Yolo Food Hub
Summary Report

October 27, 2023

AECOM Sacramento
2020 L St.
Sacramento, CA 95811

Contents

Acknowledgments

The Yolo Food Hub Concept Design was developed by AECOM for Resilient Cities Catalyst and the Yolo Food Hub Network, led by the New Season Community Development Corporation. We would like to thank all participants throughout this process for their insights, feedback, and assistance.

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Alice Manas | Founding Member
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Yolo Food Hub Network

Capay Valley Farm Shop
Jay Peacock

Hatamiya Group
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Kitchen Table Advisors
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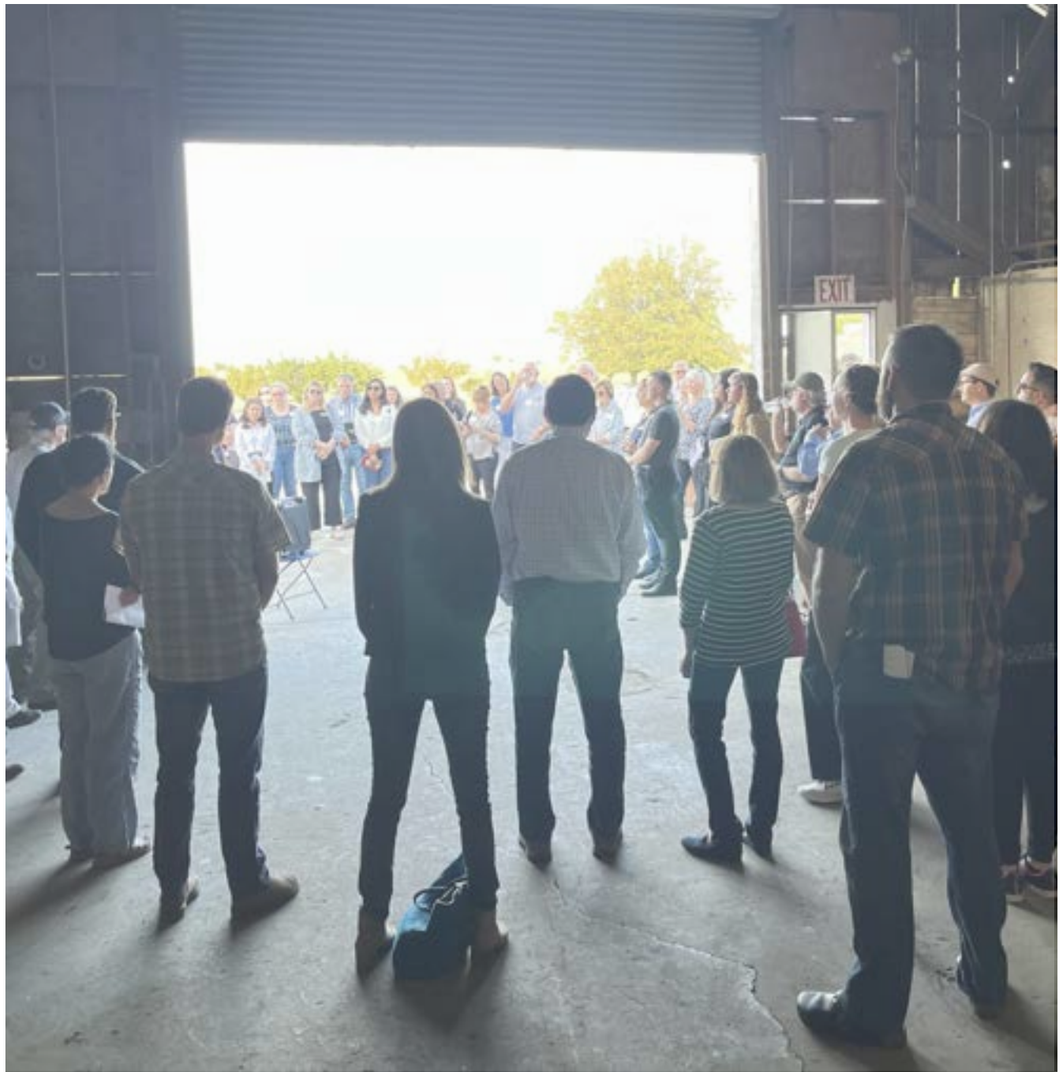


Yolo Food Hub supporters at the barn warming & celebration for the Oakdale barn.

Executive Summary

Project Overview

The Yolo Food Hub network is exploring the development of the historic Oakdale barn and site as a storage and food processing facility that will support the operations and resilience of the local farming industry.

The Yolo Food Hub is a collaborative network of Yolo County farmers, food hubs, and other stakeholders interested in supporting local food and agriculture. The vision is for the barn and site to provide a resilient network of agricultural resources that support the local economy, enabling farmers to share critical food processing services and infrastructure to increase the value of their goods, diversify market opportunities, and bring more locally grown food to the surrounding communities, including schools, institutions, and the food bank.

New Season Community Development Corporation (New Season) is the property owner, on behalf of the larger Yolo Food Hub network, which also includes Capay Valley Farm Shop, Yolo Food Bank, Durst Organic Growers, Spork Food Hub, Kitchen Table Advisors, Valley Vision, and other partners.

Resilient Cities Catalyst is working with the Yolo Food Hub network to provide technical and capacity building assistance to enable the Food Hub to secure the funding necessary to move from planning to implementation. As part of this technical assistance, AECOM developed three initial and one final concept design for the barn site.

The Final Concept

Barn and New Building

The final concept design, presented in this report, recognizes the Yolo Food Hub's desire to take the fastest and least-expensive route to making the barn useful. Preserving and renovating the barn is also a key priority, due to its connections and value for community members.

Accordingly, the design proposes light renovations to the southern extension of the barn to allow it hold modular refrigerator units on a relatively fast timeline. Some modular refrigerator units can provide cold storage, while others can serve as pre-cooling. More extensive renovations would allow the northern end of the barn to hold dry storage, light processing, and administrative spaces.

A new building to the east of the barn houses dedicated space for wet and dry food processing and additional cold storage, which was identified as a core need for small agricultural producers. Based on stakeholder feedback, wet processing is sited next to cold storage to minimize transition time for food in unrefrigerated spaces. To preserve sight lines and views of the existing barn, the new facility is shifted north to frame and celebrate the barn.

The Yolo Food Hub final concept

Executive Summary

The Final Concept

Circulation

One notable design feature is the shared central loading dock between the new facility and the barn. A descending ramp enables trucks to unload directly into the barn without the need to modify its floor elevation. The loading area maximizes connectivity and functionality, allowing food to be unloaded and stored in either the barn (pre-cooling, cold and dry storage) or new building (cold storage, wet and dry processing). Forklifts can also travel between the barn and new building via the loading dock, which will be covered. The shared loading dock can accommodate trucks of all sizes, and a secondary smaller loading area in the new building serves pick-up trucks. Critically, this arrangement separates truck circulation from smaller cars, which will use a visitor parking lot at the south end of the site.

Sustainability

The design recommendations respond to the Yolo Food Hub network's desire for sustainability and energy and water resilience. The site plan maximizes solar photovoltaic panels wherever possible, including on the roof of the new building, the existing barn, visitor parking, and covered loading area. A proposed battery energy storage system and clean-energy generator can provide critical backup during power outages, preventing loss of refrigeration for perishable agricultural products. The site also incorporates bioretention, rainwater capture, and stormwater management to support sustainable water use and management. The onsite well supplies potable water for food processing, but all non-potable uses (fixtures, flushing and irrigation) can be met through rainwater capture and wastewater recycling, reducing draws upon the well. High-level calculations of energy and water demand and supply/generation provide a starting point for the Food Hub to attain energy and water sustainability goals.

Cost and Implementation

Finally, to support the Food Hub in moving toward implementation, the concept development includes phasing recommendations and cost estimates. The aim is to provide the Yolo Food Hub with a concept design that can be used to obtain funding and move from planning to implementation of a food-processing and storage site that supports the local agricultural economy and brings more locally grown food to Yolo residents.

The Yolo Food Hub final concept

Executive Summary

The Design Process

To develop a concept for the barn site that would support the Yolo Food Hub network's goals and visions, AECOM undertook a design process that listened closely to stakeholders at every step. AECOM began with a site visit to the barn site in June 2023, hosted by Jim Durst and Valley Vision. The site visit also included a stop at the Yolo Food Bank to learn about the challenges of sourcing food to meet increasing needs in Yolo County and how a food hub could bring more fresh, locally grown produce to the Food Bank. Next, at a July 2023 workshop, the Yolo Food Hub network discussed their vision for the barn site in the next five to fifteen years and identified the facility and spatial features needed to support these activities

Based on the workshop findings, AECOM developed three concept designs that escalated in scale and complexity. The Food Hub network closely reviewed the concept designs at an in-person workshop, held in Woodland, CA in August 2023. Participants provided feedback on key components of a food hub, including circulation, the allocation of space between dry and cold storage and wet and dry processing, and wastewater treatment. The second scenario was selected as the preferred option for AECOM to refine and finalize.

Report Contents

This final report walks through the collaborative process undertaken by AECOM to develop the final concept for the Yolo Food Hub between May and October 2023:

- Ch. 1 documents the initial baselines conditions.
- Ch. 2 summarizes the initial workshop, including stakeholder input on the Yolo Food Hub's activities, goals, programming, and facility/ spatial needs.
- Ch. 3 presents the final preferred concept scenario, including recommendations on energy and water use.
- Ch. 4 describes a phasing strategy site and provides initial cost estimates for the preferred concept scenario.

The appendices elaborate on the design process and technical analysis:

- Appx. A contains the initial concept designs.
- Appx. B summarizes the initial feedback received on the three initial concept designs from the concept development workshop.
- Appx. C contains the supporting analysis and assumptions for water supply and demand at the Food Hub site.
- Appx. D provides an analysis of the solar energy generation potential of the food hub site (helioscope analysis).
- Appx. E is the full cost estimate report, including assumptions and supporting details.

The Yolo Food Hub final concept

Introduction

The Yolo Food Hub site is located in Esparto, CA, in the heart of the agricultural lands for which Yolo County is famous. The ideal growing climate, soils, and access to water support diverse crop production across hundreds of farms of all sizes. Despite naturally supportive growing conditions, the financial model for smaller-scale and family-run farms is challenging due to limited access to storage, production, processing, and distribution facilities. This support framework gap is a barrier for small farmers seeking to market and sell produce locally, including to schools and institutional buyers that can provide income stability. As a result, farms otherwise ideally suited to focus on local community food access and distribution may struggle to remain viable.

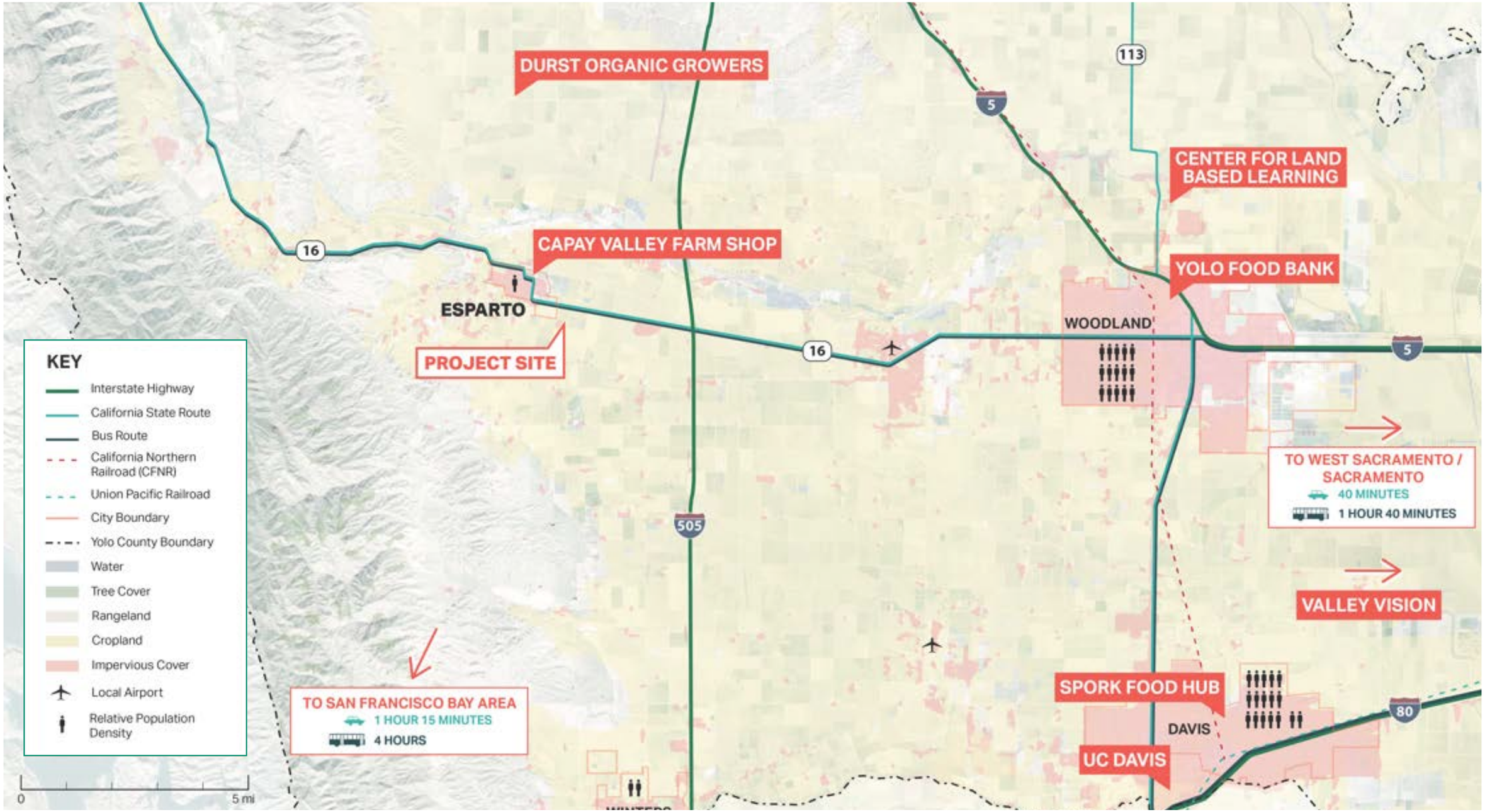
The Yolo Food Hub will operate within a larger network of food hubs, agricultural producers, and other partners, illustrated on the following pages. By complementing and augmenting the services provided by existing food hubs, the Yolo Food Hub can increase resilience and stability for small local growers, provide local processing, aggregate their products, and distribute larger volumes to institutional buyers.

The Yolo Food Hub also has a community-building role to play through education and training for new and young farmers, job creation, and enhancing access to locally grown food. Partnering with the Yolo Food Bank can bring locally grown produce to food-insecure Yolo County residents, supporting greater food access.

Long-term goals expand beyond the barn site to the Esparto train station, which can host test kitchens, a farm shop, and community spaces to produce value-added goods, teach classes, celebrate regional agritourism, and promote the local economy.

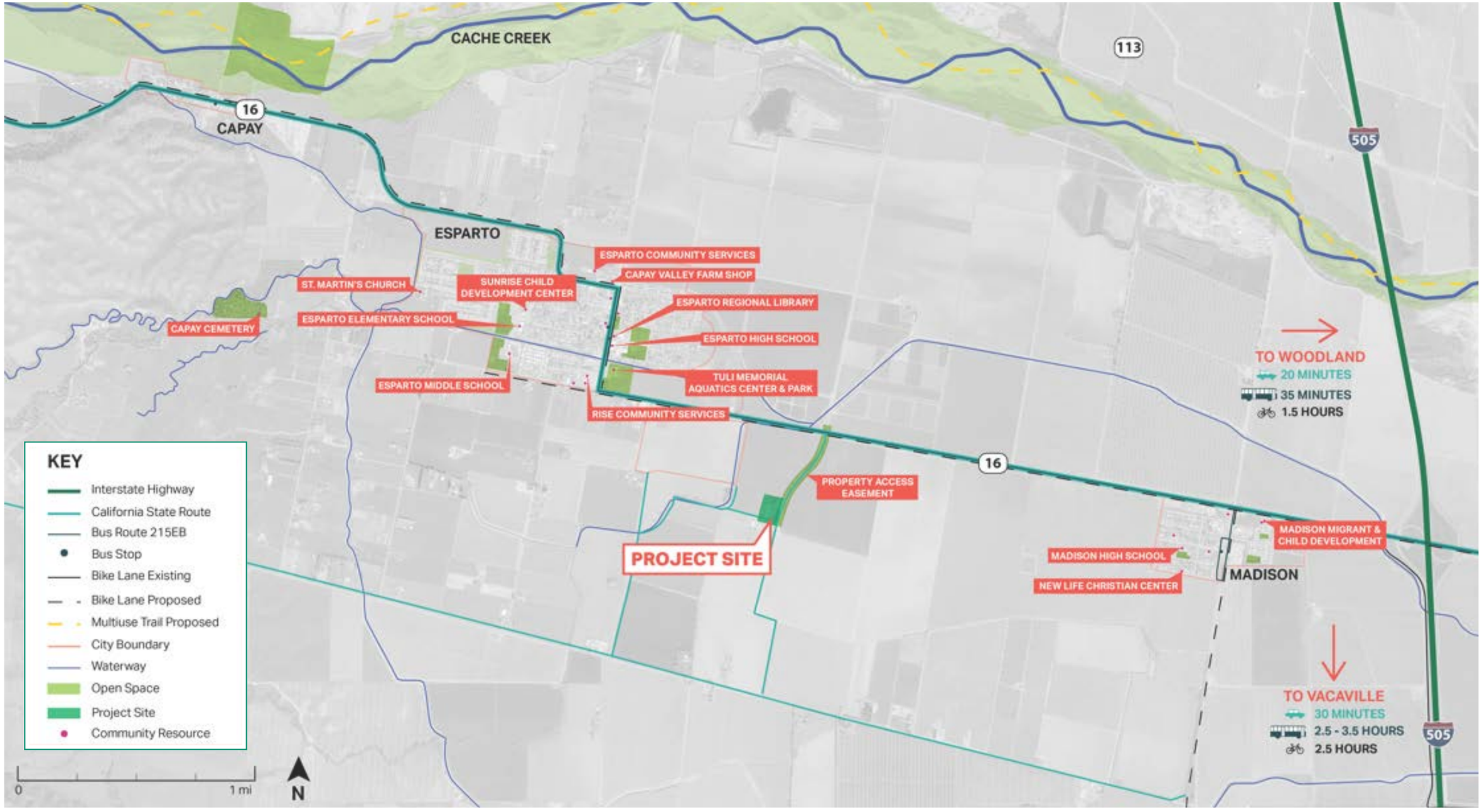
The barn's existing condition

Regional Context Map



Regional context map

Community Context Map



Community context map

01

Existing Conditions

Existing Site Conditions

Existing Site Character & Context

The 5-acre Yolo Food Hub site consists of a historic barn, gravel access roads, shed, open spaces with low grass cover, and a citrus orchard. The north end of the site also includes a residence, with a driveway, detached garage, and fenced yard. The property is surrounded by agricultural land on all sides, with a drainage ditch on the east side and additional residences to its south.

Vegetation on the project site is typical for a rural setting. As observed during the summer months, the grass cover on site is dormant with intermittent weed cover. Trees are sparsely located throughout the property's perimeter, with several oaks of varying maturity and canopy sizes.

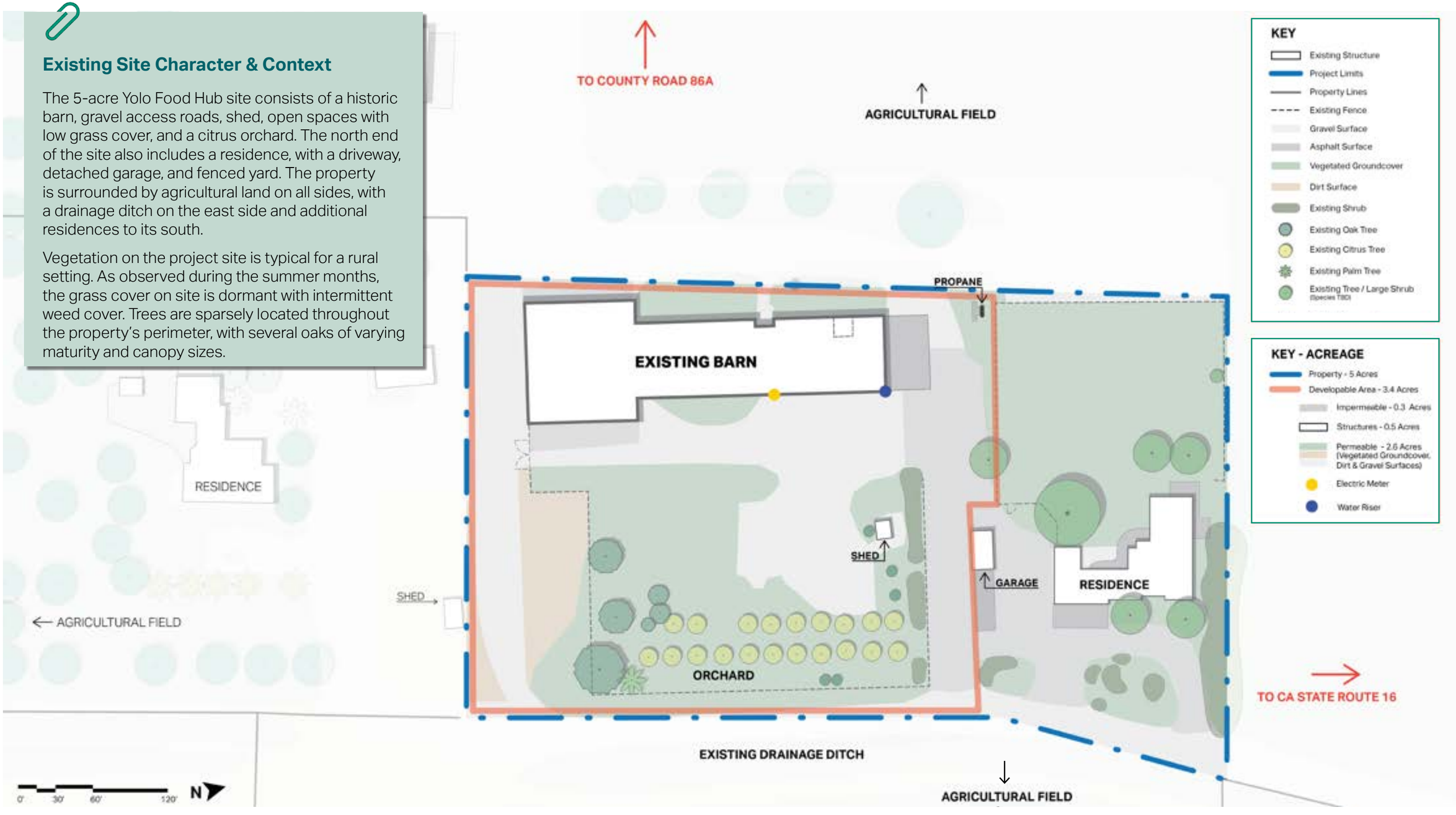


Figure 1.1: Existing site's character and context diagram

Existing Site Conditions

Existing Circulation

The property is accessible by vehicles from State Route 16 from the north and Country Road 86A from the west. There is an access easement over the roadway connecting to State Route 16, as multiple properties utilize this route as their primary access. A gravel access road abuts the project site on the south and east. There are two points of entry into the site from the south side, one of which includes a vehicular gate. On the east side, there is one entry leading to the barn structures, and two points of entry to a driveway in front of the residence. The barn structure includes several entry points for larger vehicles and farming equipment along the eastern and western facades of the structure, and a larger entry at the northern facade.

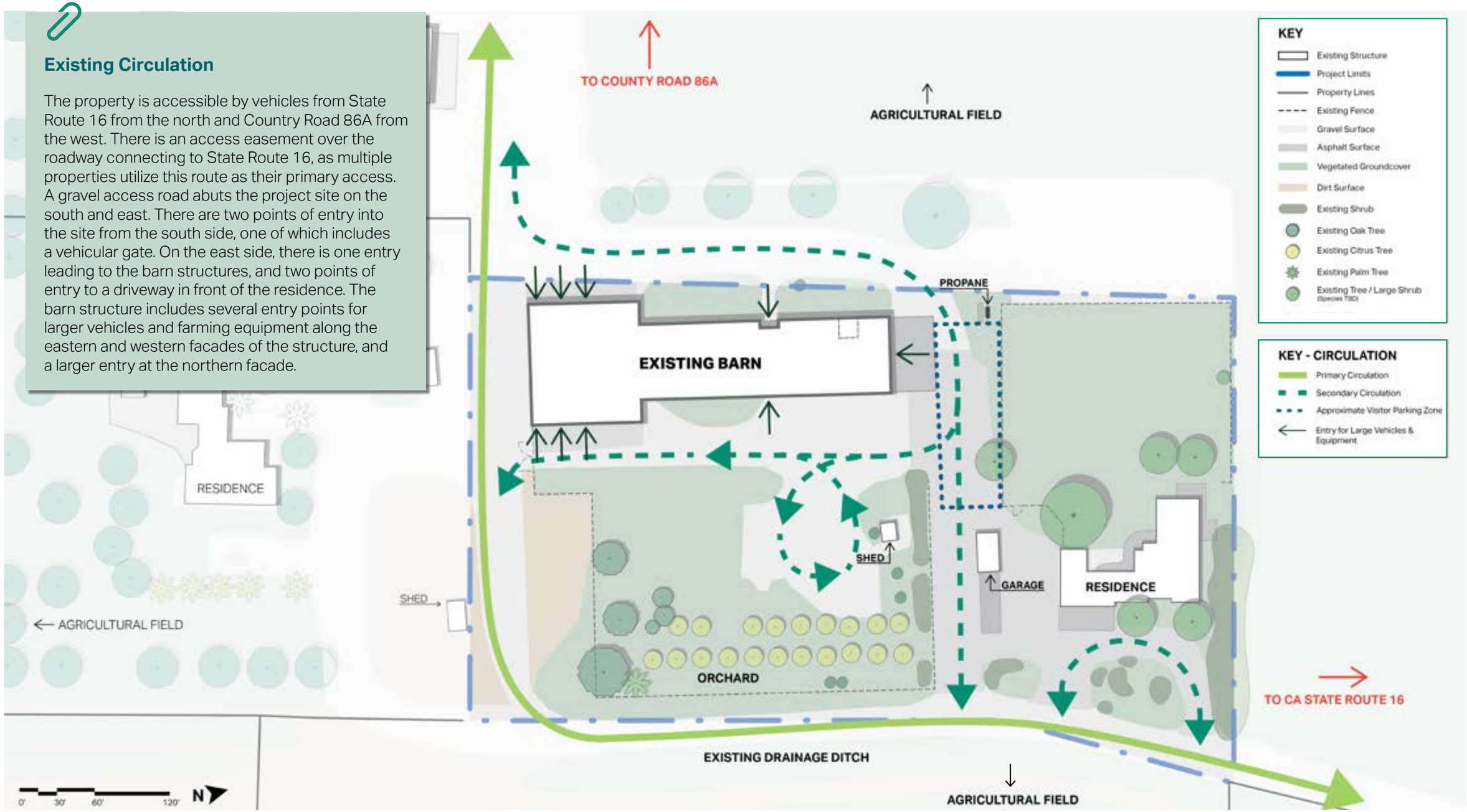


Figure 1.2: Existing circulation at the barn site

Existing Utilities - Energy

Energy

Electrical service to the site is provided by Pacific Gas & Electric (PG&E) via a 12 kilovolt (kV) overhead electrical feeder that extends north to south through the east yard from the Madison substation. There is a transformer onsite on a riser pole with a capacity to-be-determined from PG&E. From the transformer, the electrical line is routed underground via a low-voltage connection toward the main panel in the existing barn. The main panel is reported to have a 400-amp capacity[1]. Previous analysis reports that up to 2,000 amps of electrical service should be available in the area[2].

Natural gas is currently not present at the site. Propane is in place for heating systems.
Esparto receives significant solar radiation throughout the year, making the site a strong candidate for solar photovoltaics (PV). Solar radiation varies seasonally by day length, with the peak in June (average of 8.3 kilowatt-hours per square meter (kWh/sqm)) and the minimum in December (average of 2.1 kWh/sqm)[3].

