

**PROCESSION IN PROCESS:
FINDING PLACE IN FRUIT BREEDING**

by

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DEDICATION

For my parents, Maureen and Larry.

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ABSTRACT

The modern disconnect between agricultural producers and consumers in Canada is a result of an increasingly smaller percentage of society taking part in the 'making' of food.

Fruit breeding —the practice of selectively breeding two fruit varieties to create a genetically superior offspring— is a scientific process found at the Pacific Agri-Food Research Centre in Summerland, B.C. Canada that orchardists use to produce more while investing less.

This thesis attempts to reveal the fruit breeding process by establishing an architectural procession through the agricultural landscape in order to reconnect consumer and producer.

Further, the design of this thesis explores the development of an architecture of place in order to establish a deeper connection with the fruit breeding process for the visitor.

ACKNOWLEDGEMENTS

To Talbot Sweetapple and Diogo Burnay for all of their encouragement, criticism, and faith in me through the unfolding of this thesis.

To Gretel for her patience, friendship, and laughter along the way.

To my family, for their endless support.

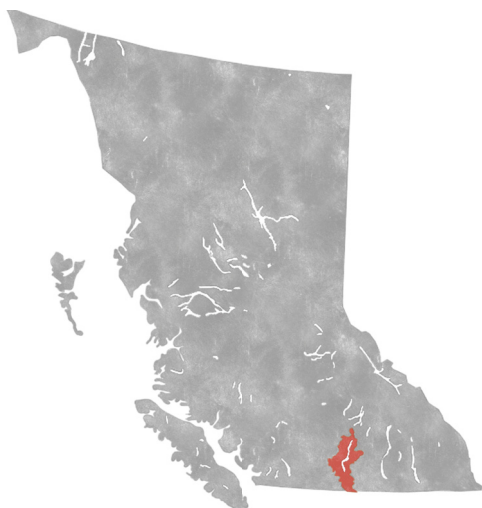
Thank you all.

CHAPTER 1: INTRODUCTION

Nestled in a mountain valley in British Columbia's interior is an unusually dry and sunny region known as the Okanagan. It developed in the post-Industrial era largely due to the ground and climate conditions that make it viable for tree fruit production. Today, it is home to over 350 000 people, mostly living in urban centres at various points along the 135 km long Okanagan Lake. The valley produces around 20% of Canada's apples, pears, peaches, plums and prunes; 75% of its apricots; and 40% of its cherries.¹



Locating British Columbia within Canada.

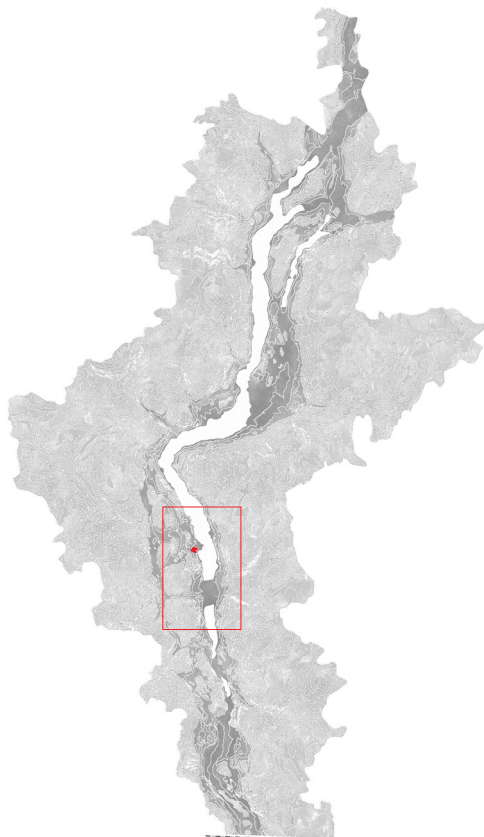


Locating the Okanagan Valley within British Columbia.

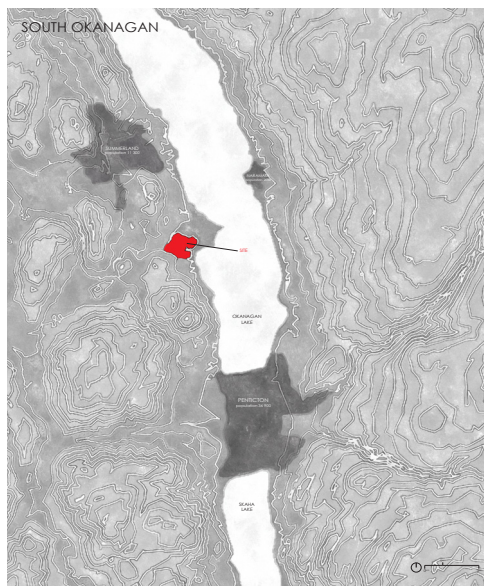
To maintain an economically viable agricultural industry here, Canada funds a government research station whose mission is “to generate knowledge and technologies to promote sustainable and economically viable production of wholesome foods and novel bioproducts from high-value horticultural crops for local, national and international producers and markets.”² The research station is one of Agriculture and

1 The Canadian Encyclopedia, *Okanagan Valley*, last modified December 16, 2013, <http://www.thecanadianencyclopedia.com/en/article/okanagan-valley/>.

2 Agriculture and Agri-Food Canada, *Pacific Agri-Food Research Centre - Summerland*, last modified November 23, 2012, <http://www.agr.gc.ca/eng/science-and-innovation/research-centres/british-columbia/pacific-agri-food-research-centre-summerland/?id=1180620561099>.



Locating the research station within the Okanagan Valley. Research station shown in red. 100 meter contours in white.



Zoom in: Locating the research station within the Okanagan Valley.

Agri-Food Canada's national network of 19 research centres and one of only two that deal with tree fruit (apples, cherries, grapes, peaches etc.).

A significant scientific process at the station is the cross-breeding of fruit varieties in an effort to produce superior offspring for commercial use. This process is currently hidden from the public view, not to protect it from intellectual theft, but because the design of the station grounds and buildings do not consider a public interaction to have value.

This thesis proposes that an agrarian architecture can be generated from the specific qualities and processes of the research station and in turn connect the public with the fruit breeding science of the station. It raises design questions of appropriate response to landscape, material, tectonics, authenticity, procession, and function.

Thesis Question

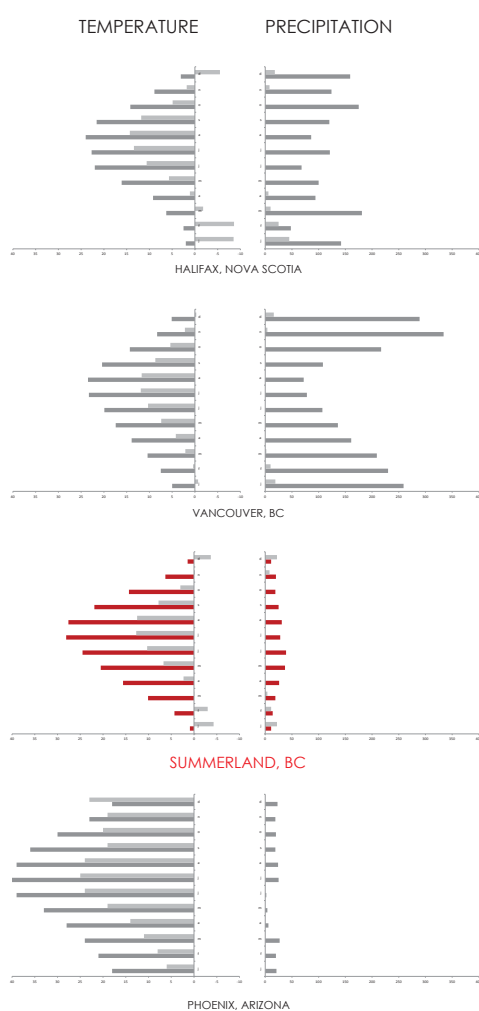
How might architecture connect visitors with place and process at an agricultural research centre?

CHAPTER 2: PLACE

Analogous to the anti-monarchical Picturesque movement, this thesis seeks an architecture which reveals the genius loci in order to confront the homogenizing and absolutist creations embodied by universal architecture. In the same way that 17th century liberal parliamentarians used the topographic features of the English countryside to critique the alien, rigid, and irrational rules enforced by the classical Formal Garden (which leveled the natural forms for the sake of order), this thesis critiques the current architectural trend in British Columbia's Okanagan Valley of ignoring the natural topography, discounting natural ventilation, and disregarding the energy of the sun. In turn, this thesis offers a solution using an architecture rooted in place to reveal the genius loci of its site. Anthony Early of Shaftsbury described genius loci as, "Your genius, the Genius of Place, and the Great Genius have at last prevail'd. I shall no longer rest the passion growing in me for things of a natural kind; where neither Art, nor the Conceit of Man has spoil'd their genuine Order, by breaking in upon that primitive State. Even rude rocks, the mossy caverns, the irregular unwrought Grotto's, and broken Falls of Waters, with all the horrid Graces of the Wilderness itself, as representing Nature more, will be the more engaging and appear

with a magnificence beyond the formal Mockery of Princely Gardens.”³

Two primary factors contribute to ‘place’ in this region: climate and ground condition. Ecology, demographics, industry, culture, material, land use, —even recreation— can be traced to these two fundamentals. The region relies on low precipitation combined with ample mountain water sources for irrigation. Sediment deposits along the valley floor and the benchlands offer a terrain that can support orchards wherever the land is flat enough.



Comparing Precipitation and Temperature. This graphic shows comparable precipitation between the site and Phoenix, Arizona. Winter temperatures are colder and summer temperatures are hotter than its geographical neighbour Vancouver.

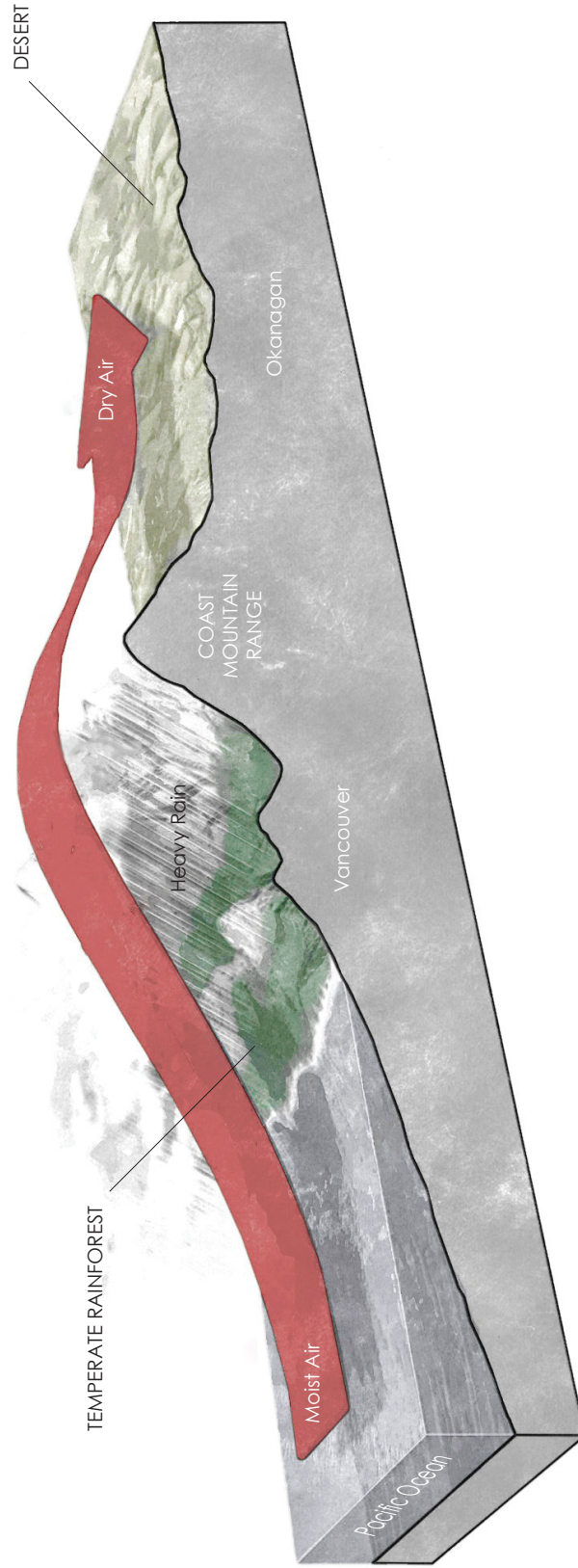
Climate

Like much of Southern British Columbia, the Okanagan receives a mild climate, although it is considerably drier than many other areas. In the summer, daytime highs occasionally surpass 40⁰ C and are often above 30⁰ C for several days at a time. In the winter, the large lakes moderate temperatures, preventing deep colds which kill fruit trees in other parts of Canada.

