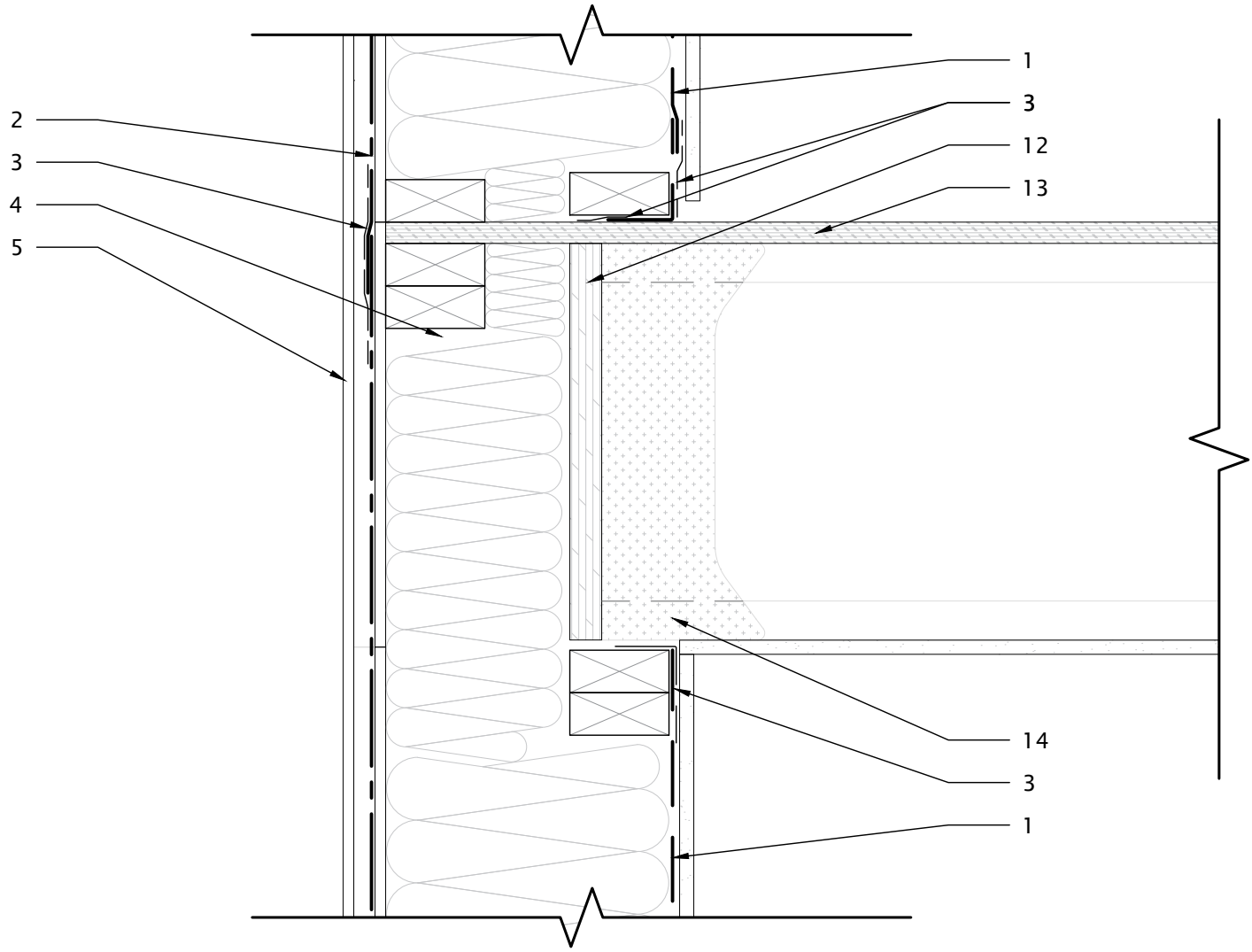


# 1 FLOOR TO FLOOR TRANSITION SETION DETAIL

2" = 1'-0"

1 AIRTIGHT VAPOUR BARRIER
2 WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 RIM BOARD
13 SUBFLOOR
14 SPRAY FOAM INSULATION

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4



Drawing Title

# DOUBLE STUD WALL NZ

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project Number | 2024-009 | Project Name | HIGH PERFORMANCE WALL ASSEMBLY | | | | |
| Drawn by | LL | Checked by | BH, NM | Date | 2025-04-30 | Scale | 2" = 1'- 0" |
| Project Address | N/A | | | | | | |
| Issued For | ALBERTA ECOTRUST FOUNDATION | | | | | | |

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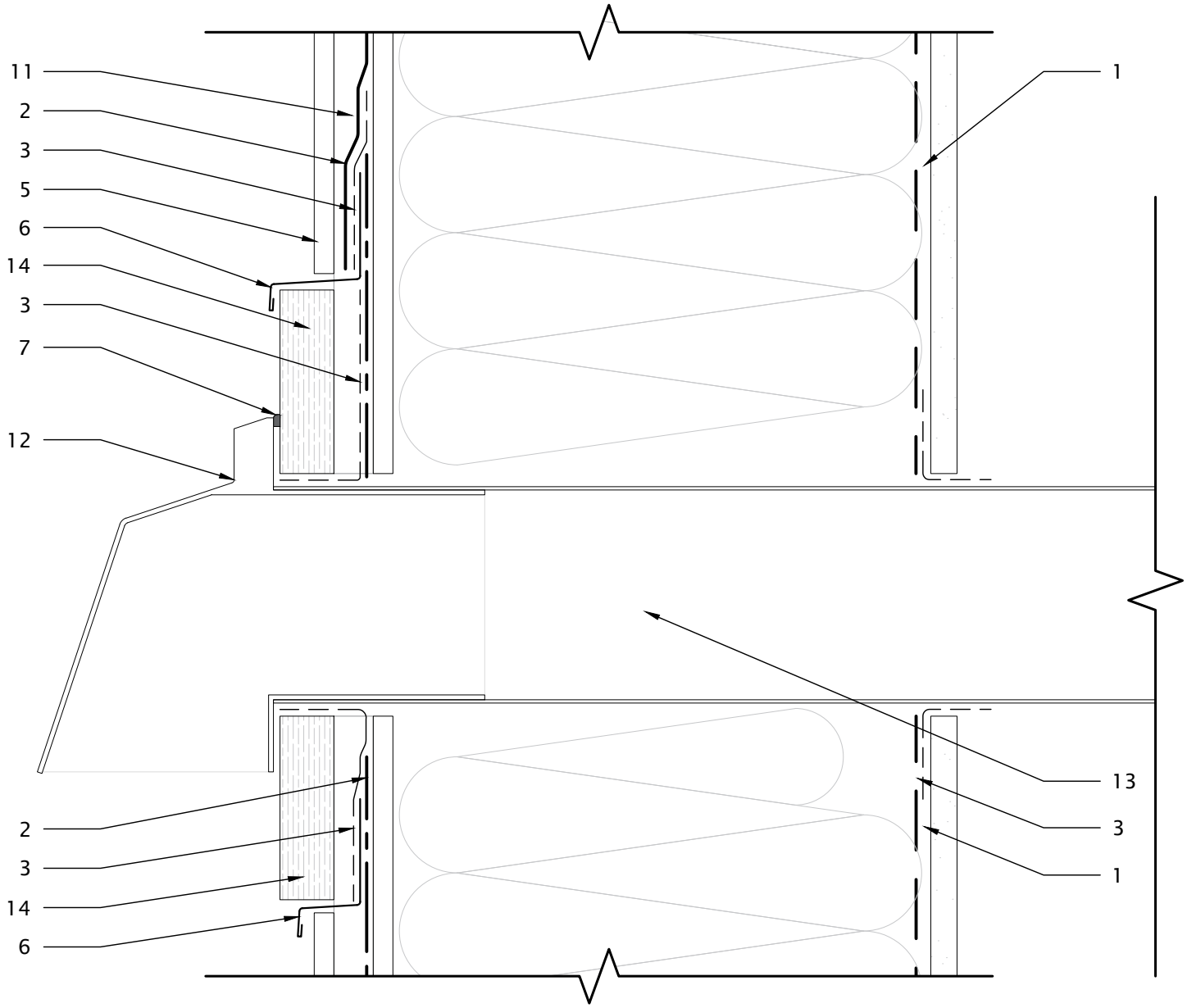


# 1 DUCT OPENING SECTION DETAIL

4" = 1'-0"

