

Okanagan College Child Care Centre



Main Entry

Table of Contents

| | |
|----|-----------------------------------|
| 2 | Project Specs |
| 3 | Project Summary |
| 4 | Strategic Decisions |
| 6 | Community |
| 8 | Site Ecology |
| 10 | Light and Air |
| 14 | Wellness |
| 16 | Energy Present and Future |
| 18 | Materials and Resources |
| 20 | Education and Information Sharing |
| 22 | Addendum |

Project Specs

Project Type: Institutional, Child Care Centre
Address: 1091 Timmins Street, Penticton, BC
Year Completed: 2017
Building Floor Area: 410 sq. m.



Rendered view from Timmins Street

Project Summary

The Okanagan College Child Care Facility is a 4,000 square foot, single story building located on the Penticton campus of Okanagan College. The building is the first Passive House certified institutional building in Canada, and embodies the commitment of its client to developing and showcasing leadership in sustainable building.

Sustainable design strategies included:

- super-insulated and airtight envelope
- passive and active solar design
- triple glazing
- central lantern for natural ventilation
- earth tube hot water

Main Project Description

Okanagan College Child Care Centre



Canopied Main Entry

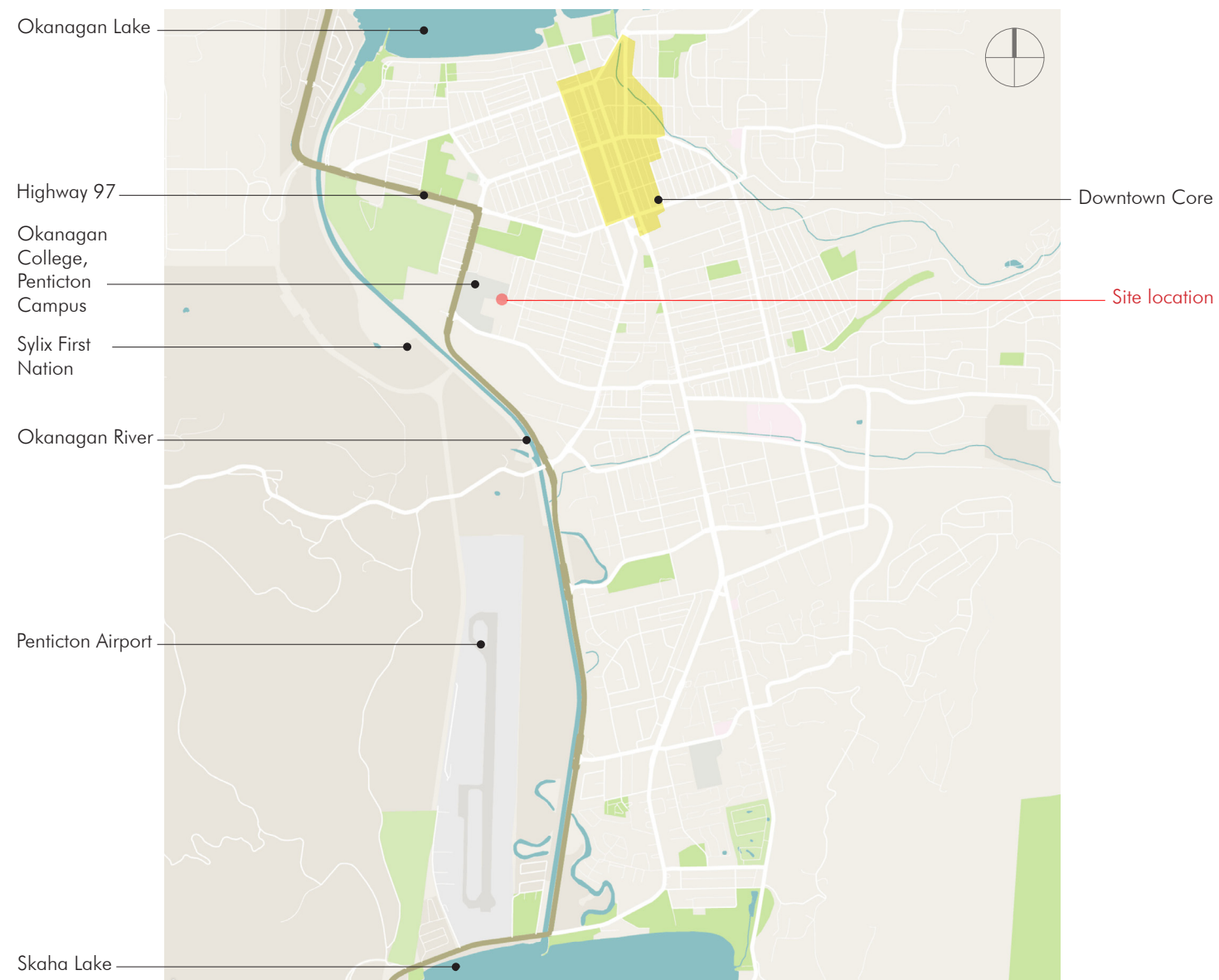


fig. 1. map of the city of Penticton

1. Strategic Decisions

Gateway to the neighbourhood

Okanagan College is located at the edge of the downtown core of Penticton. The Child Care Centre is intended to provide service to students, but also, as space permits, to the broader community. An early strategic decision was to locate the centre on an adjacent residential street, on a previously undeveloped portion of the campus. It therefore establishes a second “gateway” to the campus, and demonstrates the college’s commitment to sustainable community development at all ages. To complement this gateway function, a solar walkway was designed to provide a shaded route from Timmins Street to the main campus.