Footnotes:
[1] FoodPro, Proposed Scope of Work for Creating a Food Hub in the Sacramento Valley.
[2] Sacramento Region Food Hub Feasibility Analysis. Applied Development Economics, Inc. August 2014.
[3] https://weatherspark.com/y/600/Average-Weather-in-Esparto-California-United-States-Year-Round

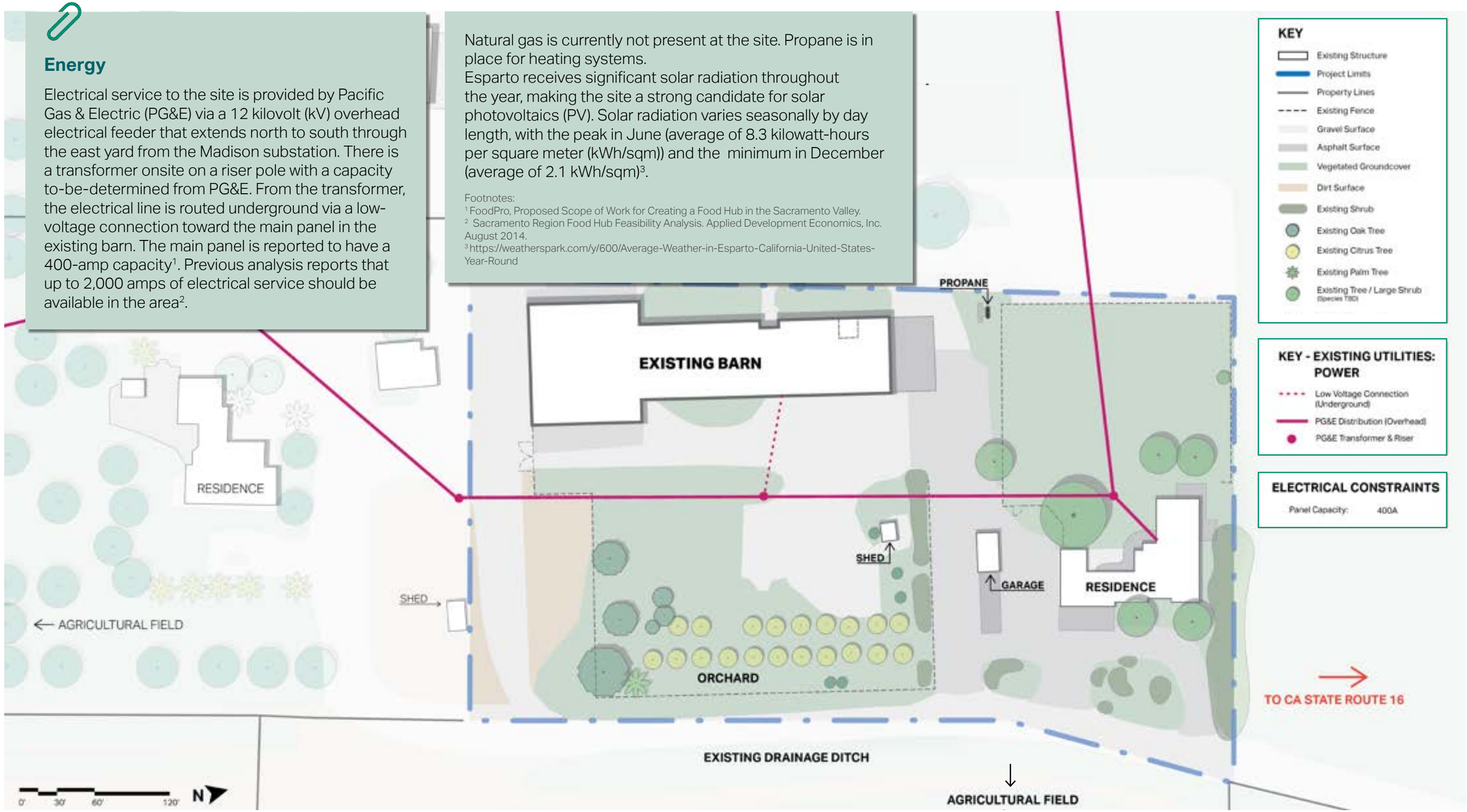


Figure 1.3: Existing water infrastructure at the barn site

Existing Utilities - Water

Water Supply

The site is approximately one mile away from the Esparto Community Services District service district boundary (refer to map in Appendix C), does not have any municipal water utility connections (water, wastewater, or stormwater), and is not within any of the designated Yolo County Community Service Areas (CSA)[1] . Water is supplied to the barn and residence by a well, equipped with a submersible pump. There is an additional, newer, non-operating, well directly adjacent to the primary well. According to signage in the adjacent shed, one of the pumps is a 5-horsepower pump, installed in 1986. The operating well pump produces 10-15 gallons of water per minute (gpm)[2].

Two pressure tanks in the shed deliver pressurized water to the domestic and irrigation system. Per review of public files on the California Department of Water Resources database[3], it was noted that one of the onsite wells (Well #176621) is 220 feet deep and 6-inches in diameter, but there is no information on its water production capacity. However, two nearby deep wells off the property (Wells #571170 and #571172) produce approximately 1,000 gpm during initial pump tests. All three wells have screens installed at similar depths, suggesting that the well onsite may produce water at similar rates. A well pump test to determine the yield of the two existing wells is recommended; steps to complete this test is outlined in Appendix C.

Per New Season, the water quality is good and has limited salts but is hard due to calcium levels. There are no restrictions on the amount of water that can be drawn from the existing well. Testing the well water quality for constituents typically found in fertilizers/pesticides/herbicides such as nitrate or selenium is recommended.

The project site is within the Sacramento Valley Subregion watershed[4] and the Yolo Subbasin groundwater basin.[5] The groundwater basin is considered a high-priority basin for sustainable groundwater management by the State, and as a result the region has adopted sustainable management goals and actions.[6]

There is no existing fire suppression system within the barn. Hose bibs and an existing drip irrigation and micro-sprinkler irrigation system are supplied by a buried distribution line that connects to the operating well.

Wastewater

Two septic systems (tanks and leach lines) serve the residence and the barn. The residential septic system is buried to the west of the residence and receives wastewater from the residence only. The septic system buried on the west side of the barn collects wastewater from the barn's sinks and toilets. The capacity, age, and condition of the septic systems are unknown.

Stormwater

Esparto historically receives 23.2 inches of rain annually, with winter months experiencing the most (4.6 inches/month in February) and no recorded rainfall in the summer months (July and August). Existing surface types at the property are a mix of impermeable (e.g., asphalt) and permeable (grass and gravel) surfaces. The soils at the site are mostly fine-silty clay (Drained Sycamore Complex) with some clay loam (Brentwood Silty Clay Loam). [7, 8]

Currently, stormwater generally drains out to a drainage ditch parallel to Oakdale Ranch Lane. Roof gutters on the east side of the barn roof help to channel rainwater to the ground for conveyance to the drainage ditch. Two buried stormwater pipes and a storm drain in the east yard transport water off the property, one north of the barn and one south. New Season has noted the site is well-draining and does not experience any localized ponding or flooding.

Changes to the site can alter the flow of stormwater and would likely require project compliance with the Yolo County stormwater management code[9]. The clay soils at the site typically have poor infiltration (drain slowly), and the site will likely need engineered stormwater systems to comply with local stormwater code, such as through implementing appropriate Best Management Practices (BMPs) to control the volume, rate, and potential pollutant load of stormwater runoff from the site.

Organic Waste

Food processing would produce organic waste that will either need to be hauled off-site or managed on-site. Waste production volumes and frequency of waste production should be further investigated to identify benefits of onsite organic waste management and potential synergies with wastewater treatment processes or other agricultural processes (e.g., fertilizer production).

Organic material in Yolo County is handled at the Anaerobic Composting Facility at the Yolo County Central Landfill. Senate Bill 1383 requires California jurisdictions to provide organic waste collection services to businesses. If businesses choose not to manage organic waste on-site, they are required to contract with one of Yolo County's organic waste collection services or self-haul to a composting facility or other organic waste collection program. Commercial edible food generators, including food distributors and food service providers, are also required to recover edible food that would otherwise be disposed for donation to a food recovery organization[10].

Footnotes:
[1] County of Yolo 2030 Countywide General Plan – Chapter 5 Public Facilities and Services (2009)
[2] FoodPro, Proposed Scope of Work for Creating a Food Hub in the Sacramento Valley.
[3] https://cadwr.app.box.com/v/WellCompletionReports/folder/77422600231?page=9
[4] https://sacriver.org/explore-watersheds/sacramento-valley-subregion/
[5] https://www.yologroundwater.org/
[6] https://www.yologroundwater.org/yolo-subbasin-groundwater-sustainability-plan
[7] USDA Soil Survey via UC Davis GIS: https://casoilresource.lawr.ucdavis.edu/gmap/?loc=38.68538,-121.99467,z17
[8] Yolo County Integrated Regional Water Management Plan, Chapter 3 Soils of Yolo County: http://www.yolowra.org/tech_data_appendix/Chapter%203%20-%20Soils.pdf
[9] https://www.yolocounty.org/government/general-government-departments/community-services/public-works-division/storm-water-management
[10] https://www.yolocounty.org/home/ home/showpublisheddocument/72527/637801025350670000

Existing Utilities - Water

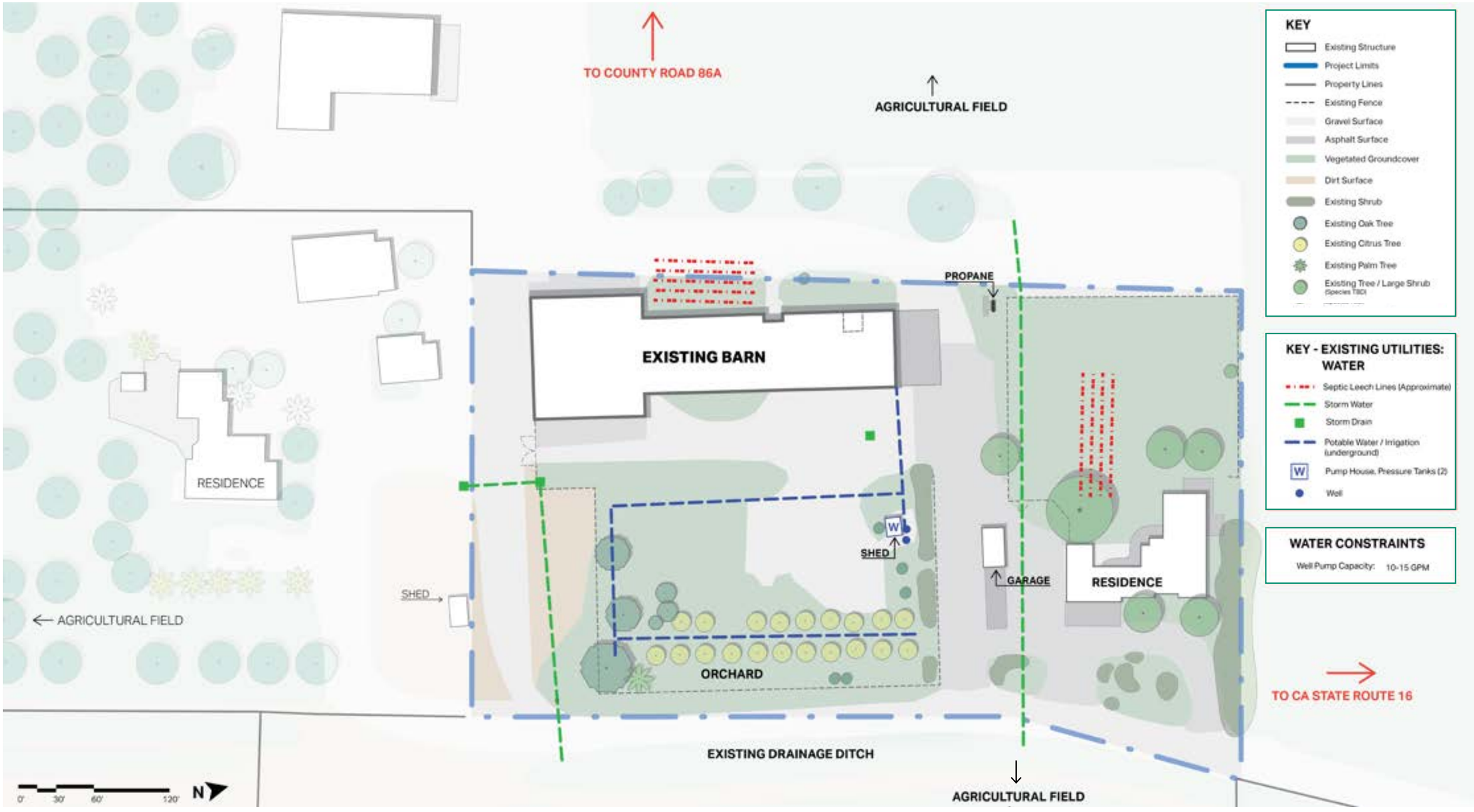


Figure 1.4: Existing energy utilities at the barn site

Existing Barn Summary

Historic Barn

The barn is a single-story wood-framed agricultural building constructed between approximately 1900 and 1945. The barn is made up of two sections:

1. The original barn construction to the south, built circa 1900;
2. An extension to the north added approximately 20-45 years after the original construction.

The southern original construction section is 88-feet wide by 96-feet long and is subdivided into five east to west bays created by load-bearing walls. The northern extension is 60-feet wide by 200-feet long and is composed of three north to south bays that run the full length of the extension. Currently the north and south bays of the extension have been divided into a series of small rooms that have been used for storage, office space, and a small apartment. There are floors above these smaller rooms that allow the space above to be used for storage. The central bay is left open.

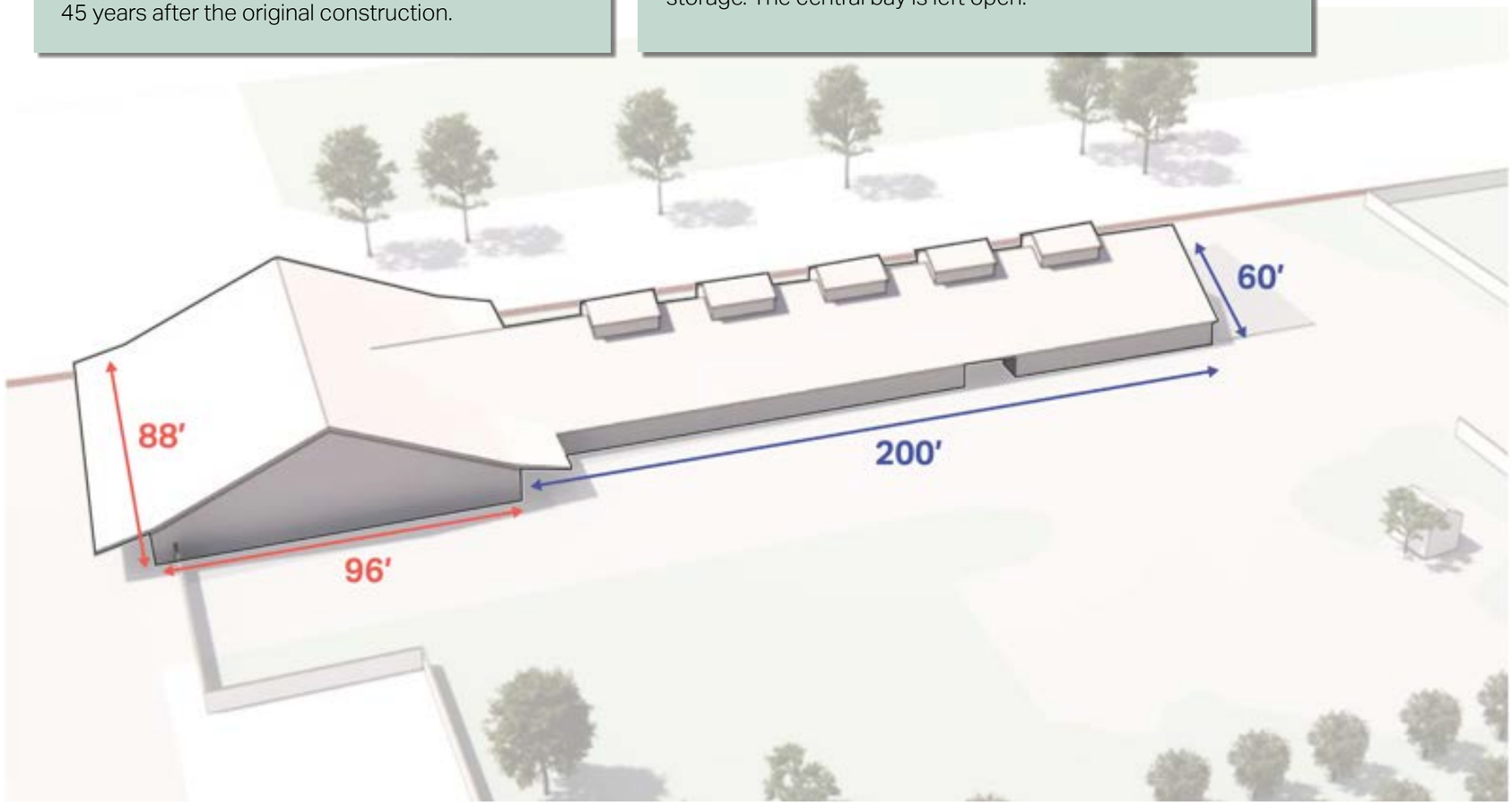


Figure 1.5: Dimensions and orientation of the barn

Summary

- Agricultural building (AG)
- No weather enclosure
- Timber construction

Original Barn ~ 120 years old

- 96' X 88' (~8,500 sf)
- Composed of five east to west structural bays with load bearing walls dividing.

Figure 1.6: Original barn

North Extension ~ 70 - 100 years old

- 200' X 60' (~12,000 sf)
- Composed of three north to south structural bays with low partition walls.

Figure 1.7: North extension of the barn

Existing Barn Structure

The wood-frame of the barn sits on a concrete slab between 6-inches and 15-inches deep in different parts of the building. The wood members that make up the barn were likely built with old-growth redwood, which was readily available at the time of construction. The wood members are not appropriately sized to meet the current California Building Code. The frame of the barn is clad with approximately 1x4-inch wood planks attached to the exterior of the frame.

There is no formal weather envelope for the barn, which means that the exterior walls are not sealed or insulated against the elements. The majority of the framing is heavily discolored due to periodic water intrusion over time. The roof framing is heavily cracked in several areas. One of the valley rafters located at the transition between the original barn roof and the addition roof is heavily damaged. A high degree of termite damage was found within one 6x6-inch post, and the other 6x6-inch posts have various degrees of weathering and splitting. Some of the loft joists are heavily weathered. The foundations are cracked in several locations.

All structural members are undersized relative to current building codes, and the building is starting to show its age.

Figure 1.8: Structural details of the barn

1 Structural members that connect original barn to the north extension are inadequate.

2 Original framing has degraded over time due to exposure to elements.

3 Partition walls built between bays are likely reinforcing the barn's structure.

Barn Summary

The deteriorated state of the barn's structure means that the partition walls in the northern extension are likely helping to hold the barn together. This gives the partition walls an outsized influence on how the space inside of the barn is subdivided and how the barn can be utilized.

The barn is approximately 22,000 square feet (sf), but its partitioning, roof heights, and floor slab conditions make it difficult to make efficient use of the full building area. The most efficient arrangement for storage would likely be achieved by lining the edges of the structure with shelving. Ideally, an area dedicated for dry goods storage would allow for palletized elevated shelving that can be accessed with a forklift that can circulate with limited obstructions.

Structural repairs or reinforcements need to be made with the overall long-term use in mind, not only to strengthen the barn. For instance, if the exterior diaphragm is reinforced, it should be strengthened sufficiently to allow for rooftop solar panels. If the structure of the barn is reinforced, it should be done in a way that can open up the interior space to allow for unobstructed circulation and storage. Although the storage space may require reduced conditioning, there will still be a need to minimize dust. Given the porous state of the structure, significant investment will be needed to seal the building from outside elements.

1 The barn holds **aesthetic significance** and can serve for many more years as it was initially intended.

2 The original intended use for the barn was for livestock and **re-purposing the structure** for the purposes of food storage and processing will require significant investment while still limiting the functionality of the structure.

Figure 1.9: Existing barn - looking west to east

02

Facility and Spatial Needs Workshop Summary

Overview

To inform the development of design concepts for the barn site, AECOM and Resilient Cities Catalyst hosted a virtual workshop for the Yolo Food Hub network on July 12th, 2023. Participants were asked to share their vision of the site's priority activities and functions in the short-, medium-, and long-term, and discuss how that would shape the infrastructure and equipment needed to realize these priorities. Visualization exercises helped to define how the barn site would — and would not — look. Throughout the workshop, participants described what the barn meant for them and their community, and how they envisioned the Yolo Food Hub network could support not only existing farms today but new generations of young farmers and surrounding residents. Through these conversations, a clear picture emerged of a close-knit agricultural community passionate about strengthening, supporting, and celebrating their region.

Key findings that emerged during the workshop include the central importance of storage and circulation to meet the Food Hub's short-term goals, and the need for aggregation and processing to enable small local growers to achieve a viable price for their produce and access institutional buyers in the region. The workshop also highlighted how the Yolo Food Hub could play a role in supporting other food hubs, the Food Bank, and new farmers through providing processing and other resources. For AECOM, the workshop articulated the key goals and activities that the concept design should support while conserving energy and water.

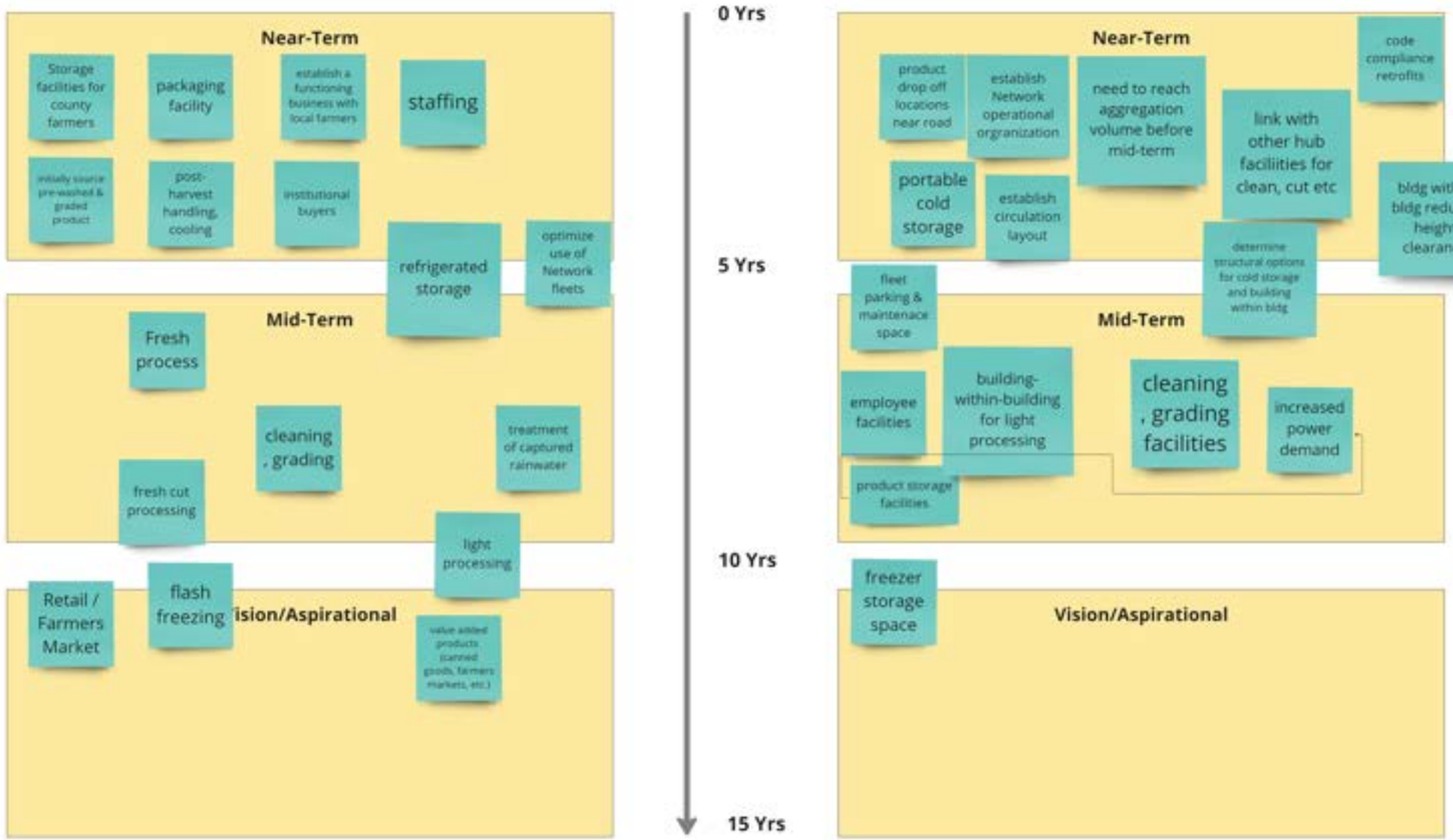


Figure 2.1: Interactive whiteboard documenting the discussion of the Business Model and Network Operations breakout group.

Participants and Roles

New Season Community Development Corporation

The building owner, and a local non-profit organization focused on purchasing distressed buildings in the Esparto area and bringing them back to life. The barn is the first facility New Season Community Development Corporation (New Season) has purchased outside Esparto town limits.

Jim Durst

Jim is President of the New Season Board, and a local farmer with over 35 years experience.

Sue Heitman

Sue is a founding member of New Season and Capay Valley Vision, a local organization dedicated to advancing a future vision for the region.

Lynn Rolston

Lynn is a founding member of New Season, and an Esparto farmer with over 20 years experience.

Bill Hailey

Bill is a retired architect and urban planner, specializing in restoration architecture and historical preservation, with family ties to the original owners.

Yolo Food Hub Network

Local stakeholders that play active roles in advancing the Food Hub development and will likely be future users of the Food Hub. Note that New Season is also part of the Yolo Food Hub network.

Valley Vision

Grace Kaufman & Trish Kelly

Provides coordination and project management for the Food Hub network. Helped develop the original food hub concept to support local economy and increase supply chain viability.

Kitchen Table Advisors & Capay Valley Shop

Thomas Nelson

Kitchen Table Advisors is a non-profit supporting viability for Northern California farmers, and aims to strengthen farmers' powers in the agricultural system. The Capay Valley Farm Shop connects local farmers to customers in the region, assisting with food transport, storage, and other services.

Yolo Food Bank

Karen Baker

Executive director of the Yolo Food Bank in Woodland, which serves approximately 21,000 residents in Yolo County.

Hatamiya Group

Lon Hatamiya

Principal consultant to the Yolo Food Hub network, former USDA administrator, and third-generation farmer. Co-author of the original food hub study for SACOG.

Spork Food Hub & Fiery Ginger Farm

Hope Sippola & Shayne Zurilgen

Owners of a five-acre farm in West Sacramento and Spork Food Hub, which aggregates and sells produce to local schools, institutions, and restaurants.

Wes Ervin

A former New Season board member and former economic development manager for Yolo County, current planner for the City of Oroville.

Consultants and Advisors

Provides technical services and assistance to the Yolo Food Hub network.

Resilient Cities Catalyst

Jeb Brugmann & Kaiwen Shi

Through its Project Preparation Program, Resilient Cities Catalyst is supporting the Yolo Food Hub to move from planning to implementation with assistance on capacity building, funding, and technical assistance (via AECOM).

FoodPro

Bill Washburn & Olga Washburn

Industrial and mechanical engineers and experts in food processing. FoodPro is a company that plans and implements food processing designs, with an emphasis on food safety.

McCandless Architects

Steve Jewkes

A local architect and farmer providing architectural services to New Season.

Carlson Williams

Eric Lakin

A licensed contractor and developer retained as an advisor to New Season.

AECOM

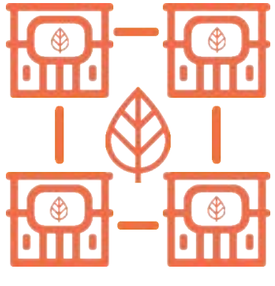
Chris Lynn, Diana Edwards, Shelley Jiang, Kelvin Sharma, Isaac Smith, Kenny Teeter, & Madeleine Craig

Through Resilient Cities Catalyst, AECOM is providing technical and design assistance to the Yolo Food Hub network.

Priorities & Space/Facility Needs Exercise

Participants divided into breakout groups to discuss the planned priorities, functionalities, and activities at the barn site, which then would help determine the facility and building features necessary to support those activities. Topic areas for the three breakout groups:

Farm Operations and the Regional Agricultural Economy



Facility Business Model and Food Hub Network Operations

Community Development and Social Needs

Participants were asked to consider the following questions within the framework of a 15 year full build-out scenario for the barn site. The next section summarizes the conversations across each of the three breakout groups and captures snapshots of the Miro boards that supported group brainstorming.

1 *What are the short-, medium-, and long-term goals and priorities for this site, given the facilities and resources already available in the Yolo Food Hub Network?*

2 *Given the facilities, spaces, and resources already available in the Network, what are the greatest needs and priorities for utilization of the barn and farm site?*

Priorities & Space/Facility Needs Exercise

Breakout Session Group 1 - Farm Operations & Regional Agricultural Economy

Time frame	Priorities and Activities	Facility and Spatial Needs
Near-term *0-5 years*	• Farm commodity aggregation and storage, including cold storage • Pre-cooling • Washing and packaging • Food safety • Shipping and receiving stations	• Modular cold storage • Barn as cold storage structure • Stormwater management • Vehicle circulation • Elevated docks • Forklifts • Auxiliary structure

Mid-term
5-10 years
	• Building institutional partnerships
	• Customized processing for institutional partners
	• Flash freezing
	• Farmer services:
	  • Marketing and safety support
	  • Forward planning for farmers
	  • Product development support system
		• Auxiliary structure east of barn
		• Processing facility
		• Second well
		• Back-up power
		• Sprinkling for dust control
		• Office space

Vision / Aspirational *10-15 years*	• Entrepreneurial hub • Ag-tourism • Amenity/café • Celebrate agricultural economy • Site retail for local produce • Network synergy • Farm to test kitchen	• Branding and marketing • Office space

Table 2.1: Breakout session group 1 - Summary of Priority and Spatial Needs Input

Priorities & Space/Facility Needs Exercise

Breakout Session Group 1 - Farm Operations & Regional Agricultural Economy

Key Takeaways

1

Satellite receiving stations near farms could help alleviate traffic into the site by aggregating deliveries. They may need to support pre-cooling, which would entail temperature controls and energy use.

2

Storage, vehicle circulation, and shipping docks were all seen as essential to initial phase of the barn.

3

Spatial layout of equipment is important to **support aggregation, packing, and cooling.** Other equipment needs include special concrete for the floor to support flash freezing.

4

Barn may be best utilized as a **small cold/dry storage**, potentially as a shell with a new building inside. **An auxiliary structure** to the east can support food processing activities.

5

Wastewater can be used to **manage dust on driveways and support landscaping** along State Route 16.

