Towards Cannabis Culture

Ryan Matthew Salas

A thesis

submitted in partial fulfillment of the

requirements for the degree of

Master of Architecture

University of Washington

2018

Comittee:
Rick Mohler
Susan Jones
Juliette Dubroca
Louisa Iarrocci

Programs Authorized to Offer Degree:
Architecture

University of Washington

Abstract

Towards Cannabis Culture
Ryan M. Salas

Chair of the Supervisory Committee:

Department of Architecture, College of the Built Environment

America is witnessing a paradigm shift - what was once a schedule I controlled substance is now legally purchased by many in small plastic bags from dispensaries that are disconnected from the natural and human factors of cannabis. But while the economic and medical benefits of cannabis are already well-known, the social aspect of cannabis is not taken seriously. This thesis aims to bring cannabis' latent ability to build community to light by celebrating the growth, processing and enjoyment of cannabis as if it were a significant agricultural product for human consumption.

ACKNOWLEDGMENTS

Many thanks to the loved ones, friends, professors and advisors who engaged this project with an open mind.

TOWARDS CANNABIS CULTURE

TABLE OF CONTENTS **PAGE**

I. YES YOU CANNABIS (INTRODUCTION)

THE ISSUE

America is witnessing a paradigm shift. Once considered "public enemy number one"[1] as stated in the film "Reefer Madness" (fig. 1), cannabis is now generally accepted as both a medicinal herb and recreational substance. By 2018 over half of the United States has medicinally legalized cannabis while 9 states and Washington DC have recreationally legalized the herb (fig. 2). Despite this positive shift, a little over a century and a half of stigmatization has robbed cannabis of any serious cultural consideration – recreational users typically buy the plant in little plastic bags from dispensaries entirely removed from the natural and human factors that produced it. Moreover, cannabis consumption is restricted to private domestic settings, which means a new demographic of cannabis connoisseurs are unable to discuss, taste or enjoy with a sense of togetherness as people typically would at a winery. With mass legalization approaching, it seems society is unaware of cannabis' latent ability to gather people and form a community.

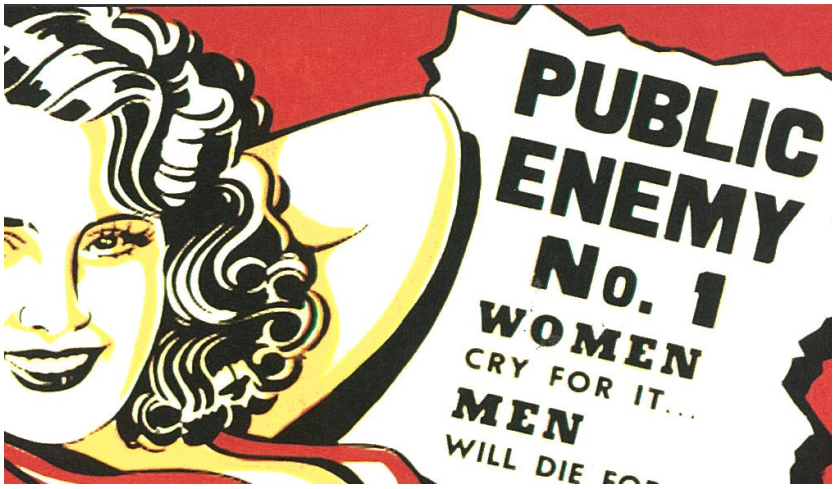


Fig. 1

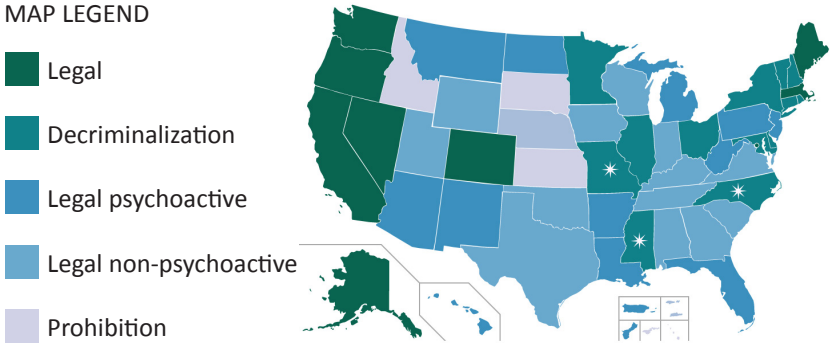


Fig. 2

Figure 1 | Advertisement for Reefer Madness. Reprinted from Time Magazine. By Bruce Barcott. 2018, *Time Magazine*, p. 03.
Figure 2 | Map of cannabis laws in the United States. Reprinted from GREENCAMP. N.D., Retrieved from https://greencamp.com/what-is-going-on-in-the-united-states-of-marijuana/

Fig. 3

Figure 3 | Photograph of a cannabis dispensary in Seattle, WA. Reprinted from 'MyNorthwest'. By D. Oxley. 2016, retrieved from http://mynorthwest.com/282617/owner-seattles-uncle-ikes-pot-shop-speaks-controversy/?

POSITION

The last century of cannabis stigmatization in the United States is negligible when compared to its 55 million year old life on earth, or 30,000 year old history of human interaction[2]. The current condition in the United States recognizes cannabis' economic and medicinal impacts, but its cultural potential is still not taken seriously. In contrast wine has a cultural legacy extending deep into human culture (fig. 4). People who grow and produce cannabis deserve the same level of calibrated facilities as a winery, and people who smoke cannabis recreationally deserve the same experience of enjoyment and community typically found at a winery.

THESIS STATEMENT:

This thesis aims to bring cannabis' latent ability to build community to light by celebrating the growth, processing and enjoyment of cannabis as if it were a significant agricultural product for human consumption.

Figure 4 | "The Wine of St. Martin's Day" by Pieter Brueghel the Elder. Reprinted from *Museo del Prado.* Retrieved from https://www.museodelprado.es/en/whats-on/exhibition/special-display-the-wine-of-saint-martins-day-by/5f4f97f7-1cad-49be-994e-f63b204ab796

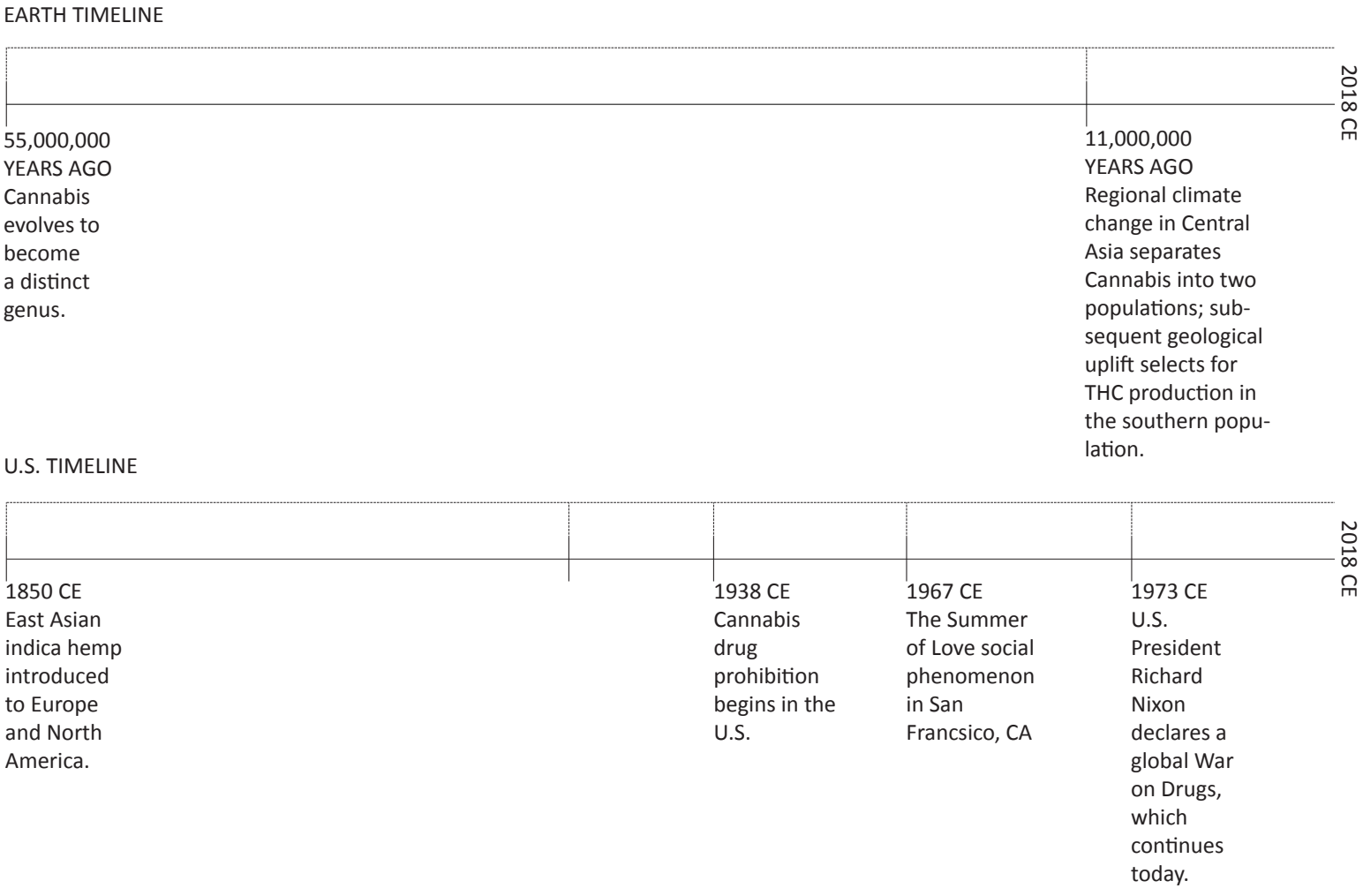


Figure 5 | Comparing the Earth and U.S. timelines of cannabis at the same scale. Reprinted from Cannabis by C. Duvall, 2014, London, UK: Reaktion Books, p. 98.

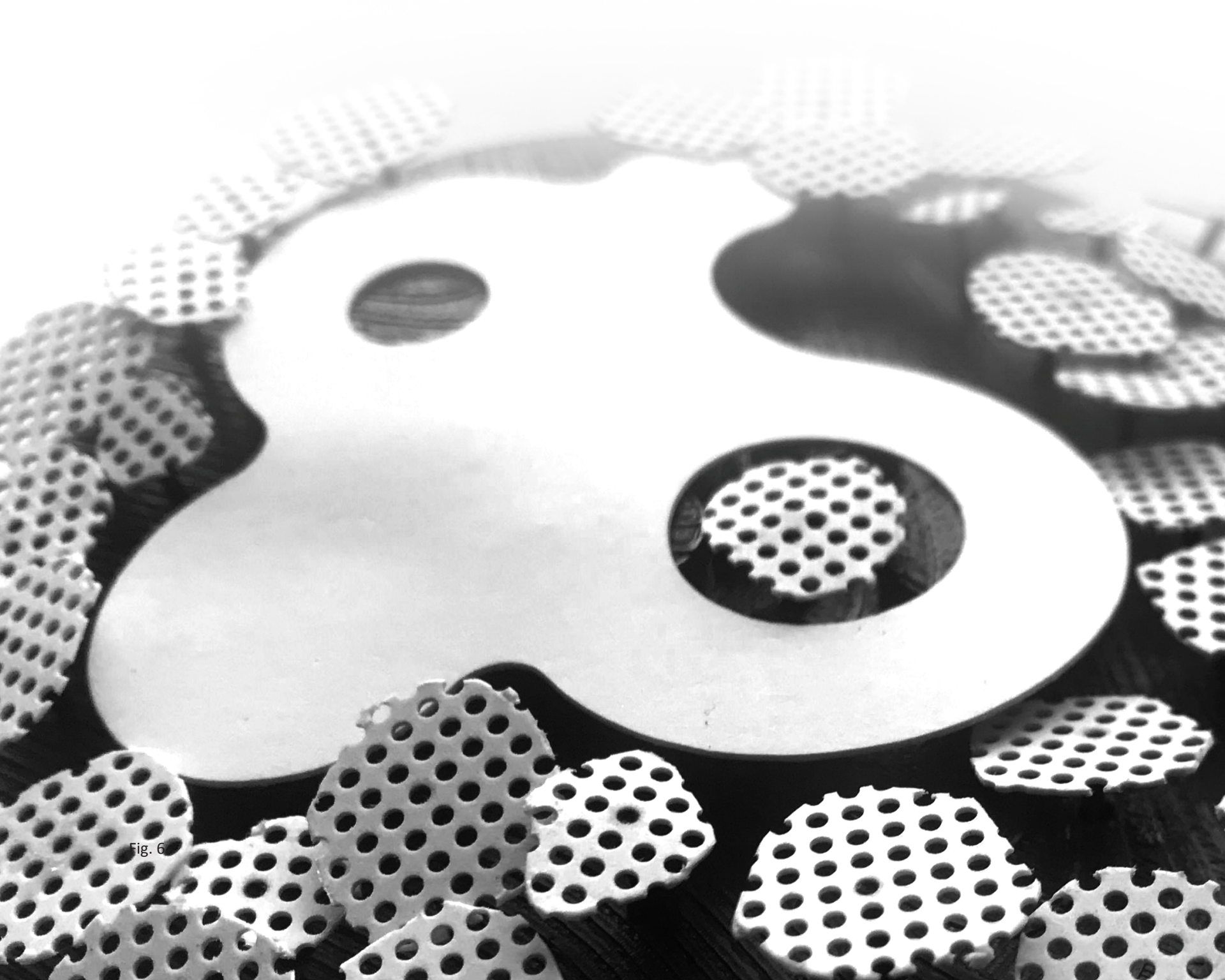


Fig. 6

PROPOSAL: THE LAKE HENNESSEY CANNABIS ESTATE

The proposed project is like a winery estate, but for cannabis, in the rolling hills of the Napa Valley in California. The Lake Hennessey Cannabis Estate will express the growing, processing and enjoyment of cannabis in a unifying architectural language.

Framed between the ideals of utility and enjoyment, the estate will look to the history of cannabis industry and consumption as foundations to build architectural case studies that support utility and enjoyment.

The site supports natural cannabis growth and augments cannabis culture.

The estate will serve growers, budtenders and botanists to develop and produce luxury cannabis while simultaneously accomodating visitors looking to enjoy the consumption of cannabis. The scope of the project includes a growing field, production, storage and analysis facilities, meditation spaces and a tasting room.

REFERENCES

1. Gasnier, L., O'Brien, Dave, Short, Dorothy, McCollum, Warren, Miles, Lillian, Young, Carleton, . . . Madacy Entertainment Group. (1998). Reefer madness (Hollywood classics). St. Laurent, Quebec: Madacy Entertainment Group.
2. Duvall, C. (2014). Cannabis (Botanical (Reaktion Books (Firm))). London, UK: Reaktion Books.

Figure 6 | Photograph of conceptual model

II. THEORETICAL FRAMEWORK

ON THE EDGE OF UTILITY AND ENJOYMENT

Growing, processing and consumption cannabis comes from a place between utility and enjoyment. While the cannabis dispensary typology functions adequately as a point of sale, it does little to communicate the value of cannabis beyond a commodity, let alone one that is grown from the earth. This lack of communication is a result of conflicting federal and state laws that can even vary between counties within states which have legalized the plant for either recreational or medicinal use. As a result, cannabis dispensaries have been forced to neglect design in order to remain in what Ryan Mungia refers to as "architectural camouflage"[3] in his recent book "Pot Shots". The cannabis dispensaries of today portray cannabis as generically banal, and for many, is the solely legal cannabis interface available. Although there is some evidence of ingenious marketing and even traits of high-end retail, the top priority is to maximize profit in the most efficient, industrial environment.

This thesis will examine the ways cannabis has historically impacted society in terms of utility and enjoyment, and how architecture can support the ideals of utility and enjoyment.

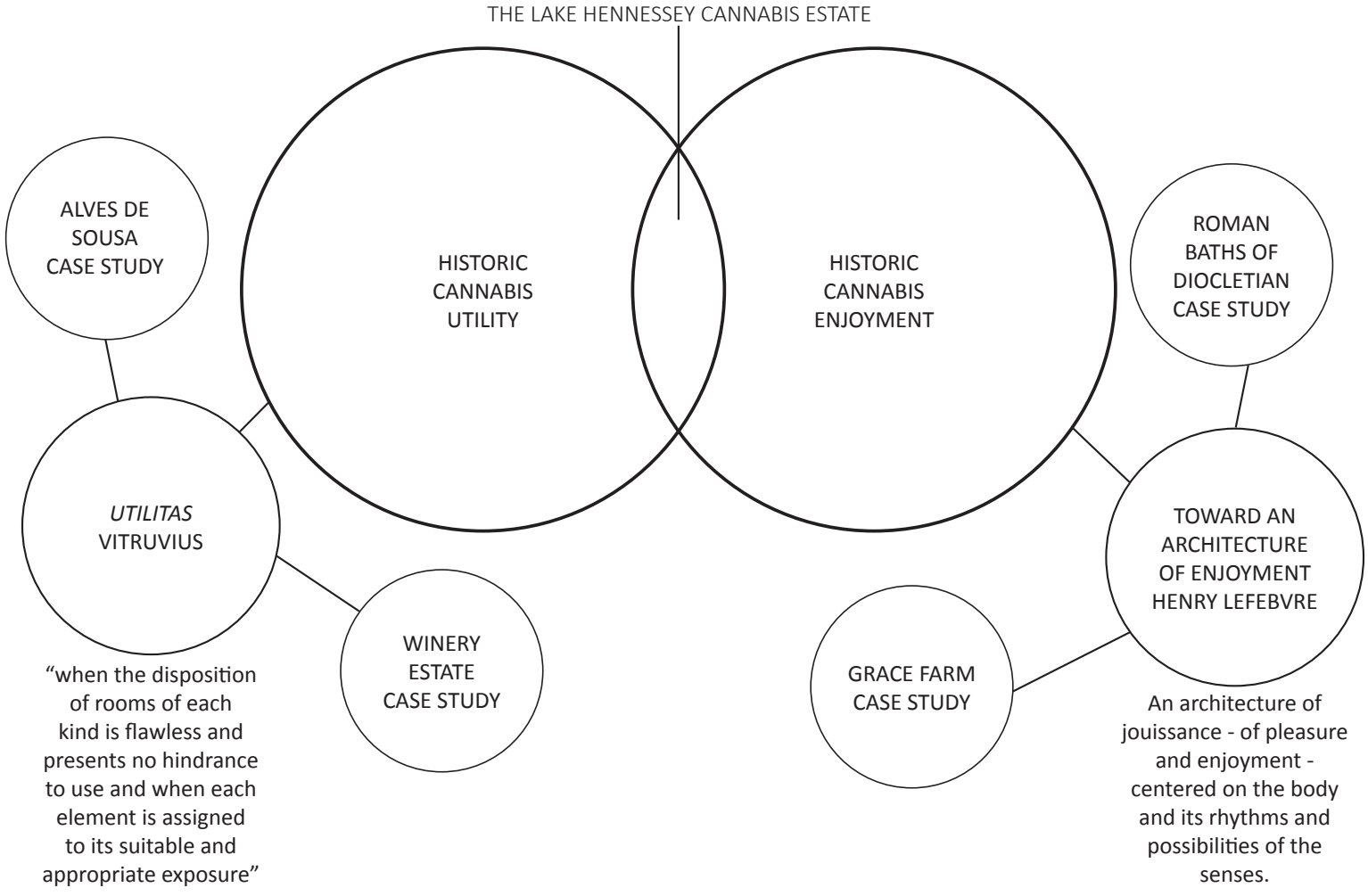


Figure 7 | Theoretical framework diagram.

CANNABIS UTILITY

Throughout history and up to present day cannabis has had a significantly positive economic impact as an agricultural product - used as both an industrial fiber and a psychoactive substance. Because of its industrious quality, the plant initially traveled with people across multiple epochs (fig. 8) and for many years to follow, cannabis was grown, bought, sold and refined as a fiber in nearly every continent, including the United States (fig. 9). From 1850 on, cannabis fiber experienced sharp decline until eventually ending or becoming illegal.[4] Psychoactive cannabis, on the other hand, has seen nearly an opposite path in terms of economic influence.[5] By 2017, drug cannabis supported $10 billion in sales and 170,000 American jobs. In the same year California, the world's fifth-largest economy, legalized cannabis recreationally, opening the "largest legal cannabis market in history".[6] In comparison, the American wine industry supports a $219.9 billion economic impact[7] - which represents

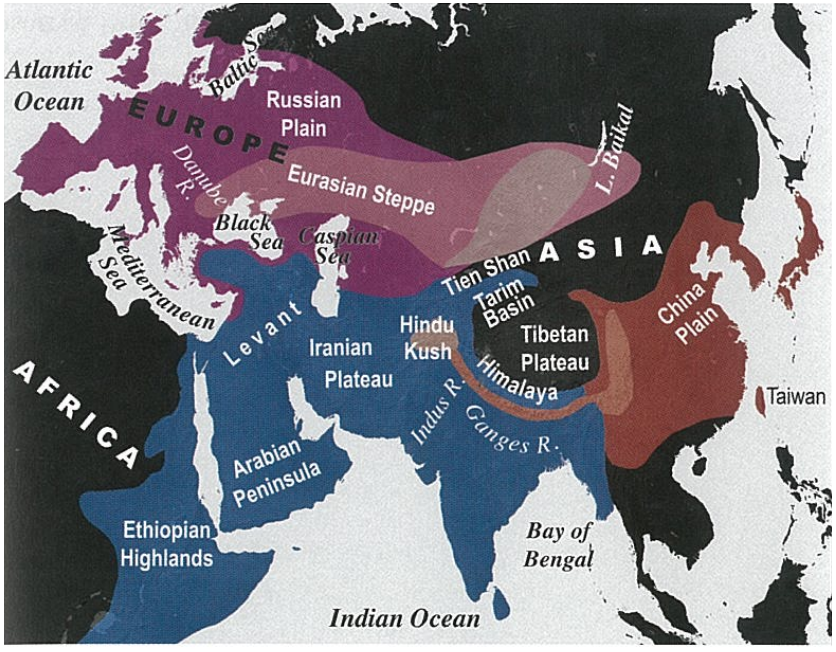


Fig. 8

Figure 8 | Map depicting the travel path of ancient cannabis. Reprinted from Cannabis by C. Duvall, 2014, London, UK: Reaktion Books, p. 31.

a high ceiling for cannabis to reach. Despite both industries utilizing both the refinement and enjoyment of a plant to generate profit, the cannabis industry has only recently begun to develop the same kind of capital that fuels the wine industry in terms of production, processing, testing, tasting and touring. In contrast to wine, cannabis remains federally illegal in the United States, its growth and processing is typically carried out in privacy, its distribution and sale confined to tiny dispensaries and its enjoyment legally relegated to one's home. With prohibition's imminent end, however, the craft of cannabis (fig. 10) is returning to light, and buildings like the Lake Hennessey Cannabis Estate will need to develop the proper function, or *utilitas*, similar to a winery, in order to express their positive economic influence.

Fig. 9


Fig. 10

Figure 9 | Kentucky hemp fields in 1910. Reprinted from Cannabis by C. Duvall, 2014, London, UK: Reaktion Books, p. 80.
Figure 10 | Photograph of typical cannabis trimming process. Reprinted from Time Magazine, by Bruce Barcott. 2018, Time Magazine, p. 61.