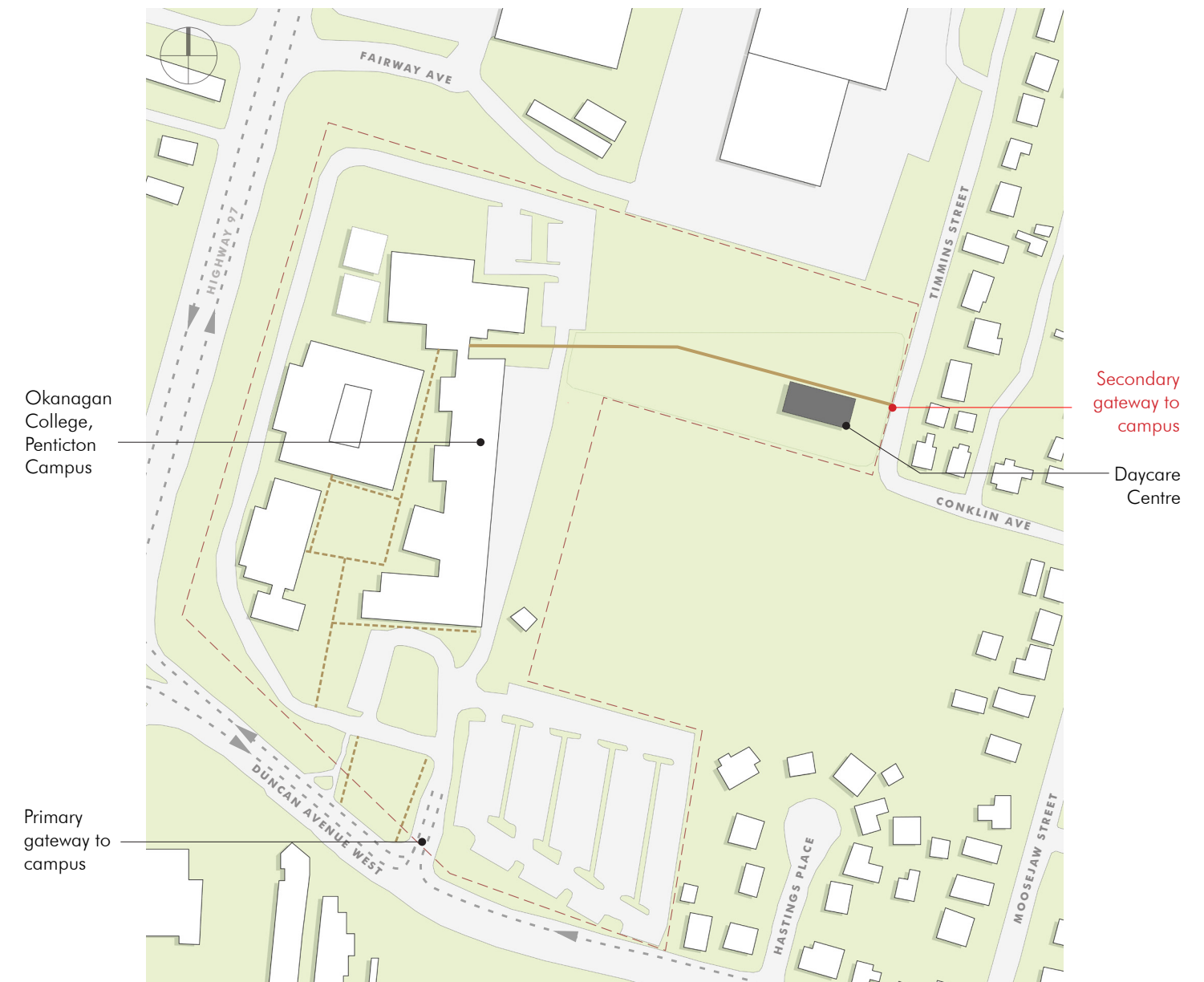


fig. 2. campus map showing new secondary gateway

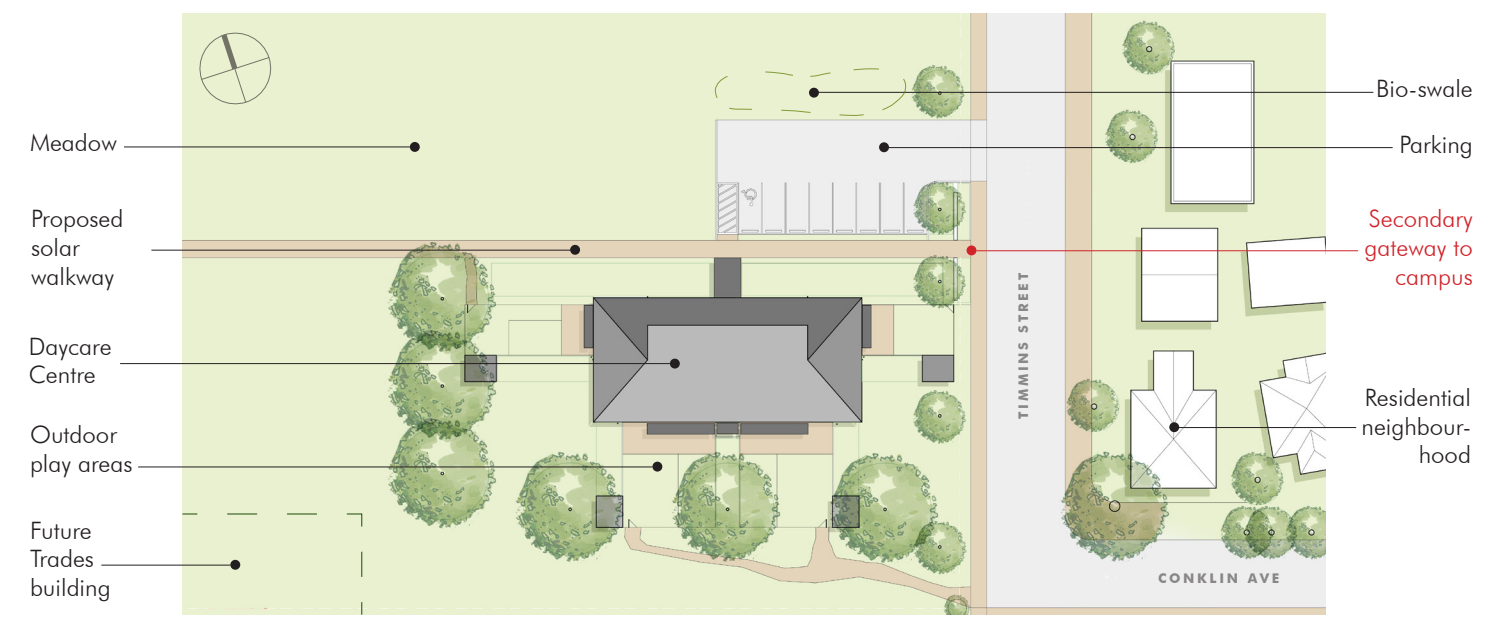


fig. 3. site plan showing relationship to residential street and campus



fig. 4. rendered view of hallway showing four chief signage

2. Community

The Sylix First Nation

The Okanagan College campus straddles the boundary between the City of Penticton and the Penticton Indian Reserve. The two are physically and collaboratively mirrored as the college and the En’owkin Centre, the cultural centre of the Syilx nation, are located directly across the river. As part of this suite of endeavours, the Child Care Centre has been given bilingual signage, and each of the four Child Care spaces has been named, and given a colour palette, corresponding to one of the four food chiefs of the Okanagan. The building is a physical gateway to the campus, integrated into the

residential street network so it is easily accessed whether walking with a stroller, biking, or using transit. It is also a metaphorical gateway between cultures, allowing children from the Syilx nation to feel welcome and valued, and children from other communities to learn a way of being which respects and relates to the natural world around them.

