

Simply put, the Team OptiMN “IMPACT Home” ...

... Looks Good, Works Great,  
**AND is Affordable, too!**

Which means anyone can build a  
Zero Energy Ready Home.

Our team and the Cold Climate Housing Program continue to work with Urban Homeworks and Green Homes North in the hopes that they can build the “IMPACT Home” soon.



# SO WHAT ABOUT EXISTING HOMES?

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- Exterior insulation provides a more robust approach to:
  - maximize insulation continuity,
  - improve water management,
  - enhance air tightness, and
  - reduce condensation potential.
- You can have your cake and eat it, too!
  - increase energy efficiency
  - while enhancing building durability

# ETTMS: APPLICATION TO RETROFIT

- Moving Exterior Insulation to Existing Homes
  - Potential application to existing homes
  - Most work can be completed from the outside
  - However, you must take care of mechanicals
    - sealed combustion
    - mechanical ventilation
    - pressure management
  - Current focus on 1-1/2 story houses

# ETTMS: APPLICATION TO RETROFIT

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- Low Hanging Fruit
  - Simple house shapes with limited overhangs
  - Homes with good exterior access
    - detached garages with limited patios and decks
  - Homes with nice interior finishes
  - Homes in need of
    - siding, roof, and windows

# BEST OF NORTHERNSTAR

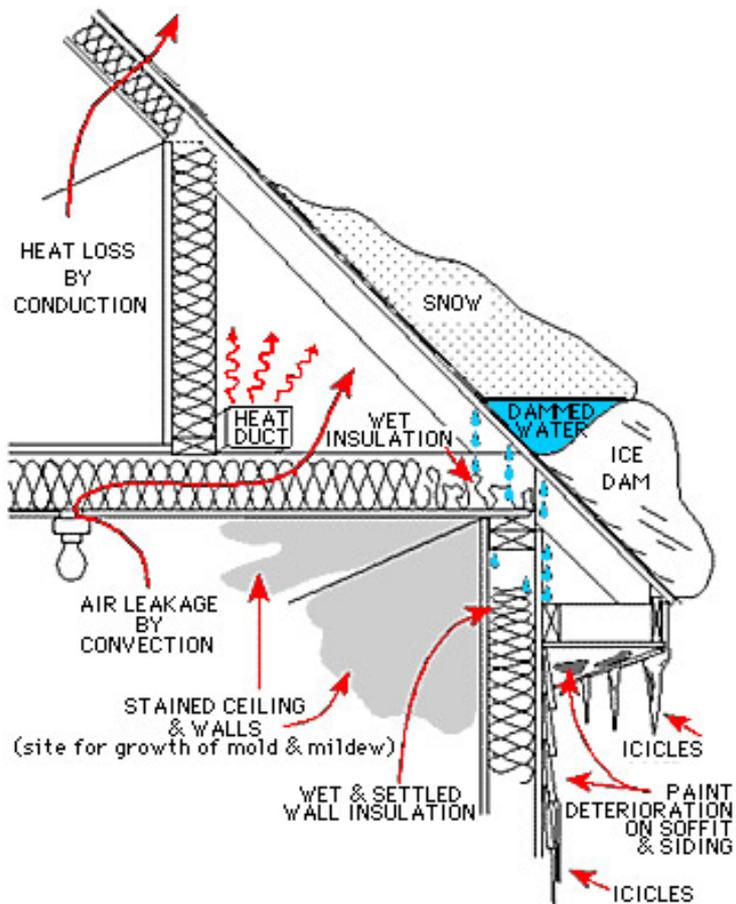
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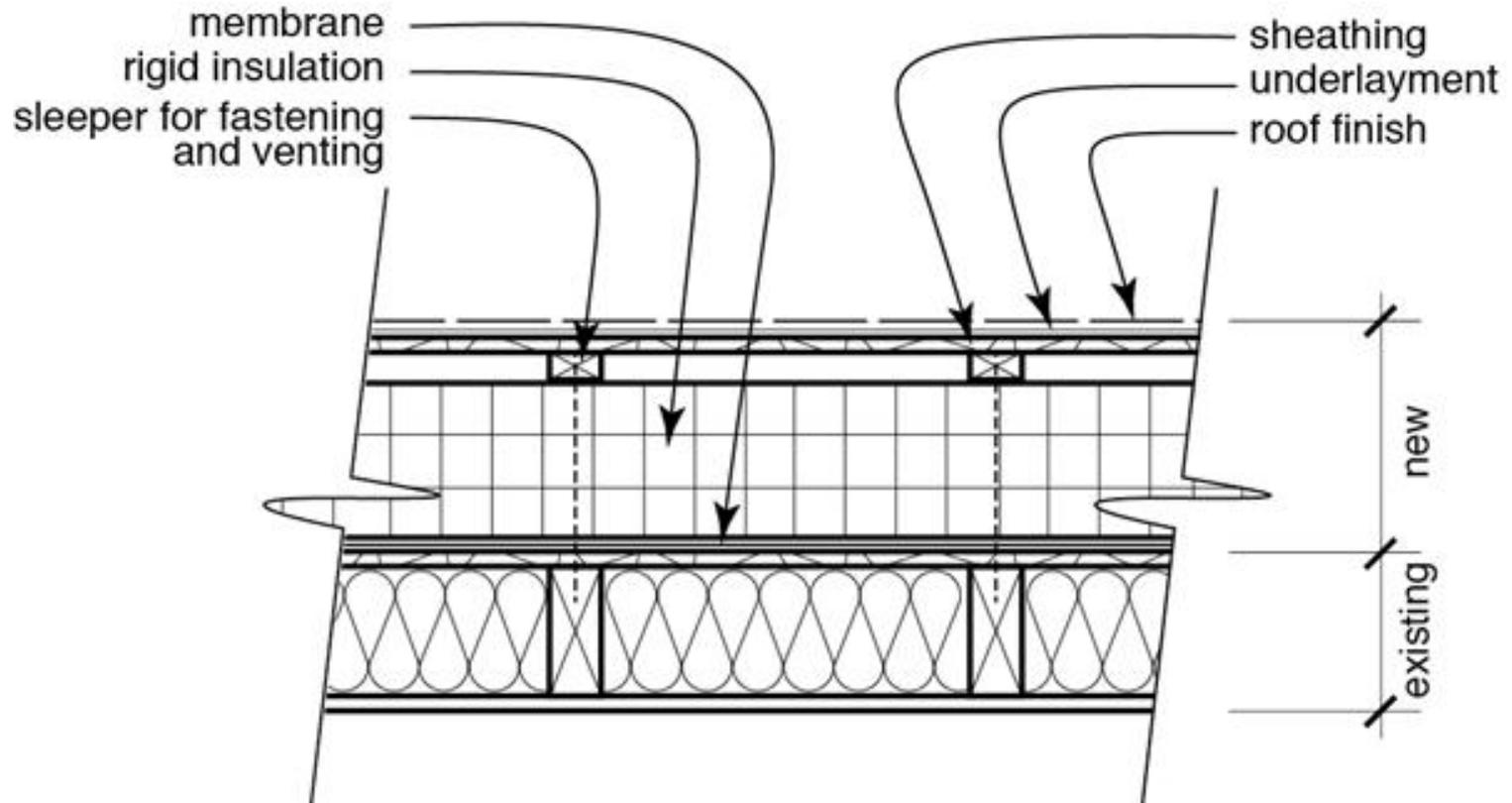
# BEST OF NORTHERNSTAR

- Work with a non-profit, affordable housing provider
  - Identify a classic 1-1/2 story house slated for renovation
- Demonstrate NorthernSTAR “capstone innovations”
  - “Excavationless” exterior foundation insulation
  - “Project Overcoat” for the roof
    - and walls, too (if appropriate and applicable)
  - Integrated space and water heating system
    - with source point ventilation
- Facilitate house tours and training opportunities
  - Before, during, and after the installations

