

Proposal for a High Tunnel at Delaney Community Farm

A Senior Project

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Bachelor of Science

By

Michael Richard Hieu Pham

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Introduction

The Delaney Community Farm is a 5-acre urban farming project in Aurora, Colorado. The farm is a collaboration between Project Worthmore and Denver Urban Gardens. Project Worthmore is a non-profit organization that serves the international refugee community in the Denver metropolitan area. Their mission is to provide programs that foster community, self-sufficiency and increase the quality of life among Denver-area refugees. Denver Urban Gardens (DUG) is a non-profit organization that focuses on building food-producing neighborhood community gardens around the Denver area. Their mission is to provide training and resources for citizens to participate in growing locally grown organic food (Denver Urban Gardens, 2021).

The Delaney Community Farm was established in 1997 as an urban farm when the City of Aurora, with the Aurora Historic Preservation Commission, Open Space Board, Parks and Recreation Board, Aurora Museum Foundation, and Denver Urban Gardens developed the Delaney Farm Master Plan Report. The Master Plan Report is a collection of design principles, archeological, historical, land-use, zoning, and biological assessments intended to manage and preserve the ecology, culture, and history of the site as well as guide the future of the Delaney Historic District. This is comprised of the Delaney Community Farm, the Delaney Farm Complex, and several large meadows with cottonwood galleries and streambanks along the West Toll Gate Creek. From the inception of its role as steward of the urban farm in 1997, DUG intended to imitate the historical agriculture patterns and the animal husbandry practices established by the Delany family in the late 19th century (Bishop, 1997). Operations developed to provide farm workers, the local public, and livestock with organically grown vegetables and feed. Allowances were made for the building of two warehouses, shade structures, and a parking lot to support the urban farm and its operations. The allowance of these structures is contingent upon a set of design principles that are primarily intended to create a distinction between the Delaney Homestead Historic District and any new development on the site.

The purpose of this paper is to provide a perspective of the Delaney Community Farm and its impact on the refugee community. Additionally, this paper proposes the construction of a high tunnel system to increase the farm's capability to grow food and train farmers in urban agriculture techniques. Included in the proposal are the necessary documents and procedures required to obtain approval from the entities that hold jurisdiction over the farm.

Urban Agriculture

For the purposes of this paper, the definition of urban agriculture is, a system of food production that operates in urban and suburban areas to provide food to nearby populations, thereby building a more direct relationship between producer and consumer. Urban Agriculture (UA) bridges the gap between the traditional large-scale farming practices and the building patterns of urban environments in the modern world. Traditional farming is thousands of years old; farming in cities is evidenced by archeological discoveries as far back as 3,500 B.C. (Aurora University, 2019). However, land use regulation beginning in the early 20th century instigated urban development patterns that have restricted agricultural operations in urban areas. Whatever benefits may have been associated with the UA practices from thousands of years ago likely disappeared when zoning codes pushed agriculture to the outskirts of cities. The effect was a dramatic proximal, and ultimately relational, separation of food producer and food consumer. But the demand for agriculture has not changed. If anything, it has increased, if not per capita then because of the sheer volume of populations in urban areas (EPA, 2019; Tilman et al., 2011).

One of the key components of a UA system is the relationship between the operation and the community it serves. While this can be a purely transactional relationship, there are some models of UA that have found that there are more abstract benefits to both producer and consumer when the scope of influence attempts to encompass more than just product and payment. In his book “Cities Farming for the Future” Rene van Veenhuizen praises the community based urban agriculture (CUBA) model as a tool for building togetherness and a foundation for holistic communal change:

Instead of seeing the members of an urban community as the object of technical development planning, CBUA is a vehicle for a more grassroots form of community development; one that grants its practitioners a sense of inclusion, dignity and accomplishment that might not occur through standard community development practice. (Veenhuizen, 2006, p. 147)

While UA can play a stable economic role, provide jobs, and create green space in an urban fabric, it is equally important that the operation creates a relational connection with the surrounding community, ideally the UA workers’ own community. In this way, UA workers hold a vocation that is woven into their own built environment and provides an essential component

of quality of life: food supply. Additionally, a UA operation that shares an environment with the consumers it serves is inherently bound to the social and physical conditions that the consumers are subject to. A UA operation and its consumers share the same weather patterns, political representatives, land use regulations, infrastructure, and, perhaps most importantly, they are part of the body of stakeholders and agents of change in the community they share. And while the social benefits of UA may be many, there are also components of UA that respond to issues of more putative urgency that face urban environments today.

The COVID-19 pandemic is just one example of how cities can develop UA as a safety net against future potential crises. An increasing rate in global hunger aside, the global pandemic has exacerbated concerns over a reliance on supply chains between countries--food imports and exports being one of the concerning components of the international geopolitical landscape (Delgado and Zhou, 2020). Now that cities, metropolitan regions and megacities in particular, are achieving new scales in size, the strain on food sources presents a volatility in the viability of feeding those urban populations. In an article on pathways towards urban resilience and global sustainability, scholars argue that UA creates a multifunctional fabric through several means: agricultural knowledge builds a community's psychological and social resilience in times of crises; UA infrastructure like community gardens and urban farms can act as a safety net, to an extent, when national and international supply chains lag or fail (this function has primarily been shown to be most impactful on disproportionately poor populations, and those with lower food access); UA in certain contexts has been shown to buffer against soil erosion, flooding and stormwater runoff, and, to a certain degree, mitigate extreme heat events and the urban heat island effect (Langemeyer, Madrid-Lopez, Beltran, and Mendez, 2020). Thus, the benefits of UA can be argued to have both qualitative and quantitative metrics for measuring potential positive impacts on the community. In the case of Delaney Community Farm, Project Worthmore and DUG established an operation that is not only addressing issues of environmental and economic concern but is also scaled and tuned to several specific challenges and needs that face the City of Aurora.