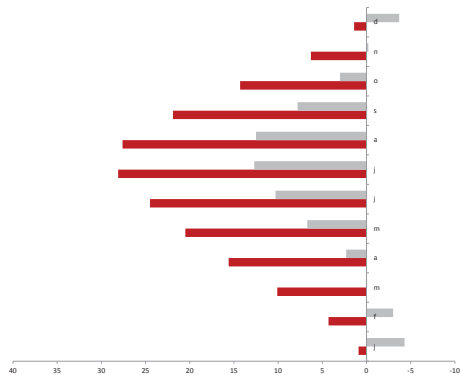
Sun & Temperature

The sun is a major contributor to the climate. Due to its northern latitude, the sun rises at almost 5:00 am and sets after 9:00 p.m. in the summer.

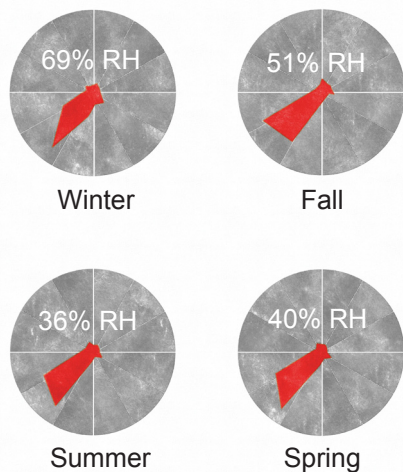
³ Anthony Ashley Cooper, Earl of Shaftesbury, *Characteristicks of Men, Manners, Opinions, Times* (Indianapolis: Liberty, 2001) line 394.



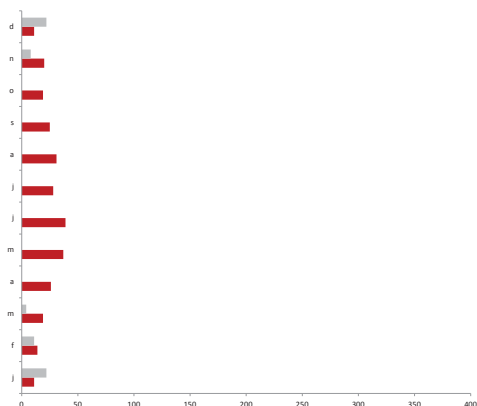
Sectional graphic describing the adiabatic cooling and heating that is responsible for the rain-shadow conditions seen in the Okanagan Valley.



Average monthly temperature for Sumnerland, British Columbia.



Wind roses and average relative humidity by season for the site.



Average monthly precipitation for Sumnerland, British Columbia.

Temperature is critical for growing fruit. The degree day growth theory is used to determine site viability. It has been determined that, for grapes, growth begins at a mean temperature of 10 degrees Celsius. Any average daily temperature over 10 degrees is added to a cumulative total for the season. The degree days for this site are 1172, giving it a “good suitability” for grape production.

Winter months typically have more cloud cover and low sun angles, while summer months have few clouds, occasional thunder storms, and very high UV indices.

Shade is crucial for an architecture to respond to this climate.

Wind & Humidity

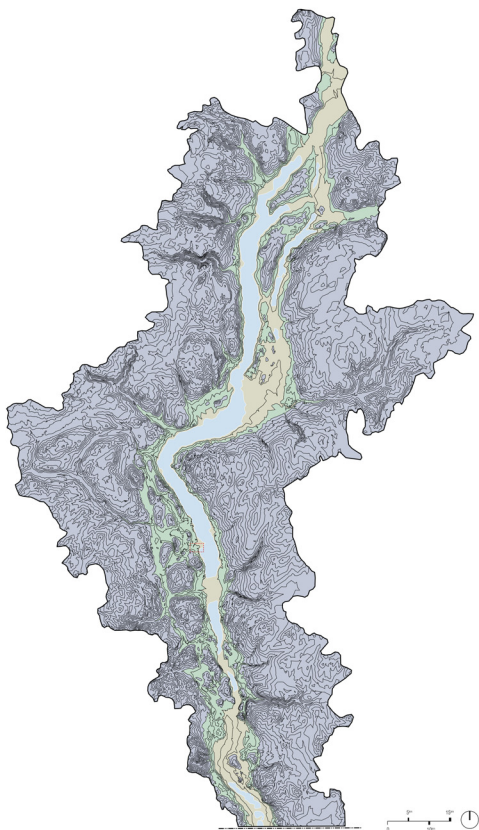
Prevailing winds provide realistic opportunities for natural ventilation due to the low humidity during summer months. Determining the vector and strength of winds is highly dependent on the microclimate as local topographical conditions greatly influence them. Prevailing winds are important for laying out agricultural rows in order to prevent cold air pooling.

Water

Fruit trees require large amounts of water to be productive, but rainfall can be destructive. If cherries get wet within a few weeks of being

ready to pick, they will absorb the water, their skin will split, and the crop will be ruined. A dry climate with ample water for irrigation is essential for producing cherries.

On the other hand, overhead sprinklers are installed in apple orchards not just for watering the plants, but for keeping the fruit cool during very hot times to prevent sun scalding. The nature of the valley is such that very little rain falls in the productive zone, yet mountain streams bring large amounts of water to the site for irrigation. The careful balance of water is difficult to maintain and the idea of water as precious is not straight forward. In fact, commercial tree fruit production was not viable in this region until extensive overland water flumes were built to direct water from mountain lakes to the fields.



Identifying topographical typologies.

Ground

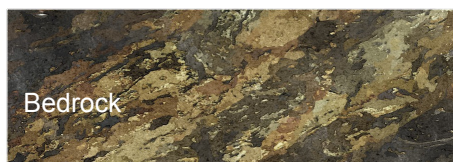
The ground condition of the agriculturally viable land in the valley is the second critical component of place.

Geology & Topography

The valley, which lies between the Columbia and Coast Mountains, is a topography of low hills, silt cliffs, and oblong lakes formed by glacial activity during the Tertiary and Pleistocene eras between 11 000 and 9000



Section through valley showing topographical typologies.



Graphic showing general ground stratification.

years ago leaving large deposits of silt, sand, and gravel on the bottom and sides of the valley.⁴ These sediments are what provide an appropriate growing medium for fruit trees.

The Okanagan valley can be broken into three major topographic typologies, each with its own unique climate, soil structure, ecology, and human use patterns:

- Mountains: formed by volcanic activity,
- Benchlands: formed by glacial lakes,
- Valley Floor: formed by current lakes.

The benchlands are the topographical typology of interest for this project. Composed of sediments deposited by a glacial lake that once covered the entire valley, these fairly flat areas on the edge of Okanagan Lake are slowly eroding by rainfall and mountain streams.

Historical Response

European Settlers

The onset of universal and global architectural trends in the early 20th century resulted in an imported building logic and the suppression of a natural vernacular in the

⁴ The Canadian Encyclopedia, *Okanagan Valley*, last modified December 16, 2013, <http://www.thecanadianencyclopedia.com/en/article/okanagan-valley/>.

Okanagan. The few naturally flat areas of land were quickly developed. A demand for flat land led to the draining of approximately 85% of wetlands around the lakes.⁵ Today, the Okanagan Valley is home to 30 percent of B.C.'s red-listed wildlife species and 46 percent of the province's blue-listed species.⁶ When the flat areas on the valley floor had been occupied, developers looked to the benchlands to build their housing suburbs, an area of land previously dominated by the agricultural industry that sustained the region's traditional economy.

The imported building logic of the area left people living here without an architectural connection to place. As the economy diversified from fruit growing into tourism, retirement, and recreation, cities and towns sought to 'cash-in' on a romantic regionalism by adopting municipal bylaws to create a sense of place. Instead of looking to the genius loci for creating a truthful and meaningful architecture, these towns used an architecture of the 'genius commercialii'⁷

5 Ministry of Environment, *Habitat Atlas for Wildlife at Risk: What Makes the Okanagan a Special Area?*, published 1998, http://www.env.gov.bc.ca/okanagan/esd/atlas/special_area.html.

6 Ministry of Environment, *Habitat Atlas for Wildlife at Risk: About Species at Risk*, published 1998, <http://www.env.gov.bc.ca/okanagan/esd/atlas/atrisk.html>.

7 Alexander Tzonis and Liane Lefaivre, *Critical Regionalism: Architecture and Identity in a*



Surface Kitsch Regionalism: Summerland.

of tourism and entertainment which offers –for a good price- a make-believe regional entity of easy access. Tzonis and Lefaivre write that this “romantic regionalism aimed at those ‘strangers, visitors, curious restless travellers’... offers to alleviate the pain of atopy and anomy of contemporary life’s over familiarized settings, simulacra of places, facades, masks and environments [by] offering the illusion of participation... in a setting that requires no effort to be totally possessed.”⁸ A false sense of place is created by these bylaws in order to appeal to a tourist economy. Lewis Mumford would refer to it as “a surface kitsch regionalism” as he wrote in his articles on Bay Region Style in San Francisco.⁹ In Osoyoos at the south end of the valley, the municipal bylaws require a ‘south western’ architecture of beige stucco facades and faux beam ends protruding from them; an imitation adobe style playing off of the desert-like climate. As opposed to a true adobe style which developed in response to climate and local materials, this adobe-façade style caters only to visitors looking for a culture that has never existed in this location. In Summerland, near the

Globalized World (New York: Prestel, 1991), 136.

8 Tzonis and Lefaivre, *Critical Regionalism*, 136.

9 Lewis Mumford, “The Sky Line [Bay Region Style].” In *Architecture Culture 1943-1968: A Documentary Anthology*, edited by Joan Ockman, 107-9. New York: Rizzoli, 1993.

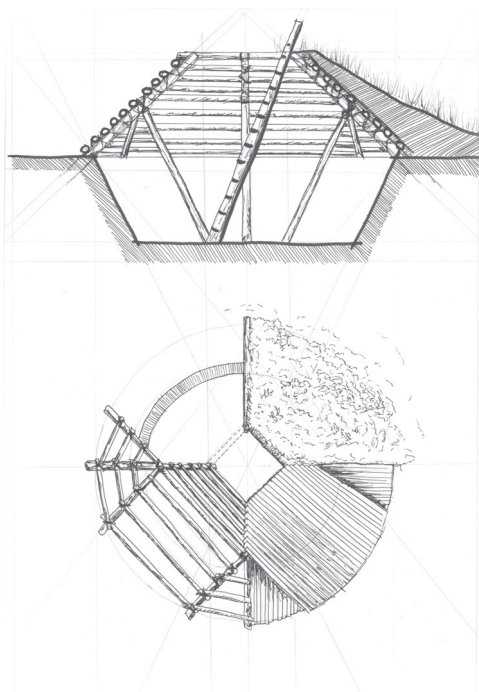
thesis site, the commercial buildings have been required to have an English Tudor style theme since the 1980s, and while this bylaw has undergone recent scrutiny and appeal, it remains standing.