1 AIRTIGHT VAPOUR BARRIER
2 WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 DUCT HOOD
13 DUCT
14 BATTEN OSB CAP

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4



Drawing Title
DOUBLE STUD WALL NZ

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project Number | 2024-009 | Project Name | HIGH PERFORMANCE WALL ASSEMBLY | | | | |
| Drawn by | LL | Checked by | BH, NM | Date | 2025-04-30 | Scale | 4" = 1'- 0" |
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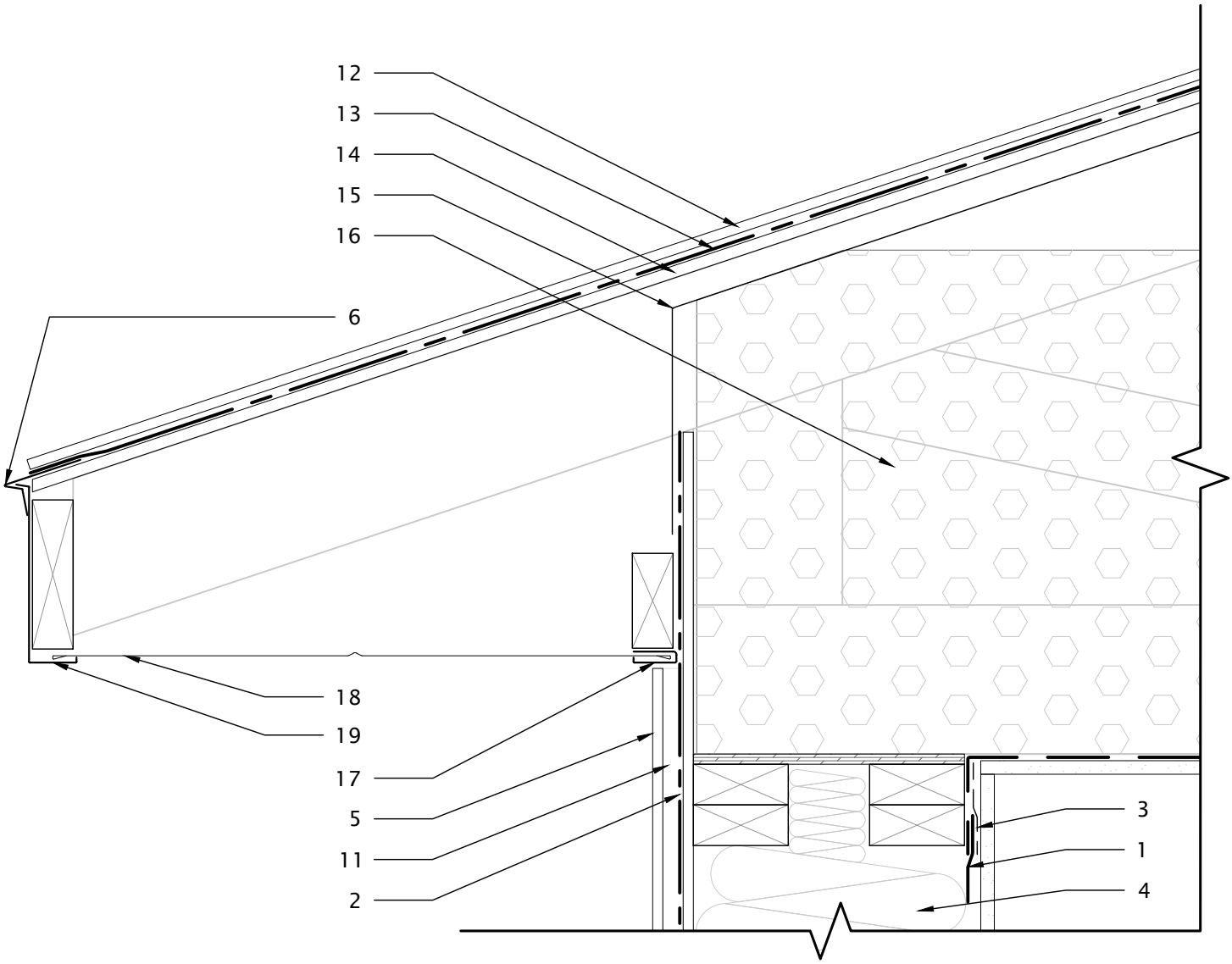


# 1 WALL TO ROOF TRANSITION SECTION DETAIL

2" = 1'-0"

1 AIRTIGHT VAPOUR BARRIER
2 WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 ROOFING SHINGLE
13 ROOFING UNDERLAYMENT MEMBRANE
14 ROOFING SHEATHING
15 INSULATION STOP
16 BLOWN INSULATION
17 J-CHANNEL
18 SOFFIT
19 FASCIA

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4



Drawing Title

# DOUBLE STUD WALL NZ

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project Number | 2024-009 | Project Name | HIGH PERFORMANCE WALL ASSEMBLY | | | | |
| Drawn by | LL | Checked by | BH, NM | Date | 2025-04-30 | Scale | 2" = 1'- 0" |
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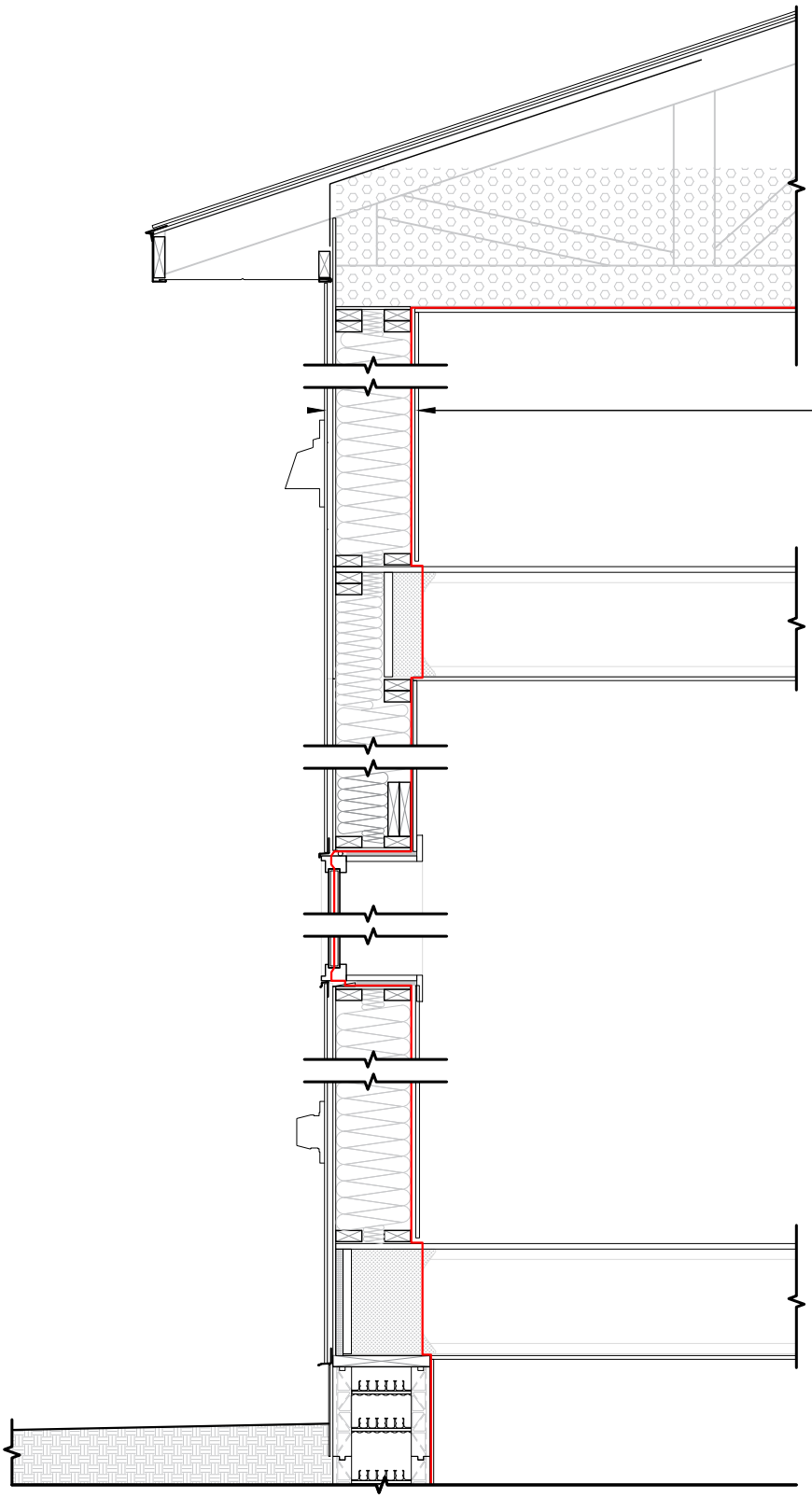

# DOUBLE STUD WALL NZ ASSEMBLY

EFFECTIVE RSI = 5.73; R-VALUE = 32.52

- EXTERIOR CLADDING
- ¾" RAINSCREEN STRAPPING (OPTIONAL)
- WATER RESISTANT BARRIER, SHEET APPLIED MEMBRANE, VAPOUR OPEN
- ⅜" EXTERIOR SHEATHING
- 2X4 WOOD STUDS w/ FIBREGLASS BATT INSULATION
- 3" VOID w/ FIBREGLASS BATT INSULATION
- 2X4 WOOD STUDS w/ FIBREGLASS BATT INSULATION
- AIRTIGHT VARIABLE VAPOUR BARRIER
- ½" GYPSUM BOARD
- INTERIOR FINISHING

## LEGEND

AIR BARRIER

## 1 AIR BARRIER CONTINUITY

1/2" = 1'-0"

SAIT

1301-16 AVENUE NW CALGARY AB, T2M 0L4



Drawing Title

DOUBLE STUD WALL NZ

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project Number | 2024-009 | Project Name | HIGH PERFORMANCE WALL ASSEMBLY | | | | |
| Drawn by | LL | Checked by | BH, NM | Date | 2025-04-30 | Scale | 1/2" = 1'- 0" |
| Project Address | N/A | | | | | | |
| Issued For | ALBERTA ECOTRUST FOUNDATION | | | | | | |