Delaney Community Farm

In 2016 DUG partnered with Project Worthmore to establish a formal program at Delaney Community Farm focused on providing the refugee community with apprenticeships,

farming jobs, and the Yu Meh Food Share. The Yu Meh Food Share provides families in need with organic fruits and vegetables from the farm as well as donated proteins and milk from other local food operations. “Families in need” in Aurora can refer to a great variety of socioeconomic groups from low-income populations to people who have been subject to racial or ethnic prejudice to newly arrived international populations. The Yu Meh Food Share, given its affiliation with Project Worthmore, tends to attract members of the refugee community. The state of Colorado has historically received several thousand refugees per year, and most of them end up in the Denver metro area; 20% of Aurora’s population of 375,000 is made up of immigrants and refugees (ICMA, 2019; Stringer, 2019). Job opportunities at the farm are one example of why the region became home to thousands of that displaced population (Hindi, 2021). The opportunity to work and learn vocational skills addresses the need for public and private programs that help refugees develop literacy, job, and finance skills. But the relationship has proven to be very much a two-way street in Colorado. The Colorado Office of Economic Security studied 2,700 refugees between 2007 and 2017 finding that for every \$1.00 spent on refugee services resulted in a \$1.68 generation in industry activity and \$1.23 return in state and local tax revenue (Colorado Department of Human Services, n.d.). Other remarkable economic impacts of refugees can be seen in Figure 1.

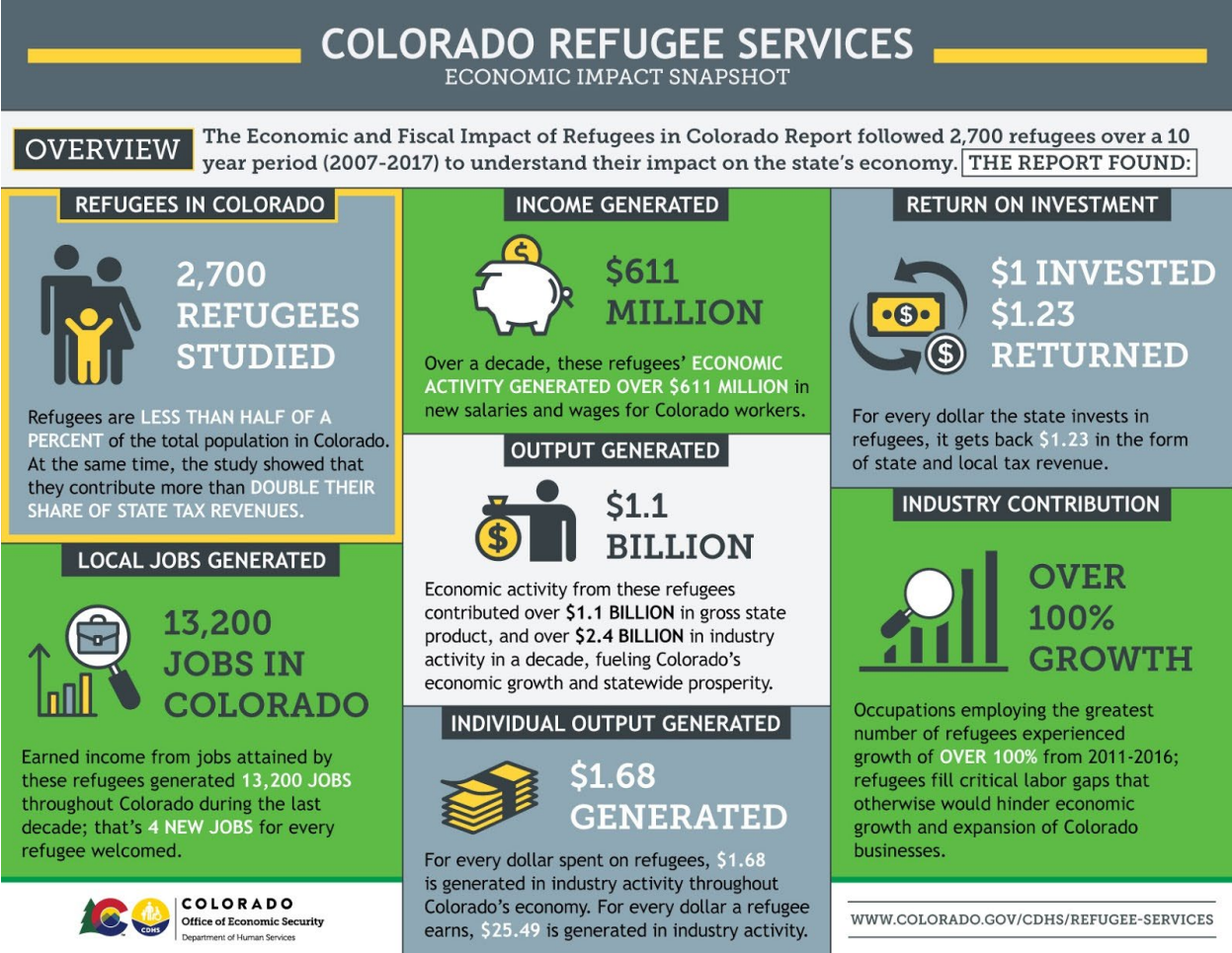


Figure 1. The economic impact of refugees in Colorado (Colorado Department of Human Services, n.d.).