# ANATOMY OF AN ICE DAM



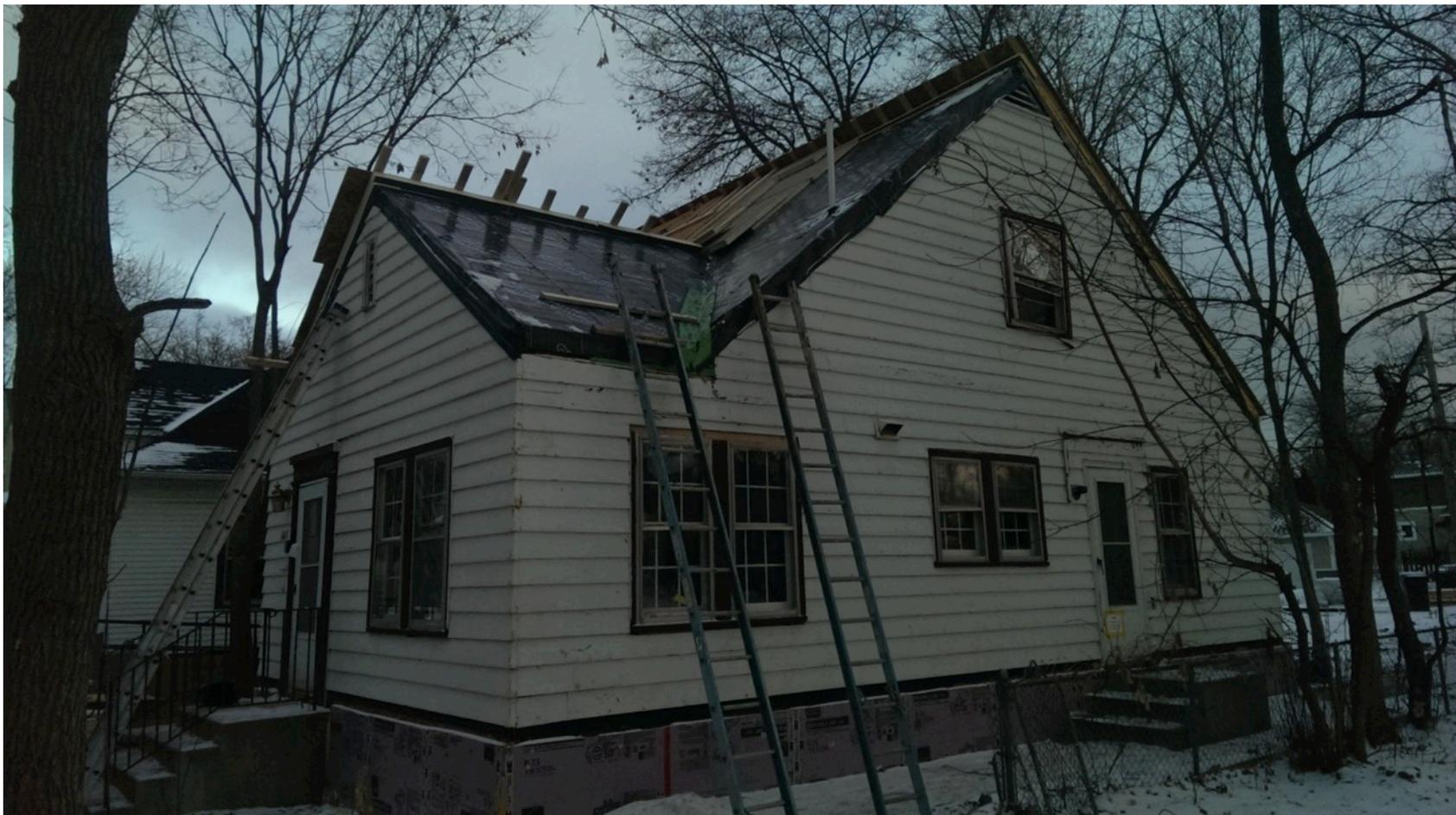
# EXTERIOR INSULATION STRATEGIES



# “PROJECT OVERCOAT”

- Remove existing roofing, overhang and trim
- Add “peel & stick” membrane
  - wrapped over bottom and sides
- Seal top plates and insulate gables
- Add 2 layers of polyiso rigid board foam
  - Staggered in both directions
- 2x4 furring with OSB, shingles & ridge vent
  - Build out overhang & finish trim

