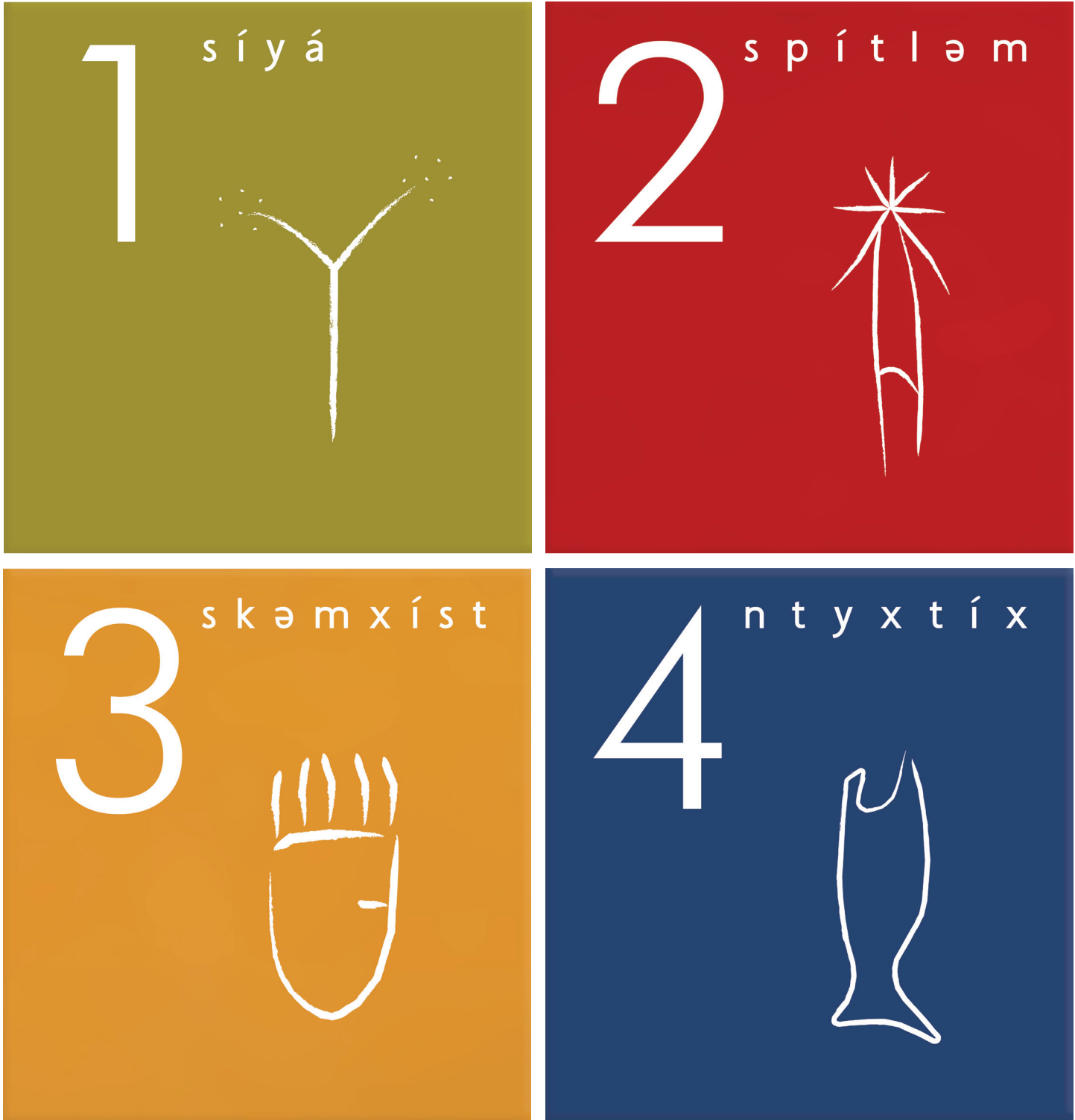


fig. 5. four chief signage

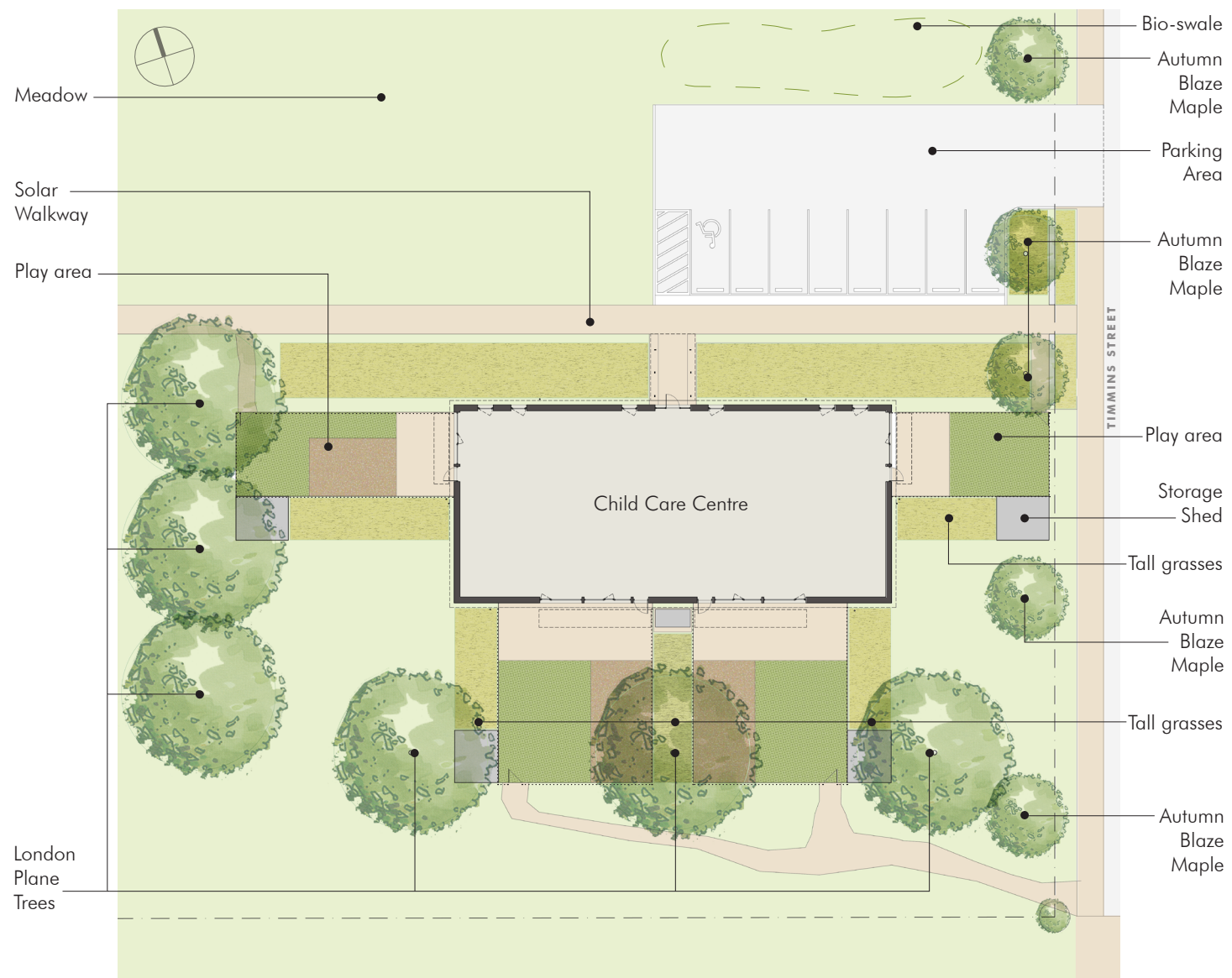


fig. 6. proposed landscape plan

3. Site Ecology

The Meadow

The site for the project was a previously developed area which had reverted to an open meadow. Being close to the Okanagan River, the high water table allows for relatively lush tree and grass growth, within the context of the Okanagan semi-desert. Our landscape plan, to be implemented in stages, maintains and strengthens the existing landscape, using the solar walkway to define an open, publicly accessible meadow. The parking area is sloped to drain into a bio-swale on the edge of this open area. Each of the four child care spaces within the building has its own contained outdoor play area, which is surrounded by tall native grasses extending the meadow.



fig. 7. exterior play areas



fig. 8. site landscape before construction



fig. 9. generous windows for indoor play space

4. Light and Air

The Lantern

The physical form of the building was developed to maximize natural ventilation. 94% of the occupied floor area is within 7.0 m of an opening window. South facing windows have low operable vents, and a double height lantern at the centre of the building, with automatic opening clerestory windows. The lantern opens north to shield from summer heat gain, but also to capitalize on a venturi effect from prevailing winds. During the heating season, air is provided through a super efficient heat recovery ventilator.