Project Worthmore itself serves refugees from over 25 countries and Delaney Community Farm is one place that refugees can practice familiar livelihoods and grow familiar foods that would otherwise be difficult to come by. The issue of familiarity has been a regular topic of discussion as it relates to the “local” food movement. Amidst this discussion is the idea that local food should not refer only to geographic proximity but, when associated with a revival in community building and pride, can incorporate a reflection of the people that reside in the locality, remind local people of their subjective perceptions of home, and help migrant populations transition into a community that would otherwise be entirely unfamiliar. Dr. Jimiliz Valiente-Neighbours, who studies social justice issues surrounding food, refers to the term “translocal subjectivity” to discuss the process of immigrants, migrants, and refugees negotiating with their new

environments to establish a sense of place, belonging, and familiarity (Valiente-Neighbours, 2012). Dr. Valiente-Neighbour's research on immigrant perceptions of food found that immigrants and refugees often consider “local” food to be that which they are familiar with rather than what is simply nearby. One of the problems that Project Worthmore founder Frank Anello wanted to tackle was that of refugees feeling unfamiliar with food options in their area (McCoy, 2021). Delaney Community Farm farmers come from Somalia, Burma, Bhutan--like many of the refugees in the aurora community. Volunteers that work on the farm throughout the week represent an even wider ethnic makeup. The vegetables grown on the farm can surpass 150 varieties of 30 different crops in a given season. Because Delaney Community Farm pursues a product variety that appeals to those seeking “locally grown” food and those seeking familiar food, their operation becomes a helping hand and an outreach to translocal populations, like immigrants and refugees. This pursuit is an extension of their official organization goals:

- To provide the space, support, resources, and expertise for refugees to grow healthy, organically produced food for themselves and their broader community.
- To foster community development and integration through education and training programs, and relationship building.
- To connect refugees to the local fresh food economy and promote economic resiliency through meaningful and dignified experiences.
- To demonstrate small-scale, sustainable agricultural practices that reconnect refugees with the land in a productive and environmentally responsible manner. (Project Worthmore, 2021)

The education and training opportunity at Delaney Community Farm is an invitation for refugees to partake in a trade that grants access to openspace, exercise, and a productive role in the community. Yu Meh, the farmer from Burma for which the Yu Meh Food Share is named, said this:

I'm an old man, I attend English classes but I still can't speak very well. There aren't many jobs that want to hire someone like me. Without work the body grows stiff and achy and starts to die. What can I do to stay healthy? How can I support my family? (...) I never thought I would farm again but here I am. My life has a new purpose and a new hope. Now I can get my hands in the dirt. There is fresh air and it feels like I can breathe again. My body is active and I feel healthy. I

have food for my family. I can help my family and my community as a farmer.
(Project Worthmore, 2015)

For elder citizens like Yu Meh, one of the challenges of adjusting to a new community is finding a workplace that not only serves as a vocation, but also contributes to a healthy life and a sense of dignity. Yu Meh's experience is not a rarity. A study looking at food transitions as a result of forced migrations, like those that refugees endure during displacement, found that land tenure, agricultural activities, and community belonging are factors that can aid in the transition process, especially for adults who have come from forced migrations and may have experienced war, organized violence, and other kinds of trauma (Harris, Minniss, and Somerset, 2014). Studies on displaced populations have found that small scale agriculture activities like home gardens contribute positively to recovery from traumatic events that many displaced people endure (Tomkins et al., 2019; Johnson, 2017). Research has shown that positive experiences and positive environments in general are healing for individuals that have experienced trauma (Gilbert and Williams, 2020). The rehabilitative aspect of growing food is one way that urban communities can provide a multi-use means of sustaining families and communities in their psychological and social health. In 2020 Delaney Community Farm employed five full time farmers from the refugee community for the entirety of the growing season; a caveat to this is that the COVID pandemic hampered farm operations and the influence of the Yu Meh Food Share (Keeley, personal communication, 24 May 2021). Regardless, five full time employees are not trivial. That accounts for five households that were sustained financially, and five individuals who could take pride in providing food for their family and others.

The simple process of bringing food from Delaney Community Farm to the Project Worthmore office, which sits in the heart of Aurora, is one of the direct ways the farm supports better access to food. In 2020, Delaney Community Farm produced 32,105 pounds of food for 20 CSA members, 12 single mothers; The Yu Meh Food Share served 638 households, providing food for on average 26 single mothers and an additional 10 households with older adults per week (Keeley, personal communication, 24 May 2021). Volunteers at the farm can exchange work for a bag of produce, an exchange that the Special Supplemental Nutrition Program for Women, Infants, and Children offers to their recipients--the only community farm with this program (Local Harvest, 2019). Perla Espinoza, a mother of two toddler boys, works for an hour

each week, and enjoys the space and the story she can tell her children: “I love it because I can teach them where their food comes from(...) I look forward to this every week” (Mitchell, 2014).

Challenges Facing Delaney Community Farm

One of the challenges facing Delaney Community Farm operations is the limitation of the plant hardiness zone in which the farm exists, which is defined as a 5b zone by the USDA. The growing season, which typically lasts approximately 6-months of the year at most—May through October, is limited in the 5b zone by an average annual extreme minimum temperature of -15 to -10 degrees Fahrenheit (USDA, 2012). A short growing season makes outdoor farming activities a challenge because of adverse growing conditions such as heavy rain, snow, and freezing and below freezing temperatures. Typical growing season activities are traditional cultivating, planting, and harvesting practices that are performed outdoors and consequently have a viable temperature threshold in order to maintain healthy crops and safe working conditions for farmers.

A possible solution to this limitation is the construction of a structure to shelter crops and employees from the harsh conditions of winter. A structure that creates favorable growing and working conditions would allow training programs, apprenticeships, and jobs to run through the winter months and would open the door to practicing different planting techniques, more efficient seeding and harvesting schedules, and new ways of improving soil health and crop quality. These opportunities are limited during the typical Aurora growing season because most of the in-season work programs are focused on the traditional outdoor farming practices. In addition to longer employment for farmers, The Yu Meh Food Share could continue providing food for the community through the winter.

Proposal

A high tunnel is a structure made of wood or steel that has a cover, typically made of plastic polyethylene. High tunnels help farms extend growing opportunities into seasons that normally have adverse growing conditions. They are advantageous for farming activities in certain climates because they allow light to enter the structure through the semi-transparent covering but also provide protection from rain and snow and provide a measure of insulation from freezing temperatures. The primary difference between a high tunnel and a greenhouse is

the dimension regarding the height of the structure and the width of the doorway--a high tunnel is intended to have a greater peak height and a wider doorway in order to increase access to the inside of the structure; high tunnels typically use a polyethylene or fabric covering, while greenhouses use glass (Rimol, 2021). High tunnels also have the capability to be moved around a farm with relative ease, while greenhouses are typically built as permanent structures.