CASE STUDY: ALVES DE SOUSA WINERY

According to Vitruvius, architecture must be built with account to function and is achieved "when the disposition of rooms of each kind is flawless and presents no hindrance to use and when each element is assigned to its suitable and appropriate exposure".[8] With a dual purpose for serving workers and visitors, wineries provide instructive examples of distinct spaces within a single building, making them successful examples of Vitruvius' function principle. One example is the Alves de Sousa Winery in Portugal's Baixo Corgo region by Belem Lima. A black box emerging from the hillside (fig. 11) accommodates production and visiting attractions of the winery. The production facility is a large double-height volume parallel to the topography containing the processing facilities of wine. The grapes are sorted on the upper level (fig. 12) where they are then transferred to the adjacent presses, where the laboratory and bottling rooms also live. The wine ferments in stainless steel, temperature controlled vats until it is transferred to oak barrels in the lower level, where it is allowed to age for a long period of time with constant temperature from the surrounding earth's thermal mass (fig. 13). The visitor program is accommodated on the third floor with a reception and wine shop, from where visitors may ascend to the tasting room while experiencing panoramic views of the valley. Two towers containing windows protrude from the large volume roof-line to direct even, northern-light into the production facilities[9]. In conclusion the Alves de Sousa Winery is not only a successful example of Vituvius' idea of *utilitas* but also for cannabis estates to model moving forward.

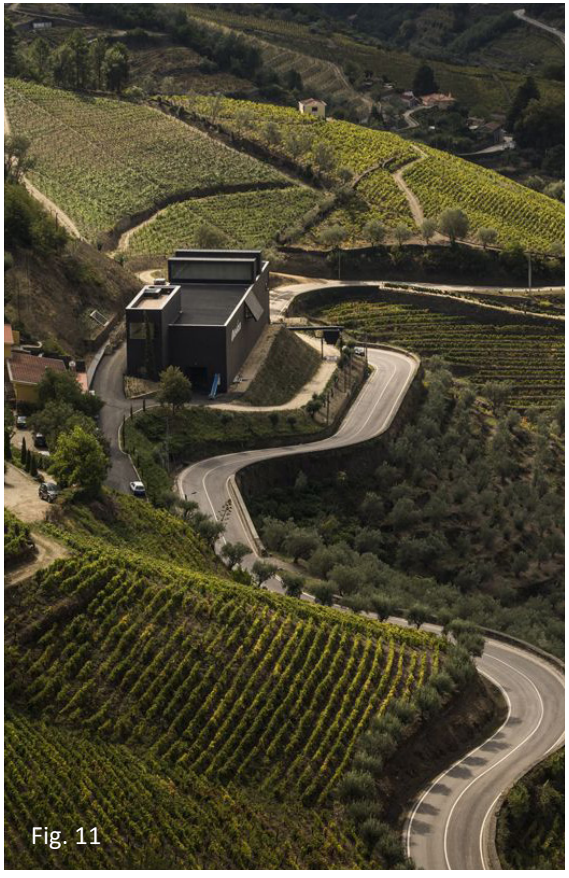


Fig. 11

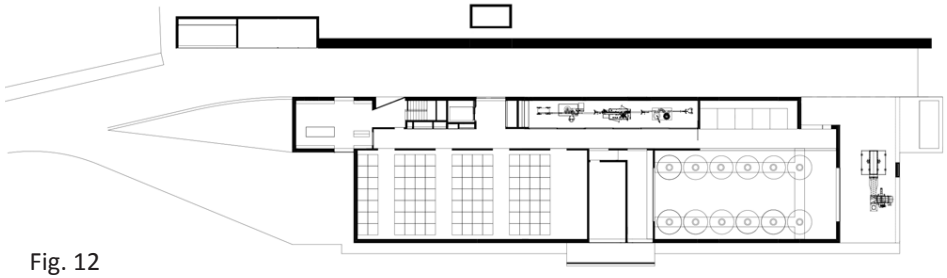


Fig. 12

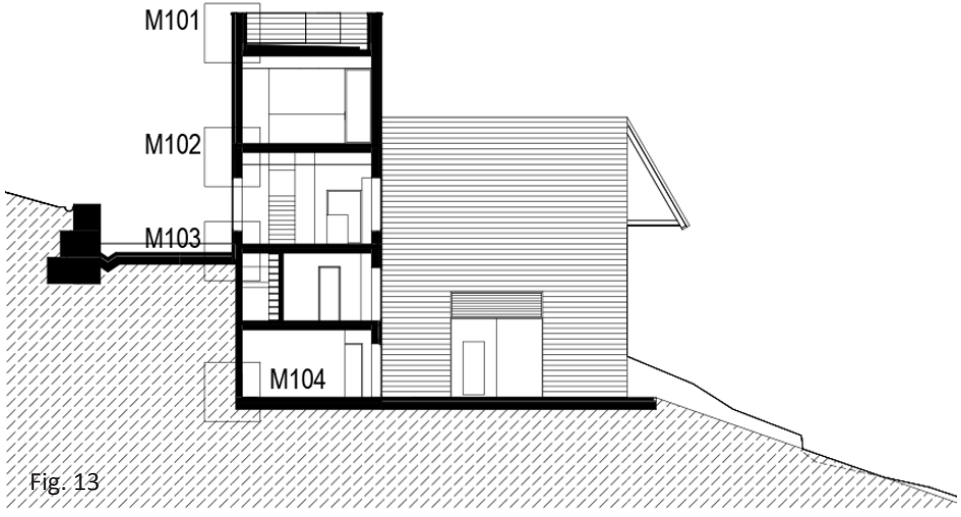


Fig. 13

Figure 11 | Aerial photograph of Alves de Sousa Winery. Reprinted from Dezeen by A. Griffiths, 2016, Retrieved from https://www.dezeen.com/2016/01/18/alves-de-sousa-quinta-da-gaivosa-estate-winery-belem-lima-portugal-black-brick-box/

Figure 12 | Alves de Sousa Winery floorplan. Reprinted from Dezeen by A. Griffiths, 2016, Retrieved from https://www.dezeen.com/2016/01/18/alves-de-sousa-quinta-da-gaivosa-estate-winery-belem-lima-portugal-black-brick-box/

Figure 13 | Alves de Sousa Winery section. Reprinted from Dezeen by A. Griffiths, 2016, Retrieved from https://www.dezeen.com/2016/01/18/alves-de-sousa-quinta-da-gaivosa-estate-winery-belem-lima-portugal-black-brick-box/

CASE STUDY: PRIVATE ESTATE IN RUSSIAN RIVER VALLEY, CA

A visit to a private winery estate provided the opportunity to experience, observe and record various relationships on site. The building's design is a purely functional approach, but is an accurate example of the day to day experiences at a small-scale winery estate, and influential to imagining the day to day experiences at a cannabis estate.

One of the most memorable features of any winery estate is the carefully calibrated landscape (fig. 14). The vines grow like any other plant, but their orderly rows of structure express an unnatural rigor that is none-the-less pleasing to the eye. The rows are purposely oriented parrallel to the north-south axis, so that the leaves can be manicured in a way that allows the morning sun from the east and filters the afternoon sun from the west. A vineyard is thus representative the great lengths humans will follow in order to grow and produce a luxury product that they consider valuable and essential.

The hard work continues beyond the vineyard and into the processing station (fig. 15), where the grapes are sorted, pressed,

Fig. 14

Figure 14 | Photograph of the private estate's vineyard

fermented and stored. In contrast to the grape's origin in the dirt, the processing room is a sterile environment, similar to a research laboratory on a college campus, and typically disconnected from the visitor's experience.The barrels (fig. 16) are made of french oakand are a vessel for wine until it is bottled. A clear differentiation between the utilitarian fermentation vats and the romanticized barrels is undeniable.

The calibrated landscape, sterile processing room and barrel storage are thus all essential to wine connoisseurship (fig. 17), which is essentially a social ritual to communicate one's knowledge and appreciation for wine. The observations made at this estate were important illustrations of what the reality of a cannabis estate might be like.

Fig. 15

Fig. 16

Fig. 17

Figure 15 | Photograph of fermentation vats
Figure 16 | Photograph of barrel storage
Figure 17 | Diagram of the process of wine connoisseurship

RECREATIONAL IMPACT (ENJOYMENT)

Beyond its economic effects, another positive impact of cannabis is its social use for enjoyment and recreation. The Lake Hennessey Cannabis Estate thus has the potential to provide spaces devoted to fostering the meaningful relationship between peoples' bodies and minds. People all over the world have gathered to enjoy cannabis' psychoactive effects on the mind and body, from as early as 2000 BCE when people of the Hindu Kush drank bhang tea, to 1500 BCE in Eastern China drinking ma tea, to 1350 CE in Ethiopia where people smoked bhangand present-day United States where people smoke cannabis flower.[10] Despite the worldwide consumption of cannabis (fig. 18), staggering amounts of Americans have been jailed each year for cannabis possession and consumption during a period of intense prohibition that was fueled by American propaganda against the plant. For example, Richard Nixon's infamous war on drugs in 1971 contributed to cannabis' negative perception. This was likely in response to major cannabis fueled cultural movements like the 1967 Summer of Love in San Francisco. Despite prohibition, cannabis' culture of enjoyment and recreation has displayed resilience, and to this day, thousands of people all over America gather on April 20th to openly protest and consume (fig. 19). With prohibition in the United States set to end soon, an architecture dedicated to enjoying the positive body and mind effects of cannabis is more possible than ever. In the essay "Toward an Architecture of Enjoyment", Henri Lefebvre raises the question "since there were architectural works devoted to death, to violence, to the celestial beyond or terrestrial power, do we find among such works a counterpart, an architecture devoted to life, to happiness, to voluptuousness, to joy?"[11]

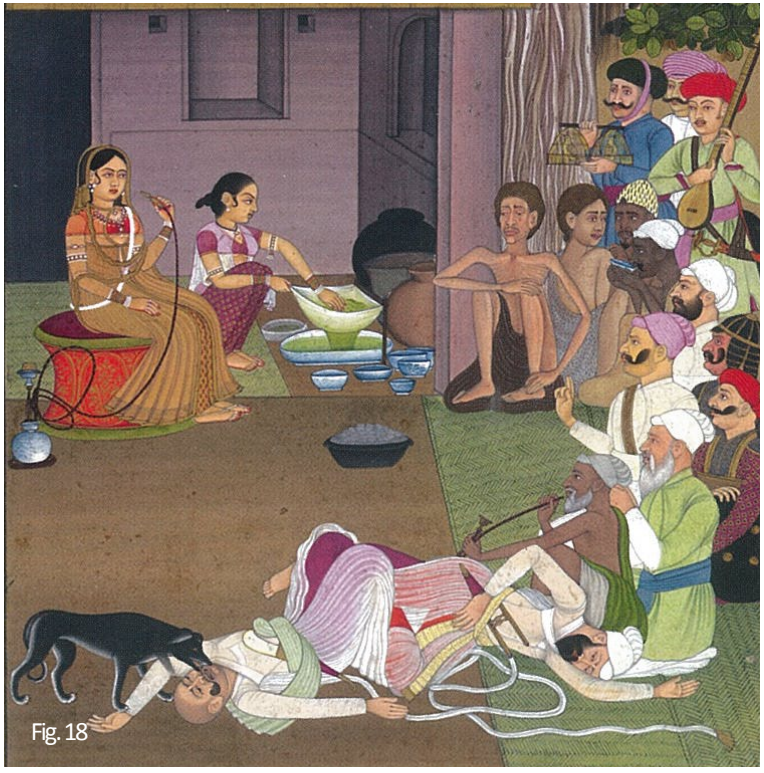


Fig. 18


Fig. 19

Figure 18 | Rendering of people dringing bhang and smoking water pipes 18th century. Reprinted from Cannabis by C. Duvall, 2014, London, UK: Reaktion Books, p. 93.
Figure 19 | Photograph of 'Hippie Hill' in San Francisco on April 20th 2015.

CASE STUDY: ROMAN BATHS OF DIOCLETIAN

Enjoyment, however according to Lefebvre, is not a function of architecture, but arises from a complete bodily experience, which is oriented and led by architecture.[12] An architectural example of enjoyment as described in Lefebvre's essay is the Roman Baths of Diocletian, where visitors are able to "cultivate the body as well as the mind".[13] Designed as a city within the city, a thick wall (fig. 20) with carved niches for baths, courts, exedra, libraries and a theatre wraps around the baths (fig. 21) to define a large courtyard totaling 130,000 square meters. Visitors enter from the northeast and experience a succession of interior and exterior rooms and pools, which are interconnected with primary and secondary axis as seen in the plan (fig. 22). The caldarium or the hottest room, laconicum or the dry sweating room, tepidarium or warm room and frigidarium or cool room exist in the central block of spaces and are surrounded by large halls. Symmetrically flanking the central block was two periphery blocks, each consisting of a cold bath, open air gymnasium with an adjacent tablinum or living room and an ephebeum or youth gym. Perpendicular to these blocks are two tertiary blocks consisting of a small laconicum, warm baths, small caldarium, and a sudatorium or sweat room. The succession of spaces varies in scale, material and temperature, both in plan and section, as they emphasized either the body or mind[14]. The Roman Baths of Diocletian therefore serves as an example for the potential of architecture to promote the universal feeling of enjoyment that cannabis users experience through its recreational consumption.

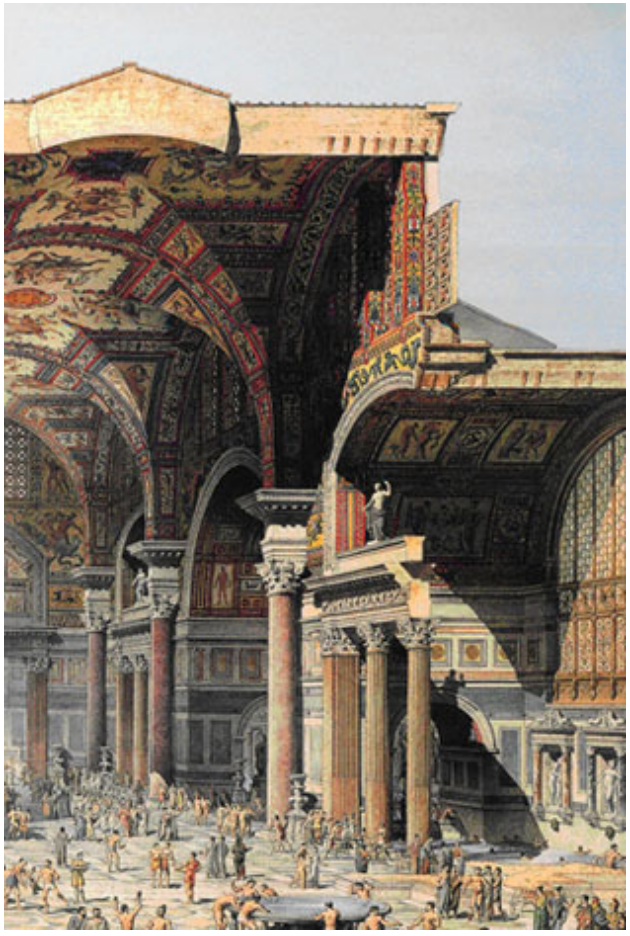


Fig. 20

Fig. 21

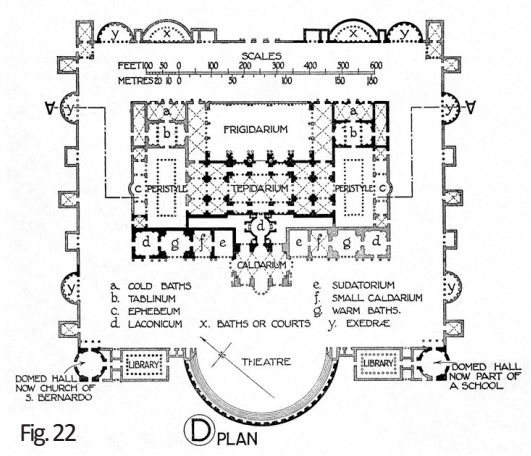


Fig. 22

Figure 20 | Detail of Edmond Paulin's reconstruction of the Roman Baths of Diocletian 1880. Retrieved from http://www.kt.rim.or.jp/~oda-h/WAO/indexeng.html
Figure 21 | Landscape with Herdsmen and Animals in front of the Roman Baths of Diocletian by Peter van Bloeman 1700. Retrieved from https://www.nationalgalleries.org
Figure 22 | Floorplan of the Roman Baths of Diocletian. Reconstructed by Studio MCM, 2006-2014, Retrieved from http://www.studiomcm.it/sur_diocletian_bath.html

CASE STUDY: GRACE FARMS

A contemporary example of an Architecture of Enjoyment is the Grace Farms Community Center by SANAA. According to the Grace Farm foundation, "the community center is a place where people can come to appreciate nature, art, justice, community and faith".[15] As seen in the floorplan (fig. 26), organic masses reminiscent of river stones are placed along a flowing path and under a continuous roof. Visitors move through both the landscape and the building - creating a unified spatial experience. According to the architects, "SANAA's goal was to make the architecture of the River become part of the landscape so that visitors may have a greater enjoyment of the environment" [16]. This is directly relatable to the proposed cannabis estate, where the landscape is an essential part of not only the cannabis product but also the spatial experience. Although the project is clearly a product of the land conceptually, its synthetically white material expression strongly contrasts that of the landscape around it (fig. 27). This is anithetical to a facility like the Lake Hennessey Cannabis Estate, where the object being enjoyed is tangible rather than the ideas enjoyed at Grace Farms.

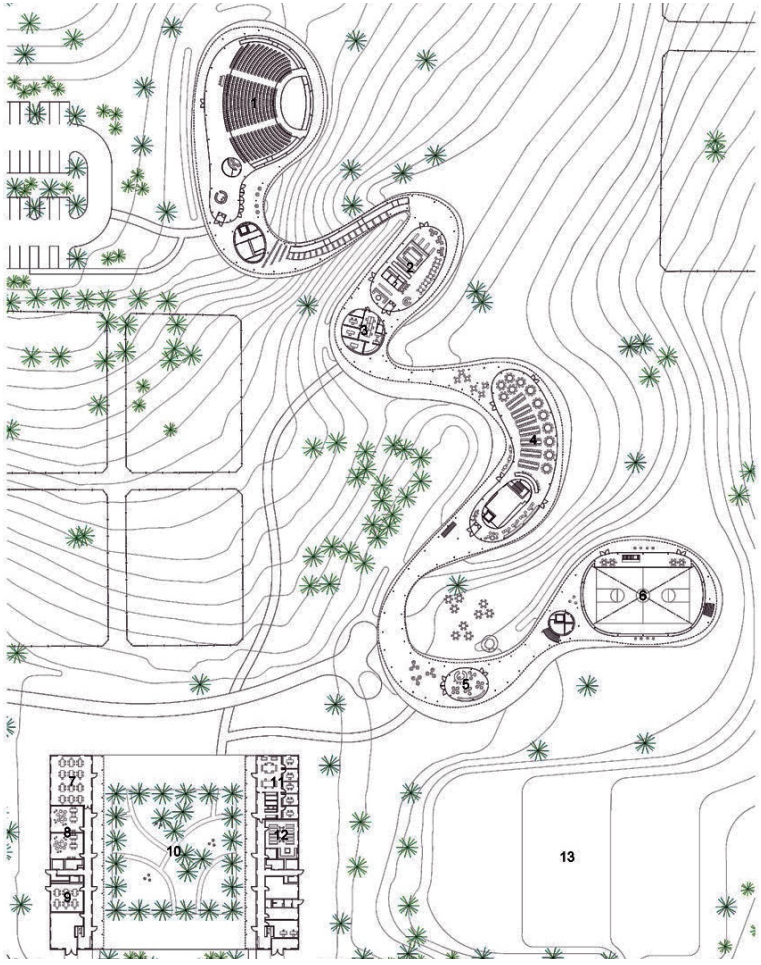


Fig. 23

Figure 23 | Floorplan of Grace Farms. Retrieved from https://www.architectural-review.com/buildings/sejima-lit-up-when-we-said-we-wanted-grace-farms-to-disappear-into-the-landscape/10003785.article

Fig. 24

Figure 24 | Landscape with Grace Farms. Retrieved from https://www.archdaily.com/775319/grace-farms-sanaa

THOUGHTS ABOUT CANNABIS ARCHITECTURE

Cannabis is a complex plant with various socio-cultural and environmental impacts. An interesting thing to note is that many of these impacts and needs have been addressed in some form of architecture but under a different context. For example, cannabis has a historic economic influence as both a fiber and psychoactive plant - and has the potential to make an even greater impact with proper infrastructure. Wine, also a psychoactive substance made from the processing of a fruit, already has the proper infrastructure in place and generates a far greater profit than cannabis. Wineries are thus an inevitable typology for the cannabis industry to model as prohibition ends.

It is equally important to note that society has already built many things dedicated to enjoyment - the Roman Baths of Diocletian or Grace Farms are just a couple of examples. Because of differing preferences and policy, however, modern society has not been allowed to build anything dedicated to enjoying cannabis - yet.

Of course, not all of cannabis' impacts are positive. Environmentally speaking, illegally and irresponsibly outdoor grown cannabis poses a risk to bioregional ecologies[17], and indoor grown cannabis consumes vast amounts of natural resources[18]. Therefore The Lake Hennessey Cannabis Estate must not only be critically architectural in terms of utility and enjoyment, but also ecologic and responsible.

Fig. 25

Figure 25. Street cannabis packaging in the UK. Reprinted from Cannabis by C. Duvall, 2014, London, UK: Reaktion Books, p. 90.

REFERENCES

3. Mungia, Ryan. (2012). Pot Shots. Boyo Press.

4. Duvall, C. (2014). Cannabis (Botanical (Reaktion Books (Firm))). London, UK: Reaktion Books. p 27

5. Barcott, Bruce. (2018, July). Introduction. Time.

6. Ibid.

7. "WineAmerica Study Shows $219.9 Billion Economic Impact of U.S. Wine Industry in 2017." Wine Industry Advisor, 27 Sept. 2017, www.wineindustryadvisor.com/2017/09/27/219-billion-economic-impact-us-wine-industry.

8. Smith, T. (2003). Vitruvius on architecture. New York: Monacelli Press. p 103

9. Griffiths, Alyn. "Alves De Sousa Winery Is a Black-Brick Box on a Hillside Site." Dezeen, Dezeen, 15 Jan. 2016, www.dezeen.com/2016/01/18/alves-de-sousa-quinta-da-gaivosa-estate-winery-belem-lima-portugal-black-brick-box/.

10. Duvall, C. (2014). Cannabis (Botanical (Reaktion Books (Firm))). London, UK: Reaktion Books. p 59

11. Lefebvre, H., Stanek, Łukasz, & Bononno, Robert. (2014). Toward an architecture of enjoyment (JSTOR EBA). Minneapolis: University of Minnesota Press.

12. Ibid.

13. Ibid.

14. Ibid.

15. "Grace Farms Foundation." Grace Farms, gracefarms.org/.

