



MORRISON HERSHFIELD

SFU SE3P: SFU's New Engineering Building

A case study of durability and resiliency using insulated precast concrete panels

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SFU's Sustainable Energy and Engineering Building



Photo Courtesy: Revery Architecture

SFU SE3P: Design Inspiration

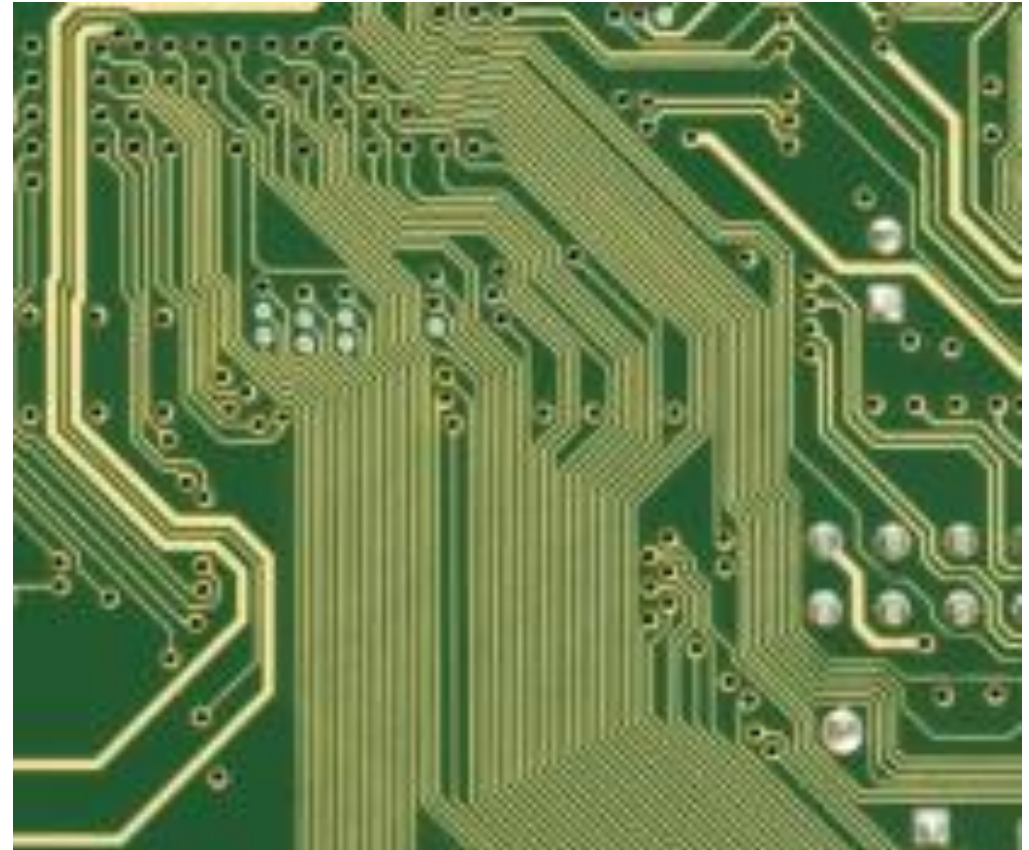


Photo Courtesy: Revery Architecture

Lecture Hall

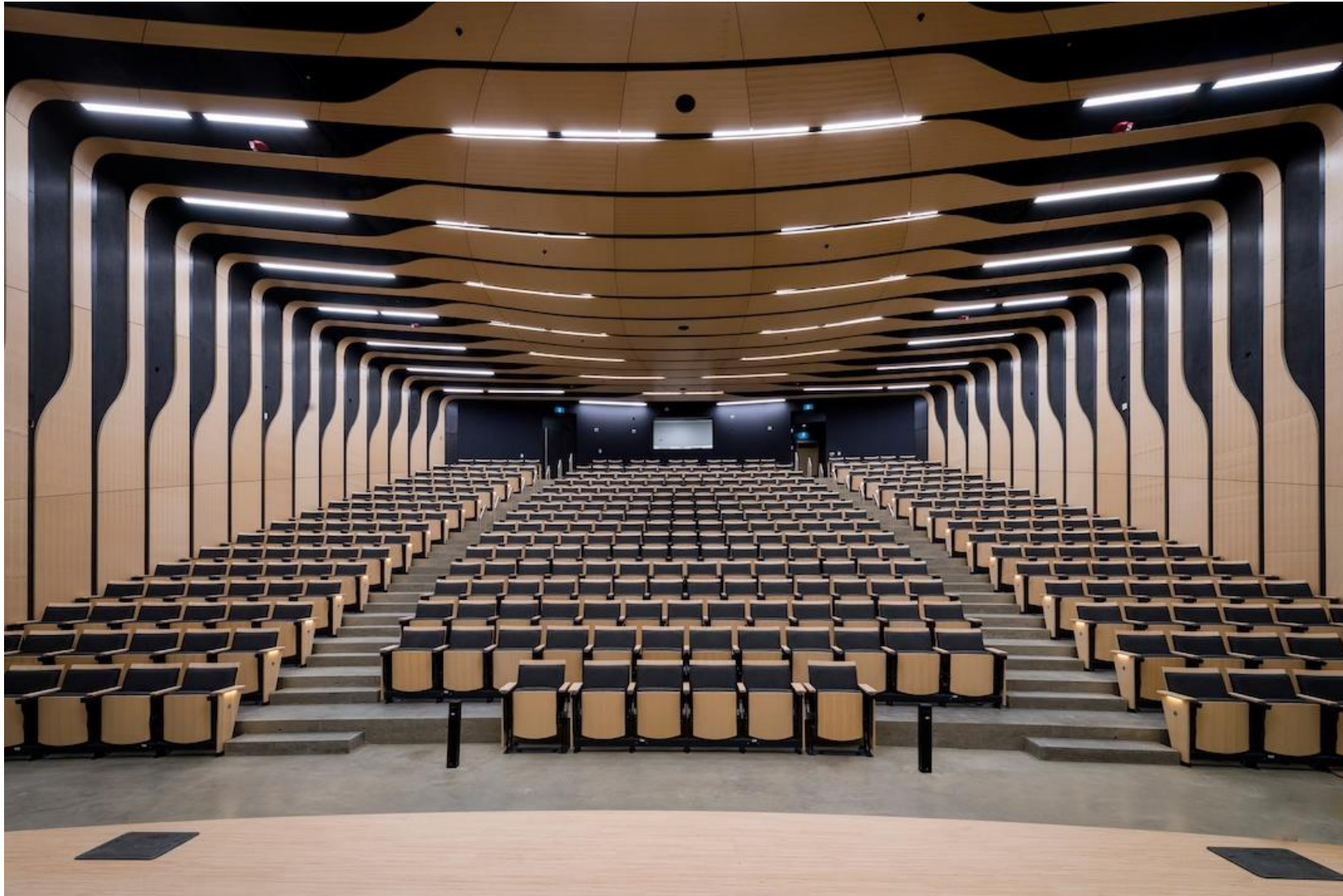


Photo Courtesy: Kenneth Chan, Vancouver Urbanized

Roof



Pre-Construction Challenges

- SFU's Requirements:
 - High performance
 - Durable
 - Sustainable building
 - Low maintenance
 - Expedited schedule
- The answer?
 - Prefabricated assemblies.
- Overlapped design and construction phases.