Rimol High Tunnel Systems

The proposed high tunnel is a product designed and manufactured by Rimol Greenhouse Systems. The model is a Nor'Easter free-standing high tunnel with a base footprint of 30'x48' and a peak height of 15'; see Appendix A for construction documents. The Nor'Easter uses a 6-millimeter polyethylene covering with a 13 gauge galvanized steel pipe and Douglas Fir lumber frame (Appendix A). The base price of a Nor'Easter high tunnel system is \$4,562. The construction of structures on the Delaney Community Farm property must be planned and approved through the City of Aurora's procedures for development. The farm itself is under the jurisdiction of the Historic Preservation Commission; the requirements for structure additions is outlined below.

Approval Process

The City of Aurora Municipal Code lists plant nurseries and greenhouses as permitted uses in the Natural Resource Districts, which includes the Open Districts, or the Parks and Open Space Zone (City of Aurora, 2006). However, Delaney Community Farm, as part of the Delaney Farm Historic District, is subject to development and use restrictions defined by the Delaney Farm Master Plan. The addition of a high tunnel at Delaney Community Farm would likely fall under the definition of a "new structure" given by the Historic Preservation Commission rules of procedure: "New structures on a designated site, as well as structural additions or deletions to a designated landmark or to any building in a designated district" (Aurora City Code, 2020). Thus, the City of Aurora Historic Preservation Commission is the body through which approval is obtained for any changes to the Delaney Farm Historic District. Obtaining approval from the Historic Preservation Committee for a new structure is a five-step process:

Step One - Pre-Application Conference: The applicant should make an appointment with a preservation specialist for an initial review of the proposed changes to the historic site.

The preservation specialist will determine if the proposed change would be considered a minor alteration or a major alteration.

Step Two - Formal Application: To make a formal submittal, the applicant should obtain an application form from the preservation specialist. The application form and all required submittal materials will be filed with the preservation specialist by an agreed upon date which will give the Historic Preservation Commission enough time to review the application and submittal materials. The Preservation Specialist will review the application for completeness and place the application on the agenda for public hearing at the next regularly scheduled meeting of the Commission.

Step Three - Posting and Notification: Subsequent to the submittal of a complete application, notice will be made of the public hearing for the application. Notice of the time and place of the public hearing regarding the major alteration application should be posted on the property, and notices should be mailed to the owner and to all abutting property owners, at least five days prior to the public hearing.

Step Four - Review of the Plans/Public Hearing: At the prescribed time after receiving a complete application, the Commission will review the proposed alterations at a public meeting. The applicant and/or a designated representative must answer any questions from the Commission. All interested persons will be given the opportunity to speak to the issue. At the conclusion of the public hearing the Historic Preservation Commission shall approve, approve with conditions, or deny the application for major alteration. A simple majority of the Commission shall decide the outcome.

Step Five - Disposition/Certificate of Appropriateness: The Historic Preservation Commission will send a written disposition of the written decision following the public hearing. If the decision is an approval, the disposition will be followed by a Certificate of Appropriateness which will allow the applicant to begin work on the proposed changes. (Brownfield, personal communication, April 29, 2021)

The proposal for the Delaney Community Farm high tunnel will require a set of documents to be included in the submittal materials and application form to the Historic Preservation Specialist. Those documents can be found in Appendix A.

Funding

Through the United States Department of Food and Agriculture, the National Resources Conservation Service (NRCS) provides financial assistance to agricultural producers seeking to improve their growing operations to address environmental health issues such as water quality, soil quality, natural habitats, and volatility to drought and climate changes. NRCS uses the Environmental Quality Incentives Program (EQIP) to specifically assist farmers who want to implement conservation practices into their growing operations. The list of techniques and technologies approved for EQIP includes high tunnel systems. In the 2020 fiscal year, the EQIP allowed funding ranging from \$2.75 per square foot of high tunnel area to \$4.08 per square foot of high tunnel area. If funding pools for the 2021 fiscal year at least meet the minimum square footage funding as the 2020 fiscal year, the Nor'Easter high tunnel system by Rimol could receive funding for between \$4,752 and \$7,050.24. Contingent on the approval of the Aurora Historic Preservation Commission, Delaney Community Farm will be pursuing the EQIP funding process under advisement of the Arapahoe County office of the USDA.

Conclusion

As Delaney Community Farm continues to provide unique benefits to the refugee community, the future of the farm and its impact depends on how it improves and expands. Chris Corrigan, the director of the farm, says, "I see the future of the farm as utilizing innovative small farm technology, a space that truly values our farmers, and is regenerating the land, and could be an educational growing space for the front range" (McKay and Poudyal, 2021). Corrigan's vision for the future is not simply to grow more food, but to streamline and enhance farm operations so that farmers are learning to use advanced, viable, and ecologically sound techniques of growing food on a small scale. The high tunnel proposal is an effort to further emphasize Delaney Community Farm as an example of a culturally and economically relevant system where migrant and refugee populations can find dignity and encouragement as they transition to life in America. From an urban planning perspective, the Delaney Community Farm exemplifies how even small

projects can help citizens navigate certain sociocultural and economic contexts. As a farm, Delaney Community Farm is an encouragement to examine how the food system can serve the modern city and its demands on resources. There are clues to be found in small scale urban agriculture practices about how the cities of tomorrow will sustain its citizens and maintain a healthy standing with the natural and built environment.

The process for approval of the high tunnel from the Historic Preservation Society will be seen through by Chris Corrigan, Director of the Delaney Community Farm, and Michael Pham, the student from Cal Poly San Luis Obispo who prepared the documents found in Appendix A. Likewise, the EQIP funding process will be pursued by Chris Corrigan and Michael Pham subsequent to the approval from the Historic Preservation Commission.