Indigenous Vernacular

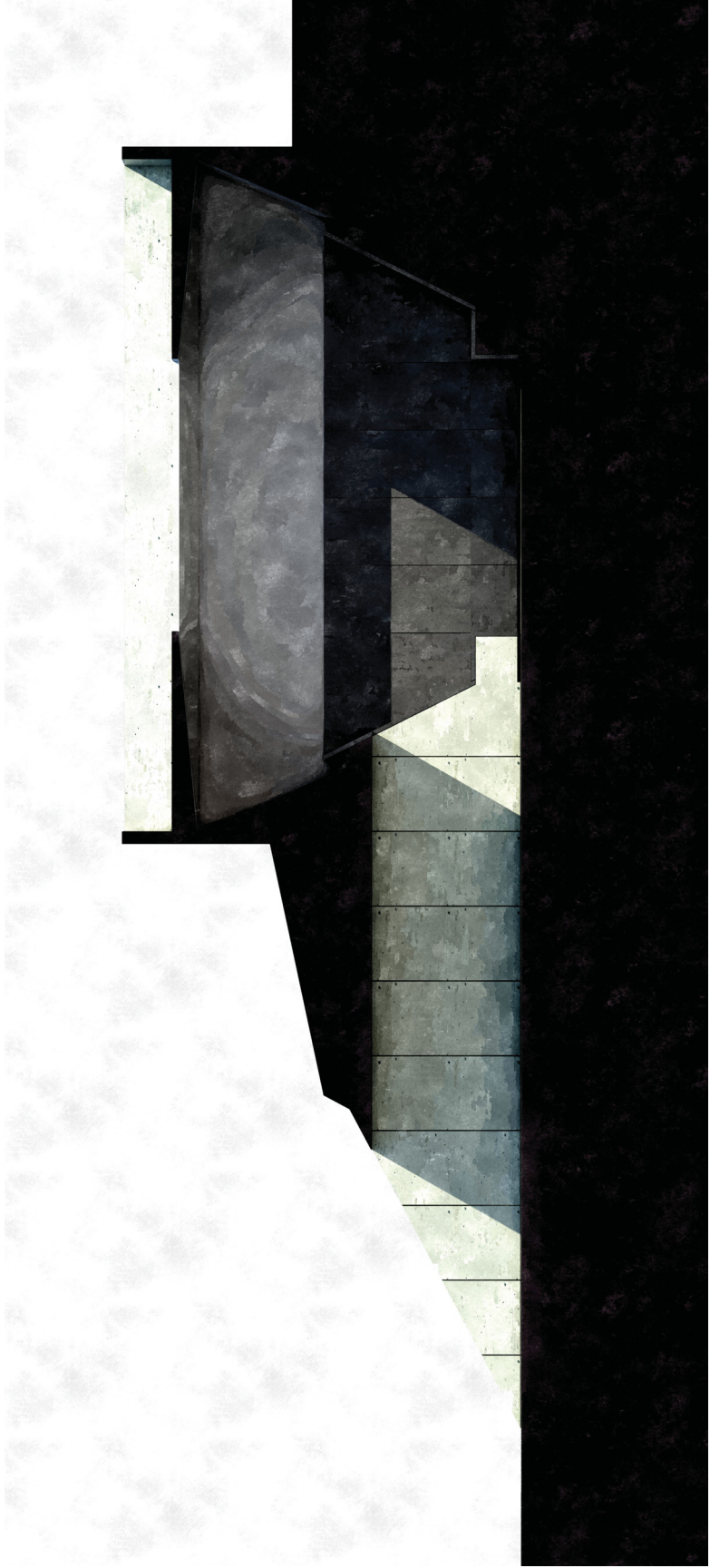
The Okanagan Valley was first settled by European fur traders in the mid 19th century. Previous to this, First Nations bands inhabited the entire length of the valley, stretching across what is now the Canadian-American border into Washington State. The indigenous people built temporary summer homes of pitched tipis covered in reed mats to give shelter from the hot sun and allow prevailing winds to cool them. They built more permanent pithouses in winter to make use of the thermal energy stored in the ground, entering them through open skylights in the roof that from the outside appear as subtle openings in the ground. The pithouses, dug into the ground, offer insight into how the sediment deposits of the benchlands can be carved into to act as shelter: the form protects against winter winds while the thermal stores of the earth moderate internal temperatures. The indigenous buildings offer a tectonic and atmospheric quality based in a historical vernacular.



Side entrance of surviving pithouse, photograph by Carolyn Keeley.



Material and construction study: indigenous pithouse.



Atmosphere & Tectonics study: Peshier Skyspace in Minneapolis, by James Turrell.

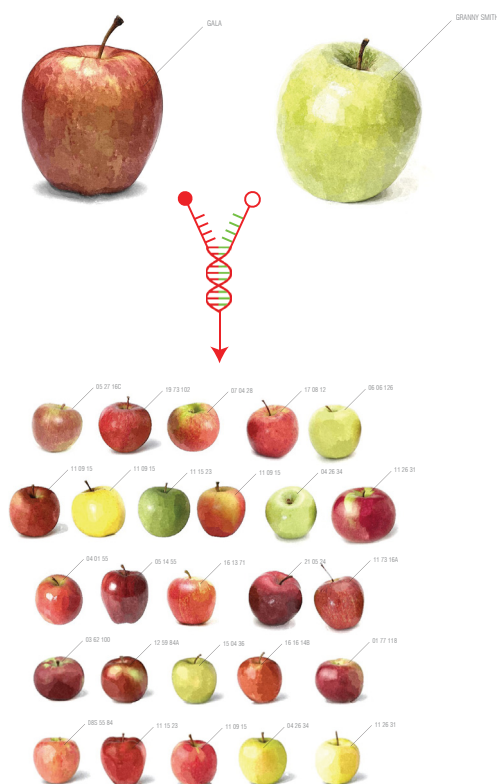
CHAPTER 3: FRUIT BREEDING

Purpose

In 1945, Summerland offered just five apple varieties from its orchards: Jonathan, McIntosh, Yellow Newtown, Delicious, and Winesap.¹⁰ Today, there are dozens of varieties produced in the valley, many of which were developed at the Pacific Agri-Food Research Centre, and all of which are considered superior apples to the previously mentioned five.

The purpose of fruit breeding is to select two parent varieties of fruit with complimentary characteristics and then cross their DNA through selective pollen transfer in order to create hundreds or thousands of offspring in hopes that one of them will contain the right mixture of DNA for a superior offspring.

For example, Apple 'A' might be sweet and have good skin and flesh colour, but is too soft and is susceptible to scabbing. It is thus bred with Apple 'B' which is exceptionally firm and resistant to scabbing in an effort to create Apple 'C': a sweet and firm apple with good skin and flesh colour and good resistance to scabbing. The same idea is applied to the other tree fruits.



Graphic describing the intent of fruit breeding. By randomly mixing the DNA of the two parent varieties enough times, a 'perfect child' is bred.

¹⁰ K.C. MacDonald, *The Okanagan Valley* (Victoria: Banfield, 1945), 17.

Process

A single cycle of fruit breeding takes 5-10 years and has a great deal of time and money invested in it. The following is a simplified breakdown of the steps involved in creating a new fruit variety.

1. Select parent varieties to cross: varieties are chosen with the goal of creating a new fruit species that combines the best features of each parent.
2. Cross the varieties: pollen from the male parent is transferred to the female parent's blossom.
3. The cross pollination produces fruit that contain genetically unique seeds: every seed is a different combination of the parents' DNA.
4. The seeds are stored in sub-zero conditions to simulate winter conditions: called 'stratification', the cold temperatures break down growth inhibitors in the seed. Growth inhibitors are common in northern species and prevent seeds from germinating at the wrong time of year.¹¹
5. The seeds are planted in greenhouses and grow into genetically unique seedlings: greenhouses keep seedlings safe from late

¹¹ Richard MacDonald (orchardist, fruit breeder), e-mail message to author, January 22, 2014.

spring frosts that could ruin an entire year's worth of new fruit varieties.

6. Seedlings are stored in acclimatizing buildings before being planted in a field: acclimatizing buildings are a half-way house for seedlings —they help seedlings adjust from indoor conditions to outdoor conditions while minimizing lost crosses.

7. Seedlings are planted in outdoor nurseries where they spend about three years before producing useful fruit buds: Fruit seeds go through a juvenile stage where they need to produce 'x' number of vegetative buds before fruit buds are formed. This usually takes about 3 years, but it varies slightly with each variety.

8. Fruit buds are harvested and grafted to rootstocks: Buds are harvested once they are out of the juvenile stage and repropagated onto precocious inducing rootstocks to get fruit as fast as possible.

9. The new trees are tended for 2-4 years before fruit is harvested for testing. Even using rootstocks to produce fruit sooner, it still takes several years of growth before adequate amounts of fruit are produced.

10. If a new fruit shows promise, it is propagated for testing multiple trees in a randomized trial: If it continues to show

promise, it is sent out for grower testing. If growers like it, then it is put into commercial testing and market evaluations.

11. New varieties can be used as parents for new fruit breeding cycles.

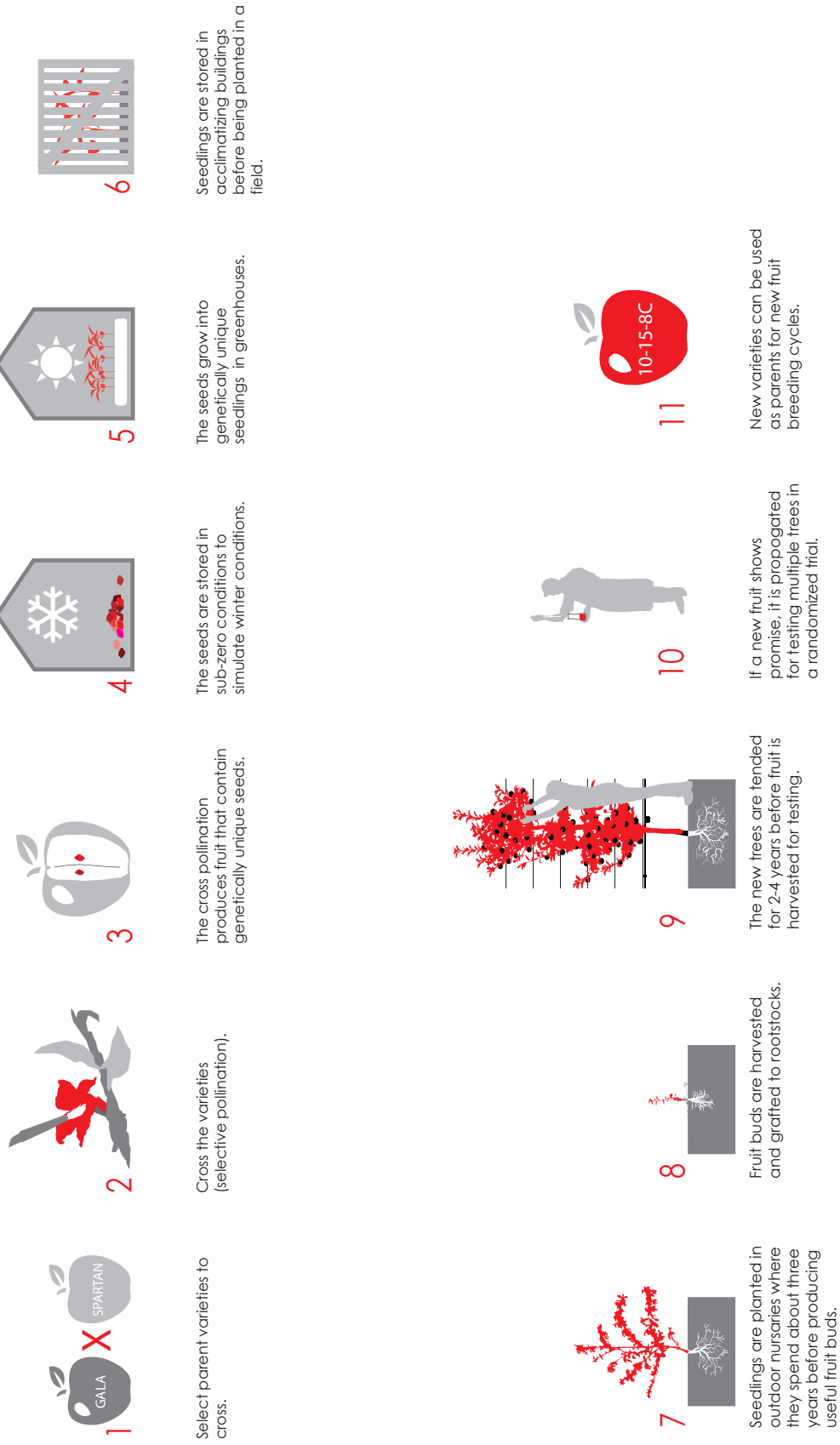


Diagram showing the steps of fruit breeding.

Opportunity

With tens of thousands of fruit varieties ripening sequentially over a six month period and only a small amount of fruit needed for testing, a design solution could turn tonnes of waste fruit into a highly desirable product that provides a real experience of this place.

Cherry season begins as early as mid June and Apple harvest doesn't end until late October. In the off season, the available products would shift from fresh to processed: wines, spirits, syrups, and flavoured ice cream to name a few.

This new program would create a draw for visitors and serve as a gustatory experience to compliment, enhance, and complete the experience of landscape and process.



[NEW] 12: Public Tasting Room

Graphic describing the extra step added to the fruit breeding process- the public tasting room.