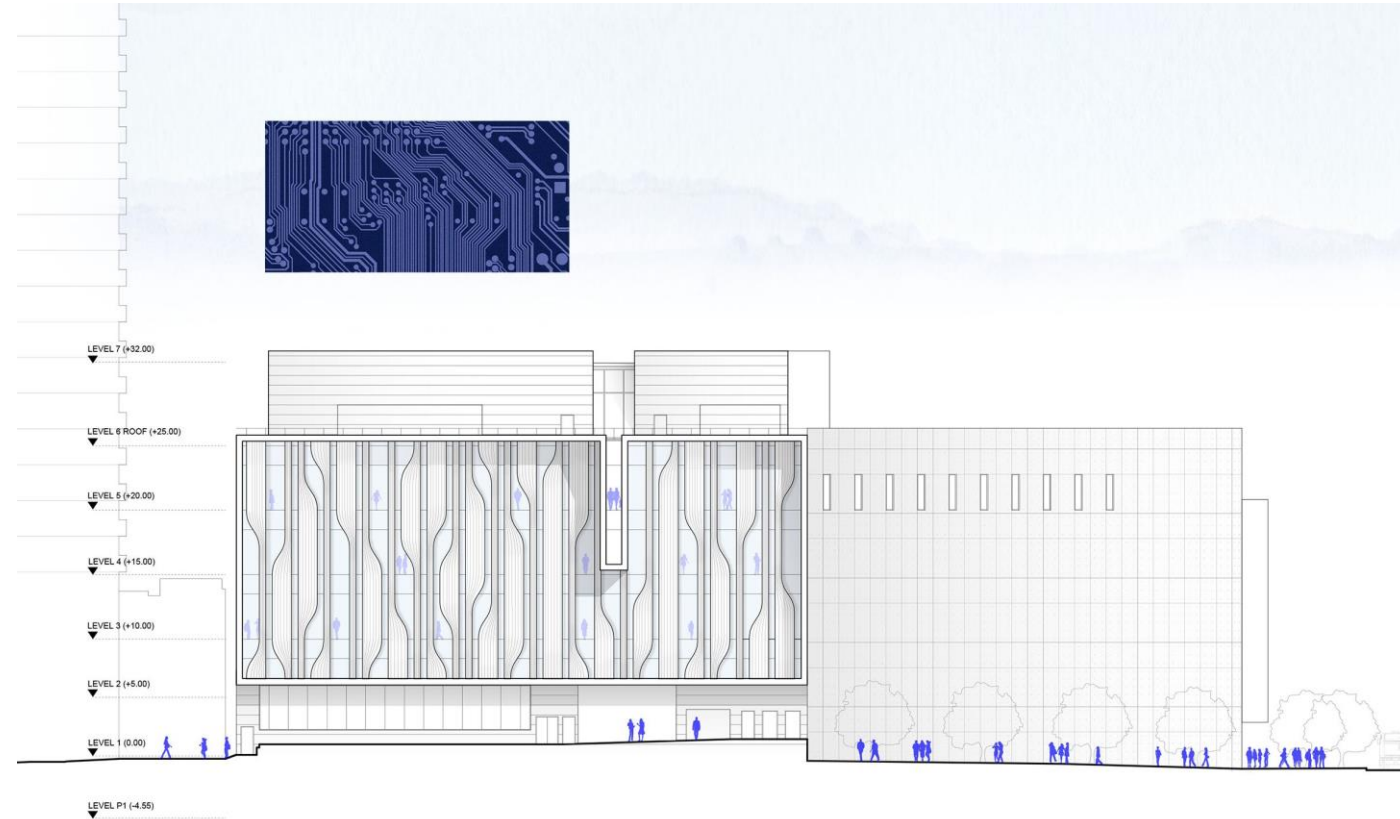


Photo Courtesy: Revery Architecture

Advantages/Disadvantages/Challenges

ADVANTAGES

- Pre-assembled system:
- Design Versatility
- Low Maintenance
- Redundant
- Durable
- Non-combustible
- Energy Efficient

DISADVANTAGES / CHALLENGES

- Weight and handling
- Modification/Repair due to damage
- Transportation
- Structural Tolerances and Connections