6

Commercial and test kitchen is more likely at the **former train station** in Esparto.

7

Potential to partner to **provide training and a suite of services** for farmers that are in the Food Hub network.

Priorities & Space/Facility Needs Exercise

Breakout Session Group 2 - Facility Business Model & Food Hub Network Operations

Summary of Priority and Spatial Needs Input

Time frame	Priorities and Activities	Facility and Spatial Needs
Near-term *0-5 years*	• Initially source pre-washed and graded product • Post-harvest handling and cooling • Storage facilities • Packaging facility • Establishing a functioning business with local farmers • Staffing • Institutional buyers *Near-/mid-term:* • Refrigerated storage • Optimize use of network fleets	• Product drop-off locations near road • Portable cold storage • Establish circulation layout • Code-compliant retrofits • Determine structural options for cold storage and a building-within-a-building concept • Establish network operational organization • Need to reach aggregation volume before mid-term • Link with other hub facilities for cleaning and cutting, etc.
Mid-term *5-10 years*	• Fresh-cut processing • Cleaning and grading • Light processing • Treatment of captured rainwater	• Building-within-building for light processing • Product storage facilities • Cleaning and grading facilities • Increased power demand • Fleet parking and maintenance space • Employee facilities
Vision / Aspirational *10-15 years*	• Retail / farmers market • Flash-freezing • Value-added products (canned goods, farmers markets, etc.)	• Freezer storage space

Table 2.2: Breakout session group 2 - Summary of Priority and Spatial Needs Input

Priorities & Space/Facility Needs Exercise

Breakout Session Group 2 - Facility Business Model & Food Hub Network Operations

Key Takeaways

1

Challenges of restoring the barn: The first priority is to know what can be done in the building, considering its **structure and design,** in the near-term – and what cannot be done.

2

Building within a building concept was noted as one potential solution, but potential challenges include reduced height clearance and whether it could support a small processing facility.

3

Multiple participants highlighted the **importance of cold storage**, but there was uncertainty over whether this was a short- or medium-term priority due to the cost and structural challenges of the barn.

4

Fleet management and operations are important but expensive.

5

Mapping this facility in relation to the existing partners reveals a need for storage, especially **refrigerated storage**. All existing partners (Capay Farm Shop, the Food Bank, and Spork) are maxed out for storage, and all need processing capacity.

6

Operational agreements should be established between food hubs for **resource sharing.**

7

The ability to aggregate and distribute larger quantities of product to buyers is key to profitability for the Food Hub. Food hubs can provide larger volumes of product to buyers that small farms can't provide on their own.

> *There are opportunities to use the barn as a component of an overall network. The Capay Farm Shop could do a few things, the Food Bank and Spork can do a few things.*
>
> ***The question is, what can this barn facility do first?***
>
> -Breakout group participant

Priorities & Space/Facility Needs Exercise

Breakout Session Group 3 - Community Development & Social Needs

Summary of Priority and Spatial Needs Input

Time frame	Priorities and Activities	Facility and Spatial Needs
Near-term *0-5 years*	• Food access: Provide good, local produce for residents • Generate jobs and hire locally • Aggregate transport, delivery, processing, and order fulfillment for farmers • Streamline transportation to Bay Area farmers markets • Cold storage and light processing • Refrigerated transport	• Temporary community farm stand operating 1-2 days per week while train station site is under development • Drop-off point or drive-through for Food Bank boxes
Mid-term *5-10 years*	• Collaboration space for upcoming funding • Farmer education (but a lot of people go to UC Davis)	• Train station (Phase 3) as site for farmers market and community space • Meeting room or hub for farmers to get updates on funding sources and resources
Vision / Aspirational *10-15 years*	• Education and skill sharing for farmers, how to wholesale, etc.	

Table 2.3: Breakout session group 3 - Summary of Priority and Spatial Needs Input

Priorities & Space/Facility Needs Exercise

Breakout Session Group 3 - Community Development & Social Needs

Key Takeaways

1

Esparto is one of the most food-insecure communities in Yolo County. Many residents **lack access to good, local produce**, and a commitment to food access should be integrated into the project to support people who cannot afford it.

2

Participants suggested **exploring a temporary community farm stand** that can operate at the barn on certain days of the week until the train station site is ready to serve as a market. The barn could also serve as a pick-up site for the Food Bank.

3

Spork Food Hub's business model could serve as a potential reference point: Spork receives and aggregates produce from multiple farms as needed to fulfill orders, and delivers to the buyer. They also handle processing, because it would be a logistical challenge for farmers to do so within the limited time window to maintain freshness.

4

Processing is critical to help local farms **achieve an acceptable price**. Spork noted it was more cost-efficient to work with a food processor in Sacramento rather than establishing their own processing. The Yolo Food Hub could provide another such option for processing.

5

The Food Bank would like to **support the Yolo Food Hub** and is open to **providing infrastructure funding** if they commit to a certain percentage of the food going to the food insecure. They could also assist with enabling the use of electronic benefit transfer (EBT) funds at a farm stand.

6

Yolo Food Hub envisions the **Esparto train station site serving as their community-facing space for classes and education,** with branding to make clear the connection between the two sites.

> *Is it a part of a food hub network?*
> *Or is it a farmer network?*
> *Or is it both?*
>
> -Breakout group participant

Visual Mapping

Across all breakout groups, there was strong consensus on the images stakeholders identified as being closely aligned and not aligned with the goals and vision for the Yolo Food Hub.

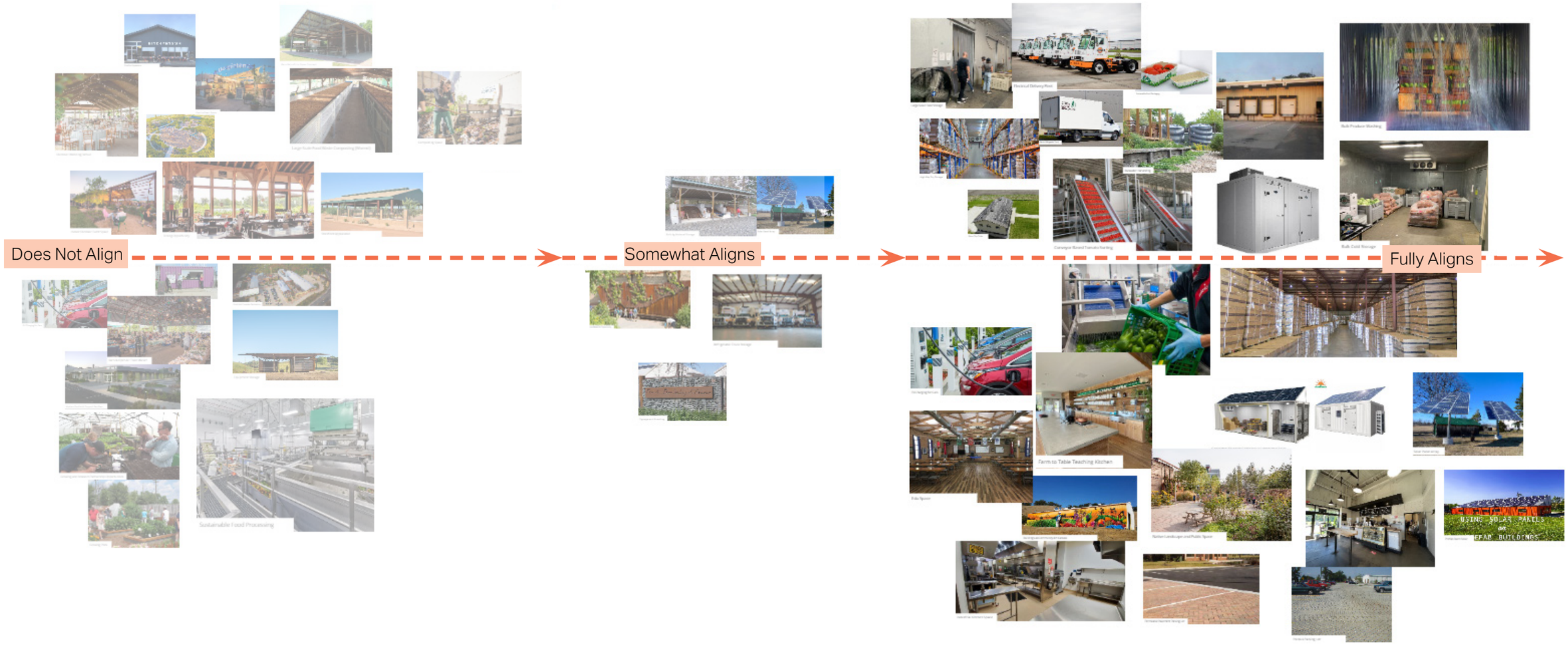


Figure 2.2: Visual Mapping results

Visual Mapping

For the visual mapping exercise, participants worked in breakout groups to place images on a spectrum of alignment with their visions for the Yolo Food Hub, as shown in Figure 2.1 Participants discussed why these images did or did not represent their aspirations.

There was broad consensus that the following do not align with the Food Hub's goals and vision:

Public gathering, dining, and event spaces

Design-forward elements; one participant noted the Food Hub doesn't have to look cool but should be a welcoming community space

Growing plots, open-air farmers markets, and composting

Stakeholders differed in their perspectives on the following:

Participants supported community-driven art such as murals, noting they were popular in Esparto, but some questioned whether they were a good use of resources at this phase in the project. The first focus should be functionality.

Similarly, electric vehicle charging was not aligned for one group, while another group noted it was fully aligned, further emphasizing that charging infrastructure should also support heavy-duty trucks.

Some said that vehicle storage was somewhat aligned, while others said it did not align, due to lack of space.

Across all groups, stakeholders noted that the following closely aligned with their vision for the project:

Food processing equipment, storage, cold storage, washing, and other function-forward features

Loading docks and trucks, including electric trucks

Sustainability features, including solar panels, permeable pavements, rainwater harvesting, and native landscaping.

Workshop Findings and Outcomes

Priorities and goals

The Yolo Food Hub will operate within a **larger network** of food hubs, agricultural producers, and other partners. By complementing and augmenting the services provided by existing food hubs, the Yolo Food Hub can increase resilience and stability for small local growers, provide local processing, aggregate their products, and distribute larger volumes to institutional buyers.

The Yolo Food Hub also has a **community-building** role to play through education and training for new and young farmers, job creation, and enhancing access to locally grown food. Partnering with the Yolo Food Bank can bring locally grown produce to food-insecure residents in Yolo County, supporting greater food access.

In the near-term, **storage, especially cold storage**, was identified as a key priority for the Yolo Food Hub to support other food hubs and partners. Storage can also include post-harvest handling, washing, cooling, and aggregation of produce to meet the needs of large-scale buyers.

Mid-term needs include washing, cleaning, fresh-cut and light processing, flash freezing, and packing, which can enable the Food Hub to effectively supply large-scale **institutional buyers. Processing is seen as critical to meet buyer requirements** and add value to agricultural products, which can enable local farmers to achieve an acceptable price for their produce.

Long-term goals expand beyond the barn site to the **Esparto train station**, which can host test kitchens, a farm shop, and community spaces to produce value-added goods, teach classes, celebrate regional agritourism, and promote the local economy.

A **building within the existing barn** concept may be able to meet near- and medium-term storage needs, such as through modular cold storage units, but a fresh-cut processing facility would likely need to be housed in a **new, food-safe building.**

Other **immediate near-term needs include vehicle circulation, shipping and receiving docks, modular storage,** and stormwater and wastewater management. However, the site size (5 acres) may make it challenging to fulfill some of these competing needs.

Sustainability is important to the Yolo Food Hub network, and mid-term plans for enhanced food processing would increase energy and water demands. The network is interested in exploring net-zero energy through on-site solar photovoltaics and sustainable water use and management.

Technical Considerations

1

Agricultural processing sites that generate 60 or more truck trips per day would **require a Minor Use Permit from Yolo County.** While it's likely that at least 60 farms and partners would be interested in using the Food Hub, they are unlikely to deliver every day.

2

Nonetheless, **receiving stations located closer to the farms** were suggested as one possibility to reduce the number of trips to the site each day and minimize disturbance to neighbours. These stations would need power and temperature controls to provide pre-cooling and chilled storage.

3

Space for on-site circulation should **support trucks** in a range of sizes, from cargo vans to semi-trucks.

4

The site has two **septic systems,** one for the residence and one for the barn, but they could be **moved, replaced, or combined**. Each septic system has an associated leech field, to the west.

03

Preferred Concept Scenario

Final Concept Design

The long-term vision for the Yolo Food Hub is illustrated in Figure 3.5 to Figure 3.9. The primary gesture of the site concept is the new structure parallel to the historic barn. Maximizing connectivity and functionality, the new structure and the barn are located close together. This tight arrangement was noted as important by the Yolo Food Hub network to minimize distance for moving food between processing and storage. It also allows for much of the existing open space to be preserved — specifically the orchard — maintaining the site's agricultural legacy while reinforcing the landscape buffer between the property and Oakdale Ranch Lane to the east.

The Barn

This concept recognizes the Yolo Food Hub's desire to take the fastest and least-expensive route to making the barn useful. To this aim, 13 modular refrigerator units are proposed for the original southern barn and a part of the northern addition. The units are individually temperature-controlled and provide 9,160sf of cold storage. Up to four units in the northern extension can provide pre-cooling. As the refrigerators are considered equipment, they can be installed without necessitating expensive structural upgrades to the barn to meet current building codes.

The remaining 5,500sf in the north end of the barn is proposed to be renovated up to current code. The renovated space is split into two: 3,000sf for dry storage and light processing, and 2,400sf for administrative and employee spaces. A central circulation corridor runs through the entire barn for free movement of forklifts and pallet jacks.

The New Facility

Food processing and storage sites have extremely strict guidelines for hygienic materials, climate control, insulation and enclosure. Building code-compliant spaces in the barn would require costly partial demolishment and reconstruction. Moreover, the barn's historic character would be lost and functionality constrained by its footprint and layout.

To meet demand for processing and increased cold storage, a new facility is proposed east of the barn. This 26,000sf facility will be scaled to complement the barn and site. A new building designed to optimize food handling, processing, and storage leads to a significantly more efficient building than the barn would allow. The new building includes:

- A 2,000sf pre-cooling loop, nested inside the cold storage area, directly adjacent to the loading dock.
- 10,000sf cold storage, with 20 ft. of clear space for stacking pallet racks.
- 5,000sf wet-processing area, directly connected to cold storage to preserve the cold loop
- 2,000sf dry processing area, adjacent to wet processing and the main circulation corridor, sized to allow for the free movement of forklifts and pallet jacks.

The new building's south side, opposite neighboring residences, is public-facing space and greets visitors and employees alike. This side includes 4,000sf for administrative space, employee restrooms and services, and a small assembly space for public and internal meetings. To preserve views of the barn, the new facility is shifted north to frame and celebrate it.

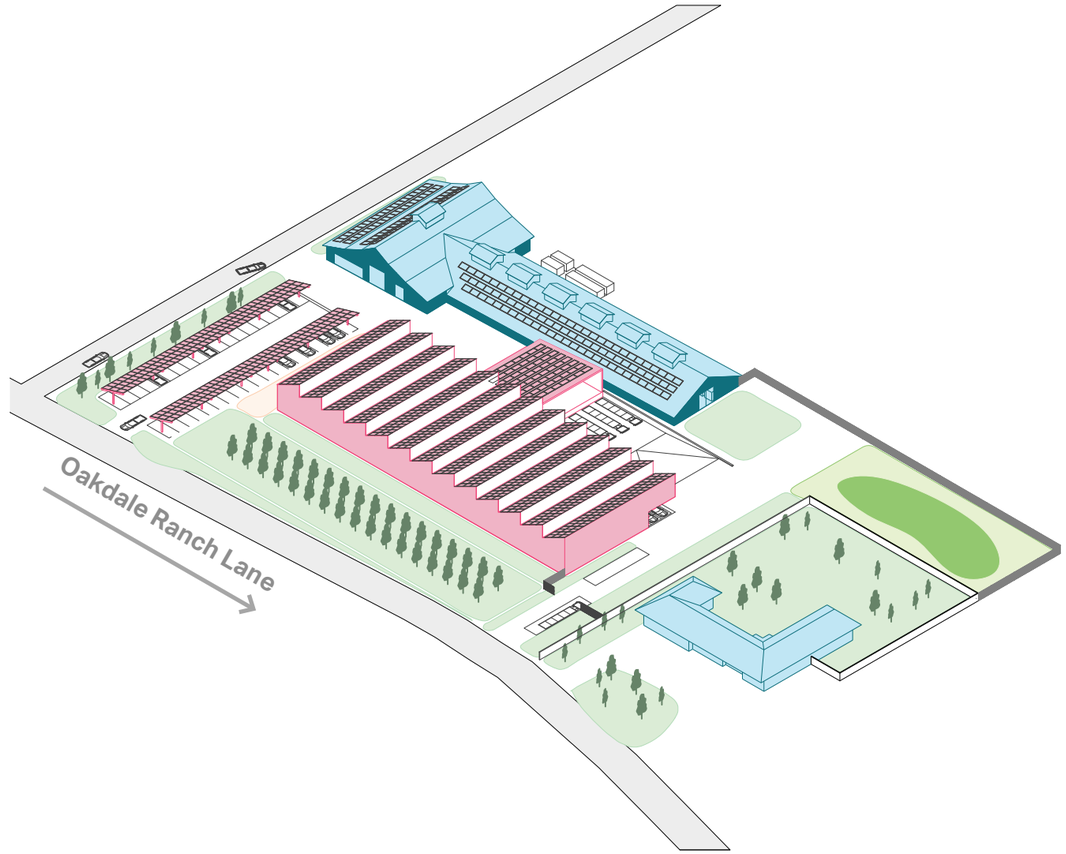


Figure 3.1: Final concept

Refined Concept

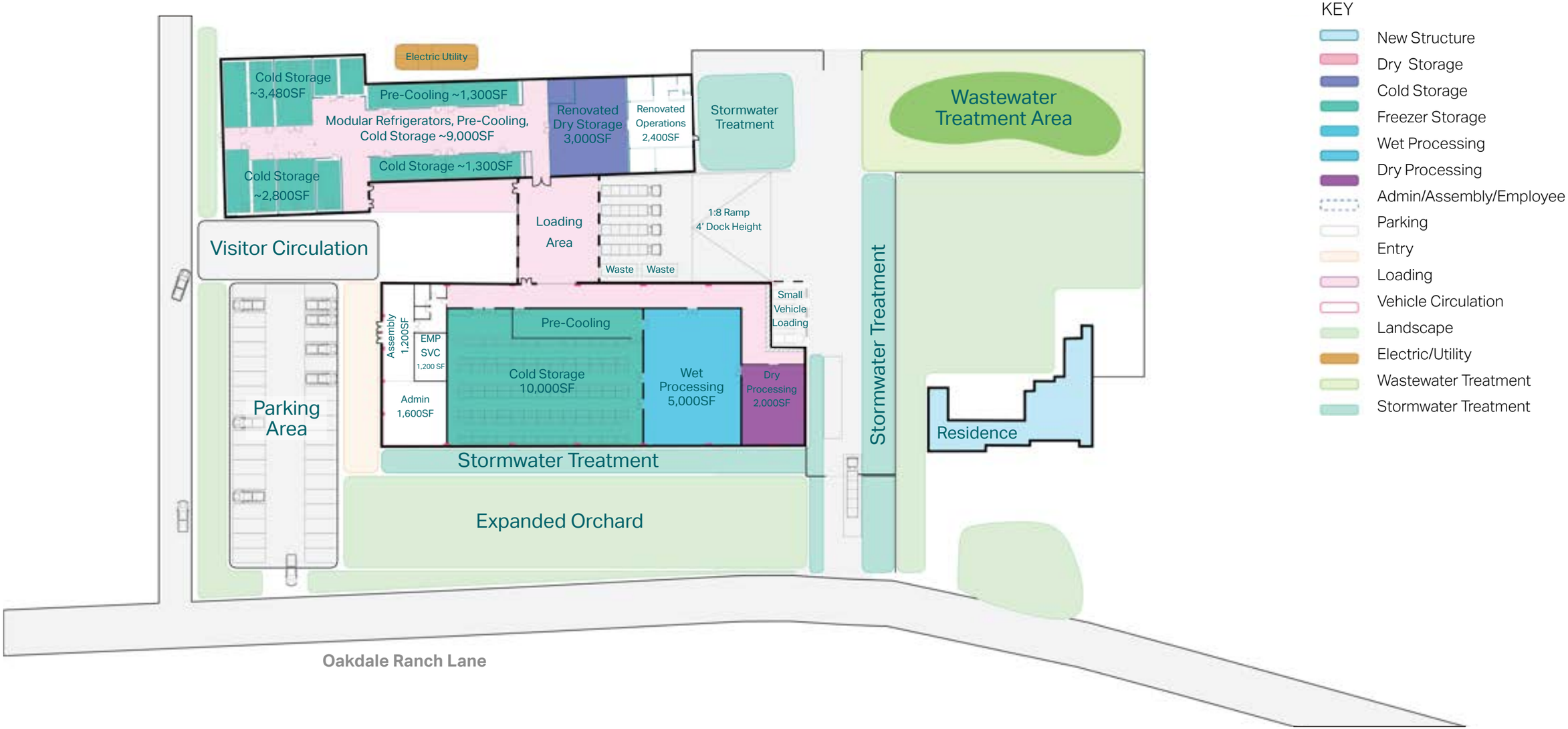


Figure 3.2: Final concept

Preferred Concept Scenario

Circulation and Site

Circulation

One design opportunity is dedicating unique spaces for shipping and receiving operations and the visitor experience. To increase maneuverability and minimize conflicts and traffic, delivery vehicle circulation is separated from smaller visitor automobiles. Figure 3.4 highlights delivery circulation at the property.

North of the new building, a drive aisle provides incoming and outgoing movement for both small- and large-scale delivery vehicles. All delivery circulation is controlled with a gated entry and scale area prior to entering the central shipping area. The south end of the site design provides a visitor-friendly experience while maintaining visibility to the distinguished feature on the site – the barn. Dual entry points to the visitor and employee parking lot provide efficient entry and egress, illustrated in Figure 3.4. A generous setback zone from the parking lot to the administrative spaces within the new structure adds to the "front door" experience. Moving between the two structures funnels users to an intimate courtyard space that can support varied outdoor functions.

The Loading Dock

A sunken 22,000sf loading dock and sorting area is centrally located between the barn and the proposed new facility to provide a shared loading zone for large-scale delivery vehicles, such as freight trucks and large vans. Regardless of whether the barn or the new facility is upgraded or constructed first, the location of the loading dock is designed to allow for comfortable circulation of large trucks accessing the site, primarily from the north. Because the barn has a low existing door height (~8'-6") limited by the eaves of the roof, the loading ramp descends four feet below grade to allow for the loading and unloading of trucks at ground level. The loading dock itself is approximately 3,500sf. The dock can be shaded and allows for sorting before deliveries are put into storage.

Small-Scale Delivery

Aside from the main loading dock, there is a second loading dock for small vehicles on the northwest corner of the new facility. It can accommodate up to four pick-up trucks, vans, or small vehicles at a time without interfering with the circulation of larger trucks using the loading dock.

Green Infrastructure

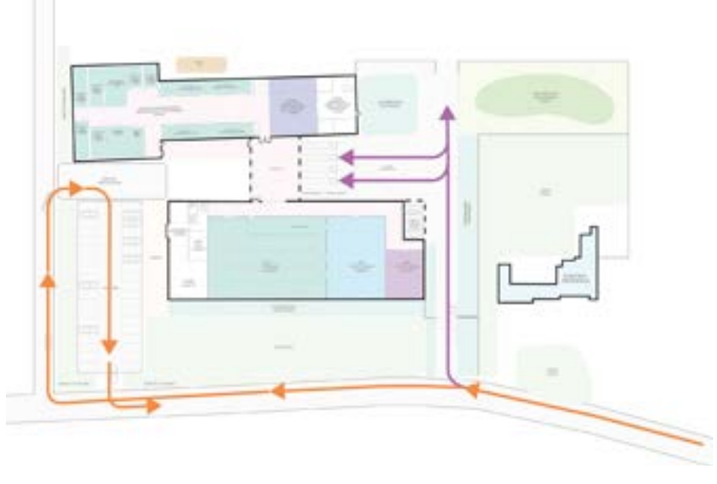
Bioretention basins have been placed near the paved areas serving delivery vehicles and along the new structure where roof runoff can be conveyed through downspouts and treated in rain gardens. To further reduce the need for drainage infrastructure and minimize stress to the existing landscape, pervious pavements in the parking lot can allow for infiltration and subsurface treatment. The use of native species in the buffer planting at the setback area at the southern and eastern property line can reduce maintenance needs, minimize water demand, provide wildlife habitat, and fit the character of the surrounding area.

Figure 3.3: View of shared, sunken loading dock and secondary delivery area for small trucks

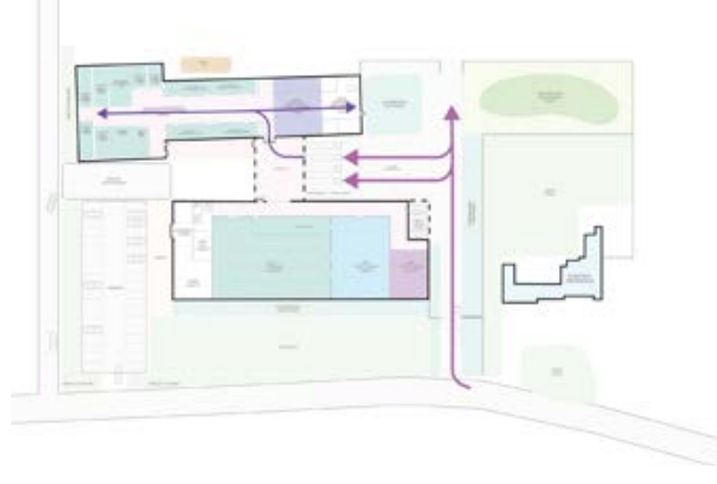
Refined Concept

Circulation

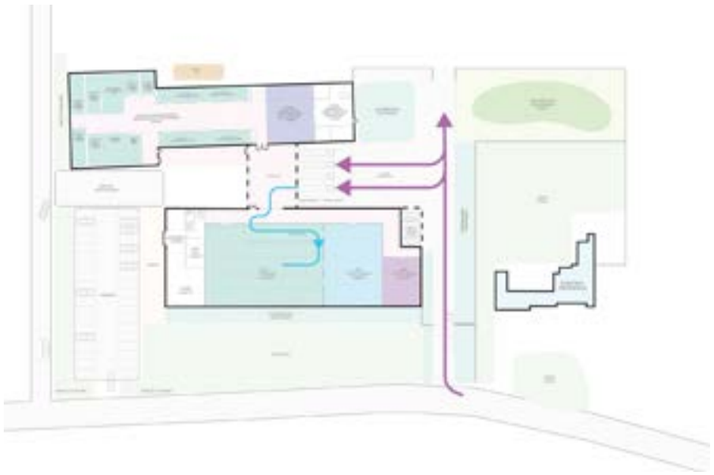
Emergency Vehicles



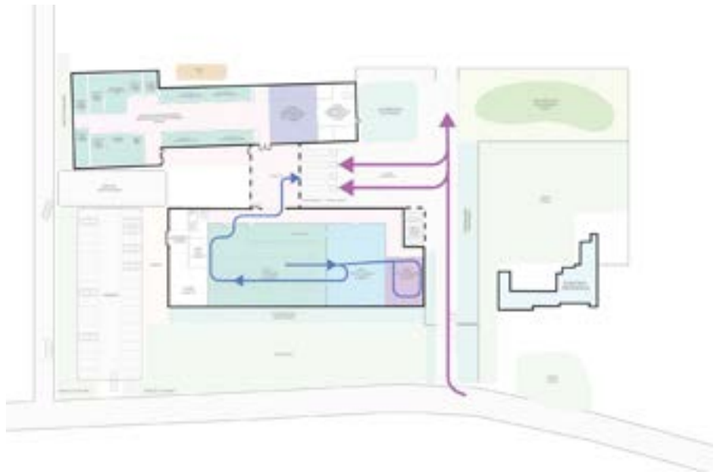
Automobile
Medium to Large Delivery Vehicles



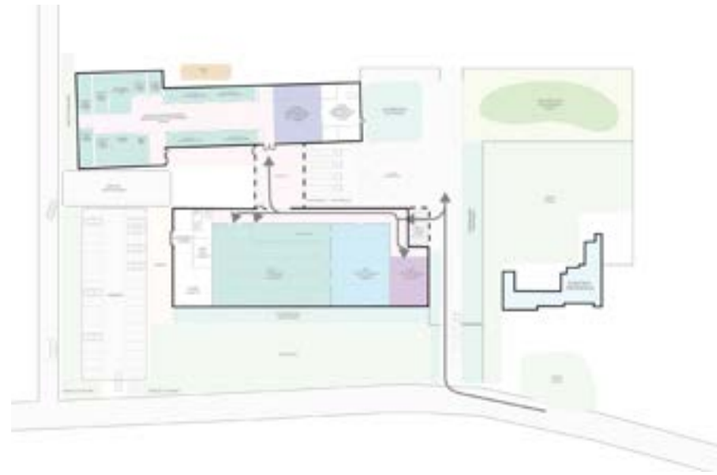
Medium to Large Delivery Vehicles
Barn Storage



Medium to Large Delivery Vehicles
Pre-Cooling



Medium to Large Delivery Vehicles
Wet Processing



Small Truck Delivery/Pick Up

Figure 3.4: Circulation diagrams for different visitor types

Final Concept

Figure 3.5: Birdseye view looking southwest

Final Concept

Figure 3.6: View looking north across visitor/staff parking area

Final Concept

Figure 3.7: View looking west through visitor parking with solar canopies

Final Concept

Figure 3.8: View looking south towards the loading and delivery docks

Final Concept

Figure 3.9: Conceptual site plan

Energy

Energy Demand

Initial annual energy usage for the Food Hub has been estimated based on space allocations in the final concept and energy use intensity (EUI) values for commercial spaces, developed by the U.S. Energy Information Administration (EIA) Commercial Building Energy Consumption Survey (CBECS 2018)[1]. EUI values are in terms of thousand British thermal units per square foot (kBtu/sf), for a warm climate (Climate Zone 3). Because EUI values reflect energy usage from existing buildings, the new structure may achieve better energy efficiency through high-performance design. Table 3.1 presents estimated annual energy usage in both kBtu and kilowatt-hours (kWh) for the food hub.