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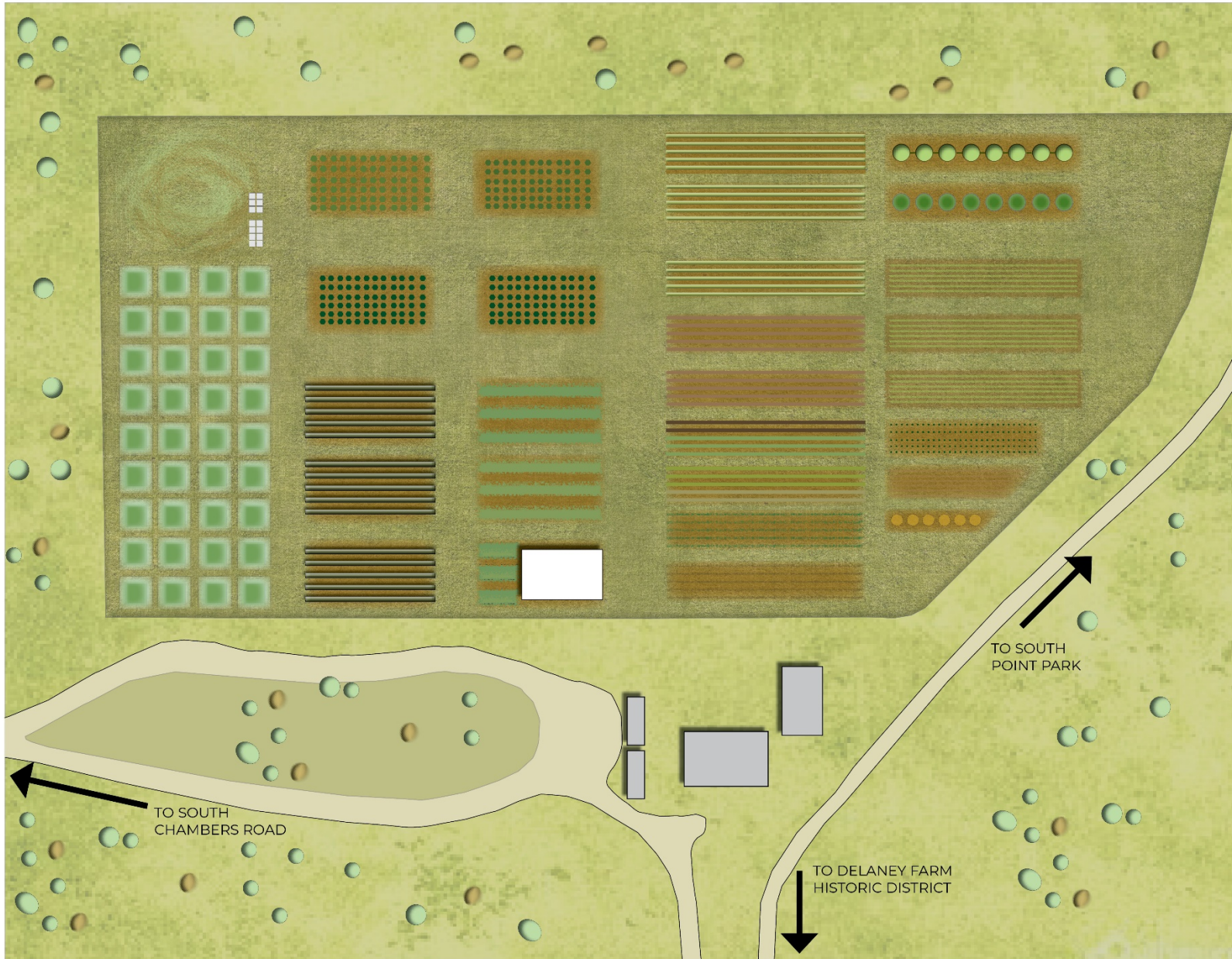
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APPENDIX A FIGURE 1



TITLE:
SITE PLAN

SCALE:
1" = 100'

LEGEND:

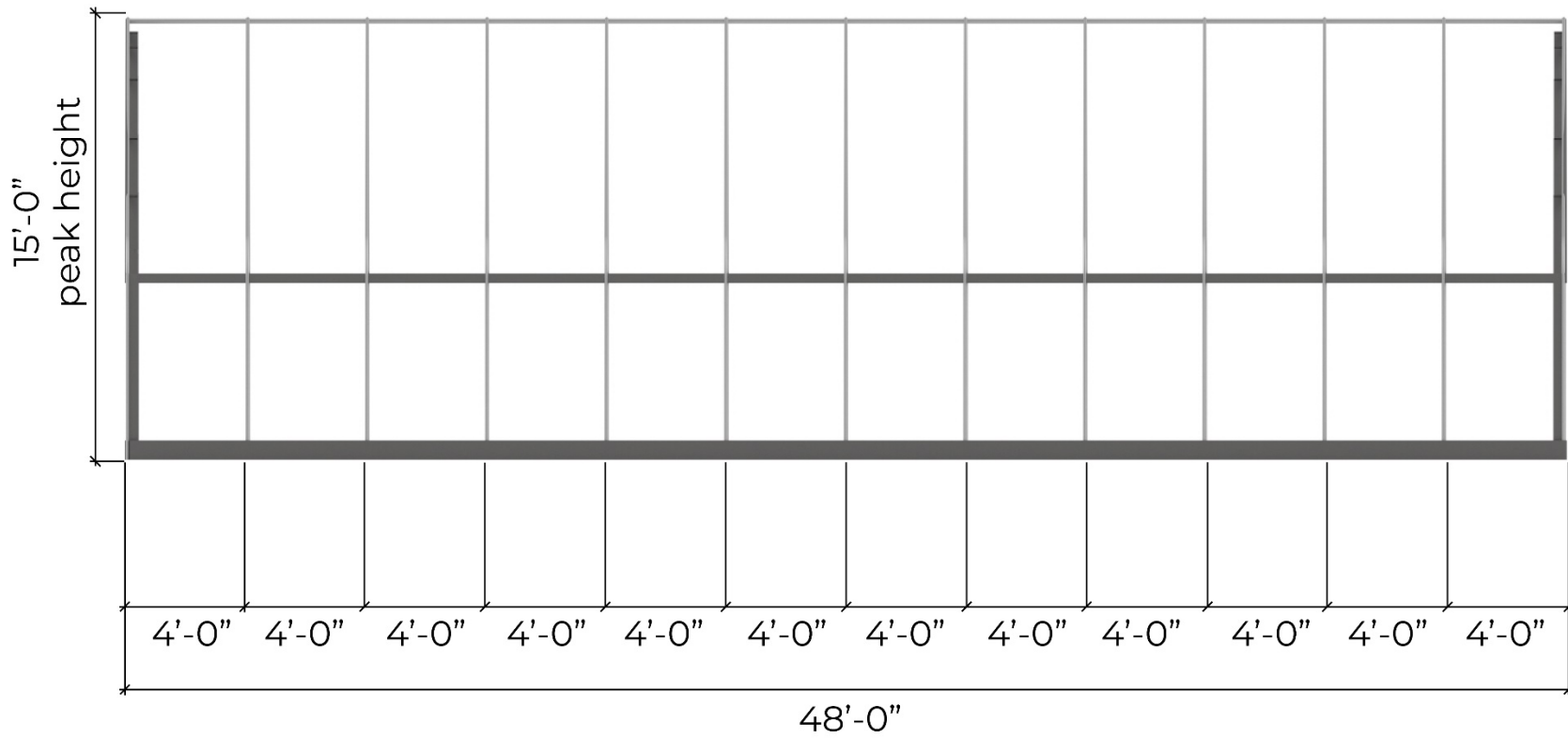
- EXISTING STRUCTURE
- PROPOSED HIGH TUNNEL

