



Nelson Peaks

Nelson Laneway House Design Competition Proposal

Inspired by the vistas of the Selkirk Mountains, the *Peak* distills the mountain landscape form into a small urban dwelling. Its unique design creates an architecture that is adaptable to various site and grade conditions, while establishing a new layer to the residential fabric of Nelson. The *Peak*'s volumetric and flexible dwelling space composes a laneway retreat that balances privacy and outlook – a hidden refuge within the City.

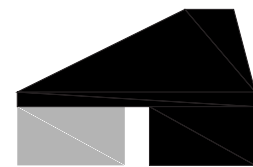
The design features an open concept living space with an adjoining loft above. The loft has a skylight at the apex of the roof, providing skyward views and light to the volume of the living space below. The dwelling layout utilizes adaptable book-end elements that flank the central interior spaces, such as the kitchen and hearth that frame the main living space. The bedroom, storage and washroom spaces are situated below the loft, providing privacy from the main living area. The exterior accessed storage provides dedicated space for active living equipment such as skis or bikes.

The floor plan is organized along a central corridor with exterior entrances at each side, enabling consistent access to the laneway, yard, and street-front. The dual aspect entry and square proportion of the building footprint allows the dwelling to be compatible with multiple site configurations. This positional flexibility allows for a various parking options, courtyard spaces, and landscaping opportunities to compliment the dwelling. Slope variation of the site is accounted for with exterior steps and grading.

The *Peak* utilizes common wood frame construction for the primary building structure, offering a unique design at a reasonable cost. Materials have been selected with an emphasis on fire resistance, sustainability, durability, economic value and local availability. Through sustainable building strategies, and efficient systems, the design strives to be environmentally responsible and limit carbon impact. Alternatively, the design can be pursued with cross laminated timber construction, utilizing another local resource of the Kootenay region.

The design can easily be customized to suit owner preferences. The flexible loft space could be inhabited as a bedroom, studio space, library or office. The hearth could incorporate shelving arrangements, or home entertainment options. The front window could become a sliding patio door to allow direct access to an outdoor terrace space. As well, the facade material and colour could be custom selected, within the suggested guidelines to maintain the architectural expression.

The *Peak* is an identifiable and unique design that would compliment the City of Nelson, forming part of a developing community of laneway housing.

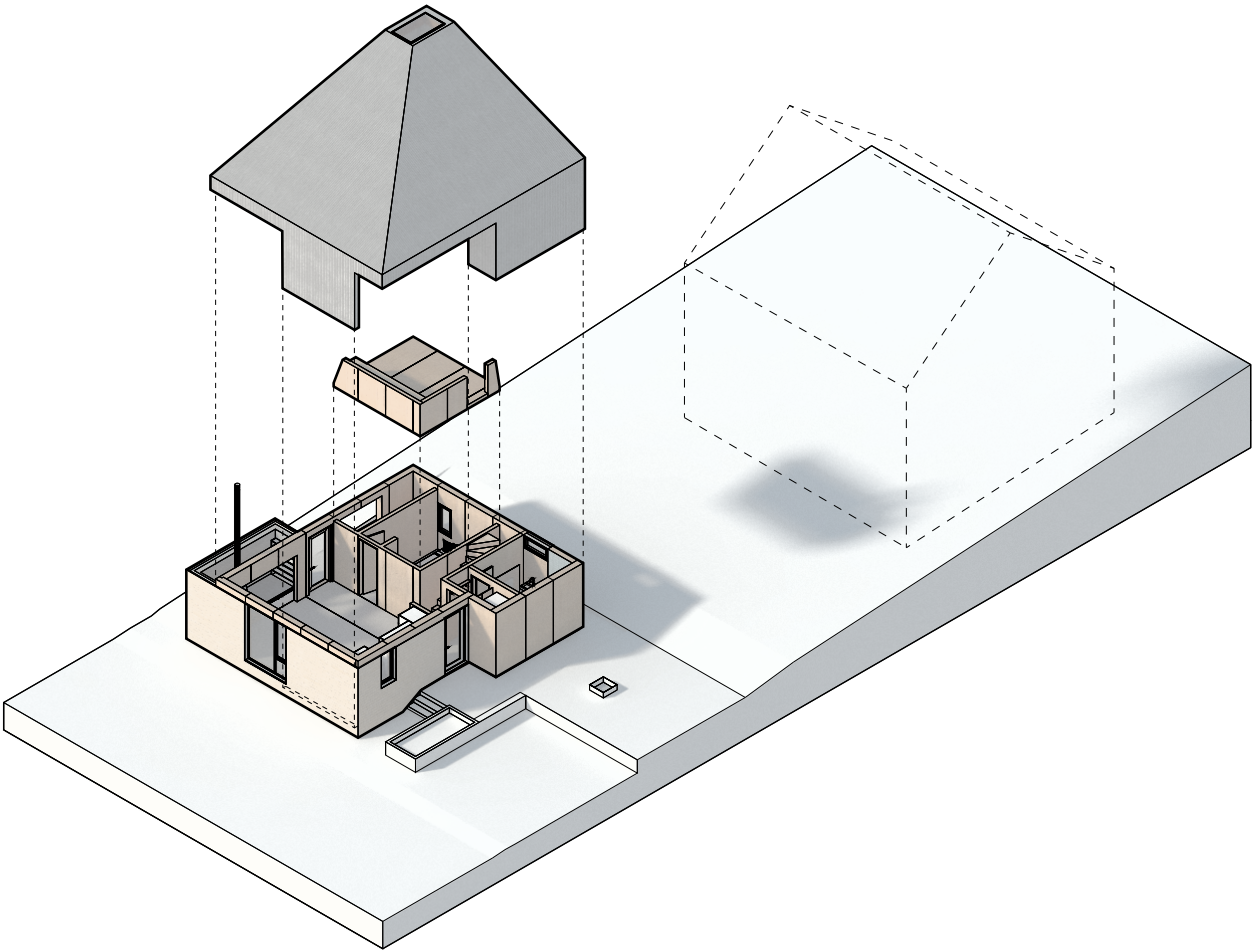


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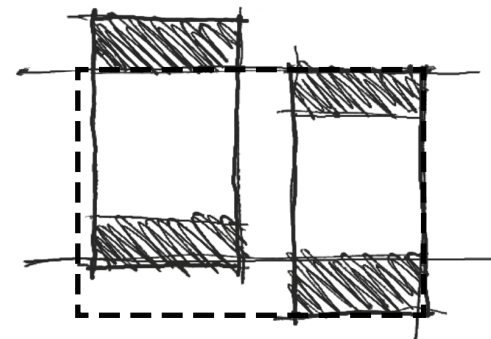
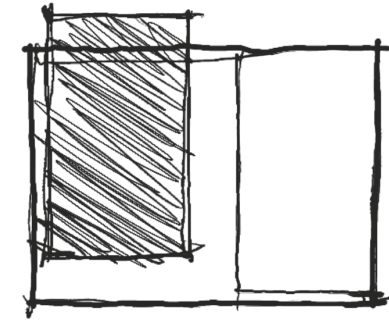
introduction

Inspired by the vistas of the Selkirk Mountains, the *Peak* distills the mountain landscape form into a small urban dwelling. Its unique design creates an architecture that is adaptable to various site and grade conditions, while establishing a new layer to the residential fabric of Nelson.

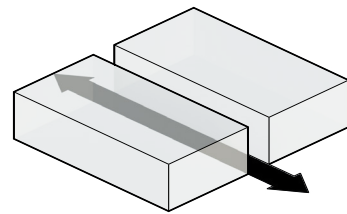
The parti sketch expresses a clear hierarchy between the public and private space of the dwelling. The public space shifts from beneath the monolithic roof form to reveal exterior threshold spaces that negotiate grade changes, and provide access to both the laneway and front-street. The low-slope skylight at the apex provides a skyward outlook from the second level loft space and indirect light to the interconnected living space below. The program organization of the dwelling utilizes adaptable *book-end* elements that flank the central interior spaces. The kitchen, hearth, bathroom, loft and secure storage can all be customized based on owner's preference.

The *Peak* utilizes a mass timber construction strategy, allowing for prefabrication and optimized production of the primary building structure. With local expertise and production of mass timber, this is an opportunity to exemplify regional skills and resources. Through the adaptability of the design, it can be applied to various site configurations and topographic conditions. Materials have been selected with an emphasis on fire resistance, sustainability, durability, economic value and local availability.

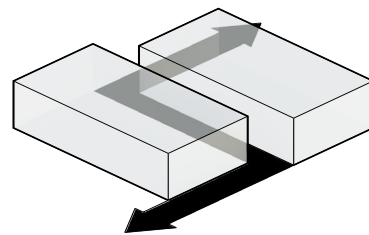
The *Peak* is an identifiable and unique design that would compliment the City of Nelson, forming part of a developing community of laneway housing.



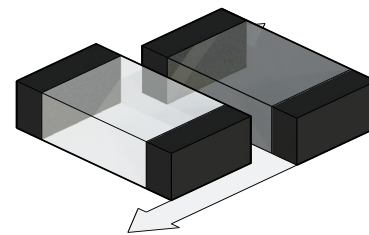
Design Narrative



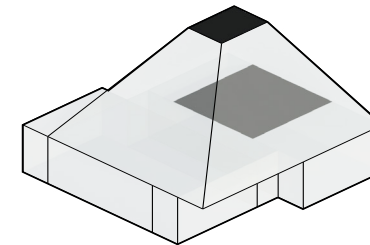
1. Split mass for internal circulation.



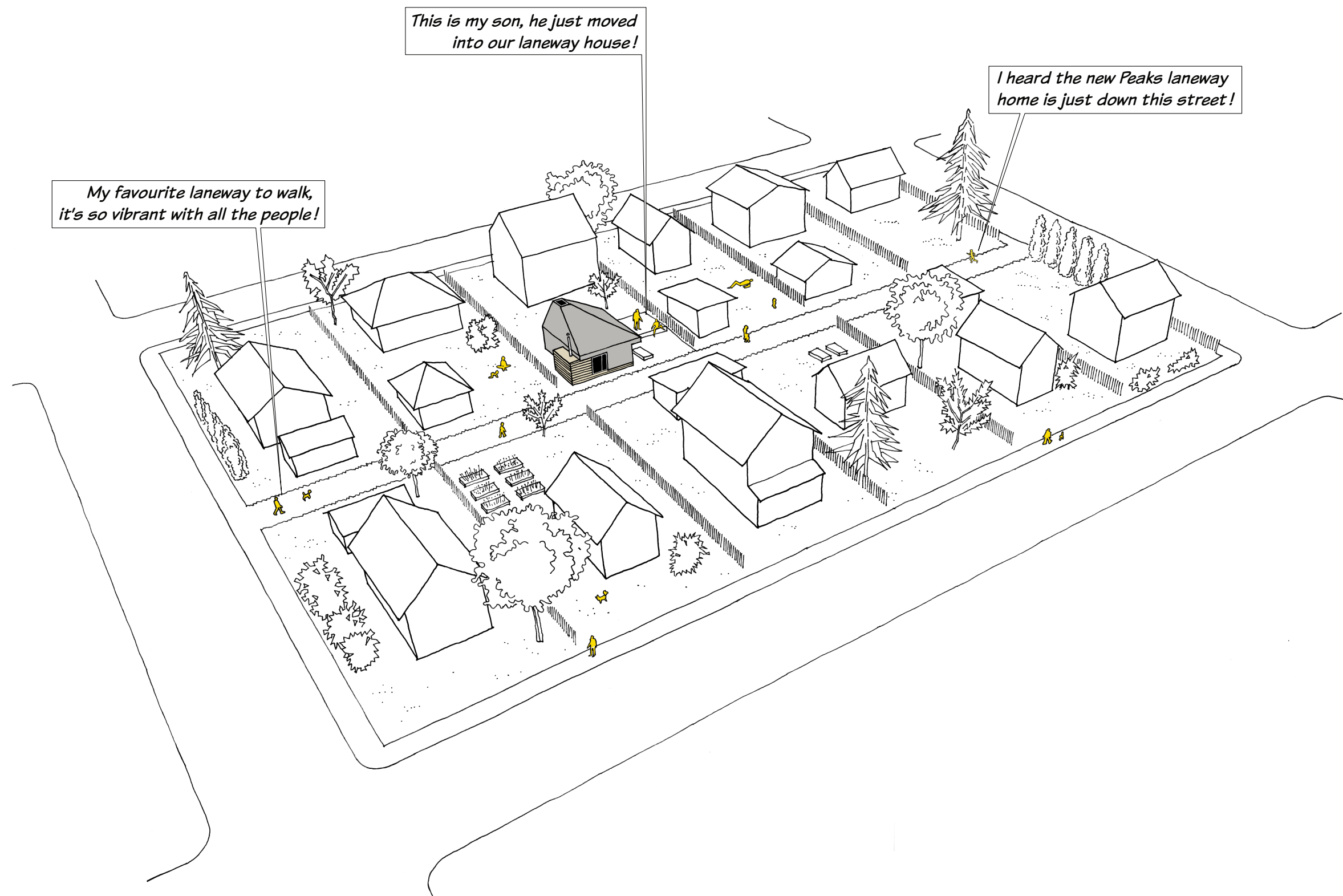
2. Shift mass to connect street + laneway + yard.