- Sequencing

Precast Sandwich Panels: An Assembly

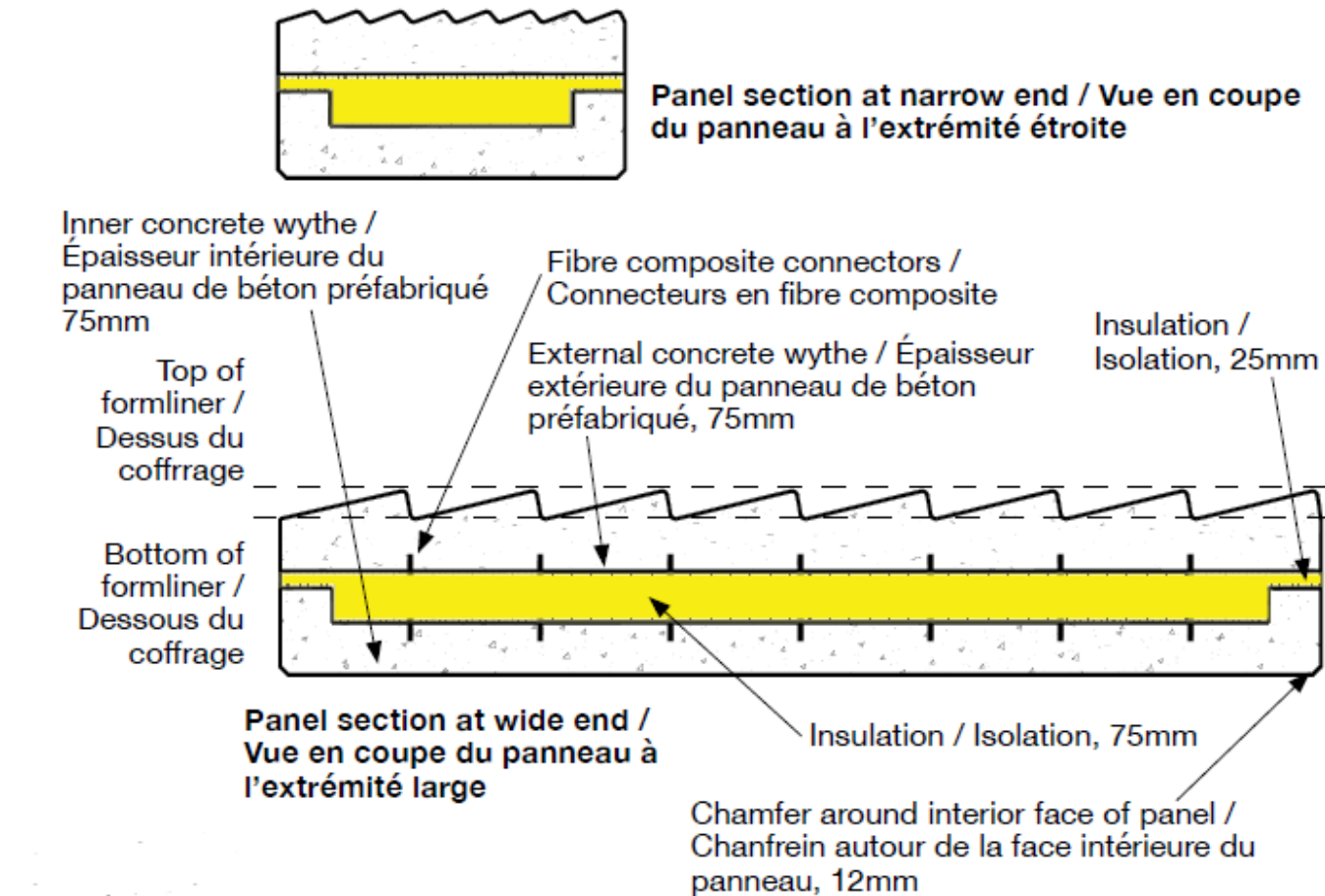


Image Courtesy: CPCI

**Section: Insulated precast concrete external panels /
Vue en coupe: Panneaux extérieurs isolés en béton préfabriqué**

Resources

CMHC – Architectural Precast Concrete Walls - Best Practice Guide

National Precast Concrete Association (US)