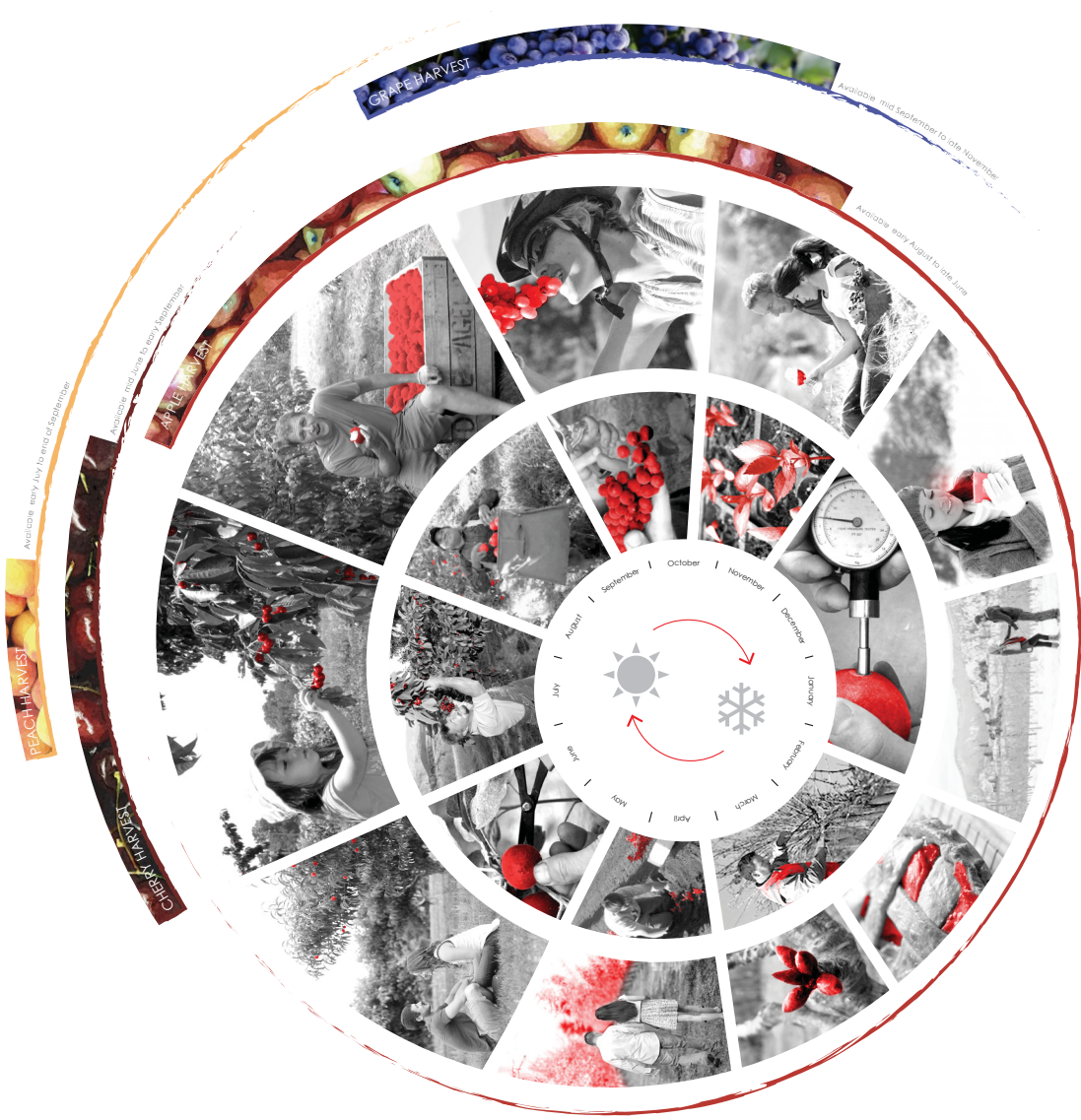


Diagram showing the seasonality of the fruit breeding process and how a visitor experience might be inserted throughout the year.

CHAPTER 4: DESIGN

Approach

When Rudofksy wrote *Architecture without Architects* he called on modern architects to see past their Eurocentric architectural bias and seek out other cultures and times for answers to the basic question of creating dwelling: “The untutored builders in space and time... demonstrate an admirable talent for fitting their buildings into the natural surroundings. Instead of trying to ‘conquer’ nature, as we do, they welcome the vagaries of climate and the challenge of topography. Whereas we find flat, featureless country most to our liking (any flaws in the terrain are easily erased by the application of a bulldozer), more sophisticated people are attracted by rugged country. In fact, they do not hesitate to seek out the most complicated configurations in the landscape.”¹² In this landscape of dry grasslands and irrigated orchards, the logic of construction imported from elsewhere is failing.

In order to find an architecture of place, this thesis considers material culture, sustainability, and landscape as design drivers, and then applies them to the fruit breeding process.

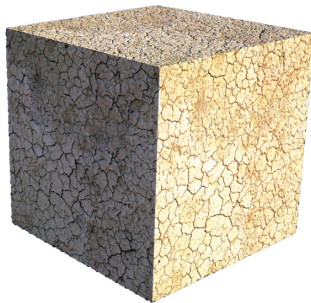
¹² Bernard Rudofsky, *Architecture without Architects* (New York: Museum of Modern Art, 1987), preface.

Material Culture

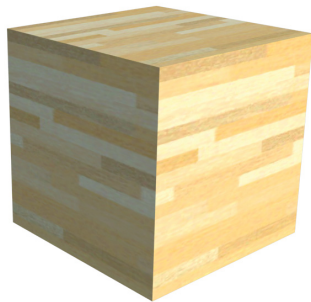
The selection of construction materials is an opportunity to connect the built form of the design with the nature of the place. Material informs structure, volume, light, atmosphere, texture, and experience. This thesis considers several materials in order to convey place, some unconventional in the current building industry.



Sample rammed earth texture.



Sample silt path texture.



Sample engineered wood (pine) texture.

Stabilized rammed earth retaining walls are a local, sustainable material directly lifted from the site. The high silt content of the ground is ideal for rammed earth application, and a small addition of cement prevents water erosion and freeze-thaw cycles from damaging the retaining walls.

Light coloured silt deposits sit 80 to 200 cm beneath the rich dark topsoil that provides growing medium for fruit trees. The tonal contrast between the two soil types is an opportunity to use the silt at surface as a guide for the visitor through the site; a visual path is created by simply unearthing the 'meat' of the benchlands.

Engineered wood products, particularly glulam beams and columns, are manufactured ten minutes from site, making them a local, renewable, and structurally efficient option.

Sustainability

Sustainability is a fundamental part of 'place' that is neglected in the current built environment of the region. High-tech solutions are gaining relevance with builders and clients as projects seek LEED accreditation. Passive strategies are often overlooked despite being far more cost effective.

A careful consideration of climate shows that natural ventilation should be used whenever possible, shade is critical, thermal mass of materials is useful, and cold weather can not be neglected as it is in other desert and semi-desert climates.

Landscape

The landscape of the site is a blending of two worlds. First, the natural world that has existed here since the end of the last ice age. Stands of ponderosa pines with grassy understories dominated the valley, while sagebrush and prickly cacti gave texture.

The second world is the man-made world that has been layered over the natural one. This orderly world is one of production. Where the natural world could be called yellow, this world is green and it is fed by the great infrastructure of dams and pipes that feed water to the fields. Where the irrigation stops, so does the imposed landscape. The

dichotomy of green and yellow is the most visual representation of the power of water on this landscape.

Site

The site is a sloping tree fruit agricultural area on the benchlands above Okanagan Lake near the town of Summerland. It is accessed from a main vehicle artery at the valley floor and rises over 50m before the orchards begin. There is no building fabric here; instead, the layout of the fields and the orientations of their rows provide the only structure to the landscape. Agricultural fields are absent where the slope of the ground exceeds 25%; these areas remain in their natural state of grasslands, sagebrush, and ponderosa pines. Row orientation is somewhat specific to the crop being planted, the slope aspect and the particular microclimate, but generally rows run north-south to maximize solar exposure and parallel to the slope to prevent cold air pooling and reduce the risk of tractor overturning.

Program

The program for this thesis is a reinvention of the existing fruit breeding infrastructure with the addition of a 'Tasting Hall' element. The Tasting Hall serves as a visitor information source, a fruit distribution point, and as a place of direct interaction between consumer



Graphic describing the thesis program in terms of relative size and relationship with the visitor's experience.



The existing conditions of the site.

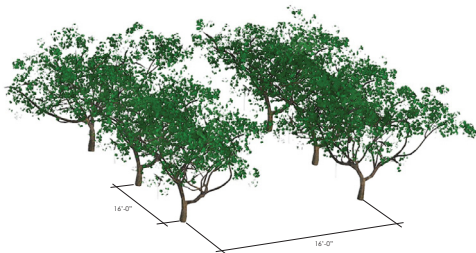
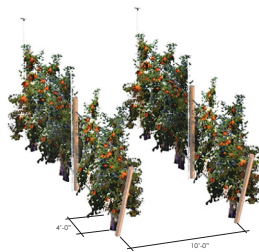
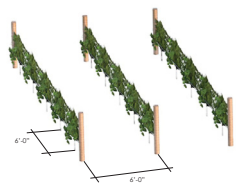
and producer.

The remaining program elements create a series of pavilions in the agricultural landscape that draw visitors along a processional path. Each pavilion allows some form of interface between consumer and process, and are always designed as a response to place.

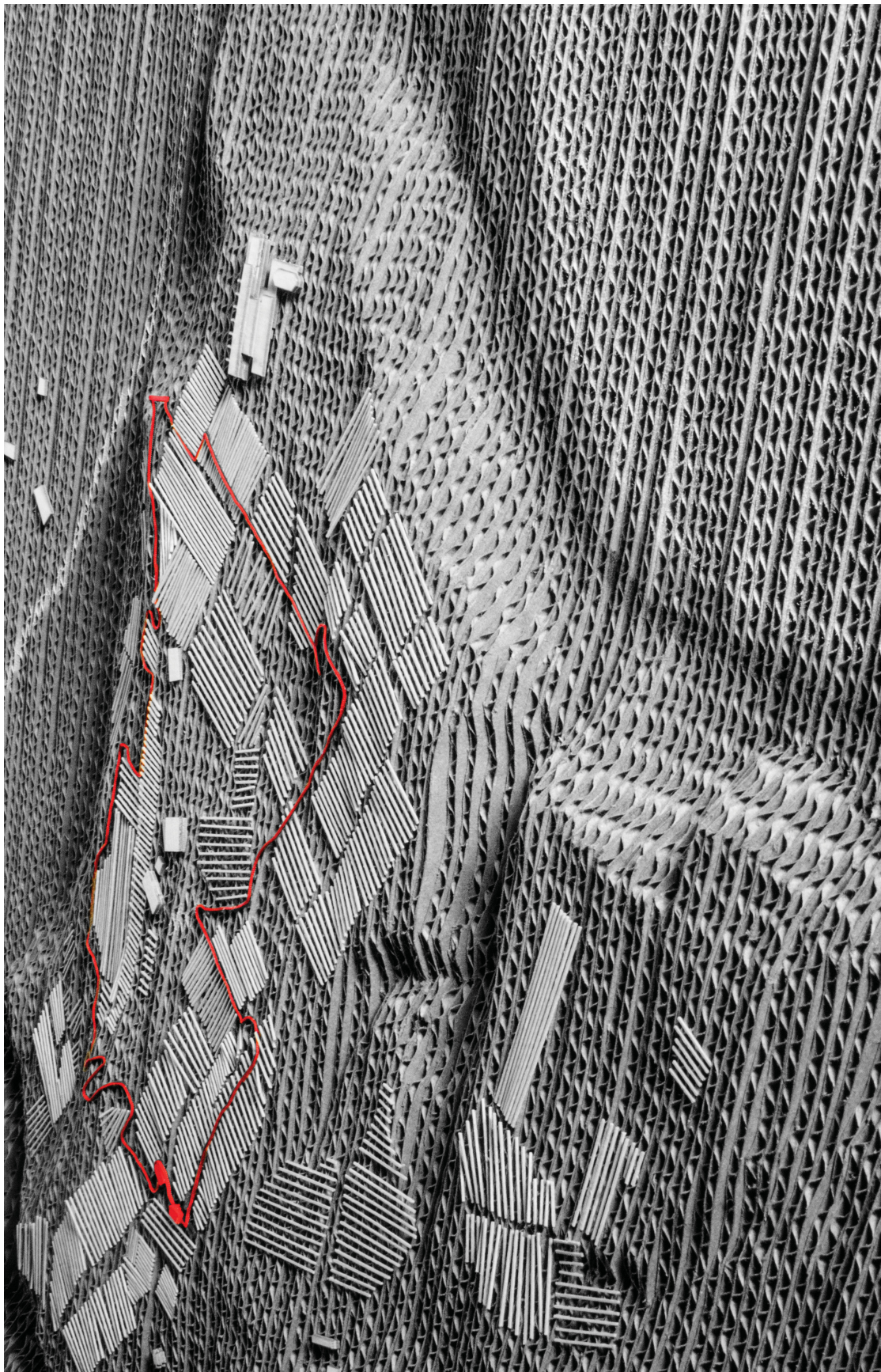
Process as Procession

The creation of a procession based on the steps of the fruit breeding process is the predictable response to the thesis question. However, by introducing an element of place, the procession becomes a series of sensual experiences relating the process to the place. Process and place are able to play off of each other, offering a deeper understanding of one through the other.