# DUCTWORK IN ATTICS OR FLOORS OVER UNCONDITIONED SPACE

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- What if the ductwork breaks through the air control and vapor control layer?
- Unless the duct is absolutely air and vapor tight, you must reconfigure the control layers ...
  - and the air and vapor control layers must be outside of the ductwork.

# FINAL NOTES & CAUTIONS

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- High performance houses require new enclosure strategies and systems:
  - Higher insulation levels
  - Improved water, air, and vapor control layers
  - Better drying strategies
  - More robust delivery systems

# FINAL NOTES & CAUTIONS

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- High performance enclosures require:
  - Integrated systems approach to low-load HVAC+DHW
  - Increased attention to indoor air quality
    - Source control
    - Ventilation
    - Distribution
  - Improved make-up air solutions

# NEW PARTNERS

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- Home Energy Raters
- Home Performance Consultants
- Other Resources
  - Building America

# BUILDING AMERICA RESOURCES

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- General Energy Information (EERE)
- Top Innovations “Hall of Fame”
- Building America Solution Center
- DOE Zero Energy Ready Home

# World-Class Research...

Building America Solution Center  
[BASC.energy.gov](http://BASC.energy.gov)



...At Your  
Fingertips



- Discussion & Questions

## Contact Information

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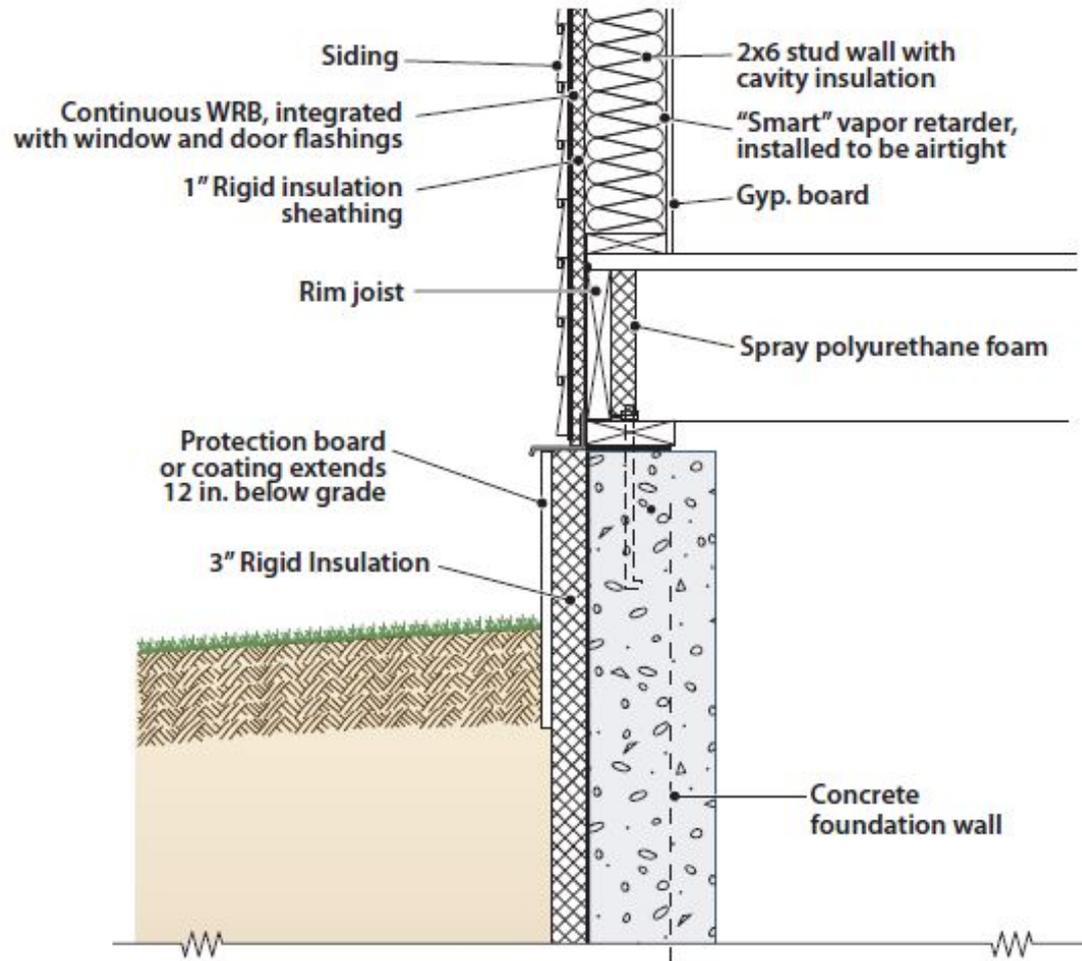
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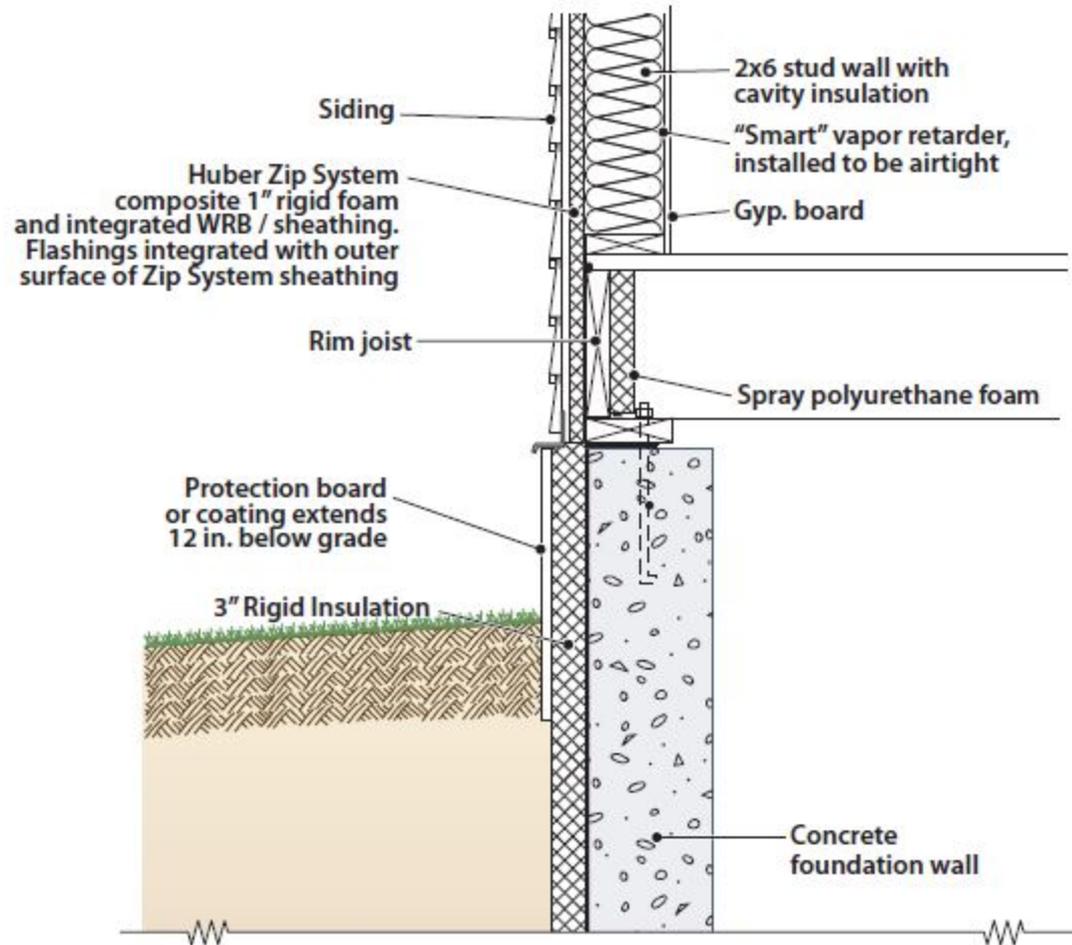
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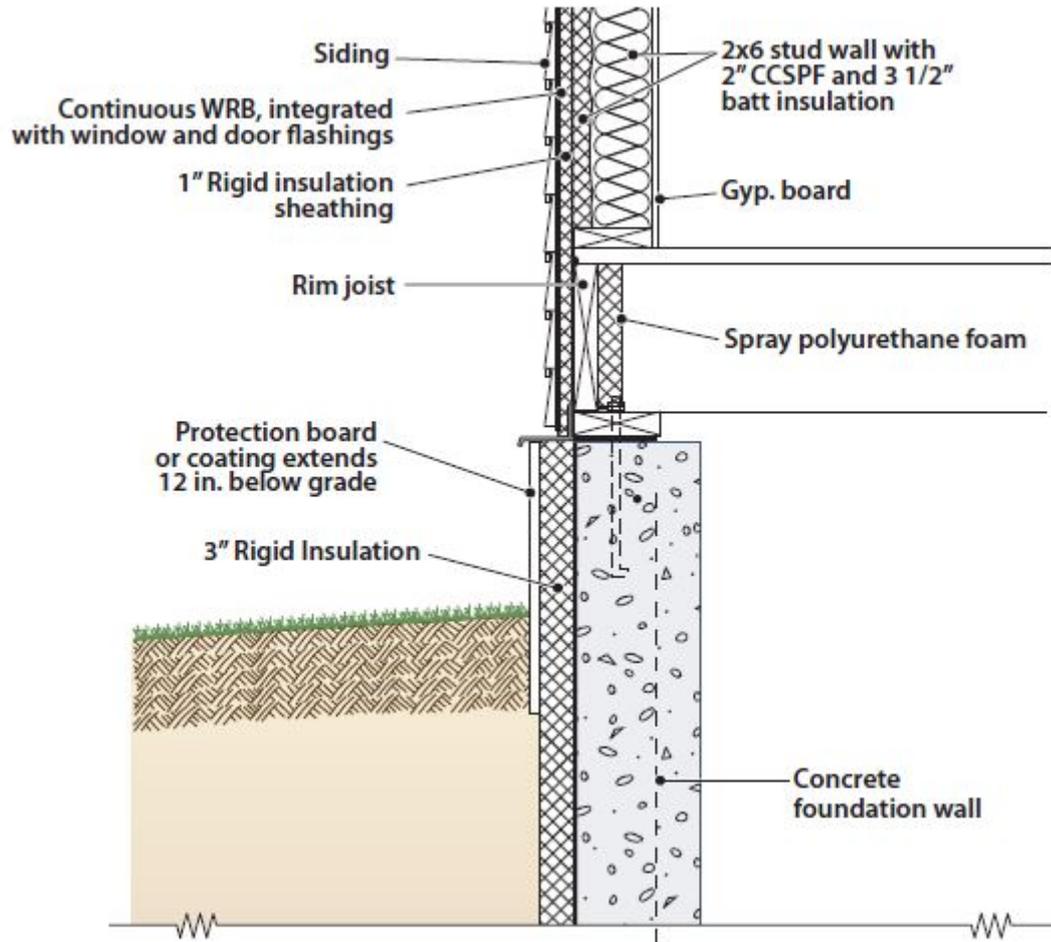
# CONTROL LAYERS – EXAMPLE 1



# CONTROL LAYERS – EXAMPLE 2



# CONTROL LAYERS – EXAMPLE 3



# CONTROL LAYERS – EXAMPLE 4