16. Ibid.

17. Jennifer K. Carah, Jeanette K. Howard, Sally E. Thompson, Anne G. Short Gianotti, Scott D. Bauer, Stephanie M. Carlson, David N. Dralle, Mourad W. Gabriel, Lisa L. Hulette, Brian J. Johnson, Curtis A. Knight, Sarah J. Kupferberg, Stefanie L. Martin, Rosamond L. Naylor, Mary E. Power; High Time for Conservation: Adding the Environment to the Debate on Marijuana Liberalization, BioScience, Volume 65, Issue 8, 1 August 2015, Pages 822–829, https://doi.org/10.1093/biosci/biv083

18. Mills, Evan. The carbon footprint of indoor cannabis production. Energy policy. Volume 46, 2012, p 58-67

III. METHODOLOGY

THESIS STATEMENT

This thesis aims to bring cannabis' positive affects to light by celebrating the growth, processing and consumption of cannabis as an essential and enjoyable agricultural product.

THESIS GOALS AND OBJECTIVES

History alone has shown that cannabis is much greater than a commodity bought and sold at retail locations. However, dispensaries today do little to communicate this value. The thesis proposal aims to demonstrate, through the design and programming of the Lake Hennessey Cannabis Estate, how architecture can set a framework for bringing cannabis' latent ability to bring people together back to light. Through an investigation of natural and human factors concerning cannabis in California, this thesis highlights the potential for the future of cannabis culture. The ecological strategy first looks at the existing California climates with the intention of locating a place with proper conditions for cannabis growth. These conditions are both natural, such as soil, sun and water, and human, such as abstract regions defined by history. The intention is to understand the site's natural value and then collaborate with it to define the new typology of cannabis architecture.

Fig. 26

Figure 26 | Cannabis drawing. Reprinted from Cannabis by C. Duvall, 2014, London, UK: Reaktion Books, p. 44.

SITE SELECTION: SOIL

This thesis aims to locate the Lake Hennessey Cannabis Estate within a California environment that is naturally suited for cannabis growth. Various regional soil composition data (fig. 27) was overlayed on a map of California (fig. 28) to locate areas with ideal soil for the growth of this plant. Areas of dense overlap are considered regions of interest. The selected region, outlined in orange, was chosen for its inclusion of the Napa Valley, a region known for its agricultural connection to elite wine production. Incidentally this region is also in close proximity to the San Francisco Bay area, which as the diagram (fig. 29) shows, is highly accepting of cannabis. Ideal soil for cannabis is considered loam (fig. 30), which is a certain ratio of sand, silt and clay.[19] Additional soil characteristics compared were pH levels, organic matter and water capacity.

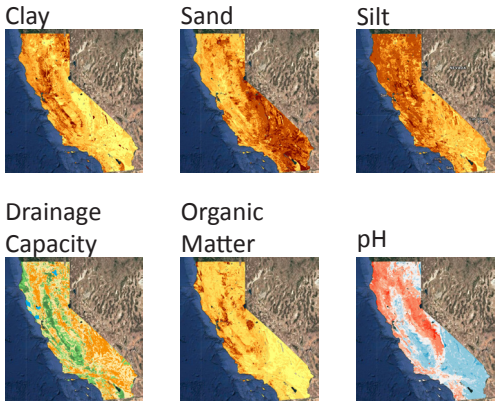


Fig. 27

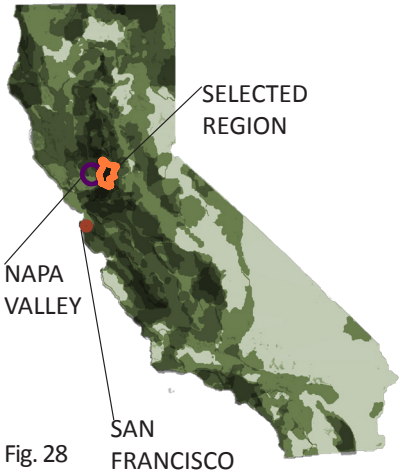


Fig. 28

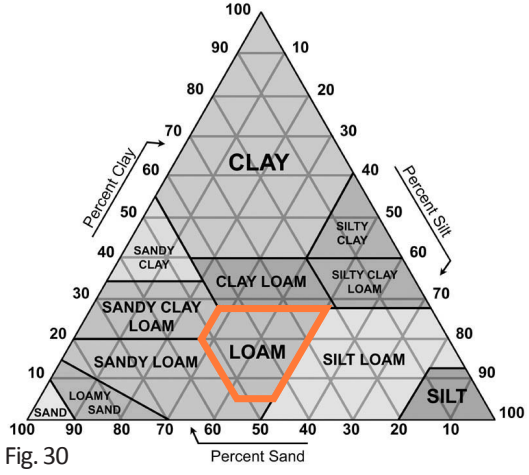


Fig. 30

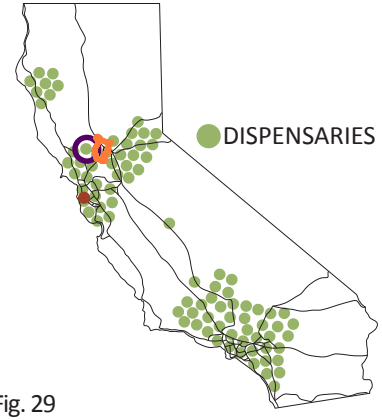


Fig. 29

Figure 27 | California soil maps. Adapted from UC Davis California Soil Lab. Retrieved from https://casoilresource.lawr.ucdavis.edu/soilweb-apps/
Figure 28 | Compiled map showing locations in California with ideal soil.
Figure 29 | Cannabis dispensary map comparing the selected region to existing dispensary density. Adapted from Weedmaps. Retrieved from https://weedmaps.com/
Figure 30 | Soil pyramid. Adapted from WeatherSTEM. Retrieved from https://learn.weatherstem.com/modules/learn/lessons/85/19.html

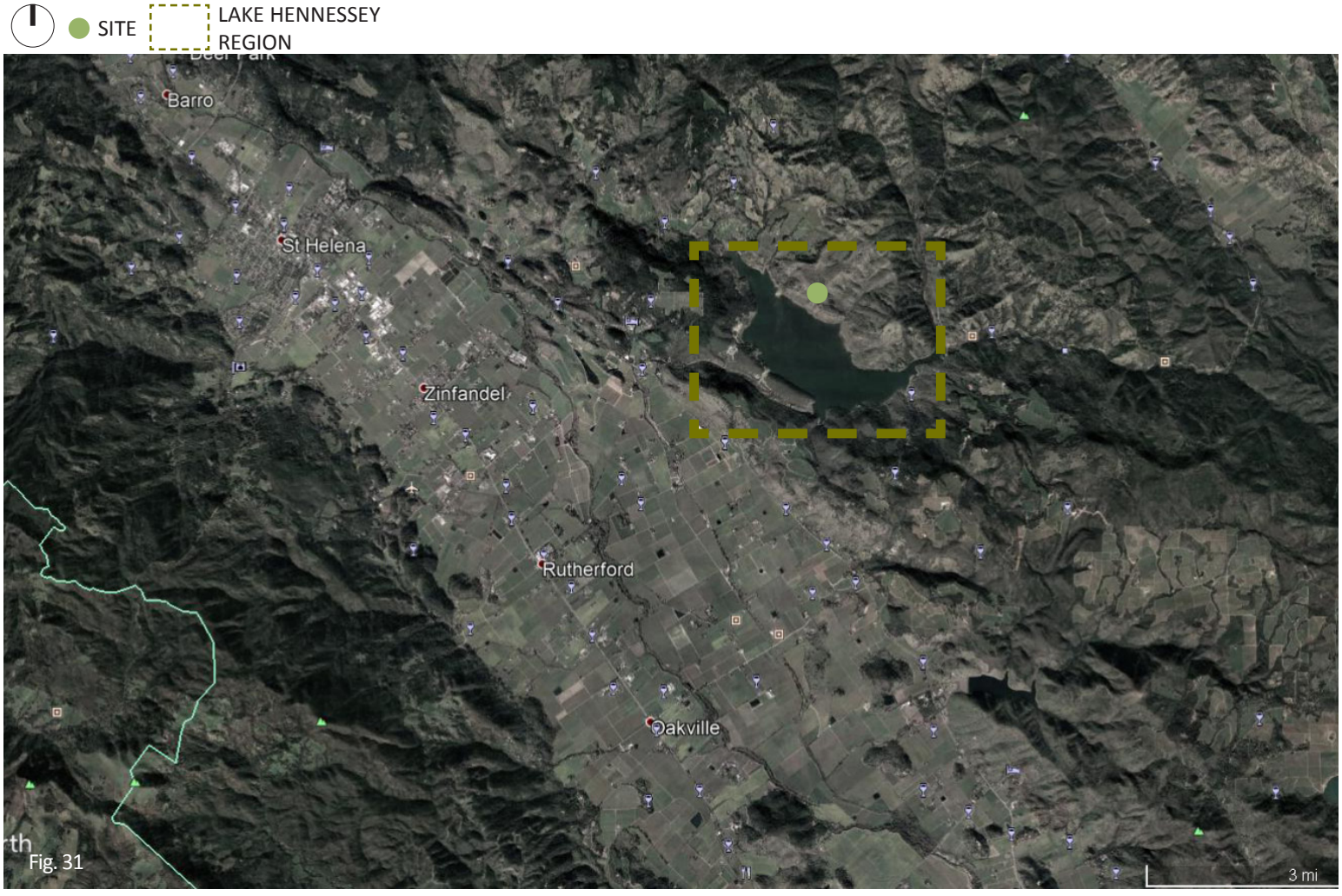


Figure 31 | Google earth photograph of the Napa Valley. Lake Hennessey and the selected site are outlined in the green rectangle.

SITE CONTEXT: NAPA VALLEY, CA

As the aerial image (fig. 31) shows, Napa Valley is a region on the edge of natural and calibrated, much like wine and cannabis. The goal of locating the Lake Hennessey Cannabis Estate here is two-fold:

1) Introduce diversity to a region homogenized by wine and grapes (fig 32).

2) Elevate cannabis to the elite culture of wine.

Fig. 32

Figure 32 | Winery density of the Napa Valley. Lake Hennessey and the selected site are outlined in the green rectangle.

SITE CONTEXT: LAKE HENNESSEY REGION

In the grassy hillsides of eastern Napa Valley, Lake Hennessey Park (fig. 33) encompasses over 1500 acres of loam, well lit and well irrigated soil, making it a prime location for growing natural cannabis. The park is currently a destination for many hikers, mountain bikers, birdwatchers, equestrians and nature enthusiasts, who share trails showcasing oak, doug fir and madrones woodlands, grasslands, wetlands and shrublands. A diverse range of wildlife including black bear, mountain lion, bobcat, gray fox, coyote, bald eagle, osprey, blue herron, egret, woodpecker and loons have all been sited in the park's diverse landscape of ecologic conditions.[20] Private vineyards surround the park, making it a rich ecosystem of natural and human processes. One of the park's most popular boating, kayaking and fishing sites, Lake Hennessey, is also the primary drinking water reservoir for St. Helena and represents the beauty of natural resources. It is therefore illegal to make bodily contact with the lake and stream runoffs are heavily monitored. In addition to representing the protection, preservation and enjoyment of the Napa Valley's natural environments and resources, the park contains various cultural resources associated with outdoor science and conservation education programs. Such resources include rentable cabins, camping spaces and an eco-campsite in neighboring Lake Berryessa. Overall the region represents a community asset that is well loved, well protected and a framework for a mutually beneficial relationship between society, cannabis and nature.

Figure 33 | A photograph of Lake Hennessey regional park. Reprinted from Napa County Regional Park & Open Space District. Retrieved from https://napaoutdoors.org/parks/moore-creek-park/

SITE CONTEXT: LAKE HENNESSEY REGION

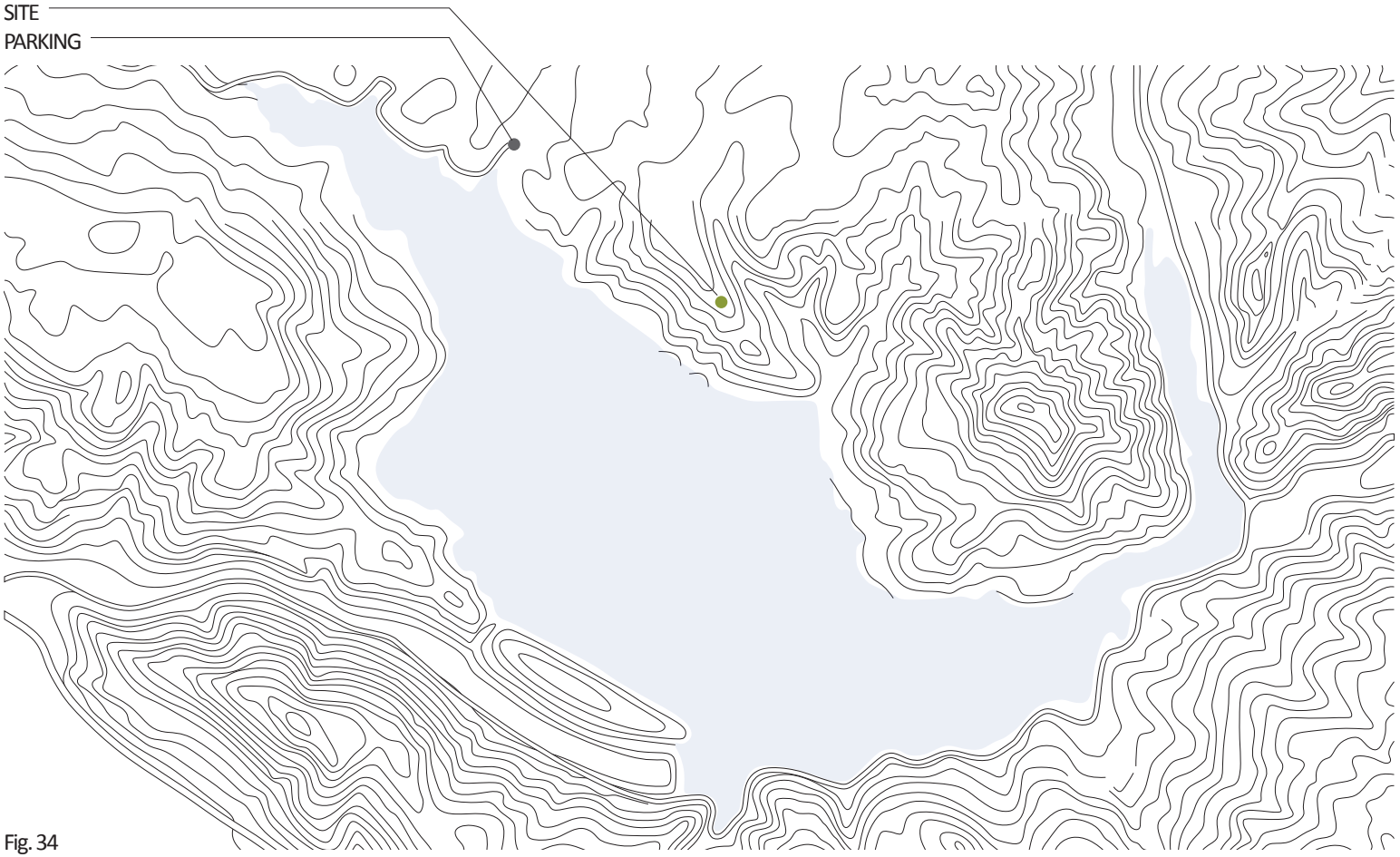


Fig. 34

Figure 34 | Topographic map of the Lake Hennessey park.

SITE CONTEXT: APPROACH

The Lake Hennessey Cannabis Estate is located at the crest of a small knoll. Because of this, the visitor's approach to the site is as much of the experience as the proposed building. The following diagrams depict not only what the site is but how it is experienced. This directly relates to the concepts presented later in the thesis.

After a short walk from the parking lot, visitors begin their ascent (fig. 35) up fire roads carved into the hillside. These not only allow for easy access during natural disasters, but also easy access for hikers. Once visitors reach the top, they are welcomed with lush yellow grasses, deep green leaves, luminous green moss, warm brown and gray oak trees, and bright blue skies. The colors, light, shadow, and textures are blended into a dynamic compositition brought to life by the wind (fig. 36).

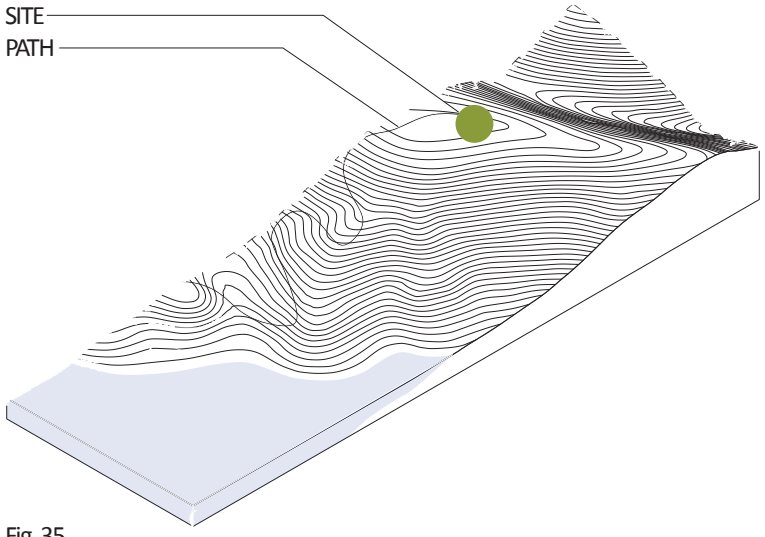


Fig. 35

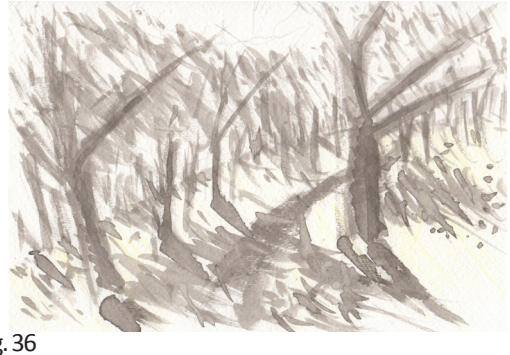


Fig. 36

Figure 35 | Axonometric drawing showing the path from the lake to the site.
Figure 36 | Sketch from the site visit depicting the movement of shadows in the wind.

Figure 37 | Photograph of the knoll from across the lake.

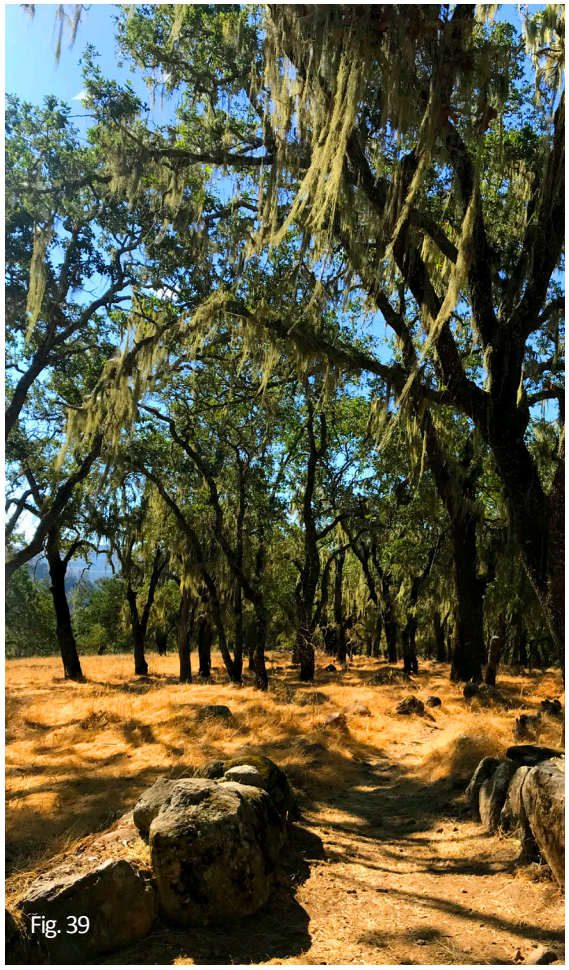


Figure 38 | Photograph of the trail ascending the knoll.
Figure 39 | Photograph of the trail at the top of the knoll.

Figure 40. Photograph of the light, shadows and flora encountered along the hike.

SITE: CLEARING

Visitors to the site will soon reach a clearing at the crest of the knoll, which is the Lake Hennessey Cannabis Estate's location (fig. 41). The clearing represents a metaphor for bringing the positive benefits of cannabis into the light. The open area also provides a unique opportunity to build within the landscape and not impede upon the lush, low hanging tree canopies and the light and shadows that filter onto the grasslands.

Figure 41 | Clearing site at the crest of the knoll. Aerial photograph from google earth.


200'-0"

Figure 42 | Photograph of the clearing at the crest of the knoll.

SITE ANALYSIS: CLEARING ASPECT

The site can also be understood according to the term aspect analysis, which refers to a surface normal's orientation according to NESW. This is important because it relates to the microclimates that make up a site - for example, eastern oriented sites north of the equator will receive direct gentle sunlight in the morning and not the intense afternoon sunlight in the afternoon, and are therefore better suited for growing vegetation (and cannabis). A Grasshopper3D script was used to analyze a digital site model of the clearing's ground condition in order to visualize its aspect (fig. 43). Because the clearing's perimeter is bisected by the soft ridge in the knoll, the site can be seen as three zones diagrammed below (fig. 44).

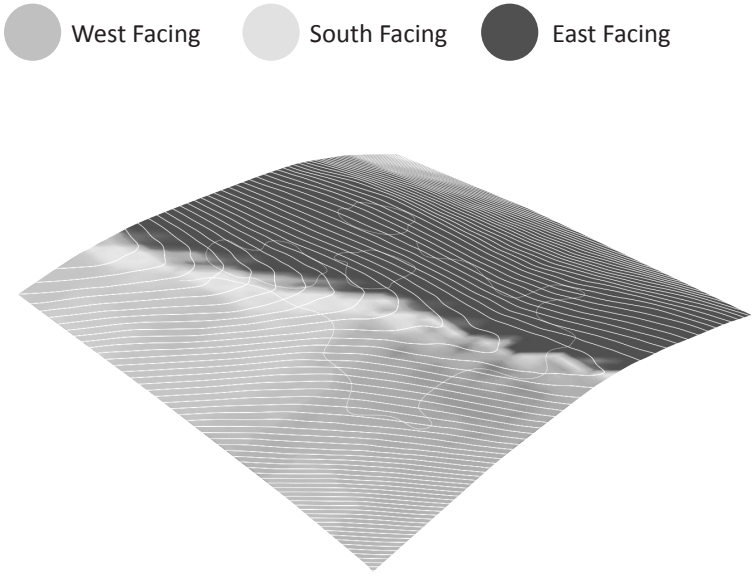


Fig. 43

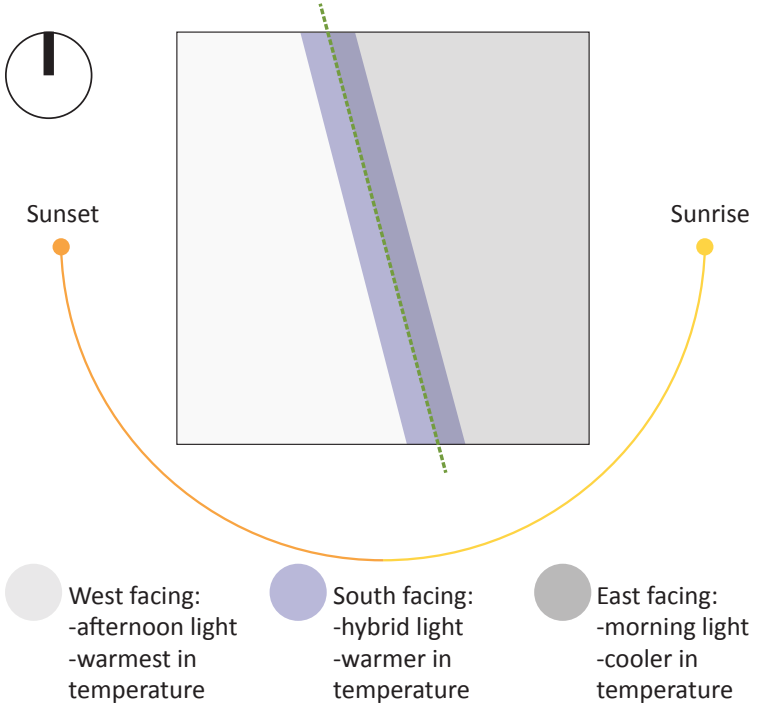


Fig. 44

Figure 43 | Clearing aspect analysis.
Figure 44 | Clearing site diagram.