The ventilation strategy is mirrored in the lighting strategy, with the large windows filling the childcare rooms with natural light. All lights are LED, and the projected annual consumption is 6.0 kWh/m².



fig. 10. lantern-lit hallway

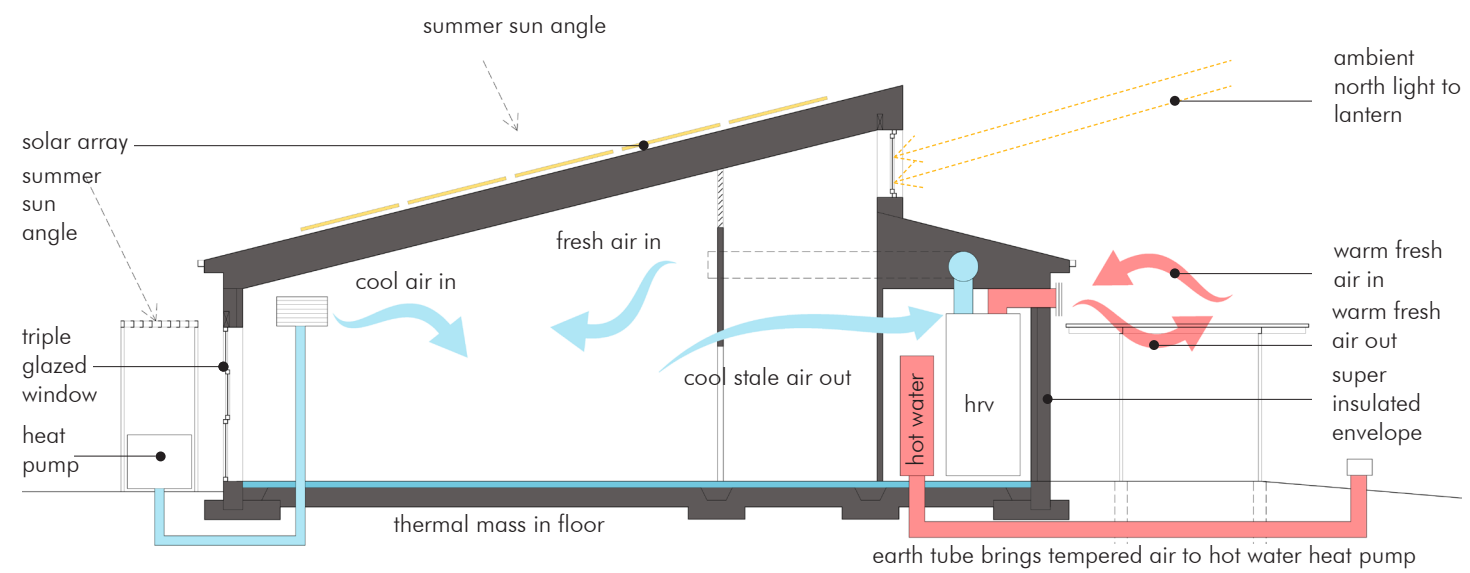


fig. 11. cross-section showing cooling mode, used 5% of the year

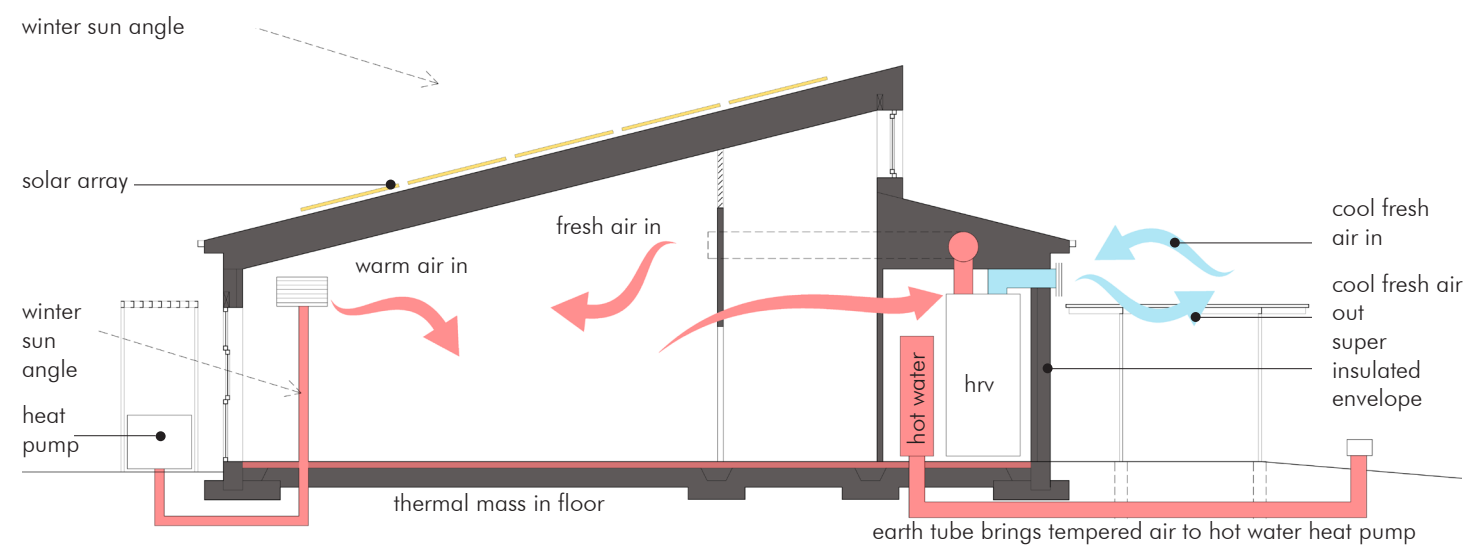


fig. 12. cross-section showing heating mode, used 25% of the year

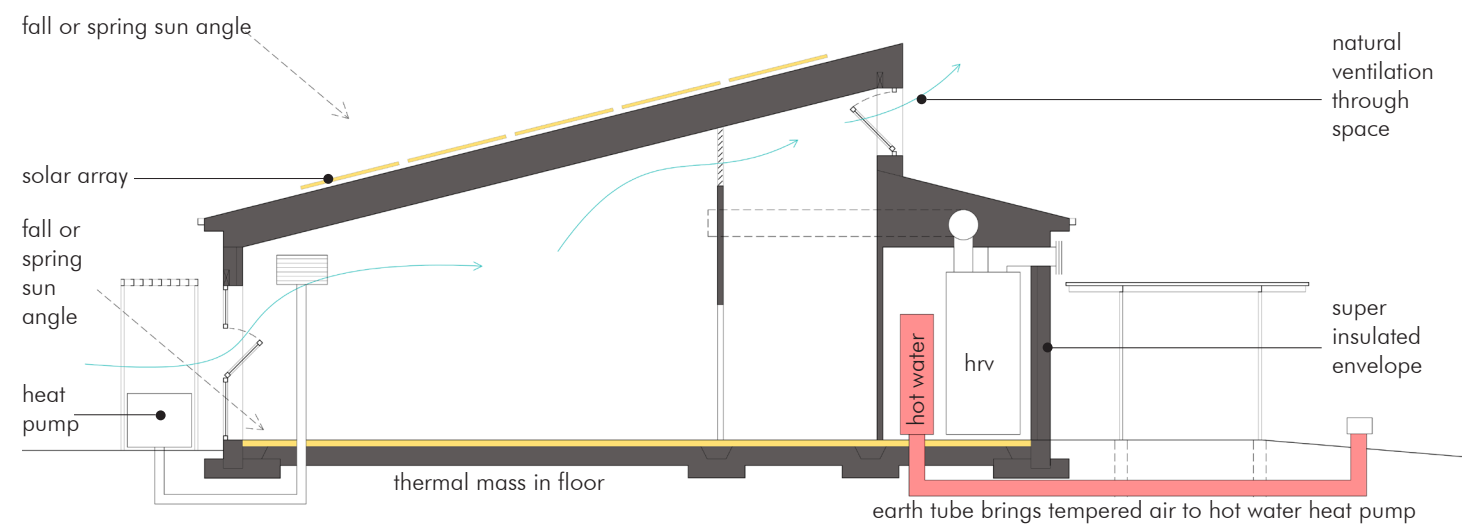


fig. 13. cross-section showing natural mode, used 70% of the year



fig. 14. view from the west showing lantern in profile



fig. 15. exterior view of the lantern

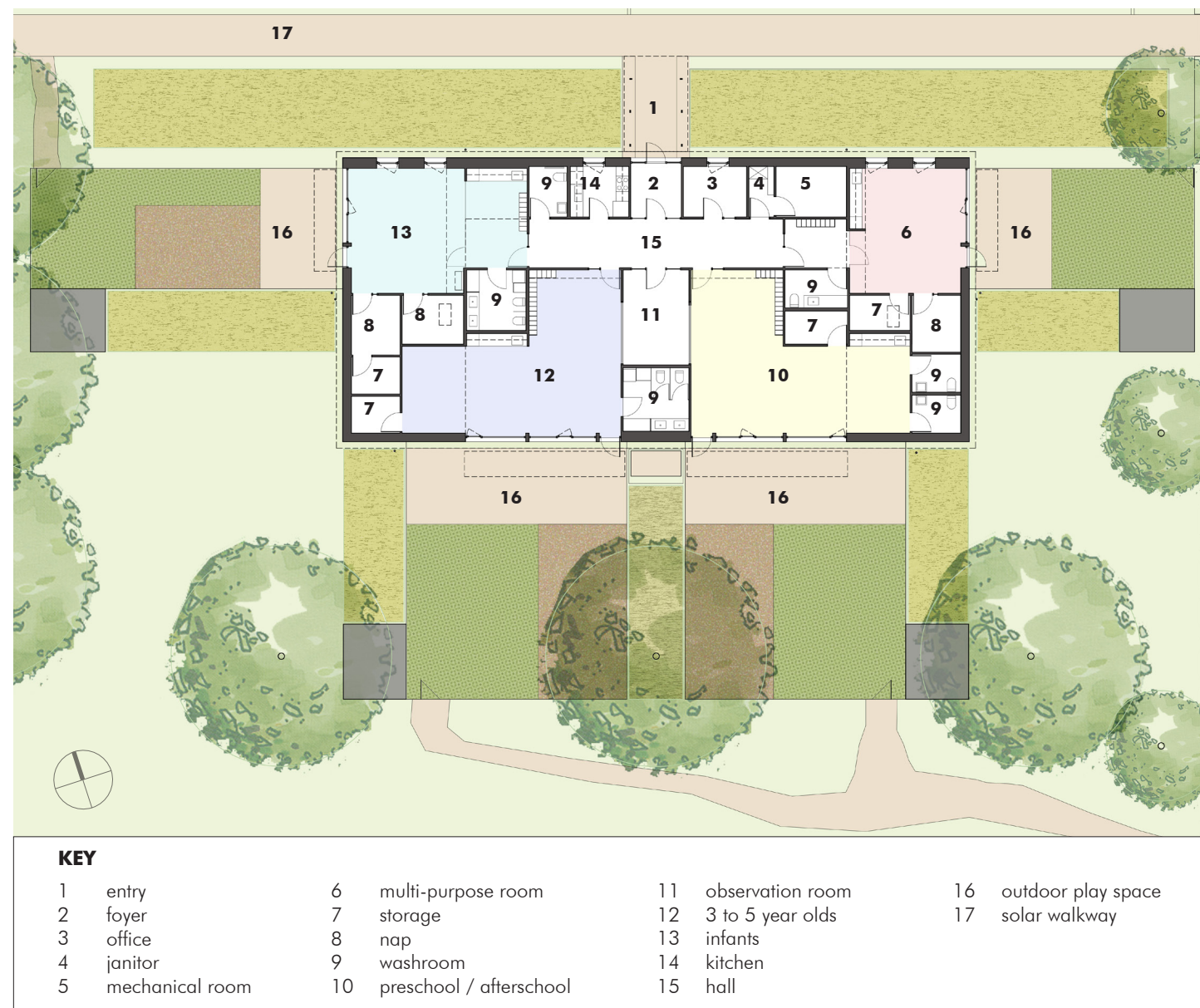


fig. 16. building plan showing indoor and outdoor play spaces

5. Wellness

Outdoor Connection

A connection between the indoors and outdoors was at the core of the design model for the Child Care Centre. Each of the four Child Care rooms has a contained outdoor space equal to twice the area of the indoor space. The design of the rooms focuses on large windows and doors which provide constant visual and physical connection to the outdoor rooms.

The outdoor spaces contain a mix of hard surface spaces for wheeled toys, storytelling and wet weather play, rubber mulched areas for active play, and natural areas including berms, plantings, logs and water sources to allow for

unstructured learning. Large shade trees protect the play areas from the Okanagan sun. With the opening windows, accessible transitions, and large doors, there is no clear distinction between outdoor and indoor – rather, the entire child care space is a healthy, clean, safe island in the meadow.



fig. 17. indoor and outdoor play spaces



fig. 18. rendered view of the proposed solar walkway

6. Energy Present and Future

Passive House

As a certified Passive House, the building has used a strategy of super-insulation, airtight construction, and efficient mechanical systems to reduce energy consumption to less than 44 kWh/m² annually. In addition, the roof of the building has been oriented to the south, and angled for optimal photovoltaic performance.