3. Flexible *book-end* programming strategy.



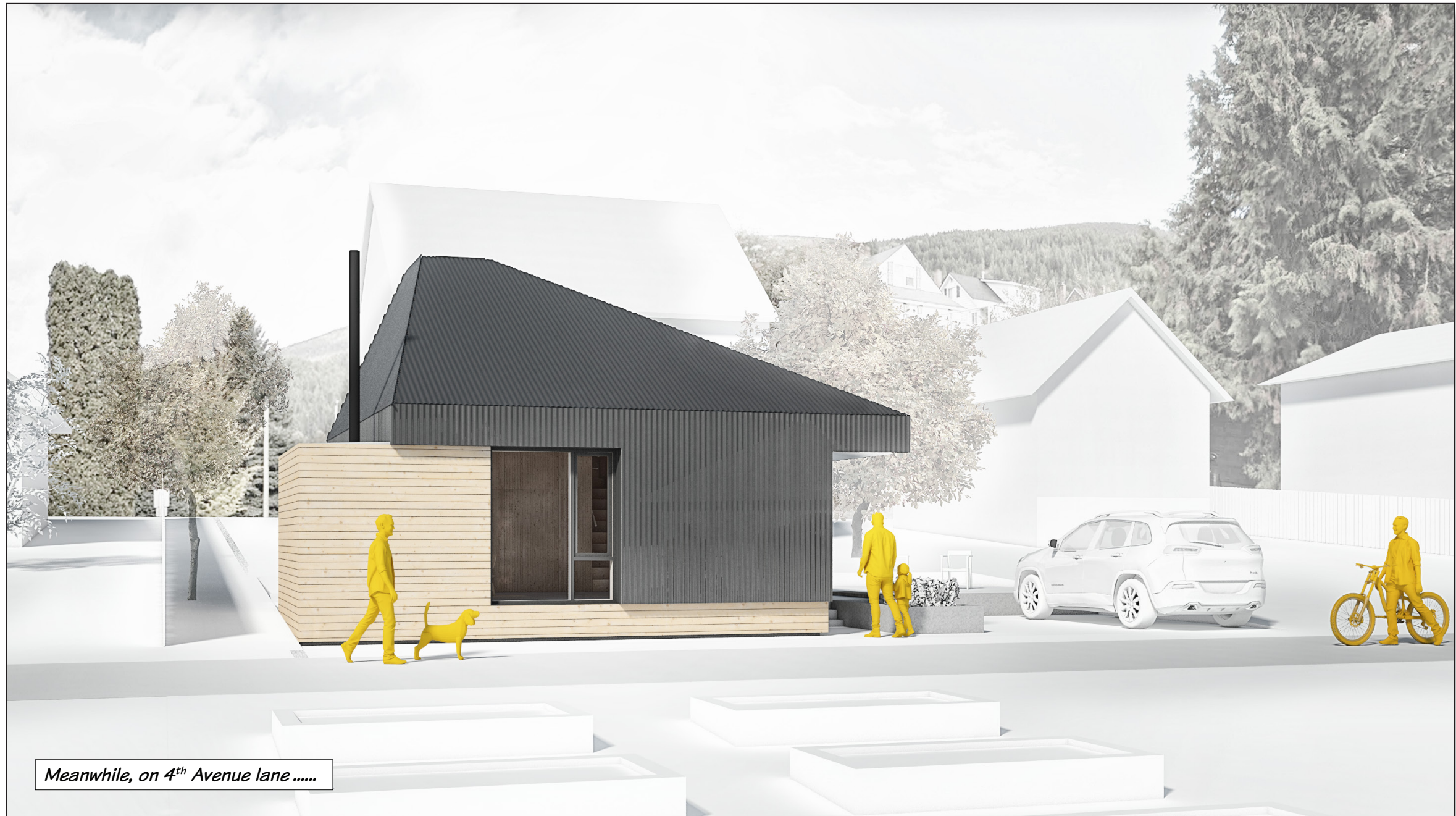
4. Place loft space on high side of slope + lift roof to peak.



*My favourite laneway to walk,
it's so vibrant with all the people!*

*This is my son, he just moved
into our laneway house!*

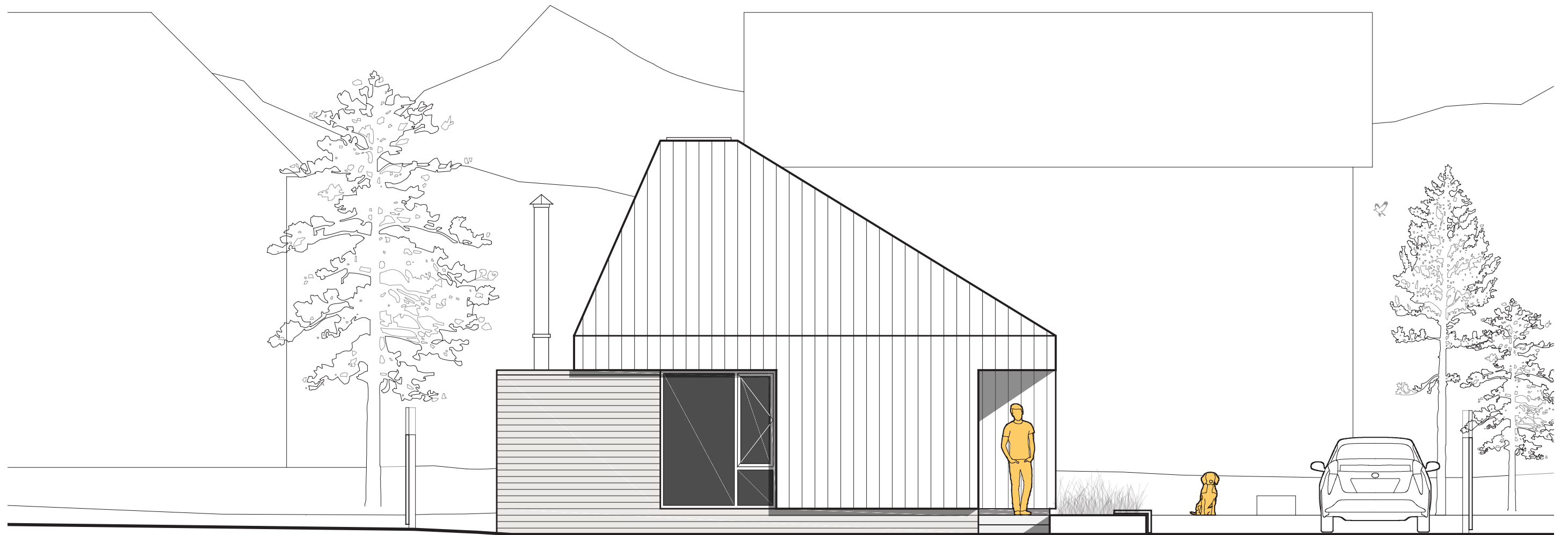
*I heard the new Peaks laneway
home is just down this street!*





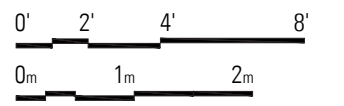
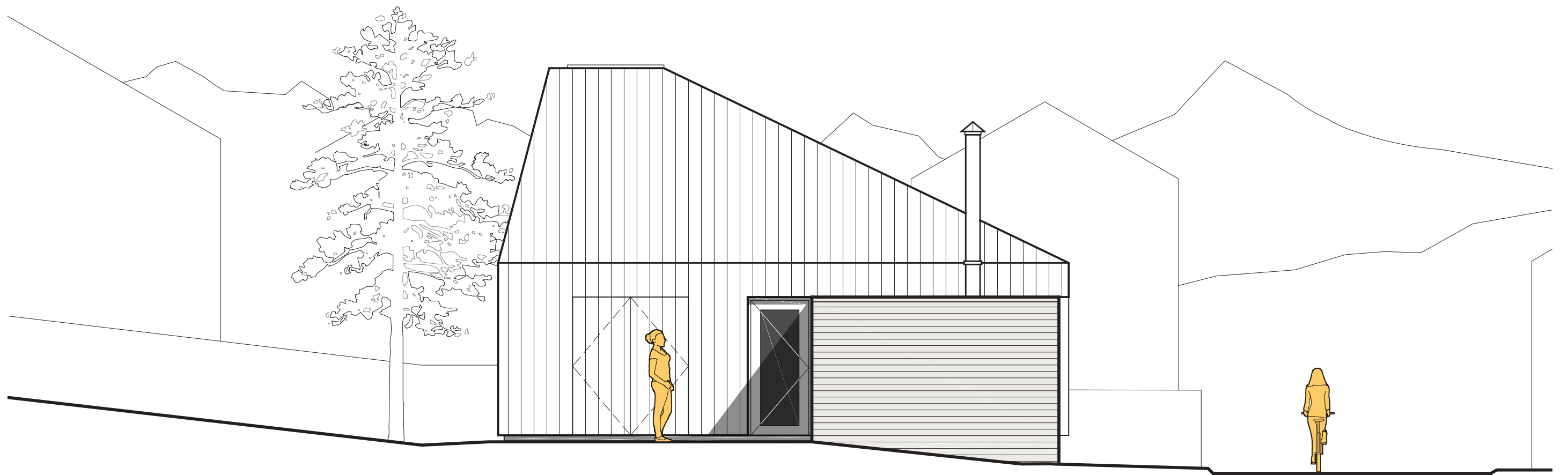




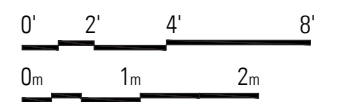
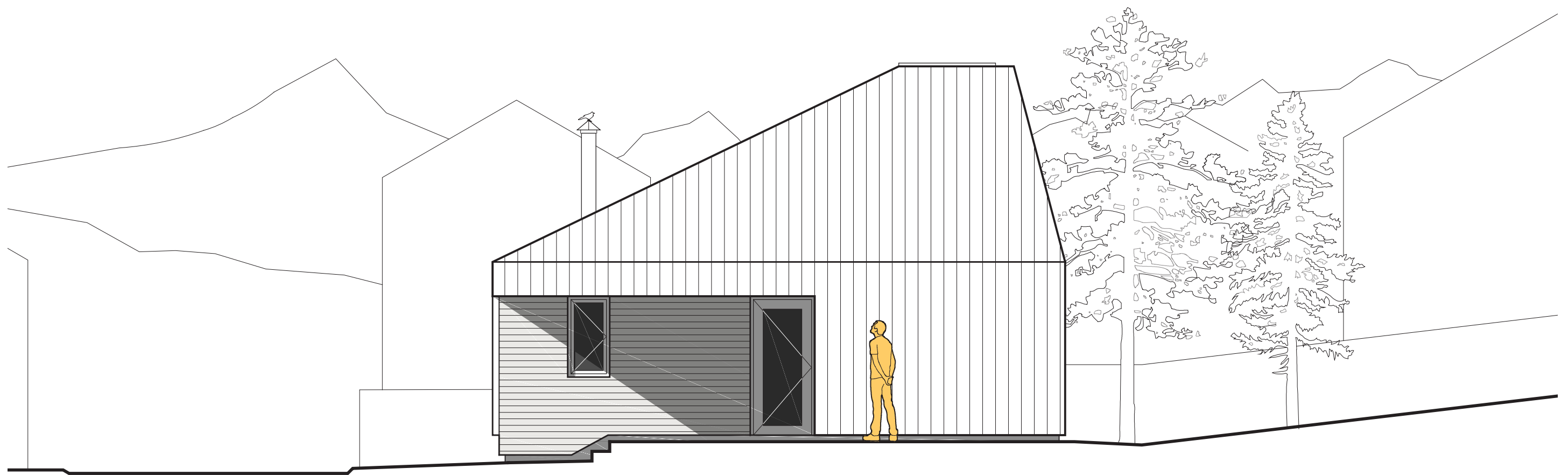