Two unknowns prevent a complete estimate of both peak electricity capacity and annual usage, as food processing and electric vehicle (EV) charging equipment have not been determined. A provisional rough-order-of-magnitude estimate of 1 to 2 megawatts (MW) is assumed for electrical system capacity planning, but should be updated at a later stage. As a reference point, the EIA Manufacturing Energy Consumption survey (MECS 2018) provides a range of energy intensities from 250 to 1,000 kBtu/sf for food processing facilities nationally. Estimating future energy demand for light and heavy-duty EV charging was beyond the scope of this analysis but should be included as EV trucks and delivery vehicles are likely to increase through 2030-2035.

Space Type	Energy Use Intensity (kBtu/sf)	Gross Floor Area (sf)	Annual Energy Use (kBtu)	Annual Energy Use (kWh)
Dry Storage	30	3,000	90,000	30,000
Cold/Freezer Storage	100	19,000	1,900,000	560,000
Admin/Assembly /Employee	60	6,400	380,000	110,000
Wet/Dry Processing	TBD	7,000	TBD	TBD
Light- & Heavy-duty EV Charging	TBD	NA	TBD	TBD

Table 3.1: Energy Use Intensity per Space Type

Footnotes:
[1] https://www.eia.gov/consumption/commercial/

Energy

Energy Supply

Electricity is proposed to be supplied from both utility-provided and on-site sources. An all-electric design is proposed to support the Yolo Food Hub's sustainability goals and avoid installing natural gas supply at the site. In the unlikely case that high-grade heat is needed for food processing, existing on-site propane sources can be leveraged.

Utility Supply

The PG&E Integration Capacity Analysis (ICA) Map[1] does not report the capacity of the existing 12kV electrical feeder, but the capacities of nearby feeders indicate that a service expansion may be required to support the 1-2 MW future peak load. Coordination with PG&E early in the implementation process is recommended to account for lengthy lead times for service expansion.

On-Site Supply

To stabilize energy costs and support resilience and sustainability goals, the Final Concept proposes to maximize on-site renewable electricity generation through full build-out of rooftop and carport solar PV arrays, a battery energy storage system (BESS), and a clean-energy emergency generator.

The Final Concept rendering illustrates the solar PV potential over the new structure, existing barn, and light-duty vehicle parking. Note that for the barn to support rooftop solar, it would require significant structural renovation, which is likely to be expensive. Table 3.2 summarizes the estimated generation potential at full build-out.

Combined, this yields an estimated future PV generation potential of approximately 1,000,000 kWh per year. The monthly generation potential is illustrated in Figure 3.10.

To provide peak electricity demand management and backup power capabilities, a BESS and emergency generator are recommended. Optimizing the size of the BESS and emergency generator is beyond the scope of this analysis because it requires the food processing equipment's anticipated load profile, or their projected electricity demand over a period of time. Until such optimization analysis can be completed, space for approximately 2MWh of battery storage capacity and 500kW of emergency generator capacity is reserved on the west side of the barn in the Final Concept.

Footnotes:
[1] https://www.pge.com/b2b/distribution-resource-planning/integration-capacity-map.shtml
[2] This is a "year one" estimate. Solar PV arrays generally degrade at rate of approximately 1% less generation per year.

Structure	Nameplate Capacity (kW)	Annual Generation Potential (kWh)[2]
Existing Barn	80	130,000
New Building	430	670,000
Solar Carport	130	210,000
Total	640	1,010,000

Table 3.2: Energy Use Intensity per Space Type

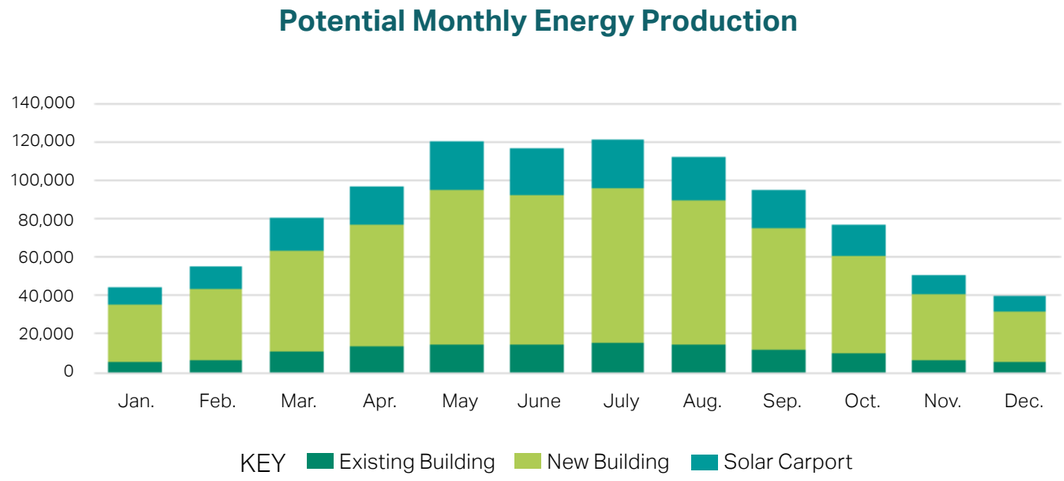


Figure 3.10: Monthly on-site PV generation potential (kWh)

Energy

Energy Resilience & Sustainability

The Yolo Food Hub has identified energy resilience and sustainability as priorities. While complementary, resilience and sustainability are distinct goals with different design considerations.

Energy Resilience

Energy resilience can be defined as the capacity of a site to withstand and recover from power disruptions. In Yolo County, Public Safety Power Shutoff events are likely to occur within the PG&E service territory every fire season. Power disruptions may occur from myriad other causes, such as downed power lines caused by high wind or vehicle collisions. At the Yolo Food Hub, valuable agricultural products could be at risk if off-site power outages disrupt electricity to cold storage. Preventing this loss of product is the primary driver for an energy resilience plan at the Yolo Food Hub.

A microgrid can meet the site's energy resilience needs. This microgrid can be powered by on-site of solar PV, battery energy storage, and emergency backup power. The components of a successful microgrid include:

1) Design the site to run as efficiently as possible. This reduces the volume of electricity needed to support critical loads.

2) Install as much on-site solar PV as possible, through renovating the barn and optimizing the design of the new structure and parking lot.

3) Install a BESS, optimized to provide peak demand management according to both the Food Hub's load profiles (food storage, food processing, administrative spaces, EV charging, etc.) and the future supply profiles of the rooftop/ carport solar PV.

4) Install a clean energy emergency generator to provide minimum critical power supply during a worst-case-scenario outage event. This generator can operate in concert with the solar PV and BESS systems to extend the duration of on-site fuel storage for as long as possible, as operating with only solar + storage is insufficient to power critical loads.

5) Navigate the microgrid interconnection agreement process with PG&E, including installing microgrid controls hardware and software that will allow the Food Hub to operate in "island mode" when needed.

When the food processing and critical energy (i.e., cold storage) load profiles are more clearly defined, optimum battery storage and emergency generation capacities can be estimated. At that stage, the microgrid interconnection agreement process through PG&E can be initiated.

Energy Sustainability

Energy sustainability goals focus on reducing greenhouse gas emissions from energy infrastructure. Based on the average energy use intensity for food processing equipment, the Food Hub's total energy demand will likely exceed available on-site solar generation. Thus, Net Zero Energy (NZE), in which all energy demand is supplied by on-site generation, is likely out of reach.

However, the Food Hub can likely achieve a Net Zero Carbon (NZC) goal through the following:

1) Generating as much clean energy on-site as possible through maximizing rooftop and carport solar PV.

2) Procuring any remaining energy required from carbon-free sources. Designing an all-electric facility simplifies this strategy substantially by excluding natural gas emissions.

An energy budget calculation illustrates the amount of electricity available to meet NZE:

On-site generation potential	Annual electricity consumption for definable loads (see Table 3.1)	Remaining NZE budget for food processing loads
1,000,000 kWh / year	**700,000 kWh/year**	**300,000 kWh/year (1,100,000 kBtu/year)**

Amount of energy typically required for food processing operations:

Gross floor area allocated to food processing	Typical food processing EUI range per MECS 2018	Estimated energy use for food processing equipment:
7,000 sf	**250 - 1,000 kBtu/sf**	**510,000 kWh - 2 MWh/year**

Even without accounting for EV charging, the Food Hub will likely have to purchase some 200,000 kWh to nearly 2 MWh of electricity annually to meet demand. Nonetheless, maximizing on-site solar generation and energy efficiency remains valuable for cost-savings and resilience benefits. To achieve NZC, the Yolo Food Hub could consider purchasing carbon-free electricity from within Yolo County, such as through Valley Clean Energy.

Water Systems

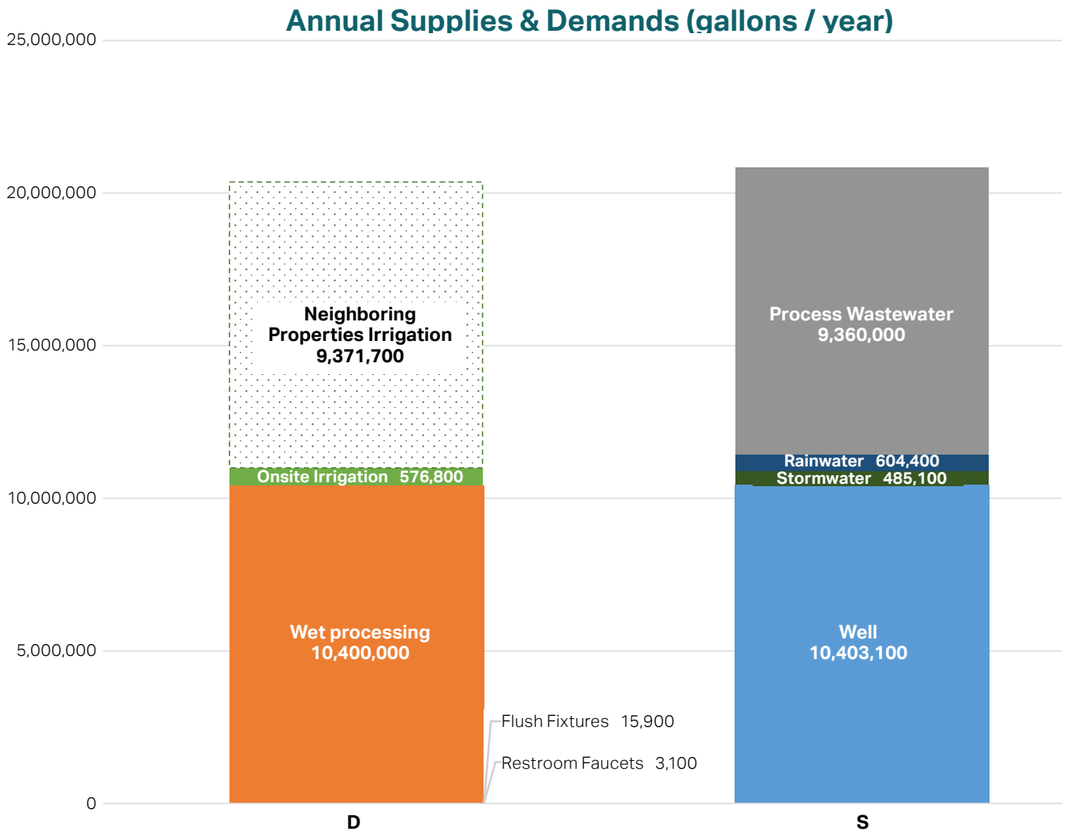


Figure 3.11: Planning-level annual water demands and supplies

Annually, the site is estimated to use 11.0 million gallons per year (MGY) of water. Figure 3.11 shows estimated annual water demands and supplies. Wet processing, based on assumptions outlined in Appendix C, is a significant draw on potable water and a significant source of wastewater, compared to other uses onsite.

There are multiple opportunities for water reuse to reduce potable water demand. Evaluation assumes that process wastewater can be treated onsite to meet irrigation demand, and the remaining treated wastewater (~8.8 MGY) can be managed either onsite or provided as irrigation to neighboring properties. Additionally, with sufficient storage, rainwater has the potential to sufficiently meet flush fixture demands (toilets and urinals). The seasonal variation of supplies and demands, as shown in Figure 3.12, should also be considered when evaluating reuse opportunities.

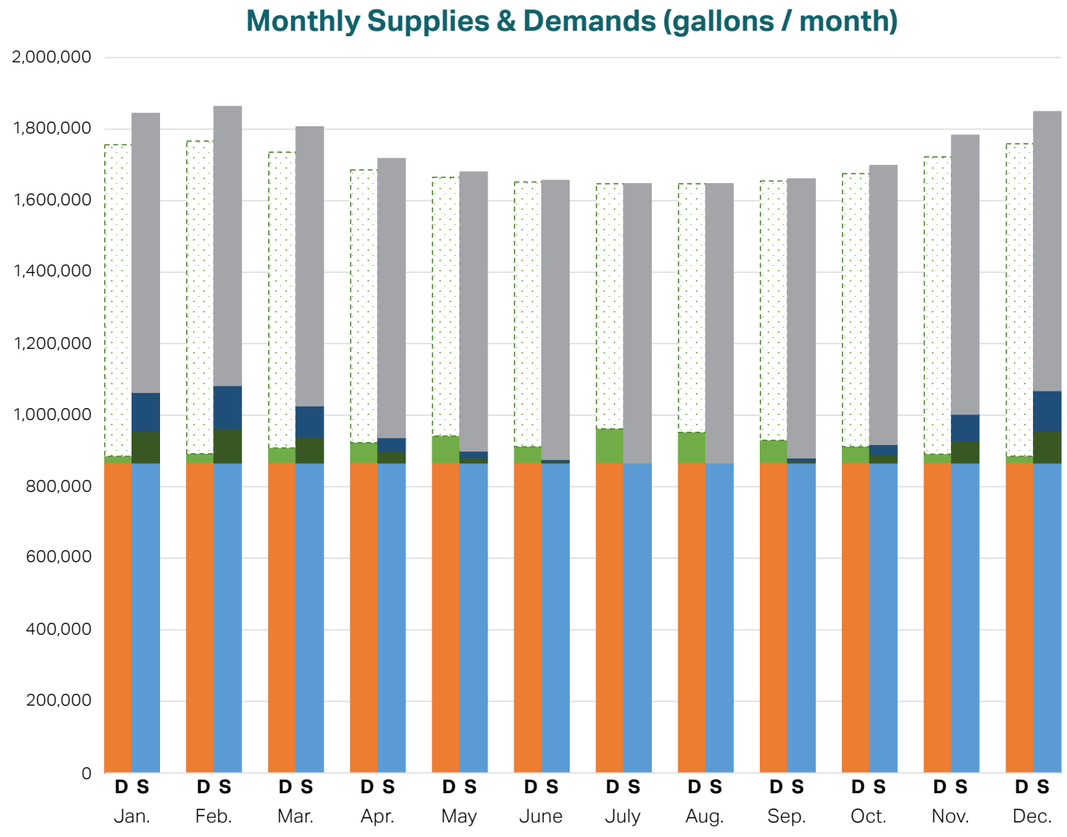


Figure 3.12: Planning-level monthly water demands and supplies

Net-zero water is a design philosophy that encourages drawing from and returning water to sources within the project boundary (e.g. groundwater recharge to the local aquifer). The intent is to supply 100% of the project's water needs through captured precipitation or other natural closed-loop water systems, and water recycling. With an onsite well and large production of wastewater, this site has the opportunity to be considered net-zero water if a beneficial end use of the wastewater is included. Potential end-uses include on-site irrigation, groundwater recharge, or irrigation of neighboring properties. For example, after accounting for on-site irrigation, the estimated remaining recycled wastewater is likely sufficient to support approximately 10 acres of almond trees.

Water Systems

Water Supply and Demands

Supply

As noted in the Existing Conditions chapter, a pump test to determine the yield and water quality of the existing wells is recommended. Steps to complete the pump test are outlined in Appendix C. Existing well water supply can likely meet the proposed site water demand. If the test finds that the well yield is less than proposed project demands, alternative potable water supplies should be considered, such as storing water onsite or investigating a connection to the Esparto Community Services District water supply. Rainwater collection and wastewater treatment can provide non-potable water supply and would reduce demand on the well.

Demands

Some water uses will require a potable water supply, while other uses can be met with non-potable water. Water uses include:

Wet Processing

Potable water will be used to rinse produce and wash equipment. Water demand can vary significantly depending on equipment type and operating schedule. Planning-level estimates are presented but further analysis will be needed once equipment has been identified. Water from some produce rinsing stages can be reused (e.g., the final rinse of a batch of rinsed produce can be used for the first rinse of the next batch). Additional information is provided in Appendix C.

Restrooms

Restroom facilities will require water use for faucets and flush fixtures (toilets and urinals). Flush fixtures can be supplied with non-potable water.

Irrigation

The proposed concept includes 45,340sf of vegetated landscaped area, including shrubs, trees, and areas that will be used for stormwater management. Irrigation can be supplied with non-potable water.

Fire Suppression

The proposed structures will be equipped with fire suppression. At this stage, it is assumed to be a wet pipe system that will be supported by the well.

Figure 3.13: Example of wet-processing

Figure 3.14: Example of pre-cooling system that uses water

Water Systems

Wastewater Production & Treatment

Wastewater Management

Wet Processing

Wastewater will be generated by produce rinsing, washing equipment, and typical kitchen operations (e.g., dishwasher). Some rinse process water can be reused within rinsing operations (i.e. last rinse cycle can become next batch's first rinse cycle). However, it is assumed that reuse volume is minimal and 90% of water used will become wastewater. Food processing wastewater is considered industrial strength, with high organic and microorganism loads. Cleaning chemicals and sanitizing agents used to wash equipment also add to wastewater load. Wet processing wastewater requires dedicated treatment before it is released to the environment. Wastewater stabilization pond(s) are typical in rural areas to treat processing wastewater and is shown schematically on the concept drawings. Stabilization ponds require large on-site footprints, but can be cost-effective, low maintenance, and have relatively passive operations[1]. More compact treatment options like treatment wetlands or packed-bed filters could be further evaluated as the site design progresses and wastewater flows and loads are further evaluated. Figure 3.16 presents a standard flow of water through the site, without reuse, to meet local discharge requirements.

Wastewater Reuse from Wet Processing

With additional treatment options such as filtration and disinfection, processing wastewater could be reused for non-potable demands, such as irrigation or maintenance activities like roadway dust control. Reusing water on-site would reduce well water draw, beneficial if well yield is limited and supports project sustainability initiatives. Further investigation into off-property treatment opportunities (e.g., neighboring lagoon) or using excess treated wet processing water should be completed. Reusing water onsite will require permitting and coordination with the State Water Resources Control Board, the Yolo County Flood Control & Water Conservation District, and potentially other permitting agencies. Figure 3.17 proposes site water flow with additional wastewater treatment to produce recycled water for on-site, non-potable demands.

Restrooms

Domestic restroom wastewater should be treated separately from food-processing wastewater. With only employees on-site, restrooms are expected to generate comparatively low flow rate of wastewater, which could continue to be treated by a septic system. Graywater capture (restroom faucet wastewater) is not expected to be a significant volume of water and is not recommended at this time.

Stormwater Management

Rainwater

Rainwater (roof runoff) is a comparatively high-quality, easy to capture alternative water supply. Although seasonal, rainwater could be captured in onsite cisterns and treated minimally (filtration and disinfection) to supplement non-potable demands (toilet/urinal flushing). Cisterns and water storage tanks, above or below ground, are typically plastic, concrete, or corrugated steel. Onsite water storage tanks would also provide resilience as a backup water supply for fire suppression.

Stormwater

Stormwater (runoff from ground surfaces) could also be captured for reuse, but this is not recommended due to its lower water quality (e.g., large contaminants such as leaves) and energy required for pumping. Additionally, the water balance does not show a need for this alternative water supply at this time. The proposed concept shows schematic bioretention areas for stormwater treatment.

Footnotes:
[1] https://sswm.info/factsheet/waste-stabilisation-ponds

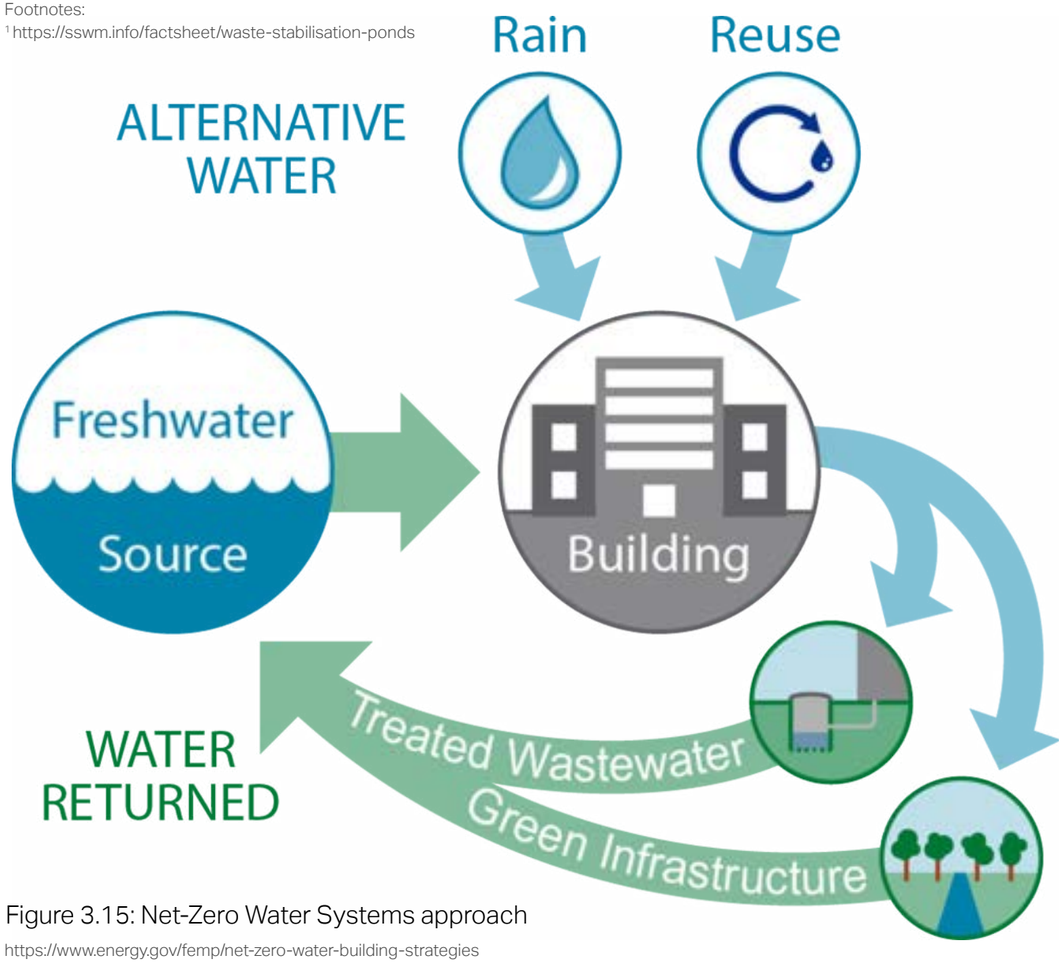


Figure 3.15: Net-Zero Water Systems approach
https://www.energy.gov/femp/net-zero-water-building-strategies

Water Systems

Proposed Project Water Systems and Water Reuse Opportunities

The first process flow diagram, Figure 3.16, shows the flow of water throughout the proposed design, without considering water reuse. In this scenario, water is drawn from the well, used for all onsite demands, and released to the environment after treatment. The second diagram, Figure 3.17, shows the site water systems with onsite water reuse opportunities. In this scenario, the overall draw from the well would be lower, as recycled water can be used for irrigation and toilet flushing.

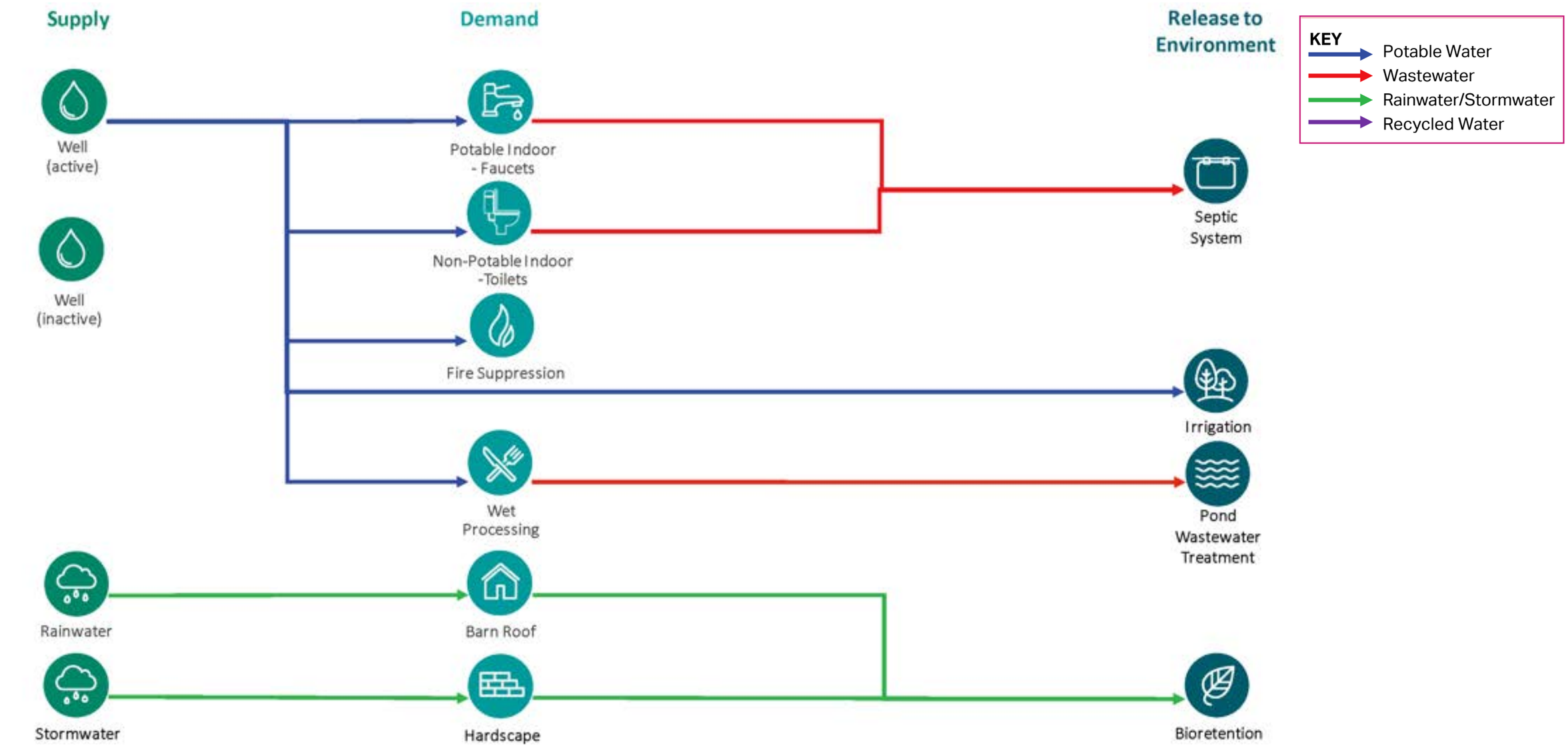


Figure 3.16: Process flow diagram for proposed project without water reuse

Water Systems

Proposed Water Flow Diagram with Reuse

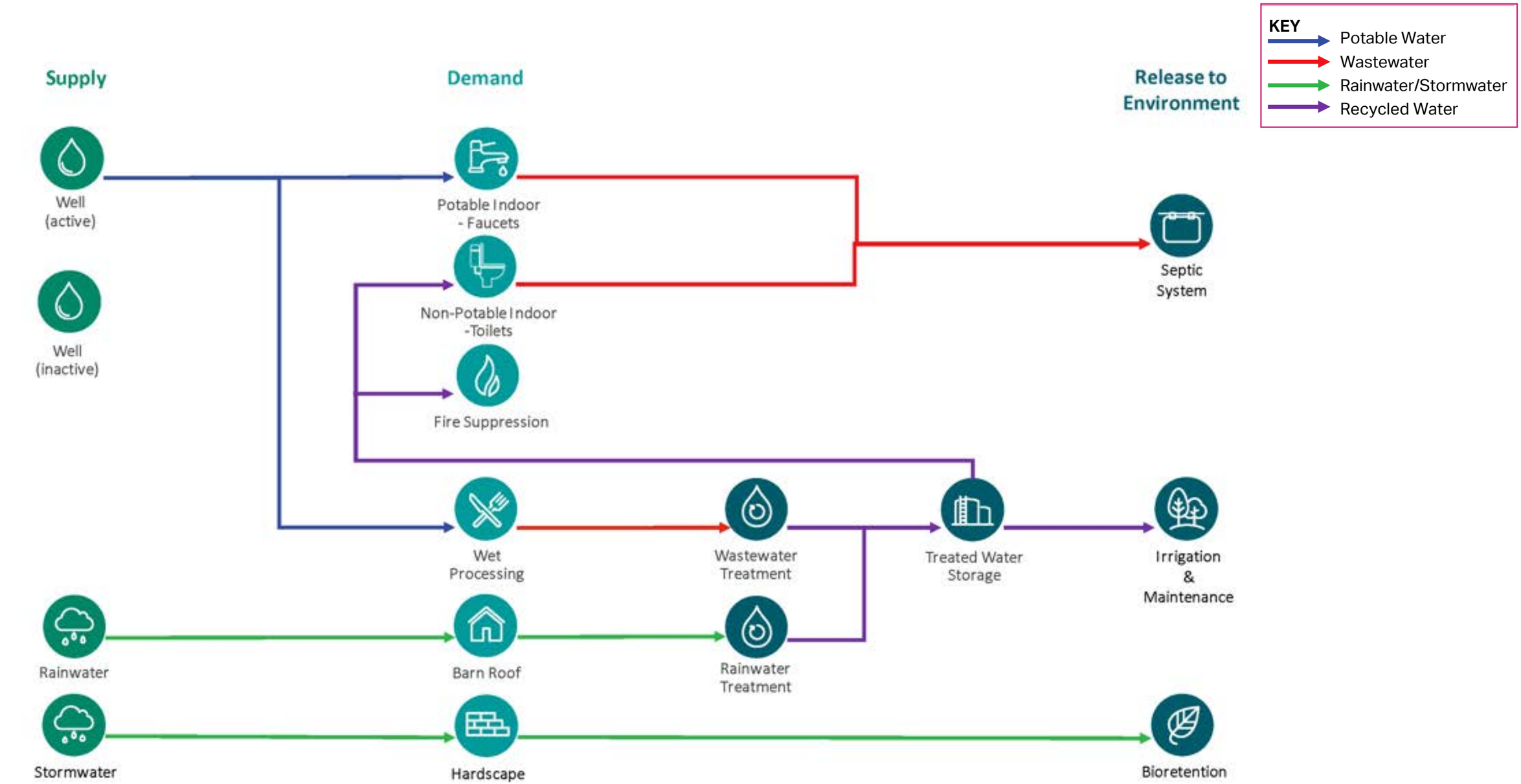


Figure 3.17: Process flow diagram for proposed project with water reuse

Water Systems

Sustainability Certification and Targets

Sustainability certifications provide a structure for additional sustainability strategies to be implemented at the project. Two example applicable certifications include the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) and the International Living Future Institute's Living Building Challenge. These frameworks guide a more collaborative design approach, ensuring more perspectives are represented.