North arrow symbol

Scale bar: 0' 15' 45' 100'

APPENDIX A

FIGURE 2

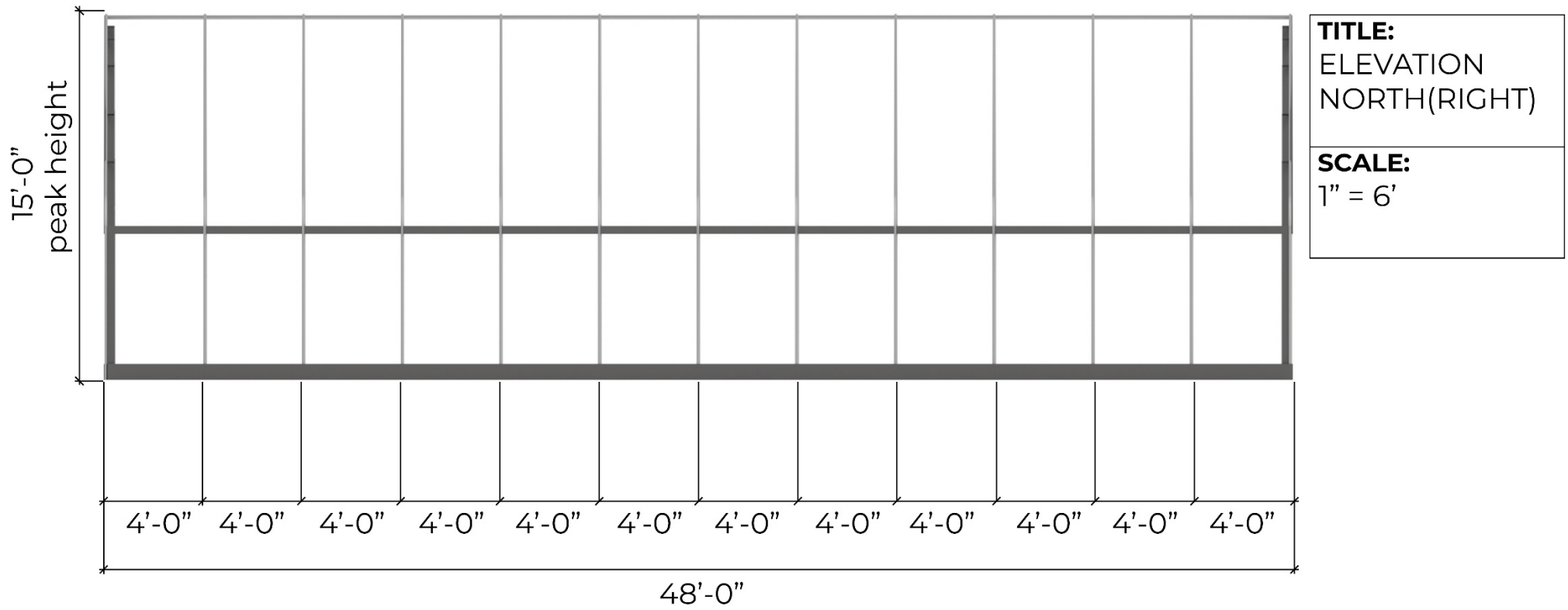


TITLE:
ELEVATION
SOUTH(LEFT)