0' 2' 4' 8'
0m 1m 2m

Elevation 1 / Lane-side



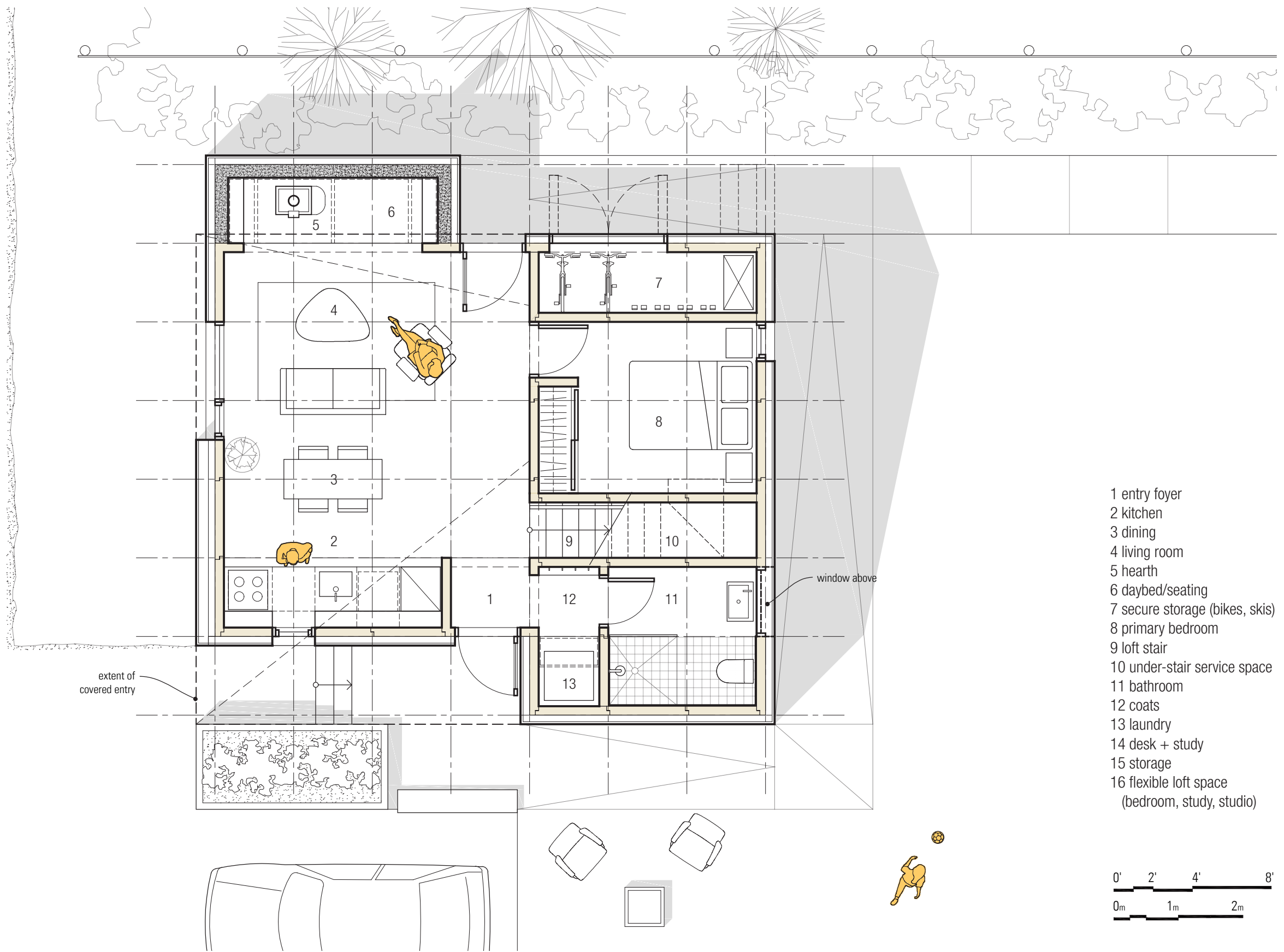
Elevation 2



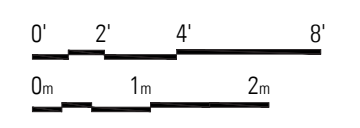
Elevation 3



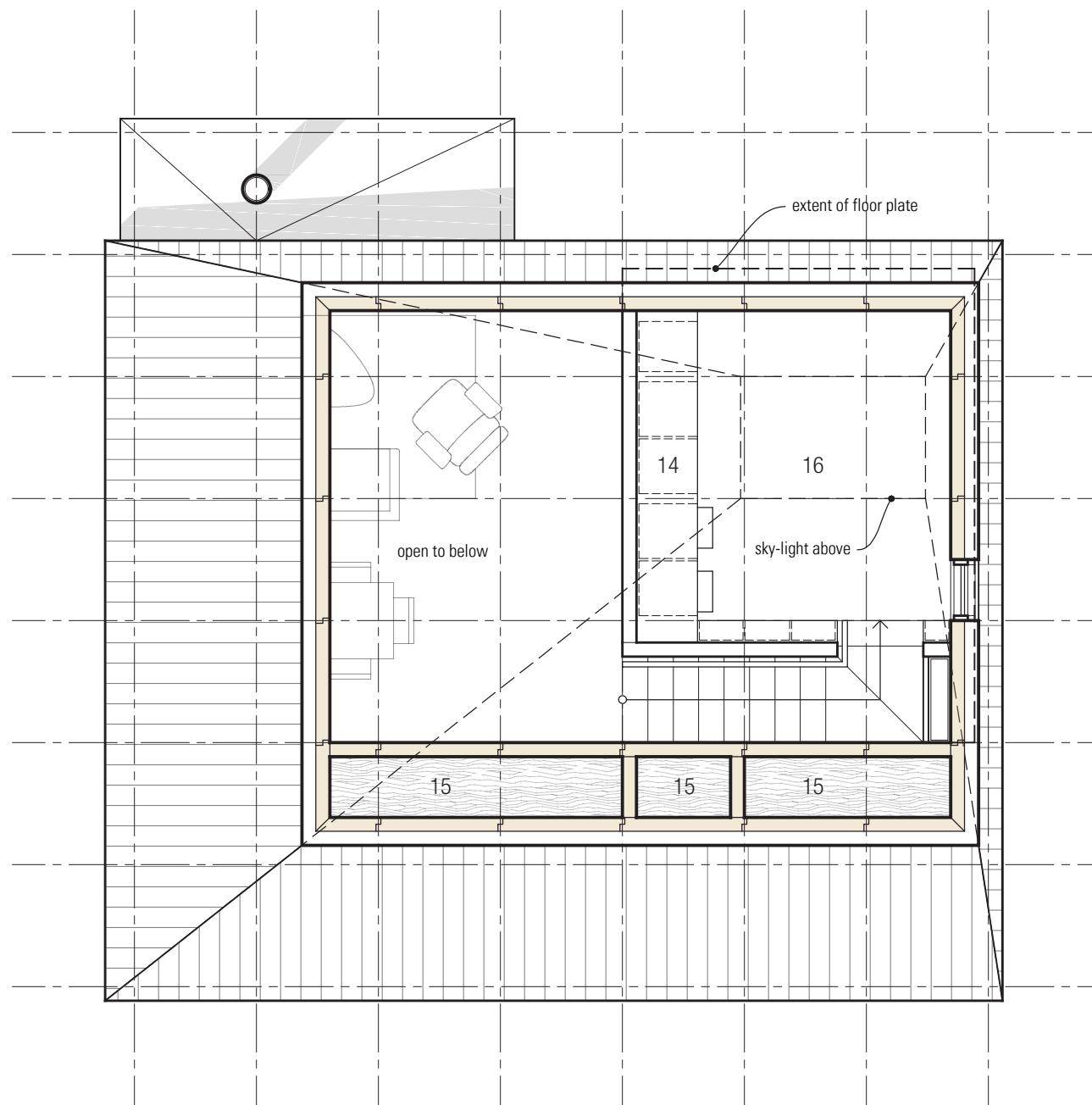
Elevation 4



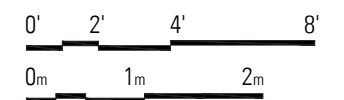
- 1 entry foyer
- 2 kitchen
- 3 dining
- 4 living room
- 5 hearth
- 6 daybed/seating
- 7 secure storage (bikes, skis)
- 8 primary bedroom
- 9 loft stair
- 10 under-stair service space
- 11 bathroom
- 12 coats
- 13 laundry
- 14 desk + study
- 15 storage
- 16 flexible loft space (bedroom, study, studio)



Ground Floor Plan / Orientation L1
(65.5m², 705 ft²)



- 1 entry foyer
- 2 kitchen
- 3 dining
- 4 living room
- 5 hearth
- 6 daybed/seating
- 7 secure storage (bikes, skis)
- 8 primary bedroom
- 9 loft stair
- 10 under-stair service space
- 11 bathroom
- 12 coats
- 13 laundry
- 14 desk + study
- 15 storage
- 16 flexible loft space
(bedroom, study, studio)



Loft Floor Plan / Orientation L1
(13.5m², 145 ft²)