PROGRAM DISTRIBUTION

The proposed Lake Hennessey Cannabis Estate totals nearly 14,500 square feet, with primary programmatic elements (fig. 51) derived from the concepts of utility and enjoyment in the context of growing, processing and enjoyment of cannabis. Because experiencing cannabis in the context of nature was a primary driver of the project, a large portion is dedicated to the visitor's movement through the landscape.

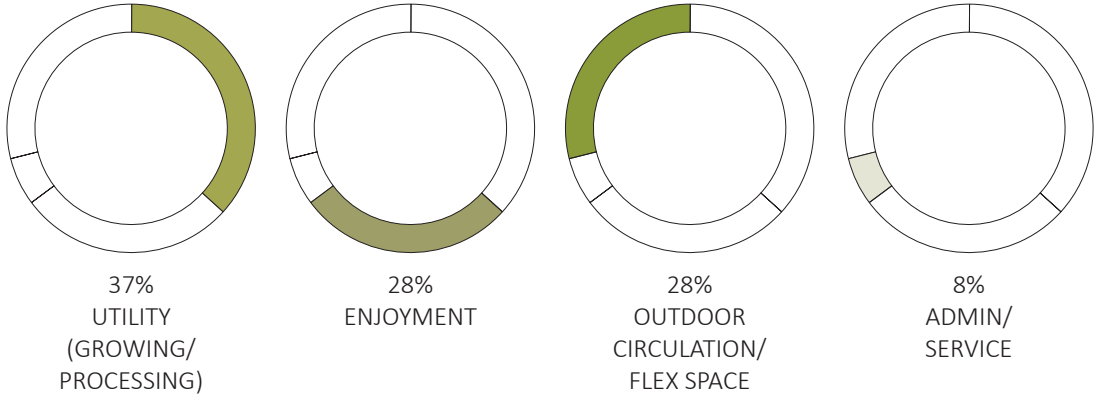


Fig. 45

Figure 45 | Program distrubution charts.

PROGRAM: UTILITY

The growing and processing division of program (fig. 52) is responsible for the growth of cannabis and calibrated processing of its flower. It affords professionals the proper facilities to dry, test, trim, process, package and store the highest quality cannabis, either grown on site by the estate, or grown offsite by partnered growers in other locations (a typical practice in the wine industry).

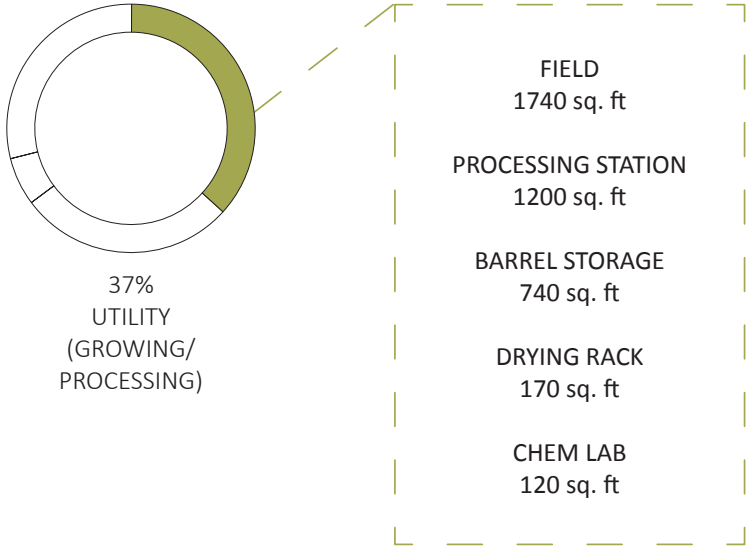


Fig. 46

Figure 46 | Utility program distrubution chart.

VINEYARD EQUIVALENT

Understanding how much space to dedicate to growing cannabis was the foremost objective. This estimation (fig. 47) was achieved by comparing Napa Valley tourist data[21] to average cannabis consumption rate,[22] cannabis flower production per plant[23] and area of 10 sq. ft per plant. This is likely an under-estimate considering a lack of academic information on the topic.

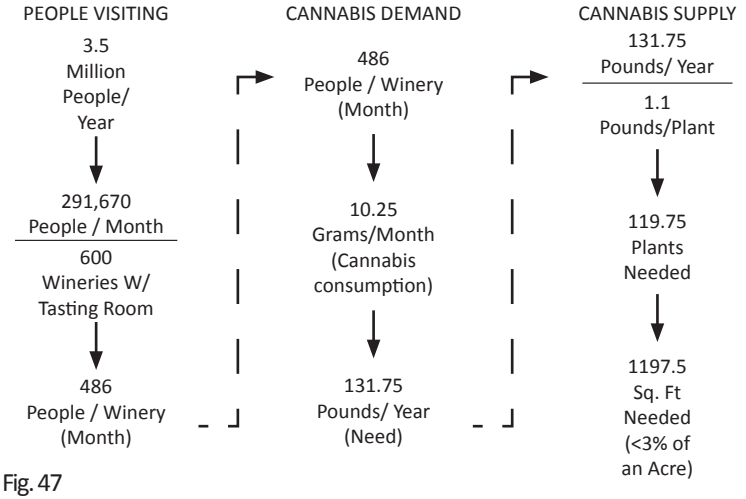


Fig. 47

GROWTH/PROCESSING

The processing program was derived from the human factors involved in Canadian cannabis company Tilray's smoke-able cannabis flower production (fig. 48). Some key events in this sequence include:

-Growing the mother plant from which all other plants are cloned

-Harvesting the cannabis flower

-Drying, trimming and analyzing the harvest

-Storing the finished product

Actual dimensions from comparable program at the Arista Estate are also used to guide the design.

Fig. 48

Figure 47 | Vineyard equivalent for cannabis estimation.
Figure 48 | Simplified cannabis growing and process diagram. Reprinted from Tilray. Retrieved from https://www.tilray.com/

PROGRAM: ENJOYMENT

The enjoyment of cannabis consumption division of program (fig. 49) accomodates visiting guests with spaces dedicated to fostering the relationship between the body, mind and cannabis. A tasting room and bar allow visitors to experience cannabis connoisseurship with a community. The meditation and massage spaces afford guests an opportunity to intimately enjoy the mental and physical affects of cannabis.

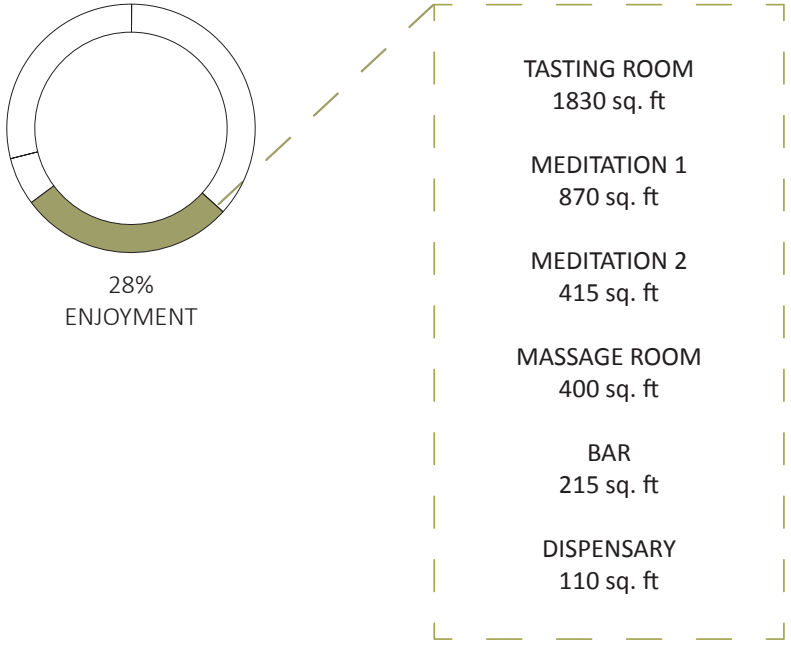


Fig. 49

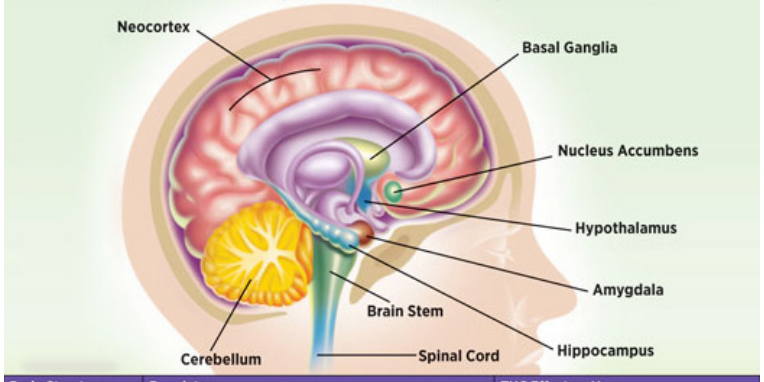
Figure 49 | Utility program distrubution chart.

PROGRAM: ENJOYMENT

The enjoyment of cannabis' physiological effects on the mind and body is highly subjective, and depends on a mix of individual body chemistry and chemicals called cannabinoids, which are naturally produced by the plant. According to the UCLA Cannabis Research Initiative,

Cannabis contains over 500 distinct compounds, which include cannabinoids, terpenoids, flavonoids, and omega fatty acids. Terpenoids are responsible for the aroma of cannabis and other flowering plants. Studies have shown terpenoids to have diverse physiologic effects, and terpenoids may be contributing to the observed effects of cannabis.[24]

These affects could be classified as visceral, when the dominant change is felt in the body, or cerebral, when the dominant change is felt in the mind (fig. 50). Designing the program dedicated to enjoying cannabis was based on this distinction, and led to spaces suitable for social or intimate smoking. The spaces are freely accessible at all times of the day, allowing guests the opportunity to find spaces suitable for their personal reaction to cannabis.



Brain Structure	Regulates	THC Effect on User
Amygdala	emotions, fear, anxiety	panic/paranoia
Basal Ganglia	planning/starting a movement	slowed reaction time
Brain Stem	information between brain and spinal column	antinausea effects
Cerebellum	motor coordination, balance	impaired coordination
Hippocampus	learning new information	impaired memory
Hypothalamus	eating, sexual behavior	increased appetite
Neocortex	complex thinking, feeling, and movement	altered thinking, judgment, and sensation
Nucleus Accumbens	motivation and reward	euphoria (feeling good)
Spinal Cord	transmission of information between body and brain	altered pain sensitivity

Fig. 50

Figure 50 | Regions of the brain affected by cannabis and their corresponding response. Reprinted from HeadsUp. Retrieved from http://headsup.scholastic.com/students/the-science-of-marijuana

INITIAL CONCEPTS

One of the primary ideas behind the Lake Hennessey Cannabis Estate is that the growing, processing and enjoyment of cannabis should be integrated to its site with a unifying architectural language (fig. 51).

The initial concepts for that language were inspired by the creation of the photogram at right (fig. 59). In this artistic exploration light, string, time, chemicals and paper were carefully calibrated to reproduce the essense of smoke. This process was purposely chosen as an analogy for the calibrated efforts witnessed at the Arista Estate and imagined at the Lake Hennessey Cannabis Estate.

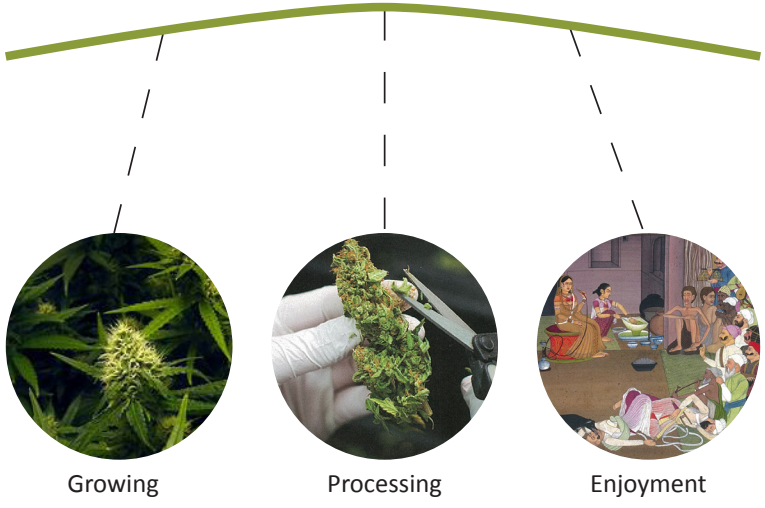


Fig. 51

Figure 51 | Simplified conceptual diagram.
Figure 52 | Smoke photogram.

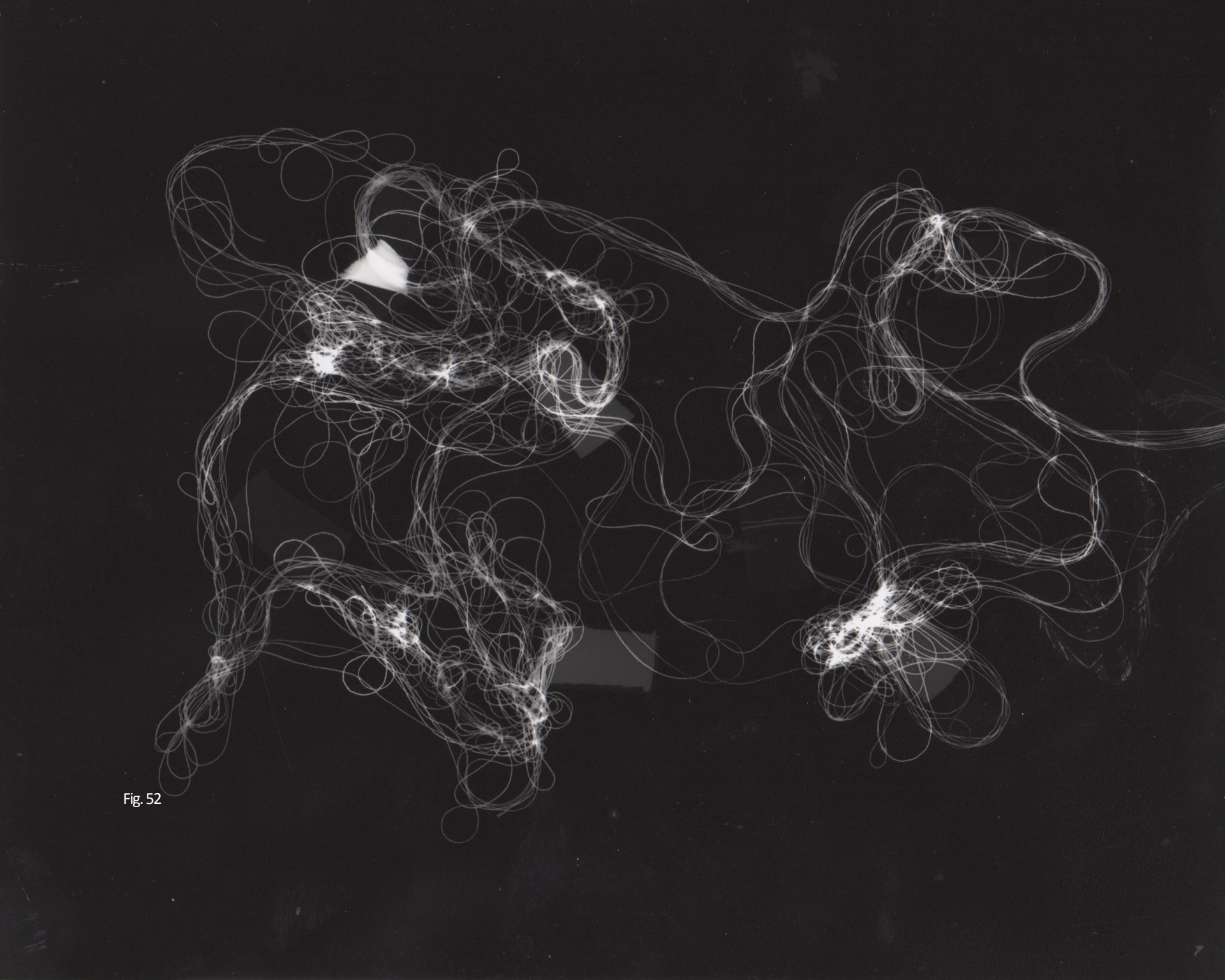


Fig. 52

INITIAL CONCEPTS: CLEARING-SMOKE

The roof's perimeter (fig. 53) was inspired by tracing the smoke photogram's wandering silhouette (fig. 54).

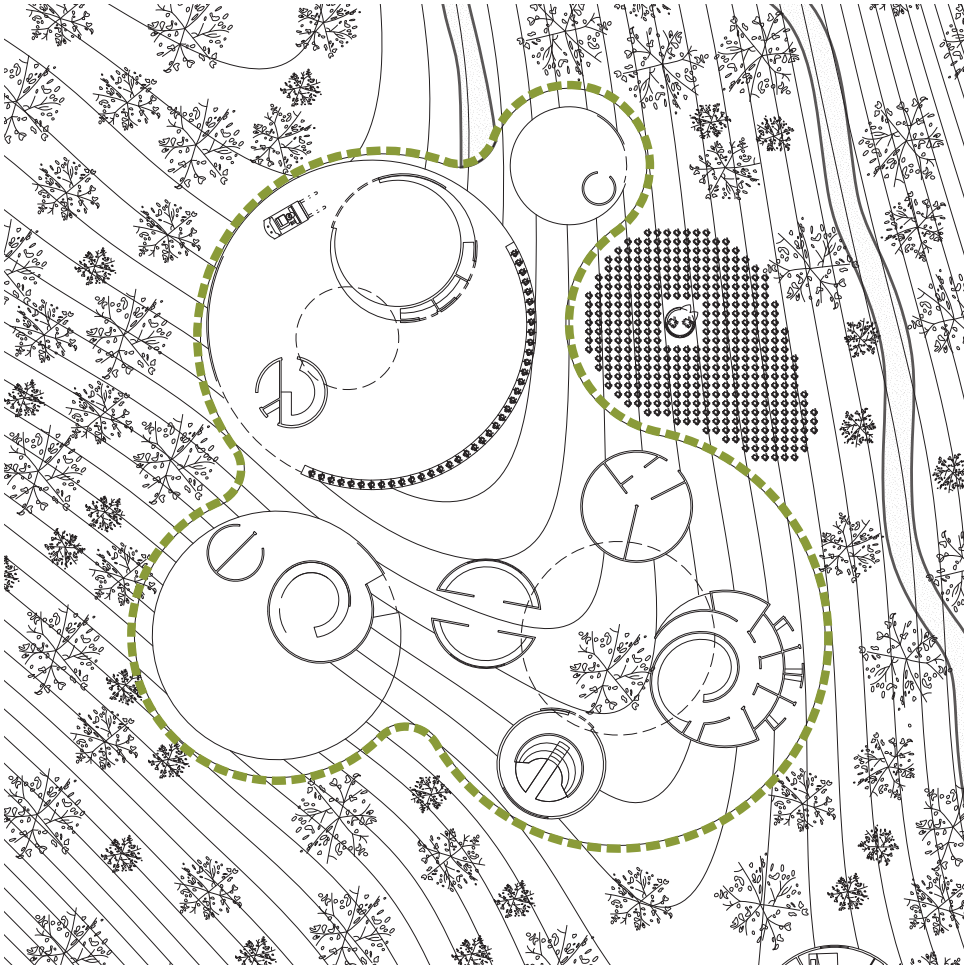


Fig. 53

Figure 53 | Plan drawing highlighting the perimeter of the roof in relation to the clearing.

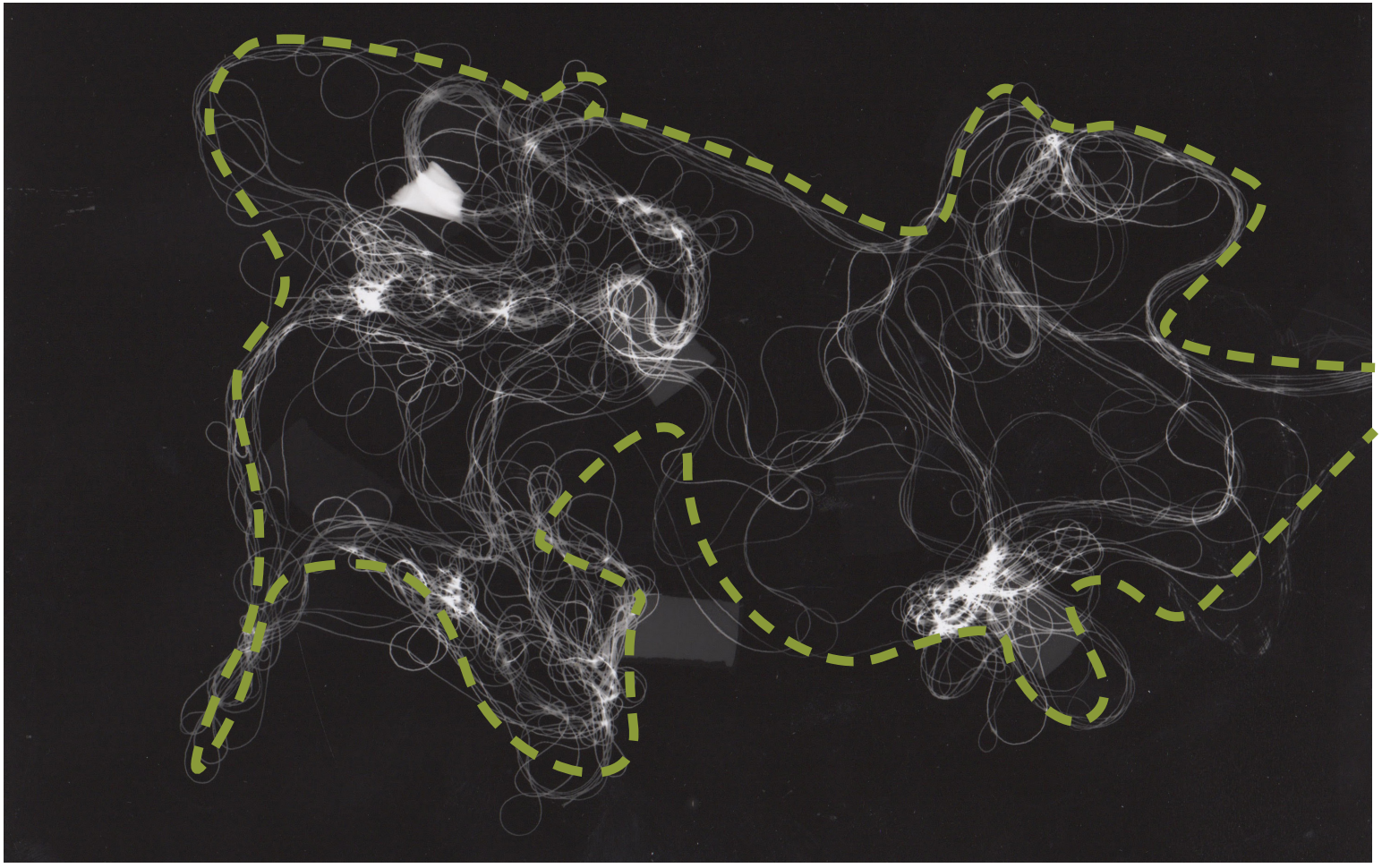


Fig. 54

Figure 54 | Smoke photogram highlighting the silhouette..

