

**It's Five O'Clock on a Farm:
Deriving Architecture from Agriculture on an Annapolis Valley
Winery**

by

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Submitted in partial fulfilment of the requirements
for the degree of Master of Architecture

at

Dalhousie University
Halifax, Nova Scotia
March 2022

Dalhousie University is located in Mi'kmaq'i,
the ancestral and unceded territory of the Mi'kmaq.
We are all Treaty people.

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For my parents, Michael and Laura

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Abstract

Wine regions around the world lack authenticity. Authentic and healthy farming practices are abandoned and replaced with a monocrop approach, solely focusing on yields, destroying natural ecosystems. Narratives are relied on to stand out among competition, resulting in architecture concerned with spectacle and consumption rather than place and tradition. Product rather than process is emphasized during winery visits, creating a disconnect between those who drink wine and those who make it.

The wine industry in Nova Scotia's Annapolis Valley is growing rapidly and risks going down this path of inauthenticity. Acting as a template for new wineries to follow, this thesis derives architecture from agricultural practices, uses procession as a method of revealing process, and crafts in-between spaces to create moments of programmatic overlap, facilitating interaction between the different users. This method of winery design creates a didactic and authentic experience that delays gratification and promotes process ahead of product.

Acknowledgements

To Talbot Sweetapple and Warren Sanders for guiding me through the thesis process, keeping things light, and allowing me the freedom to design as I pleased.

To my family, for their endless support.

To Ken Kam for your invaluable support throughout my architectural studies.

Chapter 1: Introduction

The cultivation of a single crop in order to increase yields is known as monocropping. This method of intensified farming strips soils of their nutrients, creates a breeding ground for pests, and leads to weak root systems that leaves crops more susceptible to damage in extreme weather conditions. Furthermore, monocrop farming on a large scale leads to the erasure of animal habitat and endemic plant species, both of which contribute to the health and success of ecosystems. This problem can be addressed through the introduction of biodynamic farming. An alternative method of farming developed by Rudolf Steiner in the early 20th century, biodynamic farming promotes a holistic approach to agricultural practices. Taking advantage of the space in between the vines, biodynamics introduces cover crops and wildflowers as tools to increase soil health, attract beneficial insects, birds and bats. This restores the nutrients to the ground which are so often leached from the effects of monocrop farming. Furthermore, grazing animals are introduced to the vines. The manure they produce replaces that of chemical fertilizers. Overall, biodynamic agriculture increases the health of the grapes, and contributes to the success of larger ecosystems. This notion of using in-between spaces to foster life becomes the springboard for the architecture that arises in this thesis.

The modern wine industry is at its core a branding industry. Competition among wineries is high, and as a way to distinguish themselves from one another they turn to geographical identity as their main selling point. Integral to the success of this is the notion of terroir. Terroir can be described as the 'flavour of a place', referring to the physical,

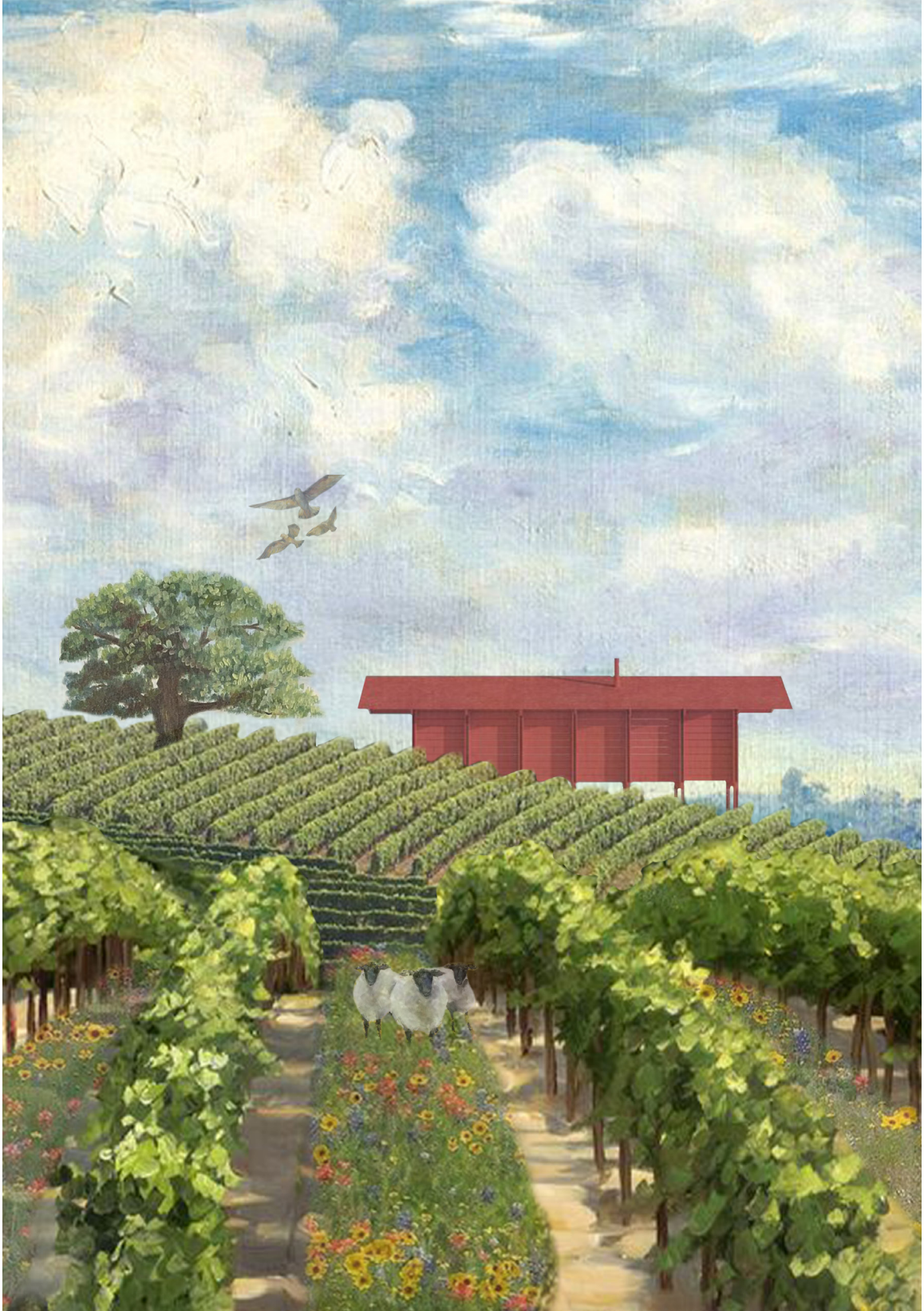
and climatic qualities of a region that give wines their identity. Terroir is a large contributor to the romanticism of wine regions. While terroir has a legitimate impact on the flavour of wine, primarily through soil compounds, precipitation and temperature, the differences found between wineries in the semi-regional scale remain minimal. As a result, wineries rely heavily on narrative to stand out from those next door. In order for these stories to be believable, and the identity of the winery to be consistent, the winery architecture must work in conjunction with the storytelling. Time and time again wineries will resort to stories about old world notions of traditional winemaking, and the resulting architecture takes the shape of Italian villas or French châteaux. The effect of this is a sense of placelessness in wine regions and an inauthentic, fairy-tale representation of terroir.

An additional effect of globalization and commercialization of wineries is a simplification of winery experiences, and a failure to make the wine experience accessible to all. Wine industries are large contributors to Canada's billion dollar ecotourism industry and yet a disconnect remains between those who drink the wine and those who make it. Migrant workers are ignored and wineries only advertise to a small, privileged portion of the population. Furthermore, an increasing importance is placed on winery designs that facilitate large numbers of visitors through the tasting room and wine shop as a means to increase profit. In this sense, wineries are failing to provide visitors with the complete experience, hiding how wine is made, who is responsible for making it, and the processes in place for vineyard maintenance. Additionally, wineries have the potential to act as catalysts for community engagement. By introducing gallery and installation spaces, wineries can promote local

craft and artistry, attracting a more diverse range of visitors to the winery.

This thesis is situated in Nova Scotia's Annapolis Valley. This region has a rich agricultural and fruit growing history, and a climate that has resulted in a specific vernacular architecture. With a rapidly growing wine industry, the Annapolis Valley faces the challenge of avoiding the aforementioned problems associated with conventional winemaking. Chapter 4 of the thesis examines the history of the region from an anthropological perspective and the climatic qualities that directly inform its regional architecture.

Together, history and climate are used to inform a design response in the form of a new winery, which takes an alternative approach to address the problems of conventional viticulture and winery design discussed below. In comparison to Canada's larger wine regions of the Okanagan Valley and Niagara Peninsula, the Annapolis Valley offers the potential to treat the design as a prototype. This is one that future winery designers can look to as a template for their designs and philosophies and one that promotes a healthier and more authentic approach to winemaking.



'Wish Image' collage capturing the essence of the thesis projects. Red building is designed by Feina Architecture and Design (Feina Architecture and Design 2021).

Chapter 2: The Problems

Three primary problems surrounding conventional viticulture and winery design can be identified. First, conventional viticulture leads to the destruction of ecosystems and the homogenization of landscapes through monocrop farming. Second, winery design, as a result of globalization and the commercialization of wineries contributes to a sense of placelessness in wine regions. Third, there is a lack of diversity in terms of both visitor experiences and the population visiting wineries. Together, these three problems contribute to the lack of authenticity found in wine regions around the world.

The Wine Industry Contributing to the Destruction of Ecosystems

With the rise of global populations over the last century, the need for food has increased dramatically. To meet this demand, agricultural land use has undergone a monumental shift towards high yield single crops that eliminate much of the world's local biodiversity. In addition to the ecological effects, monocrop agriculture has significant socioeconomic impacts on surrounding communities. These changes towards monocropping systems have lasting impacts on the global climate crisis (Nath 2016).

The History of Monocrops

Monocropping as we know it today can be traced back to a single crop in Germany in the early 20th century. Corn. The restrictions placed on Germany by the allied forces eliminated their food and fertilizer imports, putting incredible strain on local agriculture in attempts to prevent starvation. Large scale corn production was introduced into German

agricultural systems to fill this void. This was the first time a self-tolerant neophyte (a crop which can be planted in repetitive harvests) had been grown in Germany. Unlike the traditional European grains, corn was not affected by over-fertilization. The increased level of local food production overburdened the soils and left them stripped of their nutrients. In the coming years, there was significant investment in German agrochemistry, with men like Justus Von Liebig developing mineral fertilizers and liquid manures to introduce yield increasing chemicals into the soils. These fertilizers were sold to the masses in Germany, and the principles of chemical farming expanded worldwide (Uekoetter 2011).

At its roots, monocultures are an amalgamation of several rationales, described here by Frank Uekoetter in “The Magic of One; Reflections on the Pathologies of Monoculture”;

1. An economic rationale: concentration on one crop allows for comparative advantages and “economies of scale”—but also makes for a risky dependency.
2. A technological rationale: special machines require a decent load factor in order to pay off.
3. A scientific rationale: research may advance faster if scientists concentrate all their energy on one crop—but that implies that the knowledge base may become precariously narrow over time. (Uekoetter 2011, 4)

In an idealized world, monocrop farming is the perfect method of industrialized farming. Crops are selected based on specific growing conditions and locations, where they can be tailored to land with specific soil conditions such as water retention, salinity and average temperatures. Reducing crop competition allows the single crop to obtain the most amount of nutrients from the sun and soil, without competing for valuable space. Waste is reduced compared to the sloppy effects of transplanting and crop rotating. Production can be

automated and machines specialized to harvest the single crop. All of which leads to higher profits (Nath 2016).

Ecological Effects of Monocropping

Unfortunately, the idealized version of monocrop farming is far from the truth. This profit-driven agricultural method leads to significant small and large scale ecological damage.

Small Scale

The narrow genetic diversity among monocrops leaves the crops susceptible to dangerous pests and disease. If one crop is infected, the disease will easily spread among the remaining plants, often decimating entire fields. When one crop is planted over large areas, the soils become stripped of specific nutrients (most often nitrogen and phosphorus) (Carlson, Clay, and Reese 2016). The widespread use of chemical fertilizers as a result of this nutrient loss creates an uninhabitable soil environment for beneficial microorganisms. The majority of chemical fertilizers contain ammonia, which seeps into the groundwater and contaminates water runoff. This toxic water poisons plant and animal life.

Large Scale

Large scale monocropping leads to the destruction of landscapes, both physically and culturally. When studying the effects of large scale monocropping, there is no better example than the palm oil industry. Over the past three decades, palm oil plantations have rapidly been expanding into rich forest ecosystems and essential peatlands. In countries such as Indonesia and Malaysia, roughly 50% - 85% of all palm oil plantations established since 1990 have taken the place of primary or logged forests (Nath 2016). This destruction of habitat has led to the endangerment

of chimpanzees, orangutans and bonobos, while gorillas have been deemed critically endangered. In addition to the destruction of habitat, the palm oil monocultures have been the cause of civil unrest. Sacred forests have been destroyed, local lands have been seized, and in many communities drinking and washing water has been ruined by the runoff from the palm plantations.

Monocropping in the Wine Industry

Wine, although produced all over the world, requires specific growing conditions for a high quality product. As a result, relatively small areas produce extremely large quantities of wine. To maximize yields in these wine regions, vineyards have resorted to monocropping. With the price of land in notable wine regions being so high, winemakers will do whatever it takes to maximize harvest. Repetitive tilling, intense irrigation, and widespread use of pesticides are all common practices. Grapes are cultivated with specialized machinery, ripping apart the vines and leaving them lifeless. These machines harden the ground, creating ripe conditions for soil erosion. With moments of extreme climates (i.e., heavy rainfalls, flooding, fires) becoming more common, monocropped vineyards are significantly at risk. This is the first problem with conventional viticulture.



Workers on a monocrop vineyard (Railsback 2017).

Wine producing regions have not always grown grapes. Napa Valley, for instance, was at one time a sprawling oak savannah. These oaks occupied the valley for centuries, supporting dozens of native bird and bat species. As the region transformed into ranchland, the oaks provided shade and refuge for ranchers and their grazing animals. The oaks remained largely intact until the 1880's (Grossinger 2012). With the growth of orchards and vineyards, the oaks were removed because of their size and shadows cast. Along with the destruction of oak trees, streams were filled in or re-routed, and wetlands were developed upon, destroying the habitats of many endemic species.

The wine industry, like other monocrop industries, has a proclivity to simplify landscapes. This simplification has small and large scale effects, ranging from the contamination of groundwater, to the erasure of native species. Regardless of the scale, this issue of simplification needs to be addressed. Chapter 3 of this document highlights alternative methods of viticulture which mitigate against the effects of monocrop farming in the wine industry.

Erasure of Place

The wine industry, as it stands today, is a branding industry. Competition among wineries is intense and as a way to increase revenues and distinguish themselves from one another, they have turned to geographical identity as a selling point. Central to the success of this is the notion of terroir. Although terroir contributes largely to the romantic nature of wineries and wine regions, when exploited through a combination of collective geographical knowledge and individual winery heritage, an architecture arises which speaks to the values of each winery and ignores a greater

response to place. With the effects of globalization and standardization of winemaking processes, the linkages to place are further reduced. This chapter explores the significance of terroir in wine regions, how globalization is leading to a loss of agricultural connection, and how the commercialization of wineries contributes to an overall sense of placelessness.

Exploitation of Terroir

Terroir, although difficult to define exactly, can be described as the qualities that make a place so. It embodies the physical, cultural, political, architectural and functional qualities unique to a place. Emmanuel Vaudour categorizes terroir into four parts: 1. Plant Growing — nutriment terroir, 2. Territory — space terroir, 3. Advertising — slogan terroir, and 4. Identity — conscience terroir. In the wine context, terroir most often refers to the qualities of the land and earth that allow grapes to grow and give them their distinguishing flavours. Soil qualities, water and drainage characteristics, solar aspect, slopes and microclimates all play a role in the establishing terroir.

It is common practice for wineries to incorporate terroir within storytelling. Romantic narratives about the winery's history in relation to the land are often told during tasting room visits. These stories are a tool to distinguish wineries from one another. In order for these stories to be believable, the winery architecture must express the same values revealed in the story. The combination of storytelling and architecture are what give wineries their identity. Identity can be separated into two categories (Danielmeier 2014), regional identity and individual identity. While terroir plays a large role in establishing regional identity and flavour, it has

far less of an impact from one winery to another on a semi-regional scale. Wineries then resort to individual identity as a method of standing out amongst their neighbours. There are several avenues wineries will go down to differentiate themselves from one another. The most notable focus on technology and science or history and tradition, both of which contribute to the sense of placelessness. Wineries who's narratives focus on high-tech or industrial approaches to winemaking require a building that mirrors these values. The resulting architecture displays impressive structural systems, extraordinary forms, and extravagant materials, rarely having any reference to the place upon which they are built. This is an example of object buildings contributing to the erasure of place. The latter approach, history and tradition, relies on romanticized and nostalgic ideas of heritage. If the winery brands itself as having flavours comparable to iconic French Bordeaux or Tuscan Chiantis, then the buildings must match those stories. The stylized representations of Tuscan villas or French chateaux may be the most at fault for the problem of placelessness in wine regions, not because they bear no resemblance to the place they belong, as with the object building, but because inauthenticity is their fundamental goal.



Colenari Winery, Niagara Ontario (Raimondo Architects 2013).

Globalization in the Wine Industry

In part, the second problem of conventional winery design is that trends of globalization have affected the wine industry. Changes in consumer and operational behaviour, along with technological advancements have significantly impacted winery architecture. Wineries are no longer focused on simple production lines, nor are the people they serve solely interested in the wines. A great example of this is the Robert Mondavi Winery in the Napa Valley. At Mondavi, the tasting experience is broken up into a series of stations throughout the vineyard. Each station serves a different type of wine which coincides with a specific part of their story. The integration of procession and storytelling transforms the tasting experience into a journey through the vineyard, and is a large driver of increasing sales.