Kitchen Perspective

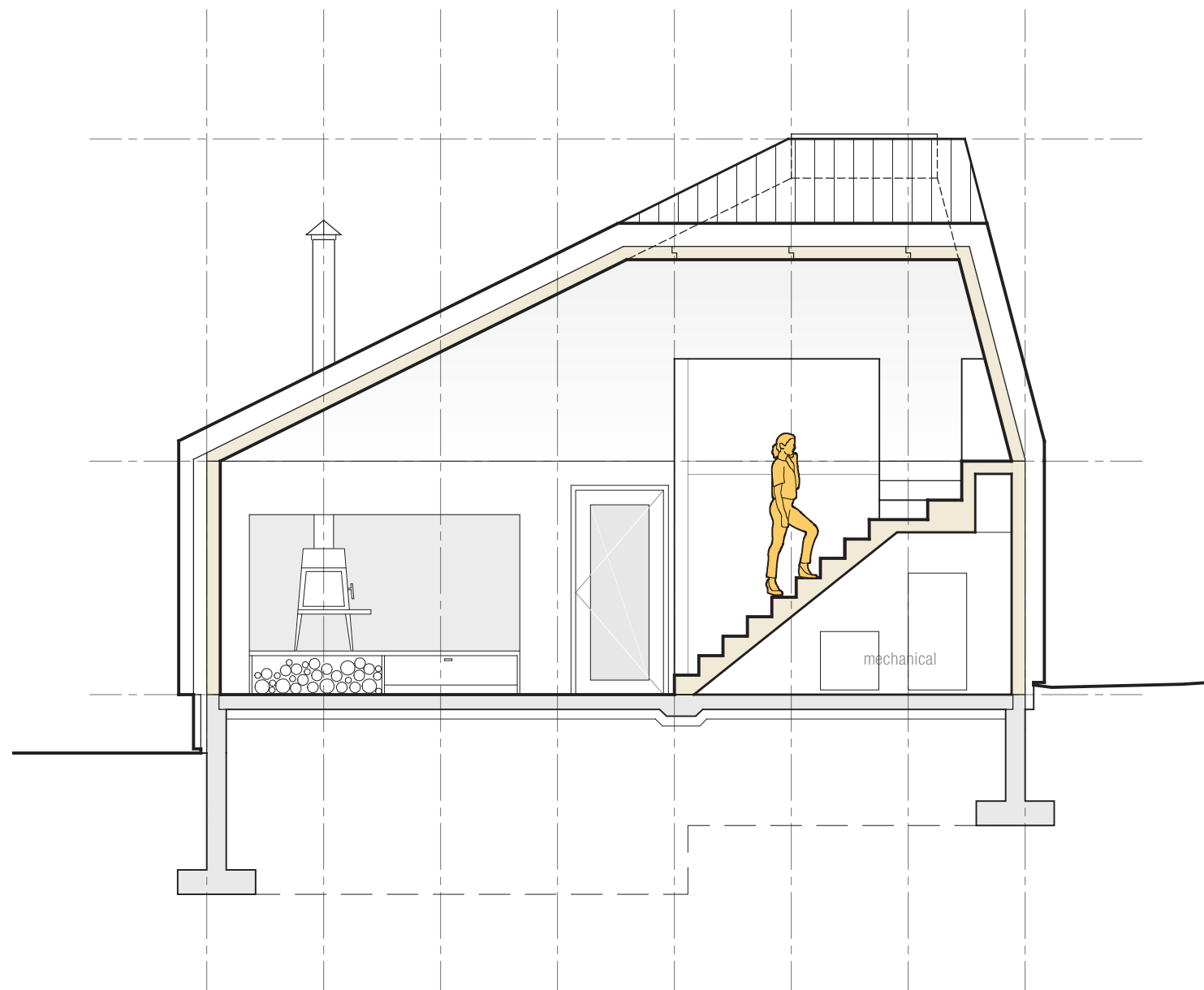


Hearth Perspective

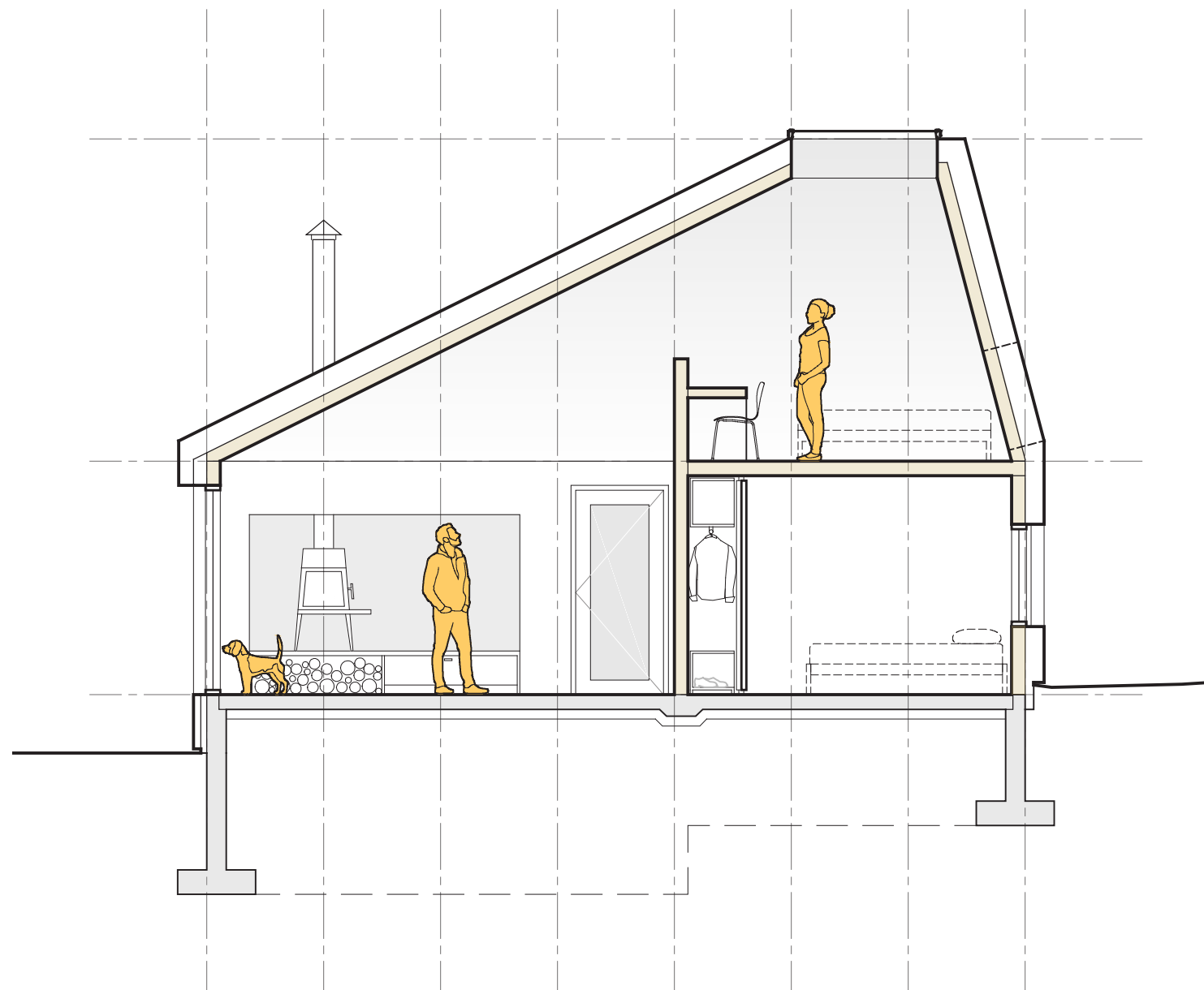


Loft Perspective

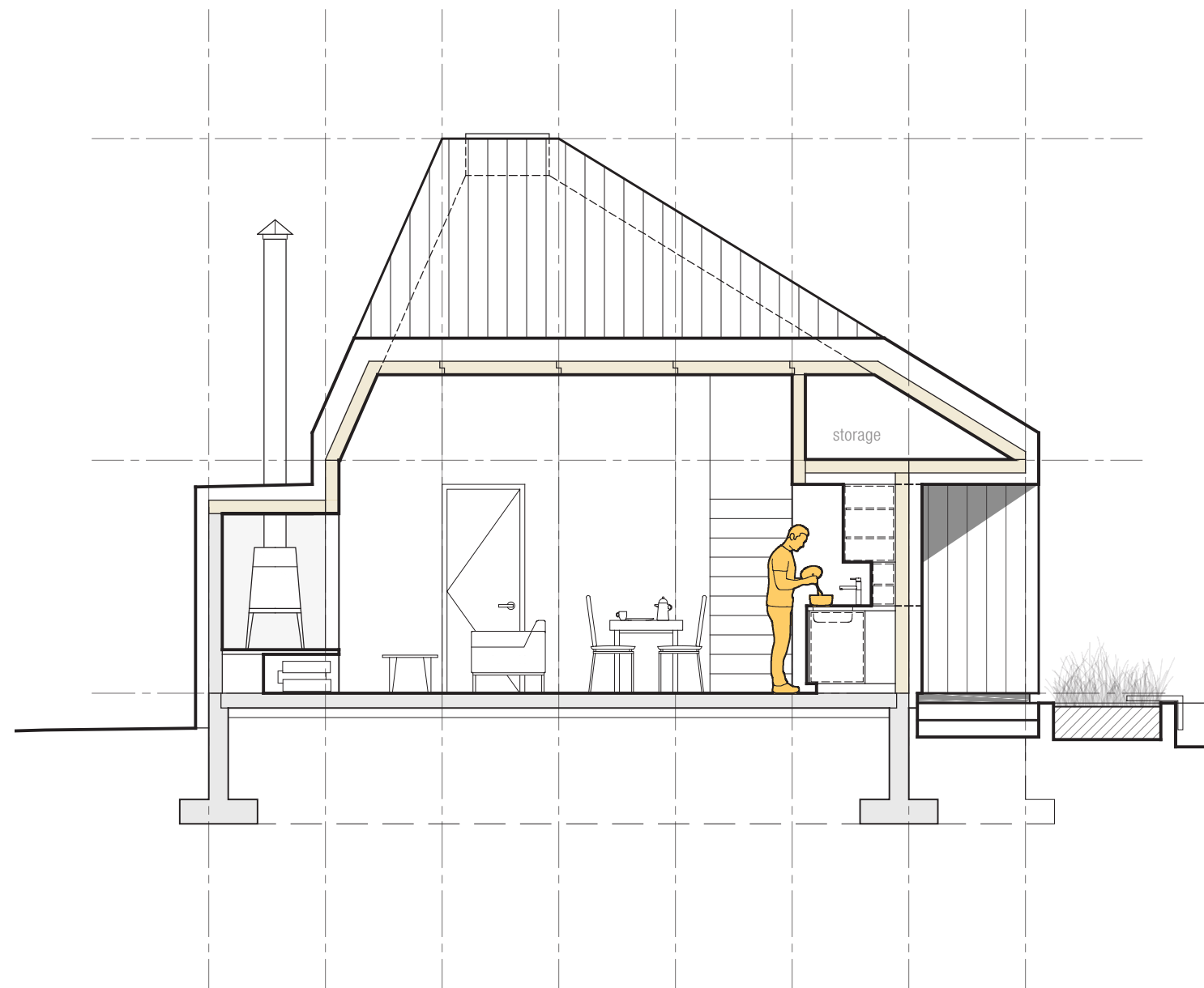




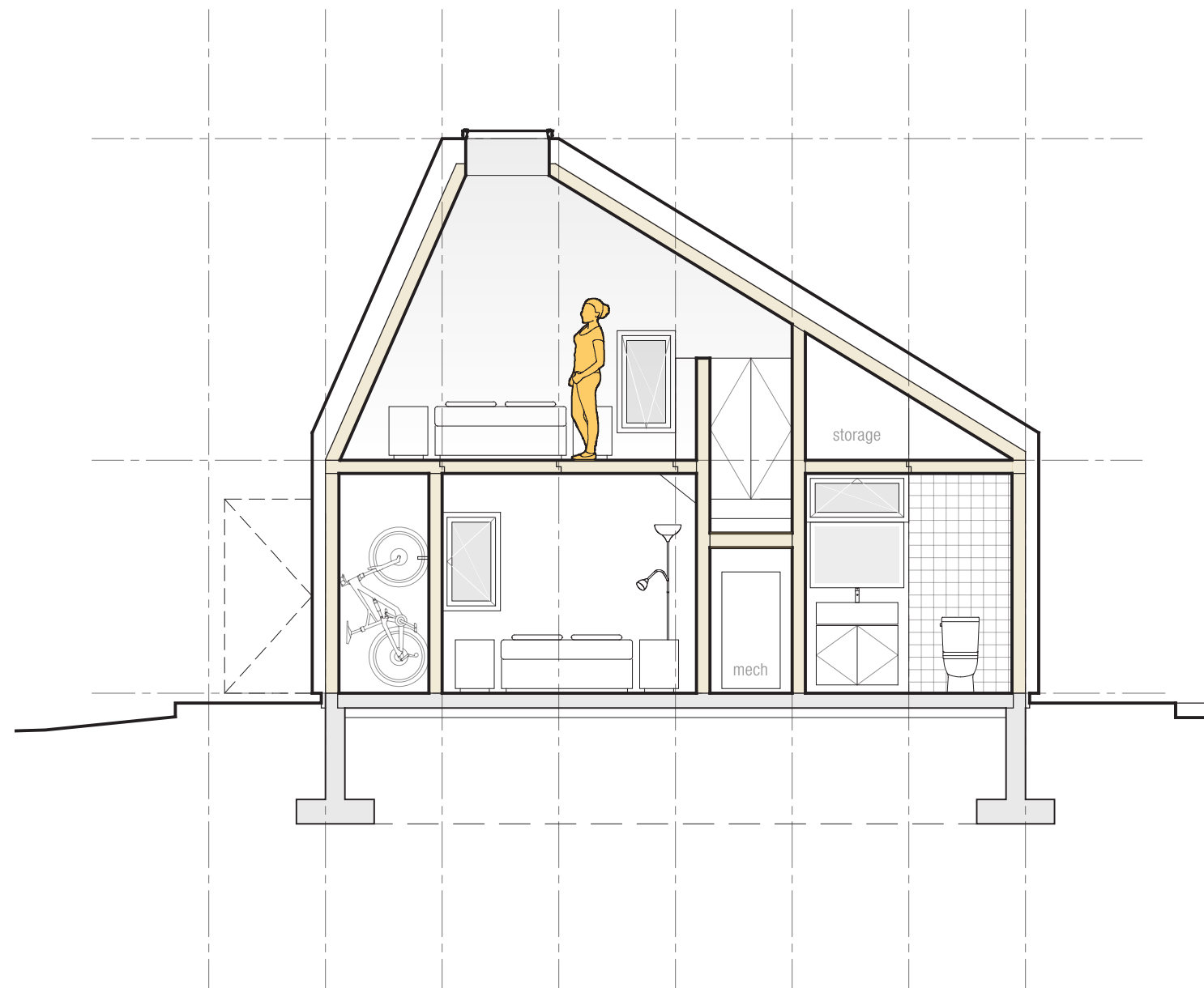
Section 1



0' 2' 4' 8'
0m 1m 2m



0' 2' 4' 8'
0m 1m 2m



0' 2' 4' 8'
0m 1m 2m

Site Strategy

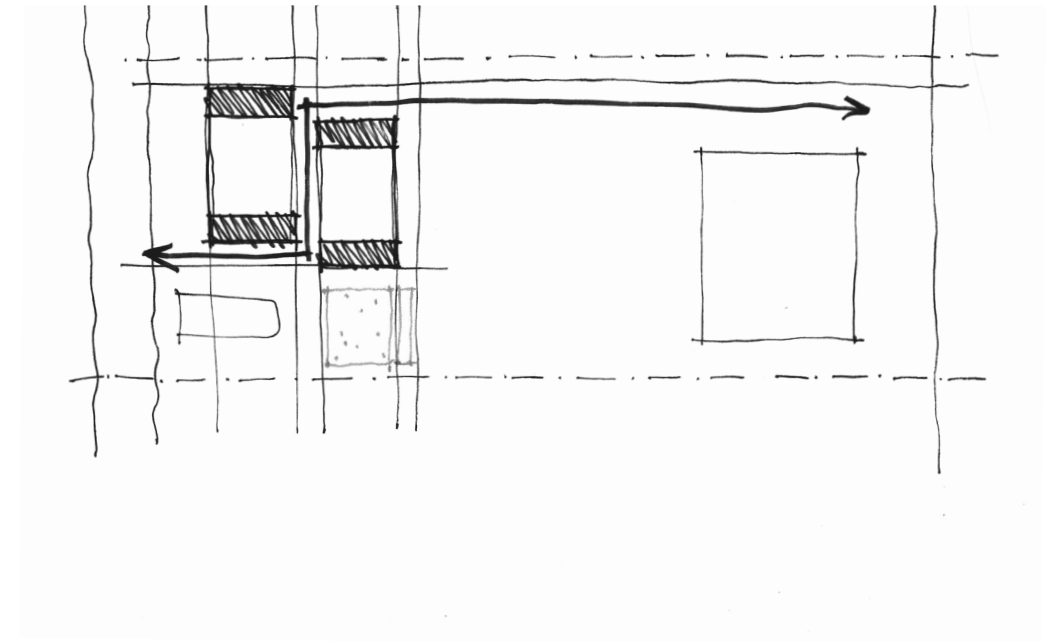
site layout

The dual aspect entry and square proportion of the building footprint allows the dwelling to be compatible with multiple site configurations. The floor plan is organized along a central corridor with exterior entrances at each side, enabling consistent access to the laneway, yard, and street-front in each building orientation.

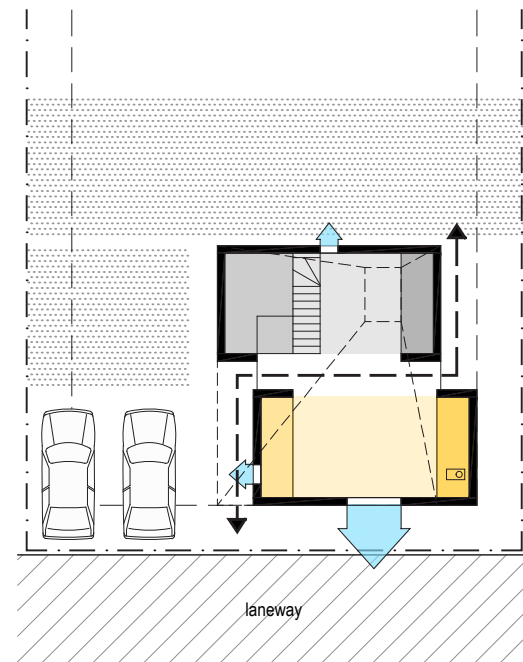
As noted in the following diagrams, the dwelling orientation can be modified in several ways, or combinations thereof (site position, mirroring, or rotation). This flexibility also allows the relationship to the laneway to be varied, and can change the degree of public connection or privacy as desired. The yellow colour on the diagram denotes primary public spaces (hearth, living, dining, kitchen), and the grey designates the private spaces (bedroom, storage, bathroom). The positional flexibility of the dwelling also allows for a various parking options, courtyard spaces, and landscaping opportunities to compliment the building.

The sculptural form of the *Peak* allows it to be a good urban neighbour. The pyramidal roof limits the perception of the dwelling having a specific front or back, and it does not place a tall wall against any one elevation. As well, carefully managed fenestration strategies find a balance between daylighting, connection to the outdoors, and privacy.

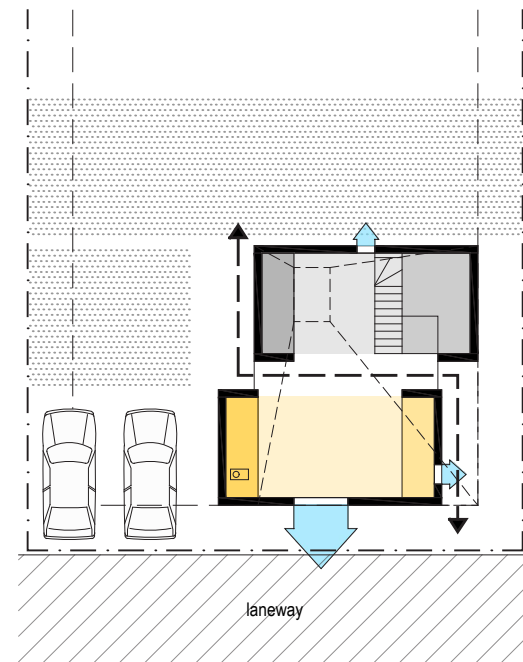
Further to the site layout diagrams, two building orientations (L1+L3) have been explored in detail to show suitability to a theoretical design site, typical of a City of Nelson block.