www.precast.org

Precast Concrete Institute (PCI)

www.pci.org

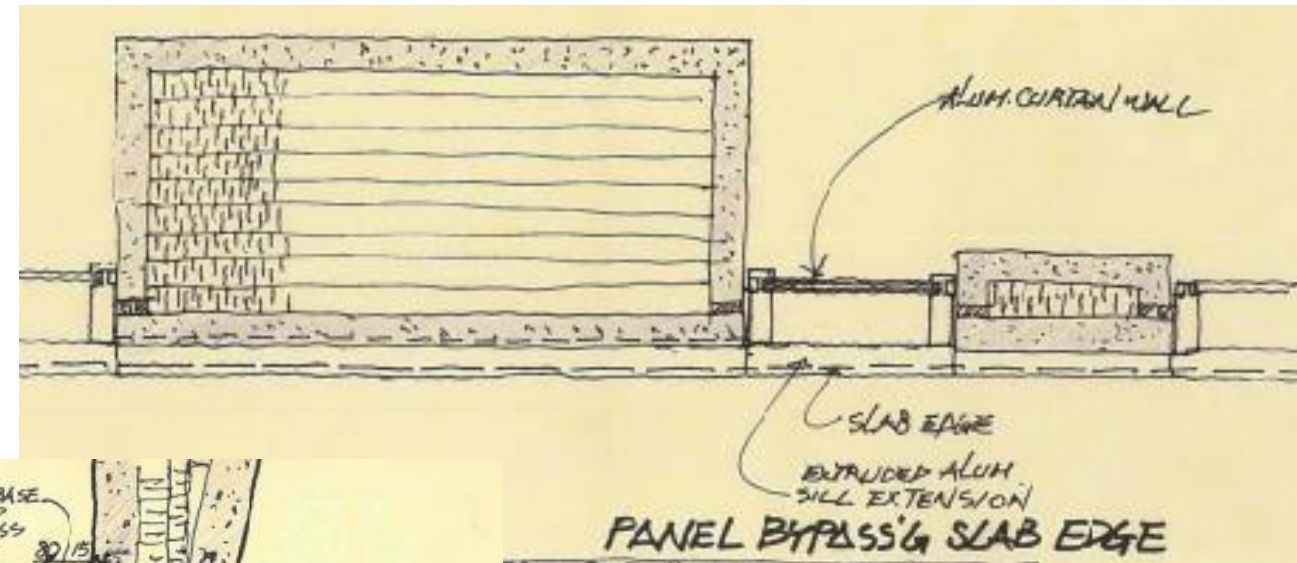
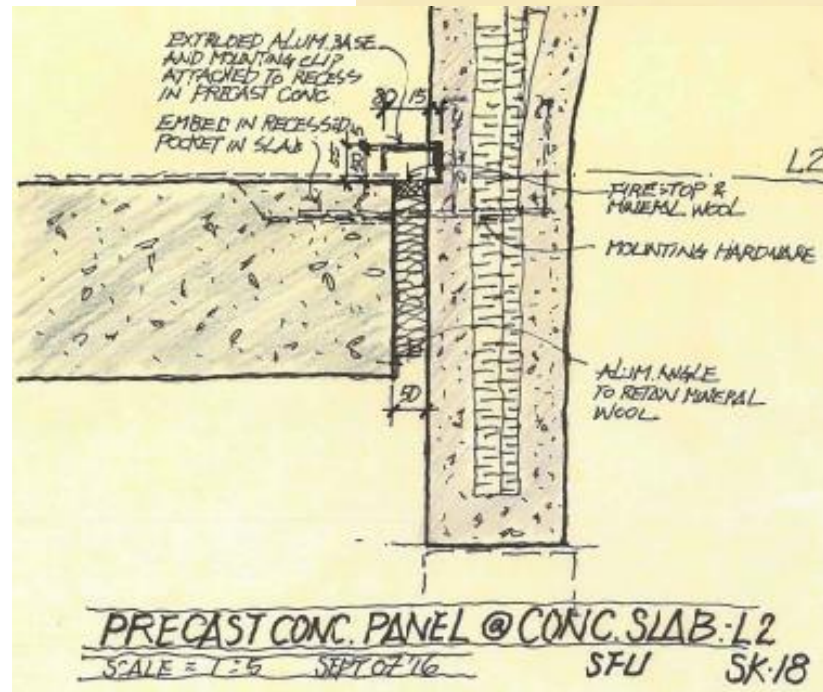
CPCI (Canada)

www.cpci.ca



Design Challenges

- Installation
- Thicker slabs
- Deflection and tolerances
- Interfaces with adjacent assemblies
- Panel size limitations
- Construction sequencing
- Thermal bridging