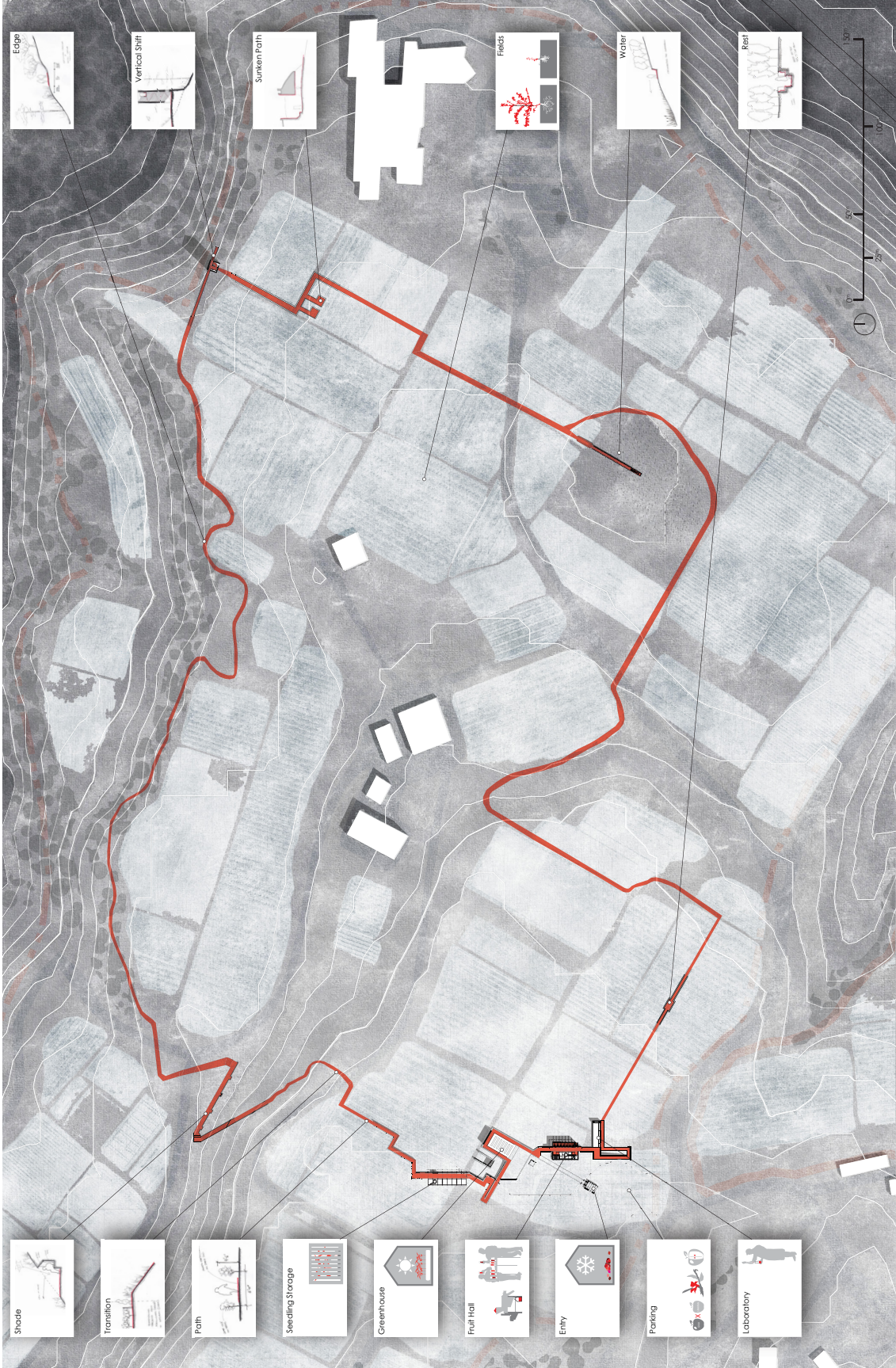
Of importance to procession in this thesis are the materials that create the boundaries of the path and the differing width. The material of the path dictates the haptic experience of the procession. Width of path determines the speed of the procession, a narrow path is passed through quickly, while a wide path slows the visitor, perhaps becoming a moment to pause.



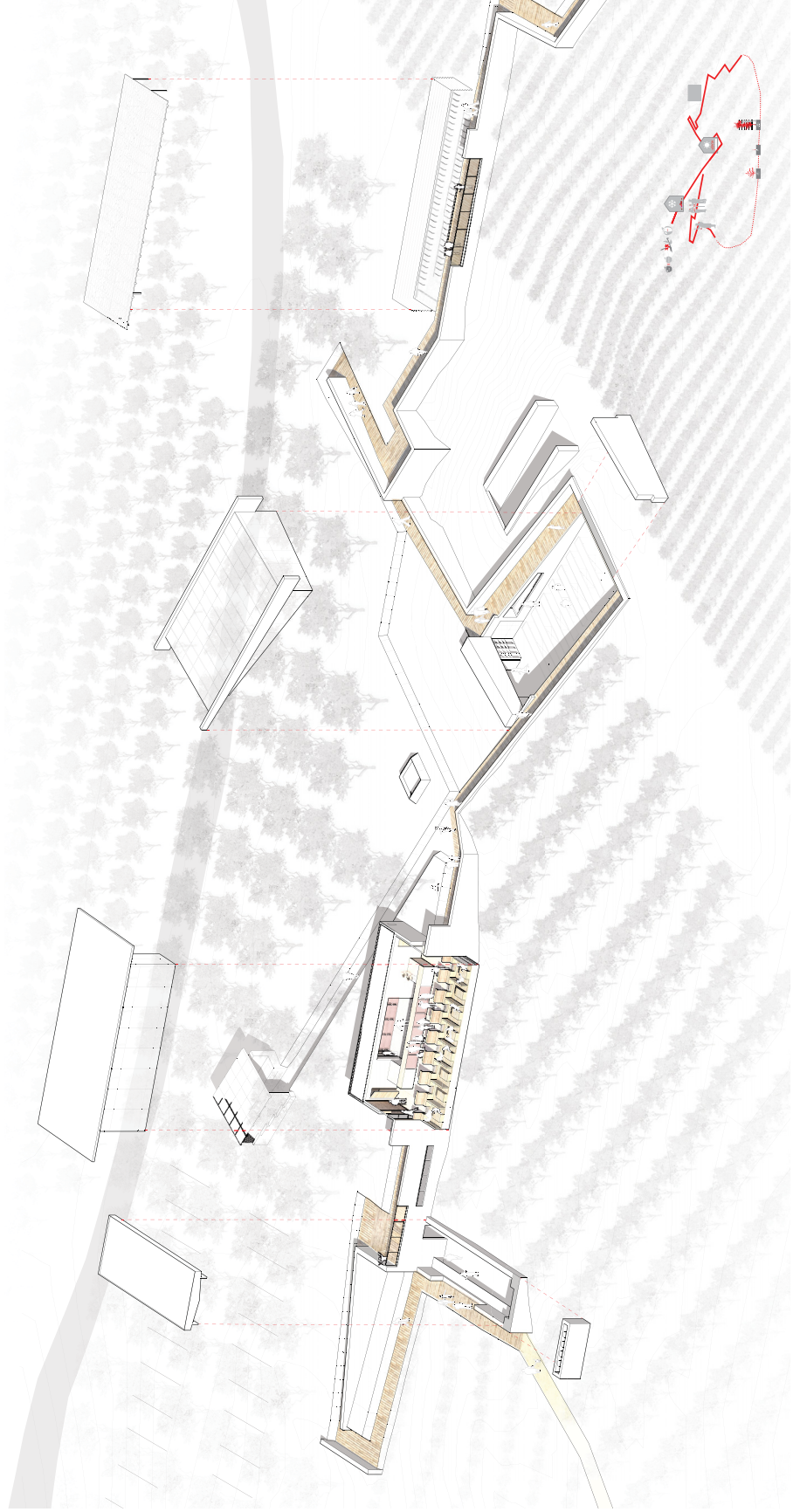
Graphic describing the typical commercial orchard grids.



1:3000 site model showing procession in red.



The procession through the site and the moments along it.



Axonometric: built forms providing infrastructure for process and experience for visitors.

Arrival

Parking within the orchard grid establishes an immediate connection with the primary use of the site. The trees produce fruit for the facility, and shade for the cars- an essential element of any parking in the Okanagan. The natural slope of the orchard is maintained. Parking on a slope is part of the experience of place, even if this means more difficulty and care required.

The parking orchard is made up of the typical parent fruit varieties; these are fruits that visitors are immediately familiar with and bring the visitor into contact with the first three steps in the fruit breeding process: selecting the parents, crossing those selections, and harvesting the seeds that result from them.



Arrival: Parking under the canopy.

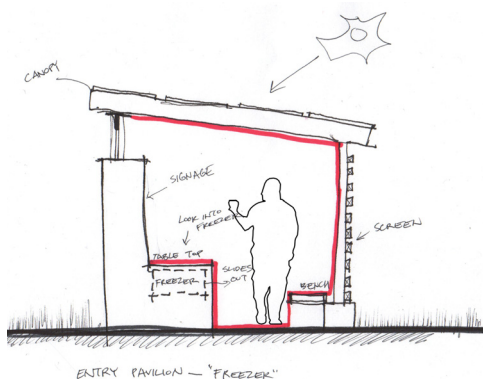


Weaving of the orchard grid with the parking grid.

Entry

The entry pavilion is an object in the parking area that marks the start of the path. It serves two purposes: first, to orient the visitor; second, to bring them in contact with the fourth step: the sub-zero storage of seeds.

The pavilion is designed as a thermally massive freezer with a window into its frozen centre. A canopy of wood beams and recovered apple bin panels create shade. A table top next to the freezer is a working surface for the extraction of the seeds from the fruit, their sanitization, organization and labelling.



Entry concept sketch.



Entry: architectural expression.



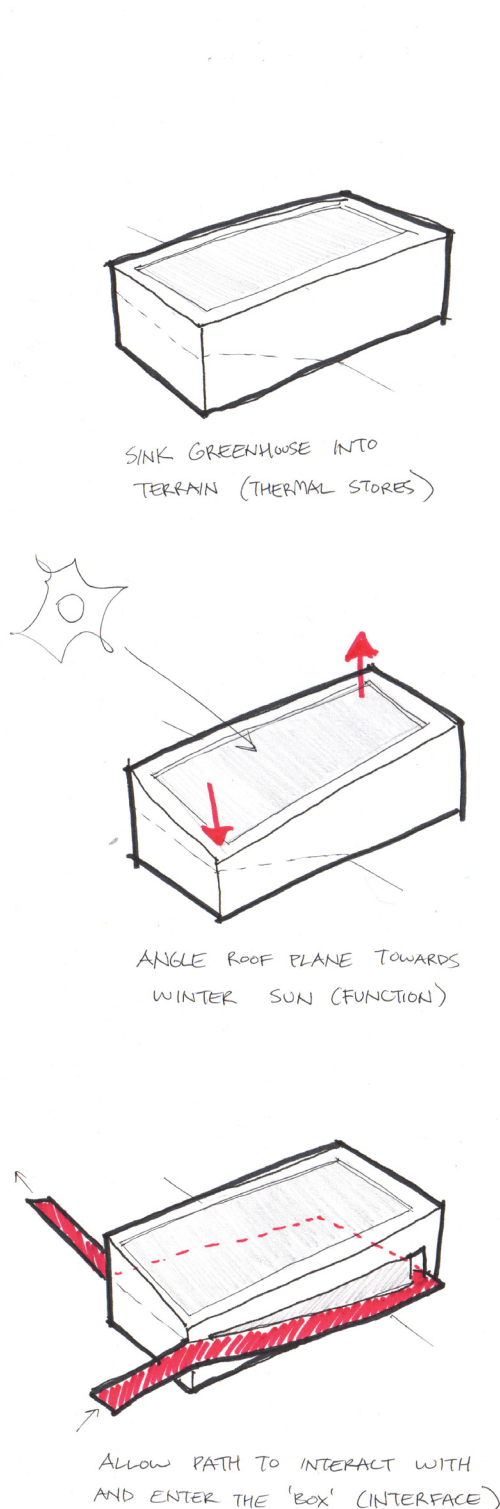
Entry pavilion is an interaction with the sub zero seed storage.