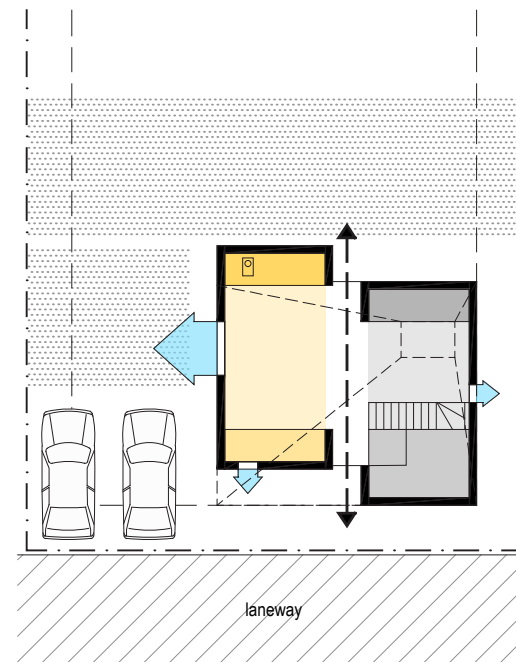




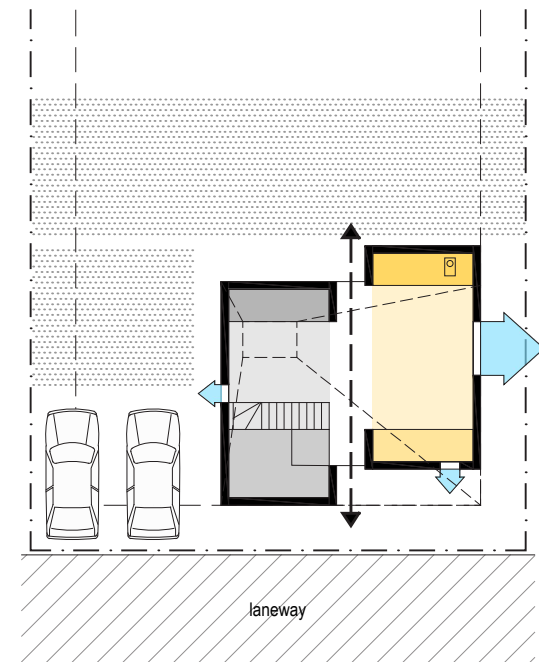
R-1



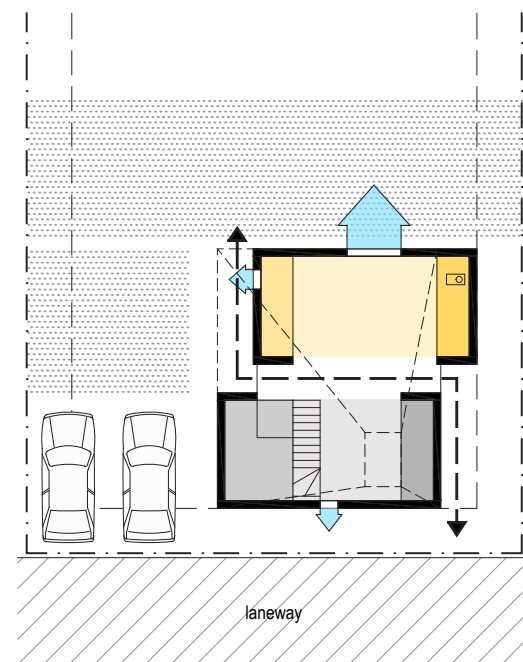
R-2



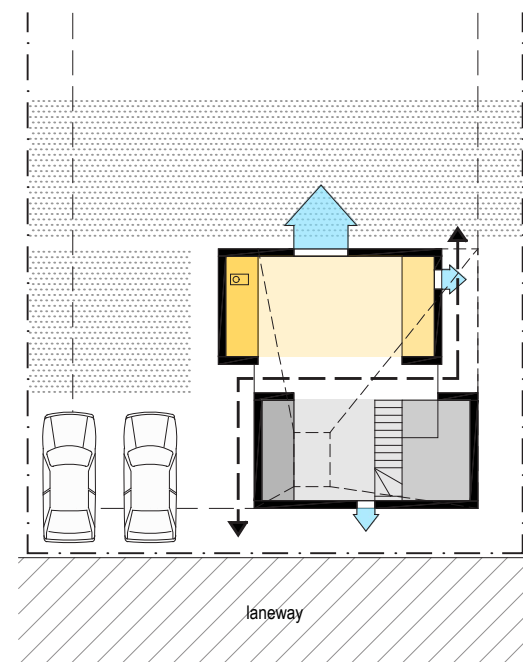
R-3



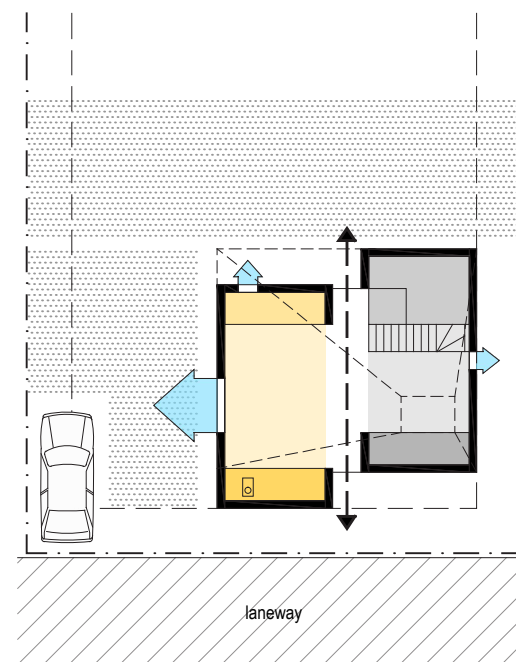
R-4



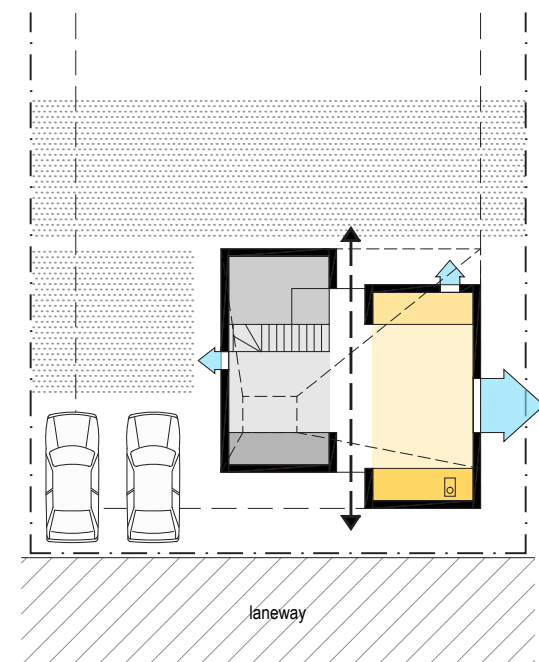
R-5



R-6

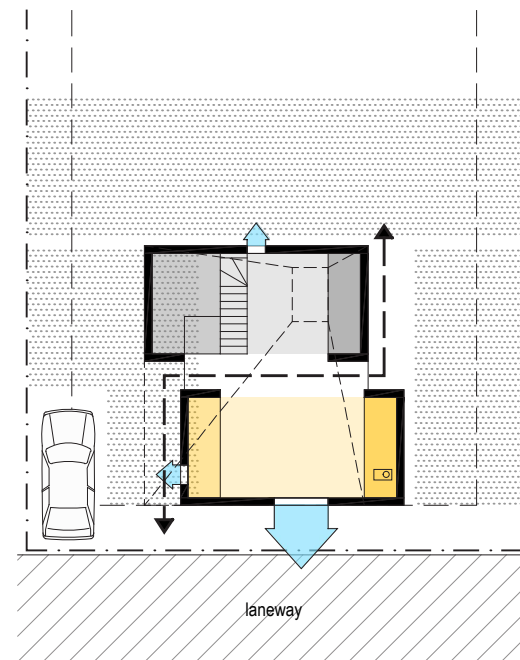


R-7

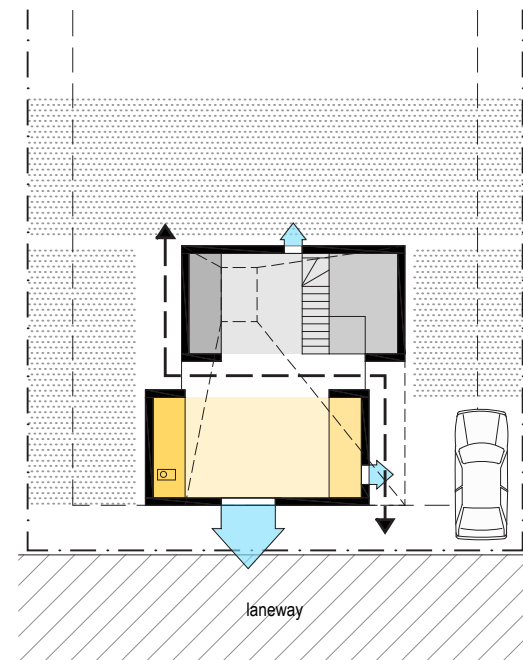


R-8

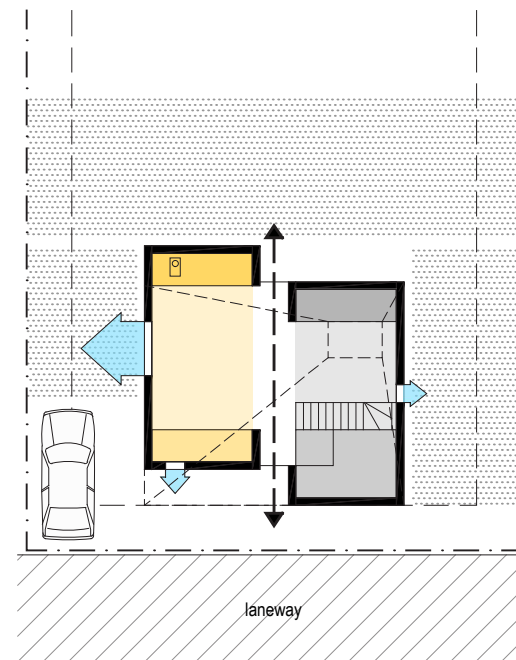




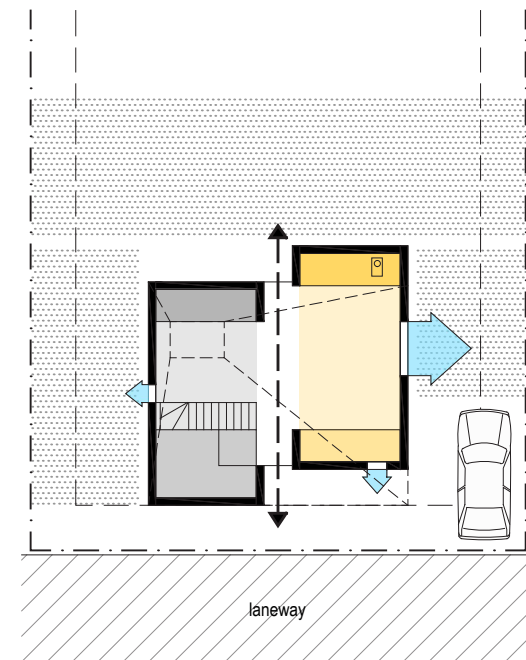
C-1



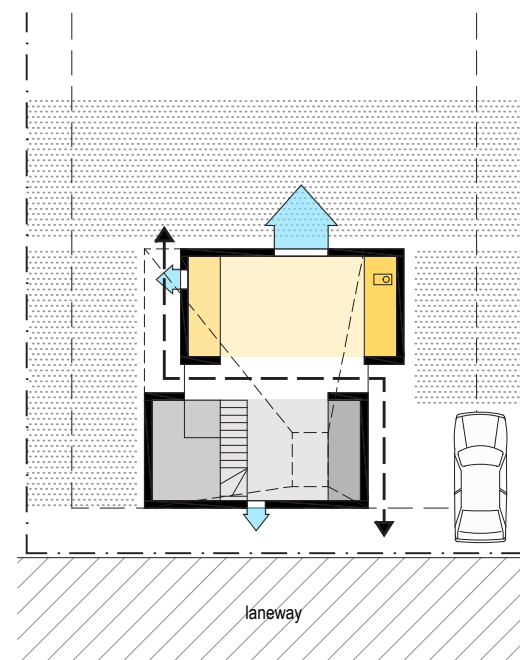
C-2



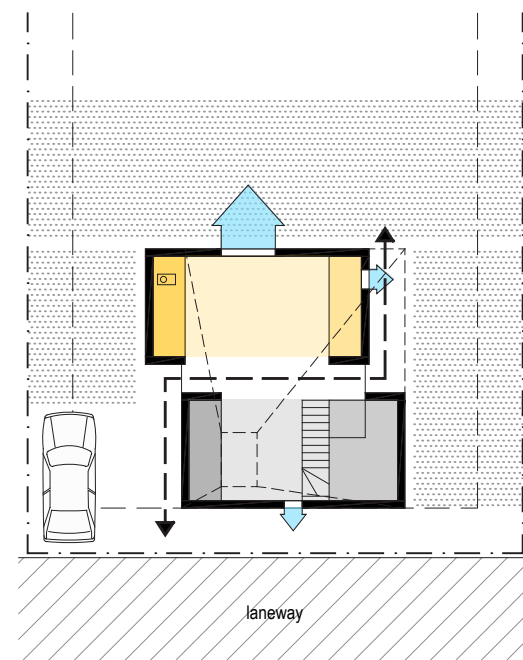
C-3



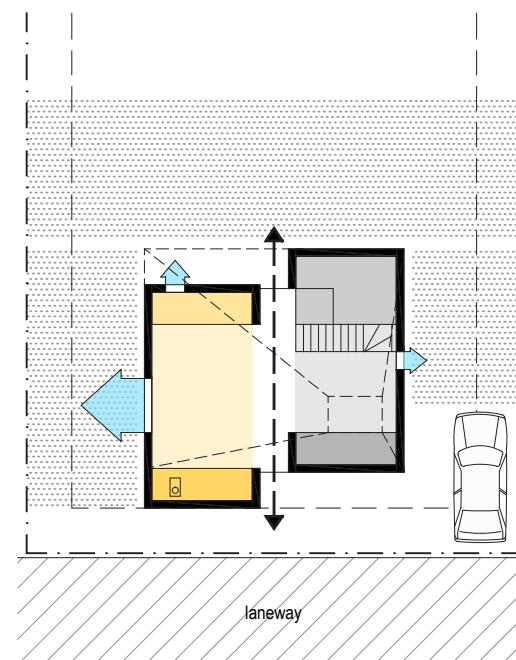
C-4



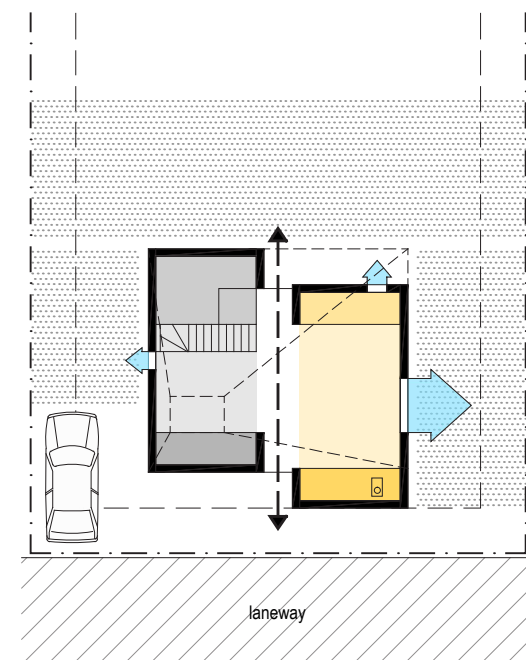
C-5



C-6

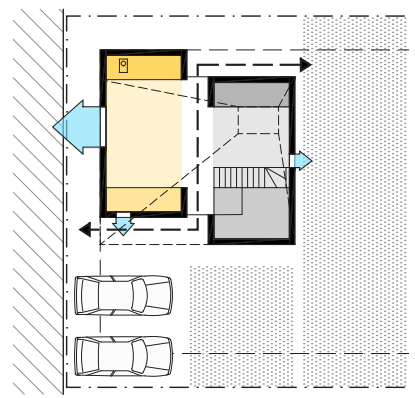
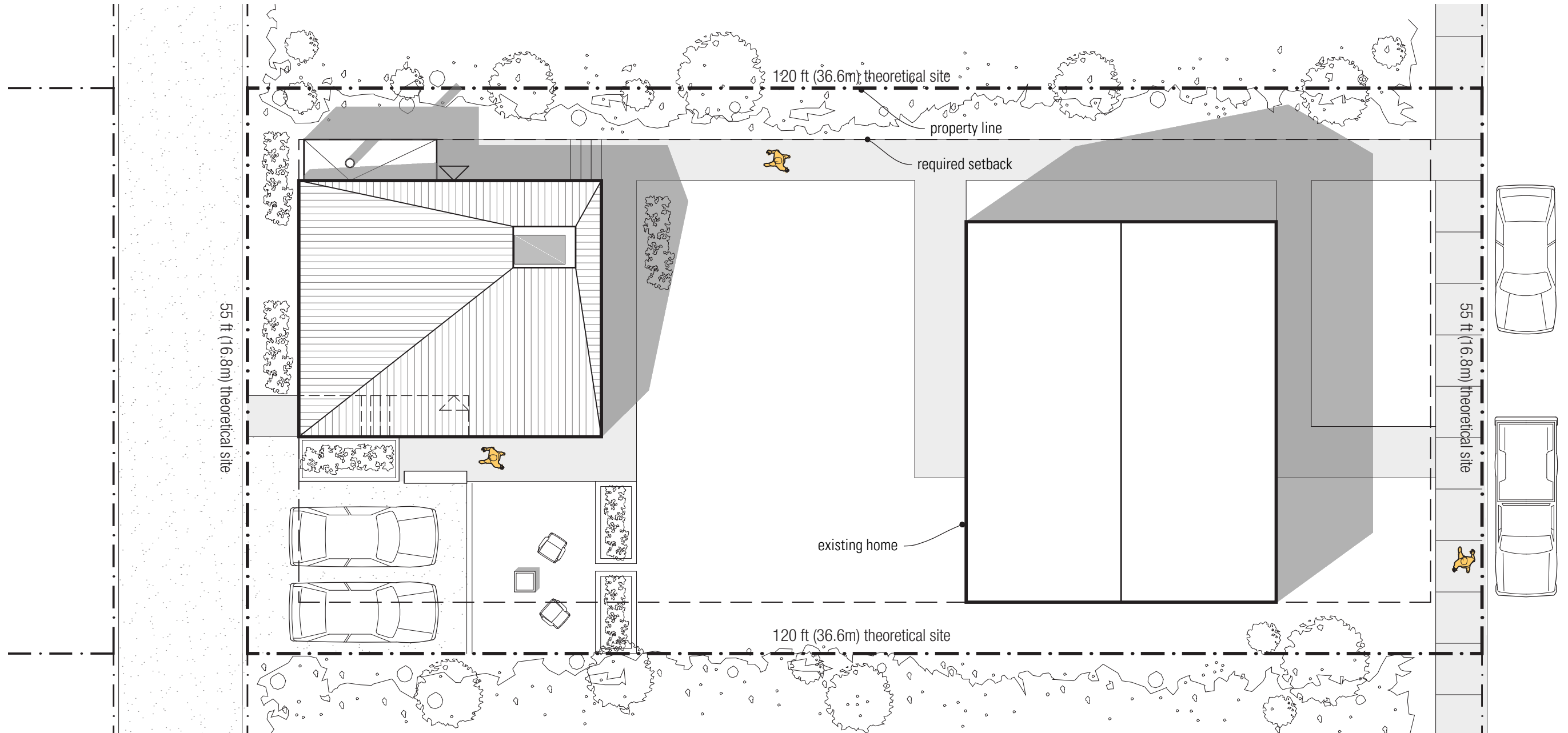