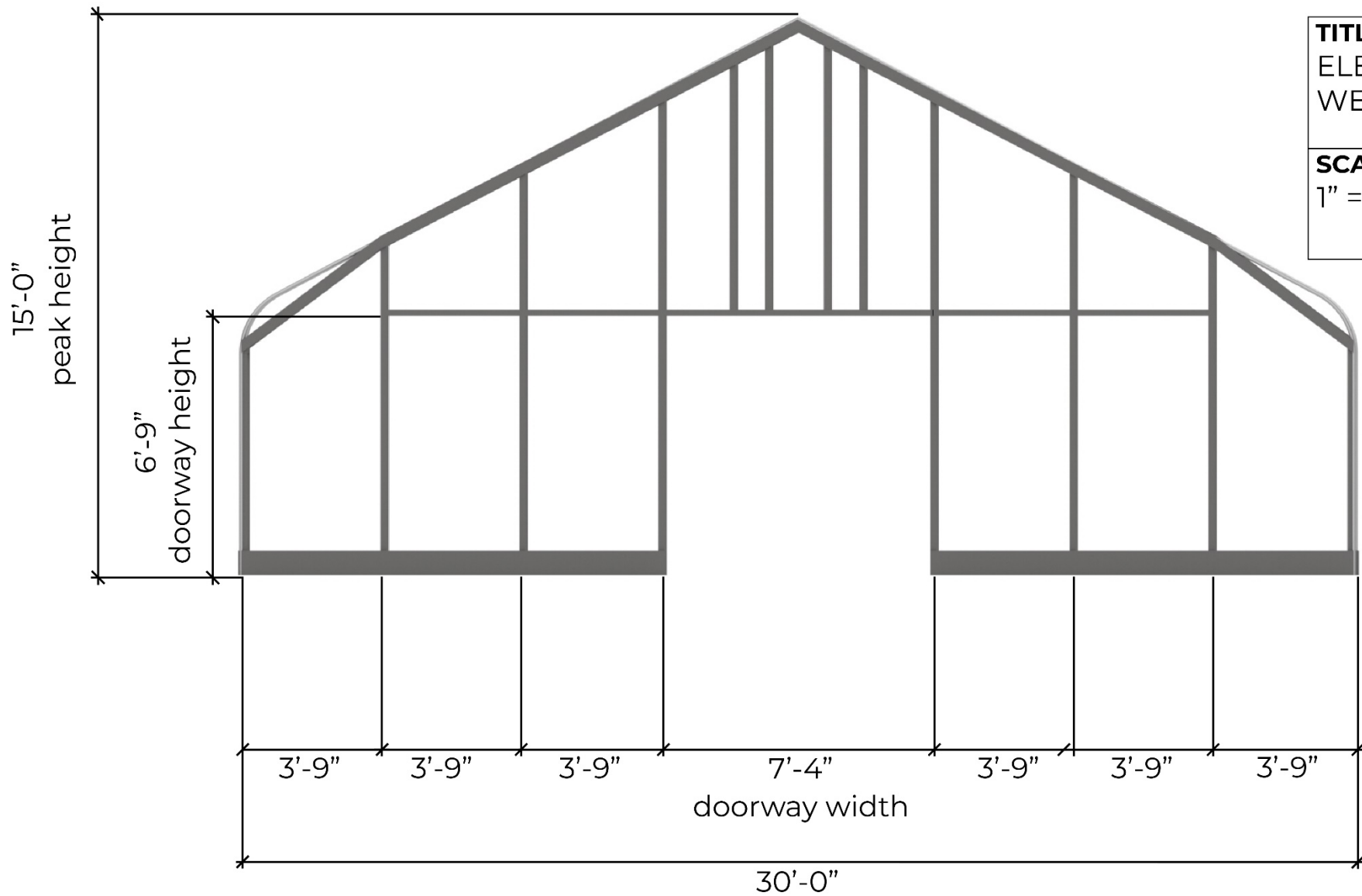
SCALE:
1" = 6'

APPENDIX A

FIGURE 3



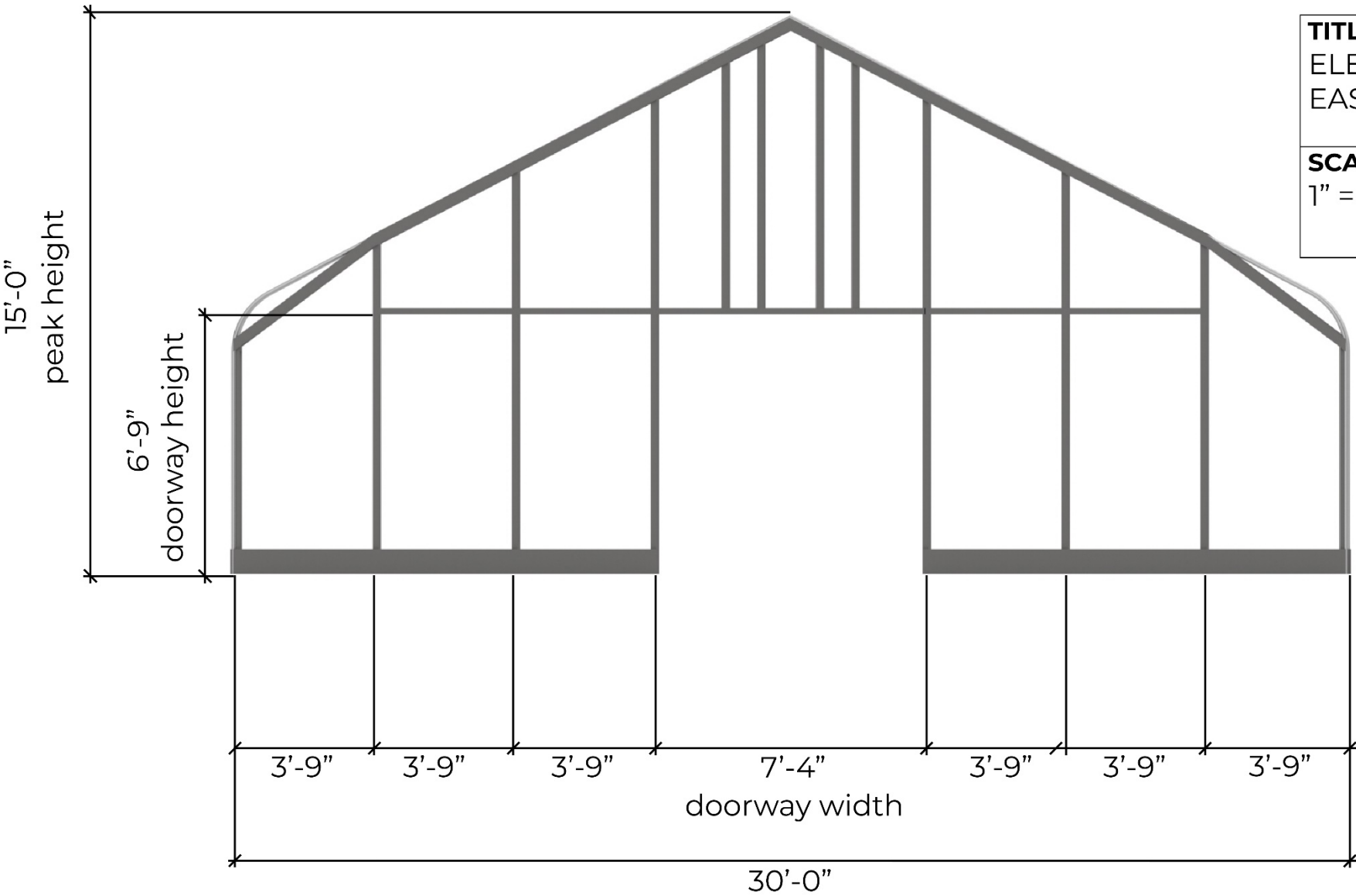
APPENDIX A FIGURE 4



TITLE:
ELEVATION
WEST(REAR)