The Greenhouse

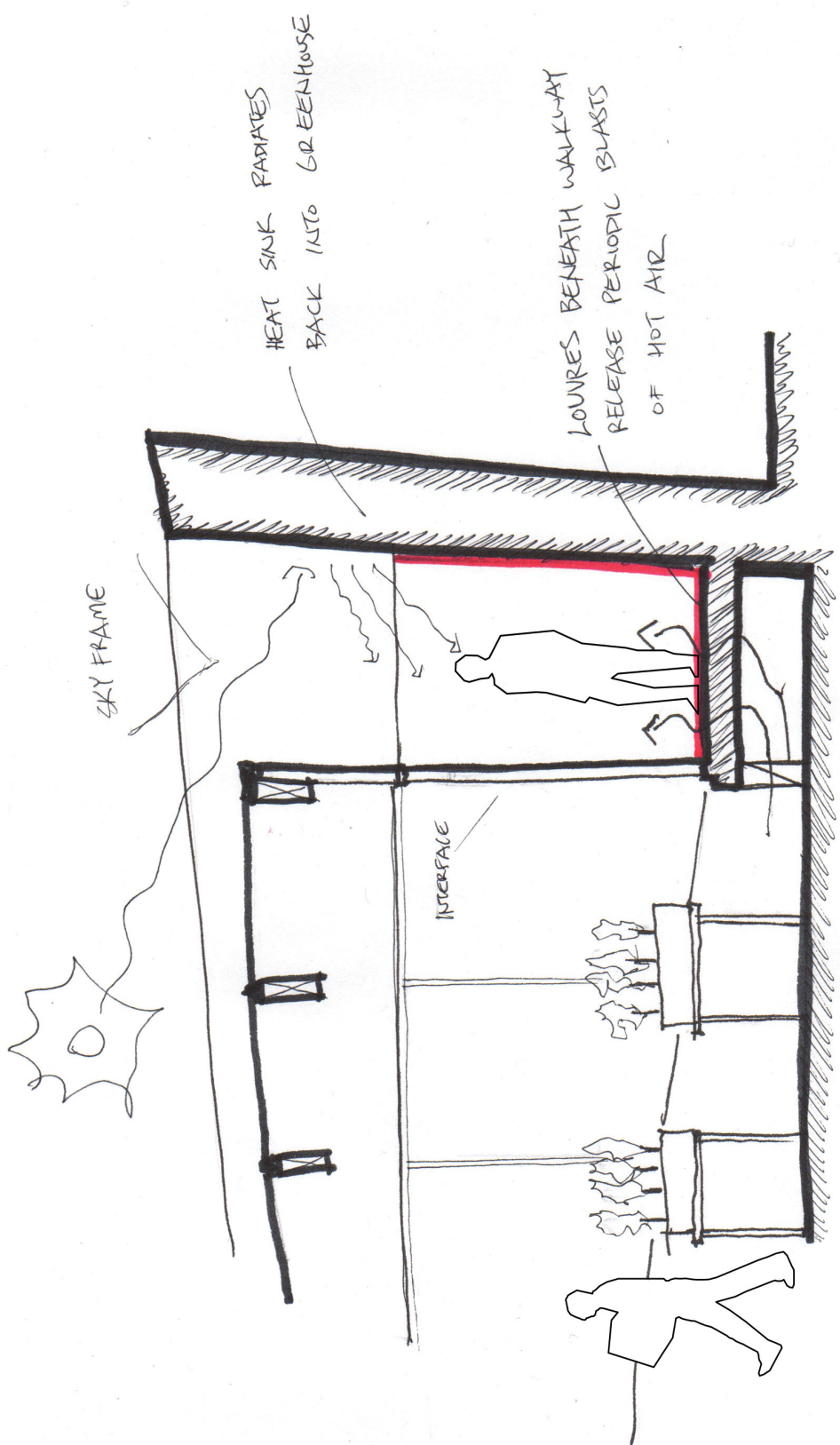
The greenhouse is sunken into the land to make use of thermal stores. The roof is tilted to better meet the angle of the winter sun and a large rammed earth wall acts as a heat sink to absorb energy throughout the day and radiate it into the greenhouse at night.

The path descends with the sloping topography to wrap around the sunken greenhouse. It is a building that slowly reveals itself. From the approach, it is invisible except for the reflection off its glazed roof. As the ramp descends, the inside of the building is discovered. This offers the visitor an experience of the greenhouse both from above (where the mechanized windows open and close automatically to maintain interior environmental conditions) as well as at ground level where they can view the greenhouse from three sides and feel the heat being released as louvres in the side open.

The greenhouse offers an experience of the fifth step: the place where the seeds are planted and grow into seedlings.



Greenhouse design diagram.



Greenhouse interface sketch with environmental strategies and experiential qualities.



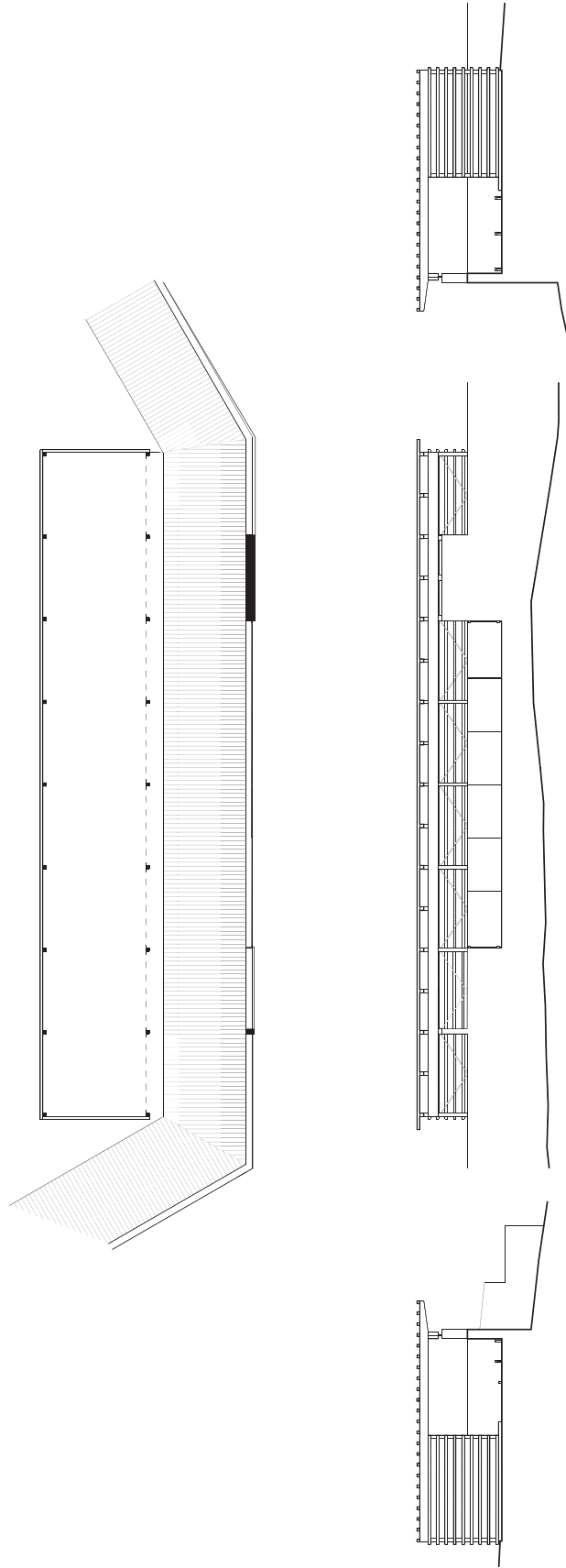
Greenhouse section perspective.

The Seedling Storage

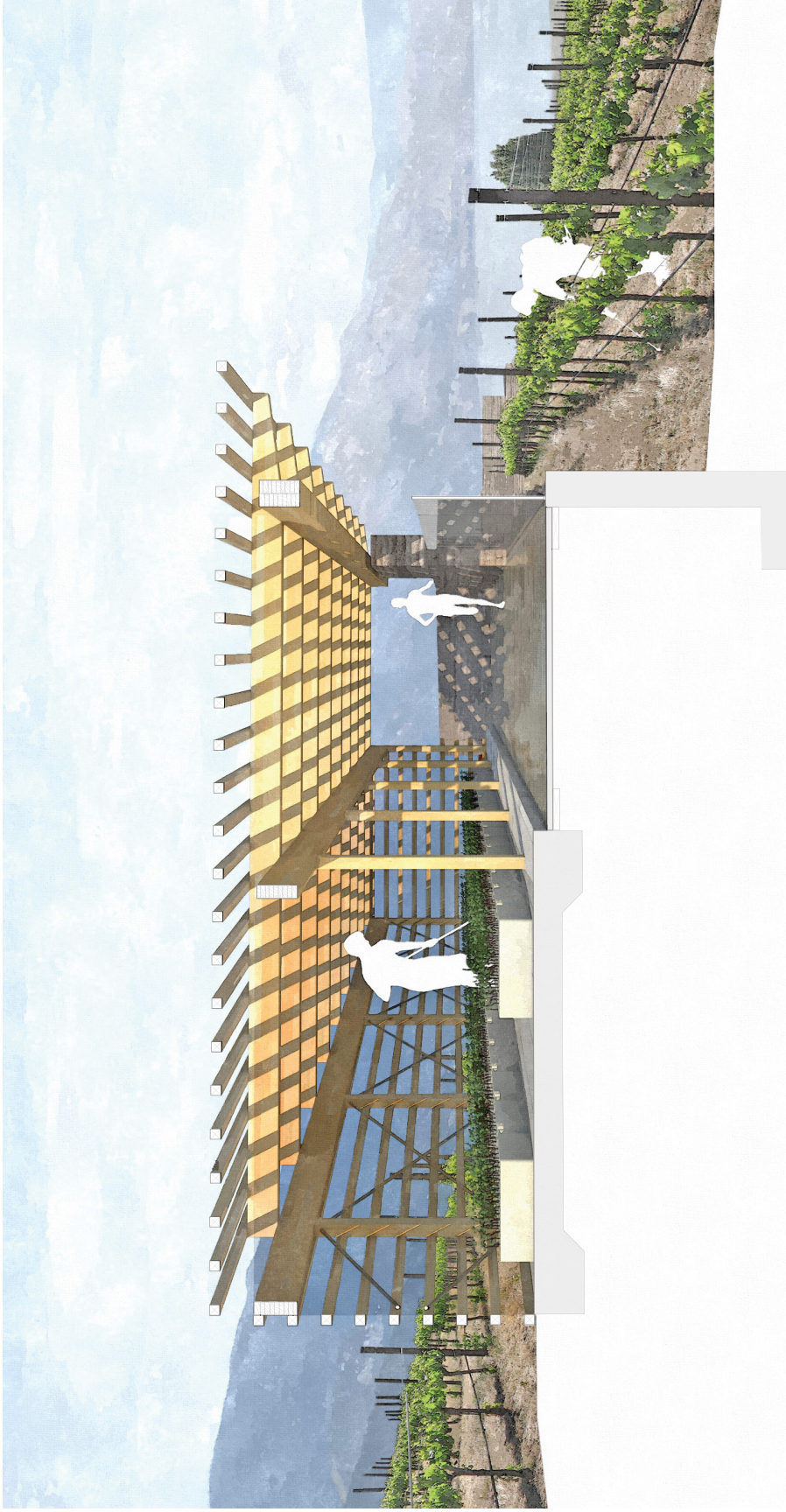
The seedling storage building is an airy pavilion situated at the high point in the topography to create a space for seedlings to be acclimatized to the outdoors before being planted.

At its simplest, it is a mesh box shielded by a wooden screen. The screen limits the extremes of the sun's intensity, simulating growth in the understory of a natural forest.

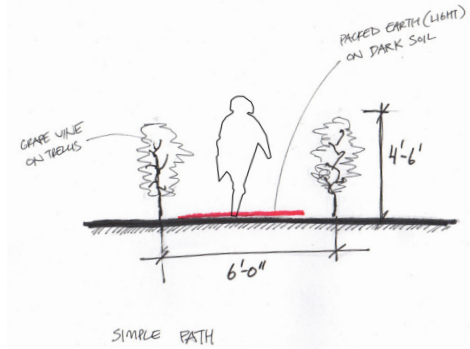
The east side of the screen is lifted up to create a canopy over the path, which approaches the pavilion from its south side and allows the long east side to be the interface between visitor and process as this building represents the sixth step.



Seedling storage plan and elevations.