As wineries expand their reach to global markets, the winery architecture is increasingly used as a tool for tourist attraction (Duhme, Friederichs, and Woschek 2012). To satisfy this goal, the winery architecture falls into the trap of object buildings, losing any connection to agricultural heritage, or notions of buildings arising out of place. As winemaking technology has advanced, traditional agricultural style wineries have been unable to adapt to the changes in process and equipment needs. Furthermore, "Legal frameworks and building materials that aim to create safer and more efficient work environments and storage capacities are further drivers of change that impact significantly on the aesthetic of winery buildings" (Harvey, White, and Frost 2014, 425). The shift away from the agricultural towards the dramatic has benefits from a marketability standpoint, but when stretched and multiplied over a region, the excessive individualism eliminates any greater connection to place.

Commercialization of the Winery Towards Consumption

Winery architecture is used as a tool to represent the values of a winery. Although winemakers try to differentiate their wineries through architectural styles and heritage based narratives, some things remain constant. Branding and marketing methods remain very much the same between wineries. Websites, images, and labels are used by all, and the content portrayed through these play a role in the homogenization of winery experience. Images of oak barrels in dimly lit rooms, endless rows of manicured vines and chilled white wines sitting next to charcuterie boards all remind us that we are, in fact, at a winery. Yet none of these images have any real relationship to place or terroir. These images are common among wine regions worldwide, and the lack of authenticity found in them contributes to an overall, albeit somewhat digital, sense of placelessness (Harvey, White, and Frost 2014).

Arguably the most impactful place a winery can express its values, aside from the architecture, is through its label. Much like how the architecture is used to showcase a winery in a region, the wine bottle label must stand out on a shelf among hundreds, if not thousands, of competitors. The wine bottle, and its label, act almost as a “promise from the producer to potential customers” (Danielmeier 2014, 436). Given the importance of the label, one would think it would inform the customer about the wine’s origin and unique qualities. Yet most commonly, wine labels simply display the winery name and possibly the signature of the winemaker. The failure to represent these ideas through the wine bottle leads to an overload of brand names with virtually no meaning to the consumer. Without the assistance of country

of origin signs in liquor stores, wine from one region would be indistinguishable from the rest. There is the potential for wineries to create a coherent identity through narrative, architecture, and label. When done correctly, this identity can express to the consumer ideas of locality, technology, and terroir.

Homogenization of Winery Users and Experiences

The third problem with conventional winery design surrounds how different groups of people experience the winery. In conventional winery design and vineyard practice, there is a disconnect between those who drink the wine and those who make it. The people responsible for cultivating and harvesting the grapes go largely unnoticed and unrecognized. Although they are critical for the success of wine regions as a whole, migrant workers are hidden from the eyes of ecotourism. Furthermore, the target user group of conventional wineries are limited to a select, privileged, few. By its nature, wine is a luxury item, and one that not everyone can afford. While this is unlikely to change, wineries have an opportunity to invite groups from diverse backgrounds to experience the vineyard. The cookie-cutter approach to winery design puts an emphasis on the tasting and buying of the wine, limiting and simplifying the user experience. This encourages shorter visits, available for fewer months of the year, and ultimately a less memorable experience.

Migrant Workers in the Wine Industry

Migrant workers play an enormous role in Canada's agricultural economy, providing constant and relatively inexpensive work for farmers who can't find local employees. Nearly 75% of all migrant workers coming to Canada

originate from Mexico or the Caribbean. Established in 1966 to meet the demands of farmers, the SAWP (Seasonal Agricultural Workers Program) provides these workers with a framework to locate jobs in Canada. Although the SAWP has been a useful program for both employees and workers, it places limitations on how easily workers can integrate into society (Hjalmarson et al. 2015). The issues surrounding the SAWP program are nuanced, and this thesis does not set out to solve the economic or social disparities that temporary foreign workers face. Rather it aims to improve their conditions, and reveal the work they do to those who benefit from it.

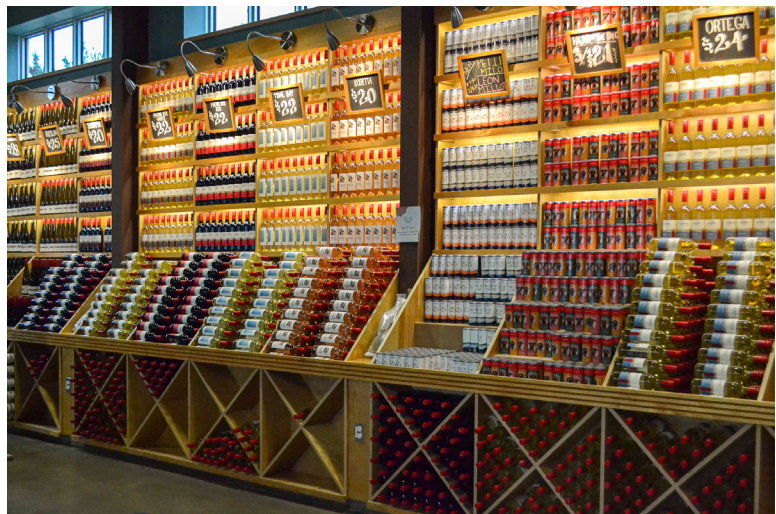
The Limitations of the Target Market

Wineries typically market to four user groups; 1. The Connoisseur, 2. The Aspirational Drinker, 3. The Beverage Wine Consumer, and 4. The New Wine Drinker (Harvey, White, and Frost 2014, 38). These groups are consistent visitors of wineries, and each have different expectations for wine quality and winery experiences. While marketing to these users ensures consistent winery visitors, it limits potential growth. Furthermore, most of these users make the majority of their winery visits during the summer months, lowering the winery activity year round. The most notable groups that wineries fail to market to are families, and not surprisingly, people who don't like wine. Due to children not being allowed to drink the wine, and the latter not wanting to, wineries must adapt existing programs, or offer additional ones in order to attract these groups. Chapter 3 provides insight into how adopting agri-tourism principles can begin to attract groups of all walks of life to the vineyard, and how vineyard activity can be encouraged year-round.

Cookie-Cutter Approach to Winery Design

Wineries are concerned with selling wine. As discussed in chapter 2, they resort to narrative, in conjunction with architecture, as a way to attract visitors and stand out amongst their competitors. But when it comes to physically selling the wine, this happens in the wine shop and tasting room (often combined). The goal for these spaces is to have visitors drink wines of a wide variety of flavors and characteristics, not only to showcase the talents of the winemakers, but in hopes that one or two will stand out to the visitor. From the tasting bar, visitors are immediately directed to the cash register where they make their purchase. The experience is focused entirely on product, with process falling by the wayside.

Here, there is a parallel between the wine industry and that of architects. First, like wine, many people cannot afford the services of an architect. The work they do is limited to designing homes for the wealthiest, or buildings for large corporations. And when architects do get the opportunity to design and build buildings, the users only ever experience the final product. As architects, process is valued as



Wine shop at Lockett Vineyards in the Annapolis Valley N.S.

highly as product, but the public is often left wondering why a building was designed the way it was. Wineries and winery architecture hold the rare opportunity for a didactic experience. They can reveal the systems, people, and processes that are required for you to enjoy a glass of wine, as well as the architectural processes that led to the spaces you experience.

Chapter 3: Conceptual Solutions

Winery Architecture Addressing Ecology

Biodynamic Agriculture

History

Developed by Rudolf Steiner in the early 1920's, biodynamic agriculture was a response to Justus von Liebig's approach to chemical agriculture. The decrease of soil and animal fertility, along with seed vitality as a result of chemical fertilizers and herbicides led farmers to look for alternate methods of agriculture. In a series of lectures held in Koberwitz in 1924, Steiner outlined a set of principles providing solutions to their problems. Worth noting is that among these principles were a set of nine preparations, which were closely linked to lunar and astrological calendars. For example,

Preparations 500 and 501 are made by packing cow manure or silica, respectively, into cow horns and burying them for a number of months before use. Steiner believed that cow horns, by virtue of their shape, functioned as antennae for receiving and focusing cosmic forces, transferring them to the materials inside. (Chalker-Scott 2013, 814)

Although there is little scientific evidence to support any significant benefit of these preparations, the benefits found in other biodynamic principles, such as cover cropping, crop rotation, low-tilling and silvopasture have received significant attention from the scientific community, and have shown to hold considerable benefits on soil fertility, microorganism diversity, and natural pest control. For this reason, this thesis/chapter will focus on the pragmatic, rather than the cosmic, principles of biodynamic agriculture

Biodynamic Principles

As a general rule, biodynamic agriculture treats the farm as a living organism, plugging into, and contributing to ecosystems at the local and regional scale. In this method of agriculture, the more complex the ecosystem, the more life it can sustain (Damery 2011). Unlike monocrop farming, where the space between vines is left empty to support cultivating equipment, in biodynamic agriculture, those spaces are filled with cover crops and wildflowers. These additional plants introduce more oxygen into soils and allow them to retain more water. They also attract insects and pollinators, which attract birds, which introduce microorganisms back into the soils through their droppings, leading to healthier soils, and in turn healthier crops. Grazing animals roam through the vines, the manure they produce is collected and used throughout the vineyard. No chemical manure is used. No chemical pesticides are used. Biodynamic farming is a holistic method of farming, creating closed loop systems which improve the overall health of the farm.

Biodynamics in the Wine Industry

Grape growers, like the farmers who turned to Rudolf Steiner, are concerned with the quality of their grapes. Years of repetitive tilling, excessive irrigation, and lack of supplemental planting have led to poor soil conditions and in turn lower quality grapes. Moreover, they are concerned that if conventional monocrop farming persists, the elements that contribute to terroir will be lost. The soils that once created ideal growing conditions for grapes will be stripped of all nutrients and left barren, only for chemicals to take their place.

The difficulty with re-establishing biodiversity in vineyard landscapes is the financial imperative. Land in wine regions is so expensive, grape growers, specifically of small and medium scale, cannot afford to replace grapes with secondary crops. Currently the cost of land in the Napa Valley is \$1,000,000/hectare (The Porto Protocol 2020). This pushes people to exclusively grow grapes on their land, contributing to the issue of monoculture farming. It doesn't make financial sense to grow anything but grapes. Sacrificing grapevines to introduce new plant species is not an option for most vineyards, regardless of the ecological benefits. This begs the question: do you need to sacrifice crops to increase biodiversity? Following the principles of biodynamic farming, the answer is no (The Porto Protocol 2020).

Small Scale Approaches

When operating a small-scale winery, moments of potential biodiversity can be found in the margins. Cover crops and indigenous flower species can be planted between vines. These attract useful pollinators and insects. These insects attract birds and bats, which act as natural pest controllers, eliminating the need for chemical pesticides (Muneret et al. 2019). Moreover, these crops allow the soils to retain more water, creating stronger root systems resulting in lower risk of damage in extreme climate conditions (i.e., lower erosion rates in heavy rainfall/storm conditions). Additional locations for planting can be found in unused areas of the vineyard such as parking lots, edge conditions, steep hills, and watersheds. Landscaping around the winery provides aesthetic as well as ecological benefits. Although individually small, these areas compound to create significant locations of life.

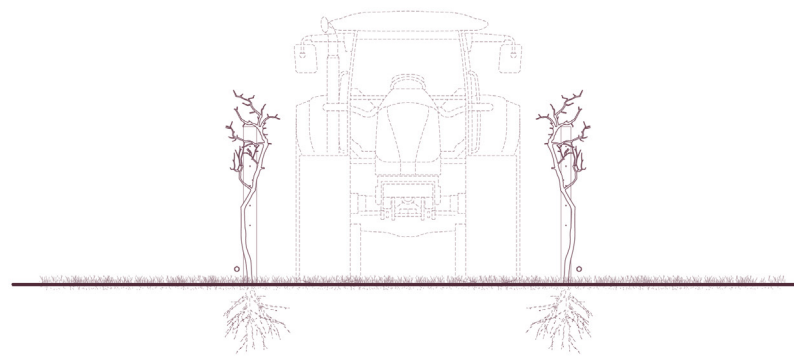
Large Scale Approaches

Where the benefits of biodynamic farming in small wineries increase biodiversity at the soil, or insect level, large scale approaches to biodynamic farming benefit regional ecosystems and habitat restoration. Large scale wineries have less pressure for crop yields, and can therefore dedicate large portions of their property to orchards, groves, meadows or forests. These lands act as grazing grounds for domesticated farm animals, and habitat for wild animals. Fruit and nuts from orchards and groves can create a secondary revenue stream for the winery, or be used in-house during restaurant and tasting experiences.

An example of this can be found at Coelheiros Estate in Portugal. The estate stretches over 800 hectares of the Alentejo region. Of the 800 hectares, 50 are dedicated to vineyards, where they practice organic farming methods. 40 hectares are dedicated to a walnut orchard, and the remainder a combination of meadow and lush cork forest. Within the forest exists olive groves, and a lake, creating a habitat for local deer, ducks, hares and rabbits. Cork is harvested every nine years without cutting down any trees. This cork is used for a combination of traditional and innovative cork products. Olives are harvested to create olive oil, which is sold by the winery. Bags of walnuts can be purchased upon visiting.



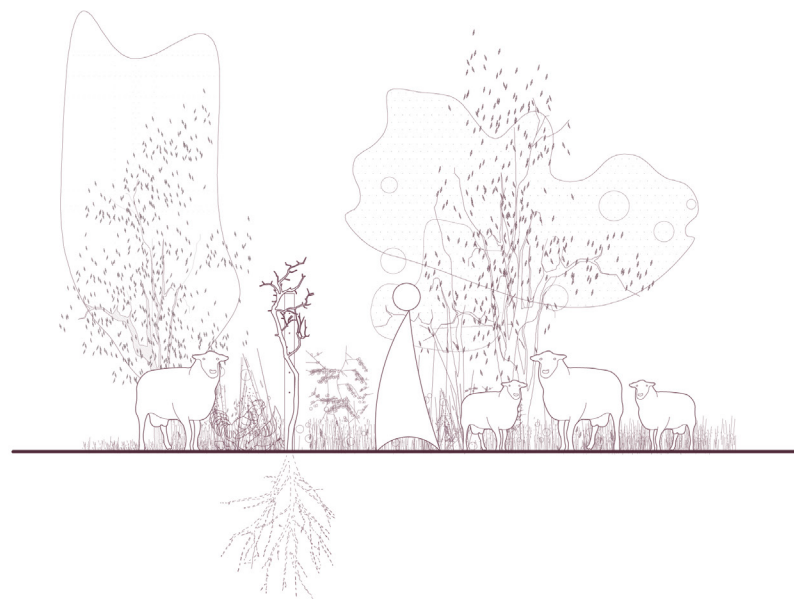
Photograph of sheep grazing in forest (Coelheiros 2021).



MONOCROP



BIODYNAMIC



NATURAL

Diagrams illustrating different vine growing methods.

Winery Architecture Addressing Place

Globalization has led, and is continuing to lead to a homogenization of built environments (through modern building technologies, and building requirements). The flattening of our built environment is removing people's connection to place. Architecture has a role in maintaining this connection. This is most successfully achieved through a critical regionalist approach to design, outlined by Liane Lefaivre and Alexander Tzonis.

Architecture Arising as a Response to Place

In addressing place, one must first understand what characterizes place? At its core, place is determined by climate and terrain. Out of these two conditions arise the physical, cultural, industrial, and material elements of places (Green 2014). Over time, rarely with the input of 'architects,' an architecture arises out of the specific conditions and constraints of the climate and terrain. This architecture can be described as vernacular. Due to this direct emergence from place "vernacular architecture does not go through life cycles. It is nearly immutable, indeed unimprovable, since it serves its purpose to perfection" (Rudofsky 1964, 1). It is then the critical regionalists (or architects) responsibility to "mediate the impact of universal civilization with elements derived indirectly from the peculiarities of a particular place" (Frampton 1983, 21) without falling into the "nostalgic historicism or the glibly decorative" (Frampton 1983, 20).

In regards to wine making, this can most easily be addressed through material culture and form. However, the winery can obtain a deeper connection to place through the methods of wine production, revealing genius loci through the winemaking process.

Critical Regionalism; Place Based Design

History

A term coined by Liane Lefaivre and Alexander Tzonis, critical regionalism describes an approach to design that arose as a response to post-modernism. Many architects were unconvinced by the surface level and reductive methods of referencing history and culture in postmodern buildings. Critical regionalists were concerned with an “approach to design that [recognized] the value of the identity of a physical, social and cultural situation, rather than mindlessly imposing narcissistic formulas from the top down” (Lefaivre and Tzonis 2003, 11).

The notion of regionalism, however, dates back far earlier than the postmodernist movement. Arising first out of an anti-monarchical approach to garden design, what would be known as the picturesque movement focused on the “preservation of the particular and the diverse, and the avoidance of the universal and the standard” (Lefaivre and Tzonis 2003, 13). Critical regionalist architecture operates under a similar vein, attempting to provide resistance to the homogenizing effects of globalization. This thesis is aligned with these views.

Critical Regionalist Principles/Strategies

At their core, critical regionalist principles are to use the specifics of site to inform design. Inspiration could come from the natural topography, qualities of local light, culturally specific modes of construction and building form, site specific materiality etc . . . as long as it is derived from the specific rather than the universal. The challenge comes from being able to “distinguish Critical Regionalism and simple-minded

attempts to revive the hypothetical forms of a lost vernacular” (Frampton 1983, 21). To simply recreate past forms and vernaculars without acknowledging contemporary times and technologies will lead to the same fairy-tale sense of place akin to Italian Villas and French Chateaux discussed in Chapter 2.

Site Specific Approaches to Winemaking

Both ancient and modern techniques of winemaking have the potential to reveal the genius loci of a place. Whether it be fermenting the grapes in the earth, using qvevri, or using natural topography to replace pumps, through gravity flow techniques, winery architecture can achieve a deep connection to place by making it an integral part of the winemaking process. Furthermore, these alternative methods of winemaking offer wineries a unique selling point and marketing ability, making the winemaking process a driving factor in attracting visitors and tourists.