SCALE:
1" = 4'

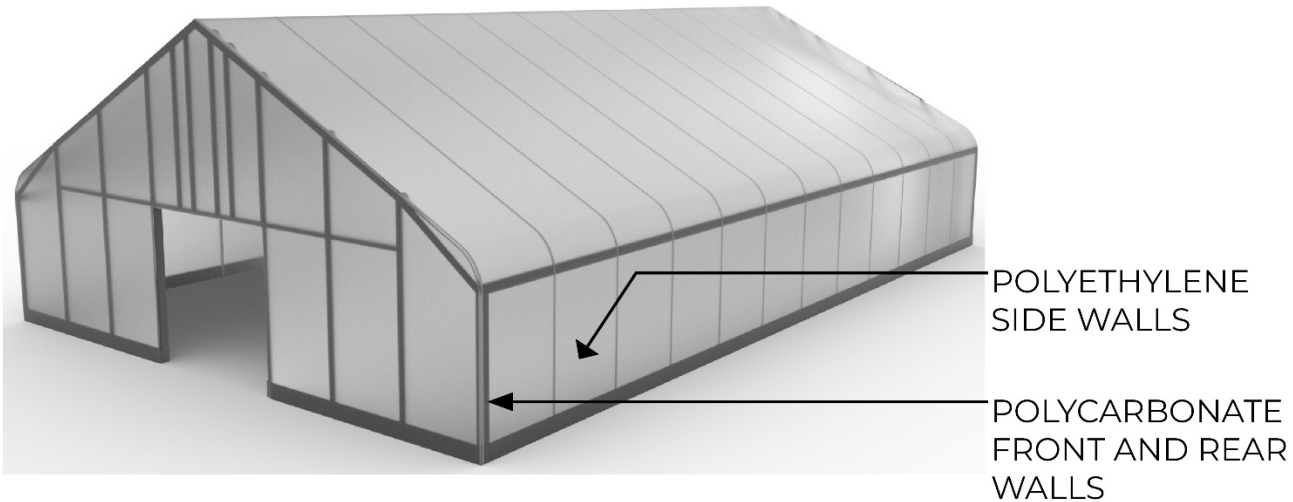
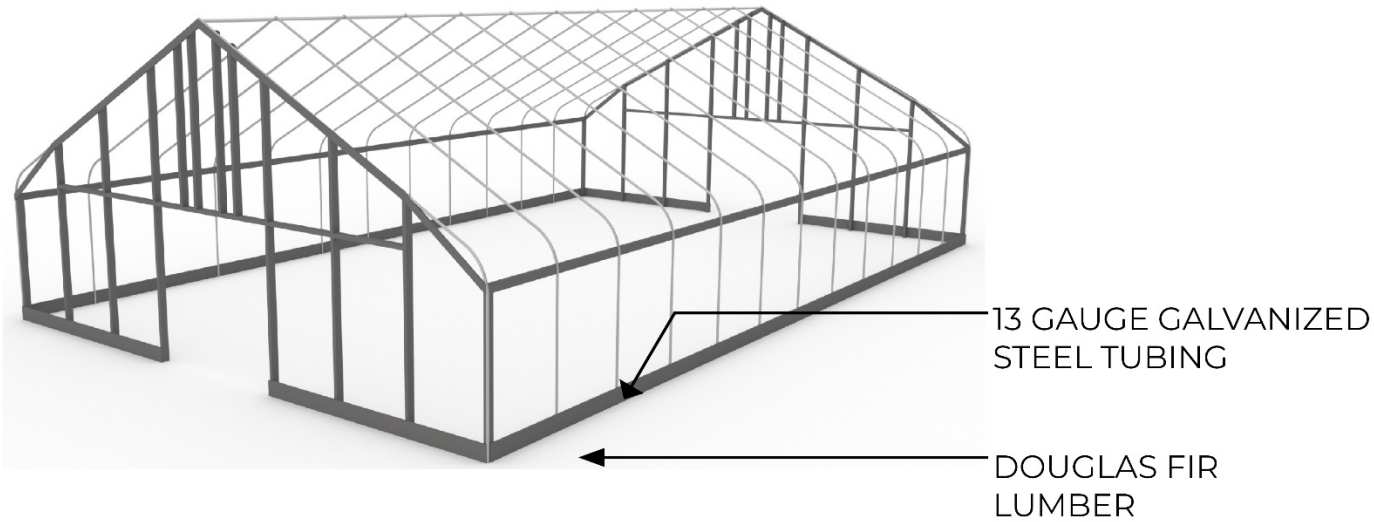
APPENDIX A
FIGURE 5



TITLE: ELEVATION EAST(FRONT)
SCALE: 1" = 4'

APPENDIX A

FIGURE 6



TITLE:

Material
Detail

Notes:

1. MATERIALS
MANUFACTURED
BY RIMOL
GREENHOUSE
SYSTEMS

2. ENGINEERING
MEETS
INTERNATIONAL
BUILDING CODES
(IBC)

APPENDIX A FIGURE 7



TITLE:
RENDERED
VIEW 1

APPENDIX A

FIGURE 8

TITLE:
RENDERED
VIEW 2



APPENDIX A

FIGURE 9



TITLE:
RENDERED
VIEW 3