C-7

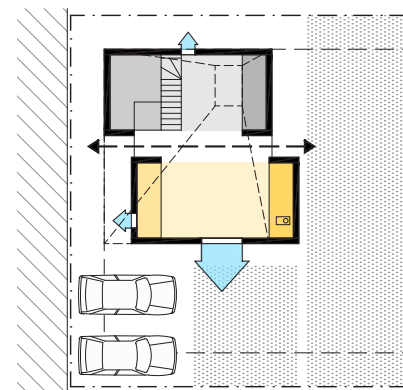
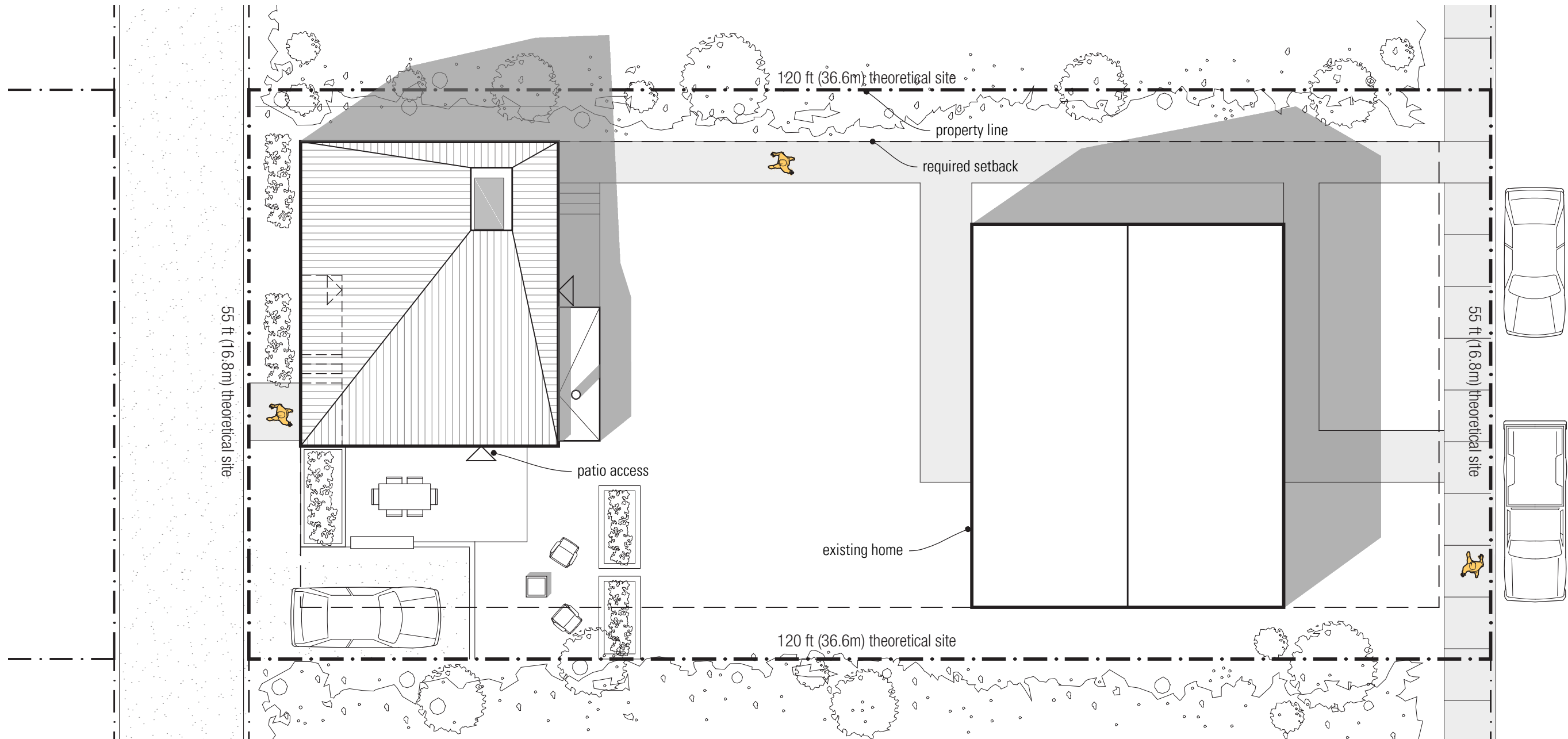


C-8





Site Plan / Orientation L1
(laneway home contribution to lot coverage = 10.9%)

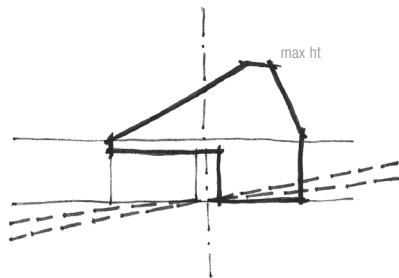


Site Plan / Orientation L3
(laneway home contribution to lot coverage = 10.9%)

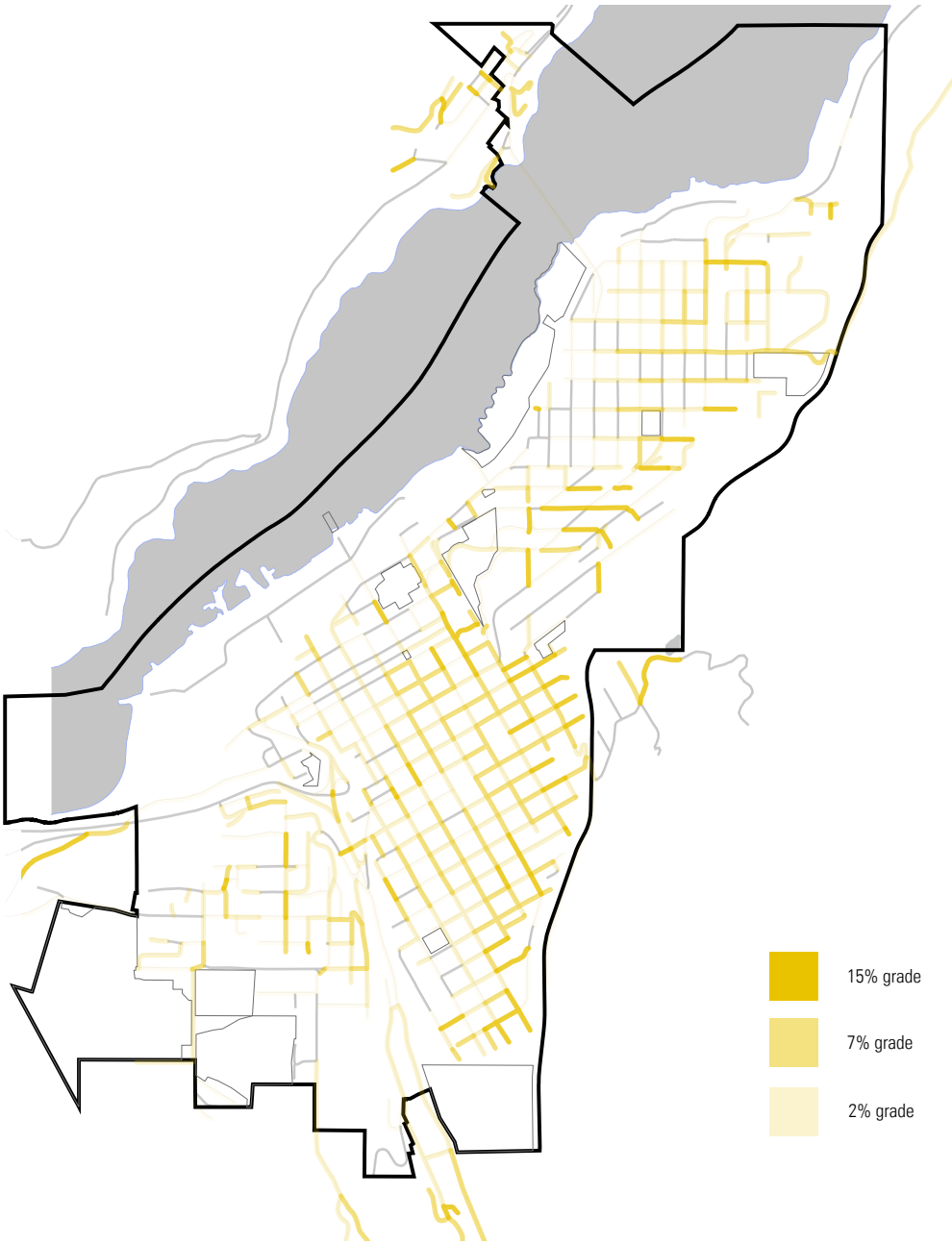
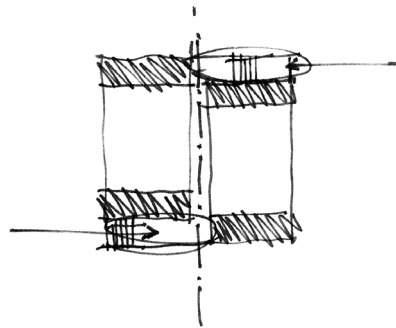
grade mitigation

The City of Nelson is organized on a typical urban grid plan set upon the steep Kootenay valley slopes. This hillside urban condition requires the built environment to respond accordingly. We have studied the adaptability of the *Peak* concept for three site grade conditions (2%, 7%, and 15%) which was informed by the average grade map of the city. The design concept accounts for slope in two primary ways:

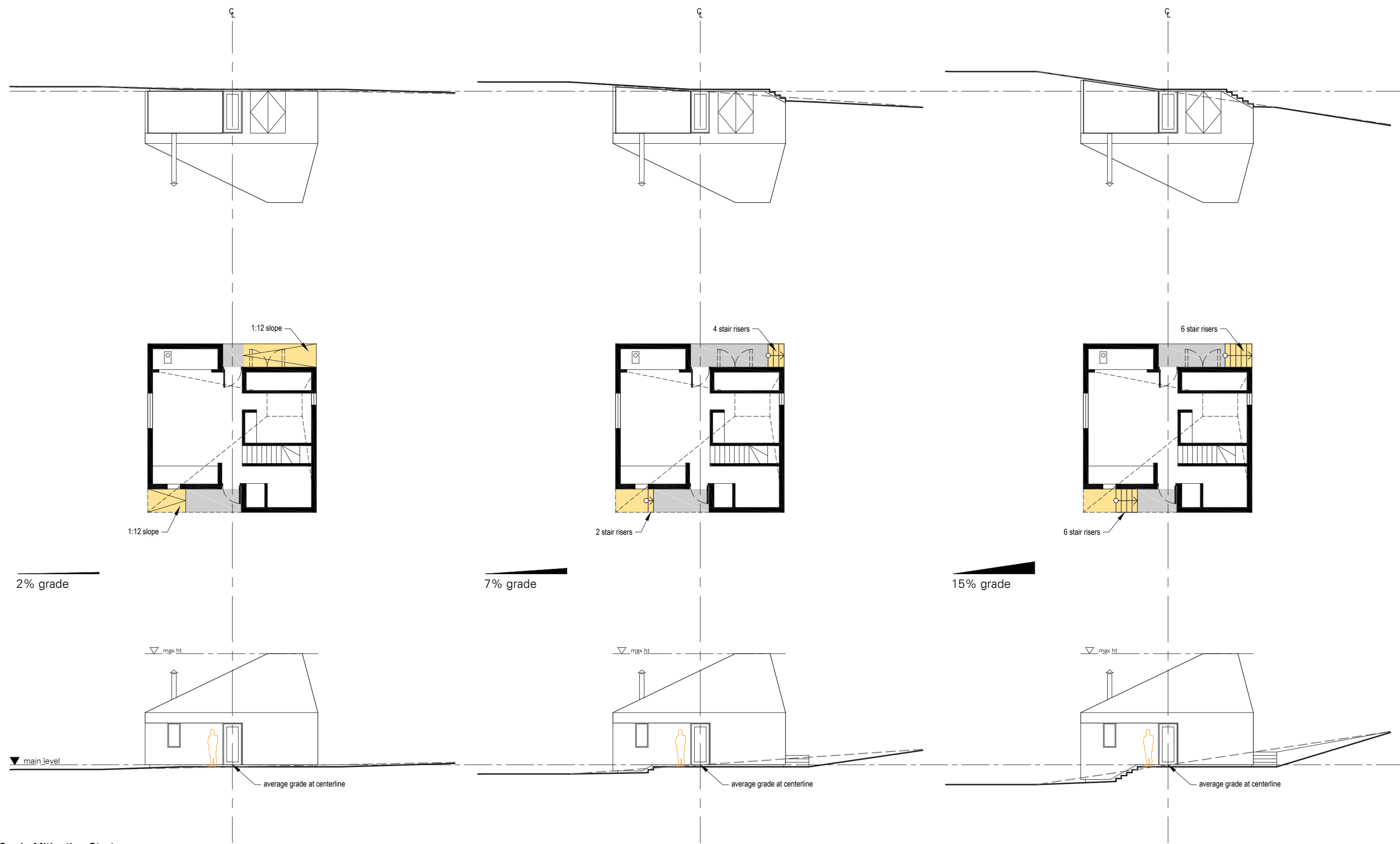
1) The facade/section can be *embedded* or *lifted* out of the earth while maintaining consistent height across average grade.