Qvevri

The qvevri (pronounced kvevri) is the oldest method of winemaking, dating back over 8,000 years. The qvevri is integral to Georgian culture, and plays a large part in Georgian identity and independence. The qvevri is both a process and an object. Hand sculpted from the earth itself, these clay vessels can grow to hold up to 10,000 litres. Once fired, the vessels are returned to the earth, buried in the ground. Once ripe, the grapes are pressed and the juices, skins and seeds are left to sit in the qvevri over winter, where the thermal energy from the earth sparks the fermentation process. The earth itself makes the wine. Because the qvevris are made from soil on site, and each vineyard will produce different variations in soil compounds, the juices will have

different reactions depending on the qvevri, creating a truly site specific wine. Although this method of winemaking is profoundly Georgian, the low yields, and specialized labour required to maintain and clean the vessels results in only 1% of all Georgian wines coming from qvevris, with their main exporters being Germany and Japan, the two nations with the highest interest in natural wines (Railsback 2018).



Qvevri maker sculpting the basins (Railsback 2018).



Qvevri in the kiln (Railsback 2018).



Winemakers placing qvevri in the ground (Railsback 2018).

Gravity Flow

Another site-specific method of winemaking, which unlike the qvevri is not limited by yields, is the gravity flow technique. This wine production method uses natural topography to make wine. Unlike conventional winemaking, which use pumps to continuously circulate the wine, this method replaces those pumps with gravity. Reducing the energy needed to make wine. Staggering the production facility down the side of a hill, gravity flow wineries create a process driven design, directly responding to their site, revealing genius loci through winemaking.

This can be clearly seen in Olson Kundig's design for Martin's Lane Winery in Kelowna, British Columbia. Terracing down the side of an existing hill, the production facility is broken into 6 distinct levels (Castro n.d.).

Level 1: Grape Receiving

The grapes arrive at this level hand picked and sorted. They are left in cooling rooms before gently falling to level 2.

Level 2: Pinot Noir Fermentation

As the grapes fall from the receiving deck they land in small, mobile, metal fermentation tanks. It is here that the fermentation process begins. Once the juices are ready, the tanks are connected to pipes and gravity lets them flow to the following stage.

Level 3: Pinot Noir Fermentation/Settling

The juices from the small fermentation tanks above flow down into large concrete vessels (this tradition inspired by the qvevri). These vessels naturally control the fermentation

and allow the leftover sediment to sink to the bottom. The Pinot Noirs rest here briefly before falling to the barrel cellar.

Level 4: Riesling Fermentation

The barrels at this level, like the rest of the winery, are filled by nothing but gravity. The juices flow directly from the press at the upper level, underneath the winery, and fill the vessels. The Rieslings briefly ferment, maintaining the light and fruity character.

Level 5: Assemblage/Blending

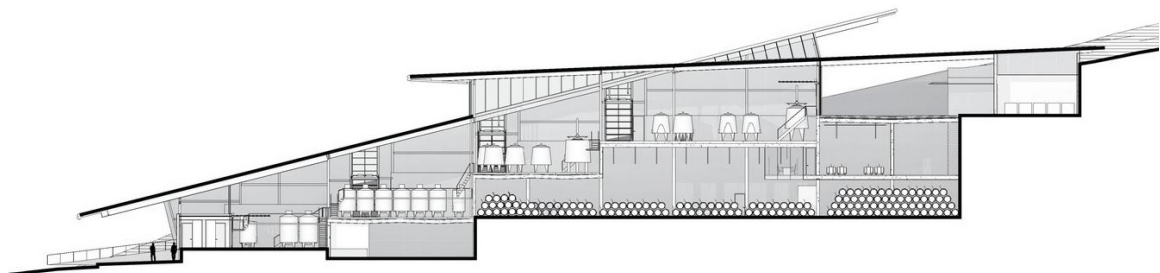
This is the final resting place before bottling. For any of the blends, this is the stage where they come together and harmonise. They are left at this stage for up to one month before being bottled.

Level 6: Bottling

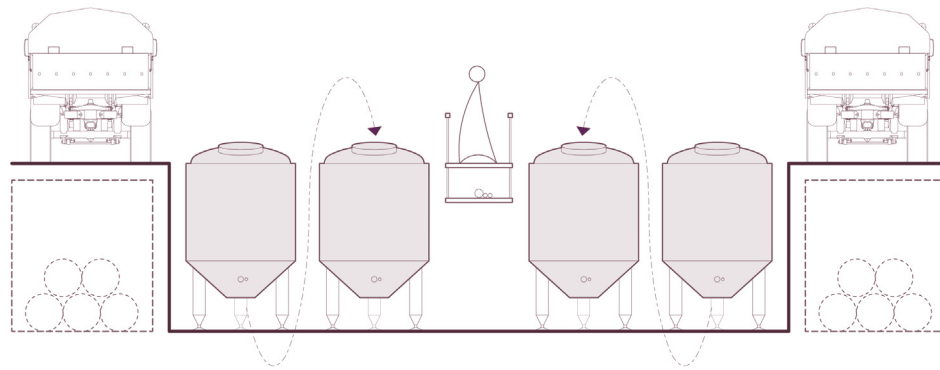
The final stage of the process. Each bottle is filled by gravity alone, completing the 100% gravity flow process.

Sub-Level: Wine Cellar

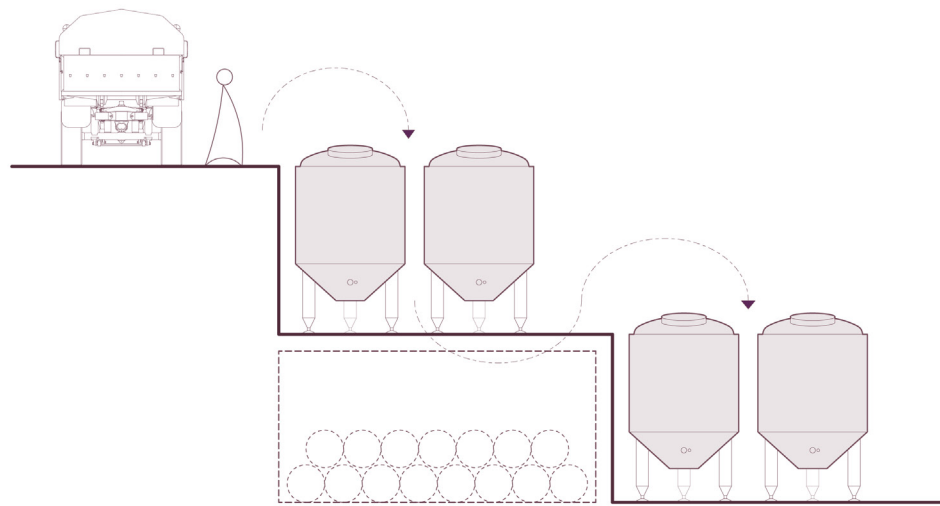
The barrels in this cellar are entirely French oak. They are all filled using gravity, and let to rest for roughly 16 months. The form of the production plant, and how it steps down the slope, creates a natural location to store the barrels.



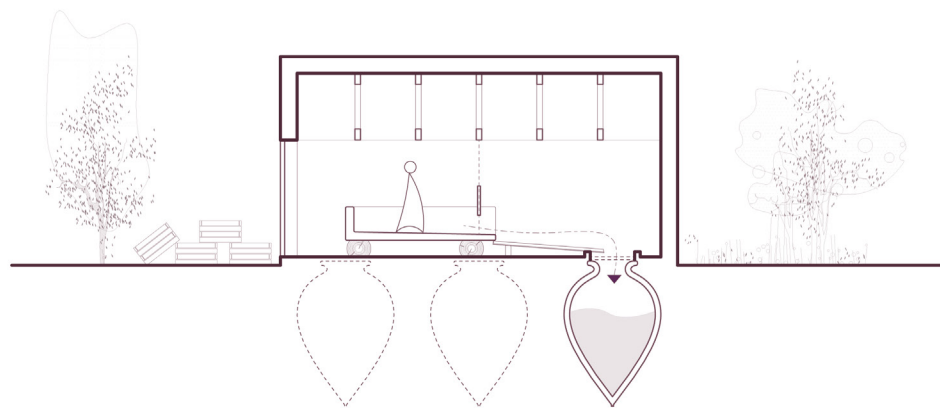
Section of Martin's Lane Winery (Castro n.d.).



PUMP



GRAVITY



EARTH

Diagrams illustrating different wine production methods.

Winery Architecture Addressing Diversity of Users and Experiences

Wineries have the opportunity to use architecture as a way to enhance their product and leave a lasting impression on their visitors. If executed well, visitors will tie the winery experience as much to the architecture as to the wine (as long as both are of a high quality). For that reason it is a shame that so many wineries simplify the winery experience to two primary factors, the tasting and purchasing of wine. And the architecture that follows primarily focuses on the tasting room and wine shop. Visitors are pushed through the winery, with the sole purpose of selling wine, rather than highlighting where it comes from, how it is made, or the people who make it possible. This chapter outlines an alternate method of winery design that enhances the user experience, and allows the winery to act as a beacon for social gathering rather than an activity for the elite.

Integrating Workers Housing

Integrating worker housing can give the visitors a deeper understanding of the winemaking process, while simultaneously providing the workers with a sense of dignity. Revealing this otherwise invisible population, creates an opportunity for discourse surrounding Canada's agricultural practices, and the populations responsible for our food (and in this case, drink). Residences are a chance for wineries to celebrate, and show thanks to the workers, rather than hiding them in the fields. If designed well, the workers' residences are an opportunity to create community in the winery. Communal cooking and eating spaces, as well as spaces of worship all play a role in this.

From Biodynamics to Architecture

When thinking about an alternative method of winery design which increases the diversity of experiences, one can turn to the principles of biodynamic farming to pull inspiration. Where biodynamic farming introduces additional crops in the spaces between the primary crops, the winery experience can be enhanced by introducing secondary programs, and taking advantage of in-between spaces on multiple scales. The in-between can be thought of physically through small scale courtyards and gardens, or on a larger scale through vineyard processions between the winery buildings. Furthermore, they can be used programmatically, creating moments of intersection between different winery users, revealing processes and systems which are usually hidden to the visitor. These in-between spaces also serve an ecological purpose increasing plant, animal and insect life, as discussed in chapter 2. If positioned thoughtfully, the in-between spaces can create refuge from harsh climatic conditions, creating microclimates which can be inhabited all year long, regardless of the conditions.

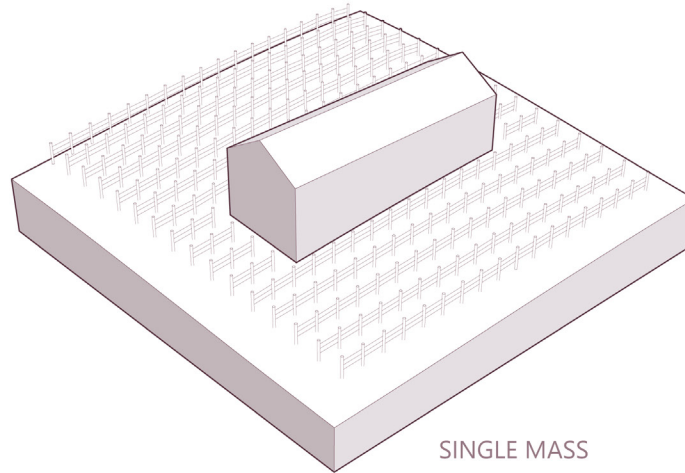
Case Studies

In addition to the conventional winery programs, most notably the tasting room, wine shop and production facility, Chateau La Coste, located in Provence, France, scatters art galleries, installation spaces, performance venues, and contemplation spaces throughout the vineyard. These spaces are designed by world-renowned architects and artists such as Renzo Piano, Frank Gehry and Tadao Ando. Although it is inconceivable for all wineries to commission works from these architects, the concept of adding complexities to the winery program can be applied universally. By adding these

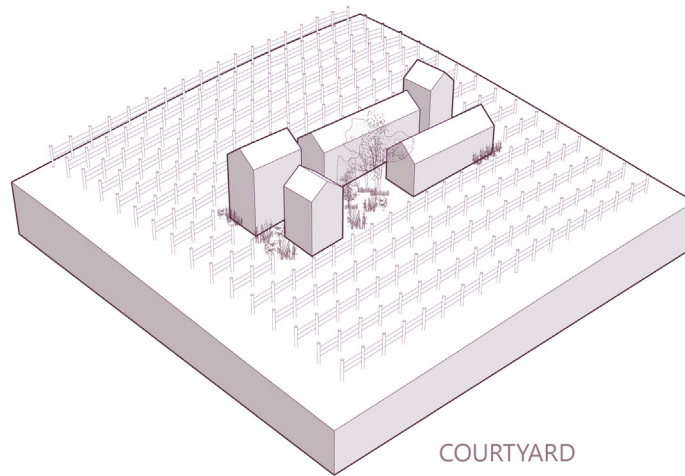
additional programs, and spreading them out around the property, the visitors not only have the option, but a reason to explore the vineyard. Gallery and installation spaces provide local artists and makers with a venue to display their work and venue spaces can host local events, boosting community engagement. These additional programs can occur separate from the wine tasting experience, opening up the winery to those who may not solely be interested in drinking wine. An additional detail worth noting about Chateau La Coste, is the integration of biodynamic principles and organic farming methods. In addition to offering a diverse range of experiences, biodiversity and ecological health are of primary importance.



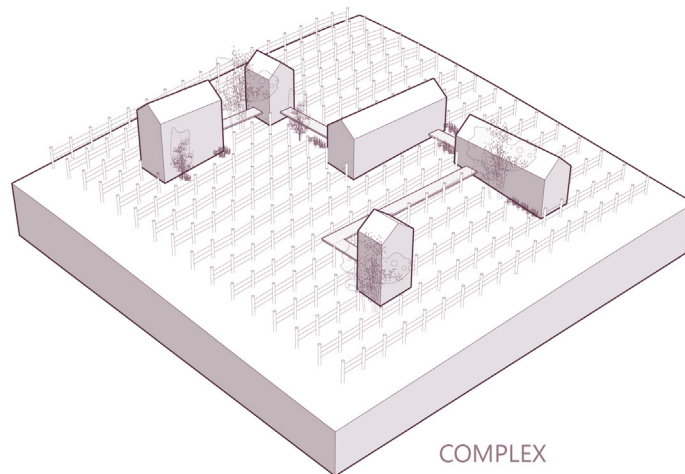
Renzo Piano Building Workshop, Chateau La Coste Art Gallery & Barrel Storage. The building is sunk into the ground to limit the shadows cast on the vineyard. The roof structure follows the same spacing as the vines (RPBW 2009).



SINGLE MASS



COURTYARD



COMPLEX

Diagrams illustrating different winery massing strategies.

Chapter 4: A Study of Place; The Annapolis Valley, N.S.

History of the Place

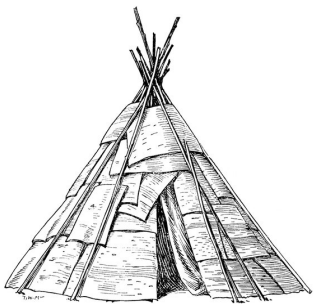
Canada's Atlantic wine region is located in the Annapolis Valley of Nova Scotia. This region has a rich agricultural history, with a climate well suited to the production of fruit. The combination of climate, terrain, industry and culture has produced an architectural vernacular well suited to the conditions of the region. This chapter breaks down the history of the place, its physical and climatic qualities and the type of architecture that resulted from the two. A type of architecture this thesis is focused on preserving.



Map of Canada locating Canadian wine regions.



Map of Nova Scotia locating Halifax and the Annapolis Valley.



Traditional Mi'kmaq wigwam structure (Jefferys 1942).