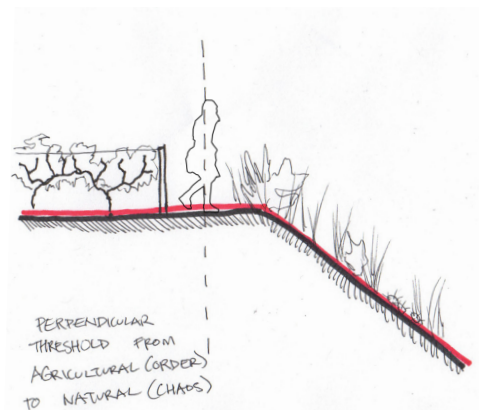
Seedling storage section perspective with plan and elevation below.



Path concept sketch.



The path is a working place as well as a means of circulating the site.



The threshold is perpendicular to the path.

The Fields

After passing the seedling storage, the wooden walkway transforms to a packed silt path, marking the transition into the experimental fields. The silt is the pale soft earth of the benchlands, and contrasts with the rich topsoil of the fields. This is where steps seven, eight, and nine occur, however their exact order becomes impossible to predict, as the fields themselves are in a constant fluctuation of crop type and maturity. Instead, the procession through the field focuses on establishing a connection between visitor and place through ideas of shade, outlook, water, and perspective.

The Simple Path

The path starts very simply, introducing the visitor to the modesty of the orchard. It parallels the direction of the grape vines, giving a sense of their spacing and their directionality. The path is straight, an order given to it by the order of the crop being grown.

Transition

The path arrives at the end of the row and instead of moving to the next row as a tractor would, it continues, leaving the ordered grid behind and passing the irrigation threshold. The material of the path stays the same, but now it feels more natural that it has left

the green landscape behind. This material belongs here; indeed, if the tall yellow grasses grew over, it would blend back into the land from which it came.

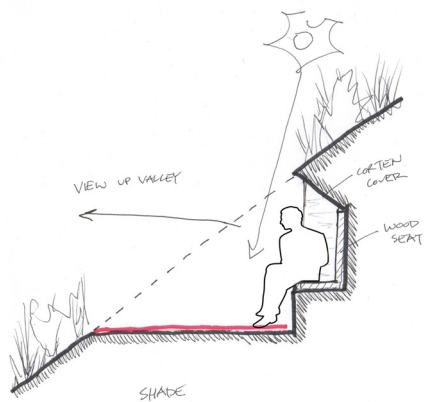
Shade

The natural landscape only exists on this site where the topography is unsuitable for agriculture. The path strikes through this area of golden grasses, cacti, and sagebrush as it descends in a switchback through an area too steep for fruit propagation. The path begins to cut into the side of the hill, revealing a retaining wall of stabilized rammed earth.

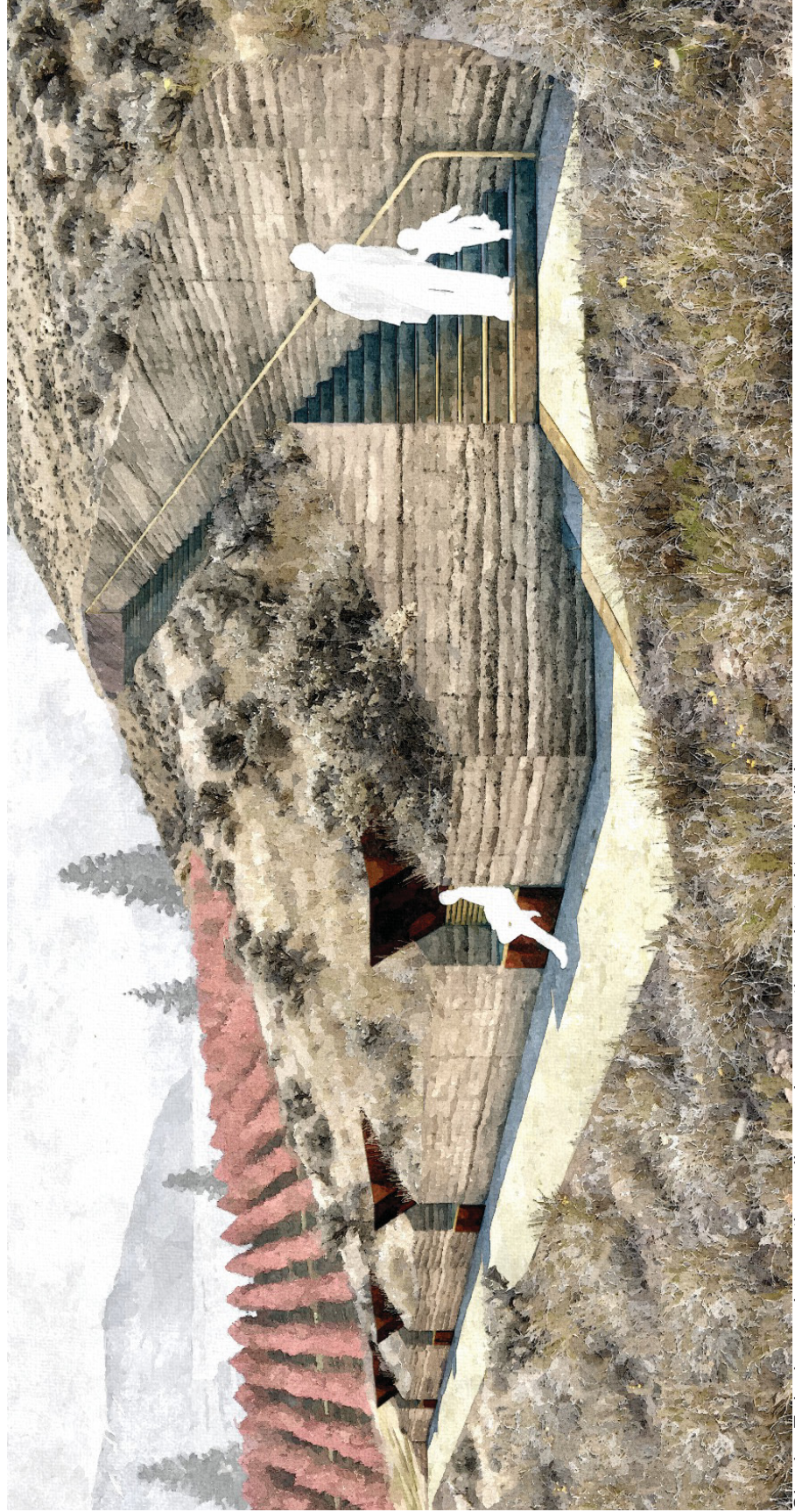
For one stretch in the switchback, the path is flat, and benches are carved into the hillside to provide a moment of rest under the cover of the hill itself; a moment to appreciate shade in this hot and dry climate.



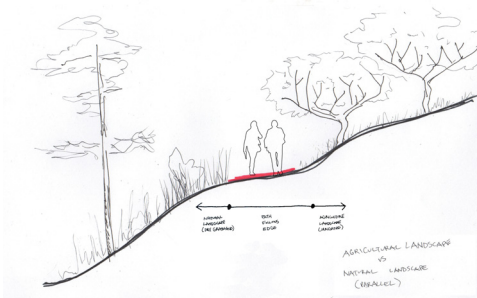
Threshold from agricultural to natural.



Concept sketch, shade on the path.



Shade: Enjoying a view up the valley under a weathered steel 'umbrella'.



Concept sketch, the Edge.



Visual representation, disorder vs order.



A 'reset' of the senses.

The Edge between Order and Disorder

Now at a lower elevation, the path finds and follows the edge between the agricultural and natural landscapes of the benchlands. By treading the edge between these two worlds, the visitor is aware of the alienness of the orchards in this setting.

Vertical Shift

After walking the first half of the path, starting from a high vantage and reaching the tower at the low point, the visitor has had a powerful experience of the agricultural and natural landscapes. The tower is a moment of pause for the visitor, a sort of dead end to turn away from the fields and remember their place in the greater context of the valley. The descent through the tower is a 'reset button' for the senses. Its dark and rough walls close the visitor off from the bright and overpowering landscape, its shade protects the visitor's skin from the heat of the sun.

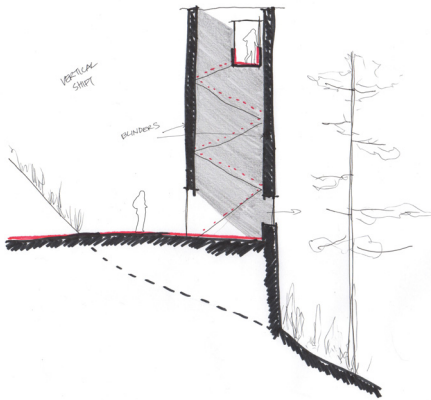
The tower prepares the visitor for a new perspective: a sunken path that sometimes frames the sky, sometimes takes your eye level to the connection between rootstock and tree, and eventually opens to the clearing.



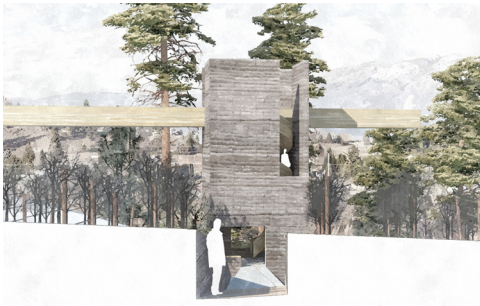
Vertical Shift (with a view).

Sunken Path

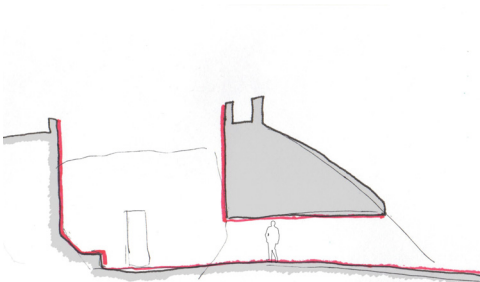
The sunken path is an experience of the land from a new perspective. The depth of the path varies, offering the roots of the fruit trees at waist level, at eye level, and even above eye level. At its deepest point, the path frames a vertical slice of the sky. The retaining walls of rammed earth reflect the real, productive earth behind them.



Concept sketch, tower.



A new perspective for the visitor.



Process sketch, sunken pavilion.



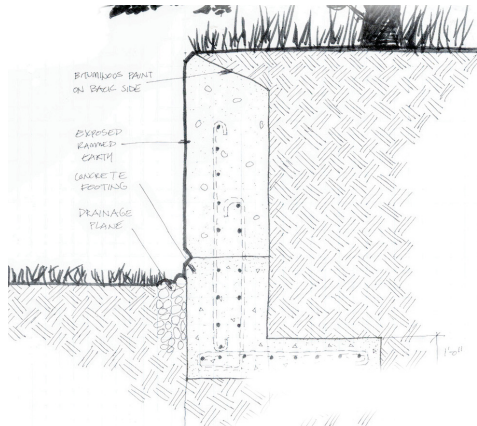
1:100 model, sunken path in orchard.

It is here that a sunken pavilion provides a necessary programmatic element to the path. Drawing from the tectonics of the indigenous pithouses, these washrooms are holes in the walls of earth. At their ends, they open into light filled chambers.

The visitor can sit and look up at the sky, sheltered from direct sunlight on the south side of the chamber. This view of the sky from below ground brings an awareness of the thin layer of productive space that exists between earth and heaven.



Section perspective, Sunken Path Pavilion.



Technical sketch, rammed earth retaining wall.



Leaving the sunken path.



A human-powered water filter offers an interaction with an element of place.

The Clearing & Water

The sunken path returns to a simple silt path on the landscape as the ground falls away towards a depression in the site.

The depression is shallow enough for agriculture, but because of poor drainage, it collects water from the surrounding fields and is unfit for use by the station. In the spring, the ground here is wet, but in the summer it is baked dry. Reeds grow, and red-winged blackbirds sing from their perches on them.

Here the path circumnavigates the wetland, but not before exploring it. A wooden walkway extends into the middle of the depression. A low bench to sit among the reeds. An irrigation pipe emerges from the ground beneath the walkway, as if it were drawing water from the wetland itself. As irrigation water is unfit for drinking, a human powered water filter, clad in bright corten, provides the water narrative: water here is precious, but introduce a little technology and human effort to work for it, it's there.

The water filter is a moment to consider the role water plays in creating this productive landscape.