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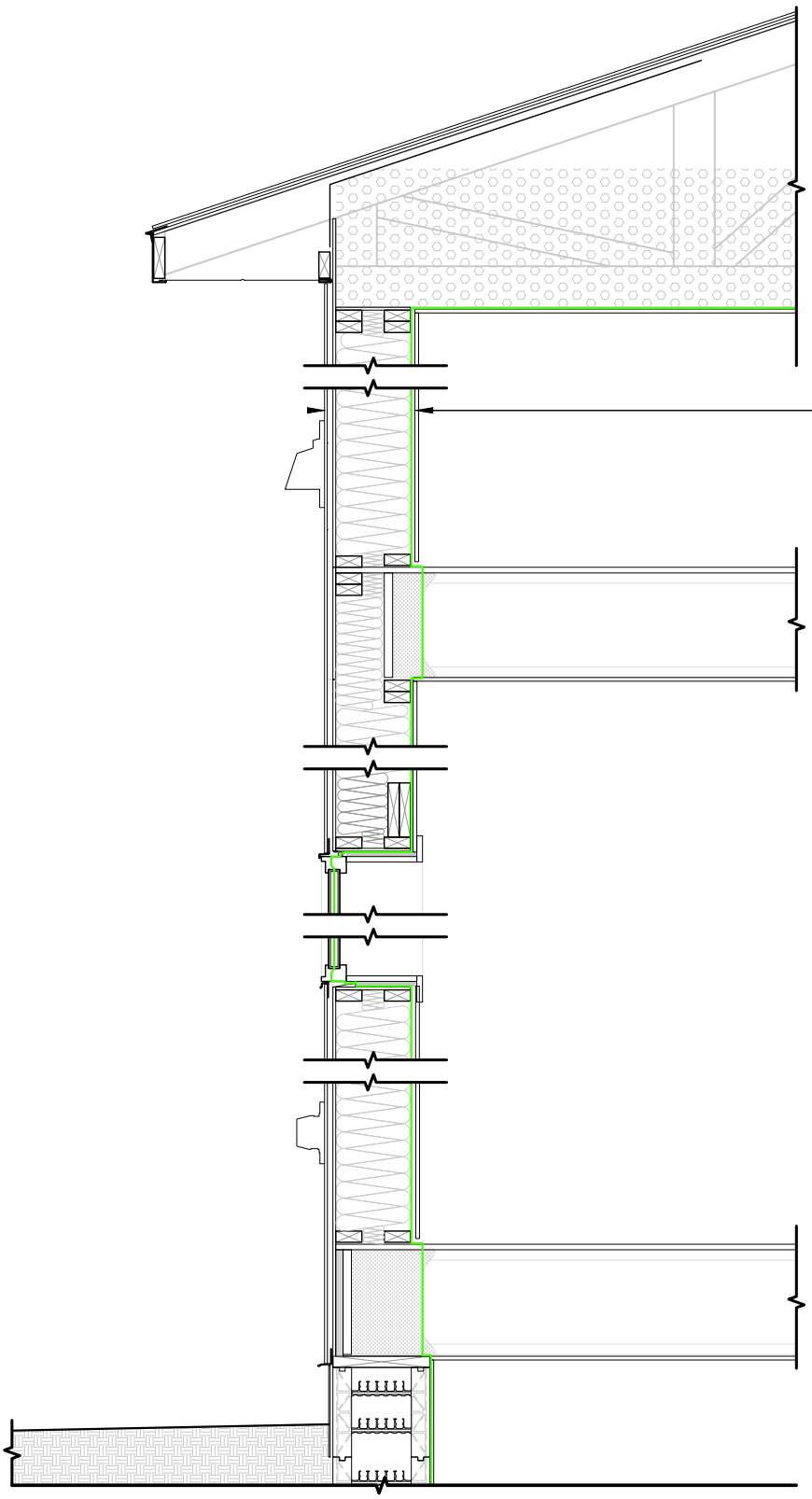

# DOUBLE STUD NZ WALL

EFFECTIVE RSI = 5.81; R-VALUE = 32.52

- EXTERIOR CLADDING
- ¾" RAINSCREEN STRAPPING (OPTIONAL)
- WATER RESISTANT BARRIER, SHEET APPLIED MEMBRANE, VAPOUR OPEN
- ⅜" EXTERIOR SHEATHING
- 2X4 WOOD STUDS w/ FIBREGLASS BATT INSULATION
- 3" VOID w/ FIBREGLASS BATT INSULATION
- 2X4 WOOD STUDS w/ FIBREGLASS BATT INSULATION
- AIRTIGHT VARIABLE VAPOUR BARRIER
- ½" GYPSUM BOARD
- INTERIOR FINISHING

## LEGEND

VAPOUR BARRIER

## 1 VAPOUR BARRIER CONTINUITY

1/2" = 1'-0"

SAIT

1301-16 AVENUE NW CALGARY AB, T2M 0L4



Drawing Title

DOUBLE STUD WALL NZ

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project Number | 2024-009 | Project Name | HIGH PERFORMANCE WALL ASSEMBLY | | | | |
| Drawn by | LL | Checked by | BH, NM | Date | 2025-04-30 | Scale | 1/2" = 1'- 0" |
| Project Address | N/A | | | | | | |
| Issued For | ALBERTA ECOTRUST FOUNDATION | | | | | | |

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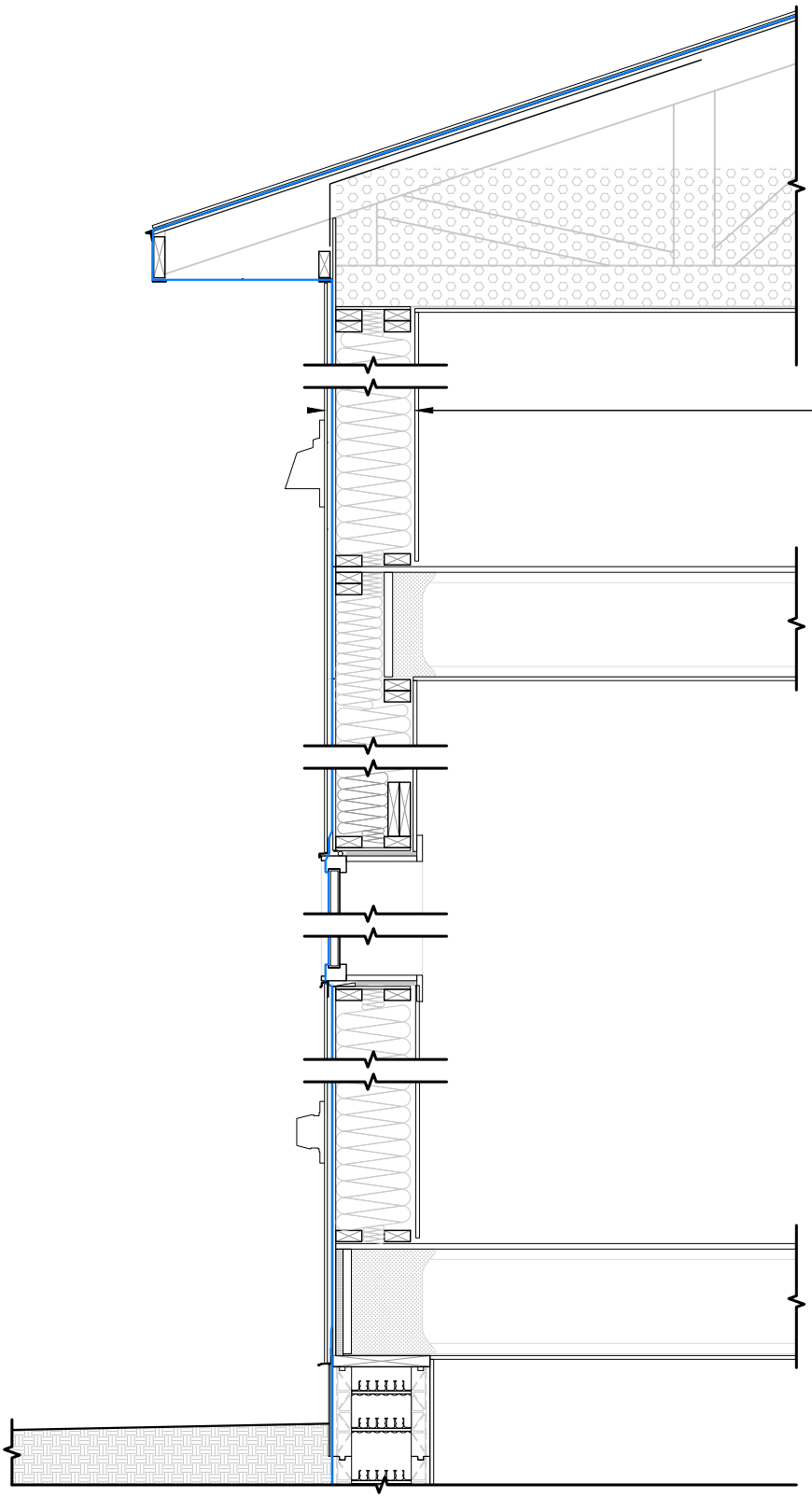