Social and Anthropological History

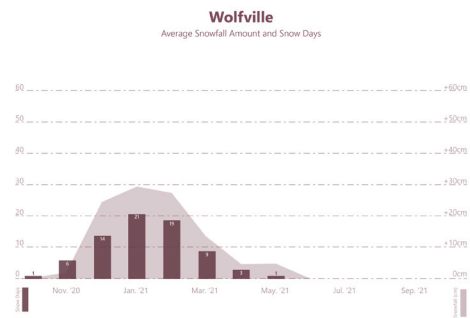
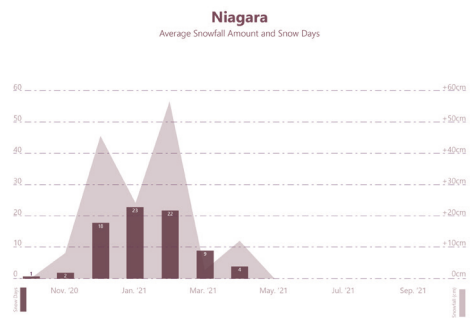
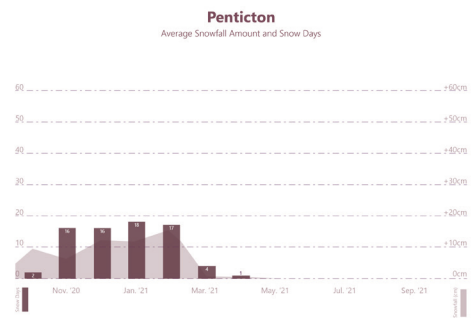
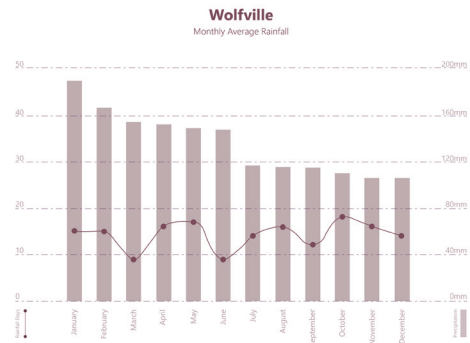
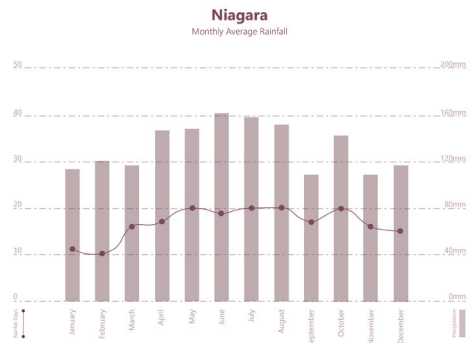
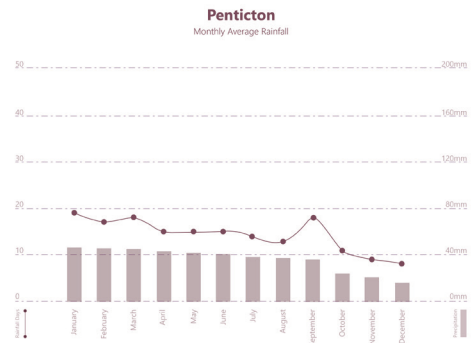
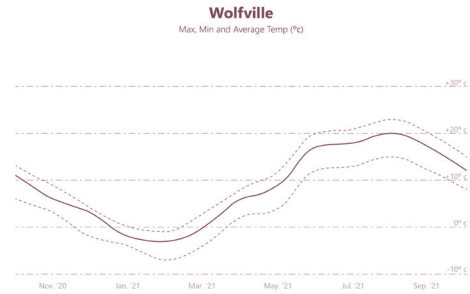
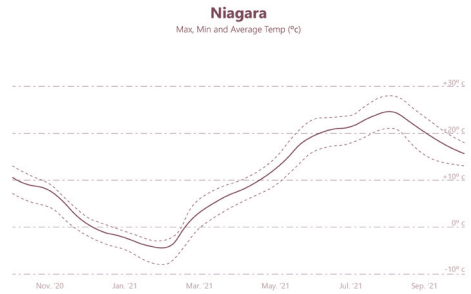
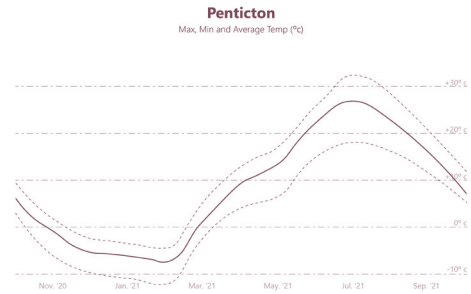
Originally inhabited by the Mi'kmaq people. The abundance of land animals and fish, both freshwater and saltwater, created a rich hunting ground. Moreover, the proximity to the sea provided them with seals and a plentiful bounty of molluscs. The nomadic, hunter-gatherer lifestyle of the Mi'kmaq people resulted in an architecture that could withstand changing conditions while being easily erected and disassembled. The resulting wigwam was a conical structure constructed out of poles covered with birchbark sewn together with spruce roots. "Inside the wigwam was a central fireplace bordered with stone. The smoke from the fire could escape through the opening at the top where the framing poles met. The floor was covered with fir boughs, which in turn were covered with woven reed mats and animal skins" (Davis 2000, 32). The wigwam is an extremely early example of how an architecture arises out of place, perfectly suited to the needs of the inhabitants.

Agricultural History

Nova Scotia's wine region is located in Kings County. Encapsulating the eastern end of the Annapolis Valley, this region has a rich agricultural history. The region is bounded by the Bay of Fundy on the north, and by the Minas Basin on the east. French settlers quickly realized the climate and terrain were well suited for fruit growing and the earliest records of apple trees being planted date back to 1633. In 1758, a large wave of English settlers arrived in Nova Scotia. After the English expelled the Acadians, many of their farmers took over the French orchards and expanded the apple industry. This expansion led to the erection of towns and villages near railways and rivers, "The first warehouse was built at Port Williams in 1884, and by 1910 every station along the railway had one or more of these buildings" (Cann, MacDougall, and Hilchey 1965, 9). Between 1871 and 1961, the population of the county nearly doubled, from 21,510 to 41,747 (MacDougall, Nowland, and Hilchey 1969). This boom of industry and population was a direct result of the specific climate and terrain of the place.

Physical Qualities

The Annapolis Valley is characterized by the large trough that creates the eastern end of the valley, ending at the Minas Basin. The valley lies between the steep North Mountain, and the rolling slopes of the South Mountain. Separating Wolfville from the Gaspereau valley is a spur locally known as 'the ridge'. The Gaspereau Valley is steeply sloped with a relatively level bottom. The Gaspereau River, along with the Annapolis, Cornwallis, Habitant, Canard and Pereaue provide significant drainage for the runoff of the north and south mountains, contributing to the viability of agricultural



Climate charts comparing the average temperature, rainfall, and snowfall between Canada's three largest wine regions (World Weather Online 2021).

land. Just over half of the valley is covered with forest. Of this, half consists of purely softwood forests, the remaining is made up of hardwood and softwood forests. Less than 1% of the valley's forests are purely hardwood. With that being said, the Annapolis Valley is one of the few locations in the province to find hardwood trees. These forests create a wide range of biodiversity in plant and animal life.

Climatic Qualities

The climatic qualities of the Annapolis Valley, specifically Kings County, are best described by D. B. Cann and J. I. MacDougall in their 1965 Nova Scotia Soil Survey.

The climate is an important soil-forming factor. It supplies the energy necessary for and determines the rate of soil formation. The kind of native vegetation, kind and amount of organic matter added to the soil, and kind of crops that may be grown are governed by the climate. In Kings County the climate is very favorable for fruit growing. (Cann, MacDougall, and Hilchey 1965, 11)

Temperature

The average temperatures remain fairly constant throughout the valley. Temperatures rise rapidly approaching the summer months, while precipitation drops off. And as winter months approach the temperature gradually drops with precipitation increasing rapidly. The condition that changes the most throughout the valley are the frost days. Critical to the success of fruit, limiting the frost days increases the growing and ripening window for the crops. The Wolfville area, due to protection from the Fundy winds by the north mountain and insulating properties of the valley, receives roughly 50 fewer days of frost compared to the southwestern towns such as Greenwood (MacDougall, Nowland, and Hilchey 1969). These additional days without frost are critical to the ripening of the grapes, resulting in higher sugar contents.

The degree day theory is used to identify viable sites for growing grapes. Any day with an average temperature over 10 degrees Celsius is added to a cumulative total over the duration of the season. Wolfville has a total of 1,094 degree days, placing it on the edge of fair and good suitability for grape growing. The climate in Wolfville is likened to that of the Champagne region in France, a climate suitable for slow ripening grapes and conducive to bubbly white wines.

Wind

In fruit growing regions, wind can be incredibly damaging. Strong gales will detach the fruit from the trees, ruining the yields. The northeast areas of the valley, i.e., Wolfville and Gaspereau Valley are protected from the predominant gales, whereas the southern parts of the valley are especially susceptible. As the temperature decreases in the winter, roughly 25% of winds come from the northeast, compared to just 3% in the summer. Note: When establishing a site for the proposed winery, protection from winter winds should be considered.

Rainfall and Precipitation

Water, although necessary for the growth of grapes, can be destructive if not properly drained. The semi-permeable soils and terrain of the valley ensure this isn't a problem.

The Architecture That Arose from This Place

Climate, terrain, industry and culture led to the vernacular Nova Scotia architecture built to suit its place. The redundant structure of light timber members was born out of the boat building tradition. The use of light timber was also adaptable, allowing families to add to existing houses as families grew or required space to fit new needs. The climate, and its ever-



Amberman House,
Granville Ferry (Nova Scotia
Information Service n.d.)

changing conditions, required materials that could adapt with these conditions. The never ending wet-dry and freeze-thaw cycles made shingles the perfect material. Their ability to store and release moisture by expanding and shrinking, while being easily produced, maintained, and replaced, made them the predominant material of the place. Buildings in this climate require simple forms, few corners, and the ability to shed snow and water. Buildings here are simple, and without fuss (MacKay-Lyons 1995).



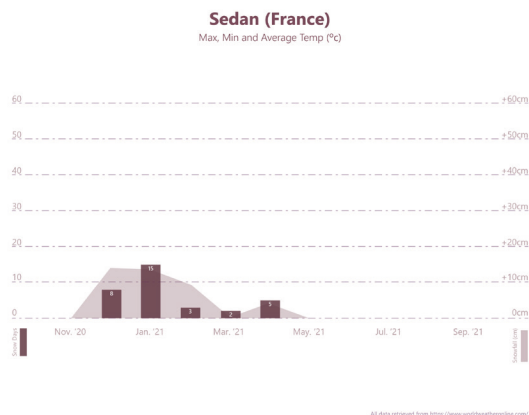
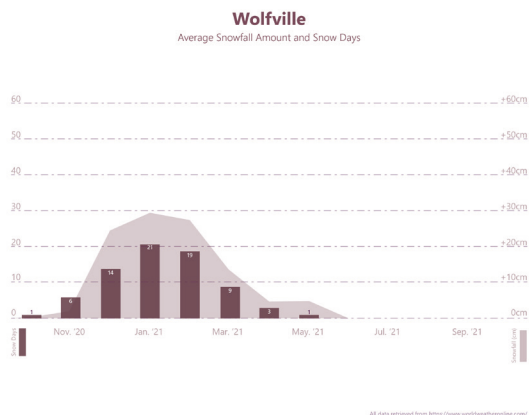
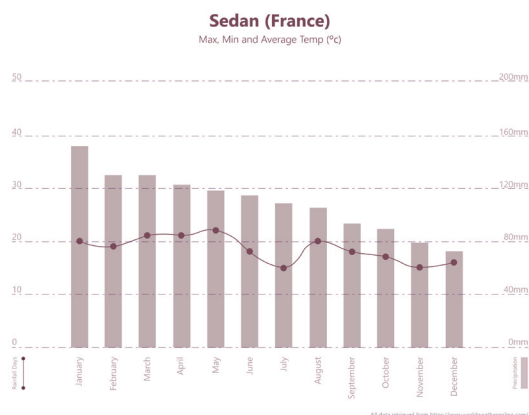
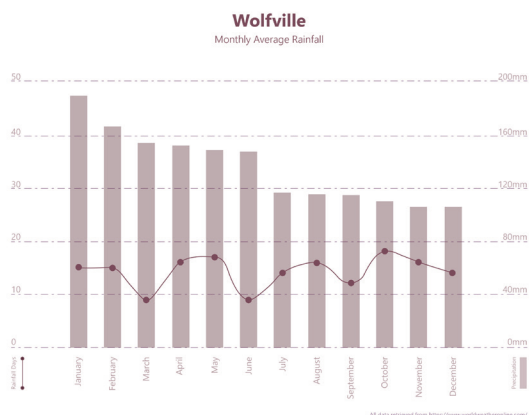
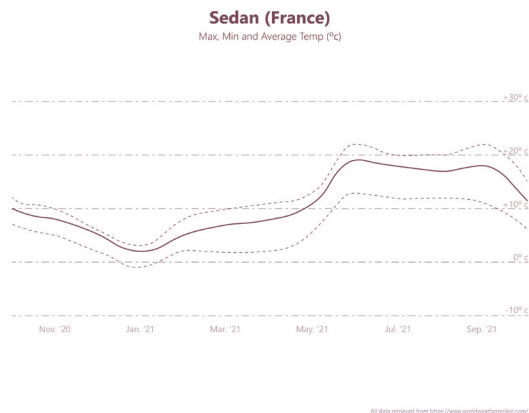
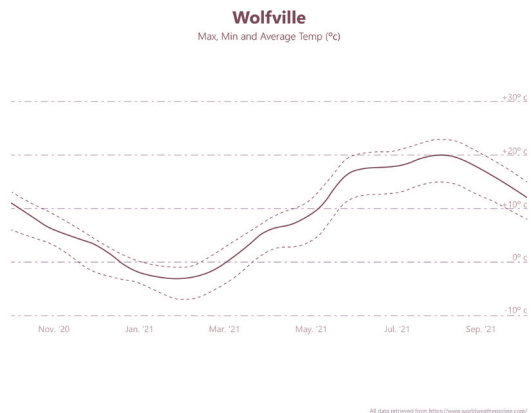
Cattle farm in the Annapolis Valley.



Dairy farm in the Annapolis Valley.



Vineyard in the Annapolis Valley.



Climate charts comparing Annapolis Valley climate to that of Sedan, located in the Champagne region of France. It is no surprise that the wine made in the Annapolis Valley shares similar qualities to those of Champagne (World Weather Online 2021).



Map of Minas Basin with primary and secondary waterways, agricultural and urban land use, softwood and hardwood forests, and existing wineries located (Road data from NSTDB 2021c, water data from ODNS 2021, land use data from SRF 2021).

Chapter 5: Architectural Solutions Tested through Design

Program

The program of the project follows four active winery users. The patrons, workers, animals and product. In-between spaces are created both spatially, through courtyards, paths, and plazas to create microclimates and introduce additional planting, but also programmatically as a method to promote interaction between the different users. The colours used to represent these different users are carried throughout the design drawings to easily locate the different users.



PRODUCT



ANIMALS



WORKERS



PATRONS

Illustrations of different winery users.

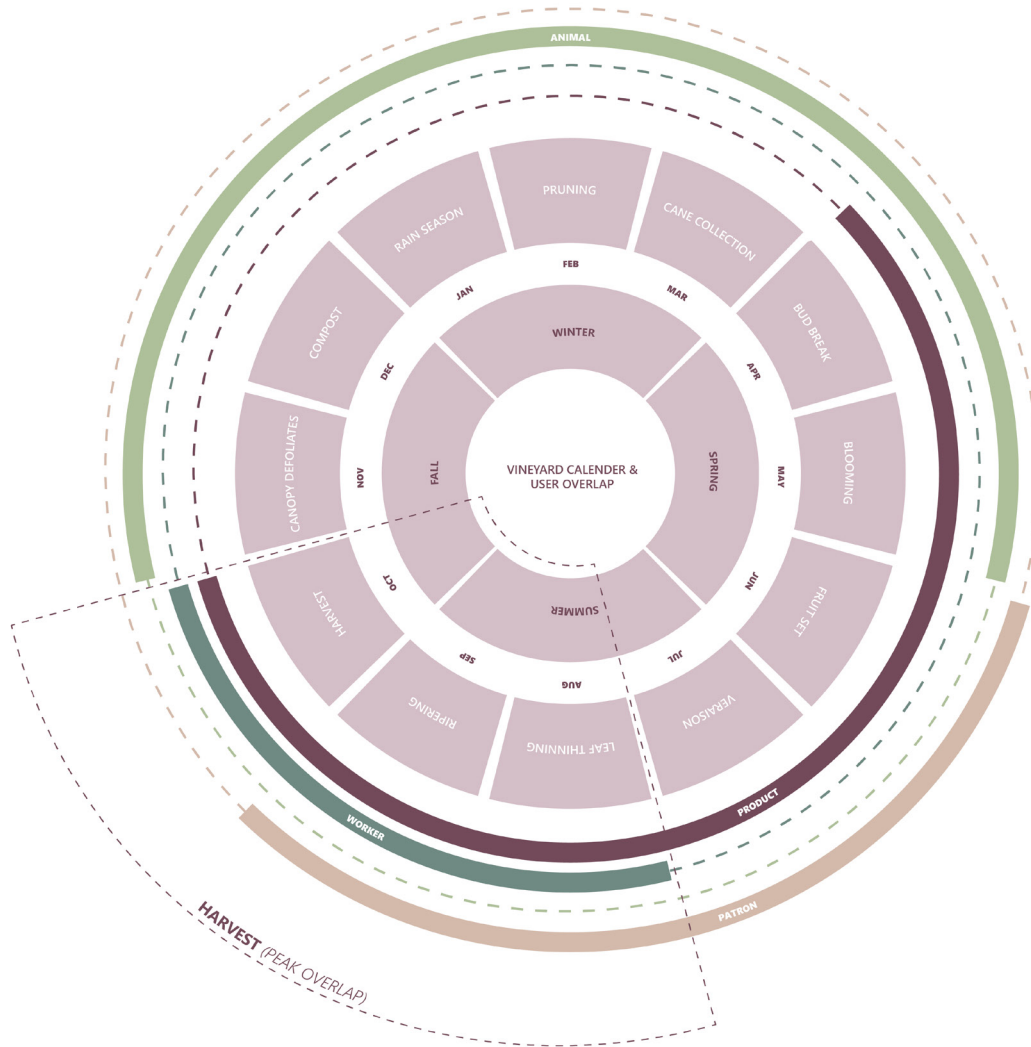
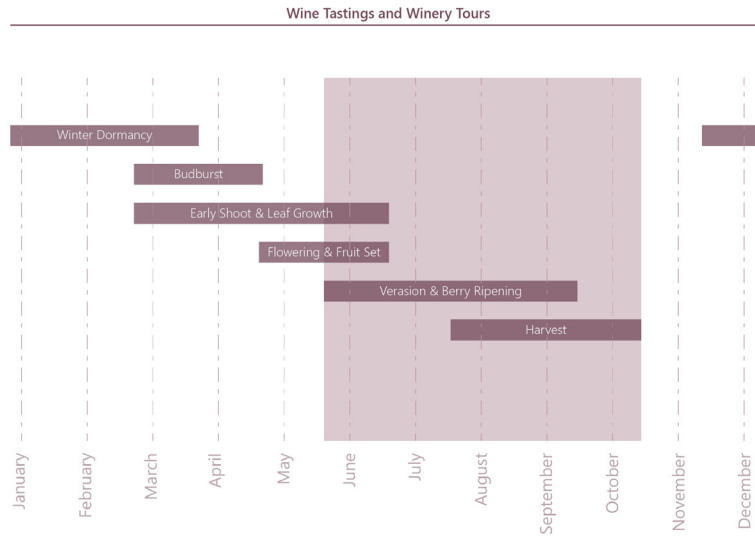


Diagram illustrating the cyclical nature of wineries. Peak user activity is added to find moments of overlap throughout the year. The most overlap occurs during harvest season in the late summer and early fall. Here the visitors, migrant workers, and product are all actively moving through the winery. While the animals are restricted from accessing the vineyard during this time, to avoid having them eat the grapes, their program can be modified to make them an active user of the winery during this time.