Panel Production



Photo Courtesy: Revery Architecture



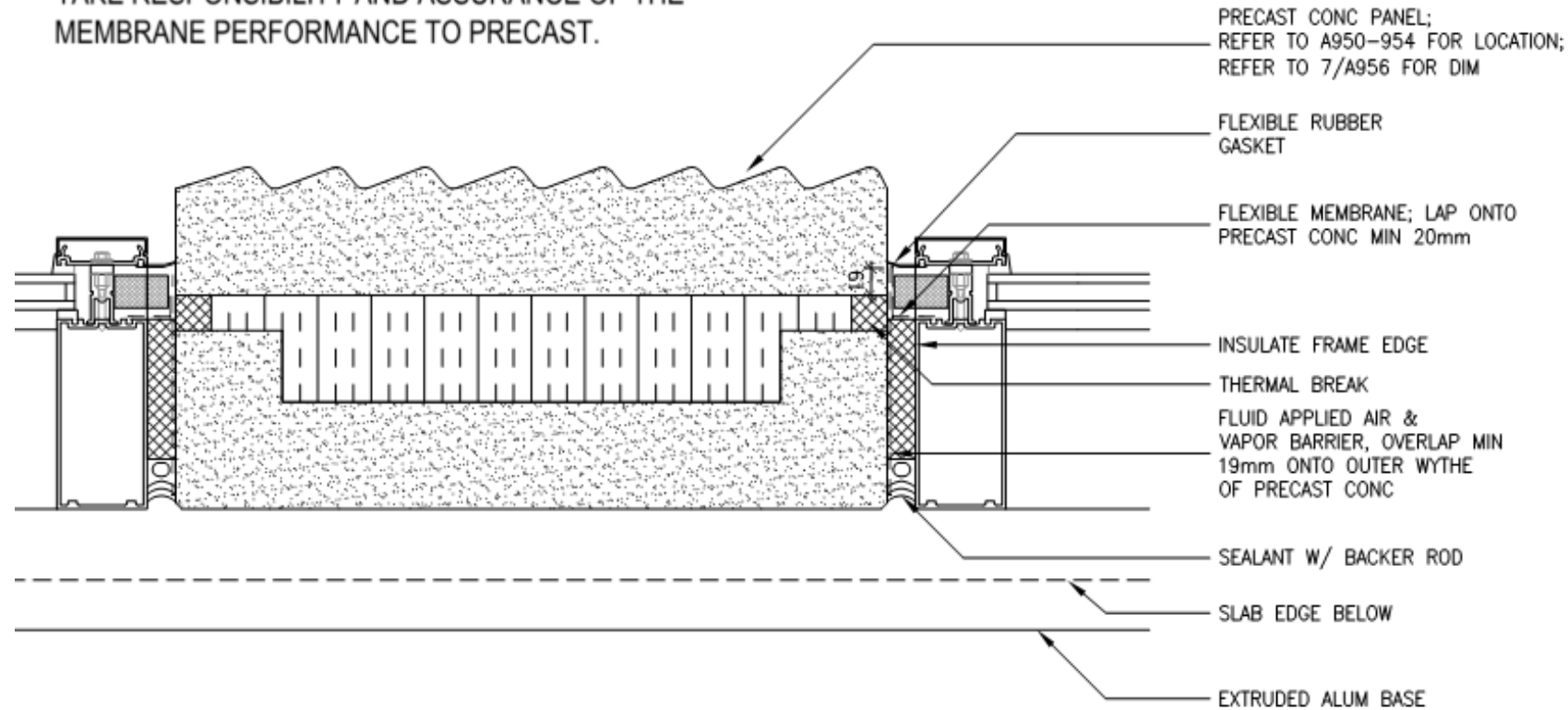
Panel Production



Photos Courtesy: Revery Architecture + Surespan

Precast to Curtain Wall Transition

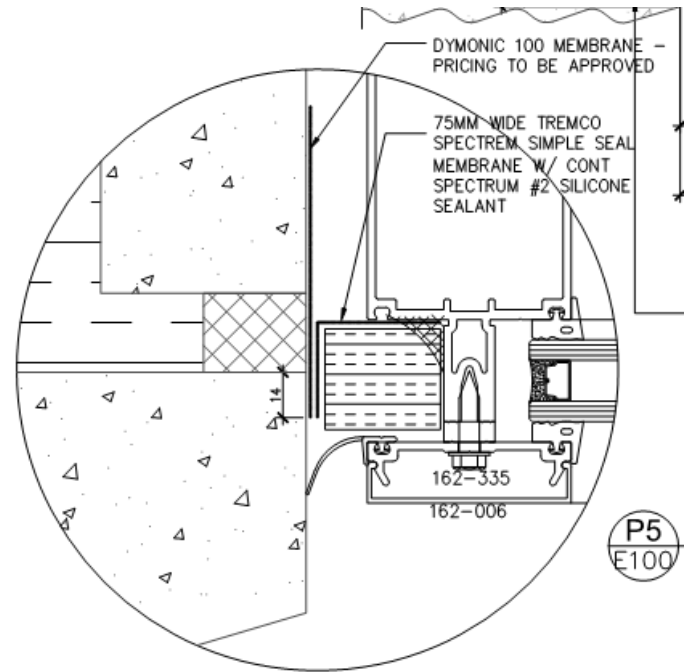
APPLICATION MEMBRANE TO CONSIDER PRECAST PANEL WILL BOW ON A DAILY BASIS OR WHEN SUBJECTED TO THERMAL VARIATION / GRADIENT DURING ITS DESIGN LIFE. WINDOW SUPPLIER TO PROVIDE A FLEXIBLE FLASHING TO ALLOW DIFFERENTIAL MOVEMENT. SURECLAD DOES NOT TAKE RESPONSIBILITY AND ASSURANCE OF THE MEMBRANE PERFORMANCE TO PRECAST.