Energy and water systems as outlined above could be considered to meet certification requirements, which would also provide structure to consider sustainability practices for waste management, embodied carbon, material management, and transportation logistics.

These sustainability certifications provide industry recognition, which could potentially help secure additional funding for the project. Additionally, certification provides transparency for sustainability efforts at the site, establishing trust within the community, and assigning accountability to ensure the project meets the outlined goals.

Social equity strategies are addressed in the Living Building Challenge. Additional strategies that could be considered include investigation into sustainable supply chains and packaging, ethical practices of growing food, and the equitable access and distribution of food, which the Yolo Food Hub could potentially meet through its partnership with the Yolo County Food Bank.

Precedent Project

UC Davis LEED Platinum Brewery, Winery & Food Pilot Facility

Completed in 2010, this facility houses the world's first LEED platinum winery, brewery, food-processing pilot plant, and milk-processing lab. Built to accommodate the many teaching and research activities related to brewing, winemaking and food processing, the building is one of the most complex facilities on campus.

"It not only meets the highest environmental design and construction standards, it goes even further to demonstrate how environmentally responsible technologies can be incorporated into the daily operations of food and beverage processing facilities," said enology professor Roger Boulton, the Stephen Sinclair Scott endowed chair in enology, who specializes in the chemical and biochemical engineering aspects of winemaking. Sustainable design components at the facility include rooftop PVs, rainwater harvesting system, drought-tolerant landscaping and sustainable materials.

https://www.usgbc.org/projects/uc-davis-brewery-winery-and-food%20and%20http://atsgallery.ucdavis.edu/greenrmi/#

Figure 3.18: UC Davis LEED Platinum Brewery, Winery & Food Pilot Facility
http://atsgallery.ucdavis.edu/greenrmi/#

04

Implementation & Funding Strategy

Introduction

Summary

To support project advancement, the preferred concept scenario was evaluated from a phasing and cost perspective. Understanding that the overall concept is not immediately feasible due to cost and infrastructure requirements, this report proposes a prioritized sequence of enabling and early-phase activities. These advance the overall project mission, allow for early demonstration, and manage initial investments. The phasing and costs presented here reflect discussions on the Food Hub's short term and long-term goals from the two workshops (described in Chapter 2 and Appendix B).

The long-term vision will require significant funding support that will need to be secured over time. While this report focuses on presenting the final concept and documenting the planning and design process, it can serve as valuable tool for pursuing grant funding. Nearly every grant and funding application will require or be more favorably evaluated if 1) a long-term vision has been clearly established, 2) a consensus among stakeholders has been reached through a documented planning process, 3) required costs (capital, operations & maintenance) are comprehensively estimated, and 4) the project has support from partners and other investments or projects to progress the overall vision. This report provides these elements through documenting the design process, partnership network, and cost estimates and phasing recommendations.

Figure 4.1: Overall Phasing Plan

Phasing Strategy

Phase #1 Barn Retrofit

Phase 1

The first phase of work focuses on the existing barn and is broken up into three sub-phases of work. This phase assumes structural restoration of the barn (Phase 1.1) is complete. Regardless of the type of future use, it is critical that the barn is structurally sound.

Phase 1A

The first priority in Phase 1 is to establish drive access, staging and turning area, and a level loading dock (depressed grade) that will allow small, medium, and large delivery vehicles to access the barn. While this is a significant initial investment, it will serve as a critical backbone for both the short and long-term operation of the Food Hub. More importantly, it will allow the Food Hub to begin using the barn for storage, opening up revenue streams to support operations and project progression.

Phase 1B

Phasing 1B will bring the barn into service to provide cold and dry storage for local farms and producers. As show in turquoise in Figure 4.1, only minimal retrofits of the barn structure are needed to allow for the placement of self-contained, modular freezer, refrigerator, and dry storage units. The units will be sized to fit the existing bay spacing, but the addition of structural headers can increase spans, allowing for wider units. As conceptualized, equipment for the modular storage will be located on top of the units. Proper wall penetrations to allow for venting will be required for mechanical air circulation. Additionally, as the Food Hub becomes operational, fences should be installed to provide security and meet requirements for food processing facilities.

Phase 1C

The final concept phase of 1 will include the renovation of the northern extension of the barn. This will require more intervention than Phase 1B as the building must be up brought up to code to provide dry storage, light processing, and administrative spaces. Some initial work will have already been done during the structural restoration for the barn. Remaining work will focus on renovations to support the intended uses and the installation of ventilation, climate conditioning, plumbing, and other systems.

Phase 1 Site Improvements

While the major focus of Phase 1 is the barn, site improvements are also important to support the Food Hub's day-to-day functions. The major site investments associated with Phase 1 are:

- Delivery Access Drive & Outdoor Staging Area
- Electrical Service Upgrades
- New Septic System
- Stormwater Management Bioretention Areas
- Preliminary Site Security Improvements

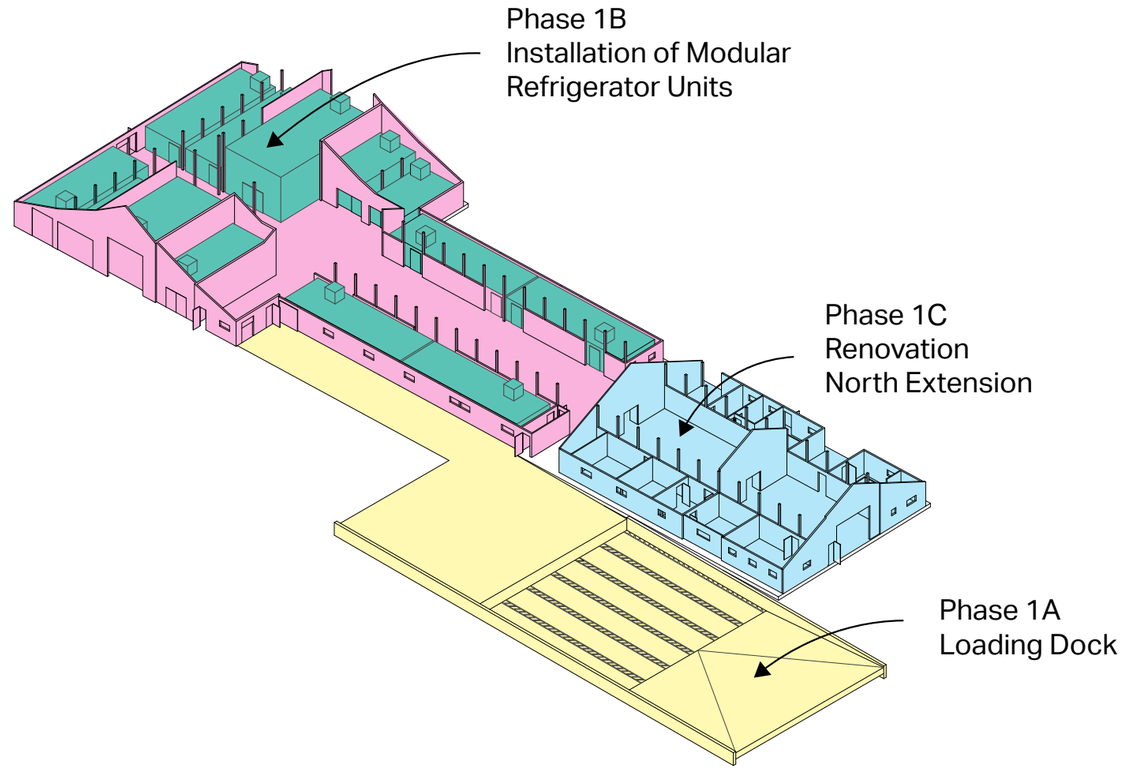


Figure 4.2: Phase 1 focuses on the loading dock and retrofits to the barn.

Phasing Strategy

Phase #2 New Facility

Summary

The second phase will construct a flexible facility built according to the specific needs and infrastructure requirements of a food processing facility. The 26,000sf facility will be directly connected to the loading dock and delivery area implemented in Phase 1A. The shared, covered loading dock will allow for efficient movement of agricultural goods between the barn and new facility while protecting them from the effects of weather and heat. Both facilities are designed to provide seamless forklift access throughout, and the main circulation routes have been sized accordingly.

With sustainability being a priority, the new facility features a rooftop solar PV system. The sawtooth roof configuration is designed to provide both the ideal orientation for optimal solar radiation as well as natural daylighting to reduce artificial illumination and create interior conditions that improve occupant wellbeing.

The new facility will include administrative offices and employee spaces on the east end of the building. Directly adjacent is a staff and employee parking area that will be shaded by a cantilevered solar canopy.

To support food processing, electrical capacity at the site will need to be increased. This new service upgrade is included in the initial investment. As the Food Hub ramps up its wet processing capacity, the existing wells (one active, one inactive) may become insufficient to meet water demand, and a new well may need to be drilled. This is a conservative approach and can be reevaluated after completing

The proposed plan will collect and manage stormwater through a series of detention basins located across the site. Stormwater will be directly captured as well as conveyed via conduits. Stormwater management infrastructure should ideally be installed across both phases so that the site can be in compliance even when it is under construction.

Sanitary service will be required to capture and treat all wastewater produced at the site. Wastewater from restroom fixtures (sinks, toilets) will be directed to a septic system. It is assumed that the existing septic system will need to be replaced, and the new system will be installed based on the number of building occupants and anticipated usage calculations. As noted in the water systems section, the wastewater produced by wet processing will be industrial strength, in high volumes, and cannot be treated via septic system. It is proposed that wet processing wastewater be treated through a stabilization pond system.

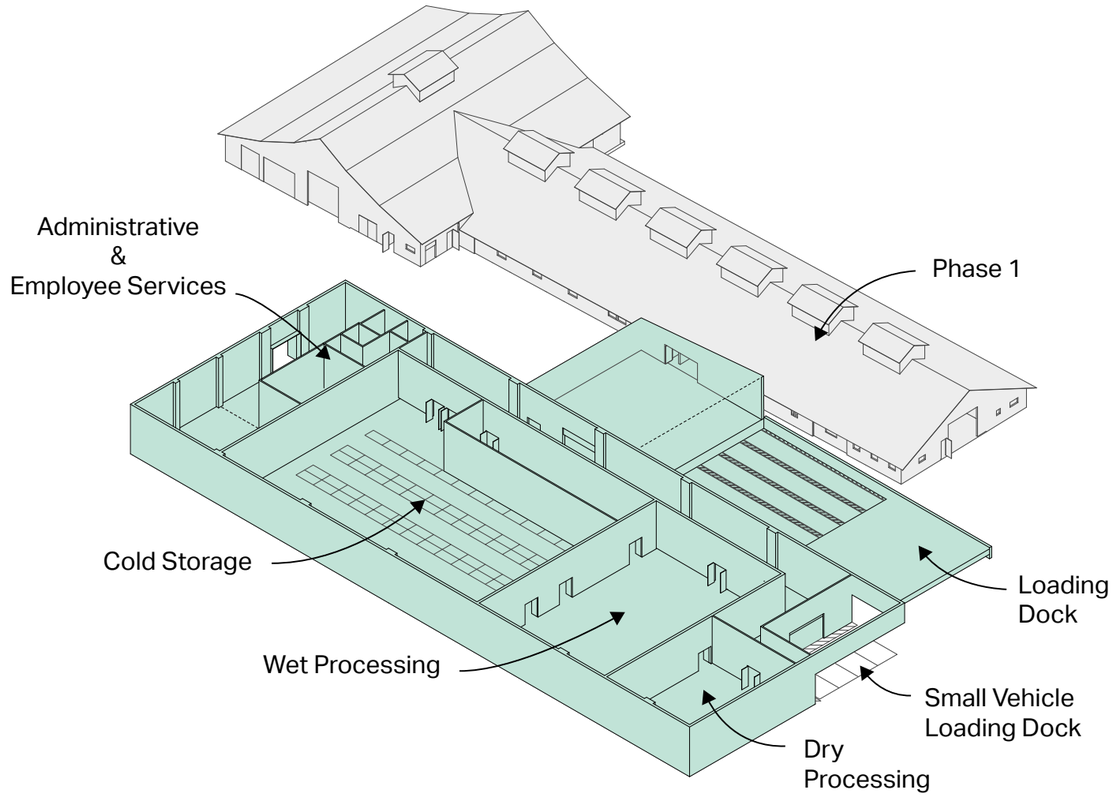


Figure 4.3: Phase 2 - New facility

Summary

Summary Phase 1

Summary

Table 4.1 summarizes the project costs associated with Phase 1. The full cost estimate report is in Appendix E and contains a full list of assumptions and exclusions behind the estimates.

	Projects	Estimated Gross Square Feet (GSF)	Estimated Cost (Q4 2023) Construction $ / GSF	Building + Site Total Direct Cost	Total Construction Cost
Phase 1					
1.1	Barn Refurbishment	20,226	$ 356 /GSF	$ 4,967,594	$ 7,197,889
1.2	Loading Dock Construction	22,049	$ 78 /GSF	$ 1,183,416	$ 1,714,733
1.3	Upgrade Electrical Services	0	$ 0/GSF	$ 165,700	$ 240,094
1.4	Modular Refrigerated Storage Units	8,910	$ 227 /GSF	$ 1,395,000	$ 2,021,312
1.5	Fences	0	$ 0 /GSF	$ 89,010	$ 128,973
Total		**51,185**		**$ 7,800,720**	**$ 11,303,000**

Table 4.1: Phase 1 Cost summary

Summary

Summary Phase 2

Summary

Table 4.2 summarizes project costs associated with Phase 2. The costs have been broken down into the major components of work. The full cost estimate report is in Appendix E and contains a full list of assumptions and exclusions behind the line-item estimates.

Ref.	Projects	Estimated Gross Square Feet (GSF)	Estimated Cost (Q4 2023) Construction $ / GSF	Building + Site Total Direct Cost	Total Construction Cost
Phase 2					
2.1	Site Development	49,094	$ 23 /GSF	$ 848,659	$ 1,148,974
2.2	New Facility	26,000	$ 407 /GSF	$ 7,806,599	$ 10,569,119
2.3	Site Parking Lot	12,013	$ 22 /GSF	$ 196,857	$ 266,519
2.4	Wastewater Treatment	12,500	$ 46 /GSF	$ 420,180	$ 568,869
2.5	Solar PV Array on New Facility Roof	22,000	$ 95 /GSF	$ 1,540,000	$ 2,084,960
2.6	Solar Carport	3,500	$ 325 /GSF	$ 840,000	$ 1,137,251
2.7	Drill additional Well	0	$ 0 /GSF	$ 80,000	$ 108.310
Total				**$ 11,732,295**	**$ 15,884,000**

Table 4.2: Phase 2 Cost summary

Summary

Qualifications of Cost Model

The Cost Model is based on the following assumptions:

- This estimate is based on preliminary information provided prior to the completion of any design. These cost models are conceptual and are not representative of the final construction costs nor does it include for any additional scope or information not determined by the date of the models. AECOM cannot and does not guarantee that the proposals, bids, and actual construction costs will not vary from this estimate.
- Estimates are prepared using current dollars (Q4 2023).
- All estimates include demolition as required.
- The estimate includes all general requirements and other general conditions as part of overall Construction.
- Construction costs include all General Contractor & Subcontractor Markups.
- Normal productivity rates as historically experienced are utilized.
- Assumed that general building permits if required, will be obtained by, and paid for by the owner.
- Assumed that all easements, if required, will be obtained by, and paid for by the owner.
- Assumed that all public space permits, if required, will be obtained by, and paid for by the owner.
- Assumed that all 3rd party inspections, materials and soil testing will be conducted by the owner's consultants, and paid for by the owner (allowances included in soft costs).
- Assumed concrete footing and steel vertical structure for loading dock.
- We include insulation and vapor barrier to perimeter of the existing façade area.
- Pre-engineered metal building for new facility
- Assumed all windows and existing wood planks façade to salvage and reinstall.
- Allow for new wood planks façade to enclosed the west side area of the barn.
- Allow for new standing seam metal roofing.
- Allow for new finishes for barn and office areas.
- Allow for the upgrade for structural upgrade to barn as per Carlson William quote for rough carpentry and steel support cost.
- Assumed bioretention build-up for stormwater and wastewater area
- Allow for site furniture
- Allow for grass to existing orchard areas
- Allow for new wood planks façade to enclosed the west side of the barn
- Allow for new standing seam metal roofing
- Allow for new finishes for barn and office areas
- Allow for the structural upgrade to barn as per Carlson William quote for rough carpentry and steel support cost
- Assumed bioretention build-up for stormwater and wastewater area
- Allow for site furniture

Exclusions

Exclusions from Construction Costs:

- Escalation / inflation beyond 2023 Q4
- Restrictive technical specifications or excessive contract conditions
- Land and easement acquisition
- Non-competitive bidding conditions
- Sole source specifications of materials or products
- Compression of Construction Schedules, premium shift work and restrictions on the contractor's working hours (out of normal hours)
- Off-site work for infrastructure improvements
- Hazardous material abatement when demolition of existing barn structure, roof and site works
- Owner softcost are excluded
- Infrastructure for food processing within the buildings (connections provided at building edge)

The following contingencies are excluded:

- Contractor Change Order contingency
- Furnitures, Fixtures & Equipment (FF&E) Contingency

Risks

- Structural and architectural intervention required on the barn
- Level (capacity) of reinforcement of existing utilities for the site
- Potential hazardous materials and abatement on the site and existing barn

Unless otherwise noted, images within the report are intended to convey relevant ideas or approaches and are for reference only. The photos and content within the reference images should not be assumed to have been taken or executed by AECOM.

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Appendix A

Concept Alternatives Development

Design Considerations Overview

Summary

Based on stakeholder feedback during the programming workshop and continued discussions, AECOM developed three concept alternatives of how the site may fulfill the Food Hub's priority activities. Through all three concepts, design choices focus on allocating space for core functions (processing, storage), providing efficient circulation, supporting on-site wastewater management and solar energy production, and retaining the integrity of the existing barn and orchard.

Design Considerations

Key design considerations are described below, with precedent imagery on the following pages.

1. Facility

Barn

Retaining the historic barn is a key priority for Yolo Food Hub stakeholders. The barn was identified as an important part of the history of the Esparto community.

Storage

In the near-term, storage, especially cold storage, was identified as a key priority for the Yolo Food Hub to support other food hubs and partners. Storage can support post-harvest aggregation of produce to meet the needs of large-scale buyers. Modular cold storage units is one potential option for the barn. Dry storage can hold items such as flour, wine, and nuts, which local farmers have identified as a need.

Processing

Mid-term needs include washing, cleaning, fresh-cut and light processing, flash freezing, and packing, which can enable the Food Hub to effectively supply large-scale institutional buyers. Processing is seen as critical to meet buyer requirements and add value to agricultural products, which can help local farmers to achieve an acceptable price for their produce.

2. Site

Circulation

Space for on-site circulation should support trucks in a range of sizes, from cargo vans to semi-trucks. Truck circulation should be separated from visitor and employee traffic and the neighboring residences to minimize disturbance and conflict. Shipping and receiving should ideally be separated.

Stormwater and Wastewater Management

The site has two septic systems, one for the residence and one for the barn, but they are likely beyond their service life and may need to be replaced. The site size (5 acres) is a limitation, but to the extent possible space should be provided to manage wastewater and stormwater on site.

Energy

Stakeholders expressed an interest in rooftop solar and solar structures for parking lots to generate energy on-site and increase energy resilience.

Framework Principles and Building Toolkit

Adaptability & Flexibility

- Opportunity for Phased Improvements
- Short-Term Needs & Long-Term Goals

Efficient Circulation & Access

- Loading & Delivery
- Modal Separation
- Creating a "Front Door"

Sustainability

- Preservation of the Barn
- Energy Efficiency & Beneficial Reuse of water

Maximize value-added space & services that leverage & complement resources across the Food Hub network.

Figure A.1: Site and facility components

Design Considerations

Food Hub Building Toolkit

Figure A.2: Dry storage

Figure A.3: Cold storage

Key Considerations

- Forklift Circulation
- Elevated Storage

Key Considerations

- Modularity & Phasing
- Storage Type Ratio
- Access to Storage (Machine or Manual)

Design Considerations

Food Hub Building Toolkit

Figure A.4: Wet Processing

Figure A.5: Dry Processing/ Packaging

Key Considerations

- Level of Processing
- Variety of Produce/Products
- Scale & Output

Key Considerations

- Level of Processing
- Variety of Produce/Products
- Scale & Output

Design Considerations

Food Hub Building Toolkit

Figure A.6: Administration

Key Considerations

- Function & Services
- Visibility/Branding

Figure A.7: Functional Site Components

Key Considerations

- Shipping and Delivery Frequency
- Security & Access

Design Considerations

Site Design Toolkit

Functional Landscape Types

Figure A.8: Stormwater treatment examples

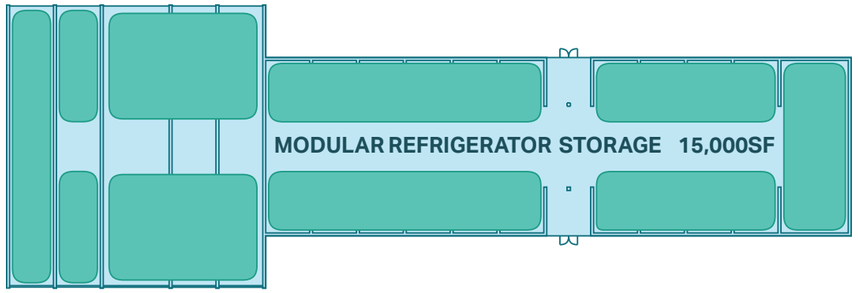
Figure A.9: Wastewater treatment examples

Figure A.10: Central valley native buffer planting

Food Hub Building Toolkit

Barn

Retrofit

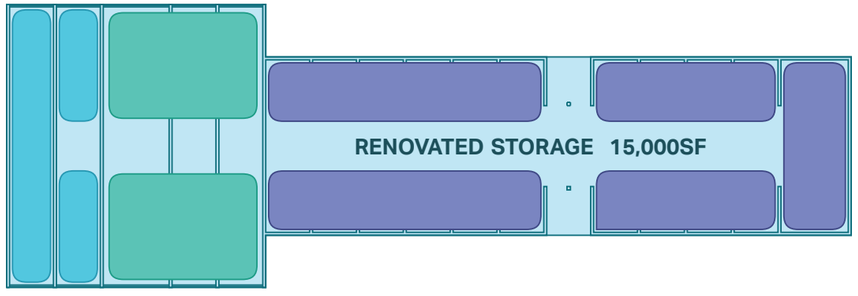


Retrofit Existing Barn with
MODULAR REFRIGERATOR STORAGE

KEY

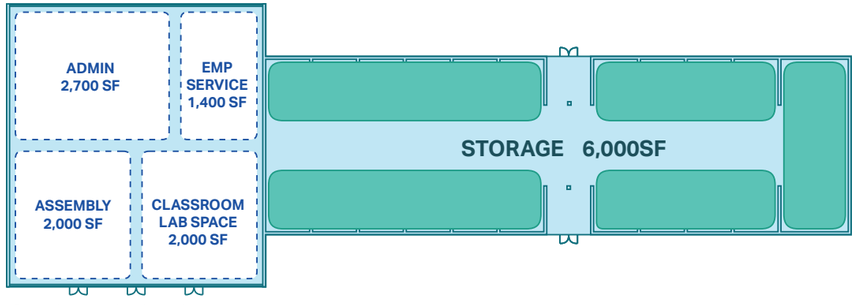
- Existing Structure
- New Structure
- Dry Storage
- Cold Storage
- Freezer Storage
- Wet Processing
- Dry Processing
- Admin/Assembly/Employee

Renovate



Renovate Existing Barn to
Meet Current Building Code and
Provide **DRY**, **COLD**, and **FREEZER STORAGE**

Renovate Retrofit +



Renovate Original Southern Barn
to **OFFICE OCCUPANCY**
Retrofit Northern Extension
with **MODULAR REFRIGERATOR STORAGE**

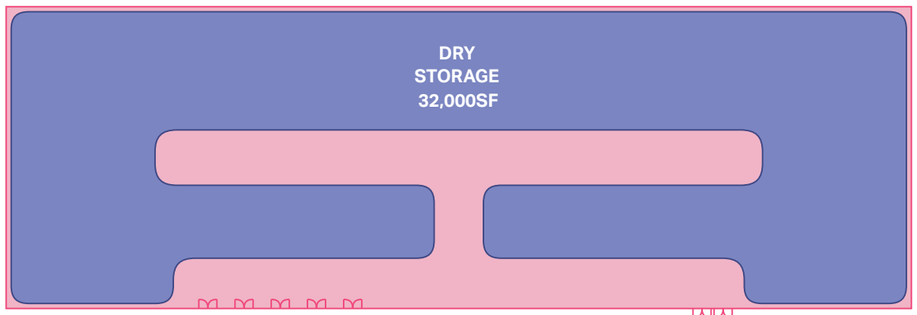
0' 50' ~

Figure A.11: Concept alternatives for the existing barn

Food Hub Building Toolkit

New Structure

DRY PROCESSING,
WET PROCESSING,
COLD STORAGE

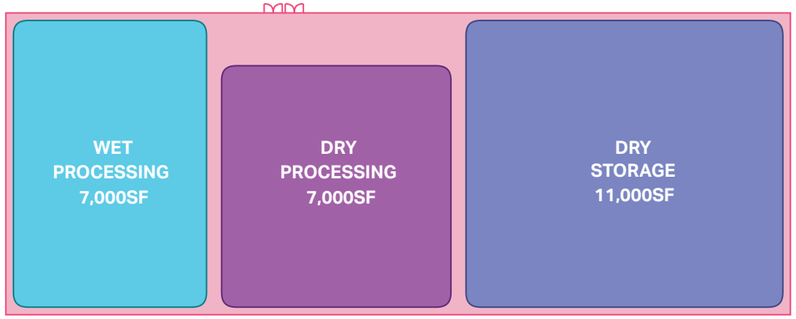


DRY STORAGE

KEY

- Existing Structure
- New Structure
- Dry Storage
- Cold Storage
- Freezer Storage
- Wet Processing
- Dry Processing
- Admin/Assembly/Employee

ADMIN,
DRY PROCESSING,
WET PROCESSING



DRY PROCESSING,
WET PROCESSING,
DRY STORAGE

Figure A.12: New structure functionality diagram

0' 50' ~

Concept Alternative Development

Food Hub Building Toolkit

Concept Alternatives

Each concept progressively increases in scale to allow for more storage and processing capabilities. This allows the concepts to be seen as phasing options.
The concepts can also serve as a "kit of parts" – components of each concept can be interchangeably combined to suit the goals and functions of the Yolo Food Hub network as they grow and expand.

