Homework 3A:

Large Scale Section Details Through Envelope

Background

In Chapter 1 of "Time-Saver Details for Exterior Wall Design" Fred Nashed advises:

"Understanding the rational behind the arrangement of components that comprise a wall assembly helps fhte designer to detail the means of protetion properly. Items such as air barriers, vapor retardes, dampproofing, waterproofing, sealants, and sealers are representatives of these components."

Nashed goes on to say in Chapter 5:

"Proper detailing of a wall system can spell the difference between a long-lasting, trouble-free wall and a leaky, drafty, short-lived one."

Resources

1. The reading from homework 2A is also relevant for this homework: http://www.johnpilling.net/Designing_Details/Summary_files/Design-Strategies-for%20Moisture-Control.pdf
2. An outline on the website summarizing Nashed's thoughts on the forces of nature affecting envelope design is also useful: http://www.johnpilling.net/Designing_Details/Summary_files/E-Nashed-notes-web.pdf
3. Another useful summary is the Whole Building Design Guide's commentary on wall systems: http://www.wbdg.org/design/env_wall.php
4. Chapter 5 of "Time-Saver Details for Exterior Wall Design" describes a process for designing and drawing wall sections. It is on electronic reserve at the BAC library.
5. Resources such as Sweets or ARCAT, both available through pointers on the website find manufactured products for the following components in your envelope design
   - Window and associated brick mould
   - Air Barrier
   - Insulation Products

Research Work

1. Become familiar with the information in the sets of resource materials
2. Building on your 1/2 inch scale exploration of the entire building envelope, propose a strategy for this window detail.

Question to Answer:

Select specific building products to be documented in your envelope design

1. - Window and associated brick mould
2. - Air Barrier
3. - Insulation Products

Document your compliance with thermal conductance requirements for your envelope

Study Chapter 13 of the State Building Code for minimum performance for your building envelope regarding thermal conductance

Propose your solution, based on your selection of insulation products, for meeting Passivhaus goals.

Account for the effects of precipitation and other forces of nature on a building envelope

Study either Nashed's 'Forces of Nature' - summarized as an outline available on the website or Whole Building Design Guide's commentary on wall systems - http://www.wbdg.org/design/env_wall.php. Using copies your section details developed in the drawing work for this exercise, apply hand drawing graphics that point out how your design mitigates the effects of moisture and air in your building envelope. Pay attention to the following subjects:

1 - wind force
2 - gravity
3 - kinetic energy
4 - surface tension
5 - capillary action

Drawing Work

Look at Building Envelope In Detail

Continue to sketch out a coordinated set of envelope details

Use the materials from the handouts, web site, and study of typical details at Mass.gov website about building envelopes:

Incorporate the information you generated from your research about building products and their thermal conductance

Design the detail of head / jamb / sill at a window on the south side wall of the building at a scale of 1-1/2" = 1'-0"

Criteria for marking this homework:

General Criteria

This Homework counts as 10% of your marking for the course
Homework will be marked from '4' to '0.'
Answers to questions count as 1/2 of the mark for the homework
Drawings designed count as 1/2 of the mark for the homework

Criteria for Answers to questions

General: The response to this question is written, criteria are based on recommendations from 'Understanding by Design,' page 175

Requirements for a mark of '4' - "A clear, well developed [explanation] that deals in a sophisticated fashion with [key] components of the question.

Requirements for a mark of '3' - "Clear, developed [explanation] that deals with [key [components of the question]]."

Requirements for a mark of '2' - General [explanation] responding to all components superficially."

Requirements for a mark of '0' - "Little or no analysis."

Criteria for quality of drawings

General:

Drawings are evaluated in terms of completeness, accuracy, and legibility

Requirements for a mark of '4' -

Work product capable of being incorporated into a project using building information management.

Requirements for a mark of '3' -

Work product could be submitted to a plans examiner. Criteria are as described by Liebling (Wiley, publisher) - BAC library reference: http://library.the-bac.edu/vwebv/holdingsInfo?bibId=5814 and in material provided in class web site.

Requirements for a mark of '2' -

Work product could be used to present an idea to a job captain

Requirements for a mark of '0' - Minimal drawing