INITIAL CONCEPTS:
SITE SECTION

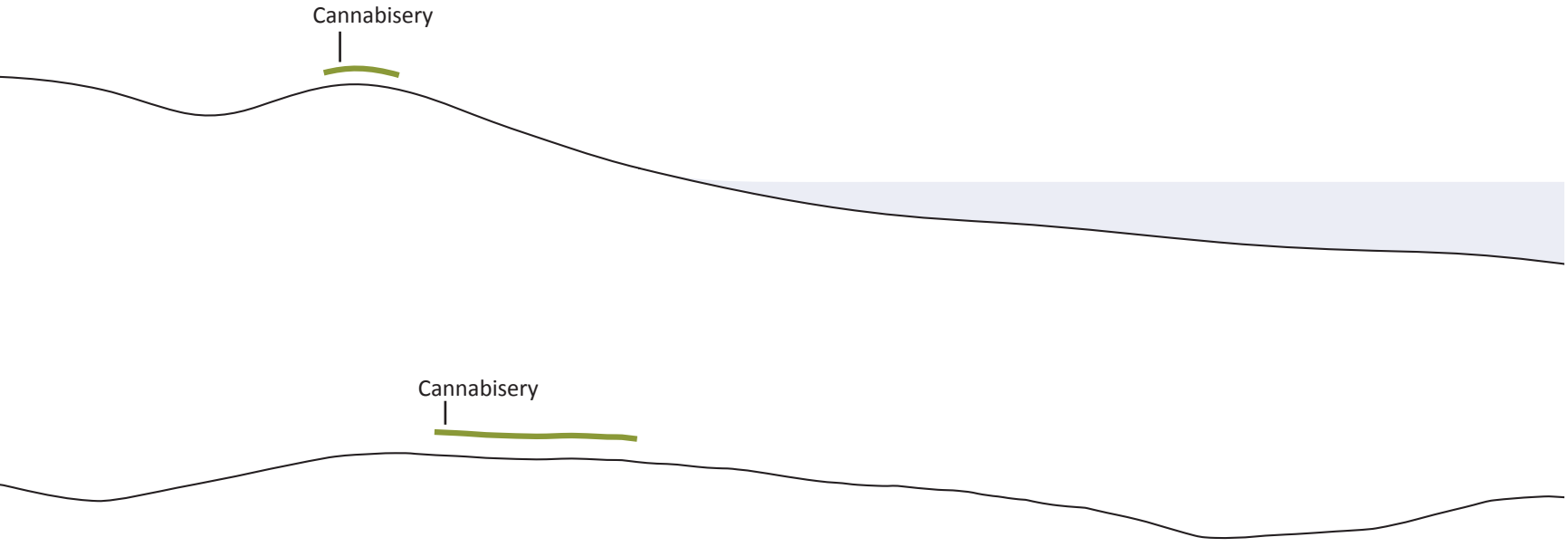
The sectional condition (fig. 55) is conceived of as a continuous ground plane beneath a large hovering roof. Both the ground and roof echo the site's existing geologic structure. As previously mentioned the roof's perimeter is calibrated to the clearing's shape, not only to unify the growing, processing and enjoyment of cannabis, but also provide shading relief from the hot California sun.

East-West Section

North-South Section

Fig. 55

Figure 55 | Site sections of the relationship between the roof and the ground.


Cannabisery
Cannabisery

INITIAL CONCEPTS: PROGRAMMATIC CLUSTERS OF CIRCULAR GEOMETRY

A strategy for massing arrangement (fig. 56) was employed in order to place similar utility and enjoyment needs together on the site and beneath the roof. This was inspired by further dissection of the smoke photogram (fig. 57), which showed the tendency of smoke to cluster. An iterative process of breaking up the programmatic masses (fig. 58) eventually keyed in on the existing circular language found in smoke and smoking (fig. 59).

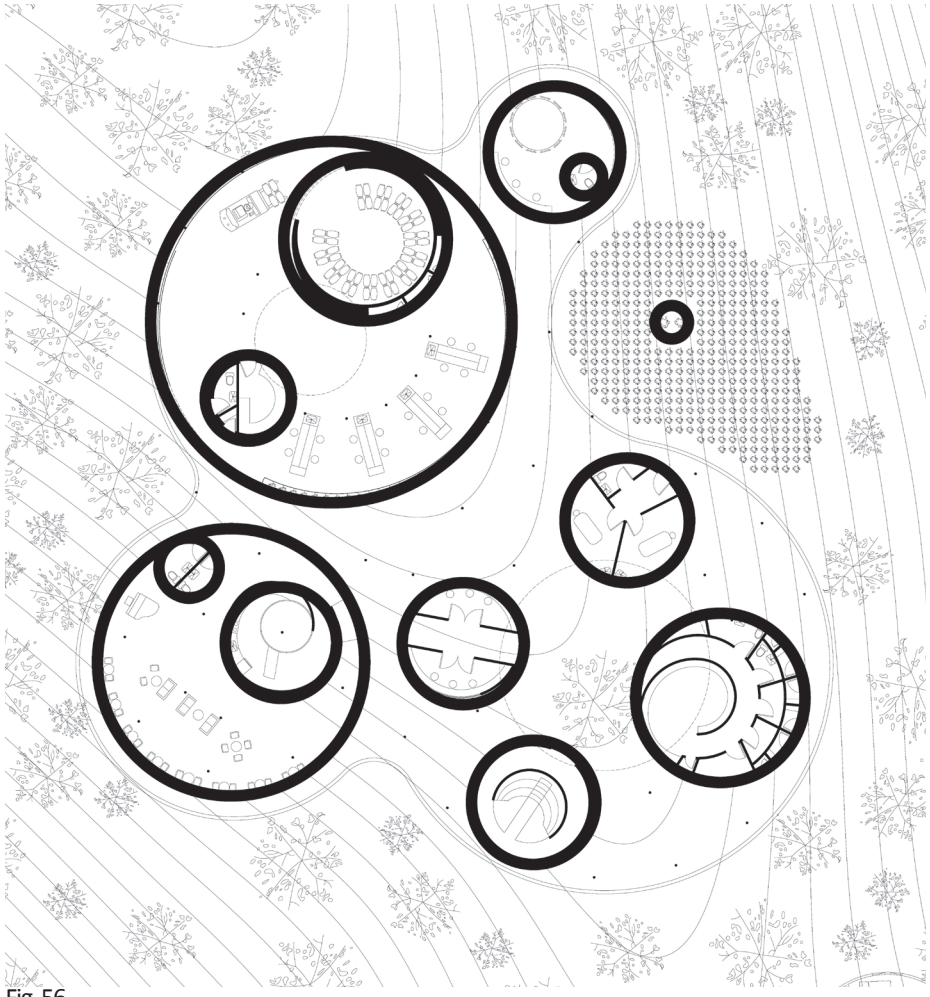


Fig. 56

Figure 56 | Programmatic cluster diagram.

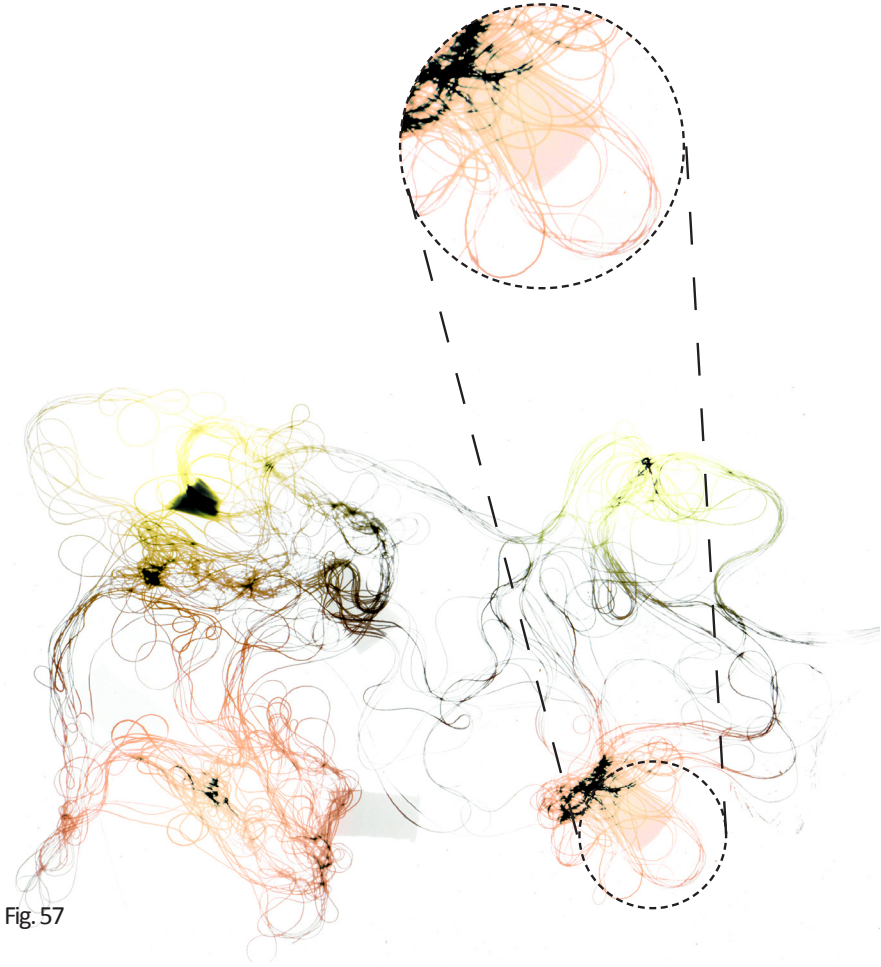
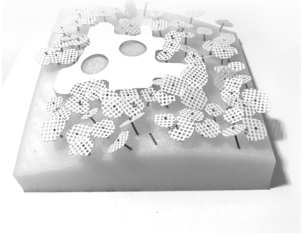


Fig. 57



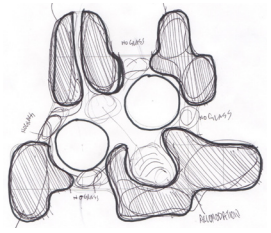


Fig. 58

SMOKING

SMOKING CIRCLE

Fig. 59

Figure 57 | Digital analysis of the smoke photogram.
Figure 58 | Process model and plan sketch.
Figure 59 | Circular geometry of smoking.

INITIAL CONCEPTS:
FREE-FLOWING CIRCULATION

Smoke will never move in orthagonal directions. It moves with the wind, freely flowing wherever it is taken. In this sense an experiential concept for circulation was developed (fig. 60), again by analyzing the smoke photogram, but focusing on the threads between the clusters (fig. 61). This way, people can move freely between the landscape, the cannabisery and its programs, which creates an individualized experience of both the landscape and the cannabisery depending on the person's state of mind.

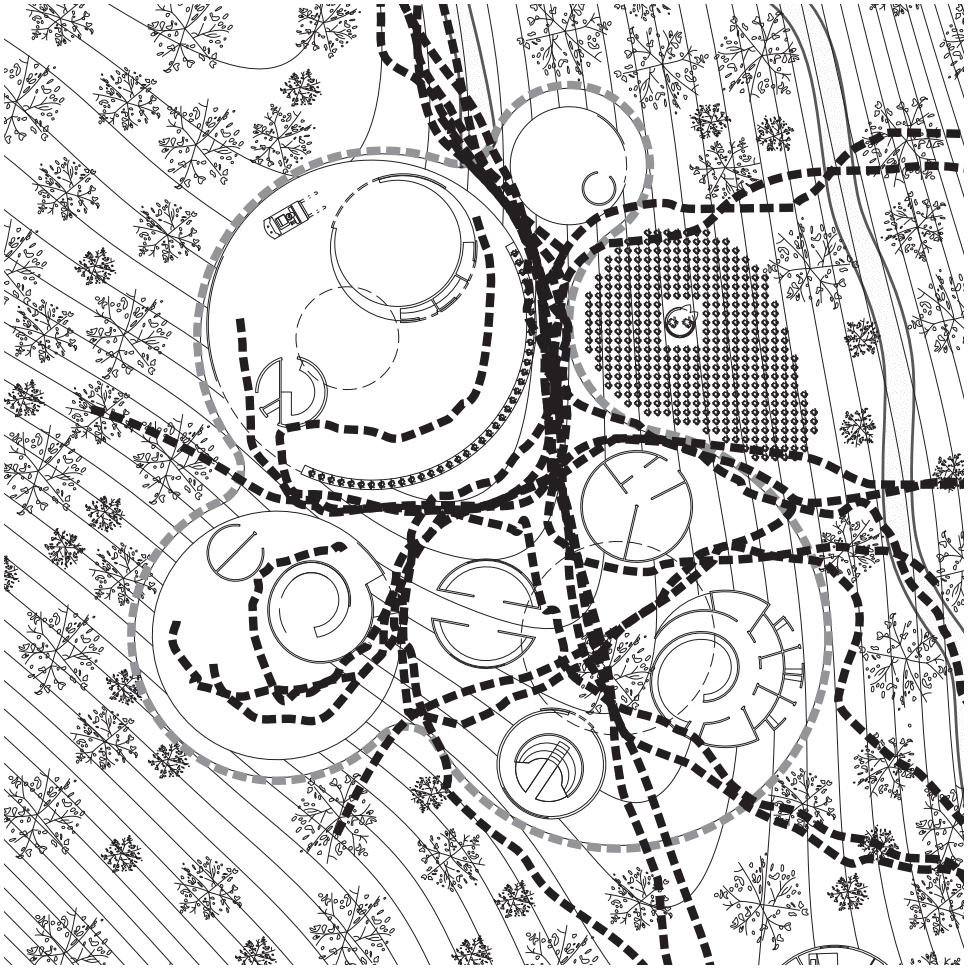


Fig. 60

Figure 60 | Circulation concept diagram.

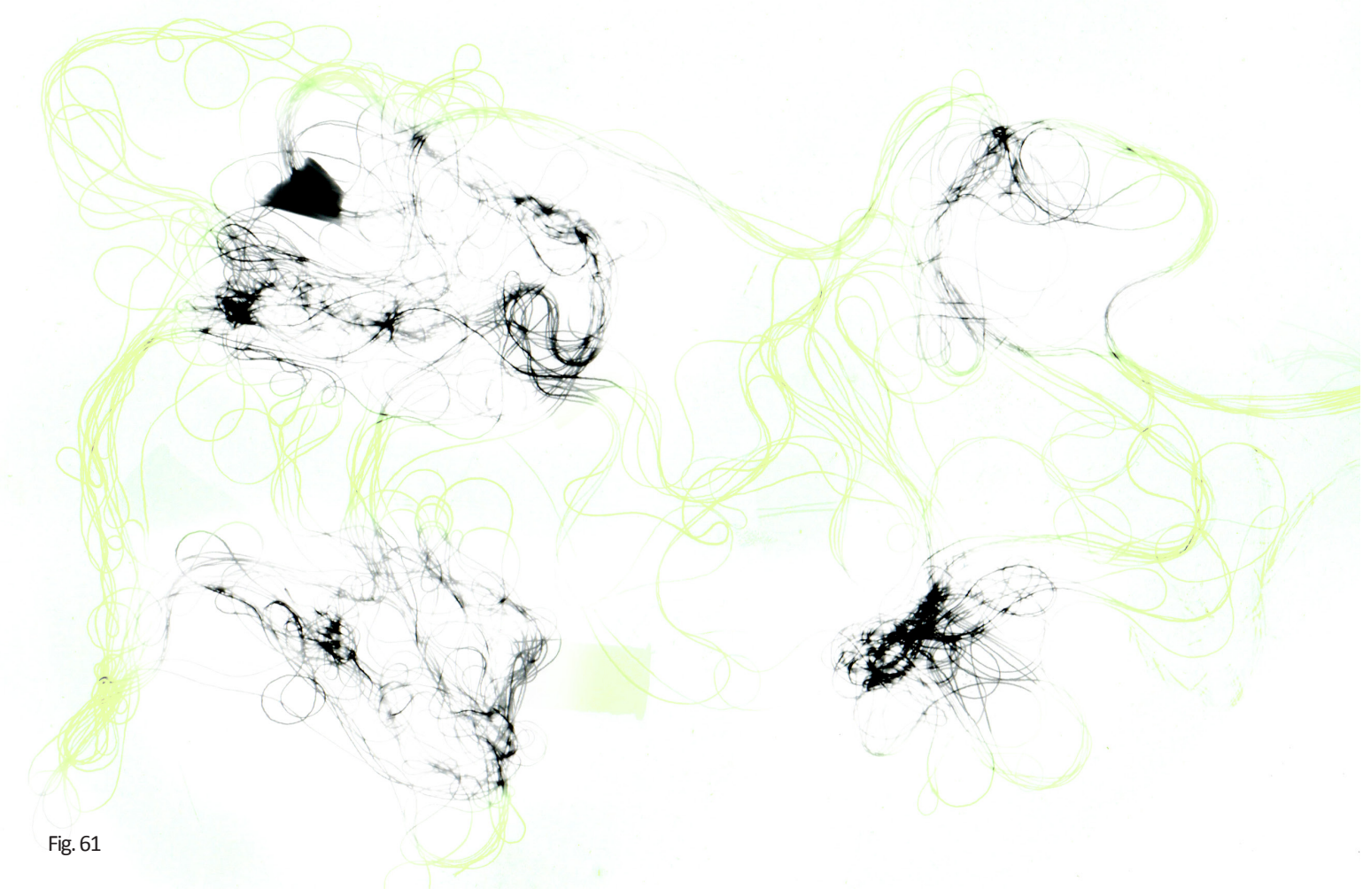


Fig. 61

Figure 61 | Digital analysis of the smoke photogram highlighting threads between clusters.

INITIAL CONCEPTS: SCENARIOS

The following sketches (fig. 62) imagine how the experience of the Lake Hennessey Cannabis Estate could manifest at the landscape, building and celebrated objects and rituals scale. These were created in tandem with the building's form and relationship to site.

An essential idea behind the Lake Hennessey Cannabisery Estate is that both human experience as well as built forms are products of the landscape. Ever since ancient times, people have been able to observe and encourage the natural processes that grew and produced desired results from the ground. This is not to be confused with controlling nature, which is often exhibited in modern agricultural practices to increase yield and profit, but rather to understand nature and collaborate with it. This series of vignettes illustrates how the building and landscape are experienced simultaneously, and thus add up to a unique architectural flavor derived from the relationships between building and site.

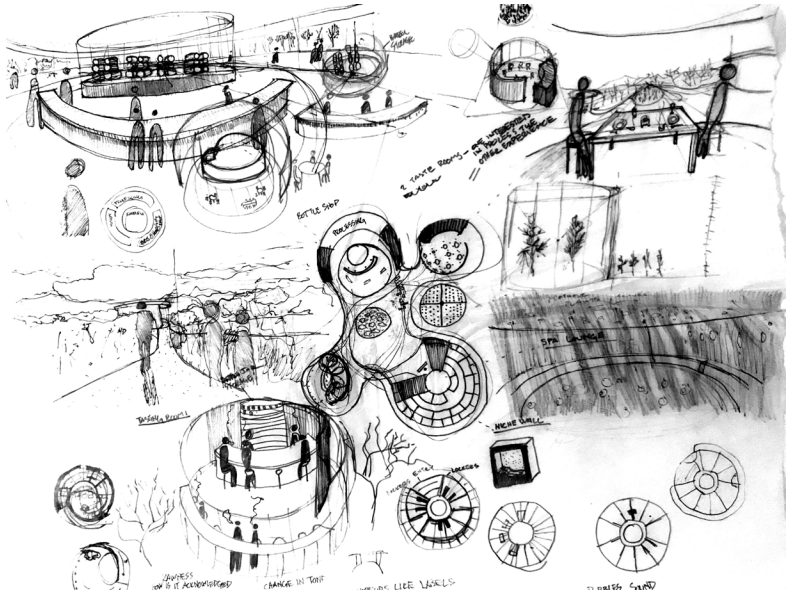


Fig. 62

Figure 62 | Scenario vignettes.

INITIAL CONCEPTS: CELEBRATED OBJECTS AND RITUALS

These sketches illustrate the primary celebrated objects and rituals that factor into experiencing the Lake Hennessey Cannabis Estate. This level of detailed human interaction with processes as mundane as storage are integral to the romanticization of wine. The sketches were thought of as visual analogies to the objects and rituals observed at a winery. The celebrated objects (fig. 63) are very similar to a winery. They are a barrel made specifically for cannabis storage, a jar with a cork lid and an elictrically powered pipe for smoking. The celebrated ritual involves the human interactions between the objects.

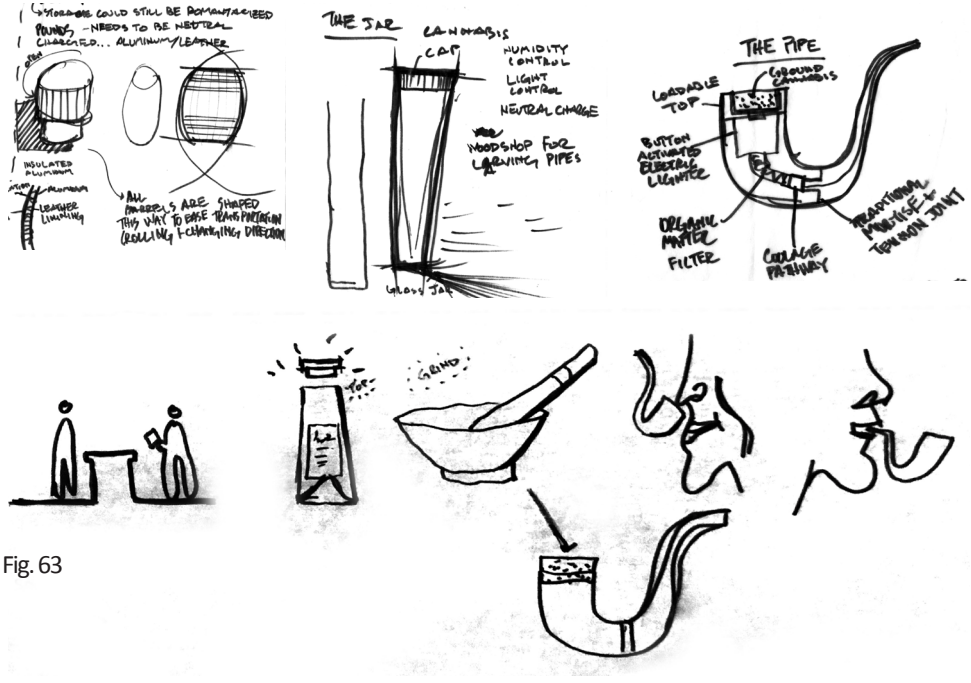


Fig. 63

Figure 63 | Celebrated objects and ritual vignettes.