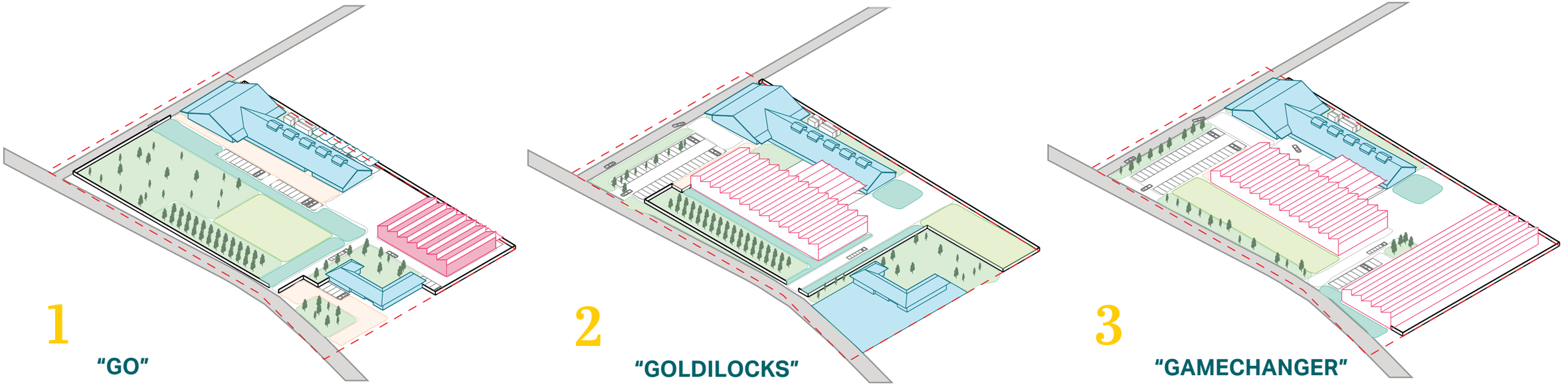


Figure A.13: Concept alternatives

Food Hub Building Toolkit

Concept Alternative #1

"Go"

Concept #1 is the lightest intervention option. It proposes to install modular refrigerator units within the existing barn, allowing the owners to forgo the expensive renovation process of bringing the barn up to code. This approach allows the barn to provide 15,000sf of cold storage as quickly as the units can be installed. To meet the program requirements, a new 12,000sf facility is proposed for the northwest corner of the property behind the residence, which is kept intact. The new construction allows for hygienic spaces for wet and dry processing as well as additional storage space. The majority of the site is left untouched and can be used for wastewater treatment or future development as the food hub grows in scale.

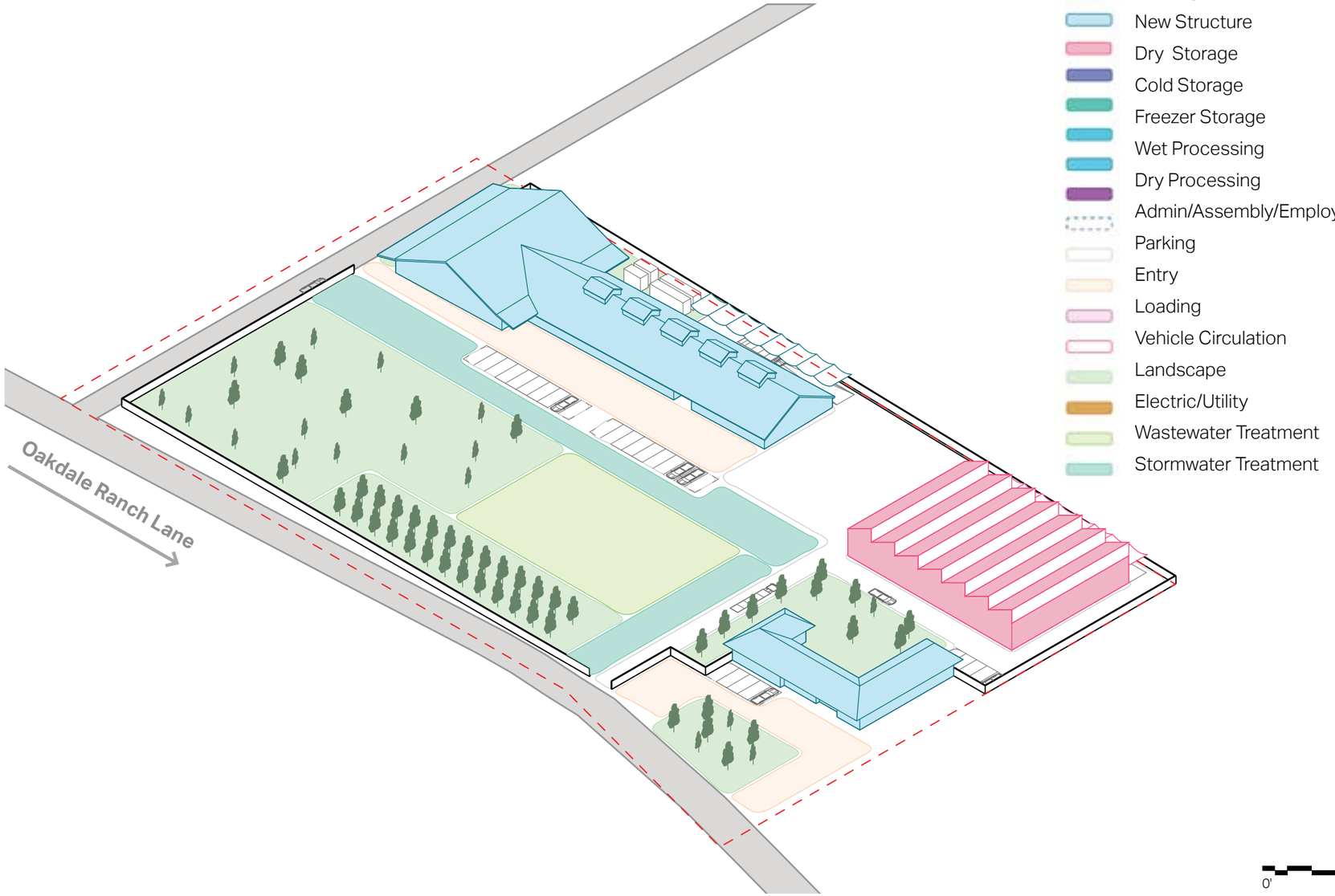
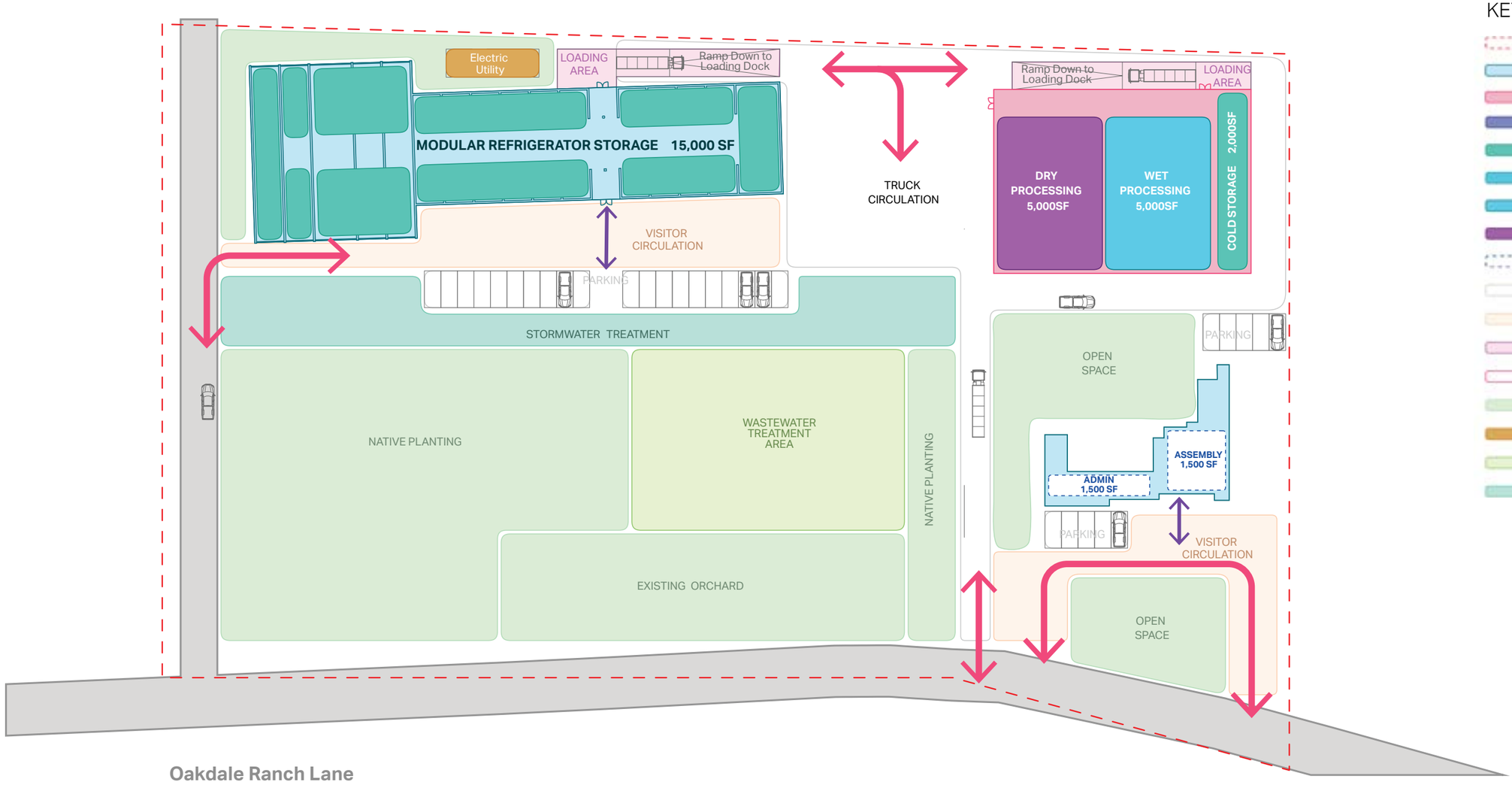


Figure A.14: Concept alternative 1

Food Hub Building Toolkit

Concept Alternative #1

"Go"



KEY

- Existing Structure
- New Structure
- Dry Storage
- Cold Storage
- Freezer Storage
- Wet Processing
- Dry Processing
- Admin/Assembly/Employee
- Parking
- Entry
- Loading
- Vehicle Circulation
- Landscape
- Electric/Utility
- Wastewater Treatment
- Stormwater Treatment

Concept Alternative Development

N

0' 50' ~

Figure A.15: Concept alternative 1

Food Hub Building Toolkit

Concept Alternative #2

"Goldilocks"

Concept #2 proposes a new 24,000sf facility east of the barn. This new construction allows for hygienic spaces for wet and dry food processing, 11,000sf for efficient cold storage, and administrative and employee spaces. The existing barn is proposed to be renovated to meet current building code for dry storage, providing up to 15,000sf of usable space. A unique feature of Concept #2 is a shared central loading area that ramps down 4 feet below grade to allow trucks to meet the existing opening of the barn. This central loading dock allows for efficient distribution to either building as well as a covered sorting area. The new loading area creates a shared courtyard space on the public-facing south side of the site, between the barn and the new structure The existing residence on the site is kept intact, and the area behind it is retained for wastewater treatment.

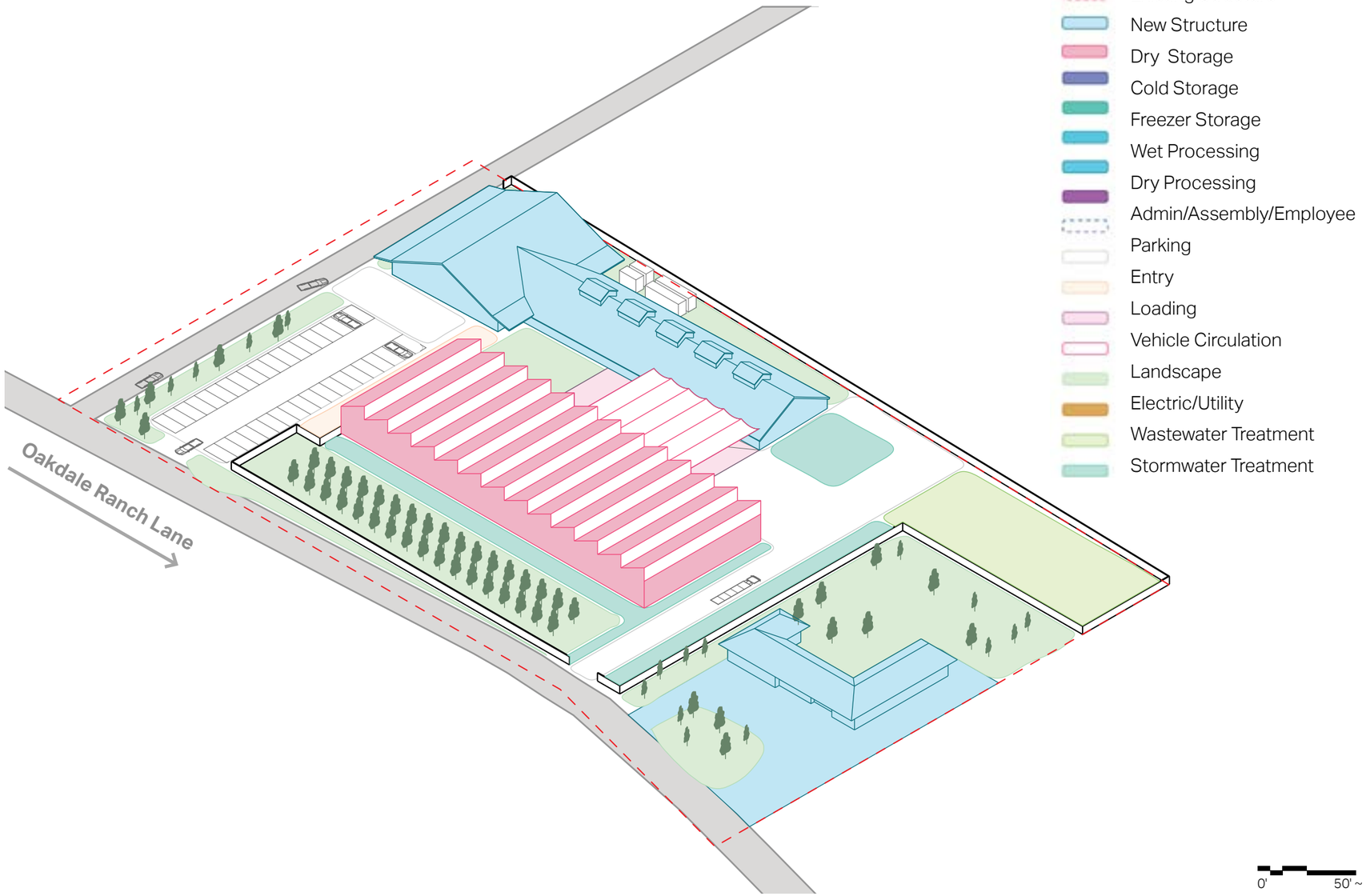
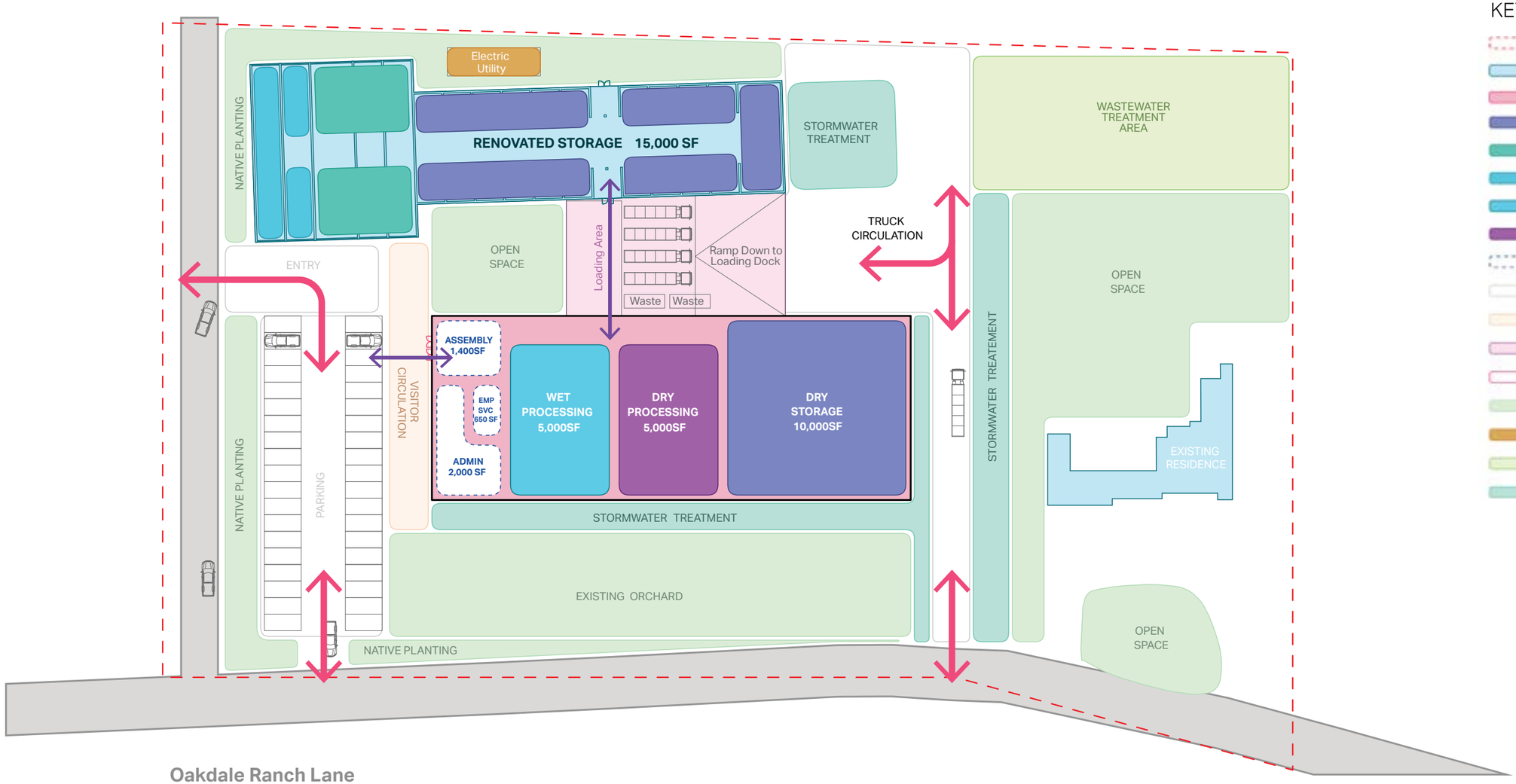


Figure A.16: Concept alternative 2

Food Hub Building Toolkit

Concept Alternative #2

"Goldilocks"



KEY

- Existing Structure
- New Structure
- Dry Storage
- Cold Storage
- Freezer Storage
- Wet Processing
- Dry Processing
- Admin/Assembly/Employee
- Parking
- Entry
- Loading
- Vehicle Circulation
- Landscape
- Electric/Utility
- Wastewater Treatment
- Stormwater Treatment

N

0' 50' ~

Figure A.17: Concept alternative 2

Food Hub Building Toolkit

Concept Alternative #3

"Gamechanger"

Concept #3 aims to use the full extent of the site while still retaining the original barn. This concept retains the new 24,000sf processing and storage facility from Concept #2 and proposes the demolition of the existing residence to make room for a 32,000sf facility dedicated to dry and cold storage. This new storage facility allows for the barn to be reimagined as a public-facing space. The original south barn can be fully renovated to provide administrative and employee spaces, assembly and community meeting spaces, and conference and classroom areas. The extension of the barn can be used as a workshop and additional dry storage area.

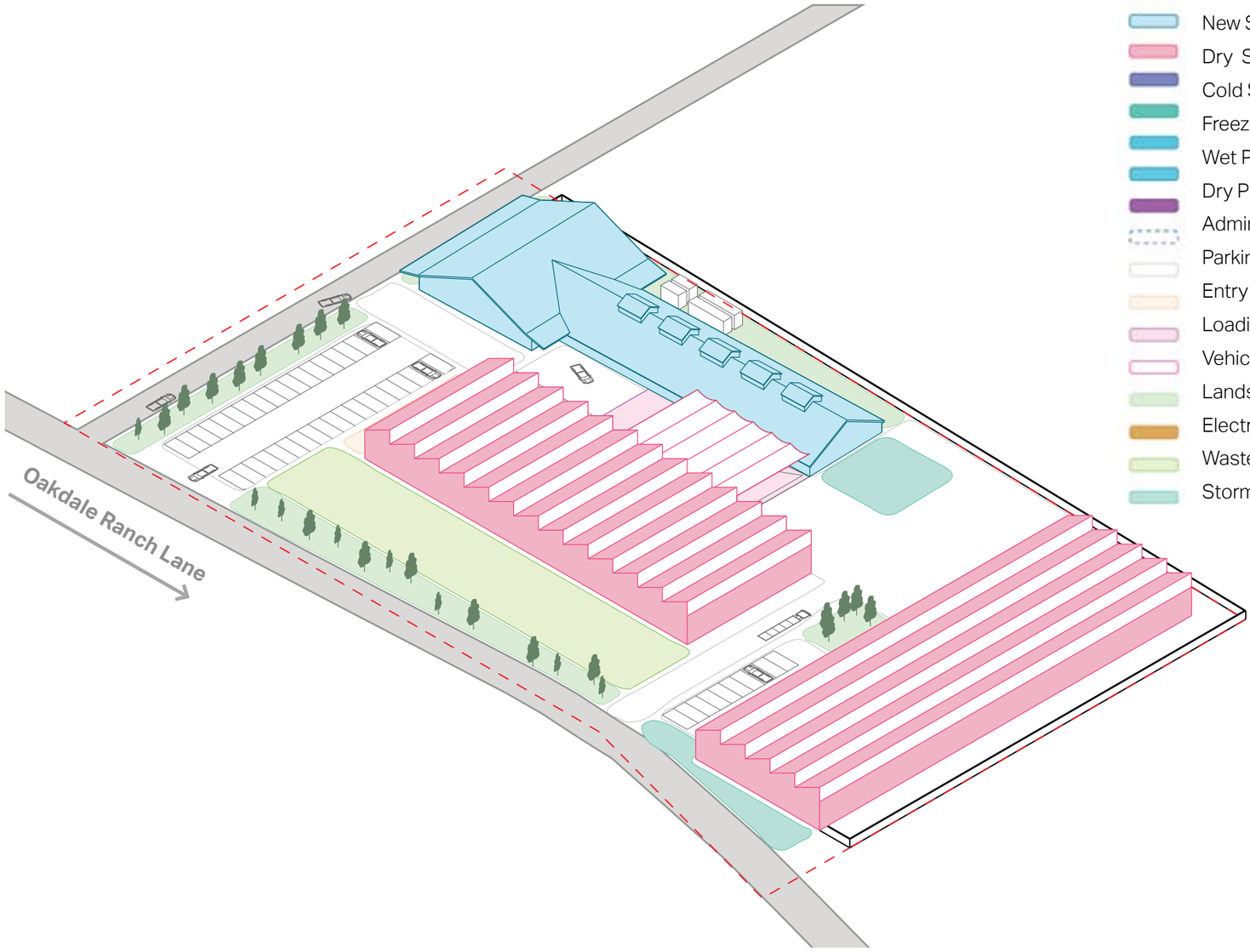


Figure A.18: Concept alternative 3

Food Hub Building Toolkit

Concept Alternative #3

"Gamechanger"

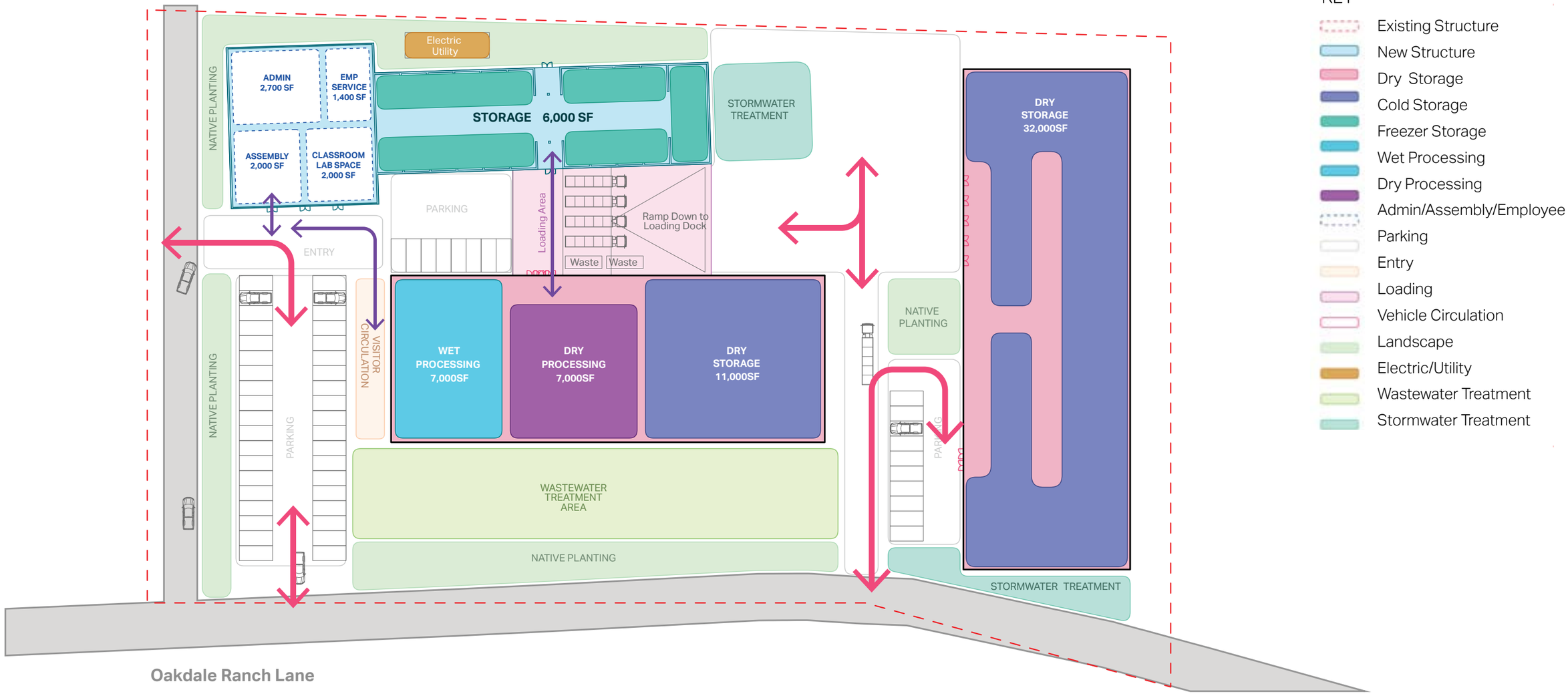


Figure A.19: Concept alternative 3

Appendix B

Concept Alternatives Workshop Summary

Overview

Summary

The concept development workshop, held in Woodland, CA, on August 23, 2023, brought together stakeholders to review the three concept alternatives developed by AECOM. The concepts provide three different approaches to how the Food Hub site could accommodate the activities and functions identified by stakeholders. AECOM also presented energy and water considerations across all concepts, highlighting potential opportunities for sustainability and conservation. Additionally, Valley Vision, Hatamiya Group, and Supply Change also presented on the potential market for a food hub, noting that both growers and buyers within the region support the concept of a food hub. The food hub can supply some of the missing infrastructure that would enable small growers to meet the demands of institutional buyers. By buying locally, schools and other buyers would benefit from higher-quality, more sustainable food while returning value to the local economy.

Participants:

New Season Board Members
Capay Valley Farm Shop
Hatamiya Group
Spork Food Hub / Fiery Ginger Farm
Valley Vision
Supply Change
Resilient Cities Catalyst
Carlson William
FoodPro
AECOM

Figure B.1: Concept alternatives workshop

Breakout Groups and Discussions

Participants divided into three groups and rotated between the three concepts. Each group had 15 minutes to review each concept and provide feedback.

Breakout Group Questions

How do you see this concept supporting the goals and priorities of the Food Hub Network?

What do you see as the biggest advantages of this concept?

What activities or functions are not supported by this concept?

Discussion Questions

What was your favorite concept, and why?

What features would you pull out from the other concepts to retain in the final concept?

What features are the most important to you?

What would you consider as a "nice to have" but is not critical? What would you drop?

Breakout Groups and Discussions

Concepts Feedback

Workshop attendees, which included all key stakeholders of the Yolo Food Hub, reviewed each concept in breakout groups and provided feedback. A brief snapshot of workshop feedback is provided below.

1 "GO"

- Distance between barn and new structure is too great
- Not enough cold storage
- This one gets us there the fastest
- Could start with storage in barn – scope could be determined by available grants
- Could be a good starting point for fundraising
- One loading dock is not enough

2 "GOLDILOCKS"

- Storage and processing at new facility will be more functional
- Dry processing should be next to dry storage, and wet processing should be next to cold storage
- Cover or enclose loading dock area – forklift access between two buildings is important
- Build new building first due to challenges of existing building and to unlock processing

3 "GAMECHANGER"

- Start with new building first
- 11,000sf of cold storage is a great place to start
- Is all the dry storage in the second new building needed? Second building can be added when there is demand.
- 30,000sf of storage is not as valuable as more wet/dry processing
- Modular units in barn can serve as pre-cooling.

Workshop Findings and Outcomes

Feedback applicable across all concept designs are listed below. Based on stakeholder feedback, Concept #2 was selected for refinement as a final concept.

We're **not a rich valley** – we're **wealthy in terms of farming**, but Esparto is not incorporated and doesn't have a city council.

Build processing first to unlock revenue for the Food Hub network

Starting with the **new building** may be **easier** and **more likely to be funded**

Barn can **be rehabilitated in phases** as funding becomes available

More **cost-efficient** to **fully build out front-end infrastructure** upfront (electricity, water)

Cold storage should be located **near wet processing** to **minimize time** food spends at room temperature during transitions

Cold storage was seen **as more important than dry storage**, and could be provided at differential temperatures, including pre-cooling

Separate space for incoming and outgoing **circulation**

Add **solar shading** above **parking lot**

Consider **security and emergency access**

Appendix C

Water Systems

Water Systems

This section provides supporting materials for the water systems analysis in Chapter 3, including information on local water systems, monitoring wells, and instructions on conducting a well water yield test. Additionally, this section also provides assumptions used to estimate site water demand and wastewater recycling.