# DOUBLE STUD NZ WALL

EFFECTIVE RSI = 5.81; R-VALUE = 32.52

- EXTERIOR CLADDING
- ¾" RAINSCREEN STRAPPING (OPTIONAL)
- WATER RESISTANT BARRIER, SHEET APPLIED MEMBRANE, VAPOUR OPEN
- ⅜" EXTERIOR SHEATHING
- 2X4 WOOD STUDS w/ FIBREGLASS BATT INSULATION
- 3" VOID w/ FIBREGLASS BATT INSULATION
- 2X4 WOOD STUDS w/ FIBREGLASS BATT INSULATION
- AIRTIGHT VARIABLE VAPOUR BARRIER
- ½" GYPSUM BOARD
- INTERIOR FINISHING

## LEGEND

WATER BARRIER

## 1 WATER BARRIER CONTINUITY

1/2" = 1'-0"

SAIT

1301-16 AVENUE NW CALGARY AB, T2M 0L4



Drawing Title

DOUBLE STUD WALL NZ

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project Number | 2024-009 | Project Name | HIGH PERFORMANCE WALL ASSEMBLY | | | | |
| Drawn by | LL | Checked by | BH, NM | Date | 2025-04-30 | Scale | 1/2" = 1'- 0" |
| Project Address | N/A | | | | | | |
| Issued For | ALBERTA ECOTRUST FOUNDATION | | | | | | |

1.12

# Appendix B:

## Wall Assembly Effective Thermal Resistance Calculations

Project Name: **High-Performance Wall Assembly Project**

Project Address:

Assembly Name: **Double Stud Wall Net Zero Wall Assembly**

| Materials in Assembly | | | | | RSI, $(m^2*K)/W$ | R-Value |
|---|---|---|---|---|---|---|
| Outside Air Film | | | | | 0.03 | 0.17 |
| Rainscreen Framing (20mm x 0.0085 RSI/mm) | $RSI_F$ = | 0.17 | % area of framing = | 20 | $RSI_{Parallel}$= | |
| Rainscreen Air Cavity (20mm) | $RSI_C$ = | 0.18 | % area of cavity = | 80 | 0.18 | 1.02 |
| Building Paper | | | | | 0.00 | 0.00 |
| OSB Sheathing (9.5mm) | | | | | 0.0930 | 0.53 |
| Stud @ 610 (89mm x 0.0085 RSI/mm) | $RSI_F$ = | 0.76 | % area of framing = | 20 | $RSI_{Parallel}$= | |
| Batt Insulation (R12) | $RSI_C$ = | 2.11 | % area of cavity = | 80 | 1.56 | 8.84 |
| 76mm space with Batt Insulation (R12) | | | | | 2.11 | 11.98 |
| Stud @ 610 (89mm x 0.0085 RSI/mm) | $RSI_F$ = | 0.76 | % area of framing = | 20 | $RSI_{Parallel}$= | |
| Batt Insulation (R12) | $RSI_C$ = | 2.11 | % area of cavity = | 80 | 1.56 | 8.84 |
| Vapour Barrier | | | | | 0.00 | 0.00 |
| Gypsum (12.7mm) | | 0.8 | | | 0.08 | 0.45 |
| Interior Air Film | | 57.6 | | | 0.12 | 0.68 |
| | | | Calculated $RSI_{EFF}$= | | **5.73** | **32.52** |
| | | | 9.36 Prescriptive RSI Required = | | 3.08 | 17.49 |
| | | | W/HRV | | 2.97 | 16.86 |

Parallel Path Flow Calculations

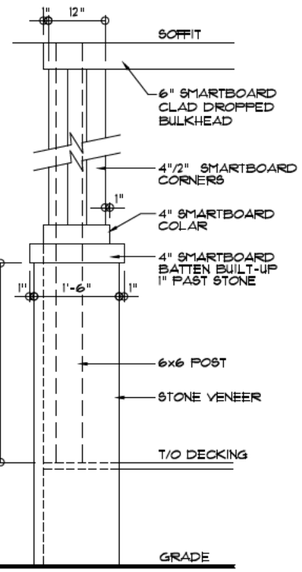
89mm stud with Batt Insulation (R12)

$$RSI_{Parallel} = \frac{100}{\frac{20}{0.76} + \frac{80}{2.11}} = 1.56 \quad (m2*K)/W$$

# Appendix C:

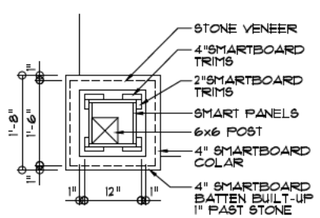
## Cost Analysis Model Home

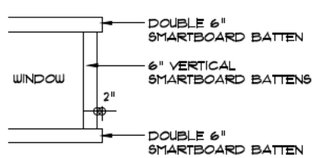
[redacted]




COLUMN DETAIL

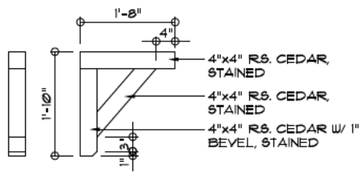
SCALE: 3/8" = 1'-0"



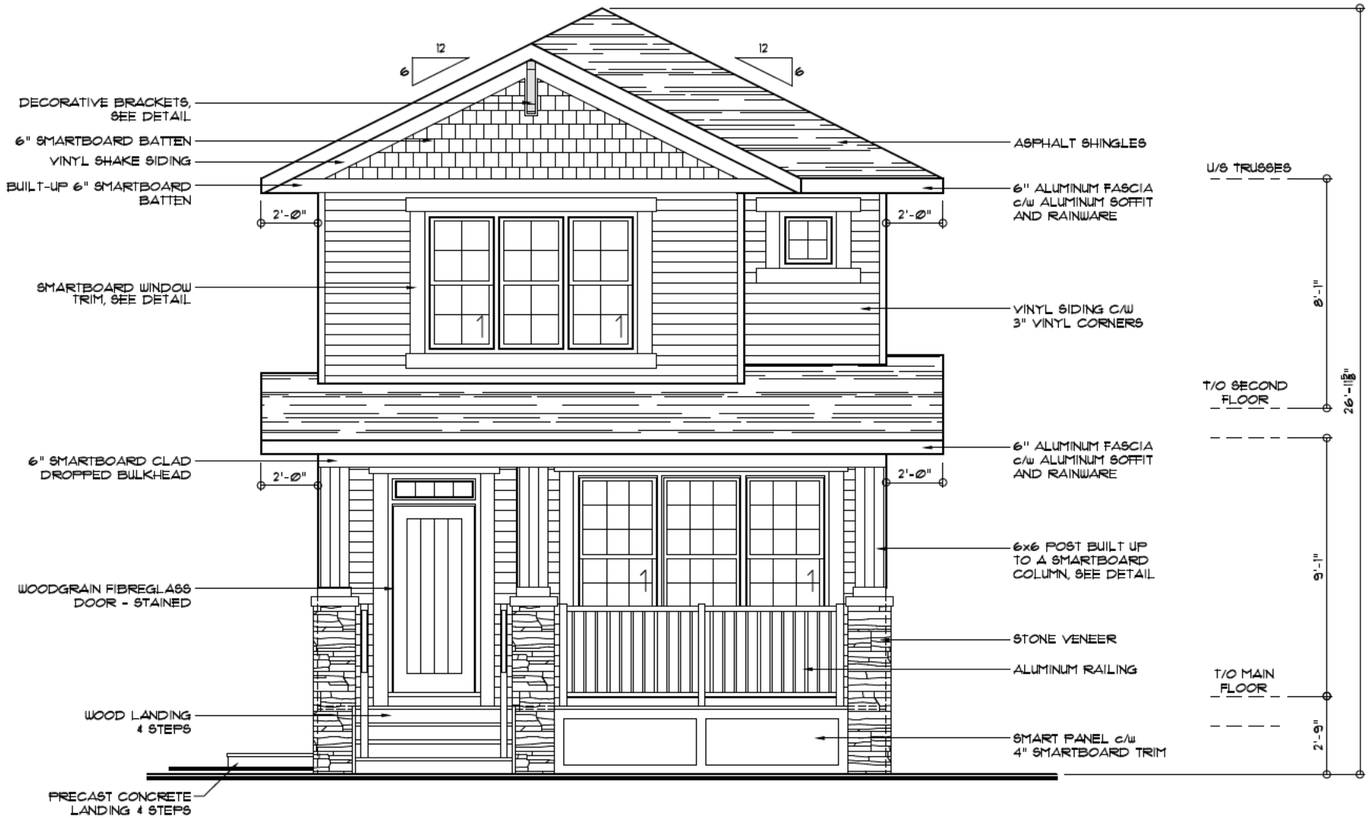

WINDOW TRIM DETAIL

SCALE: 3/16" = 1'-0"




BRACKET DETAIL

SCALE: 3/8" = 1'-0"




FRONT ELEVATION

SCALE: 3/16" = 1'-0"

[redacted]