INITIAL CONCEPTS:
CURATED MOMENTS

As the design for building develops, ideas about specific, curated moments begin to emerge. This sketch in particular (fig. 64) illustrates how a cerebral moment of enjoyment can be constructed by linking dissimilar things such structure, ventilation, furniture and a pipe.

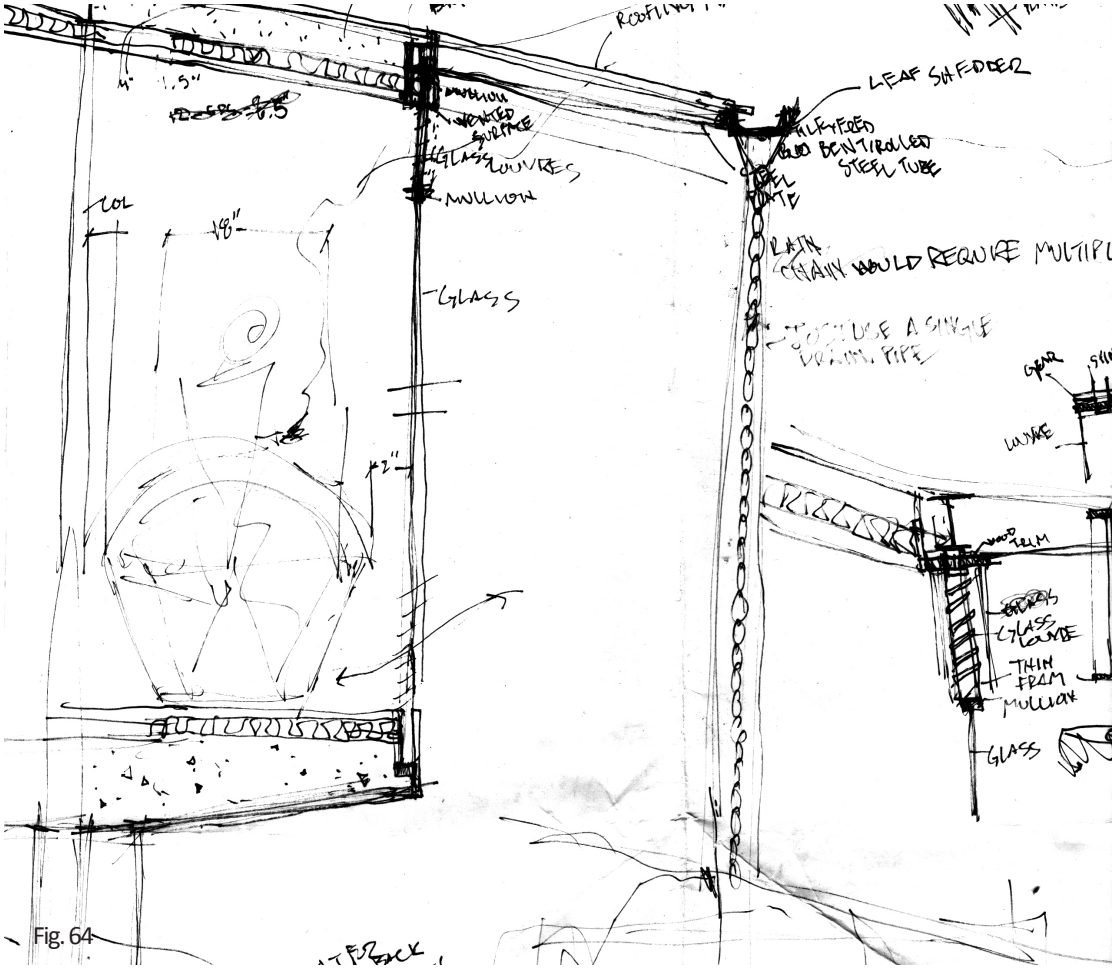


Fig. 64

Figure 64 | Detailed moment sketch.

INITIAL CONCEPTS: IDEAS ABOUT PERFORMANCE AND STRUCTURE

Considering cannabis' impact on the environment and natural resources, the large roof maximizes rainwater and solar harvesting in the clearing (fig. 65). The roof has enough area to collect 8,470 gallons of water per year and hold about 750 solar panels.

Structurally, the large floating roof is thought of as a multi-directional steel frame held off the ground with densely spaced yet thin columns. Through various iterations of the plan and form, however, a concept of independent radial systems that are tied together with the space between them was established (fig. 66).

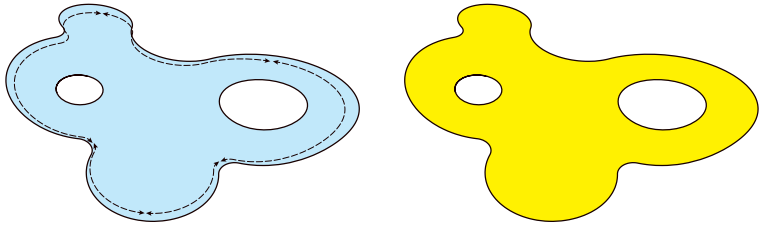


Fig. 65

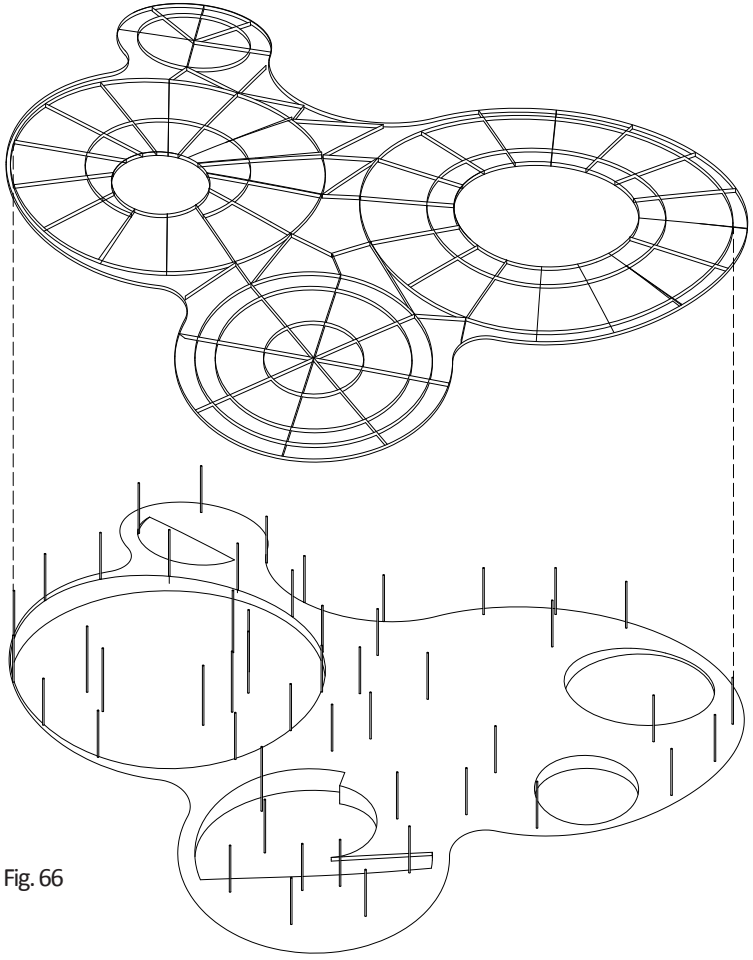


Fig. 66

Figure 72 | Diagram showing the entire roof being used to collect water and energy.
Figure 73 | Exploded axonometric structure diagram.

METHODOLOGY CONCLUSIONS

Siting and programming strategies for the Lake Hennessey Cannabis Estate specifically tailored to cannabis were executed in order to support the premise of this thesis. By comparing soil composition data and dispensary density across California, the Napa Valley is revealed to provide an ideal environment for cannabis, both to grow and consume it. Actually visiting the location afforded the opportunity of sensing it from a first-person perspective. Later analysis of the site gave reason behind the first impression. Both the first-impression and analysis were influential to later design decisions.

Programming for the building is based on the themes of utility and enjoyment in the context of cannabis. These themes were further dissected into the natural and human factors involved in the growth, processing and enjoyment of cannabis, and quantified from case study observations.

The initial concept for the Lake Hennessey Cannabis Estate is that the growing, processing and enjoyment of cannabis should be integrated to its site with a unifying architectural language. Some further concepts explored how that architectural language is expressed formally, experienced physically and performs environmentally and structurally.

By overlaying strategies about the earth, a plant and its relationship to people, this thesis aims to bring cannabis' latent ability to build community to light by celebrating the growth, processing and enjoyment of cannabis as if it were a significant agricultural product for human consumption.

It should be noted that one of the biggest issues with conducting this research was a lack of academic sources for information. Much of what is available is clearly biased and fed by advertisements and age-old cannabis propaganda. The UCLA Cannabis Research Initiative is a pivotal step forward for America and will continue to discover vital information regarding the plant's chemistry and how it affects the mind and body. Further research regarding the agriculture of cannabis will likely come from universities and lead to more sustainable and refined practices, creating an opportunity for medicinal and agricultural sciences to work in concert. Considering the human interaction with cannabis, designers are already entering the commercial side of legal cannabis.[25]

However, if one considers the Napa Valley wildfires of 2017, which destroyed 6,000 buildings and killed 36 people[26], then beautiful products are not enough. Further industrial design research could eliminate the issues between cannabis consumption and fire. The role buildings play in wildfires is an issue considering this proposal's location and program, but is considered beyond the scope of this thesis, which aims to bring cannabis' positive affects to light by celebrating the growth, processing and consumption of cannabis as an essential and enjoyable agricultural product.

REFERENCES

19. Hennings, T. (2018, Jan 10). How to find the best soil for growing cannabis. Retrieved from https://www.leafly.com/news/growing/finding-the-best-marijuana-growing-soil

20. "Moore Creek Park." Napa Outdoors, napaoutdoors.org/parks/moore-creek-park/.

21. "Travel Research & Statistics." Visit Napa Valley, Visit Napa Valley, www.visitnapavalley.com/about-us/research/.

22. Young, Bob. "Average Pot User Consumes 123 Joints per Year, State Estimates." The Seattle Times, The Seattle Times Company, 25 Sept. 2013, www.seattletimes.com/seattle-news/average-pot-user-consumes-123-joints-per-year-state-estimates/

23. Staff, Leafly. "How to Make the Most of Cannabis Plant Count Grow Limits." Leafly, 2 June 2018, www.leafly.com/news/growing/making-most-of-cannabis-plant-count-limits.

24. "Cannabis and Its Compounds." UCLA People-Animal Connection, www.uclahealth.org/cannabis/cannabis-and-its-compounds.

25. Brillon, James. "Marijuana-Related Design." Dezeen, Dezeen, 31 Aug. 2018, www.dezeen.com/tag/marijuana/

26. Park, Madison. "California Fires: Almost 6,000 Buildings Destroyed." CNN, Cable News Network, 14 Oct. 2017, www.cnn.com/2017/10/13/us/california-fires-updates/index.html.

IV. DESIGN PROPOSAL

THE LAKE HENNESSEY CANNABIS ESTATE

People who grow, process and enjoy cannabis deserve, as previously stated, the same opportunity to experience their agricultural product. Rather than commodify and mass-produce cannabis at a wholesale level, this thesis argues for a small-scaled, boutique approach similar to the Arista estate. Rather than produce large volumes of cannabis with unsustainable amounts of energy and resources, The Lake Hennessey Cannabisery Estate produces a minimal amount at the highest quality. Economic professors Adam J. Davis and Mark W. Nichols found cannabis demand to be inelastic, or unchanging with increase in price, and that "noticeable price differences are found between high, medium and low quality cannabis, with high quality at $13.57 per gram, 144% greater than low quality cannabis, at $5.55 a gram" (cite). In other words, the incentive to market and sell high quality cannabis is well known. However, a major change in the way cannabis is perceived would still be required in order to realize a building like the one proposed here. The Lake Hennessey Cannabisery Estate's proximity to San Francisco and the Napa Valley (fig. 66 & 67) will help support the architectural goals of the project which is compounded by the actual siting of the building on top of a gentle hill (fig. 68). This thesis does not assume that material, structure or form will change public perception of cannabis, but rather argues that research and acceptance will. Architecture can, however, understand and leverage changes in preference and provide a framework for people to grow, process and enjoy cannabis with dignity.

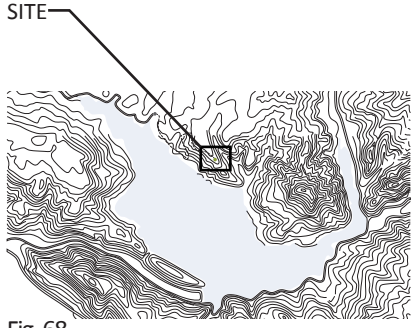


Fig. 68

Fig. 67

Figure 67 | Regional plan showing the site in context.
Figure 68 | California plan showing the region's adjacency to Napa and San Francisco
Figure 69 | Site plan.

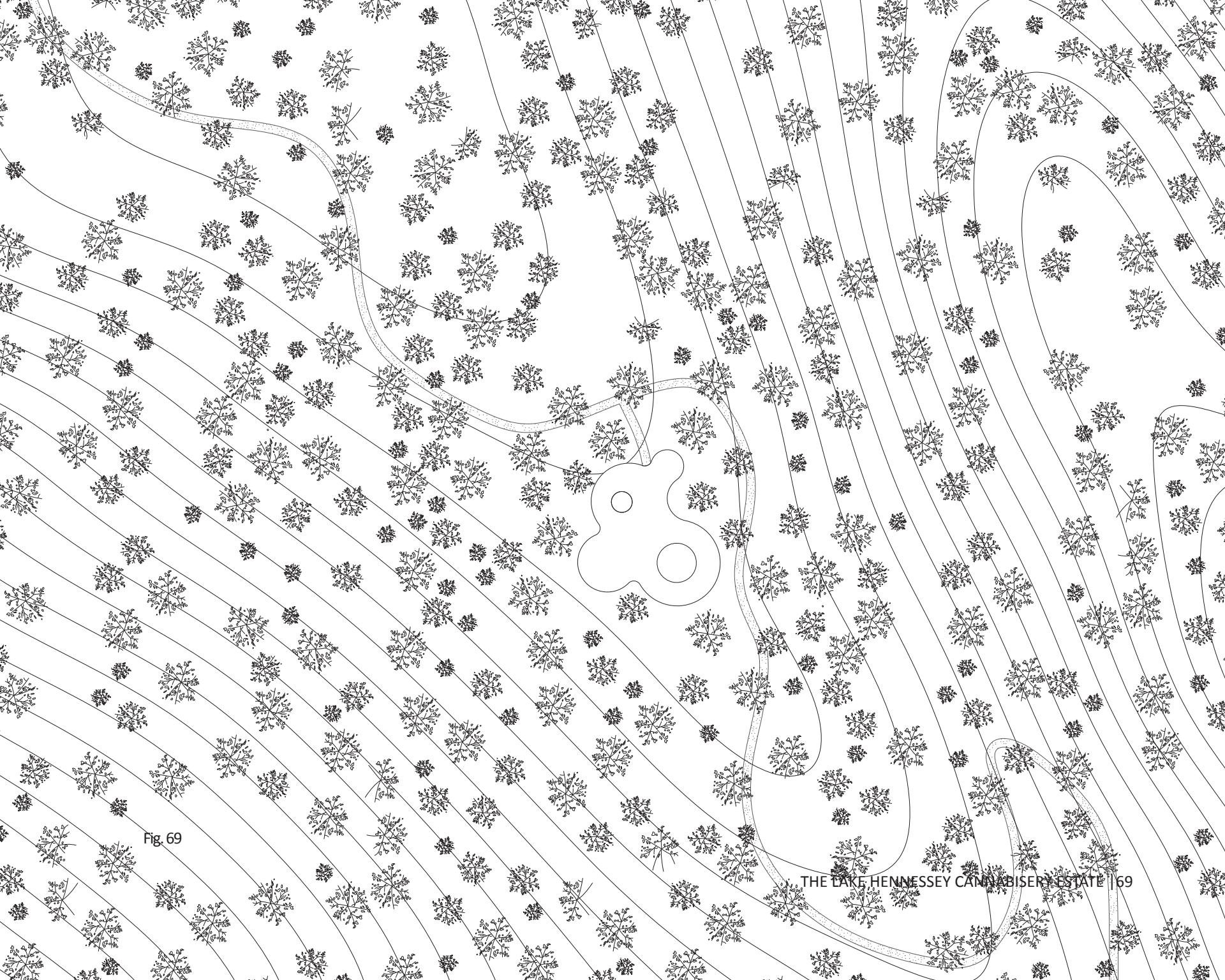


Fig. 69

ON THE EDGE OF NATURAL AND CALIBRATED

As the conceptual site model (fig. 70) shows in the contrast between the rough edge of the trees and the smooth edge of the roof, the design project is on the edge of natural and calibrated. The design energy was focused considering how the previously described components could fit into the landscape in order to frame an elegantly telluric experience for both the growers and visitors without disturbing the landscape.

A volumetric plan type (fig. 71) was utilized to create a sense of openness and connection to the landscape. The volumes are scattered in the clearing and resemble the vegetation. Initially the estate would operate solely for production and enjoyment, but in the future, accomodations for sleeping and bathing that would allow extended stay on the site could be phased in as needed.

Fig. 70

Figure 70 | Photograph of the final model.
Figure 71 | Plan.

1. Admin
2. Growing Field/Glasshouse
3. Processing Station
4. Barrel Storage
5. Chem Lab
6. Massage Room
7. Dispensary
8. Meditation Room
9. Meditation Room 2
10. Tasting Room
11. Bar
12. Yurt Suite (to be phased in as needed)

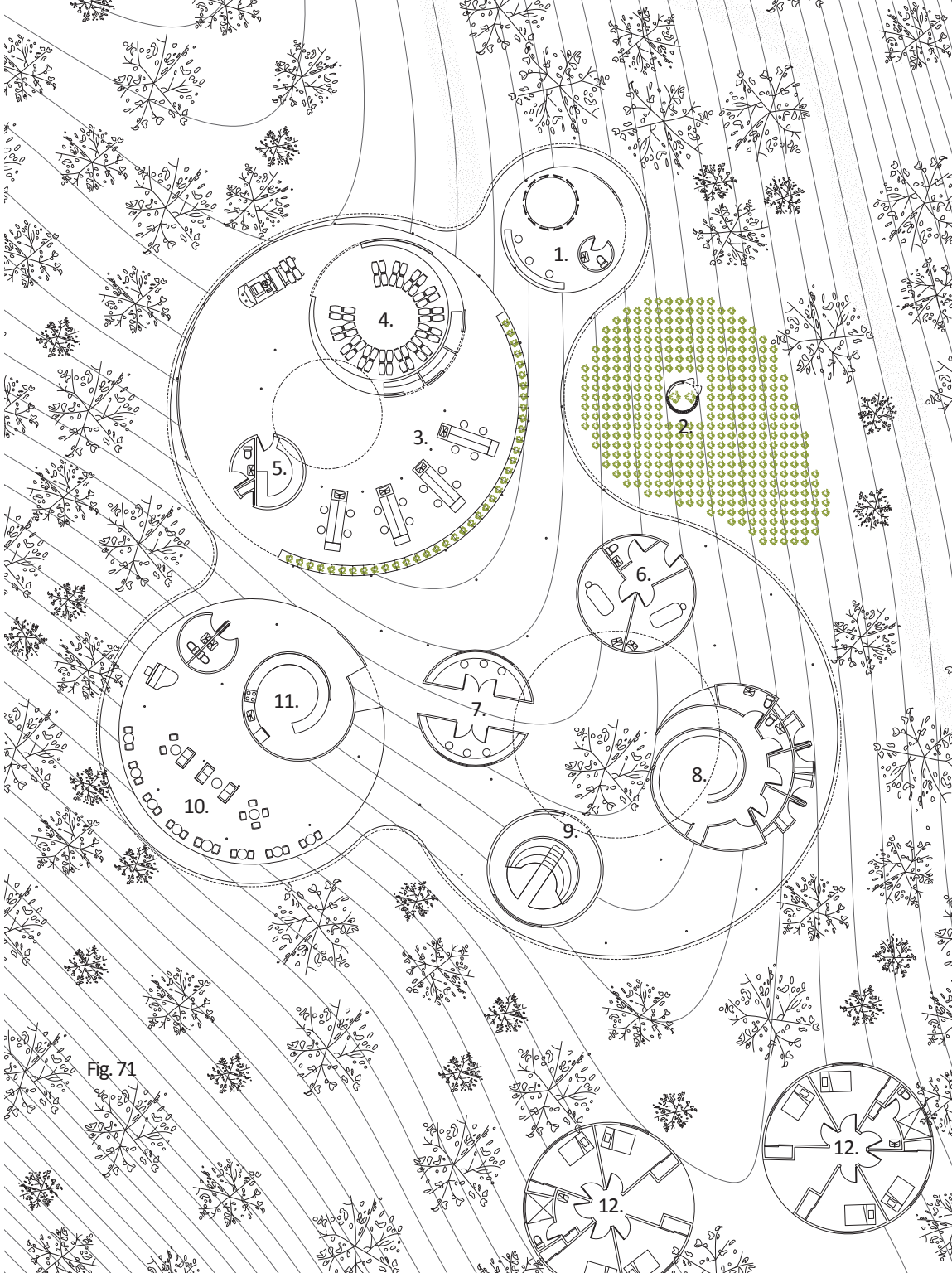


Fig. 71

ARRIVING

A newly blazed trail breaks from the traditional path and leads the visitor into the estate. The path is naturally framed with the live oaks and the building frames the entrance into the estate. From here (fig. 79) one catches a first glimpse of the cannabis, its presence layered in front of the roof, clearing and rolling hills in the background.

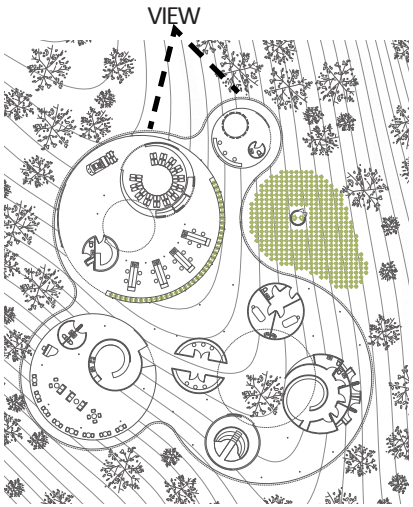


Figure 72 | Arriving at the estate.

Fig. 72

MOVING THROUGH THE LANDSCAPE

This section perspective (fig. 73) shows what it would be like to look and move all the way through the building. This dynamic experience is brought to life through movement - views into both the calibrated and natural landscape are revealed or foreshortened while the shape of the roof works with the sun to dynamically light the interior-exterior condition throughout the day.