Local municipal water and wastewater systems

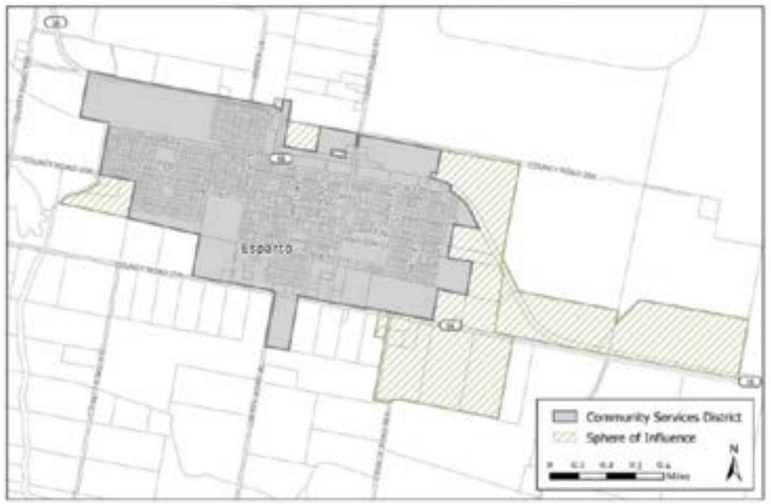


Figure C.1: Esparto Community Services District Boundary and Sphere of Influence. Project site is approximately 1 mile south from the Community Services District.

https://www.yologroundwater.org/yolo-subbasin-groundwater-sustainability-plan

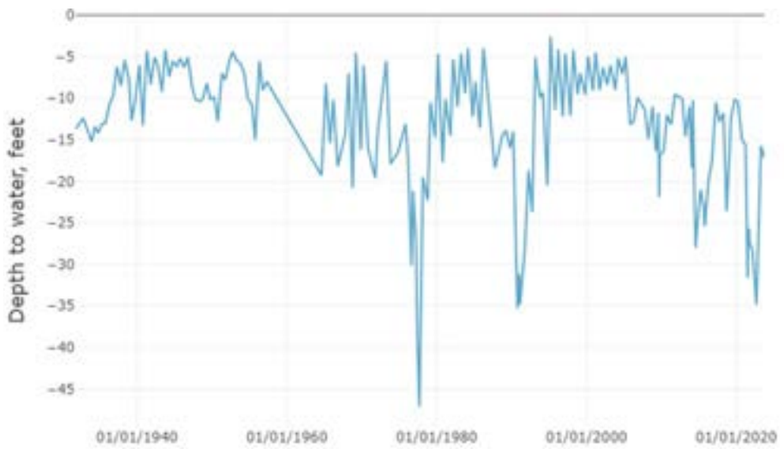


Figure C.3: Historic depth to groundwater for the Yolo Subbasin Groundwater Agency periodic monitoring well on the project site.

https://sgma.yologroundwater.org/

Yolo Subbasin Groundwater Agency Monitoring Wells

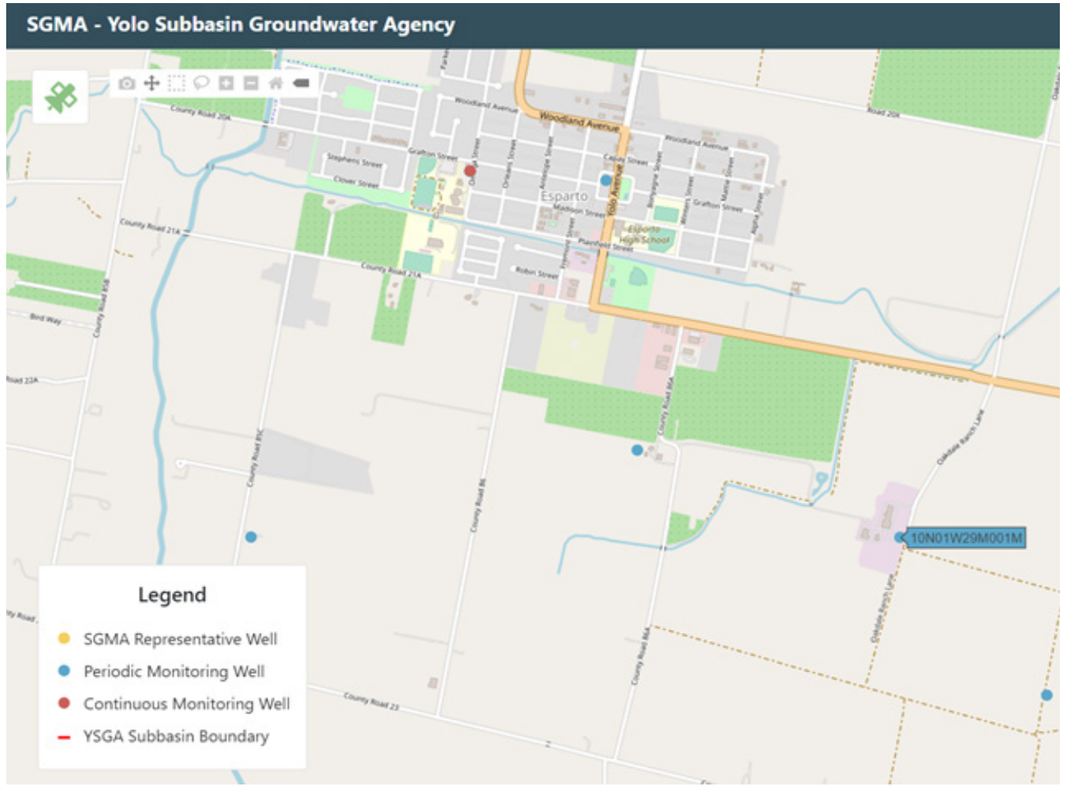


Figure C.2: Location of Yolo Subbasin Groundwater Agency Periodic monitoring wells on site (10N01W29M001M) and wells near the project site

https://sgma.yologroundwater.org/

Water Systems

Well Capacity Assessment Overview

AECOM recommends completing a pump test to determine the yield of the existing wells. Below is a brief list of considerations for this test:

- The step rate test entails pumping water from the well at set flow rates and time intervals and monitoring the level of water in the well over time using a transducer.
- The time length of testing could vary. For example, a first test may measure well drawdown every 2 hours for 24 hours, but longer tests could be useful.
- Note that a location to discharge the pumped water needs to be considered.
- It is also recommended to test well water quality for constituents typically found in fertilizers, pesticides, herbicides, and inorganics, such as nitrate or selenium.
- Additional information can be found on the Yolo County Water Well Program webpage[1].

Water Balance Supporting Assumptions

Wet Processing

- Basis of design produce: Carrots
- Water unit demand: 3,667 gallons per ton of carrots, assume wastewater produced is 90 percent of water demand.[2]
- Equates to 10.9 tons of carrots produced a day during operations.
- Operating schedule: 260 days per year (5 days per week, 52 weeks per year)
- Employee kitchen demands included in wet processing.

Restrooms

- Fixture usage based on LEED v4 Indoor Water Use Reduction Calculator.[3]
- 20 full-time employees, even gender ratio (50 percent female, 50 percent male)

Irrigation

- California Department of Water Resources CIMIS Evapotranspiration (ETo) Zone 14[4]
- Approximation for neighboring irrigation
  - California's almond farmers report irrigating their orchards with 36 inches of water, per acre, per year, on average statewide.
  - 36 inch per acre x 43,560 sf/acre x 7.48 gal/

Rainwater

- Total proposed roof area: 52,240sf
- Parking structure solar panels (6,800sf) not included in estimated rainwater collection area
- Assumed capable of capturing 80 percent of rainfall.

Footnotes:
[1] https://www.yolocounty.org/government/general-government-departments/community-services/environmental-health-division/land-use-programs/water-well-program
[2] https://www.foodnorthwest.org/index.php?option=com_content&view=article&id=83%3Awater-and-wastewater-use-in-the-food-processing-industry&catid=20%3Asite-content&showall=1&id=83:water-and-wastewater-use-in-the-food-processing-industry
[3] https://www.usgbc.org/resources/leed-v4-indoor-water-use-reduction-calculator
[4] https://cimis.water.ca.gov/App_Themes/images/etozonemap.jpg
[5] https://weatherspark.com/y/1165/Average-Weather-in-Woodland-California-United-States-Year-Round

Hydrozone No.	Hydrozone Description	Hydrozone Area (sq ft²)	Plant Factor (PF)	Irrigation Method	Irrigation Efficiency (IE)
1	Shrubs - Bioretention	13,900	0.3	Spray	0.75
2	Shrubs - Site	30,060	0.3	Drip Area	0.81
3	Trees - Site	60	0.3	Bubbler	0.81
4	Trees - Orchard	1,080	0.5	Drip Ring	0.81
5	Trees - Bioswale	240	0.3	Drip Ring	0.81
	Total	45,340			

Table C.1: Proposed irrigated areas in the final concept design and irrigation type assumptions

Rainfall (in/month)	January	February	March	April	May	June	July	August	September	October	November	December
	4.2	4.6	3.4	1.5	0.7	0.2	0	0	0.3	1.1	2.9	4.3
Total	**23.2**											

Table C.3: Historical monthly rainfall for Esparto, CA
https://weatherspark.com/y/1165/Average-Weather-in-Woodland-California-United-States-Year-Round

Water Systems

Stormwater

Site Area	Area (sf)	USDA Soil Conservation Service (SCS) Curve Number (Runoff Coefficient)
Vegetated Softscape	41,900	74
Bioretention	13,900	74
Pervious Pavement	16,250	80
Impervious Hardscape	28,750	98
Undisturbed Residence Area (site)	28,425	74
Undisturbed Residence Area (roof)	9,475	98
Total Area	138,700	

Table C.4: Summary of site landscape to calculate stormwater runoff.

Overall Water Balance

Demand	Average Daily (gal/day)			Annual (million gallons/year)		
	Potable	Non-Potable	Total	Potable	Non-Potable	Total
Wet Processing	40,000		40,000	10.40		10.40
Restroom Faucets	10		10	0.003	0.02	0.003
Restroom Flush Fixtures		60	60		0.58	0.02
Irrigation		1,570	1,570		0.59	0.58
Total Demand	40,010	1,630	41,640	10.40		11.0
Alternative Water Supply						
Process Wastewater			36,000			9.36
Rainwater			1,670			0.60
Stormwater						0.49*
Total Supply			37,670			9.96
Remaining recycled water supply for neighboring irrigation						9.37

Table C.5: Summary of Daily and Annual Water Demands and Supplies.

Appendix D

Barn Rooftop Helioscope Analysis

Design 1 YOLO County Food Hub, 17720 Oakdale Ranch Ln, Esparto, CA 95627

Report

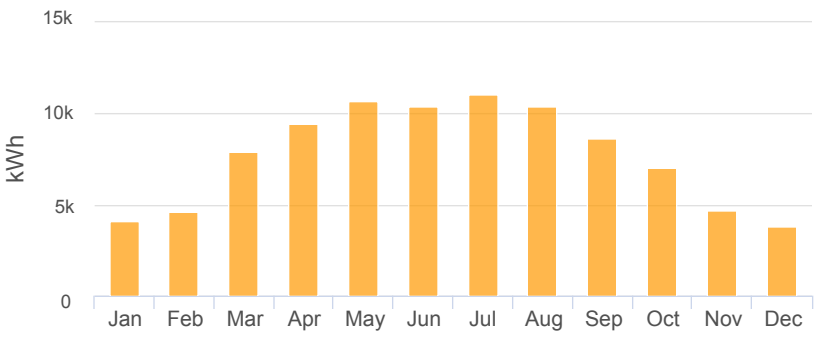
Project Name	YoLo County Food Hub
Summary	The HelioScope report provides an estimate of the annual solar energy generation potential at the Yolo Food Hub site.
Project Address	17720 Oakdale Ranch Ln Esparto, CA 95627
Prepared By	Calum Thompson calum.thompson@aecom.com

System Metrics

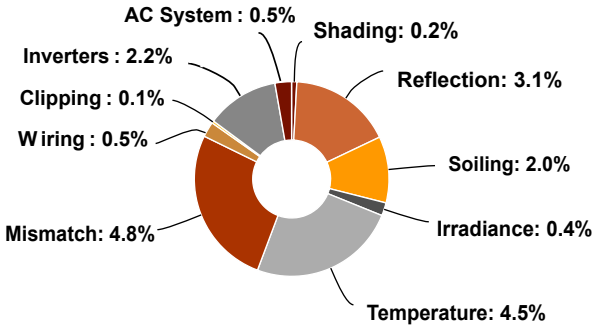
Design	Design 1
Module DC Nameplate	57.7 kW
Inverter AC Nameplate	48.1 kW Load Ratio: 1.20
Annual Production	92.80 MWh
Performance Ratio	83.2%
kWh/kWp	1,607.9
Weather Dataset	TMY, 10km Grid (38.65,-122.05), NREL (prospector)
Simulator Version	15005d4bf4-bb691dc6d3-53d616690c-8f0cc661d2

Project Location

Monthly Production



Sources of System Loss



Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	1,840.1	
	POA Irradiance	1,933.7	5.1%
	Shaded Irradiance	1,930.7	-0.2%
	Irradiance after Reflection	1,870.9	-3.1%
	Irradiance after Soiling	1,833.4	-2.0%
	Total Collector Irradiance	**1,833.5**	**0.0%**
Energy (kWh)	Nameplate	105,824.6	
	Output at Irradiance Levels	105,408.3	-0.4%
	Output at Cell Temperature Derate	100,706.2	-4.5%
	Output After Mismatch	95,859.4	-4.8%
	Optimal DC Output	95,418.9	-0.5%
	Constrained DC Output	95,354.0	-0.1%
	Inverter Output	93,263.9	-2.2%
	Energy to Grid	**92,797.5**	**-0.5%**
Temperature Metrics			
	Avg. Operating Ambient Temp		19.1 °C
	Avg. Operating Cell Temp		29.2 °C
Simulation Metrics			
	Operating Hours		4682
	Solved Hours		4682

Condition Set

Description	Condition Set 1
Weather Dataset	TMY, 10km Grid (38.65,-122.05), NREL (prospector)
Solar Angle Location	Meteo Lat/Lng
Transposition Model	Perez Model
Temperature Model	Sandia Model

Temperature Model Parameters

Rack Type	a	b	Temperature Delta
Fixed Tilt	-3.56	-0.075	3°C
Flush Mount	-2.81	-0.0455	0°C
East-West	-3.56	-0.075	3°C
Carport	-3.56	-0.075	3°C

Soiling (%)

J	F	M	A	M	J	J	A	S	O	N	D
2	2	2	2	2	2	2	2	2	2	2	2

Irradiation Variance	5%
Cell Temperature Spread	4° C
Module Binning Range	-2.5% to 2.5%
AC System Derate	0.50%

Module Characterizations

Module	Uploaded By	Characterization
Q.Peak DUO XL-G10.3/BFG 485 (Hanwha Q Cells)	HelioScope	Spec Sheet Characterization, PAN

Component Characterizations

Device	Uploaded By	Characterization
Sunny Tripower 24000TL-US (SMA)	HelioScope	Modified CEC

Components

Component	Name	Count
Inverters	Sunny Tripower 24000TL-US (SMA)	2 (48.1 kW)
Strings	10 AWG (Copper)	9 (1,461.3 ft)
Module	Hanwha Q Cells, Q.Peak DUO XL-G10.3/BFG 485 (485W)	119 (57.7 kW)

Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone	-	4-17	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Field Segment 1	Carport	Landscape (Horizontal)	26°	102°	3.0 ft	1x1	75	75	36.4 kW
Field Segment 2	Carport	Landscape (Horizontal)	40°	193°	3.0 ft	1x1	22	22	10.7 kW
Field Segment 3	Carport	Landscape (Horizontal)	26°	283°	3.0 ft	1x1			0
Field Segment 4	Carport	Landscape (Horizontal)	24°	193°	3.0 ft	1x1	22	22	10.7 kW

Detailed Layout

Appendix E

Cost Estimate

AECOM

Yolo Food Hub

Sacramento, California
Concept Cost Estimate

October 10, 2023

Delivering a better world

CONTENTS

1.0 BASIS OF ASSUMPTIONS

PREPARED FROM	**Dated**
Yolo Food Hub Concept Package for Cost Estimation	September 22, 2023
Carlson William Quotation	September 22, 2023

Subsequent correspondence between AECOM Design and Cost Management teams

This is a DRAFT issue, the quantities, costs and contents of this document are subject to change after design team and client DRAFT review

Qualifications of Cost Model

The Cost Model is based on the following assumptions:

- This estimate is based on preliminary information provided prior to completion of any design. These cost models are conceptual and are not representative of the final construction costs nor does it include for any additional scope or information not determined by the date of the models. AECOM cannot and does not guarantee that the proposals, bids, and actual construction costs will not vary from this estimate.
- This Basis of Estimate report (along with above inclusions, exclusions, assumptions and clarifications), and the attached Concept Cost Estimate are intended to be, and constitute a single document
- Estimates are prepared using current dollars (Q4 2023)
- All Estimates include demolition as required
- The estimate includes all general requirements and other general conditions as part of overall Construction.
- Construction costs include all General Contractor & Subcontractor Markups
- Normal productivity rates as historically experienced are utilized
- Assumed that general building permits if required, will be obtained by, and paid for by the owner
- Assumed that all easements, if required, will be obtained by, and paid for by the owner
- Assumed that all public space permits, if required, will be obtained by, and paid for by the owner
- Assumed that all 3rd party inspections, materials and soil testing will be conducted by the owner's consultants, and paid for by the owner (allowances included in soft costs)
- Assumed concrete footing and steel vertical structure for loading dock
- We include insulation and vapor barrier to perimeter of the existing façade area
- Pre-engineered metal building for new facility
- Assumed all windows and existing wood planks façade to salvage and reinstall
- Allow for new wood planks façade to enclosed the west side area of the barn
- Allow for new standing seam metal roofing
- Allow for new finishes for barn and office areas
- Allow for the upgrade for structural upgrade to barn as per Carlson William quote for rough carpentry and steel support cost
- Assumed bioretention build-up for stormwater and wastewater area
- Allow for site furniture
- Allow for grass to existing orchard areas

2.0 EXCLUSIONS

Exclusions from Construction Costs:

- Escalation / Inflation beyond quarter 4 2023
- Restrictive technical specifications or excessive contract conditions
- Land and easement acquisition
- Non-competitive bidding conditions
- Sole source specifications of materials or products
- Compression of Construction Schedules, premium shift work and restrictions on the contractor's working hours (out of normal hours)
- Off-site work for infrastructure improvements
- Hazardous material abatement when demolition of existing barn structure, roof and siteworks
- Owner softcost are excluded
- Infrastructure for food processing within the buildings (connections provided at building edge)

The following contingencies are excluded:

- Contractor Change Order contingency
- Furnitures, Fixtures & Equipment (FF&E) Contingency

2.1 RISKS

- Structural and architectural intervention required on the barn
- Level (capacity) of reinforcement of existing utilities for the site
- Potential hazardous materials and abatement on the site and existing barn

Yolo Food Hub
Sacramento, California
Concept Cost Estimate
October 10, 2023

AECOM

EXECUTIVE SUMMARY

Ref.	Projects	TOTAL Estimated GSF	Total Project Cost Phase I & Phase II	PHASE I	Construction Costs		PHASE II	Construction Costs	
				GSF	$ / GSF	Construction Cost	GSF	$ / GSF	Construction Cost
PHASE I			**$11,303,000**			**$11,303,000**			
1.1	Barn Refurbishment	**20,226**	$7,197,889	20,226	$ 356 /GSF	**$7,197,889**			
1.2	Loading Dock Construction and Truck Circulation Area	**22,049**	$1,714,733	22,049	$ 78 /GSF	**$1,714,733**			
1.3	Upgrade Existing Electrical Service	**0**	$240,094	0	$ 0 /GSF	**$240,094**			
1.4	Modular Regrigerator Storage Units	**8,910**	$2,021,312	8,910	$ 227 /GSF	**$2,021,312**			
1.5	Fences	**0**	$128,973	0	$ 0 /GSF	**$128,973**			
PHASE II			**$15,884,000**						**$15,884,000**
2.1	Site Development	**49,094**	$1,148,974				49,094	$ 23 /GSF	$1,148,974
2.2	New Facility	**26,000**	$10,569,119				26,000	$ 407 /GSF	$10,569,119
2.3	Site Parking Lot	**12,013**	$266,519				12,013	$ 22 /GSF	$266,519
2.4	Wastewater Treatment	**12,500**	$568,869				12,500	$ 46 /GSF	$568,869
2.5	Solar PV Array on New Facility Roof	**22,000**	$2,084,960				22,000	$ 95 /GSF	$2,084,960
2.6	Solar Carport	**3,500**	$1,137,251				3,500	$ 325 /GSF	$1,137,251
2.7	Drill a Secondary Well	**0**	$108,310				0	$ 0 /GSF	$108,310
	Total		**$27,187,000**			**$11,303,000**			**$15,884,000**

Yolo Food Hub
Sacramento, California
Concept Cost Estimate
October 10, 2023

CONTROL QUANTITIES

Ref.	Projects	TOTAL Estimated GSF	Phase I GSF	Phase II GSF
PHASE I		**51,185**	**51,185**	**0**
1.1	Barn Refurbishment	20,226	20,226	
1.2	Loading Dock Construction and Truck Circulation Area	22,049	22,049	
1.3	Upgrade Existing Electrical Service		0	
1.4	Modular Regrigerator Storage Units	8,910	8,910	
1.5	Fences		0	
PHASE II		**125,107**	**0**	**125,107**
2.1	Site Development	49,094		49,094
2.2	New Facility	26,000		26,000
2.3	Site Parking Lot	12,013		12,013
2.4	Wastewater Treatment	12,500		12,500
2.5	Solar PV Array on New Facility Roof	22,000		22,000
2.6	Solar Carport	3,500		3,500
2.7	Drill a Secondary Well			0

Yolo Food Hub
Sacramento, California
Concept Cost Estimate
October 10, 2023

SUMMARY PHASE I

Ref.	Projects	Estimated GSF	Estimated Cost (Q4 2023) Construction $ / GSF	Building + Site Total Direct Cost	Total Construction Cost
PHASE I					
1.1	Barn Refurbishment	**20,226**	**$ 356 /GSF**	**$4,967,594**	**$7,197,889**
1.2	Loading Dock Construction and Truck	**22,049**	**$ 78 /GSF**	**$1,183,416**	**$1,714,733**
1.3	Upgrade Existing Electrical Service	**0**	**$ 0 /GSF**	**$165,700**	**$240,094**
1.4	Modular Regrigerator Storage Units	**8,910**	**$ 227 /GSF**	**$1,395,000**	**$2,021,312**
1.5	Fences	**0**	**$ 0 /GSF**	**$89,010**	**$128,973**
	Totals	**$ 51,185**		**$ 7,800,720**	**$ 11,303,000**

6 PHASE I Elemental Summary

TOTAL CONSTRUCTION COST SUMMARY

PHASE I	*Gross Area (GSF)*		*$/GSF*		*TOTAL ($) Construction*
BUILDING CONSTRUCTION	**23,458**				
1. Foundations	23,458	$	18.46	$	433,104
2. Vertical Structure	23,458	$	51.16	$	1,200,146
3. Floor and Roof Structure	23,458	$	-	$	-
4. Exterior Cladding	23,458	$	40.14	$	941,540
5. Roofing, Waterproofing & Skylights	23,458	$	29.05	$	681,440
6. Interior Partitions, Doors & Glazing	23,458	$	3.74	$	87,850
7. Floor, Wall & Ceiling Finishes	23,458	$	17.68	$	414,703
8. Function Equipment & Specialties	23,458	$	59.41	$	1,393,713
9. Stairs & Vertical Transportation	23,458	$	-	$	-
10. Plumbing Systems	23,458	$	8.43	$	197,704
11. Heating, Ventilation & Air Conditioning	23,458	$	19.69	$	461,800
12. Electrical Lighting, Power & Communication	23,458	$	53.60	$	1,257,308
13. Fire Protection Systems	23,458	$	9.00	$	211,122
SUB TOTAL - Building	***23,458***	***$***	***310***	***$***	***7,280,430***
SITE DEVELOPMENT	**18,817**				
14. Site Preparation & Building Demolition	18,817	$	12.37	$	232,857
15. Site Paving, Structures & Landscaping	18,817	$	11.56	$	217,433
16. Utilities on Site	18,817	$	3.72	$	70,000
SUB TOTAL - Site Improvements	***18,817***	***$***	***28***	***$***	***520,290***
Indirect Construction Costs					
Design Build Fee (excluded, assume design-bid-build)	*0.00%*			*$*	*-*
General Conditions	*7.00%*			*$*	*546,050*
General Requirements	*4.00%*			*$*	*312,029*
Preconstruction Phase Fee	*1.00%*			*$*	*78,007*
Bond & Insurances	*2.75%*			*$*	*214,520*
Contractor's Overhead & Profit or Fee	*4.00%*			*$*	*312,029*
PLANNED CONSTRUCTION COST				***$***	***9,264,000***
Contingencies					
Contingency for Development of Design	*10.00%*			*$*	*926,400*
Construction Contingency	*12.00%*			*$*	*1,111,680*
PLANNED CONSTRUCTION COST (w/ Contingencies)				***$***	***11,303,000***
Escalation - Excluded	*0.00%*			*$*	*-*
TOTAL CONSTRUCTION COST (BUILDING & SITE)	***23,458***	***$***	***482***	***$***	***11,303,000***

6.1 Detailed Build-Up (PHASE I)

Item Description	*Quantity*	*Unit*	*Rate*	*Total*	*Project Category*
1. Foundations					
Excavation to loading dock area ~assume 4ft excavation	1,445	CY	45.00	65,003	1.3
Backfill from on site stores	547	CY	30.00	16,405	1.3
Shallow Pad foundations; assume 3'x3'x1.5' deep to loading dock area	2	CY			1.3
(Assumed 3 no.)					1.3
Excavation		CY	45.00	*Included above*	1.3
Base fill	0.5	CY	70.00	35	1.3
Formwork	54	SF	20.00	1,080	1.3
Rebar 150lbs/CY	225	LBS	1.80	405	1.3
Concrete	1	CY	400.00	599	1.3
Backfill		CY	30.00	*Included above*	1.3
Retaining wall , size 6" thick	30	CY			1.3
Excavation		CY	45.00	*Included above*	1.3
Base fill	17	CY	70.00	1,184	1.3
Formwork	3,204	SF	20.00	64,080	1.3
Rebar 100lbs/CY	2,967	LBS	1.80	5,340	1.3
Concrete	30	CY	400.00	11,867	1.3
Backfill		CY	30.00	*Included above*	1.3
Allow for shoring at existing Barn	550	SF	150.00	82,500	1.3
Slab on grade; assumed 4" thick (covered dock)	3,232	*SF*			1.3
Concrete	40	CY	385.00	15,347	1.3
Perimeter formwork	236	SF	20.00	4,726	1.3
Reinforcement	3,232	SF	1.80	5,818	1.3
Gravel; assumed 0.5' thick	60	CY	70.00	4,185	1.3
Waterproofing	3,232	SF	1.50	4,848	1.3
Vapor barrier	3,232	SF	5.00	16,160	1.3
Construction joints, water stops, allow	3,232	SF	0.80	2,586	1.3
Slab on grade; assumed 6" thick (ramp)	7,070	*SF*			1.3
Concrete	131	CY	385.00	50,356	1.3
Perimeter formwork	354	SF	20.00	7,089	1.3
Reinforcement	7,070	SF	1.80	12,726	1.3
Gravel; assumed 0.5' thick	131	CY	70.00	9,156	1.3
Waterproofing	7,070	SF	1.50	10,605	1.3
Vapor barrier	7,070	SF	5.00	35,350	1.3
Construction joints, water stops, allow	7,070	SF	0.80	5,656	1.3
Waterproofing					1.3
Waterproofing @ SOG	20,000	SF	0.00	*Include above*	1.3
Permanent dewatering			0.00	*Excluded*	1.3
				433,104	

6.1 Detailed Build-Up (PHASE I)

Item Description	*Quantity*	*Unit*	*Rate*	*Total*	*Project Category*
2. Vertical Structure					
Floor & Column Construction		lbs/SF			
Structural Steel Frame, to covered loading dock	17.3	Ton	6,500.00	112,393	1.3
Steel beams; 4LB/SF	*6.5*	*T*		*Included*	1.3
Steel columns; 3LB/SF	*4.8*	*T*		*Included*	1.3
Steel truss, girder, brace; 3 LB/SF	*4.8*	*T*		*Included*	1.3
Misc. steel plate & connection	*1.1*	*T*		*Included*	1.3
Fireproofing	*17.3*	T		*Included*	1.3
Allow for structural upgrade to barn, including new additional roof trusses, bracing, columns and beams to reinforced the barn	1	LS	1,085,996.00	1,085,996	1.1
Misc. steel	*3,232*	*GSF*			
Exterior façade / enclosure steel support; 0.15 LB/SF	0.2	T	6,500.00	1,576	1.3
Fireproofing	0.2	T	750.00	182	1.3
				1,200,146	
3. Floor and Roof Structure				*Included above*	
				0	
4. Exterior Cladding					
Exterior Wall Construction					
Exterior Skin					
Remove, salvage wood planks at facade and reinstall, allow 20' high	9,580	SF	50.00	479,000	1.1
East Elevation	1,220	SF			
North Elevation	6,440	SF			
South Elevation	1,920	SF			
Battens, Insulation & vapor barrier	9,580	SF	5.50	52,690	1.1
Allow for painting of existing wood plank façade	9,580	SF	3.50	33,530	1.1
Allow for new wood plank façade					1.1
West Elevation	1,920	SF	58.50	112,320	1.1
Metal Panel, to loading dock wall, assume 20' high	2,280	SF	75.00	171,000	1.3
Windows					
Remove, salvage windows and reinstall	40	EA	1,800.00	72,000	1.1