The college currently has the largest solar array in western Canada on campus, and once fundraising is complete for the Child Care Centre, it will receive an additional array, and become energy net positive. While the campus does have a district energy system, the energy consumption of the

building is so low that there turned out to be no financial benefit to making a connection. Instead, we used an earth tube system, placed parallel to an existing sewer line to scavenge heat, to provide incoming air for a heat pump water heater. Building heating, and cooling if required, is also provided by heat pumps. Not only would this building be unaffected by a future shortage of fossil fuels, it has rendered fossil fuels unnecessary from the outset.

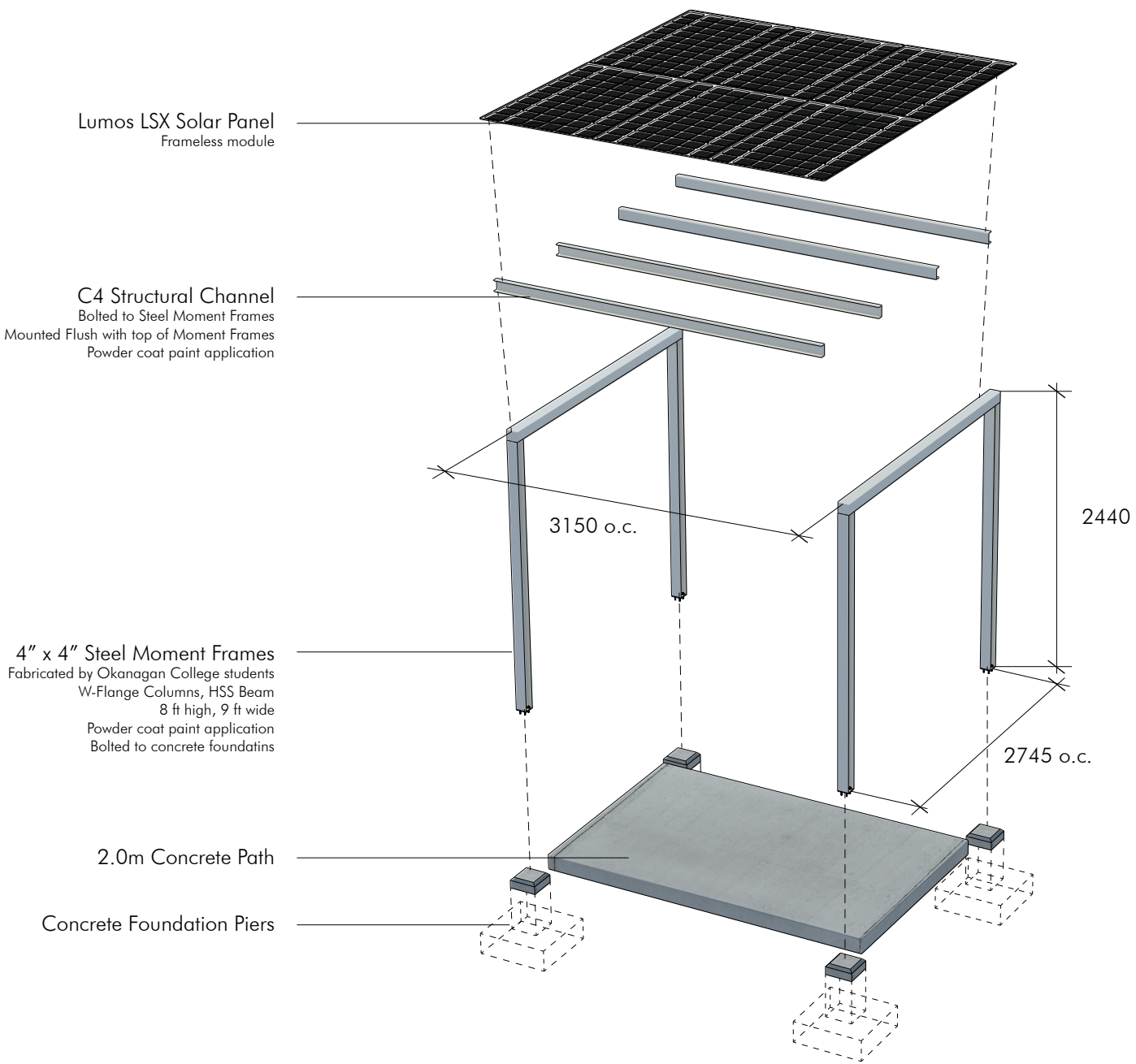


fig. 19. exploded 3d diagram of solar walkway module

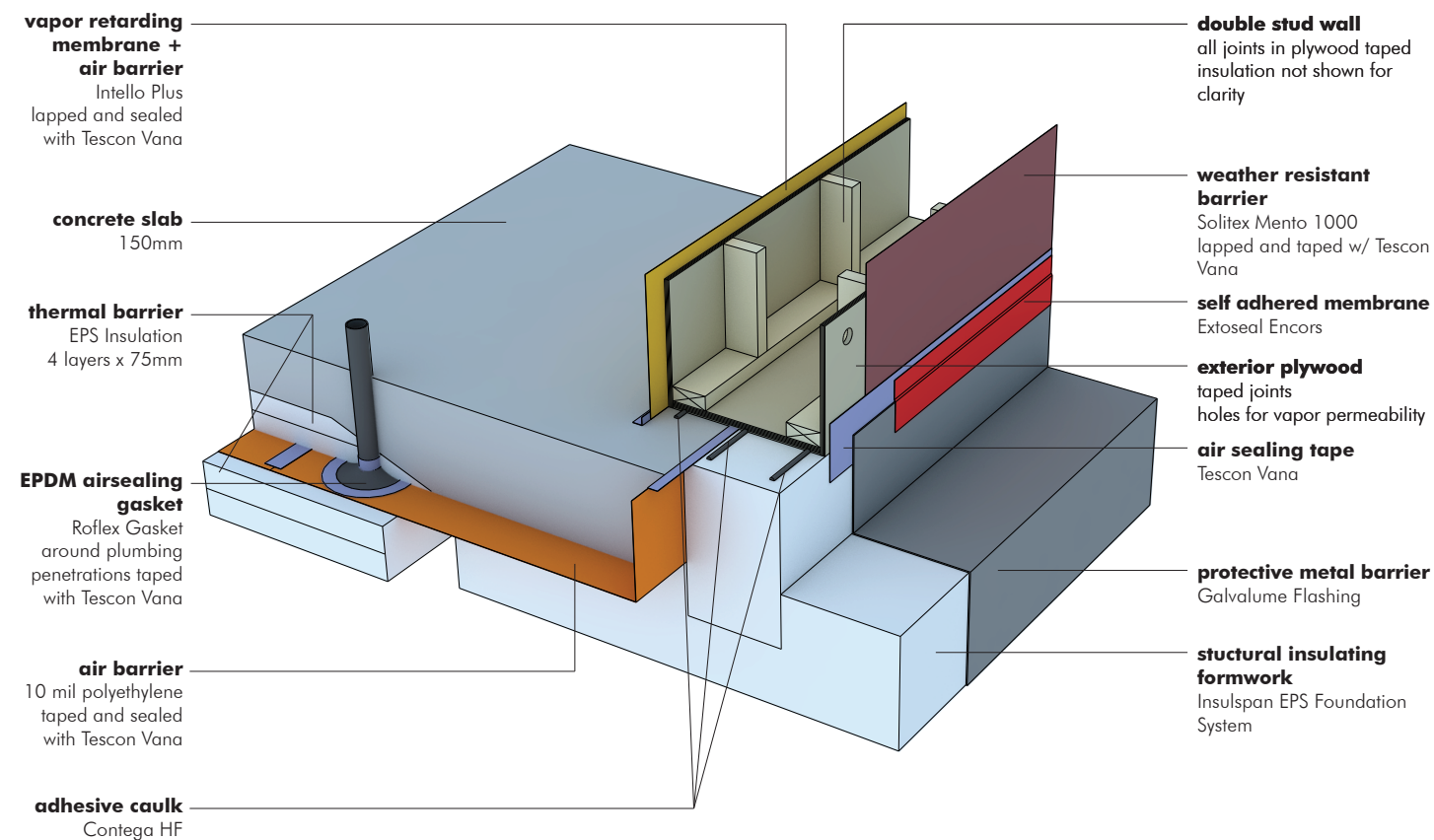


fig. 20. wall assembly which facilitated achieving an airtightness of 0.39 ACH

7. Materials and Resources

Regionalism

The core of the material strategy for the building was a regionalist approach, selecting materials that were regionally abundant, and materials appropriate to the regional climate.

The main structural material for the building is wood: double stud walls, and a light frame wood truss roof. All wood was harvested and milled within the Okanagan region. EPS insulation for the slab on grade was custom fabricated in Langley, BC, and the cellulose insulation used in walls and roof came from Kelowna, BC.

This focus on local materials not only reduces transportation emissions, it fosters the development of a sustainable regional economy. An example would be the lantern space at the core of the building, where a local custom wood window manufacturer donated douglas fir window frames and doors, and these were set into plywood clad walls to create a ceremonial heart for the building.