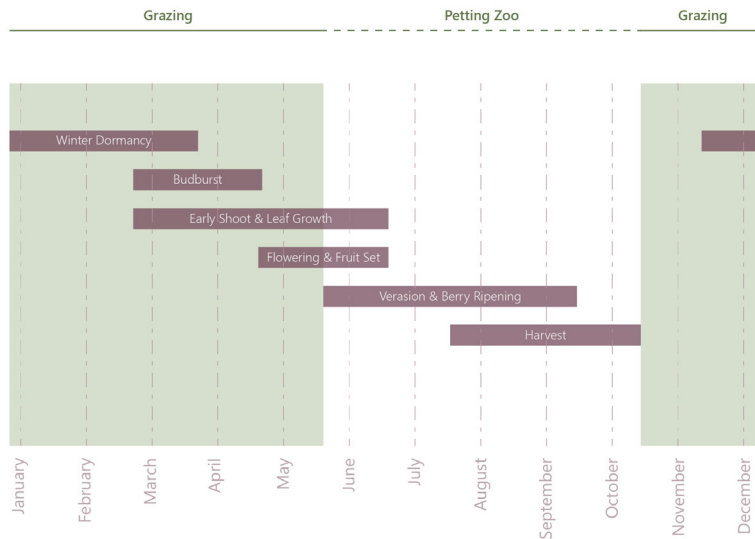
Vineyard Cycle

Product Programs and Peak Activity Times



Vineyard Cycle

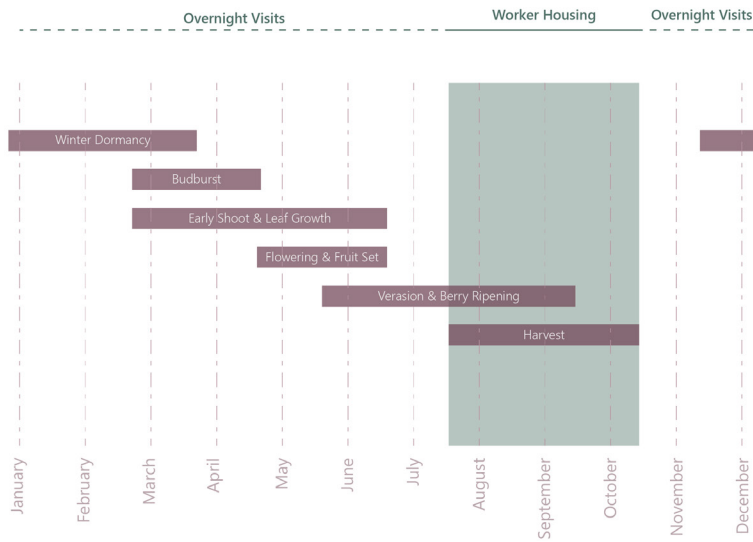
Animal Programs and Peak Activity Times



Diagrams examining each user separately and identifying their peak vineyard activity. Program adjustments are added to users as a way to attract visitors year round.

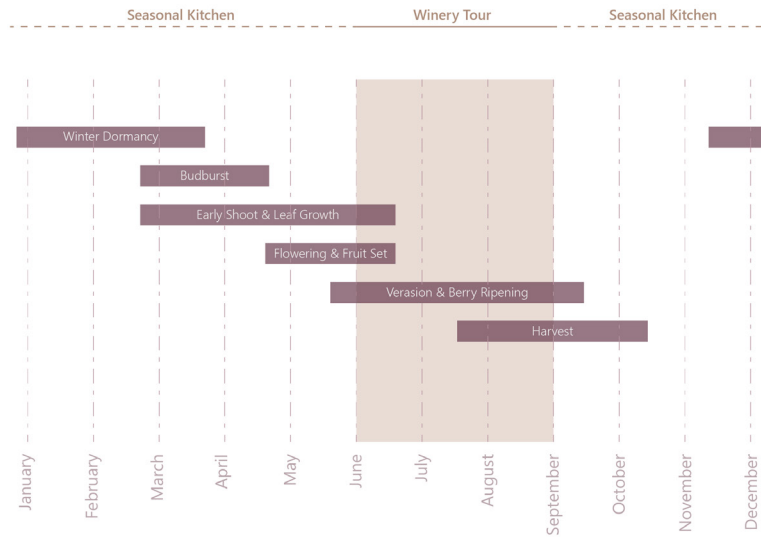
Vineyard Cycle

Workers' Program and Peak Activity Times



Vineyard Cycle

Patron Programs and Peak Activity Times



Diagrams examining each user separately and identifying their peak vineyard activity. Program adjustments are added to users as a way to attract visitors year round.

Site Strategy

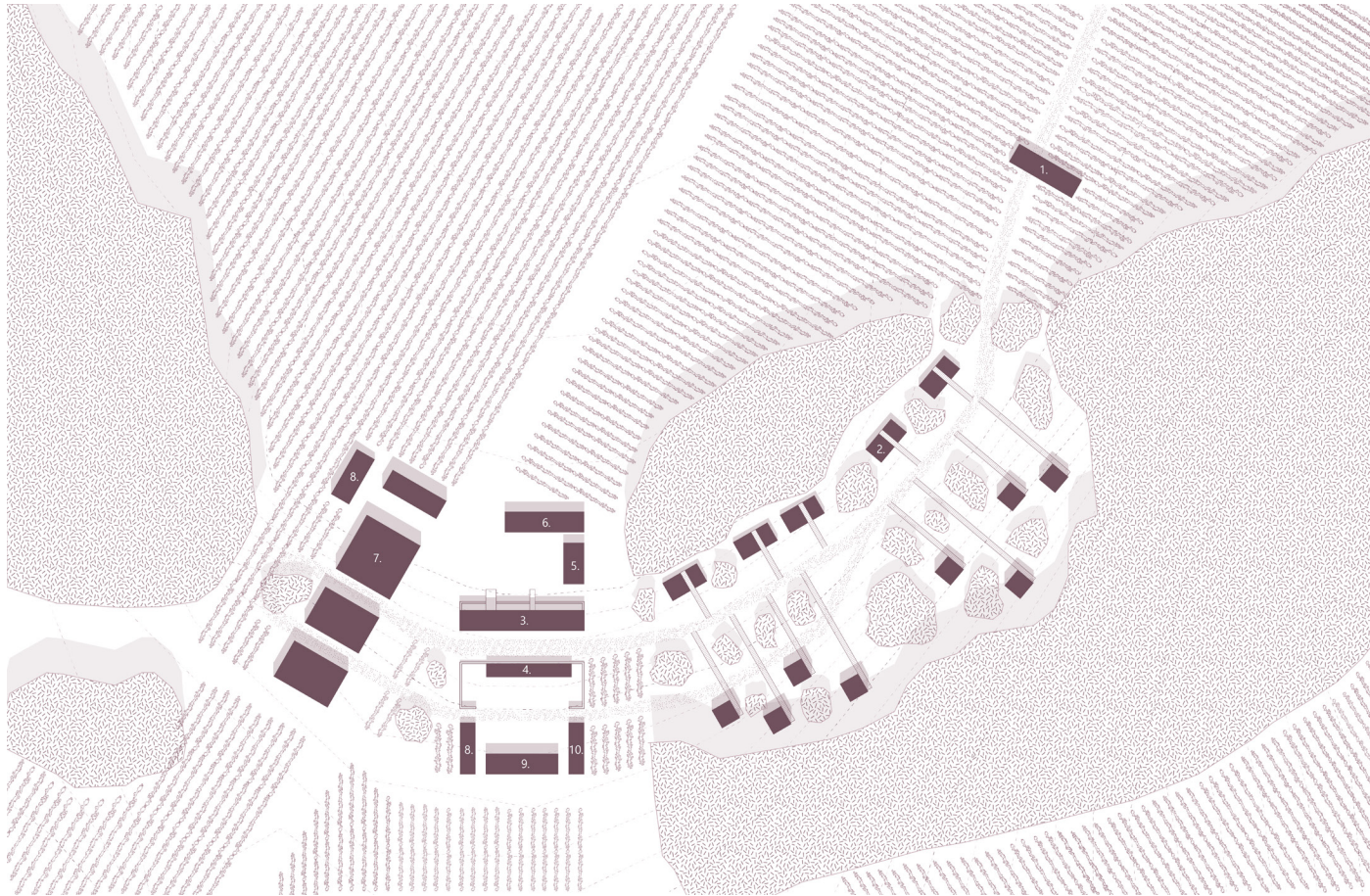
When identifying a site, several criteria are at play. Direct connection to Grand Pré Road is a primary factor. This is the road that takes wine tourists from Domaine de Grand Pré to Lockett Vineyards, two prominent wineries in the Annapolis Valley. Placing the design along this road ensures the project is plugging into the existing winery infrastructure. Following this, the next criteria is solar exposure. Southern exposure is ideal for grape growing as well as naturally lighting the architectural spaces. A steep topography is required to facilitate the gravity flow production facility. The presence of both hardwood and softwood forests provide existing pockets of biodiversity. And lastly, views to the valley are an added benefit for attracting visitors. The proposed site meets all of these requirements, making it an obvious choice to test the design proposal.



Area of interest located along existing winery loop, between Domaine de Grand Pré and Lockett Vineyard. (Building data from NSTDB 2021a, contour data from NSTDB 2021b, water data from ODNS 2021, land use data from SRRF 2021).



Site plan. Public accesses winery from Grand Pré Road while Biggs Road acts as a service road for shipping trucks. (Building data from NSTDB 2021a, contour data from NSTDB 2021b, road data from NSTDB 2021c, water data from ODNS 2021, land use data from SRFR 2021).

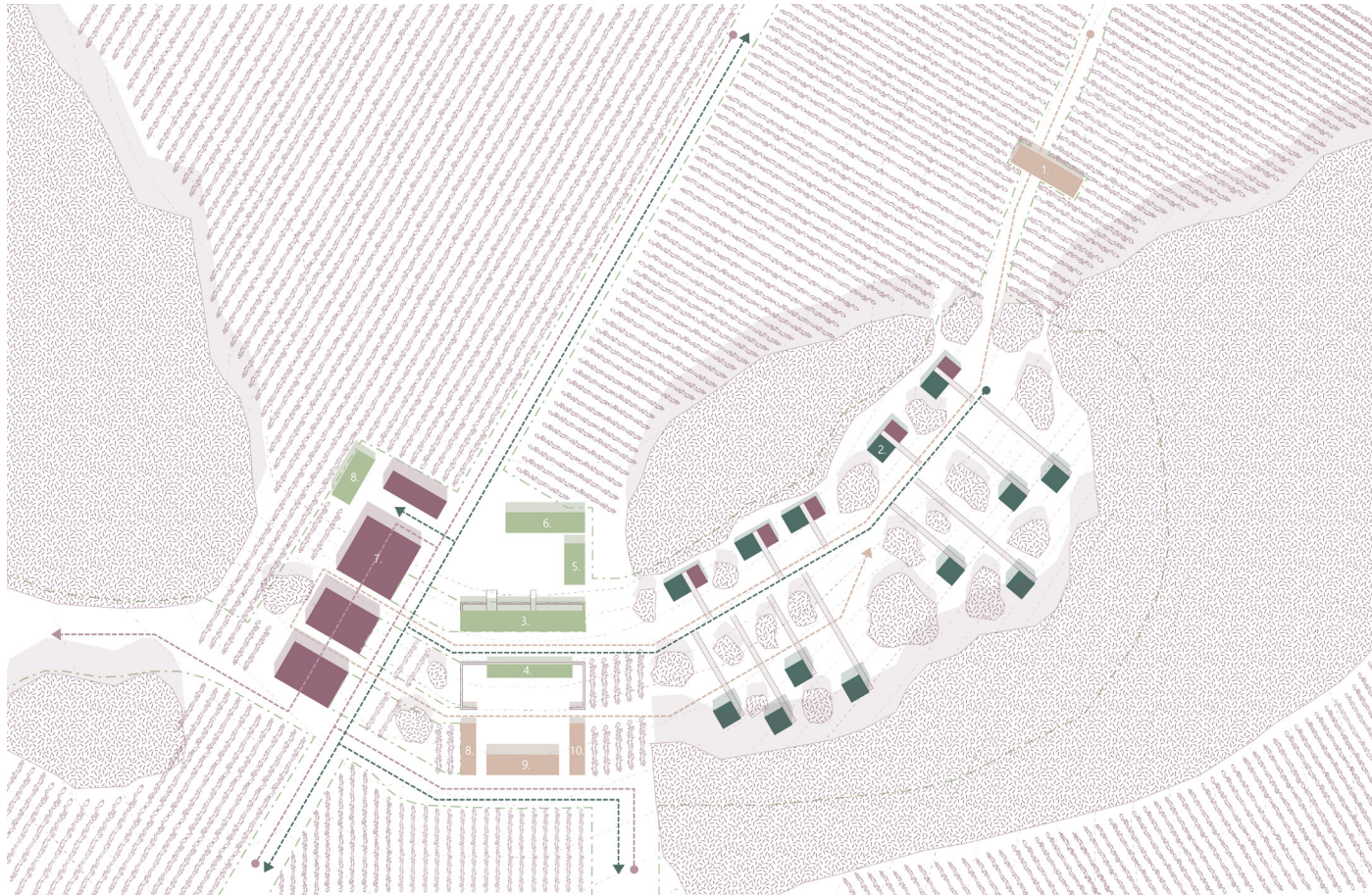


Winery Complex Plan

- 1. Wine Shop
- 2. Workers Housing & Overnight Amenities
- 3. Chicken & Sheep Barn
- 4. Greenhouse
- 5. Feed Storage
- 6. Agricultural Equipment Storage
- 7. Production Facility
- 8. Winery Equipment Storage
- 9. Kitchen
- 10. Restaurant & Tasting Room
- 11. Outdoor Tasting Bar



Winery complex plan. Locating the winery between existing woods provides cover from prevailing winter winds. The additional programs follow the existing site contours, working with the site rather than rejecting it.



Winery Complex Plan
User Overlay

1. Wine Shop
2. Workers Housing & Small Scale Production
3. Chicken & Sheep Barn
4. Greenhouse
5. Feed Storage
6. Agricultural Equipment Storage
7. Production Facility
8. Winery Equipment Storage
9. Kitchen
10. Restaurant & Tasting Room
11. Outdoor Tasting Bar



Overlaying the user groups and their respective routes illustrates moments of programmatic overlap. The production facility is located on the steepest part of the site, facilitating the gravity flow method. Agricultural buildings are located on the top of the hill, the flattest part of the site, allowing for easy storage of equipment and feed. Workers housing is located in the forest, providing refuge from the fields where they spend most of their days. The major patron amenities are located at the bottom of the hill, the topography flattens here allowing for minimal landscape intervention. Views to the river valley are unobstructed by other winery buildings. A layer of fencing is applied around each vineyard plot. When possible, these fences extend to wooded areas, allowing the grazing animals to roam freely through the trees.

The Procession

The winery experience plays out through a procession. Along this procession the patron is exposed to all elements required to make the wine before having the opportunity to taste it. This method of winery design promotes process ahead of product and creates a didactic experience for the patron.

Site Entry

The Gate

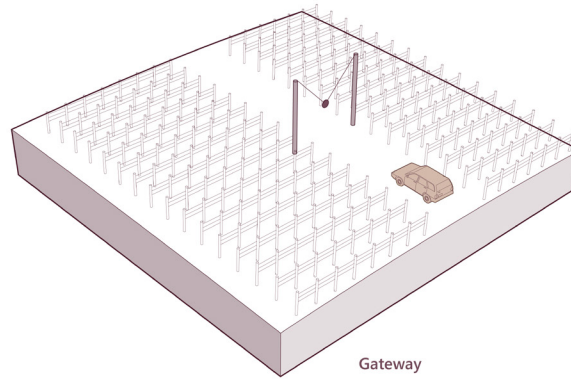
The procession starts in the field. You arrive at the site through an initial gate. This gate is a physical representation of the winery logo, establishing winery identity from the very beginning.

Parking

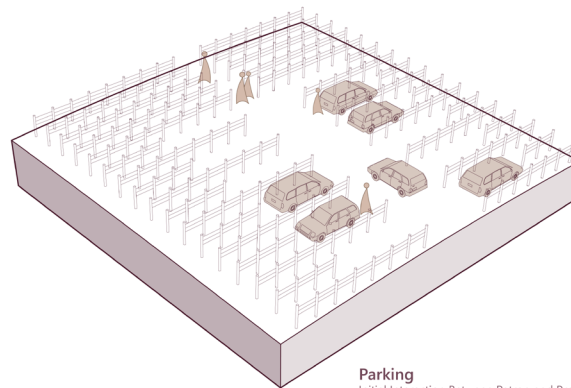
From there you drive through the vines before arriving at the parking lot, located within the vineyard. Parking stalls are created from the negative space between the vines. This creates an initial interaction between patron and product. Once out of their car the patrons walk along a narrow path in the direction of the winery.