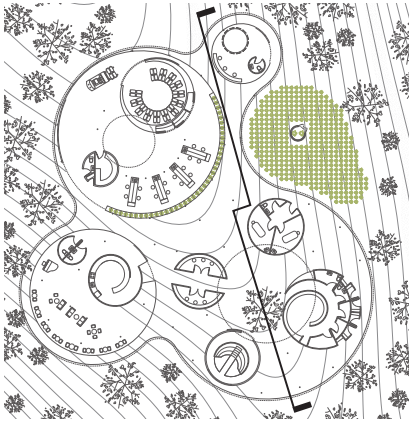
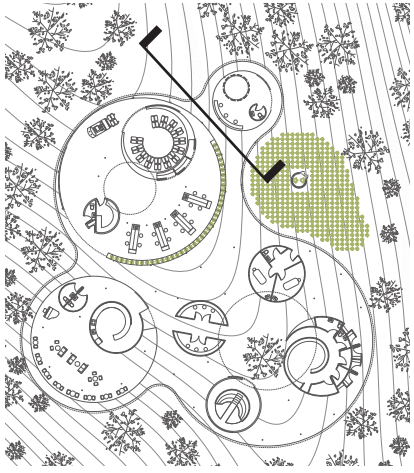


Fig. 73

Figure 73 | Section perspective illustrating movement through the landscape and estate.

The edge between natural and calibrated is implied with the minimal threshold (fig. 74) created by the building. This initial human encounter will provide direction and information to visitors, where they can get acquainted with the site and figure out where to go based on their needs.



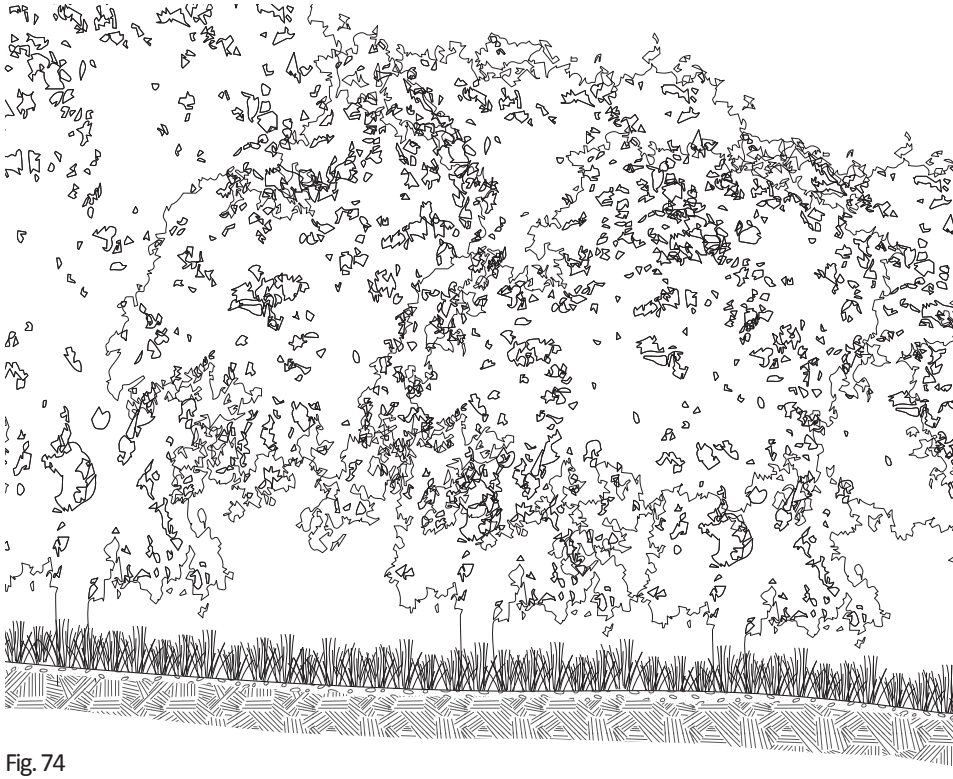
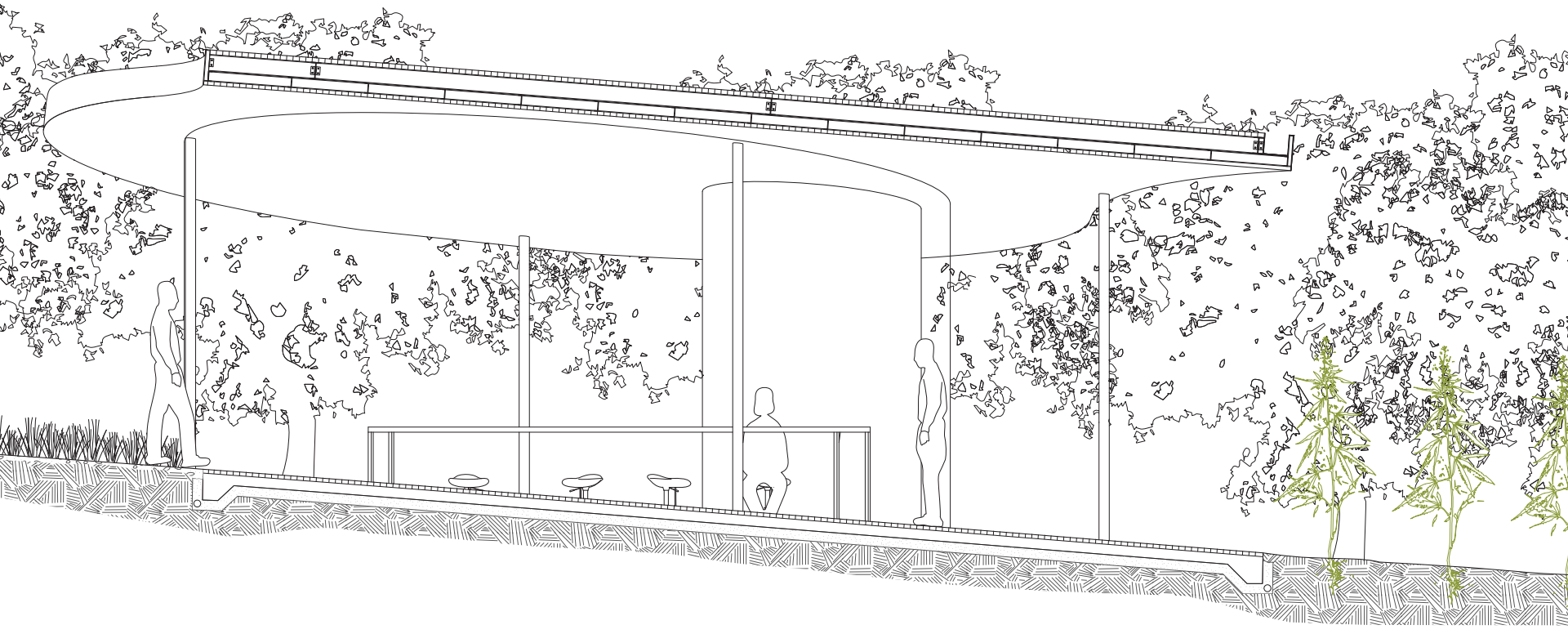


Fig. 74

Figure 74 | Section detailing the threshold between the natural landscape and the calibrated landscape.

THRESHOLD CULTIVATED LANDSCAPE



UPON ENTERING

Here (fig. 75) visitors are greeted by both the building's long and continuous nature as well as nearly the entire cycle of cannabis. Crossing the threshold enacts nearly all of the senses: smell and site are immediately aroused by the cannabis, while touch is amplified by the smooth wood floor while the sound of nature plays in the background.

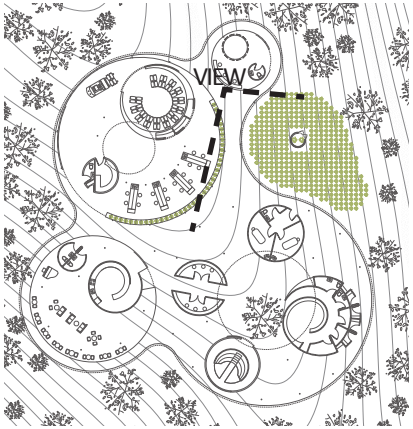
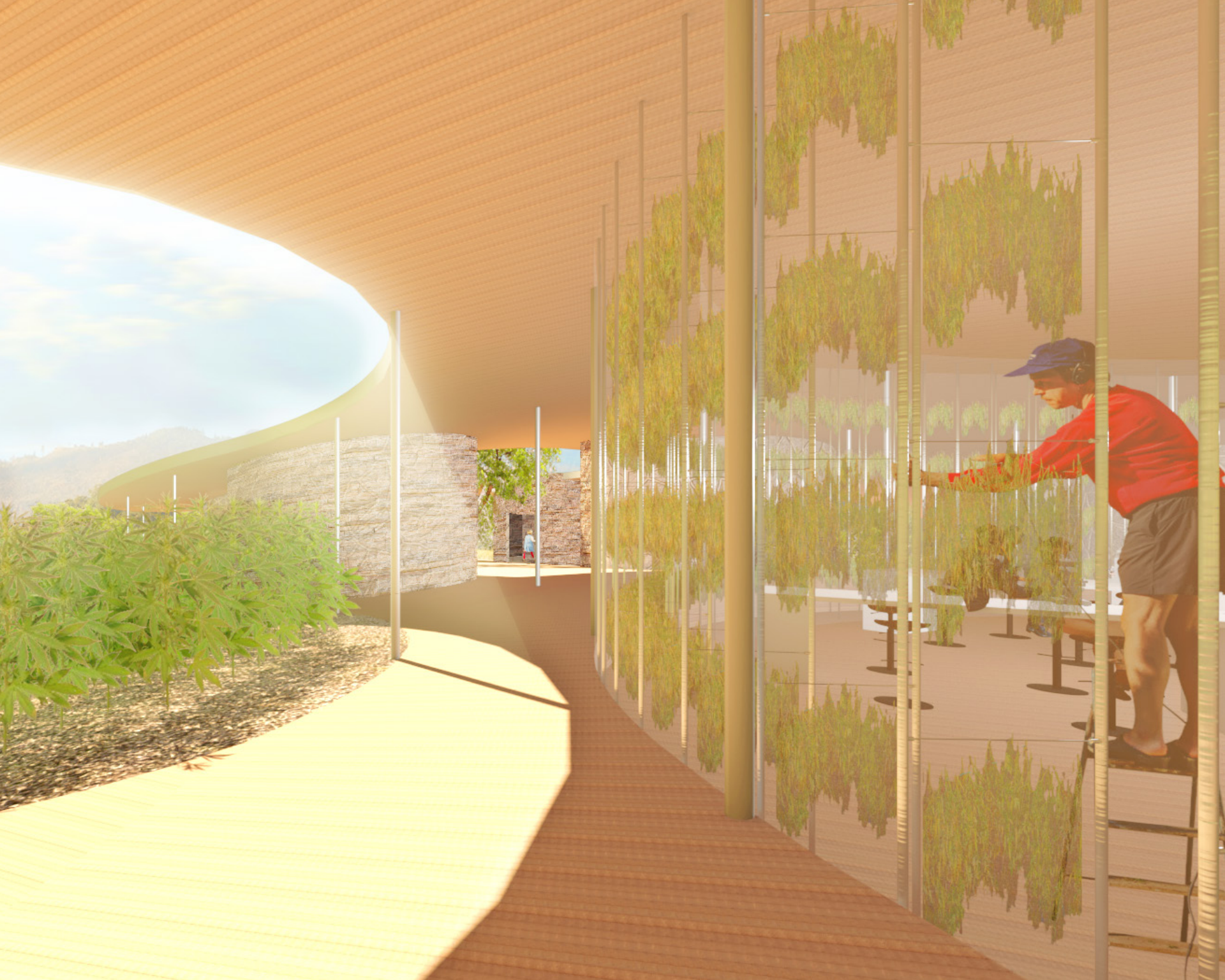


Figure 75 | View upon entering the estate.

Fig. 75



GROWING & PROCESSING

This section perspective (fig. 76) illustrates the growing and processing of cannabis in the context of Lake Hennessey Regional Park. In this scheme the plants, both growing and drying, receive gentle morning light and are then shaded in the afternoon by the building.

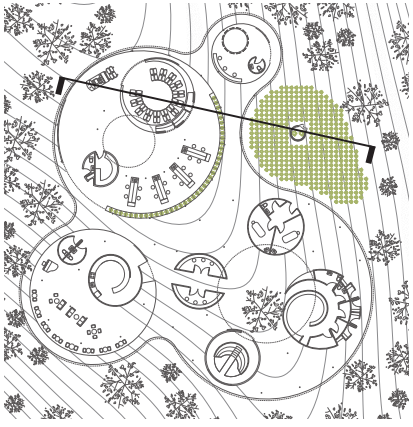
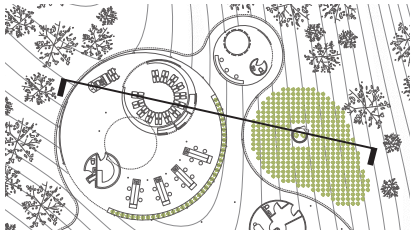
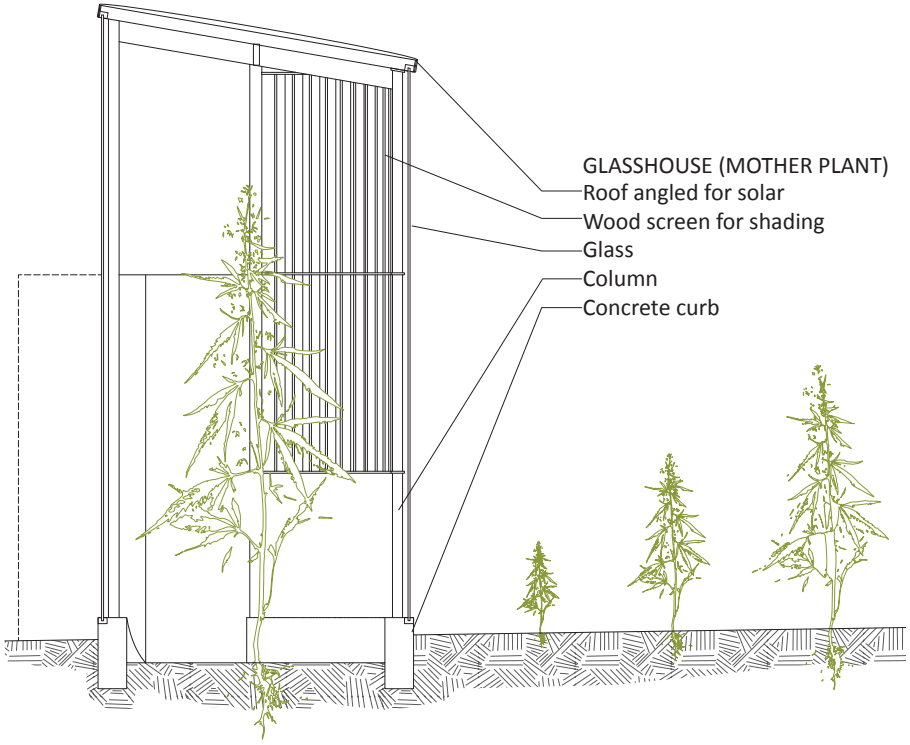


Figure 76 | Section perspective through the estate's growing and processing program. Fig. 76

GROWING & PROCESSING

This series of sections (fig. 77) details the presence of architecture as a background to the natural factors and human actions that are part of the growth and processing of cannabis.





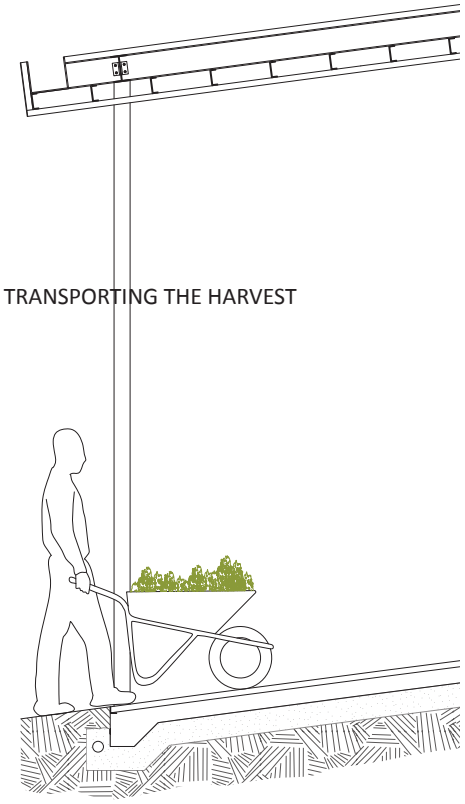
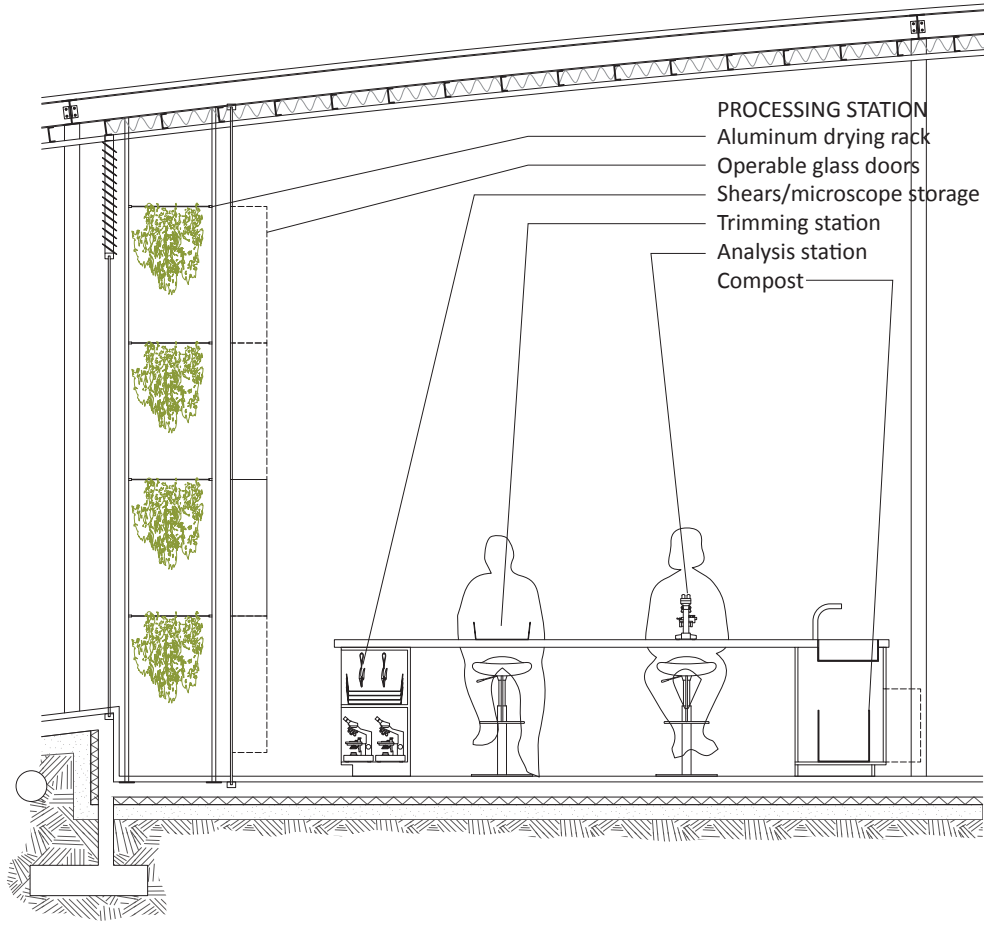
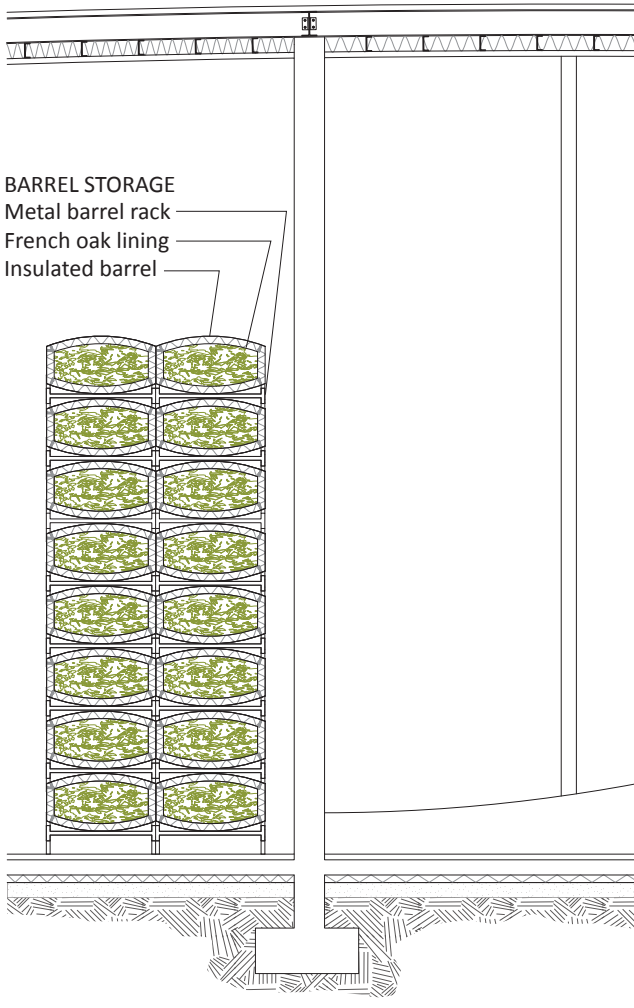


Figure 77 | Section sequence of the growing and processing of cannabis.


PROCESSING STATION
Aluminum drying rack
Operable glass doors
Shears/microscope storage
Trimming station
Analysis station
Compost


BARREL STORAGE
Metal barrel rack
French oak lining
Insulated barrel

PLANT'S PERSPECTIVE

The mother plant is the source for the entire field, where throughout the day the sun's energy is absorbed for photosynthesis by the growing cannabis plants. Figure 78 shows a view of the glasshouse from the growing field, where the processing room and drying rack can be seen in the background. The glasshouse protects the mother plant and echoes the tectonic language of the cannabisery.

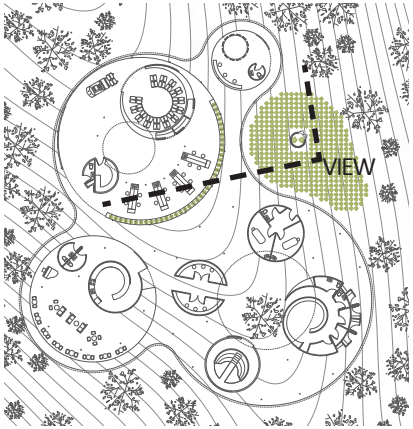


Figure 78 | View from the growing field.

Fig. 78

BUD'S LIFE

Before the bud can be smoked, it needs to be dried, manicured, analyzed and cured. In this scene (fig. 79), all of this is happening simultaneously. This scenario is possible considering the estate's partnership with neighboring growers.

Figure 79 | View from the processing station.

Fig. 79

ENJOYMENT

The section perspective (fig. 80) depicts two spaces dedicated to enjoying the diverse psychoactive affects of cannabis. On the left, characterized by its subtractive quality, a meditation space is rooted into the earth and gives the impression of groundedness.The right hand space is characterized by its cantilevered floor and provides users with the impression of lightness.