2) The *dual entrance* strategy allows for grade changes to be accounted for with steps prior to entering the dwelling. This strategy allows for a consistent floor level and limits complicated height adjustments within the plan. On the following diagrams the yellow fill indicates the exterior grade mitigation threshold spaces (steps or ramp slope).



City of Nelson Average Grades by Block
Map data courtesy of City of Nelson (<https://www.nelson.ca/DocumentCenter/View/730/Street-Grades-by-Block-PDF?bidId=>)



Grade Mitigation Strategy

Sustainable Systems

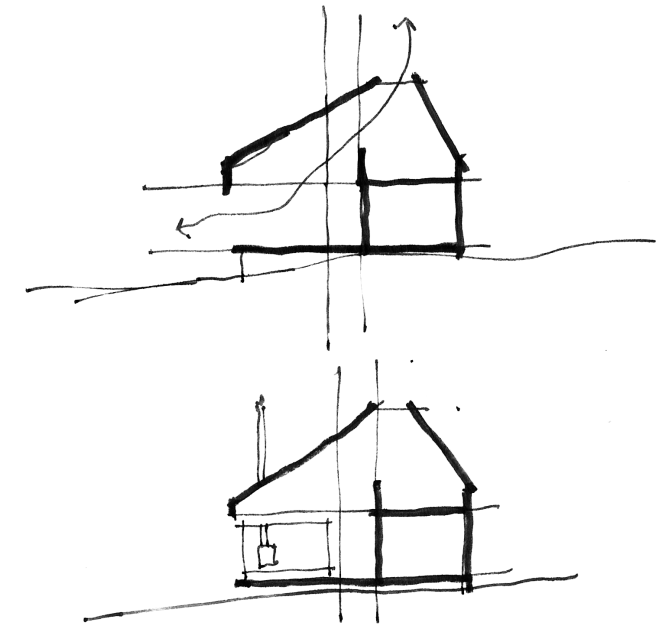
sustainability

The *Peak* is designed to maximize passive building strategies and limit environmental impacts. By incorporating strategies for natural ventilation, thermal mass, solar shading, strategic fenestration, and renewable resources, the project seeks to be environmentally responsible. The design also has the capability to engage various systems to compliment the passive design, such as solar panels, solar hot-water heaters, heat recovery ventilation and heat pumps.

The proposed mass timber construction system capitalizes on a renewable resource that is locally manufactured, greatly reducing its carbon footprint. As noted, the system has many sustainable attributes, helping to create an environmentally responsible building structure. With material strategies such as exposed concrete and CLT panels, the project is about building with less, and celebrating materials for their natural beauty.

The proposed construction assemblies are anticipated to meet or exceed the current British Columbia STEP Energy Code, and are prepared to accept further levels of compliance.

Native landscaping and softscaped terraces are also suggested to allow for storm-water management.



"I cannot pursue my architecture without considering the minimization of energy consumption, simple and direct technologies, a respect for site, climate, place and culture. Together, these disciplines represent for me a fantastic platform for experimentation and expression. Of particular importance is the junction of the rational and the poetic resulting hopefully in works that resonate and belong to where they reside." **Glenn Murcutt**

construction system

The *Peak* concept has been designed with a mass timber system, commonly known as cross-laminated timber. The forests of British Columbia offer excellent source material for mass timber, and the panels are locally manufactured within the province's interior region. British Columbia has become a world leader in this type of construction, and this project would provide an opportunity to exemplify regional excellence in both the craft and supply of this system.

A summary of the benefits of mass timber construction include:

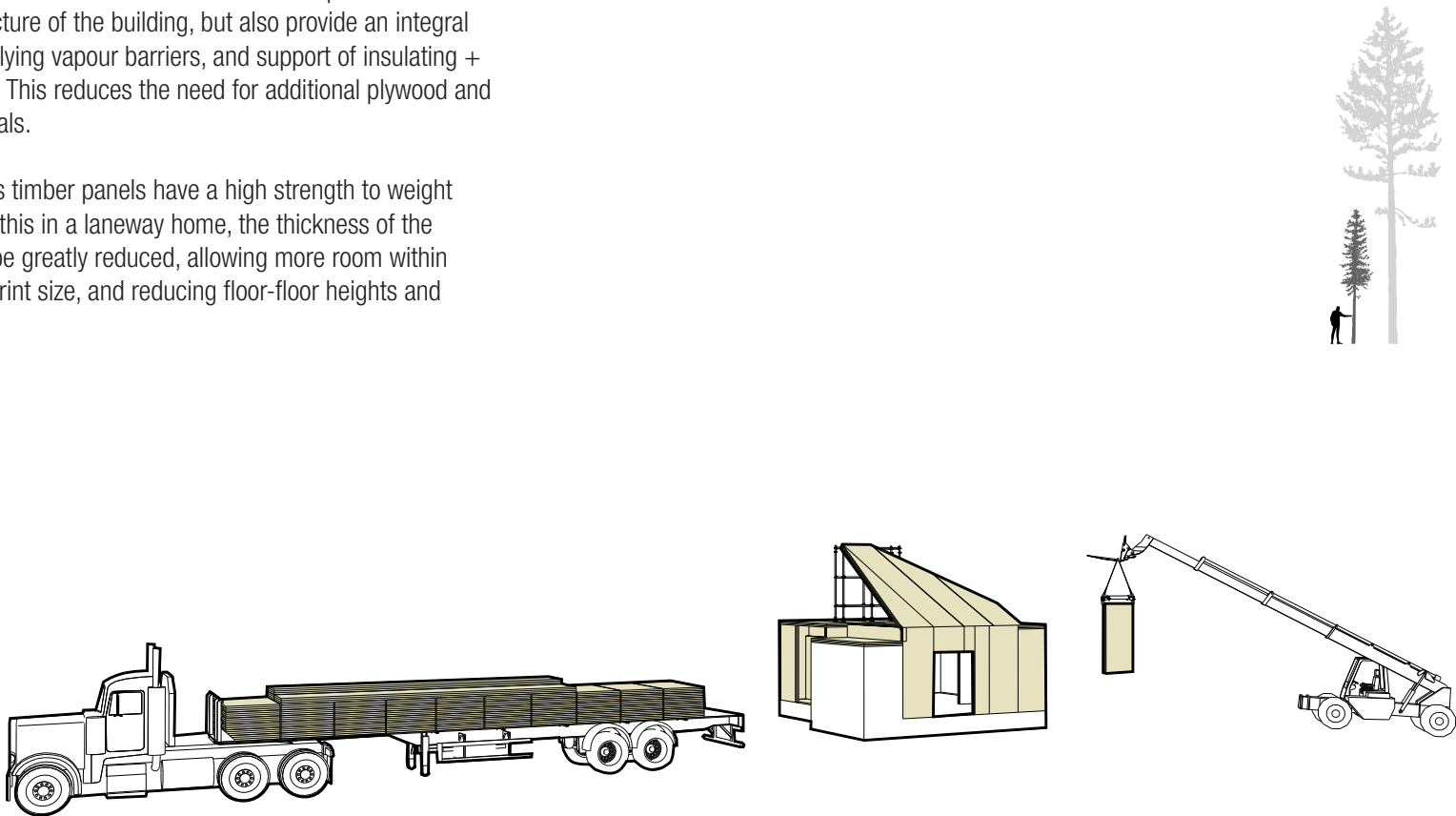
- **Prefabrication:** By manufacturing the cross-laminated timber building panels off-site there is reduced labour required in the field. An efficiency can be gained through the prefabrication process and having the product delivered to site ready for construction.
- **Schedule:** The prefabrication of the primary structure allows it to be erected quickly, limiting site disturbance and labour time on site.
- **Cost:** Mass timber systems can be comparable to traditional framing and construction methods. Advantages are obtained in efficient construction, and reduced labour requirements.

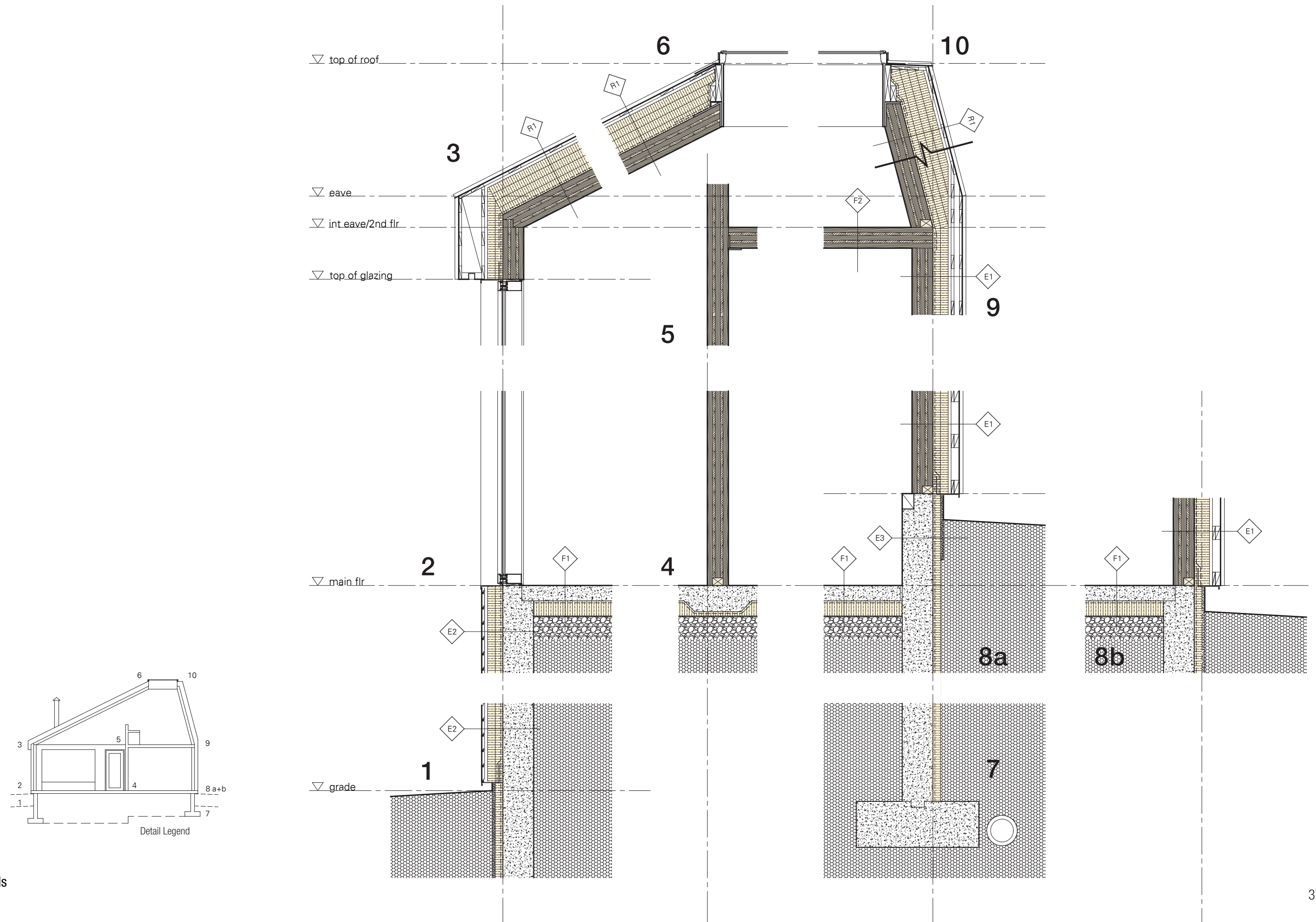
- **Acoustic Isolation:** The mass of the cross-laminated timber system allows for increased acoustic isolation of the dwelling. Given the proximity of laneway houses to the street, this is an important benefit to help limit infiltration of unwanted vehicle and neighborhood noise.
- **Environmental Impact:** Cross-laminated timber has a lower environmental impact than other construction systems. Wood construction is a sustainable and renewable resource under proper resource management practices, and has a low level of embodied carbon. As well, cross-laminated timber is fabricated by laminating small dimension lumber into larger sections, reducing the demand for larger logs and the harvesting of old growth forests. The product is also recyclable at the end of its service life.
- **Integral Substrate:** The cross-laminated timber panels form not only the structure of the building, but also provide an integral substrate for applying vapour barriers, and support of insulating + facade materials. This reduces the need for additional plywood and sheathing materials.
- **Strength:** Mass timber panels have a high strength to weight ratio. By utilizing this in a laneway home, the thickness of the assemblies can be greatly reduced, allowing more room within a restricted footprint size, and reducing floor-floor heights and

building volume. Some estimates anticipate cross-laminated timber to provide 8-10% more habitable space than traditional construction methods.

- **Insulation:** Mass timber panels have an insulation value of ~R 1.25/inch.
- **Aesthetics:** Additional wall finishes are not required, as the wood finish can be left exposed, limiting additional material use and costs.

While we see many benefits to using this system, the project does not rely on it and can be traditionally framed as well, with alternate finishes selected.





assembly type summary

Roof Type (R1)

- standing seam metal roofing
(option for pre-finished corrugated galvalume)
- 3/4” horizontal strapping
- 3/4” vertical strapping (down-slope)
- rock-wool exterior insulation (R40 min STEP energy code)
- self adhered vapour barrier membrane
- cross laminated timber structure (SPF J-grade, exposed interior face)

Exterior Wall Type 1 (E1)

- standing seam metal siding
(option for pre-finished corrugated galvalume)
- 3/4” horizontal strapping
- 3/4” vertical strapping
- rock-wool exterior insulation (R18 min STEP energy code)
- self adhered vapour barrier membrane
- cross laminated timber structure (SPF J-grade, exposed interior face)

Exterior Wall Type 2 (E2)

- 3/4” horizontal ship lap wood boards
(option for pre-finished metal, horizontal orientation)
- 3/4” vertical strapping
- rock-wool exterior insulation (R18 min STEP energy code)
- self adhered vapour barrier membrane
- reinforced concrete wall

Exterior Wall Type 3 (E3)

- pre-finished cement board at area exposed above grade
- rock-wool exterior insulation (R18 min STEP energy code)
- drainage board
- vapour barrier membrane
- reinforced concrete foundation wall
(architectural conc finish on faces exposed to interior)

Floor Type 1 (slab on-grade) (F1)

- reinforced concrete slab (steel trowel finish w/surface hardener)
- poly vapour barrier membrane
- rock-wool exterior insulation (R11 min STEP energy code)
- 6” minimum compacted gravel sub-grade

Floor Type 2 (loft) (F2)

- cross laminated timber structure (SPF J-grade, both faces)

material selection summary

Standing Seam or Corrugated Metal Facade + Roofing:

- Fire resistant, durable and extended life span, various finish options (profiles, colours etc), limited maintenance requirements, thermal advantages (reflective), locally available, and has limited snow retention.