Wine Stand

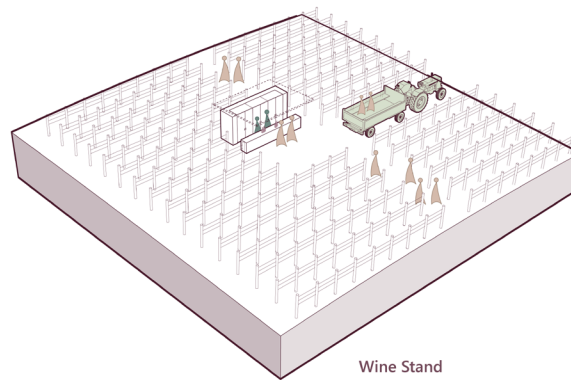
An opening is created within the vines and the patron is greeted by a small wine stand, here they can buy a bottle or two if they are familiar with the product. A host points the visitors in the direction of the winery. A tractor can be called to carry those who cannot or choose not to walk into the winery. This tractor ride establishes an agricultural character to the project. In the distance, the first of the winery buildings is seen peeking out over the vines.



Gateway



Parking
Initial Interaction Between Patron and Product



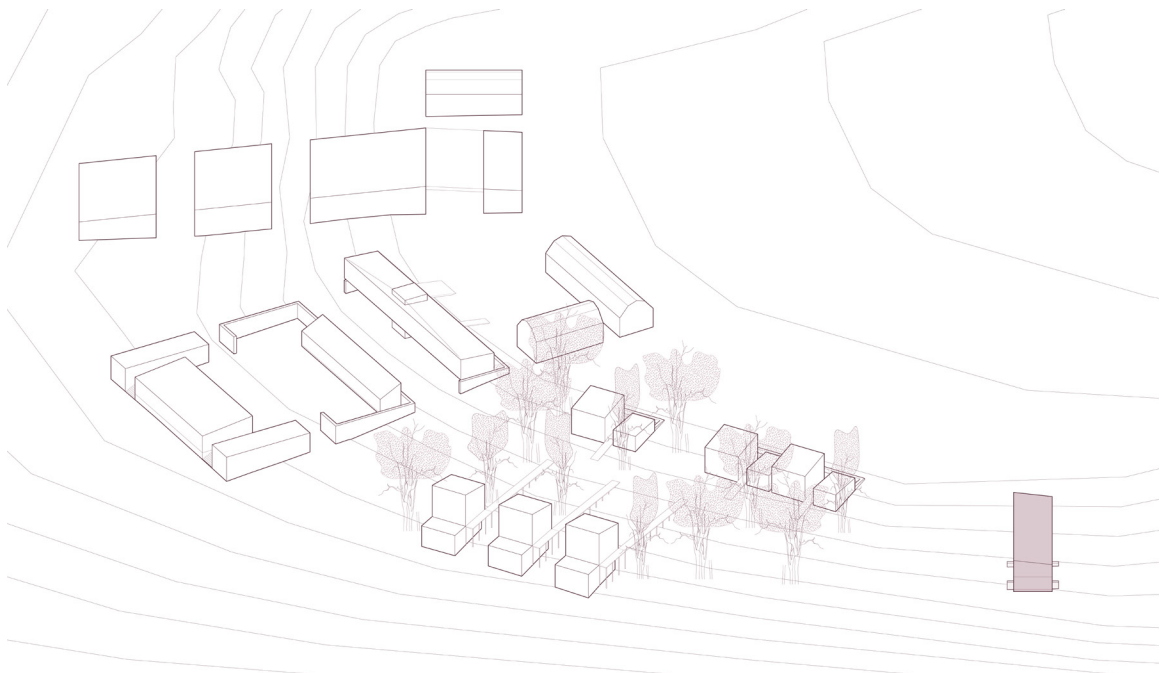
Wine Stand

Series of site approach diagrams illustrating how patrons arrive to the winery.

The Wine Shop

The wine shop acts as the primary threshold into the winery complex. Located between the vines, it reinforces the method of deriving architecture from biodynamics. This building establishes the architectonics for the project. Stone masses house the service spaces, while light volumes composed of wood and glass house the served spaces. It is a small note, but a consistent architectural language is important in creating a unified architectural experience. Locating the wine shop here also ensures the shortest distance for patrons carrying wine cases back to their cars.

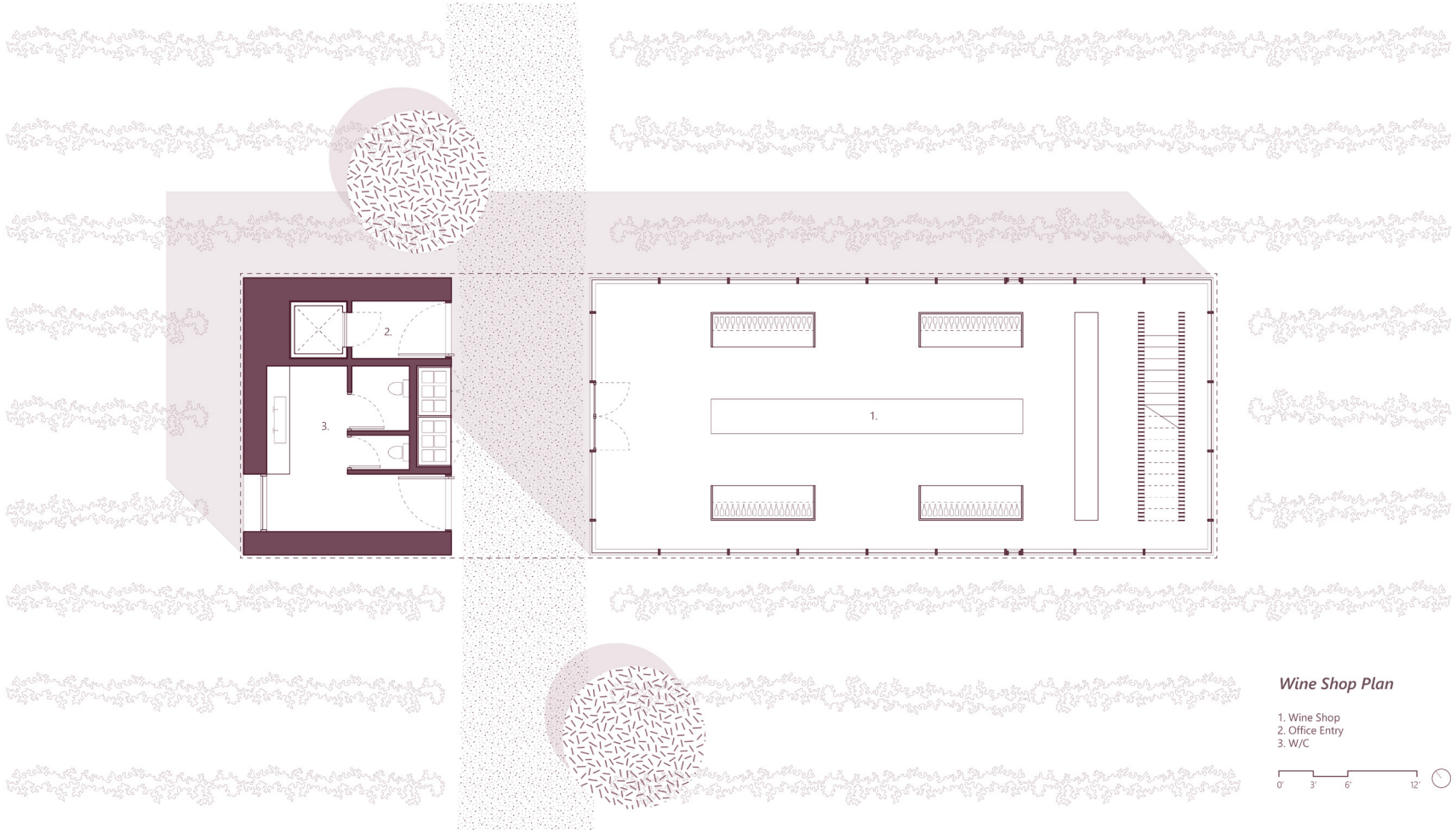
Within the wine shop you find four wooden volumes storing the wine, and a long central planter box housing native flowers and grasses. The full height glazing creates a connection to the vines outside and provides unobstructed views to the valley. Rather than overwhelming visitors with product, this wine shop focuses on fitting into and revealing its place.



Site axonometric drawing highlighting the wine shop in relation to the rest of the winery buildings.



Render of wine shop as seen from the approach. Through the wineshop aperture the workers housing can be seen in the distance. The top of the barn can be seen over of the vines.



Wine shop plan.

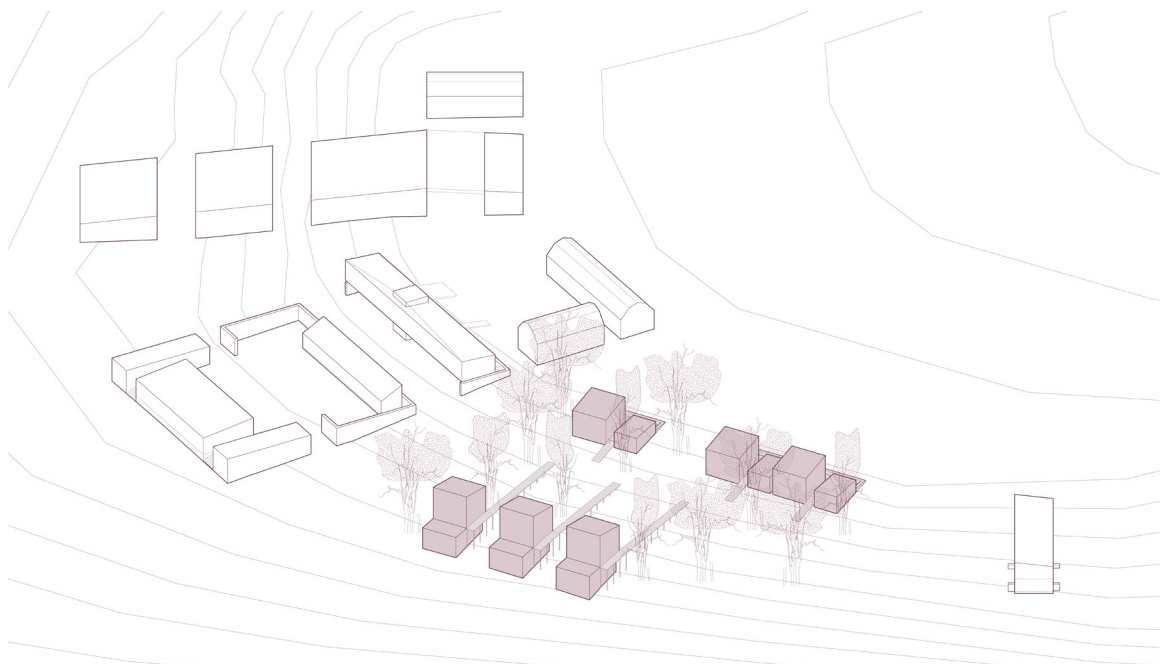


Interior wine shop render.

Workers Housing

Once through the wine shop, the path continues through the woods. Here the patrons walk past the village housing. This housing is provided to migrant workers during the harvest season. Locating the housing in the woods provides the workers with refuge from the fields where they spent most of their days. The trees provide the workers with a buffer between work and life. Locating the housing early on in the winery procession creates an interaction between patron and worker that many wineries actively try to hide. Attached to the housing units are stone volumes housing small scale wine production spaces. Introducing this provides the workers with more agency over the wine production, allowing them to make wine for themselves, rather than working solely for others.

Creating an environment that workers want to return to year after year is the ultimate goal. In part this is achieved by providing each unit with moments of warmth. The sparkling

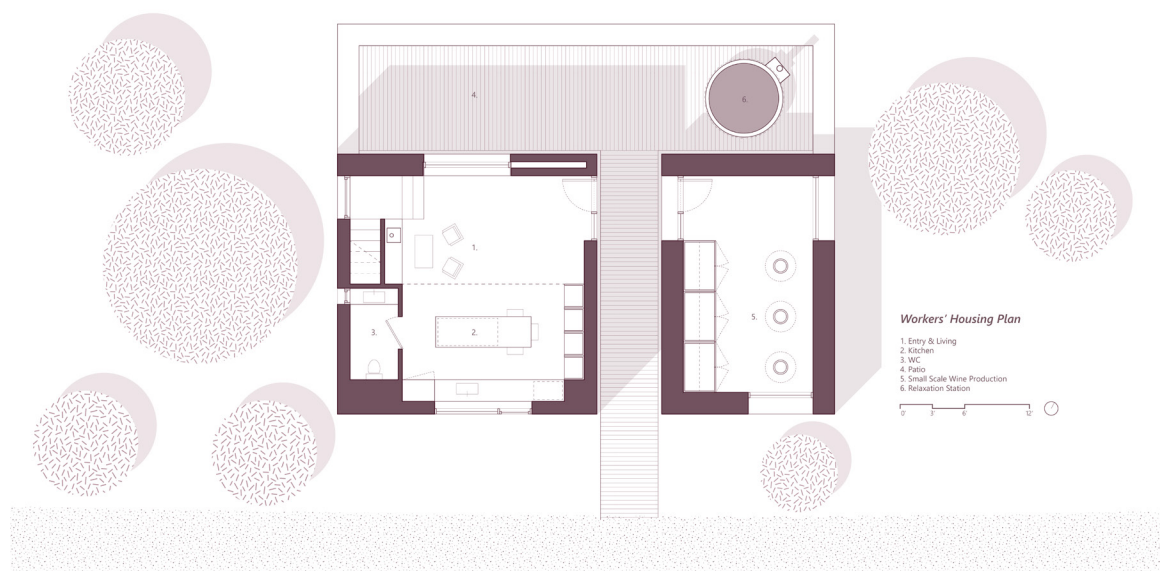


Site axonometric drawing highlighting the housing in relation to the rest of the winery buildings.

wines of the Annapolis Valley are harvested late in the season, when it is rainy and cold. When workers return from the vines they require places of warmth to relax and reset. Each unit is provided with a wood burning stove inside as well as a wood heated hot-tub outside. When coming home from a day in the rain, the workers can relax in heat.

Large windows into the wine production spaces create visual connections between patron, worker, and product. Units are filled with natural light from all directions, allowing the space to change with the sun. The main floor spaces follow the sequence of cooking, eating, sitting, and outdoor space, supporting the patterns of daily life. Sleeping arrangements are located in a loft above the kitchen.

In the off-season these units are offered to the patrons for overnight stays. During this time the small scale wine production acts as an educational tool for the patrons, teaching them about winemaking at an approachable scale. Having the patrons and workers live in the same space creates an element of dignity to the workers housing.



Housing unit plan.



Section through village housing.



Interior render of workers housing.

The Barn

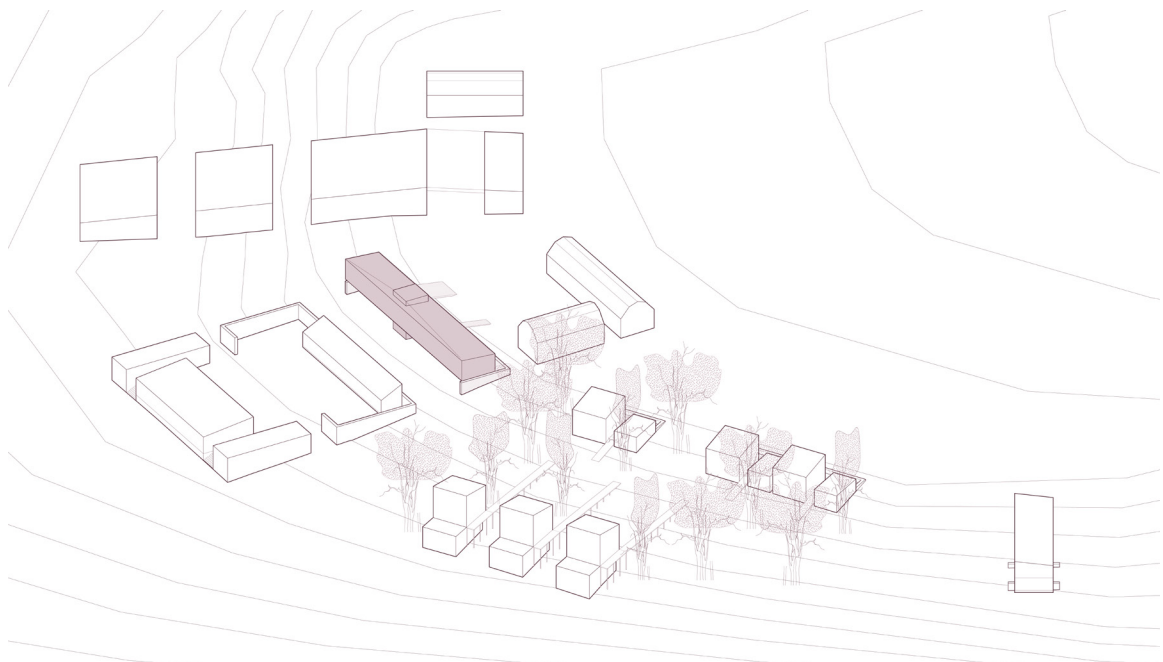


Traditional bank barn found at New Ross Farms. (Jarvis 2012)

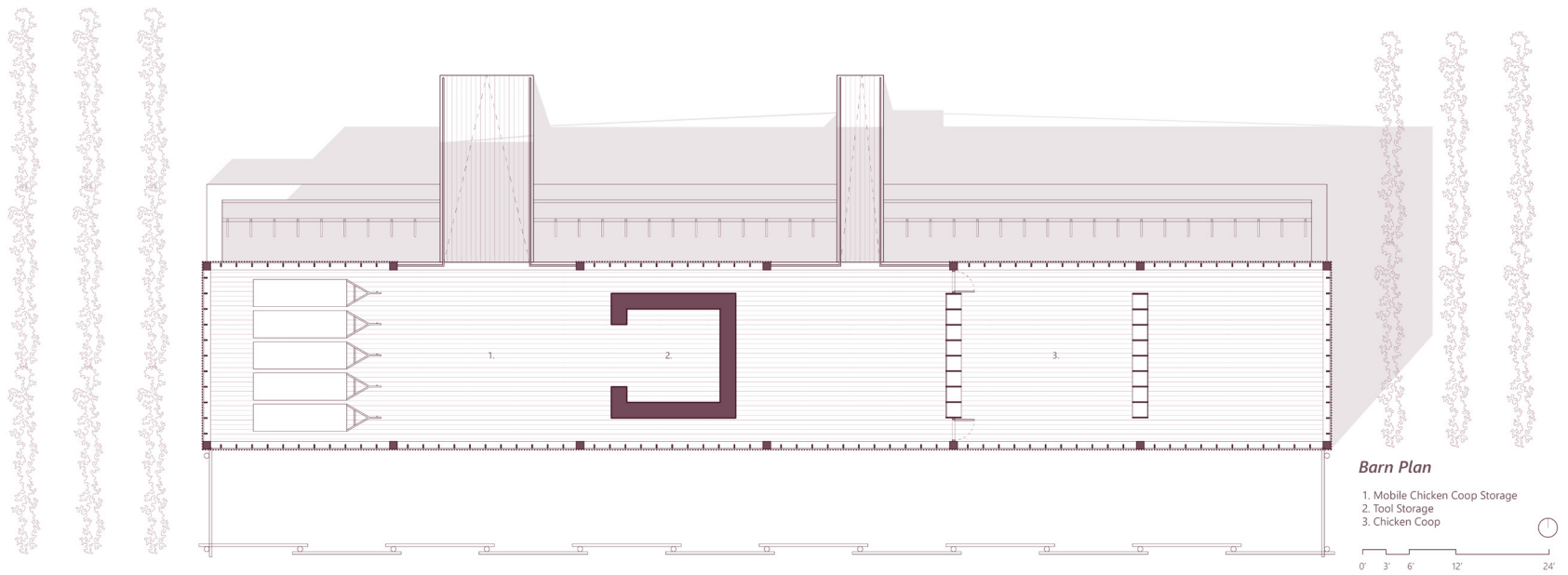
Leaving the woods, you arrive at the barn. The barn takes inspiration from the traditional bank barns found throughout The Annapolis Valley. Lifted off the ground and tethered to a stone core, the barn creates a covered sheep pen below. The pen extends up to the path creating interaction between patron and animal.