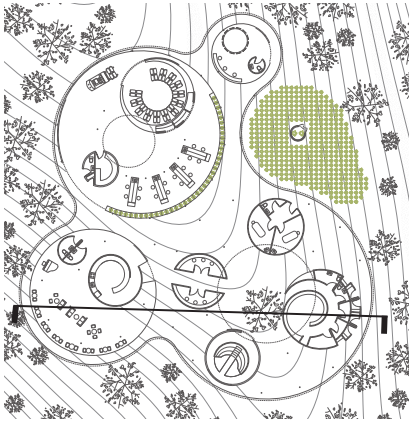


Figure 80 | Section perspective through the enjoyment program.

Fig. 80

MEDITATION SPACES

This is a view (fig. 81) from the courtyard central to the meditation spaces. The cylindrical volumes are carved to create informal seating and openings that imply entrance, and are arranged to frame distant views to the landscape. An oak tree is brought into the courtyard to anchor the space and dapple the direct light.

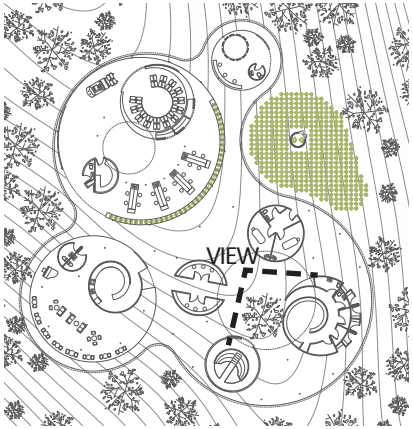


Figure 81 | View toward the meditation spaces.

Fig. 81

MEDITATION SPACE 1

In this space (fig. 82), instead of a framed view, users are afforded the experience of watching time through the passage of light. Here, the dappled light filtered through the oak tree brings the texture of the wood and brick to life, dynamically changing throughout the day. Likely in a state where their body remains still but their mind wanders, users can hone in on a space the size of a wood grain (fig. 83) while they meditate on cannabis' affect.

Fig. 83

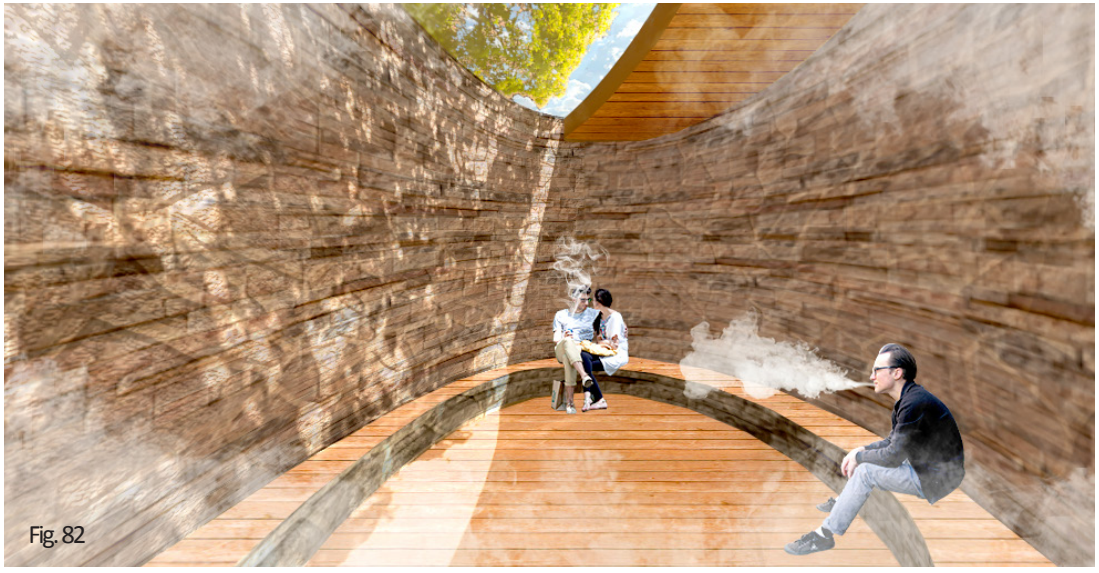


Fig. 82

Figure 82 | View into meditation space 1.
Figure 83 | Experience of honing in.

MEDITATION SPACE 2

This space (fig. 84) deliberately layers a framed view of Lake Hennessey beyond an immediate view of the reflection pond so that users can fluctuate between the two and feel enmeshed in the landscape while engaging in either intimate conversation or independent quiet time. An experience of "zoning out" (fig. 85) is expected.

Fig. 85

Fig. 84

Figure 84 | View into meditation space 2.
Figure 85 | Experience of zoning out.

TASTING ROOM

The tasting room (fig. 86) disconnects the user from the ground to create an airy atmosphere ideal for social smoking and sonic enjoyment. The adjacent oak trees frame glimpses to the panoramic views of the lake beyond while simultaneously protecting the interior from the afternoon sun.

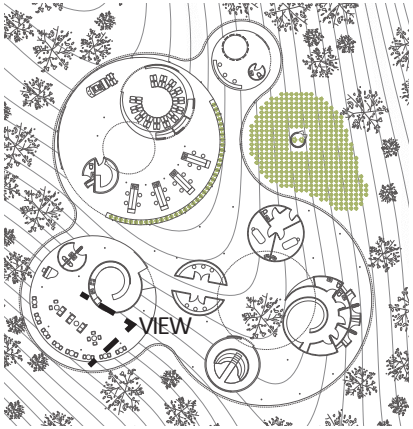
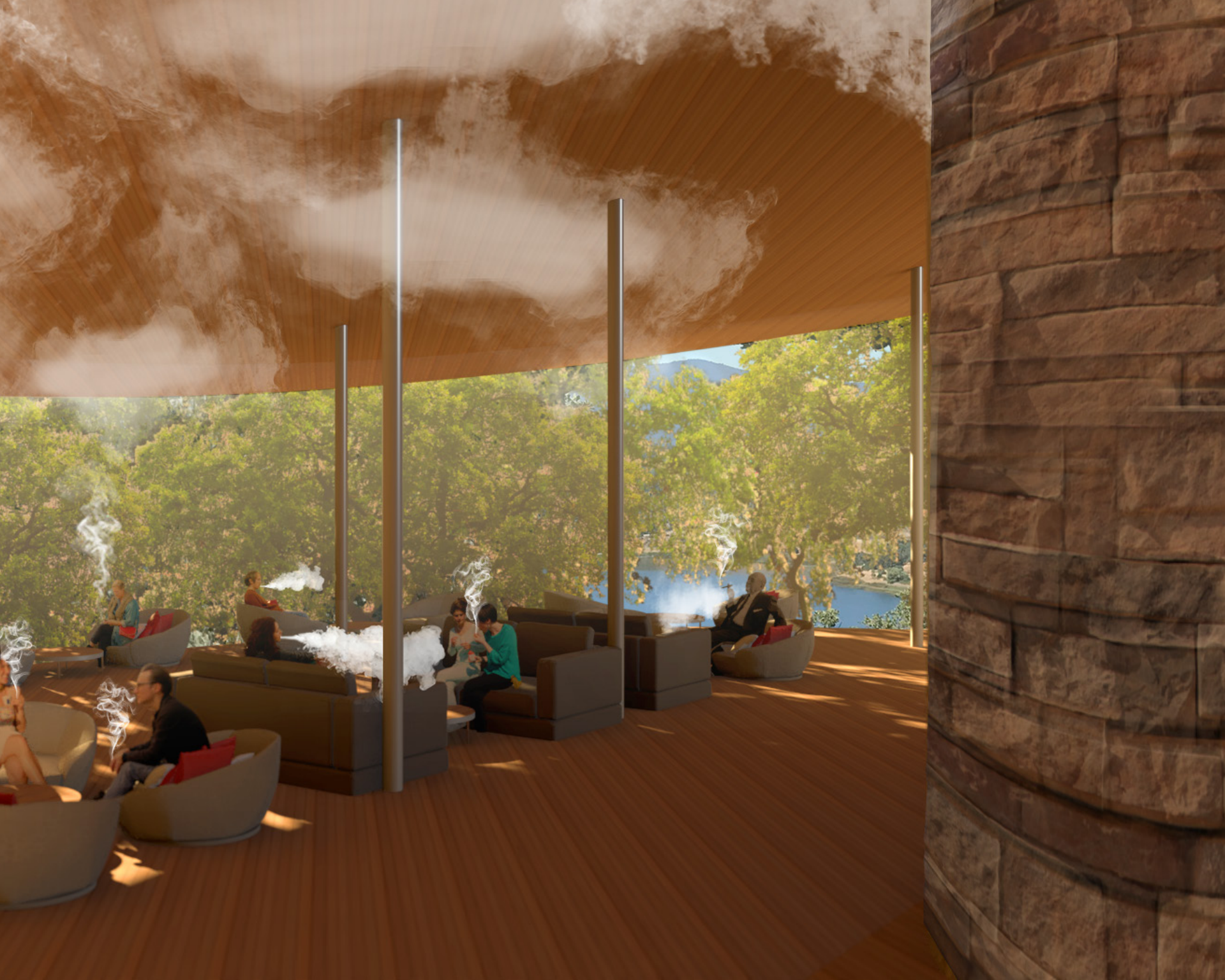


Figure 86 | View upon entering the tasting room.

Fig. 86



ORDERING

The bar (fig. 87) is embedded in the tasting room. Here, the celebrated object of the jar is on display, proudly storing cannabis waiting to be smoked. A preparation ritual (fig. 88), similar to ordering wine, occurs between the customer and the budtender before taking the cannabis to their seat to be smoked.

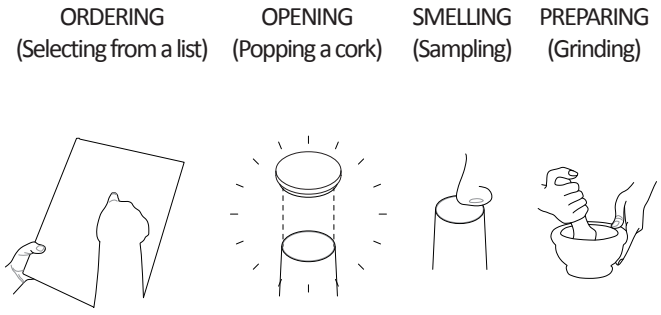


Fig. 88

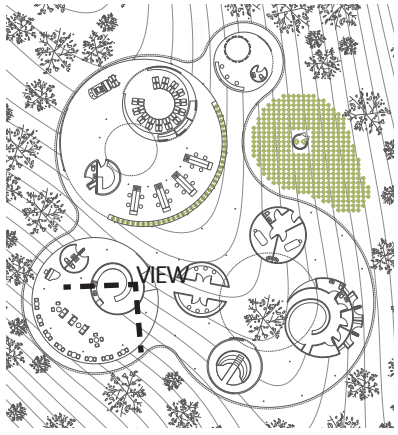


Fig. 87

Figure 87 | View into the bar.
Figure 88 | Process of connoisseurship.

LINGERING

The experience of smoking in the taste room is shown in figure 96. It is imagined that social ritual will be developed that is analagous to cheering a wine glass (fig 97).

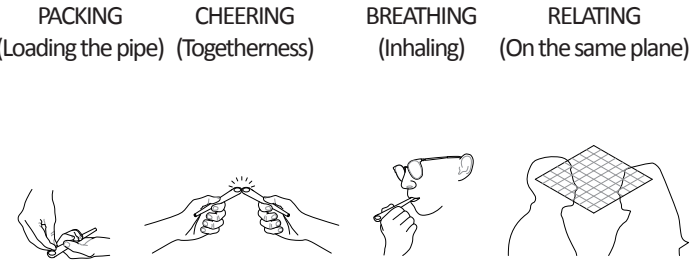


Fig. 90

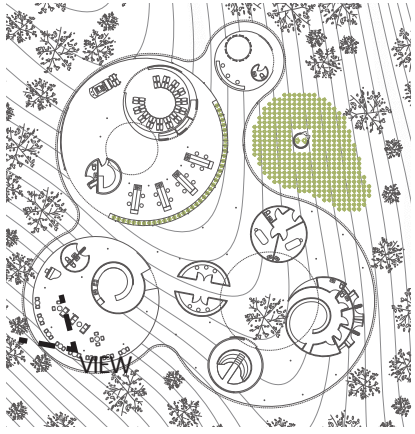


Fig. 89

Figure 89 | Lingering in the tasting room.
Figure 90 | Process of smoking.

V. CONCLUSION

Cannabis is a natural phenomenon guided by human intervention through history. This mutually beneficial relationship between cannabis and people has persisted for over 30,000 years, and in just a single century, has been cast away as taboo. Preferences and policy are changing, however, and America is in the midst of a paradigm shift. Cannabis' latent ability to gather people and form community will soon come back to light.

The proposed project is like a winery, but for cannabis. Directly adjacent to California's Napa Valley, the site context alone could facilitate this change. With ideal soil and climatic conditions for growing cannabis, a new typology of agricultural production facilities will emerge that is bolstered by the region's direct connection with San Francsico.

The Lake Hennessey Cannabisery Estate is a hypothetical project that imagines a place where the growing, processing and enjoyment of cannabis as if it were a significant agricultural product for human consumption.

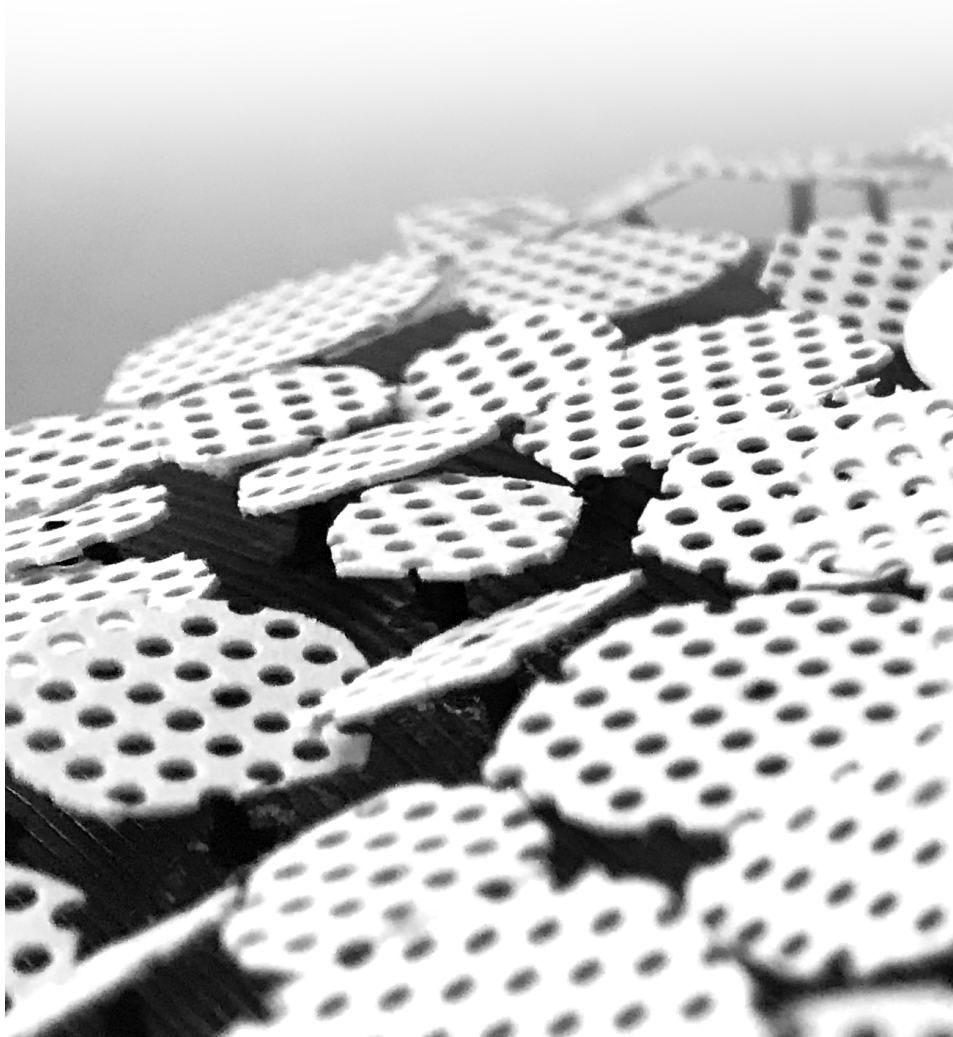
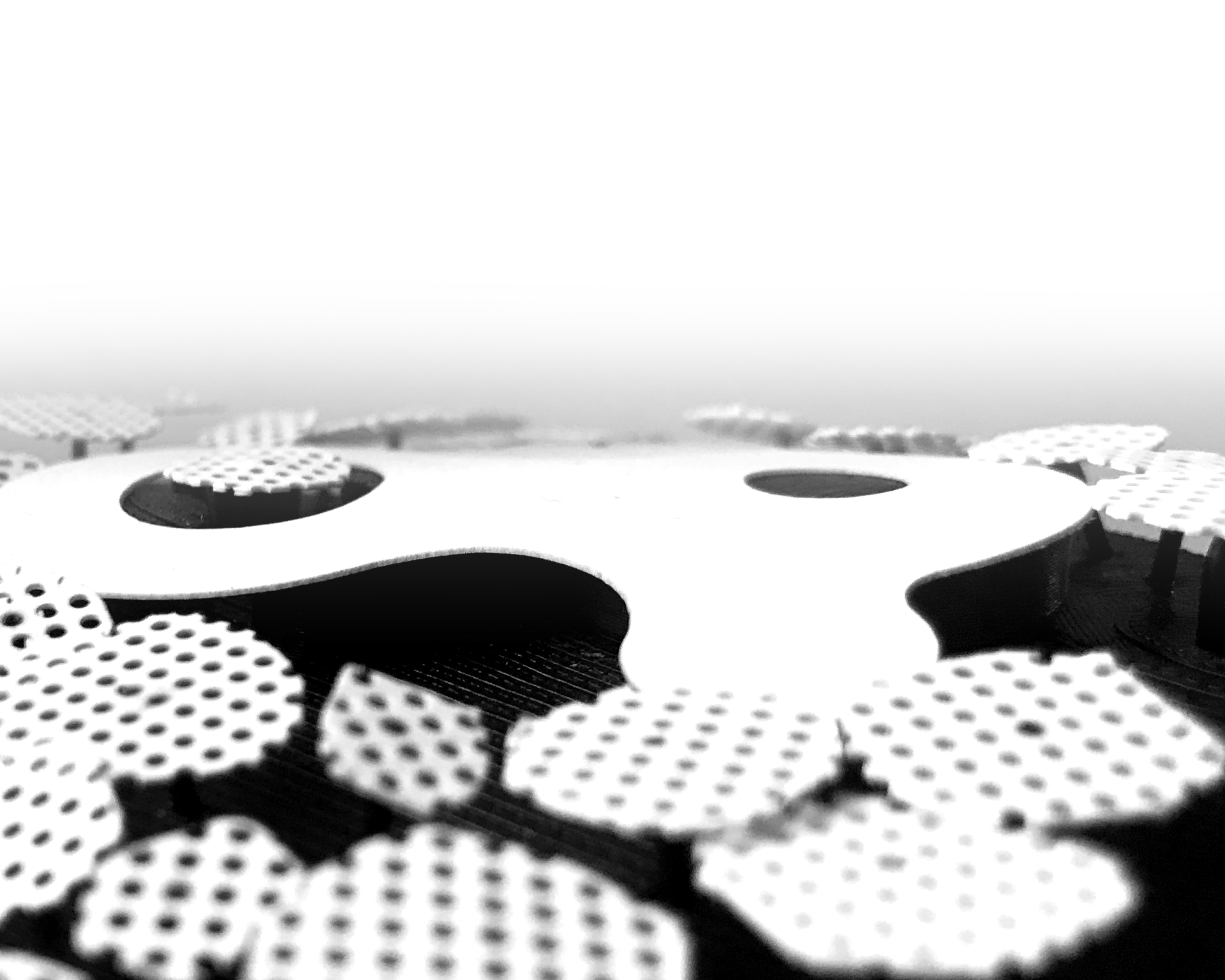


Figure 91 | Photograph of conceptual site model



LIST OF FIGURES

BIBLIOGRAPHY

Barcott, Bruce. (2018, July). Introduction. *Time.*

Brillon, James. "Marijuana-Related Design." Dezeen, Dezeen, 31 Aug. 2018, www.dezeen.com/tag/marijuana/

"Cannabis and Its Compounds." UCLA People-Animal Connection, www.uclahealth.org/cannabis/cannabis-and-its-compounds.

Duvall, C. (2014). Cannabis (Botanical (Reaktion Books (Firm))). London, UK: Reaktion Books.

Gasnier, L., O'Brien, Dave, Short, Dorothy, McCollum, Warren, Miles, Lillian, Young, Carleton, . . . Madacy Entertainment Group. (1998). Reefer madness (Hollywood classics). St. Laurent, Quebec: Madacy Entertainment Group.

"Grace Farms Foundation." Grace Farms, gracefarms.org/

Griffiths, Alyn. "Alves De Sousa Winery Is a Black-Brick Box on a Hillside Site." Dezeen, Dezeen, 15 Jan. 2016, www.dezeen.com/2016/01/18/alves-de-sousa-quinta-da-gaivosa-estate-winery-belem-lima-portugal-black-brick-box/

Hennings, T. (2018, Jan 10). How to find the best soil for growing cannabis. Retrieved from https://www.leafly.com/news/growing/finding-the-best-marijuana-growing-soil

Jennifer K. Carah, Jeanette K. Howard, Sally E. Thompson, Anne G. Short Gianotti, Scott D. Bauer, Stephanie M. Carlson, David N. Dralle, Mourad W. Gabriel, Lisa L. Hulette, Brian J. Johnson, Curtis A. Knight, Sarah J. Kupferberg, Stefanie L. Martin, Rosamond L. Naylor, Mary E. Power; High Time for Conservation: Adding the Environment to the Debate on Marijuana Liberalization, BioScience, Volume 65, Issue 8, 1 August 2015, Pages 822–829, https://doi.org/10.1093/biosci/biv083

Lefebvre, H., Stanek, Łukasz, & Bononno, Robert. (2014). Toward an architecture of enjoyment (JSTOR EBA). Minneapolis: University of Minnesota Press.

Mills, Evan. The carbon footprint of indoor cannabis production. Energy policy. Volume 46, 2012, p 58-67

"Moore Creek Park." Napa Outdoors, napaoutdoors.org/parks/moore-creek-park/.

Mungia, Ryan. (2012). Pot Shots. Boyo Press.

Park, Madison. "California Fires: Almost 6,000 Buildings Destroyed." CNN, Cable News Network, 14 Oct. 2017, www.cnn.com/2017/10/13/us/california-fires-updates/index.html.

Smith, T. (2003). Vitruvius on architecture. New York: Monacelli Press.

Staff, Leafly. "How to Make the Most of Cannabis Plant Count Grow Limits." Leafly, 2 June 2018, www.leafly.com/news/growing/making-most-of-cannabis-plant-count-limits.

"Travel Research & Statistics." Visit Napa Valley, Visit Napa Valley, www.visitnapavalley.com/about-us/research/.

Young, Bob. "Average Pot User Consumes 123 Joints per Year, State Estimates." The Seattle Times, The Seattle Times Company, 25 Sept. 2013, www.seattletimes.com/seattle-news/average-pot-user-consumes-123-joints-per-year-state-estimates/