On the exterior, material selection focused on durable components, with high albedo, appropriate to the hot, dry climate. This included cement board siding, steel exterior



fig. 21. exterior finishes, CLT entry canopy

shading, fibreglass windows, and galvalume standing seam metal roofing. Through design and construction, full components were sourced to avoid creating waste, and the small amount of waste that was completely unavoidable was collected and diverted to a local waste sorting facility.



fig. 22. detail, lantern cladding



fig. 23. observation room

8. Education and Information Sharing

The next Generation

The Okanagan College Child Care Centre is a demonstration project on every level. As an educational institution, the college has taken full advantage of the teaching opportunities implicit in design, construction and operations. The college has a Sustainable Construction Management program, and the students were heavily involved in design, materials research, and vetting of design options.

During construction, trades students were involved in carrying out parts of the work. The operating building is being used for ongoing training of HVAC students, and

also incorporates a viewing room for child care students.

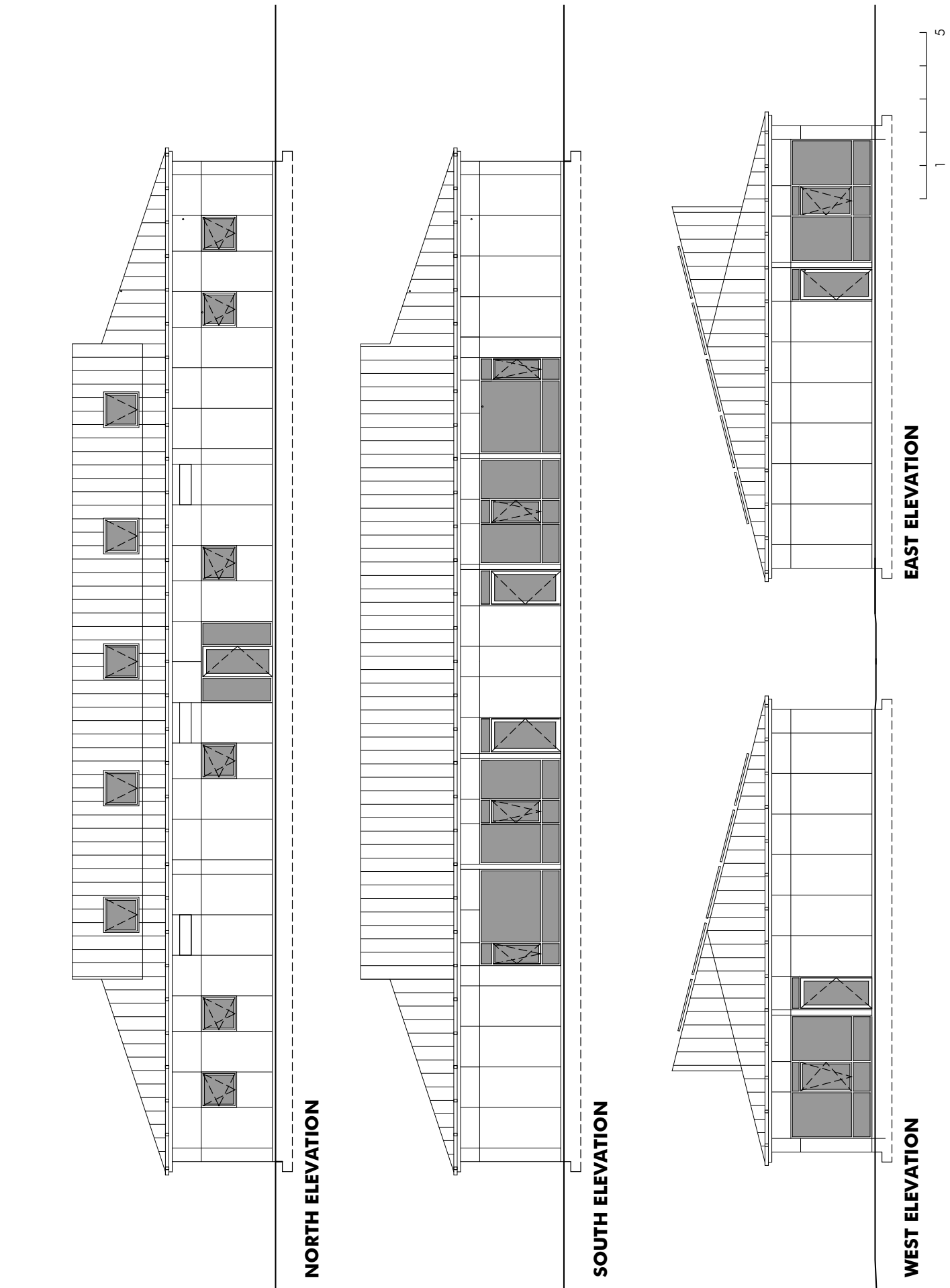
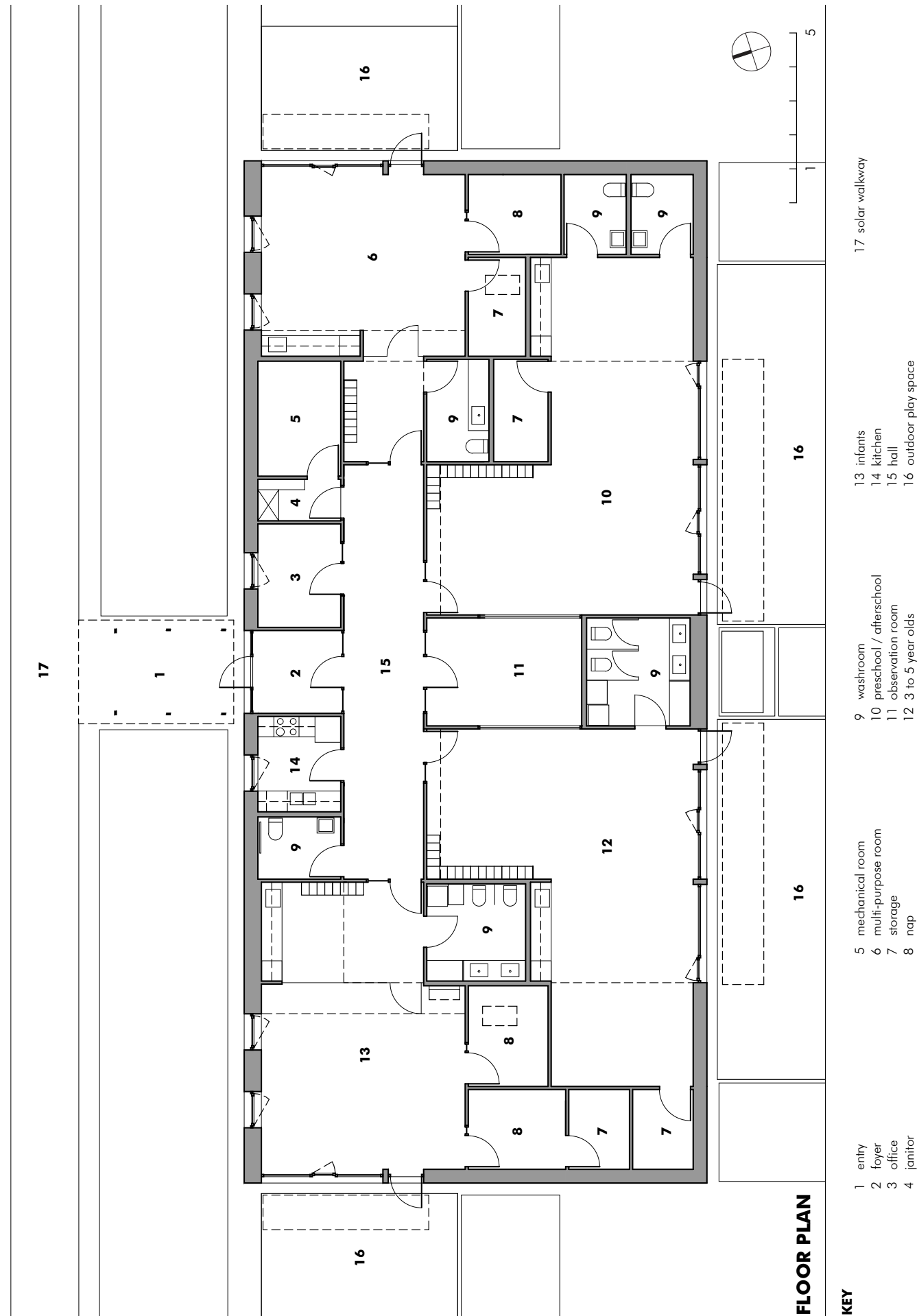
As the first Passive House Certified commercial building in Canada, regular tours are being given to utility companies, elected officials, and green building professionals. Most importantly, the parents and children that have made the building part of their daily routine are learning that a cleaner, healthier way of building is achievable, desirable and inspirational.