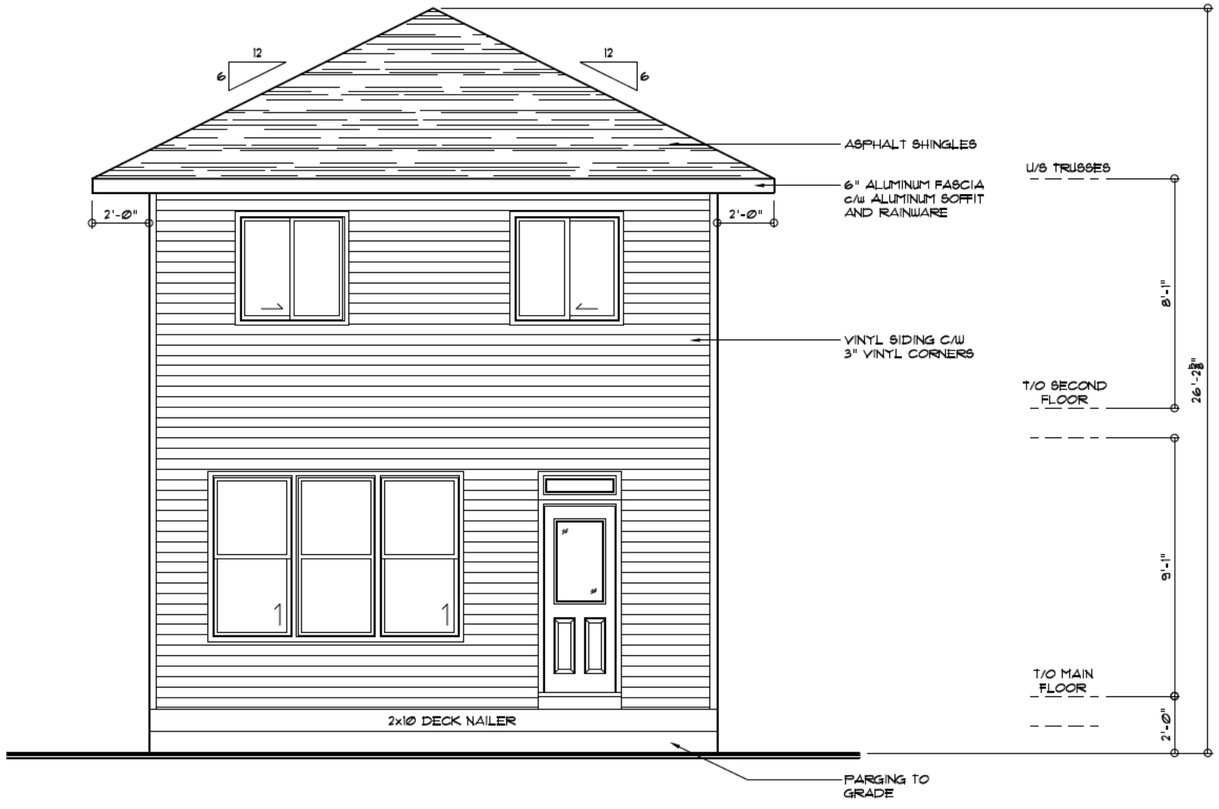
ADDRESS: [redacted]

| | | |
|---|---|---|
| TOTAL AREA: | 1440 | sq.ft. |
| MAIN FLOOR: | 700 | sq.ft. |
| UPPER FLOOR: | 740 | sq.ft. |
| GARAGE: | N/A | sq.ft. |
| BSMNT DEV: | N/A | sq.ft. |
| DECK: | N/A | sq.ft. |

REVISIONS:

MODEL: 2 STOREY

ELEVATION: CRAFTSMAN




[redacted]

ADDRESS: [redacted]

| | | |
|---|---|---|
| TOTAL AREA: | 1440 | sq.ft. |
| MAIN FLOOR: | 700 | sq.ft. |
| UPPER FLOOR: | 740 | sq.ft. |
| GARAGE: | N/A | sq.ft. |
| BSMNT DEV: | N/A | sq.ft. |
| DECK: | N/A | sq.ft. |

REVISIONS:

MODEL: 2 STOREY

ELEVATION: CRAFTSMAN

## UNPROTECTED OPENINGS

| | |
|---|---|
| LIMITING DISTANCE: | 3.08 m |
| ALLOWABLE OPENINGS: | 9.00 % |
| EXPOSED BUILDING FACE: | 743.33 sq.ft. |
| UNPROTECTED OPENINGS: | 46.84 sq.ft. |
| ACTUAL OPENINGS: | 6.30% |


[redacted]

ADDRESS: [redacted]

| | | |
|---|---|---|
| TOTAL AREA: | 1440 | sq.ft. |
| MAIN FLOOR: | 700 | sq.ft. |
| UPPER FLOOR: | 740 | sq.ft. |
| GARAGE: | N/A | sq.ft. |
| BSMNT DEV: | N/A | sq.ft. |
| DECK: | N/A | sq.ft. |

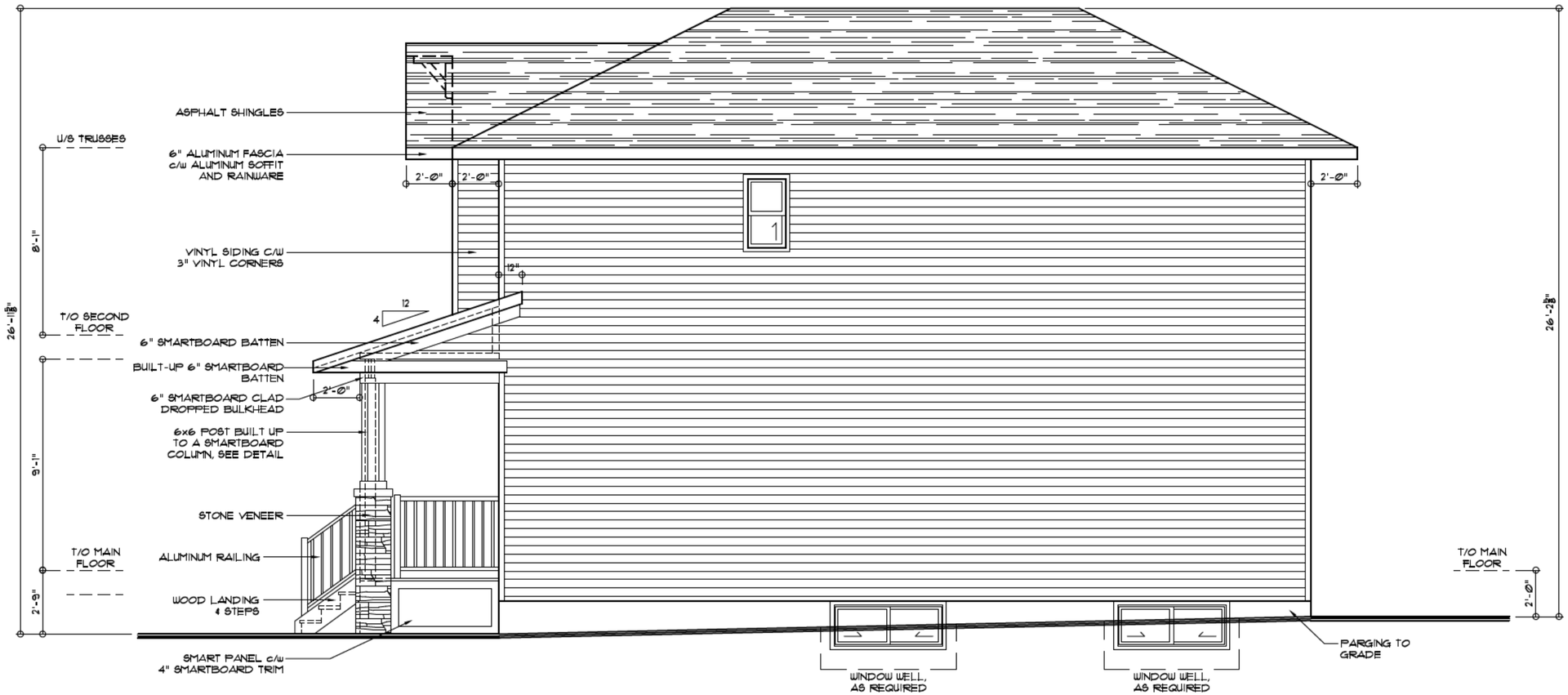
REVISIONS:

MODEL: 2 STOREY

ELEVATION: CRAFTSMAN

## UNPROTECTED OPENINGS

| | |
|---|---|
| LIMITING DISTANCE: | 1.22 m |
| ALLOWABLE OPENINGS: | 7.00 % |
| EXPOSED BUILDING FACE: | 739.05 sq.ft. |
| UNPROTECTED OPENINGS: | 27.50 sq.ft. |
| ACTUAL OPENINGS: | 3.72% |




RIGHT ELEVATION

SCALE: 3/16" = 1'-0"

[redacted]