While the sheep typically roam through the vines, grazing on cover crops, and introducing useful nutrients back into the soil, they are restricted from doing so during the fruiting/harvest season. During this time, which happens to align with the peak visitor seasons, the sheep pen acts as a petting zoo. This attracts unlikely visitors to the winery. Families can come to the winery, parents can enjoy wine while children play with the sheep.

Above the sheep you find the chicken coop on the east, and storage for the fleet of mobile chicken coops on the west. These mobile chicken coops are designed to be pulled



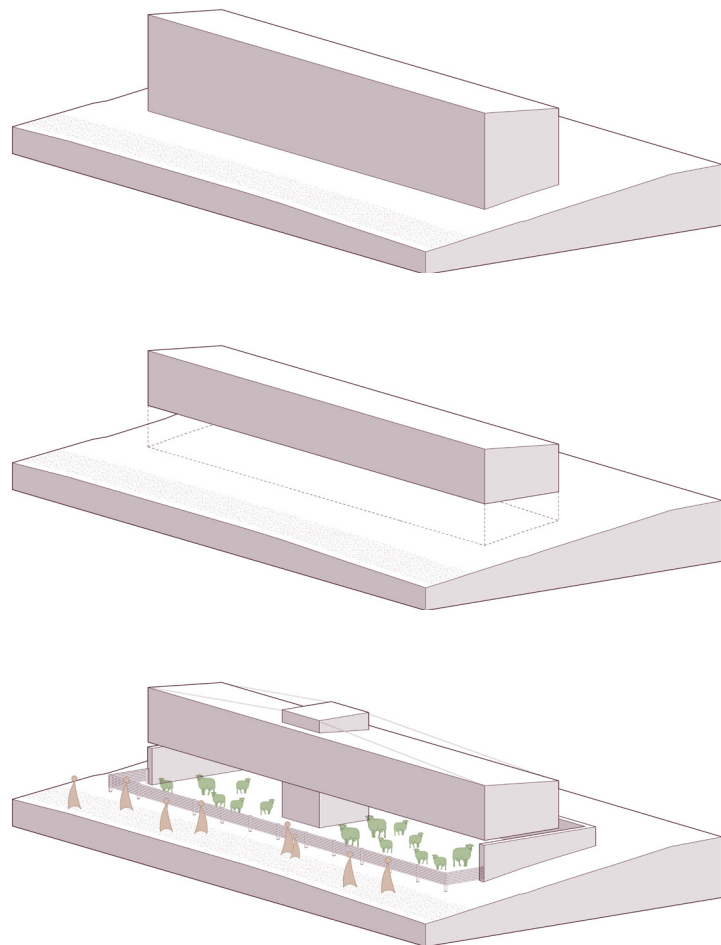
Site axonometric drawing highlighting the barn in relation to the rest of the winery buildings.



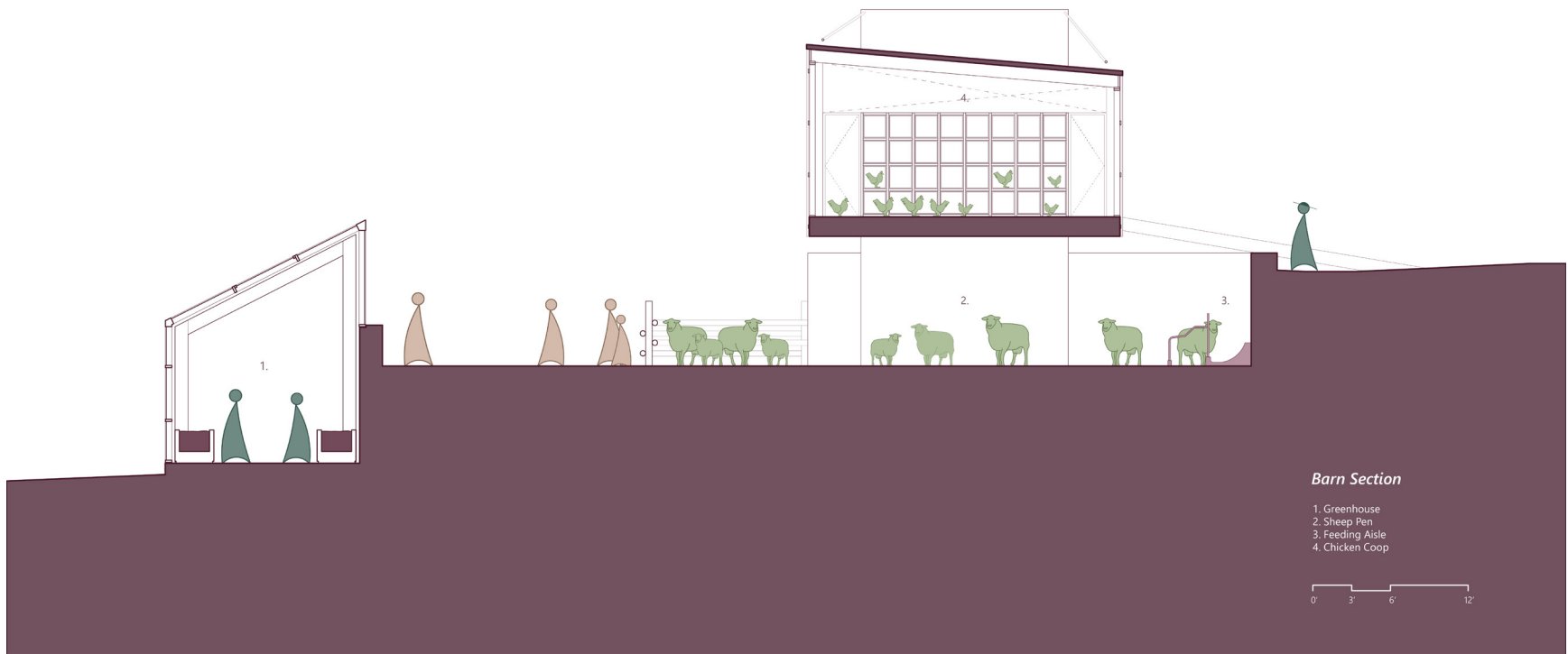
Barn plan.

behind a tractor and fit between the vines, allowing the chickens to be transported to the vineyard where they can provide their natural pest controlling benefits. Roost boxes are located up high, with easy access to egg collection. The tubes along the end are a simple yet effective feeding system. Where like the production facility, gravity does all the work. Direct overlap between agriculture and product are achieved with these coops.

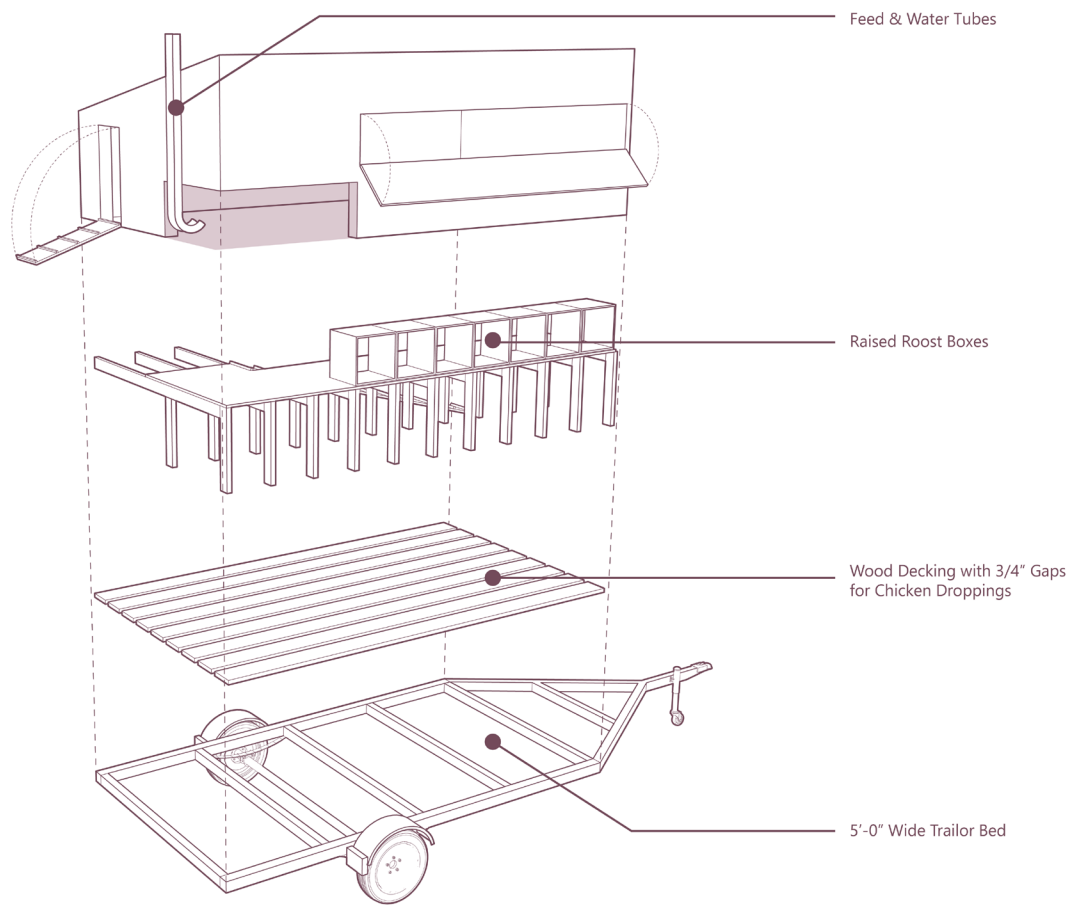
The barn is wrapped with slatted wood walls, allowing the smells from the barn to be carried throughout the site. Although undesirable at times, these are the authentic smells of the place.



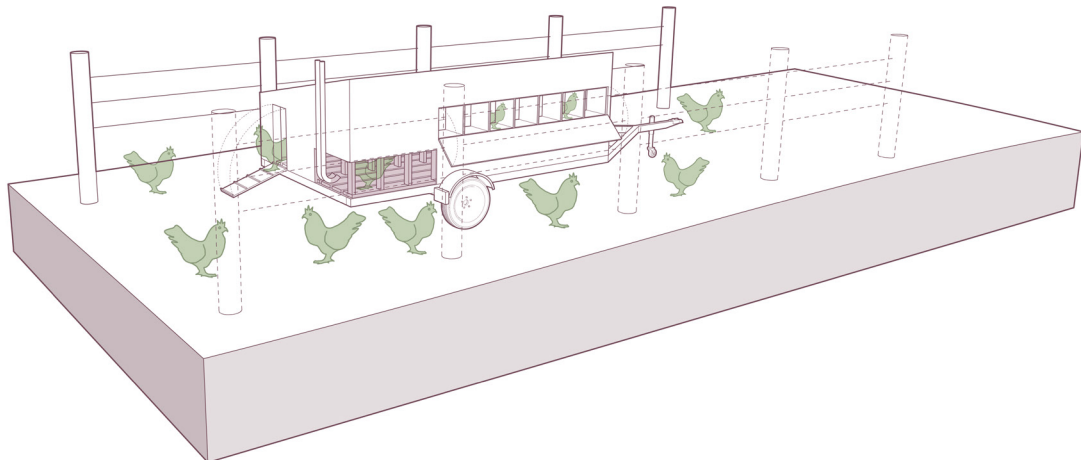
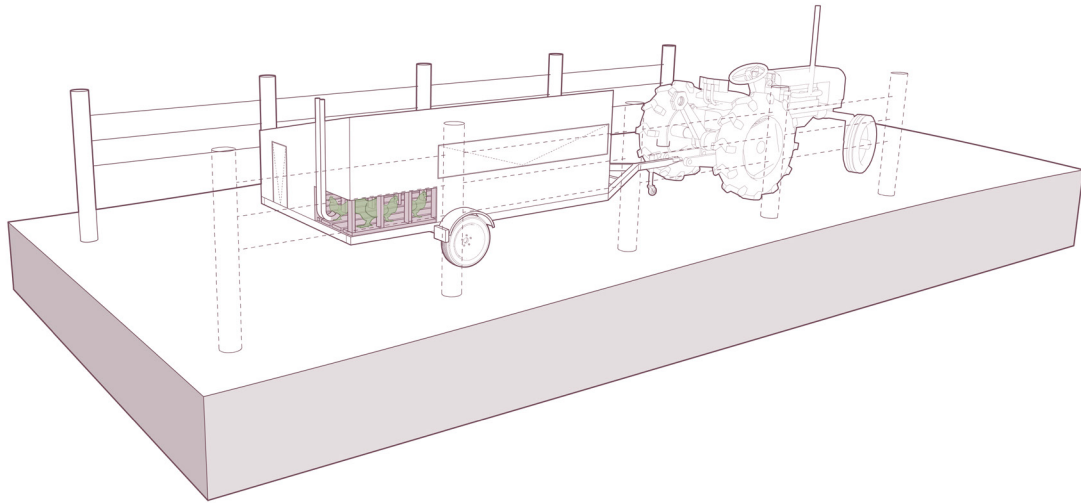
Diagrams illustrating the massing process for the barn and sheep pen.



Barn section.



Exploded perspective drawing of the mobile chicken coops.



Diagrams illustrating how the mobile chicken coops are used within the vineyard.



Render of the sheep pen and barn. The greenhouse can be seen to the left, creating a visual connection to the final tasting court. Large stones take the place of benches, creating informal seating in the spaces between winery buildings. The production facility can be seen in the distance.

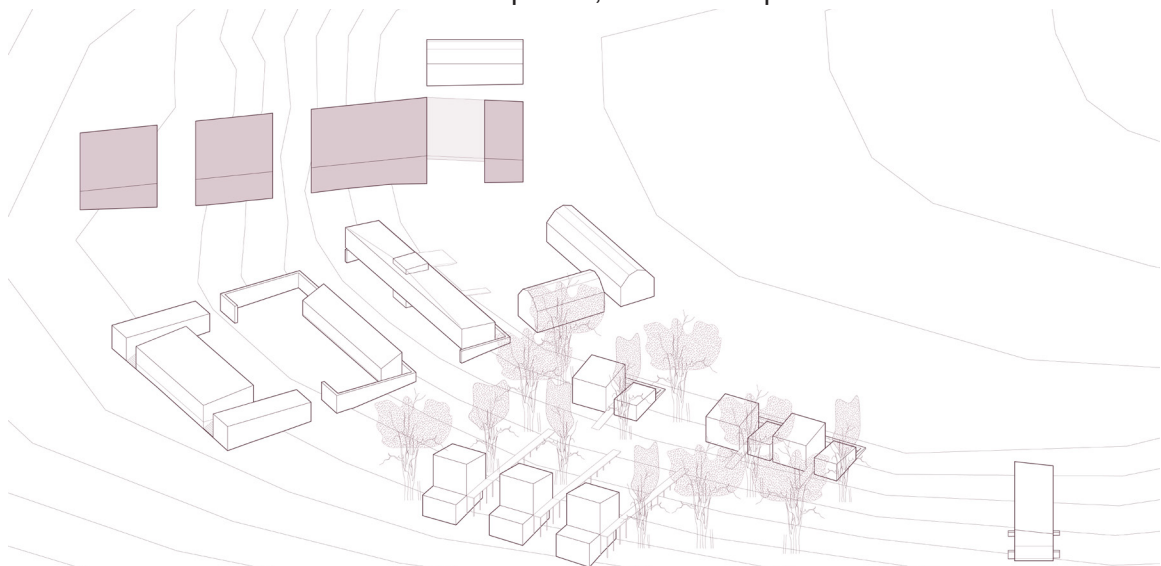
The Production Facility

Leaving the barn the patrons travel through the production facility. The above ground massing is opened up and terraced down the hill. This is a reflection of the existing topography as well as the winemaking process within. Furthermore, the openings created by this massing strategy create a series of circulation axes for the different users.