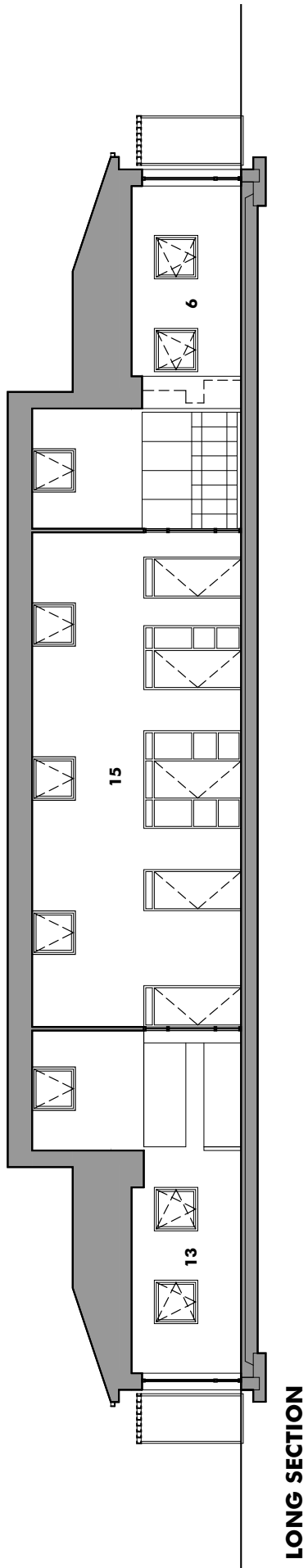


Addendum

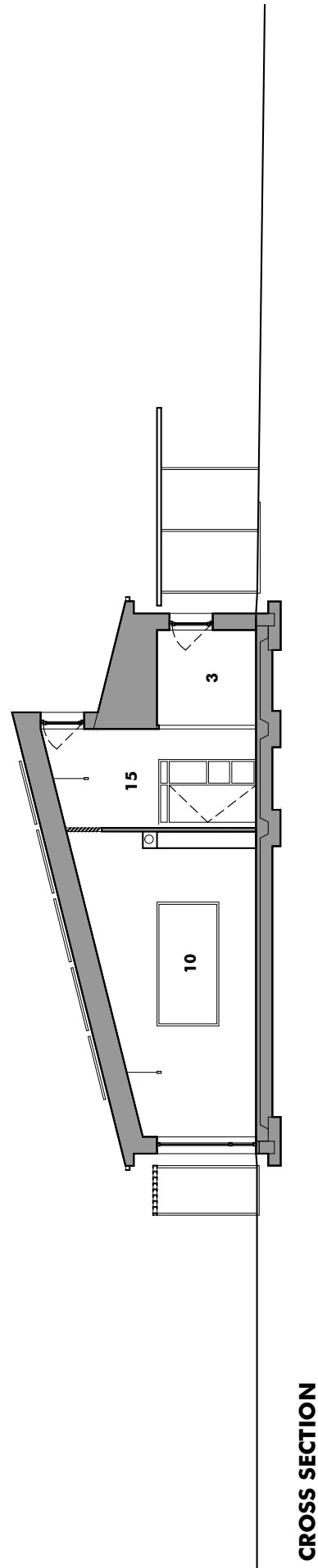
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LONG SECTION



CROSS SECTION