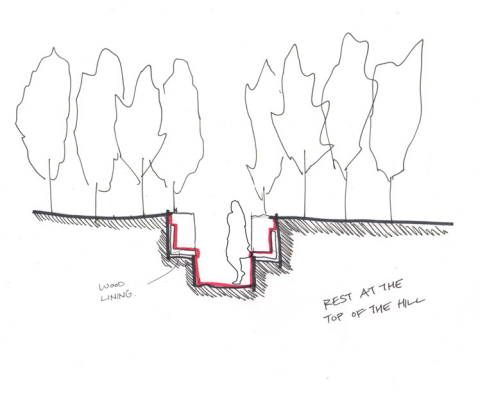
A low bench in the reeds.



Leaving the clearing.

Rest & Return

Leaving the clearing, the path turns uphill towards the starting point. A bench carved from the land and wrapped in wood provides a moment of rest in the heart of a cherry orchard before the visitor completes the experience of walking the fields and moves on to the Laboratory and Fruit Hall.



Concept sketch, bench in ground.



Return.



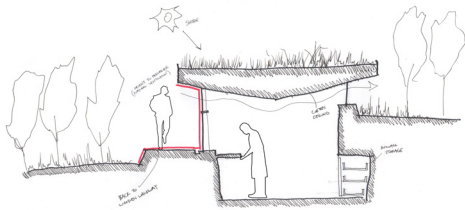
A wood bench in an earthen path marks a place to rest at the top of the hill.

The Laboratory

The path leaves the fields when it meets the laboratory. It becomes a wooden walkway once more, marking the transition.

Sunken into the landscape, the laboratory is where the fruit is tested after it is harvested or when it comes out of cold storage. This is the tenth step in the fruit breeding process.

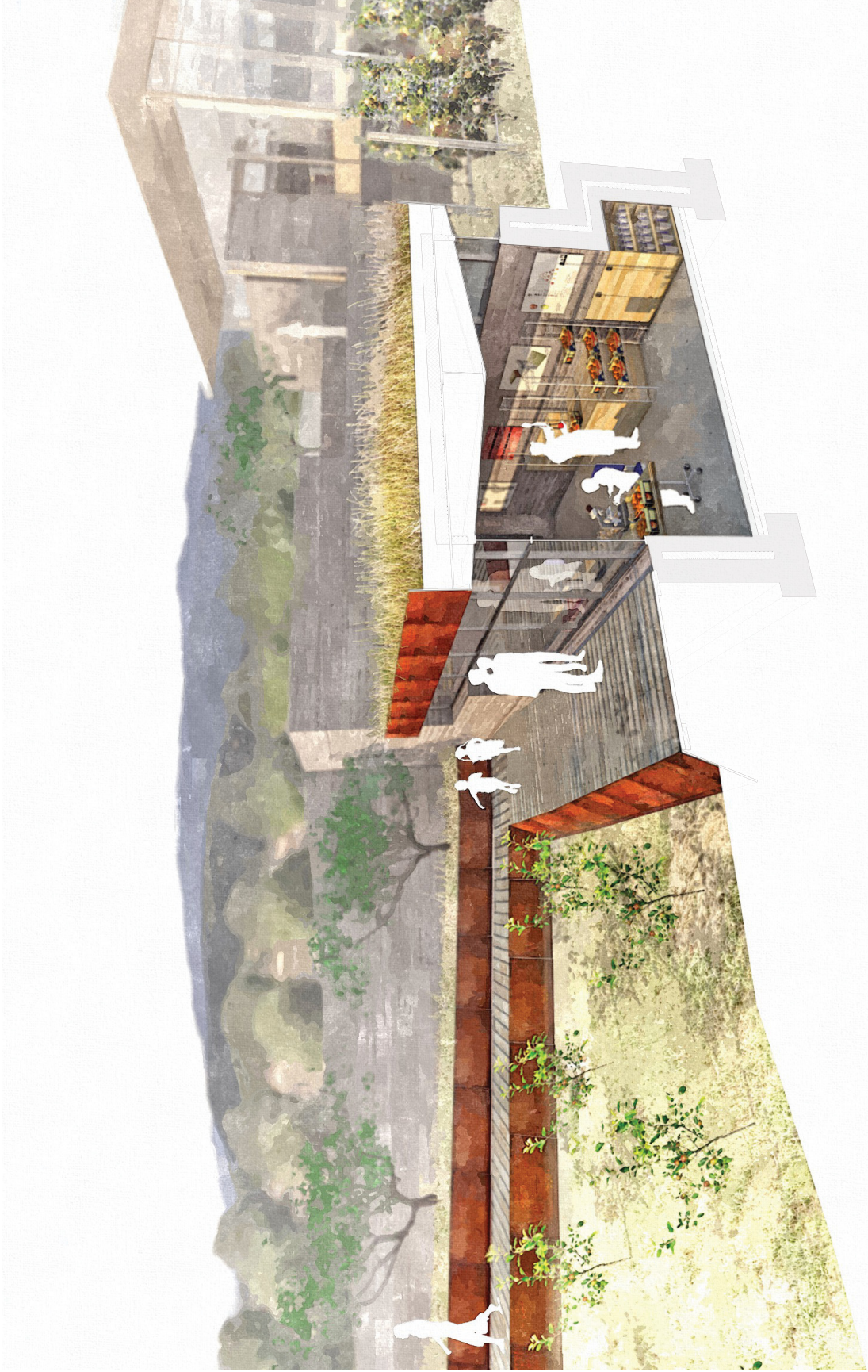
By sinking the laboratory into the ground and raising the path off of it, the visitors look down at the working surface. This top down viewpoint allows a greater understanding of what the scientists are doing, distracts the scientists less, and decreases reflection off of the glass surface.



Concept sketch, Laboratory.



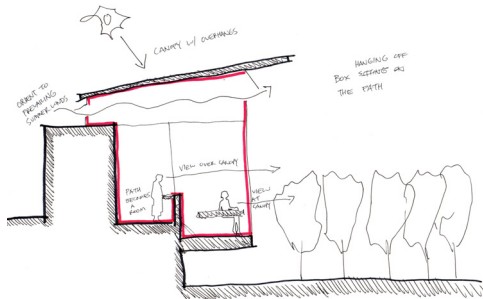
Revealing the hidden science.



Section Perspective: Laboratory and Path.

The Fruit Hall

After passing the laboratory and witnessing the fruit being processed through the scientific end of the process, the visitor ascends a ramp in the land. At the top, they are greeted with the same view over the landscape that they had at the very start; only now they've begun to appreciate the inner workings of its nature. There is only one step left to complete the experience: to be the consumer, to taste!



Concept sketch, fruit hall.



1:50 model, interior space.

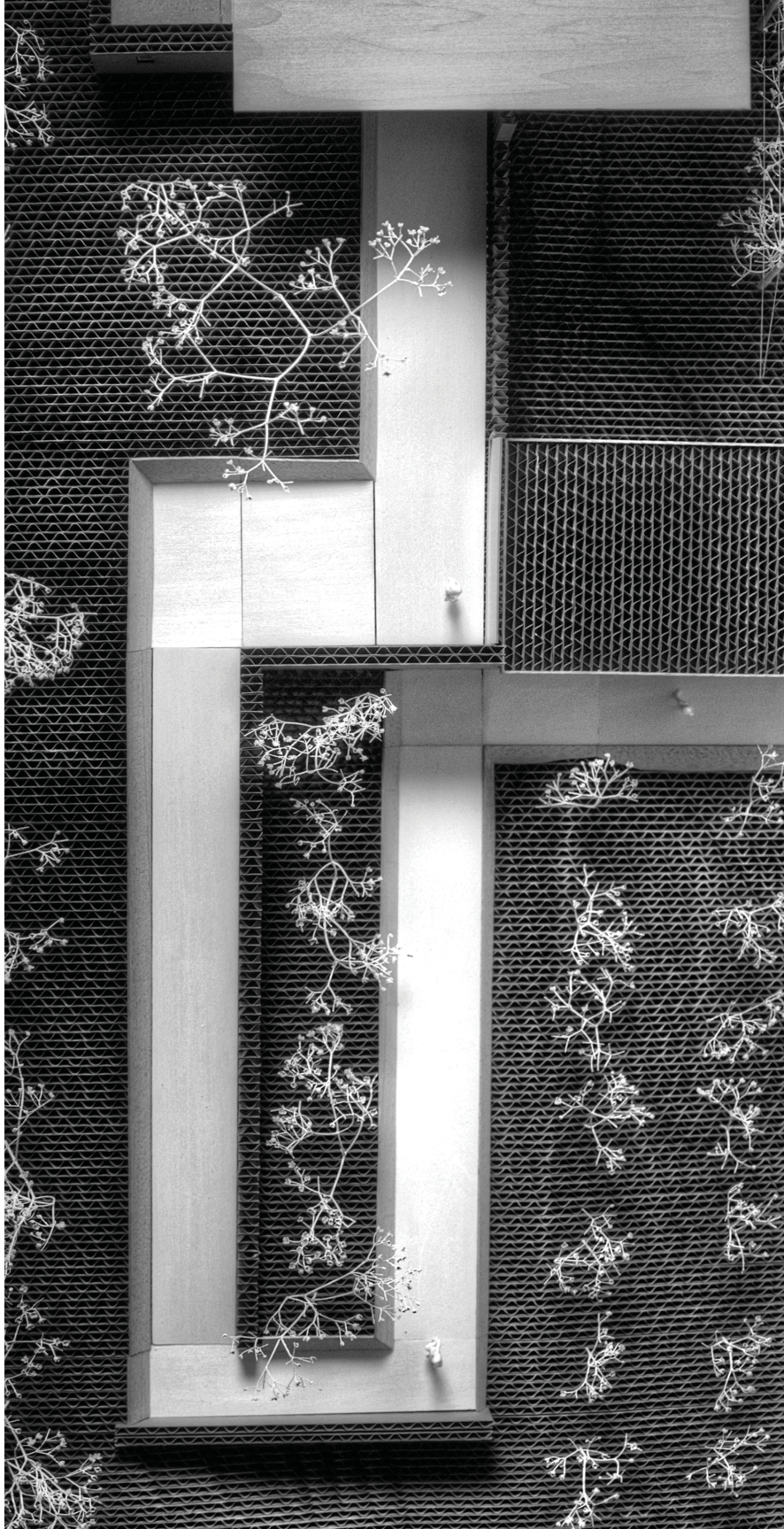


Experiencing a place through taste.

The Fruit Hall is the final pavilion in the procession. It is a place to complete the experience by tasting the new fruit varieties that are ripening around the visitor as they traverse the fields.

The building sits right on the path, or, the path runs right through the building. The path becomes a social space, with the 'fruit bar' on one side and a seating area on the other.

By stepping down into the seating area, the visitor is wrapped in gentle wood, and surrounded by the fruit filled canopy outside the window. Alternatively, one can sit or stand on the path and look over the canopy across the landscape towards the lake.



1:50 model: Procession from Laboratory to Fruit Hall.



Section Perspective: Fruit Hall.



East elevation, south section.



East elevation, north section.



North elevation.



South elevation.



1:50 section model of Laboratory and Fruit Hall.

CHAPTER 5: CONCLUSION

How might architecture connect visitors with place and process at an agricultural research centre?

The connection between visitors and process is in the orchestration of the architectural program along the path: travelling along the path is also travelling through the process. By finding moments along the path that create an interface between visitor and process, the architecture is inherently a medium of connection. By creating a new program using the wasted by-product of the process, the visitor completes this connection through taste.

Peter Zumthor writes about the importance of architecture that responds to its time and place: “Every new work of architecture intervenes in a specific historical situation. It is essential to the quality of the intervention that the new building should embrace qualities which can enter into a meaningful dialogue with the existing situation.”¹³

This thesis intends to do just that. The connection between visitors and place in this thesis is in the use of materials, the moments of shade, rest, reset, and water, and in the experience of the process itself. It is in the

¹³ Peter Zumthor, *Thinking Architecture* (Boston: Birkhäuser, 2006), 18.



A social space unique to the place and process.



Creating an interface.

details: locating the handle of the water filter on the north-east side to protect it from the sun; the reuse of apple bins as shading devices or storage shelves; the rammed earth thermal wall on the north side of the peach trees helping the fruit colour and ripen.

The thesis has been an exploration of an architecture of place to reveal a fundamental process of that place. What is discovered through that exploration is a series of new questions:

How can an abstraction of a process be developed into a meaningful architecture?

What is the minimum intervention required to create an architecture of place?

How does a new architecture fit into the global body and history of architecture?

What is the role of architecture in mediating the relationship between the public and the secretive programs their tax dollars pay for?

Many more questions have arisen and are unanswered, but the thesis question is given an answer. It is found in the new program developed to anchor the visitor experience, in the moments of interface between producer and consumer, and in the human interaction with the elements of place.



A human interaction with place.

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