A high-angle photograph of a construction site. The foreground and middle ground are dominated by a long, narrow concrete channel or trench. The left side of the channel is lined with wooden formwork, and the right side is a concrete wall. The floor is covered with wooden planks and debris. In the background, there are construction materials, including spools of wire and a white car. The scene is brightly lit, suggesting daytime.



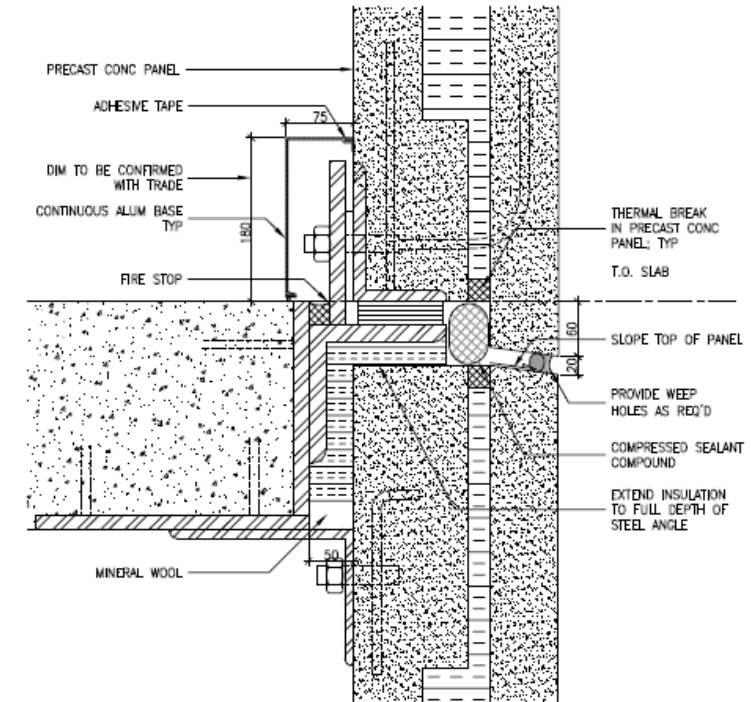
Precast to Curtain Wall Transition



Precast to Curtain Wall Transition

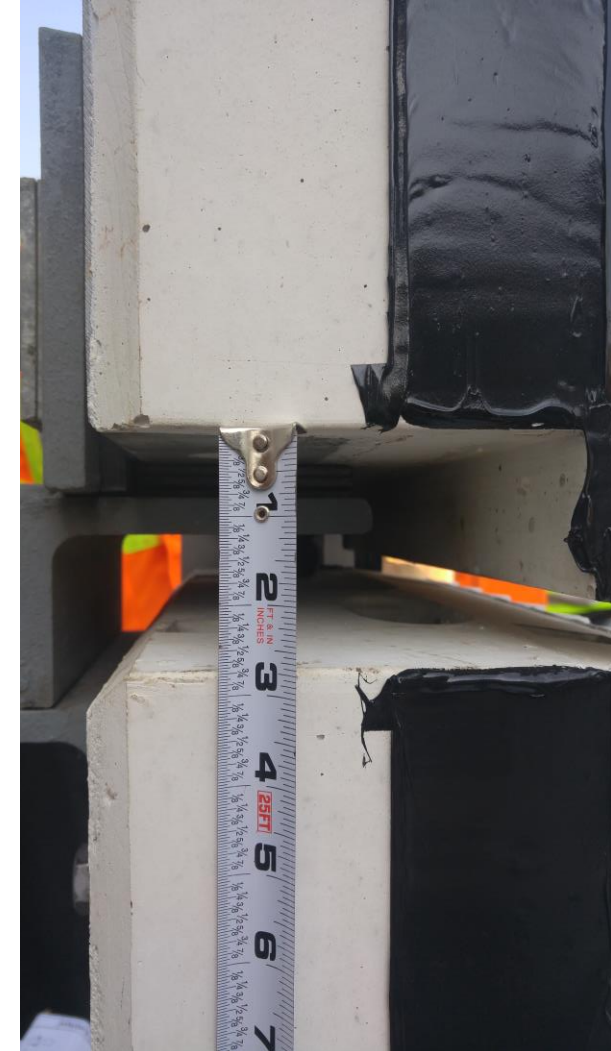


Horizontal Stack Joint



2 PRECAST PANEL @ SLAB EDGE: SECTION
A800 SCALE 1:5

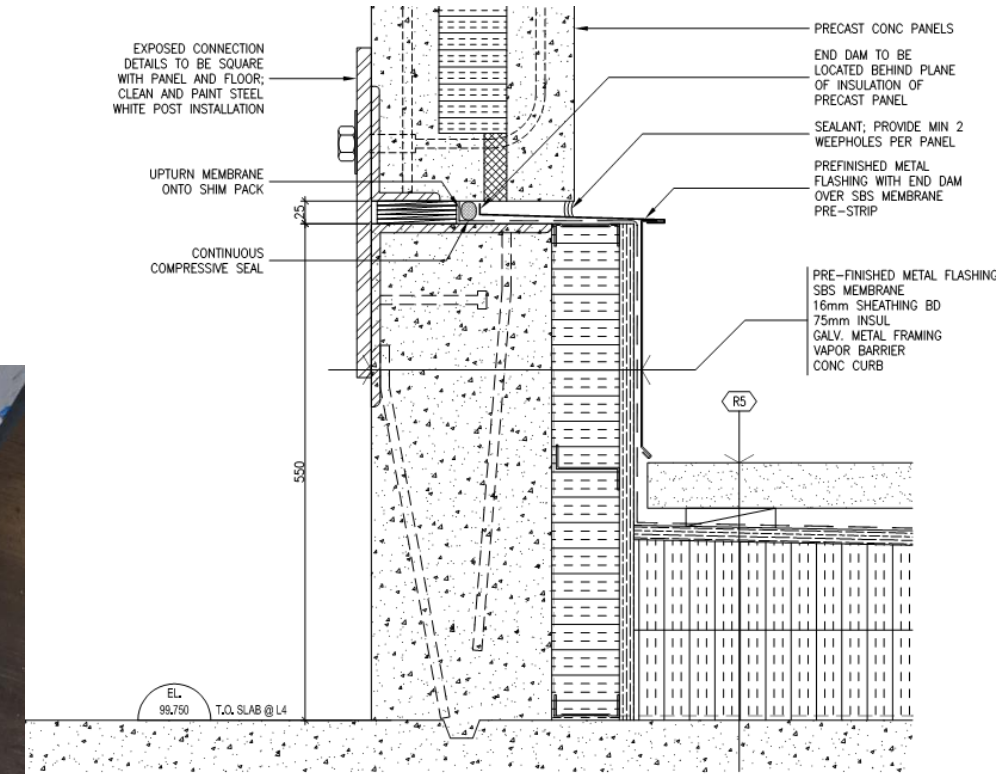
Precast to Curtain Wall Transition - Mockups