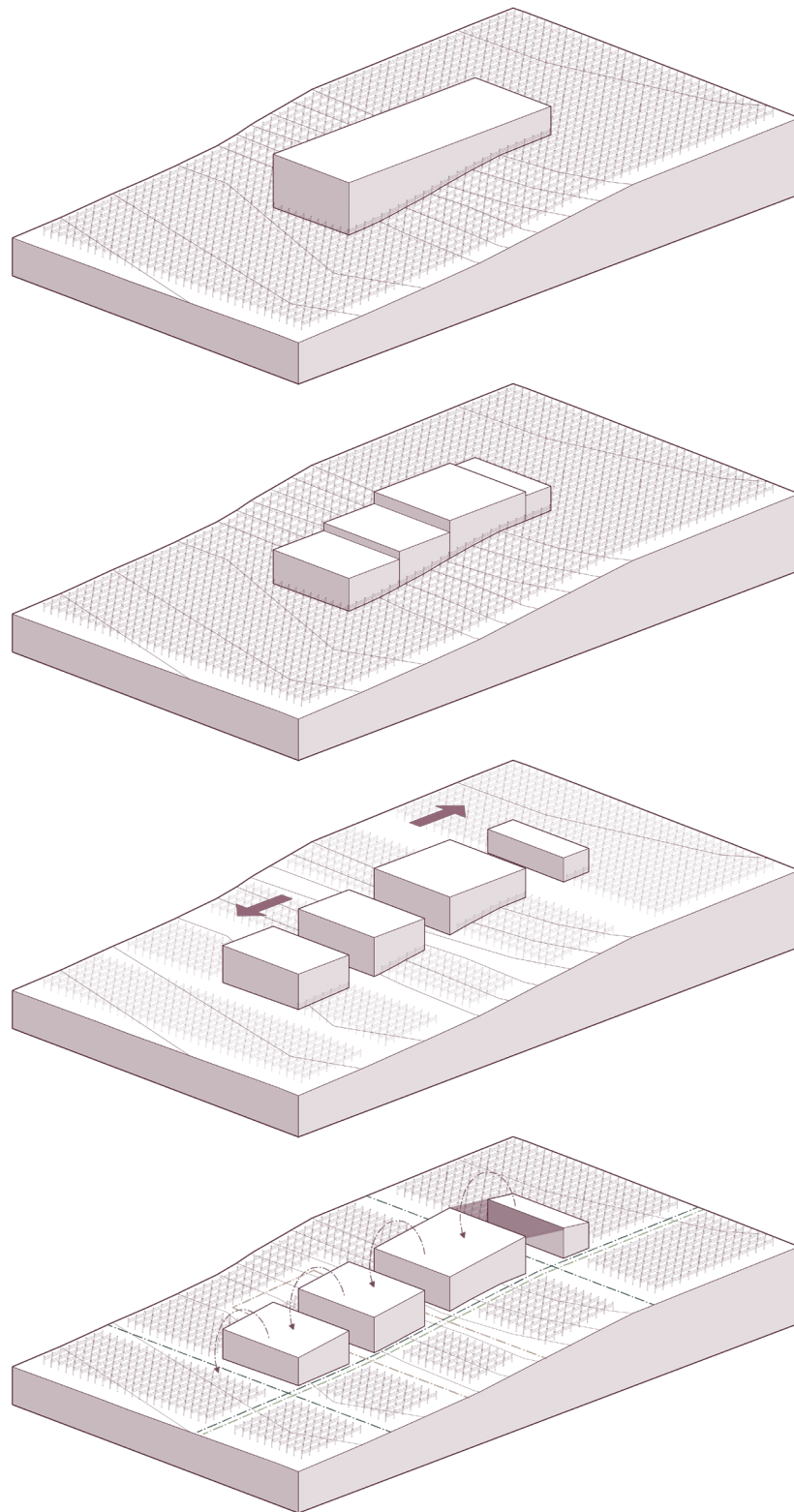
The top and bottom axes created by the crush pad and loading bay become service routes. These are used for trucks, tractors and other large equipment necessary for the transport of grapes and animals.

The central openings become a part of the visitors path. By weaving through the production facility the Patron follows the path of the product as it flows down the hill.

Large openings are added to the north facades of the volumes. In the production facility, south light is undesirable as the solar gain makes it difficult to control the temperature of the tanks. These large openings create a visual connection between patron, worker and product.



Site axonometric drawing highlighting the production facility in relation to the rest of the winery buildings.



Massing diagrams illustrating how in-between spaces are introduced to the production facility to establish interaction between the different winery uses. The lowest diagram illustrates how the different users navigate through the facility.



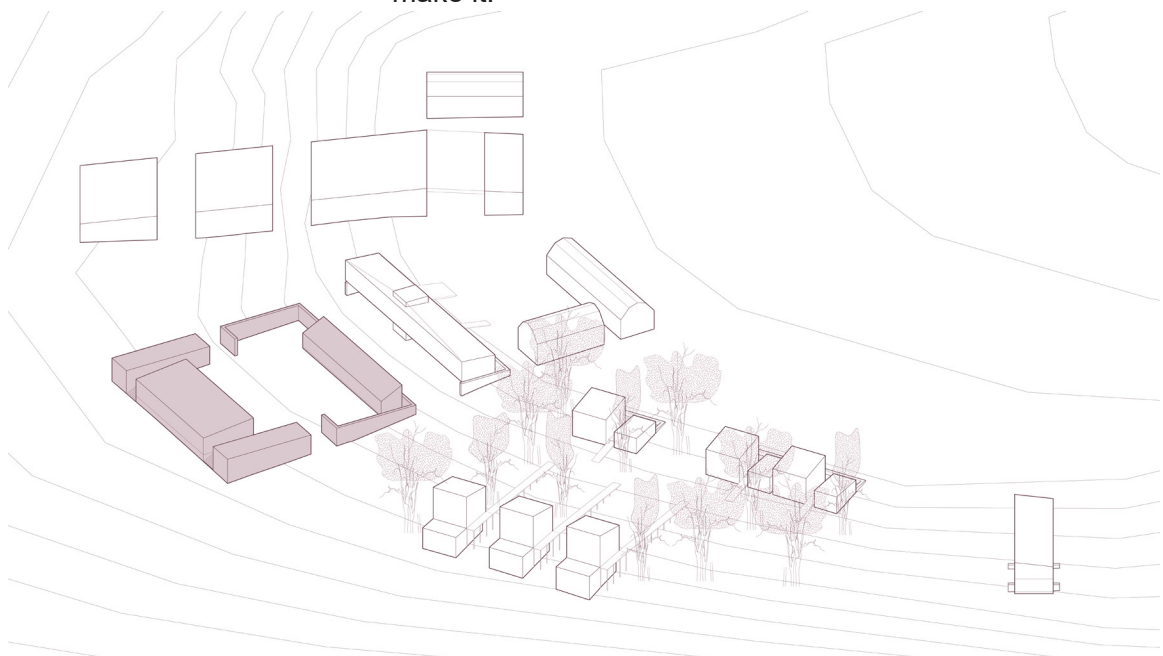
Production facility section.



Interior render of production facility. Here there is overlap between product (in tanks), worker, patron and animal in the distance.

The Tasting Court

Once past the production facility, the visitor arrives at the final destination, the tasting court. It is here where the final overlap between patron and product occurs; The tasting of the wine. Two stone volumes housing the tasting bar and kitchen, flank the courtyard. With the restaurant and greenhouse enclosing it. Large retaining walls on the north block winds and create a microclimate for the visitors. Loose seating is scattered around the courtyard. A seasonal kitchen is added to the program as a way to increase visitation year round. The produce used at the restaurant is grown on site, planted between the vines. A wall of full height glazing allows visitors to watch as their food is being made. The greenhouse is open to visitors allowing them to interact with the vegetables they will eat in the restaurant, creating another overlap between patron and agriculture. This courtyard acts as a reward, finally allowing the patron to taste the wine after witnessing the elements required to make it.



Site axonometric drawing highlighting the tasting court in relation to the rest of the winery buildings.



Tasting court plan.



Render of the tasting court from the kitchen.

Winery Branding

One final note to touch on is winery identity. As stated previously, the winery industry is at its core a branding industry. Wineries need to separate themselves from one another, and to do so they most often resort to false narratives and create an architecture which matches said narrative. The combination of these two strategies is what leads to the majority of the inauthenticity you find in wine regions. But the third level of identity, and often most overlooked, is the label.

Middle ground means the space in-between, a literal connection to the methodology of the project. But it also applies to the project being somewhere in between a winery and a farm. I have tried to find a middle ground architecturally, being conscious of not falling into what Frampton describes as “nostalgic historicism”, found so often in wine regions around the world.



MIDDLE GROUND

PINOT NOIR
2021

Annapolis Valley
N.S.

13.5% alc. / vol. 750ml

Wine bottle label.



Render of wine bottle with designed label applied.

Chapter 6: Conclusion

The inauthenticity found in wine regions around the world is the result of three major faults of conventional winemaking and winery design. The tendency towards monocrop farming leads to an inauthentic representation of landscape, while simultaneously destroying the characteristics that contribute to terroir. Wineries use false narratives to stand out among competition, resulting in an architecture focused on spectacle and consumption rather than place and tradition. And lastly, winery experiences are tailored to product rather than process, simplifying the winery experiences, and disconnecting those who make the wine from those who drink it.

What role does architecture play in addressing the lack of authenticity found in wine regions around the world?

Nova Scotia's Annapolis Valley is an ideal testing ground for this question. The up-and-coming nature of the valley means it risks going down the path of inauthenticity. Situating the thesis project here allows it to act as a prototypical project, one that future winery designers can look to for guidance.

Using Rudolf Steiner's method of biodynamic farming as a springboard for the architectural interventions, in-between spaces are applied at different scales throughout the project. These spaces serve a functional purpose, creating courtyards and microclimates where different users can find refuge from the elements. Furthermore, in-between spaces are used at a programmatic level, creating moments of overlap between the patrons, workers, grazing animals/ agricultural elements, and product. Revealing rather than

hiding the different users contributes to the authentic winery experience.

Procession is used to reveal the winemaking process. Dissolving the winery massing into a complex, the visitors must walk past all of the people and systems required to make the wine before having the opportunity to taste it. This separation of the winery massing allows for a more specific site approach, where buildings follow contours both in plan and section, responding to place rather than rejecting it.

Workers housing is designed with dignity.

Buildings reference the way they were built in the past, using concepts rather than imagery to draw inspiration. Saving the project from historic nostalgia.

As a whole this project is authentic to its people, place and process. This winery is somewhere people come to spend time. Where they come to slow down. Where they come to learn. Where they come to stay.

References

- Cann, D., J. MacDougall, and J. Hilchey. 1965. *Nova Scotia Soil Survey*. Report no. 15. Canada Department of Agriculture and Nova Scotia Department of Agriculture and Marketing.
- Carlson, Gregg, David Clay, and Cheryl L. Reese. 2016. "Common Fertilizers Used in Corn Production." In *iGrow Corn: Corn Best Management Practices*, edited by David Clay, Gregg Carlson, Sharon Clay and Emmanuel Byamukama, 1-7. Brookings: South Dakota State University. <https://extension.sdstate.edu/igrow-corn-best-management-practices-corn-production>.
- Castro, Fernanda. n.d. "Martin's Lane Winery / Olson Kundig." *ArchDaily*. Accessed September 29, 2021. <https://www.archdaily.com/897284/martins-lane-winery-olson-kundig/5b355b13f197cca23e00021b-martins-lane-winery-olson-kundig-section-03>.
- Chalker-Scott, Linda. 2013. "The Science Behind Biodynamic Preparations: A Literature Review." *HortTechnology* 23, no. 6: 814-819.
- Coelheiros. 2021. Photograph of Sheep Grazing in the Forest. Coelheiros. <https://www.coelheiros.pt/en/herdade/os-animais>.
- Damery, Patricia. 2011. "The Enclosed Garden: Underlying Principles of Jungian Analysis and Biodynamic Agriculture." *Jung Journal* 5, no. 2: 103-116.
- Danielmeier, Tobias. 2014. "Winery Architecture Creating a Sense of Place." In *Wine and Identity: Branding, Heritage, Terroir*, edited by Matt Harvey, Leanne White, and Warwick Frost, 423-454. New York: Routledge.
- Davis, Stephen A. 2000. *Mi'kmaq: People of the Maritimes*. Halifax: Nimbus Publishing.
- Duhme, Denis, Katrin Friederichs, and Heinz-Gert Woschek. 2012. *Wine and Architecture*. München: Detail Business Information BmbH.
- Feina Architecture and Design. 2021. Elevation of Artist Studio, Galicia. <https://feinastudio.com/artiststudio/>.
- Frampton, Kenneth. 1983. "Towards a Critical Regionalism: Six Points for an Architecture of Resistance." In *The Anti-Aesthetic: Essays on Postmodern Culture*, edited by Hal Foster, 16-30. Port Townsend, WA: Bay Press.
- Green, William. 2014. "Procession in Process: Finding Place in Fruit Breeding." Master's thesis, Dalhousie University. <https://dalspace.library.dal.ca/handle/10222/49071>.
- Grossinger, Robin. 2012. *Napa Valley: Historical Ecology Atlas: Exploring a Hidden Landscape of Transformation and Resilience*. Berkeley: University of California Press.

- Harvey, Matt, Leanne White, and Warwick Frost. 2014. *Wine and Identity: Branding, Heritage, Terroir*. New York: Routledge.
- Hjarlmarson, Elise, Robyn Bunn, Amy Cohen, Edna Terbasket, and Levi Gahman. 2015. "Race, Food, and Borders: Situating Migrant Struggle in the Okanagan Valley, British Columbia." *Journal of Agriculture, Food Systems, and Community Development* 5, no. 4: 1-6.
- Jarvis, Dennis. 2012. Photograph of Ross Barn. Flickr. <https://www.flickr.com/photos/arch-er10/7816070306/>.
- Jefferys, Charles W. 1942. Drawing of Birch Bark Wigwam. C.W. Jefferys. <https://www.cwjefferys.ca/ojibway-birch-bark-lodges>.
- Lefavre, Liane, and Alexander Tzonis. 2003. *Critical Regionalism: Architecture and Identity in a Globalised World*. London: Prestel.
- MacDougall, J. I., John L. Nowland, and J. D. Hilchey. 1969. *Nova Scotia Soil Survey*. Report no. 16. Canada Department of Agriculture and Nova Scotia Department of Agriculture and Marketing.
- MacKay-Lyons, Brian. 1995. "Seven Stories from a Village Architect." *Design Quarterly* 165, no. 165: 1-31.
- Muneret, Lucile, Arthur Auriol, Dennis Thiéry, and Adrien Rusch. 2019. "Organic Farming at Local and Landscape Scales Fosters Biological Pest Control in Vineyards." *Ecological Applications* 29, no. 1: 1-15.
- Nath, Tapan Kumar. 2016. *Monoculture Farming: Global Practices, Ecological Impact and Benefits/Drawbacks*. New York: Nova Publishers.
- Nova Scotia Information Service. n.d. Amberman House, Granville Ferry. Nova Scotia Archives no. 4885. Accessed December 3, 2021. <https://archives.novascotia.ca/built-heritage/archives/?ID=66>.
- NSTDB (Nova Scotia Topographic Database). 2021a. *Buildings (Poly Layer)*. Open Data Nova Scotia. Map from GIS data, using ArcGIS Pro. <https://data.novascotia.ca/Municipalities/Nova-Scotia-Topographic-DataBase-Buildings-Poly-La/t5xr-fjkr>.
- NSTDB (Nova Scotia Topographic Database). 2021b. *Landforms (Break Line Layer)*. Open Data Nova Scotia. Map from GIS data, using ArcGIS Pro. <https://data.novascotia.ca/Lands-Forests-and-Wildlife/Nova-Scotia-Topographic-DataBase-Landforms-Break-L/na6y-vuz3>.
- NSTDB (Nova Scotia Topographic Database). 2021c. *Roads, Trails and Rails (Break Line Layer)*. Open Data Nova Scotia. Map from GIS data, using ArcGIS Pro. <https://data.novascotia.ca/Roads-Driving-and-Transport/Nova-Scotia-Topographic-DataBase-Roads-Trails-and-/845c-gbqt>.

- ODNS (Open Data Nova Scotia). 2021. *Nova Scotia Primary Watersheds*. Scale 1:10,000. Map from GIS data, using ArcGIS Pro. <https://data.novascotia.ca/Environment-and-Energy/1-10-000-Nova-Scotia-Primary-Watersheds/569x-2wnq>.
- The Porto Protocol. 2020. "Climate Talks; The Role of Biodiversity In Vines In A Changing Climate." Video, 1:05:45. YouTube. <https://www.youtube.com/watch?v=d9ZTG84pXRI&t=3s>.
- Railsback, Emily, dir. 2017. *Our Blood is Wine*. Film. Chicago, IL: Music Box Films.
- Raimondo Architects. 2013. Photograph of Colaneri Winery, Niagara, Ontario. <https://www.raimondoarchitects.com/portfolio/view/colaneri-winery>.
- RPBW (Renzo Piano Building Workshop). 2009. Château La Coste Art Gallery, Provence. https://www.archdaily.com/871645/chateau-la-coste-art-gallery-renzo-piano-building-workshop/591dafa5e58ecef3170000d9-chateau-la-coste-art-gallery-renzo-piano-building-workshop-photo?next_project=no.
- Rudofsky, Bernard. 1964. *Architecture Without Architects: A Short Introduction to Non-Pedigreed Architecture*. New York: Doubleday.
- SRFR (Spatially Related Forest Resources). 2021. *Current Forest Data*. Nova Scotia Department of Natural Resources and Renewables. Map from GIS data, using ArcGIS Pro. https://novascotia.ca/natr/forestry/gis/dl_forestry.asp.
- Uekoetter, Frank. 2011. "The Magic of One: Reflections on the Pathologies of Monoculture." *RCC Perspectives*, no. 2: 1-20.
- World Weather Online. 2021. <https://www.worldweatheronline.com/>.