6.1 Detailed Build-Up (PHASE I)

Item Description	*Quantity*	*Unit*	*Rate*	*Total*	*Project Category*
Doors					
Hollow Metal Doors & Entrances (pair)	2	EA	6,000.00	12,000	1.1
Hollow Metal Doors & Entrances, single	3	EA	3,000.00	9,000	1.1
Overhead coiling door, to loading dock		EA	20,000.00		1.3
				941,540	
5. Roofing, Waterproofing & Skylights					
Roof Coverings & Insulation					
Roof Finishes, standing seam metal roofing, to barn	19,876	SF	25.00	496,900	1.1
Roof Insulation	19,876	SF		*Included*	1.1
Roof gutter, flashings & trim	802	LF	70.00	56,140	1.1
Roof Finishes, standing seam metal roofing, to loading dock area	3,232	SF	25.00	80,800	1.3
Roof gutter, flashings & trim	230	LF	70.00	16,100	1.3
Skylights & Roof Openings					
Allow for Skylights, assume 7 no. of 10' x 5'	350	SF	90.00	31,500	1.1
				681,440	
6. Interior Partitions, Doors & Glazing					
INTERIOR PARTITIONS					
Fixed Partitions					
GWB partition					1.1
Dry storage, assume 20' high	2,720	SF	17.50	47,600	1.1
Office, assume 15' high	750	SF	15.00	11,250	1.1
INTERIOR DOORS					
Interior Doors (incl hardware & finish)					
Wood door with metal frame, single, to offices	4	EA	4,250.00	17,000	1.1
Hollow metal door with metal frames, double, to Dry storage	2	EA	6,000.00	12,000	1.1
SPECIALTIES / FITTINGS					
				87,850	
7. Floor, Wall & Ceiling Finishes					
FLOOR AND BASE					
Sealed Concrete	17,873	SF			
Barn storage area	8,607	SF	5.00	43,035	1.1

6.1 Detailed Build-Up (PHASE I)

Item Description	*Quantity*	*Unit*	*Rate*	*Total*	*Project Category*
Barn corridor/hallway	6,266	SF	5.00	31,330	1.1
Dry storage	3,000	SF	5.00	15,000	1.1
Loading dock	3,232	SF	5.00	16,160	1.3
Carpet	1,877	SF			
Office circulation	1,298	SF	5.75	7,464	1.1
Office rooms	579	SF	5.75	3,329	1.1
Ceramic tile	1,298	SF			
Toilets	1,298	SF	25.00	32,450	1.1
Base finish					
Rubber base	590	LF	4.00	2,361	1.1
Ceramic base	87	LF	25.00	2,185	1.1
WALL FINISHES					
Wall Finishes to Inside walls (paint - prime and two coats)	37,961	SF			
Barn, allow 20' high	29,300	SF	2.50	73,250	1.1
Dry storage, allow 20' high	5,518	SF	2.50	13,795	1.1
Office circulation, allow 10' high	1,772	SF	2.50	4,429	1.1
Office rooms, allow 10' high	1,372	SF	2.50	3,430	1.1
Ceramic tile	787	SF			
Toilets, allow 9' high	787	SF	25.00	19,663	1.1
CEILING FINISHES					
Acoustic tile, suspended system	1,877	SF			
Office circulation	1,298	SF	20.00	25,960	1.1
Office rooms	579	SF	20.00	11,580	1.1
Painted GWB Drop Ceiling	1,298	SF			
Toilets	1,298	SF	36.00	46,728	1.1
Exposed, painted	17,873	SF			
Barn storage area	8,607	SF	3.50	30,125	1.1
Barn corridor/hallway	6,266	SF	3.50	21,931	1.1
Dry storage	3,000	SF	3.50	10,500	1.1
				414,703	

8. Function Equipment & Specialties

Toilet Accessories					
Mirror	2	EA	500.00	1,000	1.1
Toilet accessories, allow	2	EA	800.00	1,600	1.1
Signage					
Room System signage	20,226	GSF	0.50	10,113	1.1
Equipment					

6.1 Detailed Build-Up (PHASE I)

Item Description	*Quantity*	*Unit*	*Rate*	*Total*	*Project Category*
Modular refrigerated storage units, 13 units with various sizes	8,910	SF			
Cold storage unit, size 14'x22'x8'	300	SF	150.00	45,000	1.2
Cold storage unit, size 14'x22'x12'	300	SF	166.67	50,000	1.2
Cold storage unit, size 14'x30'x12'	420	SF	166.67	70,000	1.2
Cold storage unit, size 14'x32'x8'	450	SF	166.67	75,000	1.2
Cold storage unit, size 14'x40'x8'	1,680	SF	150.00	252,000	1.2
Cold storage unit, size 22'x32'x16'	1,400	SF	150.00	210,000	1.2
Cold storage unit, size 22'x40'x16'	1,760	SF	150.00	264,000	1.2
Pre-cooling unit, 46'x14'x8'	2,600	SF	150.00	390,000	1.2
Truck Dock Equipment					
Allowance for truck dock bumpers	1	LS	25,000.00	25,000	1.3
				1,393,713	
9. Stairs & Vertical Transportation				*N/A*	
				0	
10. Plumbing Systems					
Restroom fixtures					
Lavatory	2	EA	4,000.00	8,000	1.1
Toilet	2	EA	6,400.00	12,800	1.1
Hand wash sink	1	EA	3,000.00	3,000	1.1
Janitor mop sink/utility sink	1	EA	5,800.00	5,800	1.1
Hose bibbs	4	EA	1,800.00	7,200	1.3
Distribution / Drainage / Sanitary Systems				*Included above*	
Rain Water Drainage					
Pipe and Fittings	800	LF	80.00	64,000	1.1
Trench drain at loading dock	40	LF	150.00	6,000	1.3
Loading dock sump pump	1	EA	10,000.00	10,000	1.3
Other Plumbing Systems, allow	20,226	SF	4.00	80,904	1.1
				197,704	
11. Heating, Ventilation & Air Conditioning					
Heating, Ventilation & Air Conditioning	23,616	GSF			
Barn	15,349	GSF	20.00	306,980	1.1
Dry storage	3,000	GSF	25.00	75,000	1.1
Office	1,877	GSF	40.00	75,080	1.1
Toilet	158	GSF	30.00	4,740	1.1
Loading dock	3,232	GSF	0.00		1.3
				461,800	

6.1 Detailed Build-Up (PHASE I)

Item Description	*Quantity*	*Unit*	*Rate*	*Total*	*Project Category*
12. Electrical Lighting, Power & Communication					
Electrical Lighting	23,616	GSF			
Barn	15,349	GSF	12.00	184,188	1.1
Dry storage	3,000	GSF	12.00	36,000	1.1
Office	1,877	GSF	20.00	37,540	1.1
Toilet	158	GSF	20.00	3,160	1.1
Loading dock	3,232	GSF	12.00	38,784	1.3
Electrical Equipment and Panels	23,616	GSF	12.00	283,392	1.1
Electrical service to buidling	1	LS	150,000.00	150,000	1.4
Power Distribution System	23,616	GSF			
Barn	15,349	GSF	16.00	245,584	1.1
Dry storage	3,000	GSF	14.00	42,000	1.1
Office	1,877	GSF	16.00	30,032	1.1
Toilet	158	GSF	14.00	2,212	1.1
Loading dock	3,232	GSF	10.00	32,320	1.3
Cold sorage unit circuits	13	EA	3,000.00	39,000	1.2
Data, Telephone/Communication	1,877	GSF	4.00	7,508	1.1
Office	1,877	GSF			1.1
AV/IT System	1,877	GSF	4.00	7,508	1.1
Office	1,877	GSF			1.1
Fire Alarm	23,616	GSF	5.00	118,080	1.1
				1,257,308	
13. Fire Protection Systems					
Sprinkler and Standpipe Systems					
Fire Protection Sprinkler Systems	20,226	GSF	9.00	182,034	1.1
Loading dock	3,232	GSF	9.00	29,088	1.3
				211,122	
14. Site Preparation & Building Demolition					
Building Demolition					
Roof demolition	19,876	SF	10.00	198,760	1.1
Allow for demolition of existing MEP to barn area	1	LS	8,000.00	8,000	1.1
Site Clearing	22,049	SF	0.95	20,987	1.3
Site Demolition					

6.1 Detailed Build-Up (PHASE I)

Item Description	*Quantity*	*Unit*	*Rate*	*Total*	*Project Category*
Demo existing concrete pad to west side of barn	2,044	SF	2.50	5,110	1.1
				232,857	
15. Site Paving, Structures & Landscaping					
Paving					
Paving to truck circulation area	11,747	SF	9.00	105,723	1.3
Road Markings					
Allow for road markings to loading dock and ramp	5	EA	200.00	1,000	1.3
Allow for road markings to truck circulation area	5	EA	200.00	1,000	1.3
Site structures/fixtures					
Allow for waste receptacle, to loading dock area	2	EA	2,500.00	5,000	1.3
Fencing, metal, including support and footings, to electrical utility service area	132	LF	100.00	13,200	1.4
Gate, double, to electrical utility service area	1	EA	2,500.00	2,500	1.4
Fencing, metal, including support and footings, perimeter	989	LF	90.00	89,010	1.5
				217,433	
16. Utilities on Site					
Site Utilities, within 5' of building					
Water Supply and Distribution	1	LS	10,000.00	10,000	1.3
Sanitary onsite sewer system (Cost is split with phase 2)	1	LS	30,000.00	30,000	1.3
Storm drain system	1	LS	10,000.00	10,000	1.3
Site Communications and Security	1	LS	20,000.00	20,000	1.3

Yolo Food Hub
Sacramento, California
Concept Cost Estimate
October 10, 2023

SUMMARY PHASE II

Ref.	Projects	Estimated GSF	Estimated Cost (Q4 2023) $ / GSF	Building + Site Total Direct Cost	Total Construction Cost
PHASE II					
2.1	New Facility	**26,000**	**$ 407 /GSF**	**$7,806,599**	**$10,569,119**
2.2	Drill a Secondary Well	**0**	**$ 0 /GSF**	**$80,000**	**$108,310**
2.3	Solar Canopies in Parking	**3,500**	**$ 325 /GSF**	**$840,000**	**$1,137,251**
2.4	Site Parking Lot	**12,013**	**$ 22 /GSF**	**$196,857**	**$266,519**
2.5	Solar Array on Roof of New Facility	**22,000**	**$ 95 /GSF**	**$1,540,000**	**$2,084,960**
2.6	Wastewater Treatment	**12,500**	**$ 46 /GSF**	**$420,180**	**$568,869**
2.7	Site Development	**49,094**	**$ 23 /GSF**	**$848,659**	**$1,148,974**
	Totals			**$ 11,732,295**	**$ 15,884,000**

8 PHASE II Elemental Summary

TOTAL CONSTRUCTION COST SUMMARY

PHASE I	*Gross Area (GSF)*		*$/GSF*		*TOTAL ($) Construction*
BUILDING CONSTRUCTION	**26,000**				
1. Foundations	26,000	$	29.45	$	765,704
2. Vertical Structure	26,000	$	83.46	$	2,170,000
3. Floor and Roof Structure	26,000	$	-	$	-
4. Exterior Cladding	26,000	$	9.25	$	240,500
5. Roofing, Waterproofing & Skylights	26,000	$	-	$	-
6. Interior Partitions, Doors & Glazing	26,000	$	29.45	$	765,805
7. Floor, Wall & Ceiling Finishes	26,000	$	35.03	$	910,662
8. Function Equipment & Specialties	26,000	$	59.88	$	1,556,900
9. Stairs & Vertical Transportation	26,000	$	-	$	-
10. Plumbing Systems	26,000	$	20.05	$	521,200
11. Heating, Ventilation & Air Conditioning	26,000	$	43.29	$	1,125,460
12. Electrical Lighting, Power & Communication	26,000	$	49.48	$	1,286,368
13. Fire Protection Systems	26,000	$	9.00	$	234,000
SUB TOTAL - Building	***26,000***	***$***	***368***	***$***	***9,576,599***
SITE DEVELOPMENT	**73,607**				
14. Site Preparation & Building Demolition	73,607	$	1.89	$	139,023
15. Site Paving, Structures & Landscaping	73,607	$	23.05	$	1,696,672
16. Utilities on Site	73,607	$	4.35	$	320,000
SUB TOTAL - Site Improvements	***73,607***	***$***	***29***	***$***	***2,155,695***
Indirect Construction Costs					
Design Build Fee (excluded, assume design-bid-build)	*0.00%*			*$*	*-*
General Conditions	*7.00%*			*$*	*821,261*
General Requirements	*4.00%*			*$*	*469,292*
Preconstruction Phase Fee	*1.00%*			*$*	*117,323*
Bond & Insurances	*2.75%*			*$*	*322,638*
Contractor's Overhead & Profit or Fee	*4.00%*			*$*	*469,292*
PLANNED CONSTRUCTION COST				***$***	***13,933,000***
Contingencies					
Contingency for Development of Design	*10.00%*			*$*	*1,393,300*
Construction Contingency	*4.00%*			*$*	*557,320*
PLANNED CONSTRUCTION COST (w/ Contingencies)				***$***	***15,884,000***
Escalation - Excluded	*0.00%*			*$*	*-*
TOTAL CONSTRUCTION COST (BUILDING & SITE)	***26,000***	***$***	***611***	***$***	***15,884,000***

8.1 Detailed Build-Up (PHASE II)

Item Description	*Quantity*	*Unit*	*Rate*	*Total*	*Project Category*
1. Foundations					
Bulk excavation including perimeter drain					
~assume 2ft excavation	2,309	CY	45.00	103,896	2.1
Backfill from on site stores	1,917	CY	30.00	57,516	2.1
Shallow Pad foundations; assume 3'x3'x1.5' deep	11	CY			2.1
(Assumed 22 no.)					
Excavation		CY	45.00	*Included above*	2.1
Base fill	4	CY	70.00	256	2.1
Formwork	396	SF	20.00	7,920	2.1
Rebar 150lbs/CY	1,648	LBS	1.80	2,967	2.1
Concrete	11	CY	400.00	4,396	2.1
Backfill		CY	30.00	*Included above*	2.1
Perimeter Grade Beams, size 1.5' x 1.5'	60	CY			2.1
Excavation		CY	45.00	*Included above*	2.1
Base fill	20	CY	70.00	1,399	2.1
Formwork	3,240	SF	20.00	64,800	2.1
Rebar 150lbs/CY	8,991	LBS	1.80	16,184	2.1
Concrete	60	CY	400.00	23,976	2.1
Backfill		CY	30.00	*Included above*	2.1
Slab on grade; assumed 4" thick	26,000	*SF*			2.1
Concrete	321	CY	385.00	123,457	2.1
Perimeter formwork	240	SF	20.00	4,800	2.1
Reinforcement	26,000	SF	1.80	46,800	2.1
Gravel; assumed 0.5' thick	481	CY	70.00	33,670	2.1
Waterproofing	26,000	SF	1.50	39,000	2.1
Vapor barrier	26,000	SF	5.00	130,000	2.1
Construction joints, water stops, allow	26,000	SF	0.80	20,800	2.1
Slab on grade; assumed 6" thick, to loading dock					
	859	*SF*			2.1
Concrete	16	CY	385.00	6,118	2.1
Perimeter formwork	61	SF	20.00	1,220	2.1
Reinforcement	859	SF	1.80	1,546	2.1
Gravel; assumed 0.5' thick	16	CY	70.00	1,112	2.1
Waterproofing	859	SF	1.50	1,289	2.1
Vapor barrier	859	SF	5.00	4,295	2.1
Construction joints, water stops, allow	859	SF	0.80	687	2.1
Waterproofing					2.1
Waterproofing @ Foundation				*N/A*	2.1
Waterproofing @ Grade Beams				*N/A*	2.1
Waterproofing @ SOG	26,000	SF		*Include above*	2.1
Subsurface drainage					2.1
Perimeter	720	LF	65.00	46,800	2.1
Under slab drainage	26,000	SF	0.80	20,800	2.1
Permanent dewatering			0.00	*Excluded*	
				765,704	

8.1 Detailed Build-Up (PHASE II)

Item Description	*Quantity*	*Unit*	*Rate*	*Total*	*Project Category*
2. Vertical Structure					
New Facility Structure					2.1
Pre-engineered metal structure and enclosure: including structural steel framing, metal roof panels, insulated metal wall panels and metal soffit panels	26,000	GSF	75.00	1,950,000	2.1
Floor & Column Construction				*Include above*	2.1
Additional structure for Solar array on roof of new	22,000	SF	10.00	220,000	2.5
				2,170,000	
3. Floor and Roof Structure					
Roof Construction				*Include above*	2.1
				0	
4. Exterior Cladding					
Exterior Wall Construction					
CMU wall to loading dock, assume 20' high	1,300	SF	50.00	65,000	2.1
Metal Panel, to loading dock wall, assume 20' high	1,300	SF	75.00	97,500	2.1
Doors					
Hollow Metal Doors & Entrances (pair)	3	EA	6,000.00	18,000	2.1
Overhead coiling door	4	EA	15,000.00	60,000	2.1
				240,500	
5. Roofing, Waterproofing & Skylights					
Roof Coverings & Insulation				*Include above*	2.1
				0	
6. Interior Partitions, Doors & Glazing					
INTERIOR PARTITIONS					
Fixed Partitions					
8" CMU partition					
Dry storage, assume 8' high	320	SF	28.00	8,960	2.1
Wet processing, assume 8' high	1,152	SF	28.00	32,256	2.1
Cold storage	3,588	SF	28.00	100,464	2.1
GWB partition					
Office, assume 15' high	2,445	SF	15.00	36,675	2.1
Dry storage, assume 12' high	480	SF	15.00	7,200	2.1
Wet processing, assume 12' high	1,728	SF	15.00	25,920	2.1

8.1 Detailed Build-Up (PHASE II)

Item Description	*Quantity*	*Unit*	*Rate*	*Total*	*Project Category*
Cold storage, 12' high	2,472	SF	15.00	37,080	2.1
Insulated metal wall panels					
Pre-cooling, assume 20' high	1,980	SF	40.00	79,200	2.1
Cold storage, assume 20' high	8,220	SF	40.00	328,800	2.1
INTERIOR DOORS					
Interior Doors (incl hardware & finish)					
Wood door with metal frame, single, to offices	5	EA	4,250.00	21,250	2.1
Hollow metal door with metal frames, double					
Dry storage	1	EA	6,000.00	6,000	2.1
Restroom corridor	1	EA	6,000.00	6,000	2.1
Metal door with metal frames, double					
Wet processing	1	EA	6,000.00	6,000	2.1
Insulated metal door, double					
Cold storage	4	EA	10,000.00	40,000	2.1
Pre-cooling	3	EA	10,000.00	30,000	2.1
SPECIALTIES / FITTINGS					
				765,805	
7. Floor, Wall & Ceiling Finishes					
FLOOR AND BASE					
Sealed Concrete	16,454	SF			
Pre-cooling	1,396	SF	5.00	6,980	2.1
Cold storage	8,604	SF	5.00	43,020	2.1
Corridor	4,454	SF	5.00	22,270	2.1
Dry processing	2,000	SF	5.00	10,000	2.1
Carpet	4,000	SF			
Admin office	1,600	SF	5.75	9,200	2.1
Admin assembly	1,200	SF	5.75	6,900	2.1
EMP SVC	1,200	SF	5.75	6,900	2.1
Resilient flooring	5,000	SF			
Wet processing	5,000	SF	15.00	75,000	2.1
Ceramic tile	546	SF			
Toilets	546	SF	25.00	13,650	2.1
Base finish					
Rubber base	1,437	LF	4.00	5,749	2.1
Ceramic base	198	LF	25.00	4,951	2.1
WALL FINISHES					
Wall Finishes to Inside walls (paint - prime and two coats)	9,631	SF			
Admin office, allow 10' high	1,570	SF	2.50	3,925	2.1
Admin assembly, allow 10' high	1,635	SF	2.50	4,088	2.1

8.1 Detailed Build-Up (PHASE II)

Item Description	*Quantity*	*Unit*	*Rate*	*Total*	*Project Category*
EMP SVC, allow 10' high	965	SF	2.50	2,413	2.1
Corridor, allow 10' high	5,461	SF	2.50	13,652	2.1
Dry processing, allow 10' high	1,820	SF	2.50	4,551	2.1
Toilet corridor, allow 10' high	820	SF	2.50	2,050	2.1
Ceramic tile	1,044	SF			
Toilets, allow 9' high	1,044	SF	25.00	26,109	2.1
Wet processing, allow 15' high	4,380	SF	25.00	109,511	2.1
CEILING FINISHES					
Acoustic tile, suspended system	4,000	SF			
Admin office	1,600	SF	20.00	32,000	2.1
Admin assembly	1,200	SF	20.00	24,000	2.1
EMP SVC	1,200	SF	20.00	24,000	2.1
Painted GWB Drop Ceiling	546	SF			
Toilets	546	SF	36.00	19,656	2.1
Insulated ceiling	21,454	SF			
Pre-cooling	1,396	SF	40.00	55,840	2.1
Cold storage	8,604	SF	40.00	344,160	2.1
Exposed, painted	11,454	SF			
Corridor	4,454	SF	3.50	15,589	2.1
Dry processing	2,000	SF	3.50	7,000	2.1
Wet processing	5,000	SF	3.50	17,500	2.1
				910,662	
8. Function Equipment & Specialties					
Fixed Furnishings and Casework (office)	1	LS	10,000.00	10,000	2.1
Toilet Accessories					
Mirror	3	EA	500.00	1,500	2.1
Toilet accessories, allow	3	EA	800.00	2,400	2.1
Signage					

8.1 Detailed Build-Up (PHASE II)

Item Description	*Quantity*	*Unit*	*Rate*	*Total*	*Project Category*
Room System signage	26,000	GSF	0.50	13,000	2.1
Equipment					
Solar panels to parking canopies	3,500	SF	60.00	210,000	2.3
Solar array on roof of new facility w/ associated storage approx. (2) batteries	22,000	SF	60.00	1,320,000	2.5
				1,556,900	
9. Stairs & Vertical Transportation				*N/A*	
				0	
10. Plumbing Systems					
Restroom fixtures					
Lavatory	3	EA	4,000.00	12,000	2.1
Toilet	3	EA	6,400.00	19,200	2.1
Janitor mop sink/utility sink	1	EA	5,800.00	5,800	2.1
Hose bibbs, allow	4	EA	1,800.00	7,200	2.1
Distribution / Drainage / Sanitary Systems				*Included above*	
Drain Waste Vent piping					
Pipe and Fittings	1,200	LF	80.00	96,000	2.1
Floor Drains	2	EA	2,000.00	4,000	2.1
Floor Sinks (Wet processing)	2	EA	3,000.00	6,000	2.1
Roof Drains	6	EA	2,000.00	12,000	2.1
Other Plumbing Systems, allow	26,000	SF	4.00	104,000	2.1
Wet Processing (Supply piping, water heater)	5,000	LF	35.00	175,000	2.1
New water well (Turn key)	1	EA	80,000.00	80,000	2.2
				521,200	
11. Heating, Ventilation & Air Conditioning					
Heating, Ventilation & Air Conditioning	26,000	GSF			2.1
Admin office	1,600	SF	45.00	72,000	2.1
Admin assembly	1,200	SF	45.00	54,000	2.1
EMP SVC	1,200	SF	45.00	54,000	2.1
Toilets	546	SF	25.00	13,650	2.1
Pre-cooling	1,396	SF	55.00	76,780	2.1
Cold storage	8,604	SF	55.00	473,220	2.1
Corridor	4,454	SF	15.00	66,810	2.1
Dry processing	2,000	SF	45.00	90,000	2.1
Wet processing	5,000	SF	45.00	225,000	2.1
				1,125,460	

8.1 Detailed Build-Up (PHASE II)

Item Description	*Quantity*	*Unit*	*Rate*	*Total*	*Project Category*
12. Electrical Lighting, Power & Communication					
Electrical Lighting	26,000	GSF			
Admin office	1,600	SF	20.00	32,000	2.1
Admin assembly	1,200	SF	20.00	24,000	2.1
EMP SVC	1,200	SF	20.00	24,000	2.1
Toilets	546	SF	20.00	10,920	2.1
Pre-cooling	1,396	SF	12.00	16,752	2.1
Cold storage	8,604	SF	12.00	103,248	2.1
Corridor	4,454	SF	12.00	53,448	2.1
Dry processing	2,000	SF	12.00	24,000	2.1
Wet processing	5,000	SF	20.00	100,000	2.1
Electrical Equipment and Panels	26,000	GSF	12.00	312,000	2.1
Power Distribution System	26,000	GSF			
Admin office	1,600	SF	16.00	25,600	2.1
Admin assembly	1,200	SF	16.00	19,200	2.1
EMP SVC	1,200	SF	16.00	19,200	2.1
Toilets	546	SF	16.00	8,736	2.1
Pre-cooling	1,396	SF	14.00	19,544	2.1
Cold storage	8,604	SF	14.00	120,456	2.1
Corridor	4,454	SF	16.00	71,264	2.1
Dry processing	2,000	SF	20.00	40,000	2.1
Wet processing	5,000	SF	20.00	100,000	2.1
Data, Telephone/Communication	4,000	GSF			
Admin office	1,600	SF	4.00	6,400	2.1
Admin assembly	1,200	SF	4.00	4,800	2.1
EMP SVC	1,200	SF	4.00	4,800	2.1
AV/IT System	4,000	GSF			
Admin office	1,600	SF	4.00	6,400	2.1
Admin assembly	1,200	SF	4.00	4,800	2.1
EMP SVC	1,200	SF	4.00	4,800	2.1
Fire Alarm	26,000	GSF	5.00	130,000	2.1
				1,286,368	
13. Fire Protection Systems					
Sprinkler and Standpipe Systems					
Fire Protection Sprinkler Systems	26,000	GSF	9.00	234,000	2.1
				234,000	
14. Site Preparation & Building Demolition					
Site Clearing	99,607	SF	0.95	94,809	2.7
Site Demolition					
Demo existing fence	705	LF	5.00	3,525	2.7
Demo existing garage	561	SF	4.50	2,525	2.7

8.1 Detailed Build-Up (PHASE II)

Item Description	*Quantity*	*Unit*	*Rate*	*Total*	*Project Category*
Demo existing shed	182	SF	15.00	2,730	2.7
Demo existing gate, double	1	EA	500.00	500	2.7
Demo existing landscaping	41,246	SF	0.75	30,935	2.7
Demo existing tree	4	EA	1,000.00	4,000	2.7
				139,023	
15. Site Paving, Structures & Landscaping					
Paving					
Entry pavement	2,422	SF	20.00	48,440	2.7
Visitor circulation pavement, paver	3,951	SF	20.00	79,020	2.7
Concrete pavement, to light vehicles	7,309	SF	18.00	131,562	2.7
Concrete pavement, to parking lot	12,013	SF	14.00	168,182	2.4
Concrete curb, to parking lot	445	LF	35.00	15,575	2.4
Concrete curb, to planting	1,980	LF	30.00	59,400	2.7
Road Markings					
Parking space line markings	800	LF	10.00	8,000	2.4
Arrow markings, allow	6	EA	200.00	1,200	2.4
Accessible graphic marking, allow	3	EA	500.00	1,500	2.4
Parking signage, allow	3	EA	800.00	2,400	2.4
Landscaping					
Grass and native planting	6,822	SF	3.50	23,877	2.7
Grass to existing orchard area	15,820	SF	2.50	39,550	2.7
Trees, allow	10	EA	1,000.00	10,000	2.7
Stormwater Management Area					
Excavation to stormwater, assume 2' deep	946	CY	45.00	42,567	2.7
Haul-off site	946	CY	50.00	47,296	2.7
Bioretention area to stormwater area					2.7
Underdrain, crushed gravel, assume 12" thick	473	CY	65.00	30,743	2.7
Bioretention soil, assume 6" thick	236	CY	65.00	15,371	2.7
Planting	12,770	SF	7.00	89,390	2.7
Wood mulch	12,770	SF	3.00	38,310	2.7
Wastewater Area					
Excavation to wastewater pond, assume 4' deep	796	CY	45.00	35,800	2.6
Haul-off site	796	CY	50.00	39,778	2.6
Bioretention area to wastewater area					
Underdrain, crushed gravel, assume 12" thick	199	CY	65.00	12,928	2.6
Bioretention soil, assume 18" thick	298	CY	65.00	19,392	2.6
Native soil, assume 6" thick	132	CY	65.00	8,582	2.6
Planting	5,370	SF	7.00	37,590	2.6
Wood mulch	5,370	SF	3.00	16,110	2.6
Allow for irrigation	6,822	SF	5.00	34,110	2.7
Site structures/fixtures					
Canopy to parking, including footing	3,500	SF	180.00	630,000	2.3
Allow for site fixtures/furniture	1	LS	10,000.00	10,000	2.7

8.1 Detailed Build-Up (PHASE II)

Item Description	*Quantity*	*Unit*	*Rate*	*Total*	*Project Category*
				1,696,672	
16. Utilities on Site					
Wastewater treatment					2.6
Wet Food Processing treatment system. Includes pond & liner, pumps, piping, airation nozzles and monitoring equipment.	1	LS	250,000.00	250,000	2.6
Site Utilities, within 5' of building					
Water Supply and Distribution (Cost is split with phase 1)	1	LS	10,000.00	10,000	2.1
Sanitary onsite sewer system (Cost is split with phase 1)	1	LS	30,000.00	30,000	2.1
Storm drain system	1	LS	10,000.00	10,000	2.7
Site Communications and Security	1	LS	20,000.00	20,000	2.1