Precast to Curtain Wall Transition – 3D Visualization



Panel at Concrete Curb



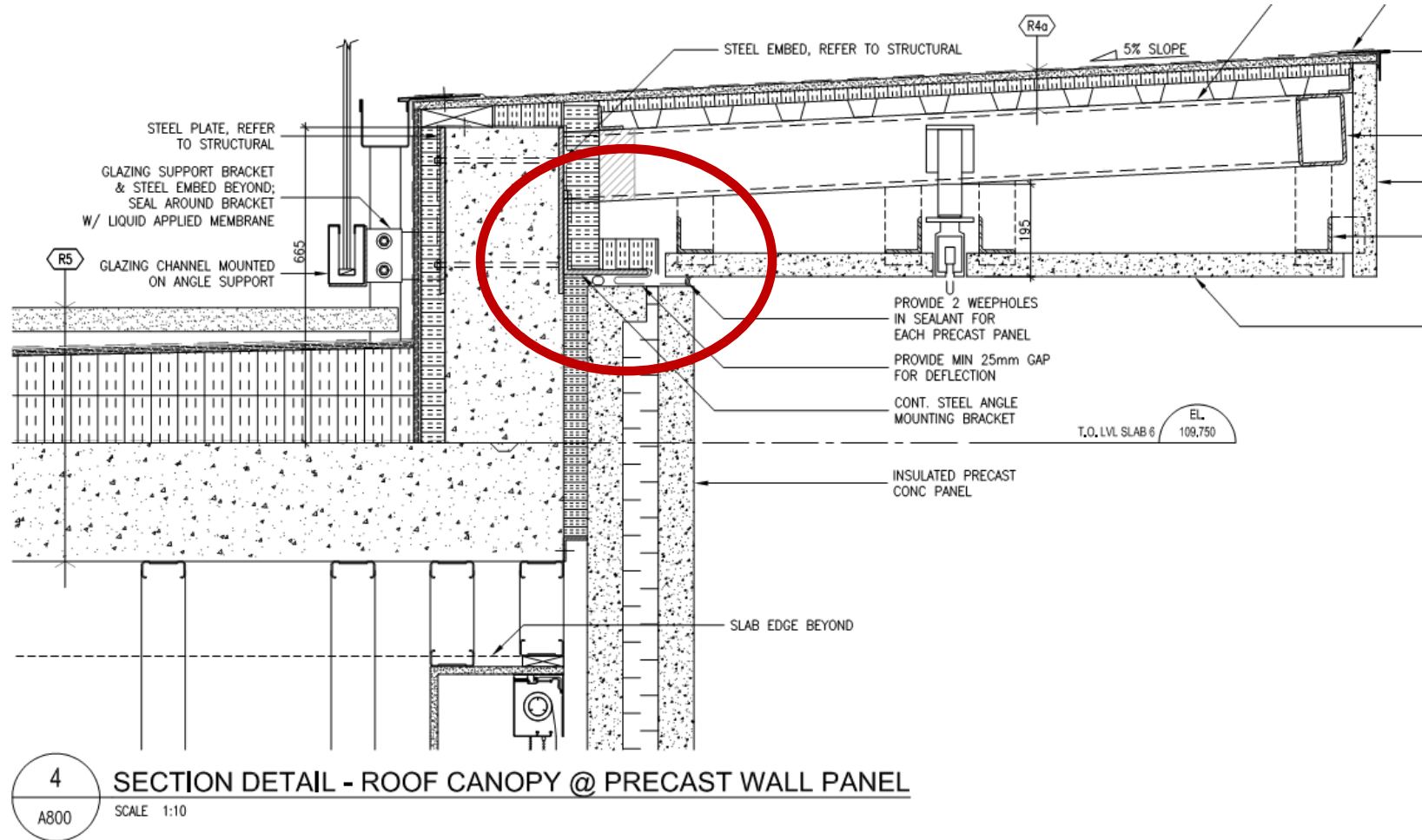
CONC UPSTAND CURB @ LVL 4 NORTH FACADE; PRECAST INTERFACE

SCALE 1:5

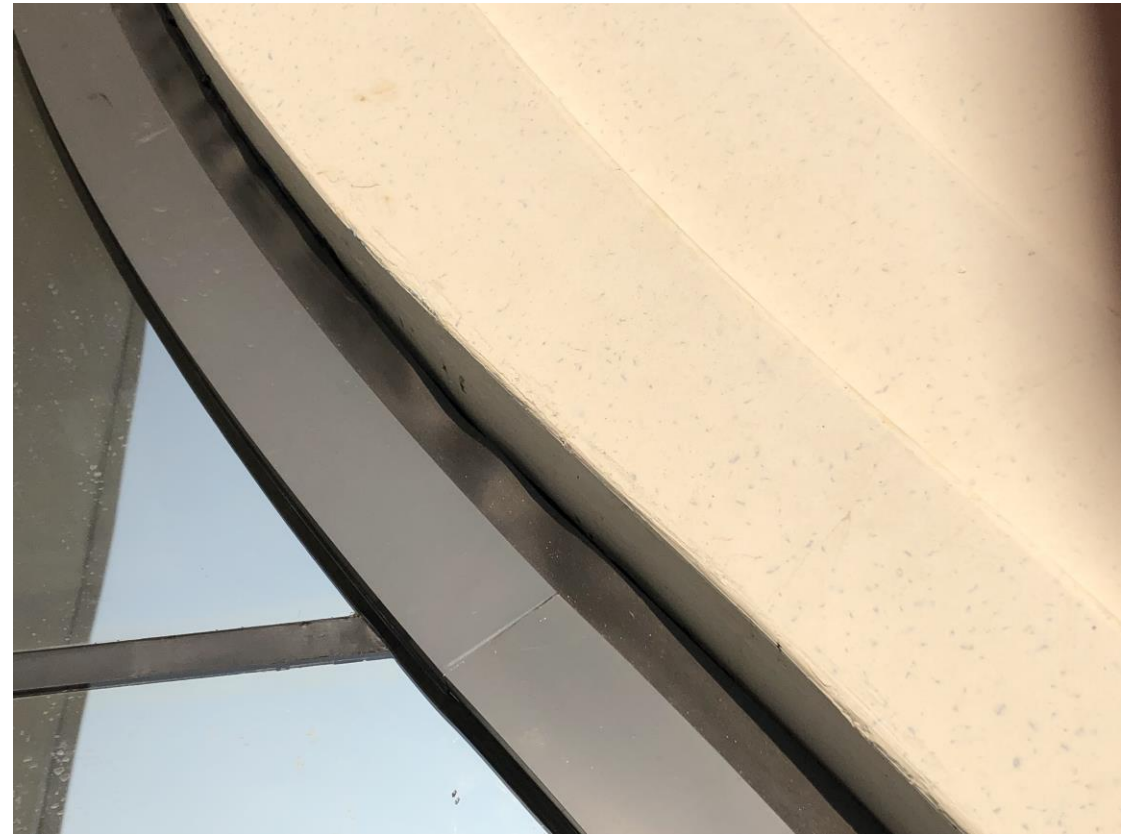
Lifting Anchors



Panel at Roof Canopy



Precast to Curtain Wall - Weatherseal



Precast – Sealer?



Conclusions:

Insulated Precast Panels are durable and resilient and provide an efficient, sustainable, and low maintenance envelope solution.

This project was successful because:

- 1.) There was a plan
- 2.) Buy-in was obtained
- 3.) 3D
- 4.) Mockups
- 5.) Redundancy. What is the weakest link?



Thank You



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