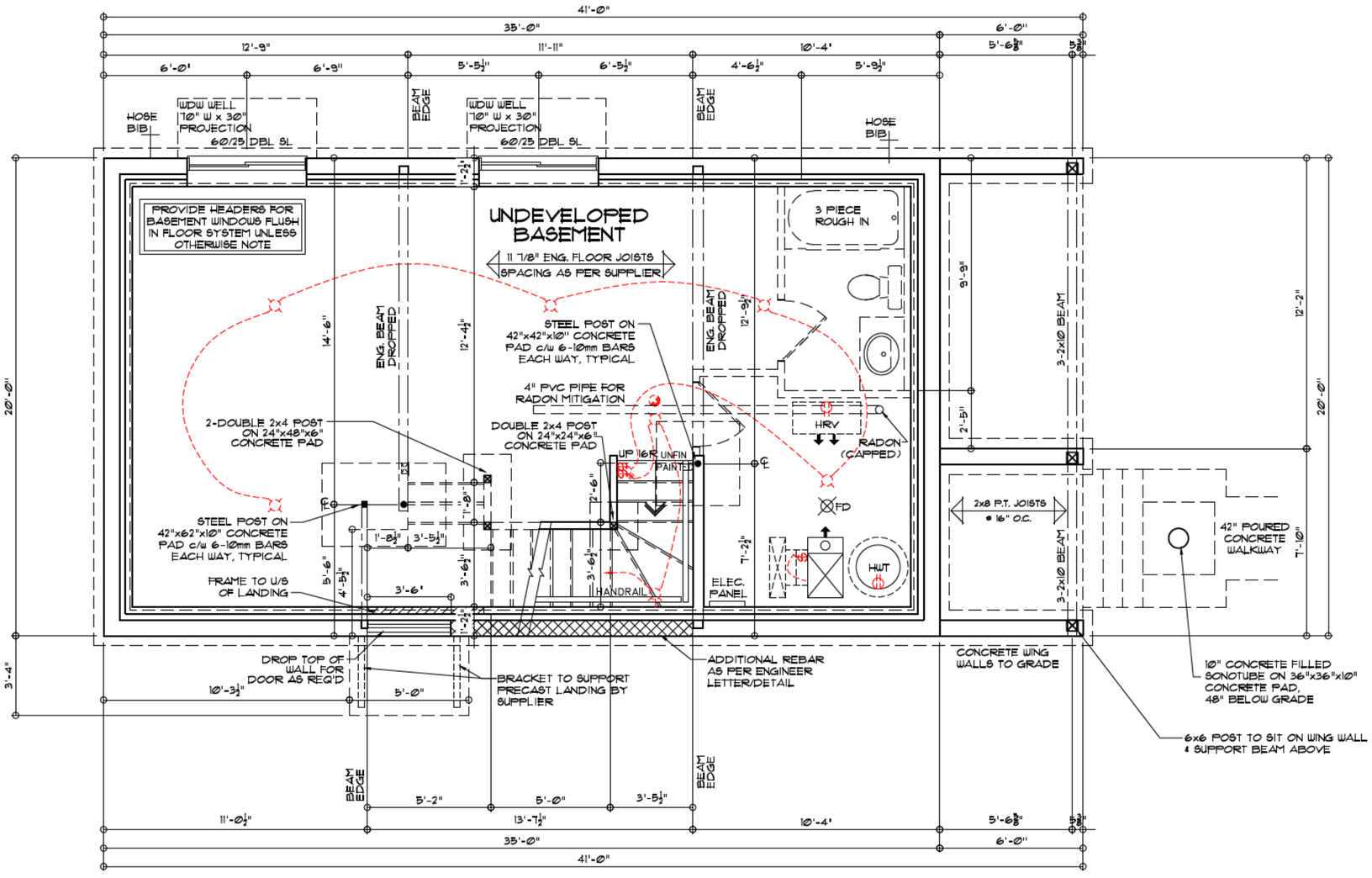
ADDRESS: [redacted]

| | | |
|---|---|---|
| TOTAL AREA: | 1440 | sq.ft. |
| MAIN FLOOR: | 700 | sq.ft. |
| UPPER FLOOR: | 740 | sq.ft. |
| GARAGE: | N/A | sq.ft. |
| BSMNT DEV: | N/A | sq.ft. |
| DECK: | N/A | sq.ft. |

REVISIONS:

MODEL: 2 STOREY

ELEVATION: CRAFTSMAN




## FOUNDATION PLAN

SCALE: 3/16" = 1'-Ø"

STANDARD WALL SCONCE HEIGHT AT LANDING OR RISERS: 6'-8"

[redacted]

ADDRESS: [redacted]

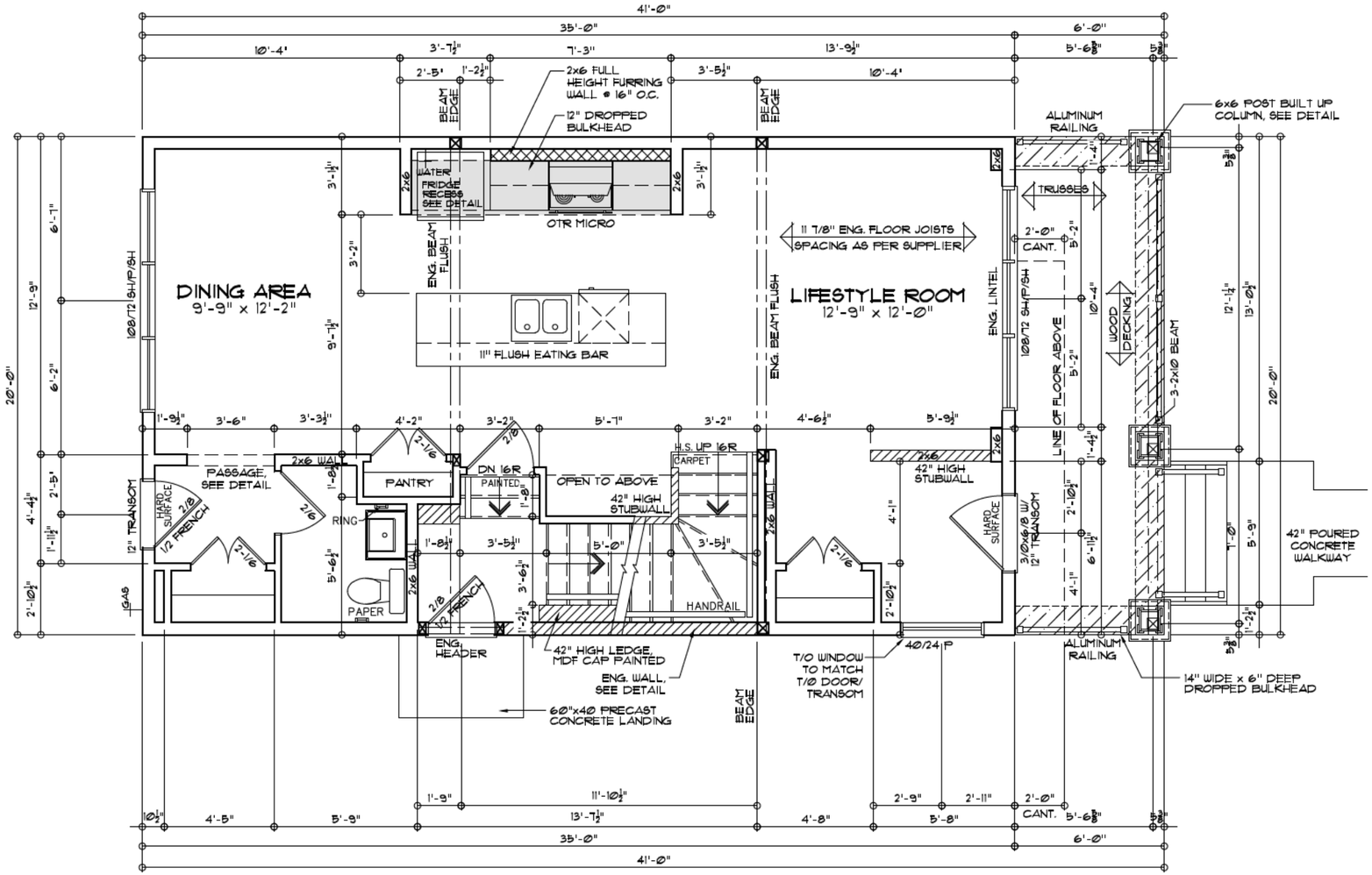
| | | |
|---|---|---|
| TOTAL AREA: | 1440 | sq.ft. |
| MAIN FLOOR: | 700 | sq.ft. |
| UPPER FLOOR: | 740 | sq.ft. |
| GARAGE: | N/A | sq.ft. |
| BSMNT DEV: | N/A | sq.ft. |
| DECK: | N/A | sq.ft. |

REVISIONS:

MODEL: 2 STOREY

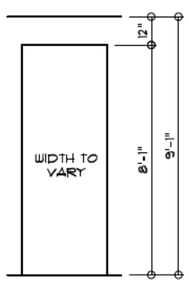
ELEVATION: CRAFTSMAN

NOTE:
MAIN FLOOR WINDOWS
TO BE 7'-11" HIGH UNLESS
OTHERWISE NOTED



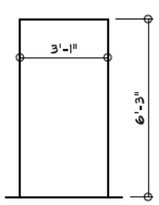

## MAIN FLOOR PLAN

SCALE: 3/16" = 1'-0"




## PASSAGE DETAIL MAIN

SCALE: 3/16" = 1'-0"




NOTE:
DIMENSIONS ARE
TO FINISHED MATERIAL

## FRIDGE RECESS DETAIL

SCALE: 3/16" = 1'-0"

[redacted]