Rock-Wool Comfort Board Rigid Exterior Insulation:

- Environmentally sustainable, locally available, fire resistant, high r-value/inch, vapour permeable, continuous thermal break, high compressive strength, resistant to mold.

Self Adhered Vapour Barrier:

- Continuous vapour seal, reduced air changes/hour, flexible, self sealing, durable.

Drainage Board:

- Reduction of hydrostatic pressure at foundation, consistent drainage plane to weeping tile system, limited foundation wall moisture infiltration.

Concrete Slab on Grade (finished floor):

- Integral finish not requiring additional flooring material, thermal mass advantages, ability to integrate in-floor heat.

Concrete Hearth Box (exposed to interior):

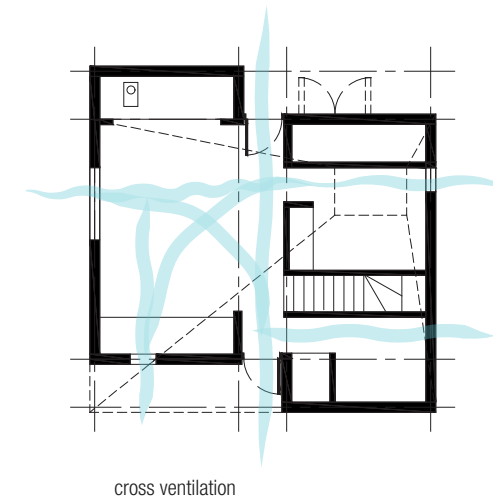
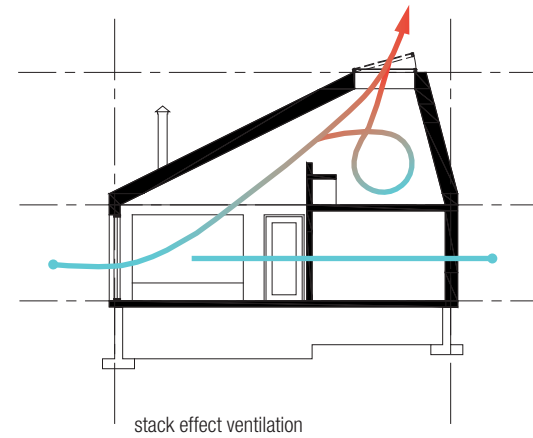
- Fire resistant, shear strength capability.

Cross-Laminated Timber:

- Refer to construction system information.

natural ventilation

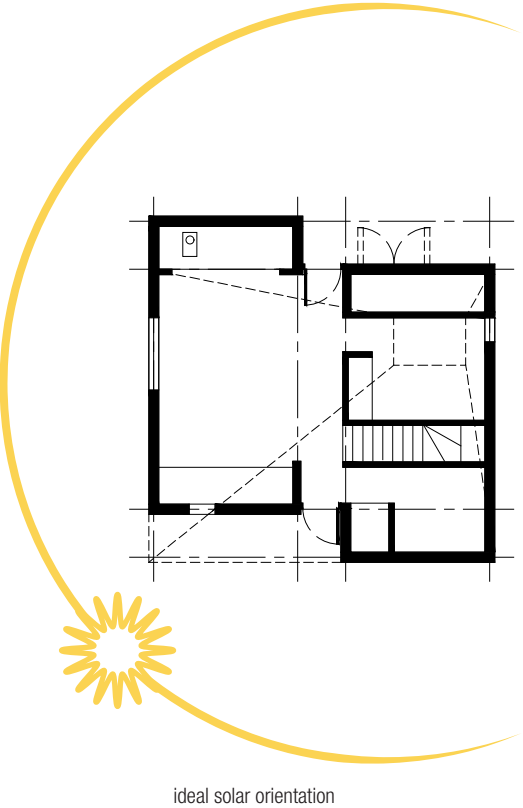
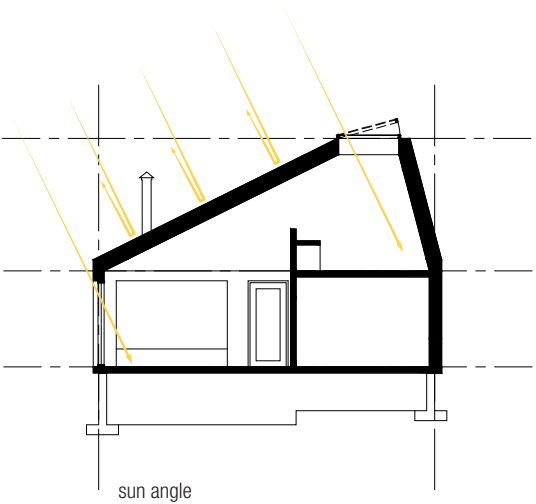
The design concept benefits from an interconnected floor space, allowing vertical air flow and “stack effect” ventilation through the operable skylight. The adjacent operable windows also promote cross ventilation, helping to provide a means of natural ventilation, aiding in efficient heating/cooling.



solar orientation

Through careful building orientation the dwelling can utilize sunlight for heat and light, reducing its reliability on electricity. By the shape of the roof plane, it is a shading element, protecting from excessive heat gains. East and west exposures are also limited, reducing early and late day heat gains. As referenced in the Step Energy Code, site orientation can reduce solar gain by up to 30-40%.

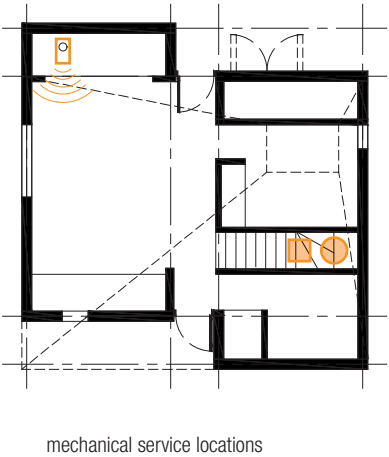
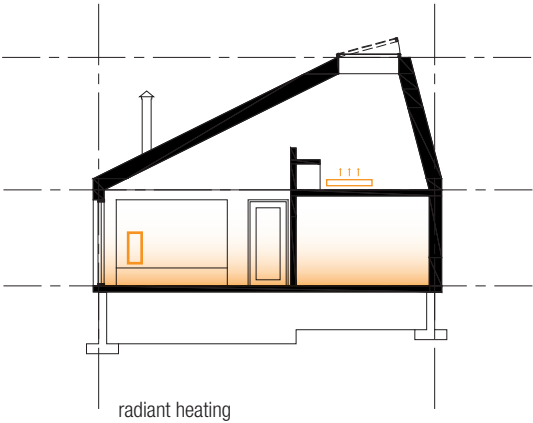
The primary entrance has an overhang, providing a protected entry. Each site orientation will require study to achieve optimal building orientation, and consideration of site specific shading and exposure factors.



heating and cooling

There are modes of heating and cooling that minimize reliance on carbon fuels, and maximize energy efficiency. By utilizing primarily electrically powered heating systems, consumption can be offset with regional wind and solar power utilities, limiting the reliance on traditional fuels. The proposed heating and cooling system strategies include:

- 1) *In-floor radiant heating* would allow the thermal mass of the concrete floor slab to be utilized in maintaining a consistent building temperature. This heat source would be generated by a boiler system, with the option to have it powered with electricity, or natural gas. A supplemental electric baseboard heater would be required to heat the loft space, however, some heat would naturally rise to the upper loft area (interconnected floor space). On a hot day the concrete floor slab will aid in keeping the space cool.
- 2) A *heat-pump* system would be an efficient means of heating the space by drawing on the ambient air temperature differential. The system would have the ability to be reversible for cooling capabilities as well.
- 3) A *wood-burning fire place* offers supplemental heat, and the ability to maintain a backup system in the case of disruption to the energy/utility grid.



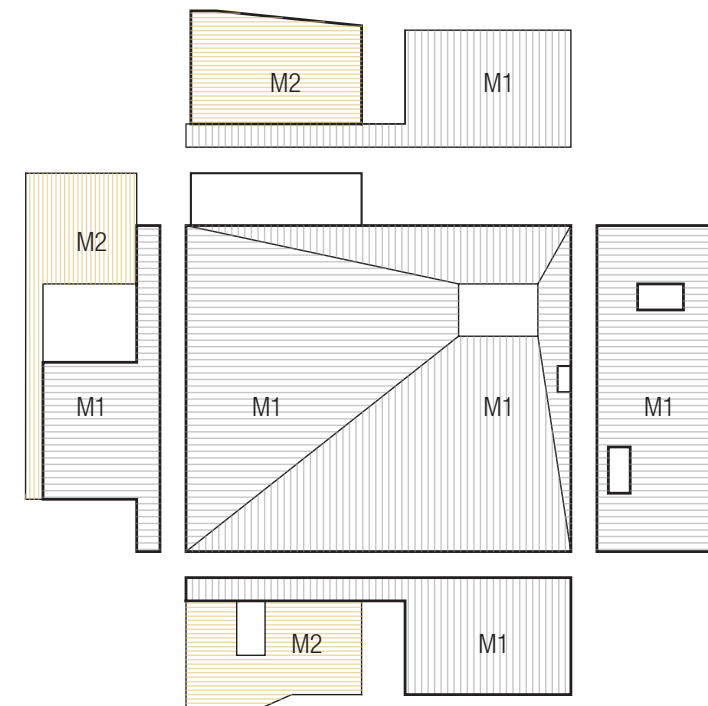
Customization Options

facade material + colour options

The facade can be customized with different types of materials and colours according to owner preference. However, it is suggested that a few key principles be maintained to help with the continuity of the architectural expression.

1) To maintain the monolithic aesthetic of the roof and walls, material 1 must have vertically oriented profiles. It is suggested that material 1 be a metal cladding product (suitable for both wall and roof cladding), either a standing seam or corrugated metal.

2) To help express the public space of the interior program, material 2 should contrast from material 1, and be oriented horizontally. As the material does not serve as a drainage plane for the roof, it can be metal, wood, or even cementitious panels.



flexible loft space

The loft space can provide multiple program options for the lane-way house. It can provide space for a bedroom, office, library, creative studio, or yoga...etc. This provides a high level of flexibility for the dwelling, and users can easily customize its use to their preference.



Loft as bedroom



Loft as studio

sliding door/glazing with operator

The large glazing frame on elevation 1 can accommodate either a sliding door, or glazing with an operable window. This allows the opening to provide a flexibility of use for varying site orientations, and support side-yard patio/courtyard access if desired.



Operable window + glazing (site orientation L1)



Sliding door access to yard (site orientation L3)

hearth

The hearth box can be customized to have book shelves or an entertainment unit. This allows the owner to plan the great room space and customize it to their preference.



Hearth



Entertainment centre + shelving

Quantity & Budget Analysis

quantity & budget analysis

There are many variables that contribute to creating a budget for a concept design. Factors such as site conditions (grade, access, environmental), interior finish/fixture selections, and exterior cladding selections significantly impact order-of-magnitude pricing. The proposed cross-laminated timber building system would require design-assist work from a manufacturer for technical engineering and detailed cost-value analysis. There is the option to pursue traditional framing methods for the project if preferred, which would also impact the cost.

There are several strategies integrated in the design with the intention of creating cost savings. By selecting materials with inherent finish qualities, such as the exposed CLT wall finishes, and exposed concrete floor, this limits the additional finish and material /costs for these components. The proposed exterior metal cladding system is cost competitive, especially when factoring life cycle and savings in its durability.

Information is listed below to assist in budget analysis for prospective owners and builders:

Floor Area:

705 ft², 65.5 m² main floor
145 ft², 13.5 m² second floor
850 ft² , 79.0 m² gross floor area (ANSI Z765-2003 standards)

Budget Pricing:

Rough order-of-magnitude pricing:
850 ft² @ \$200/ ft² = \$170, 000
850 ft² @ \$220/ ft² = \$187, 000
850 ft² @ \$250/ ft² = \$212, 500
850 ft² @ \$300/ ft² = \$255 000
850 ft² @ \$350/ ft² = \$297, 500
850 ft² @ \$400/ ft² = \$340, 000
850 ft² @ \$450/ ft² = \$382, 500
850 ft² @ \$500/ ft² = \$425, 000

Quantity Analysis:

Exterior Roof Envelope:
1065 ft², 98.9 m²

Exterior Wall Envelope:
cladding Type 1 648 ft², 60.2 m²
cladding Type 2 348 ft², 32.3 m²

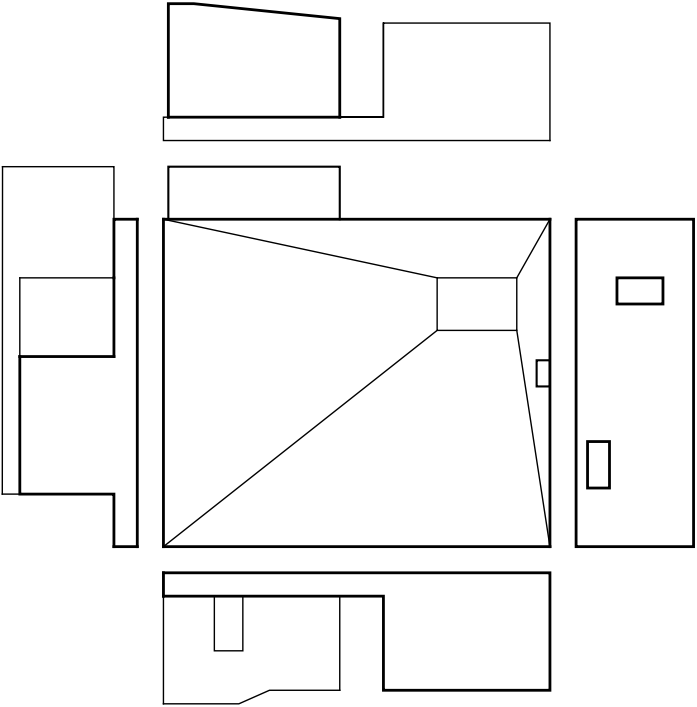
Insulated Soffit:
62 ft², 5.8 m²

Fixtures:
kitchen: sink, dishwasher, fridge
bathroom: shower, sink, toilet
great room: wood stove

Casework:
kitchen cabinetry
stair cabinetry
flex loft desk/shelves
hearth drawers, casework

Glazing:
x1 low-slope operable skylight
x2 aluminum framed glazed entry doors
x4 standard aluminum frame operable windows
x1 large aluminum frame glazing (patio options)

Doors:
x1 bedroom door
x1 bathroom door
x1 double insulated/clad doors to secure exterior storage



Appendix



paper cut-out model

Each design site is unique and requires independent study. We encourage prospective builders/owners to build models to help understand context and develop site strategies. This model can be printed at 11x17 and cut and folded to be representative of the project scale at $1/8"=1'-0"$ (1:96)