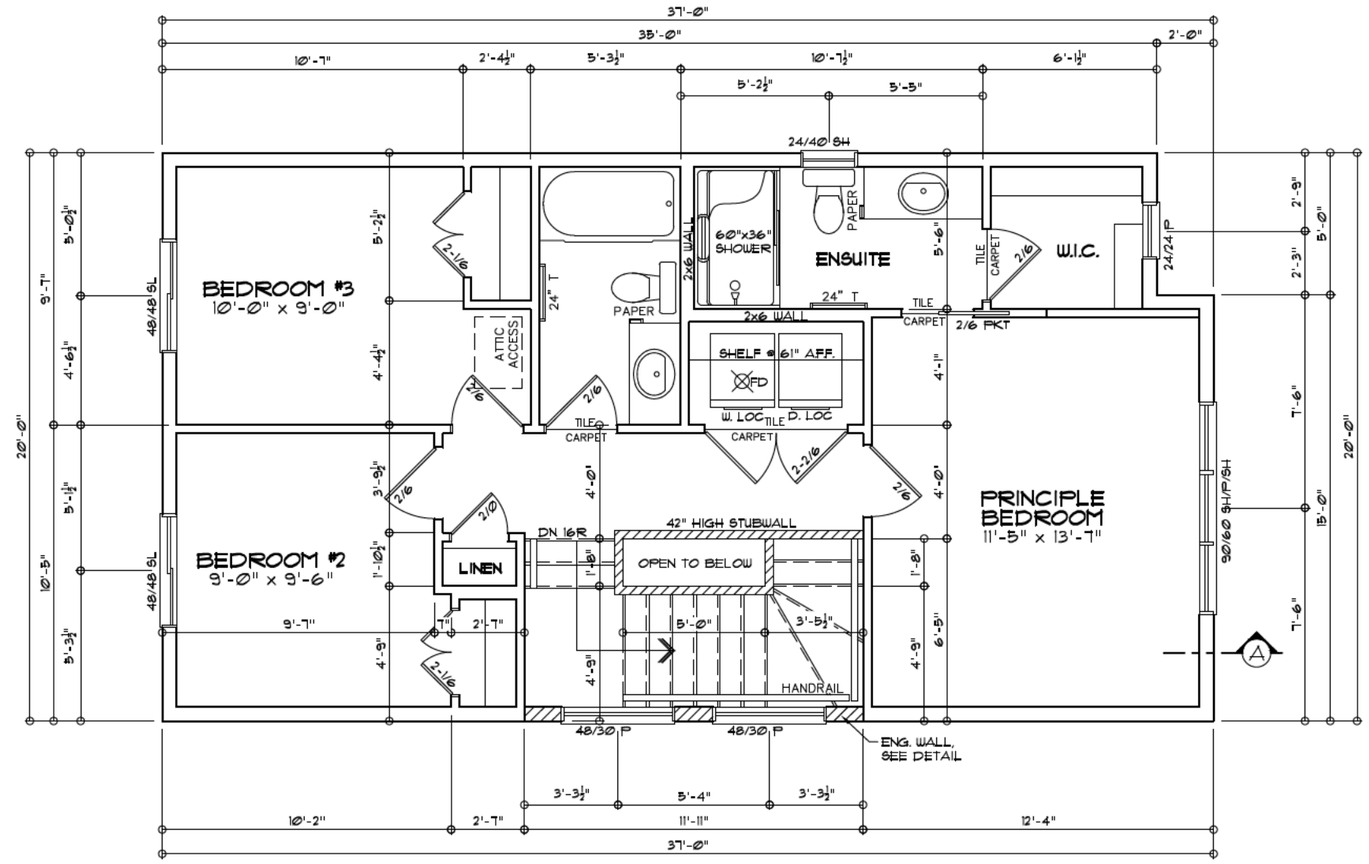
ADDRESS: [redacted]

| | | |
|---|---|---|
| TOTAL AREA: | 1440 | sq.ft. |
| MAIN FLOOR: | 700 | sq.ft. |
| UPPER FLOOR: | 740 | sq.ft. |
| GARAGE: | N/A | sq.ft. |
| BSMNT DEV: | N/A | sq.ft. |
| DECK: | N/A | sq.ft. |

REVISIONS:

MODEL: 2 STOREY
ELEVATION:
CRAFTSMAN

NOTE:
UPPER FLOOR WINDOWS
TO BE 6'-11" HIGH



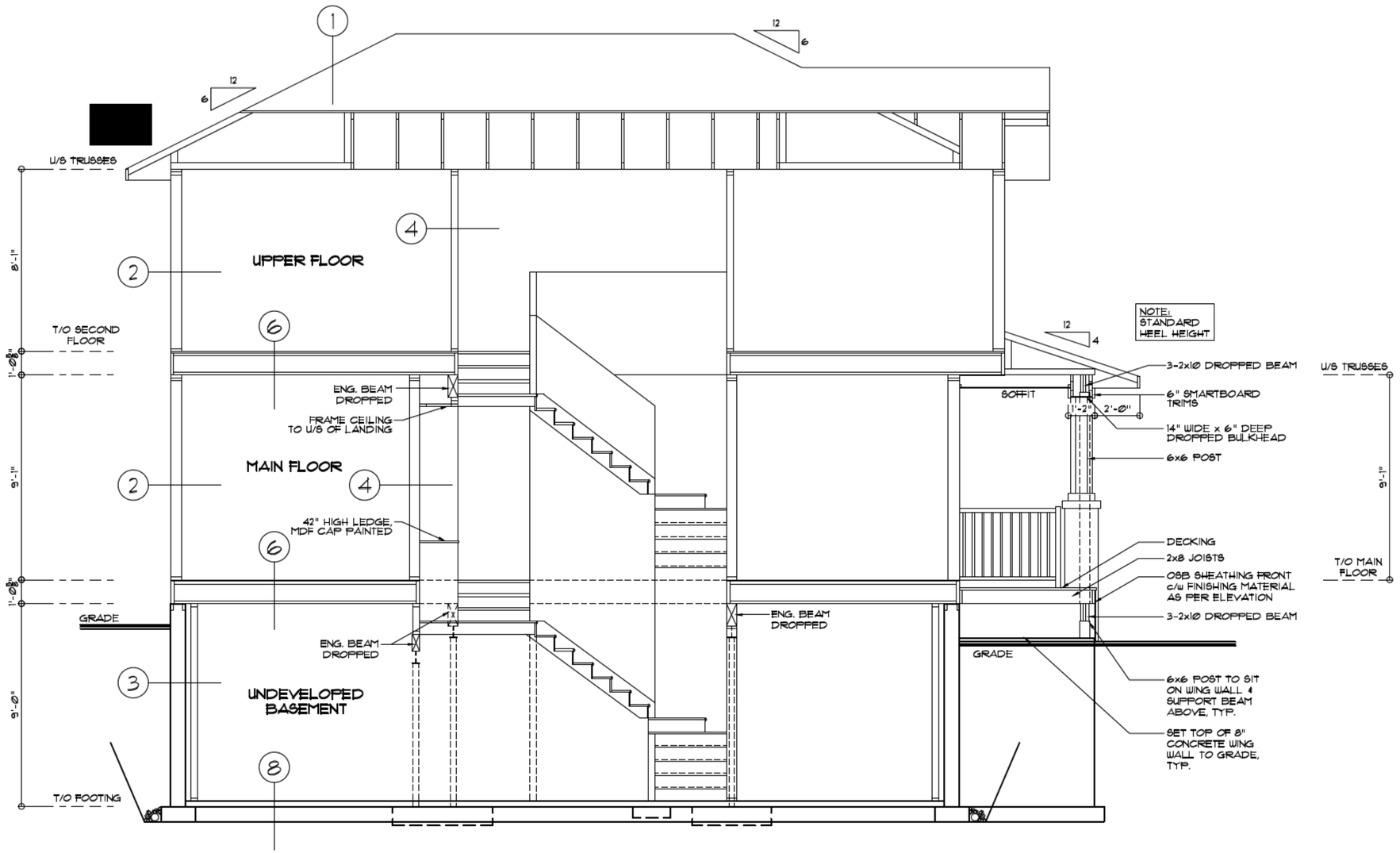

## UPPER FLOOR PLAN

SCALE: 3/16" = 1'-0"

| | | | |
|---|---|---|---|
| [redacted] | ADDRESS: [redacted] | | |
| | TOTAL AREA: 1440 sq.ft.<br>MAIN FLOOR: 700 sq.ft.<br>UPPER FLOOR: 740 sq.ft.<br>GARAGE: N/A sq.ft.<br>BSMNT DEV: N/A sq.ft.<br>DECK: N/A sq.ft. | REVISIONS: | MODEL: 2 STOREY<br>ELEVATION: CRAFTSMAN<br>PAGE 7 OF 10 |

NOTE:
MAIN FLOOR WINDOWS TO BE 7'-11" HIGH UNLESS OTHERWISE NOTED

UPPER FLOOR WINDOWS TO BE 6'-11" HIGH UNLESS OTHERWISE NOTED




## CROSS SECTION A

SCALE: 3/16" = 1'-0"

**GENERAL NOTES**

-ALL CONSTRUCTION TO CONFORM TO CURRENT A.B.C., FIRE CODES AND 9.36 PERFORMANCE ENERGY MODEL DETAILS
-SPECIFICATIONS, CHANGE REQUESTS SHALL OVERRIDE PLANS
-FINAL GRADING AND SITE CONDITIONS MAY VARY EXTERIOR APPEARANCE
-SECTION NOTES ARE GENERAL AND MAY VARY OR NOT APPLY TO ALL PLANS
-ALUMINUM FASCIA AND EAVESTROUGH AS NOTED
-ALUMINUM VENTED SOFFIT ON FRONT AND REAR ELEVATIONS ONLY.
-NON-VENTED ALUMINUM SOFFIT ON SIDE ELEVATIONS
-TRUSS MANUFACTURER TO VERIFY ALL ROOF SLOPES AND TRUSS DESIGN PRIOR TO FABRICATION

LINTEL NOTES:
-ALL EXTERIOR LINTELS TO BE 2-2x10 SPF UNLESS NOTED
-ALL LINTELS OVER 6'-0" MUST HAVE A DOUBLE CRIPPLE
-INSULATE & DRYWALL WALLS WITHIN 4'0" OF FURNACE & HWT
-INSULATE & DRYWALL WALLS ADJACENT TO STAIRS AND LANDING
-INSULATE AND DRYWALL WALLS AT BASEMENT LAUNDRY WHEN APPLICABLE
-ANY DISCREPANCIES TO BE REPORTED TO THE DESIGNER PRIOR TO CONSTRUCTION

[redacted]

ADDRESS: [redacted]

| | | |
|---|---|---|
| TOTAL AREA: | 1440 | sq.ft. |
| MAIN FLOOR: | 700 | sq.ft. |
| UPPER FLOOR: | 740 | sq.ft. |
| GARAGE: | N/A | sq.ft. |
| BSMNT DEV: | N/A | sq.ft. |
| DECK: | N/A | sq.ft. |

REVISIONS:

MODEL: 2 STOREY
ELEVATION: CRAFTSMAN

# Appendix D:

## Wall Assembly Affordability and Constructability Analysis

# Cost per sq/ft of Wall Affordability Analysis

| Assembly | Cost/sqft of Wall | Notes |
|---|---|---|
| **Tier 1 2x6** | **Baseline Cost** | Assembly built with materials commonly used in current residential construction. These include;<br>• Tyvek WRB.<br>• 6 mil poly vapour barrier. |
| **Exterior Mineral Wool Tier 3** | **153%** higher than baseline | Incorporates high-performance building materials at an additional cost. These include;<br>• Siga Majvest WRB (Roughly twice as much per sq/ft coverage of Tyvek).<br>• Siga Majrex vapour barrier (roughly 9x as much per sq/ft coverage of 6 mil poly).<br>• Siga WRB and VB tapes for air sealing.<br><br>Other Additional Costs:<br>• Exterior mineral wool insulation.<br>• Rainscreen material. |
| **Double Stud Net Zero** | **64%** higher than baseline | Incorporates a combination of more commonly used construction materials and high-performance building materials at an additional cost. These include;<br>• Typar WRB (similar in price to Tyvek).<br>• Siga Majrex vapour barrier (roughly 9x as much per sq/ft coverage of 6 mil poly).<br>• Siga VB tapes for air sealing.<br><br>Other Additional Costs:<br>• Framing of 2 walls.<br>• Additional insulation to fill wall cavity. |
| **Exterior Foam Net Zero** | **465%** higher than baseline | Incorpotates high-performance building materials at an additional cost. These include;<br>• Soprema Sopraseal Stick WRB (Roughly 11x as much per sq/ft coverage of Tyvek).<br>•Soprema sill flashing.<br><br>Other Additional Costs:<br>• Exterior XPS insulation.<br>• Rainscreen material.<br>• Fasteners for screwing through a large amount of insulation. |
| **Fire Resistant Retrofit** | **206%** higher than baseline | Incorporates high-performance building materials at an additional cost. These include;<br>• ProClima Mento WRB (Roughly 3x as much per sq/ft coverage of Tyvek.<br>• ProClima tapes for air sealing.<br><br>Other Additional Costs:<br>• Exterior mineral wool insulation.<br>• Rainscreen material.<br>• Thermal Clips. |
| **Larsen Truss Retrofit** | **165%** higher than baseline | Incorporates common building materials similar to the baseline home;<br>• Typar WRB (similar cost as Tyvek).<br><br>Additional Costs:<br>• Framing material for the Larsen Truss.<br>• Rainscreen material.<br>• WRB tape for air sealing.<br>• Insulation for Larsen Truss cavity.<br>• Soprema liquid applied membrane for window bucks and air sealing. |

*• No monetary value has been noted as there are many variables that could impact the comparability of these costs.*
*• This chart is a direct comparison of the cost of the material to construct* ***ONLY*** *the wall assembly of the model home.*
*• This chart only compares the materials selected for each physical mock-up. It cannot be considered a 1 to 1 comparison as different materials selected have different costs, possibly resulting in inflated prices for certain assemblies.*

# Constructability Analysis

| Assembly | Material Availability | Difficulties/Issues | Constructability Rating (1-5) |
|---|---|---|---|
| **Tier 1 2x6** | • All material used was available at common hardware/construction material supply stores.<br>• Material was all readily available as this is a commonly built assembly across Alberta. | • Accoustical sealant can be messy and inconsistent. | **1**<br>**Baseline**<br>•Easiest to construct. |
| **Exterior Mineral Wool Tier 3** | • Framing and cavity insulation materials were readily available at common hardware/material supply stores.<br>• SIGA WRB, VB and tapes was not readily available and needed to be ordered in. This required a small lead time.<br>• Exterior mineral wool insulation was not readily available and needed to be ordered. This required a significant lead time.<br>• Rainscreen framing material and fasteners were readily available at common stores.<br>• Custom made flashing was required. GBTAC made these on site with the use of a Break. If GBTAC did not have this tool, this material would need to be custom ordered. | • WRB was the air control layer, so ensuring continuous membrane behind flashings and penetrations increased the difficulty of installing the WRB.<br>• Ensuring the screws that hold on the rainscreen strapping properly embed in a structural member of the wall.<br>• Ensuring proper flashing installation and detailing around the window.<br>• Custom exterior window trim detail was required.<br>• Order of operations for the framer. WRB membrane was required to transfer into the interior at the roof so as to transfer the air control layer to the underside of the roof ceiling. | **2.5**<br>• Relatively simple to construct.<br>• Exterior insulation is the major change from the baseline that makes it more difficult |
| **Double Stud Net Zero** | • All materials used in this assembly were readily available at common hardware/material supply stores aside from the VB.<br>• VB and tapes was not readily available and needed to be ordered in. This required a small lead time. | • Double walls could be heavy and difficult to move around.<br>• Custom window jambs are required to be made to cover the large window rough opening to the interior of the window.<br>• Order of operation for the framer. VB needs to be wrapped under the plates of the walls before the walls are installed.<br>• Proper installation of the 3 layers of insulation in the cavity to ensure there is no settlement. | **2**<br>• Simple Construction .<br>• Not to dissimilar to the baseline with adding a second wall and extra insulation increasing the difficulty. |
| **Exterior Foam Net Zero** | • Framing material readily available at common hardware/material supply stores.<br>• WRB was not readily available and needed to be ordered in. This required a small lead time.<br>• XPS and fasteners were readily available at some material supply stores, but had the possibility to need to be ordered in with a small lead time.<br>• Custom flashing needed to be made. This was made onsite with a break, otherwise this would have been needed to be ordered from a supplier. | • WRB was the air control layer, so ensuring continuous membrane behind flashings and penetrations increased the difficulty of installing the WRB.<br>• Ensuring the screws that hold on the rainscreen strapping properly embed in a structural member of the wall.<br>• Ensuring proper flashing installation and detailing around the window.<br>• Custom exterior window trim detail was required.<br>• Installing through flashing in the correct spot at the wall proved difficult.<br>• Peel and stick membrane required at least 2 workers to install as it was difficult to remove the backing without adhering the membrane to itself. | **5**<br>• Most difficult to construct.<br>• Long screws and the amount of exterior insulation made this assembly difficult to construct. |
| **Fire Resistant Retrofit** | • ProClima WRB and tapes wer not readily available and needed to be ordered in. This required a small lead time.<br>• Exterior mineral wool insulation was not readily available and needed to be ordered. This required a significant lead time.<br>• Rainscreen framing material and fasteners were readily available at common stores.<br>• Custom made flashing was required. GBTAC made these on site with the use of a Break. If GBTAC did not have this tool, this material would need to be custom ordered.<br>• Soprema thermal clips had to be ordered in with minimal lead time. | • Attaching the rainscreen strapping to the metal thermal clips proved quite difficult at times. | **3**<br>• Somewhat difficult to construct.<br>• If good screws are used that screw into the metal thermal clips well, the construction would be slightly easier. |
| **Larsen Truss Retrofit** | • All framing material and the WRB material was readily available at common hardware/material supply stores.<br>• Dense pack cellulose needed to be installed by a professional installer. Lead time for booking the installer was required.<br>• Liquid applied membrane for window bucks was required to be ordered in with a small lead time. | • Installing the liquid applied membrane could not be done at a lower temperature. | **2.5**<br>• Relatively simple to construct.<br>• Amount of labour and correct installation of the Larsen Truss raises the difficulty. |

*• Constructability values are based on the previous experience of the GTAC Staff and conversations with industry*

# Double Stud Wall Net Zero Assembly


24
16


IN CASE OF
EMERGENCY
CALL 911


FIRST AID
STATION INSIDE
FIRE
EXTINGUISHER
EYEWASH
STATION


Blueskin. BUTYL FLASH
Blueskin. BUTYL FLASH
Blueskin. BUTYL FLASH


BRING ON THE ELEMENTS.


TYPAR
BRING ON THE ELEMENTS.


Caution
Do NOT climb or stand on the Wall displays
Beware of SHARP Edges and Splinters
These are real examples of walls and have all the pointy bits associated
Thank you
enbix
Blueskin BUTYL FLASH
Blueskin BUTYL FLASH
Blueskin BUTYL FLASH

MADE IN CANADA


SIGA-Majrex
Unbedruckte Seite zur Dämmung
Blank side facing the insulation
Face non imprimée dirigée vers l'isolation