Van Dwinnells
Summer Studio 2012

Southern Illinois University Carbondale
Professor Chad Schwartz | arc550

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Begin

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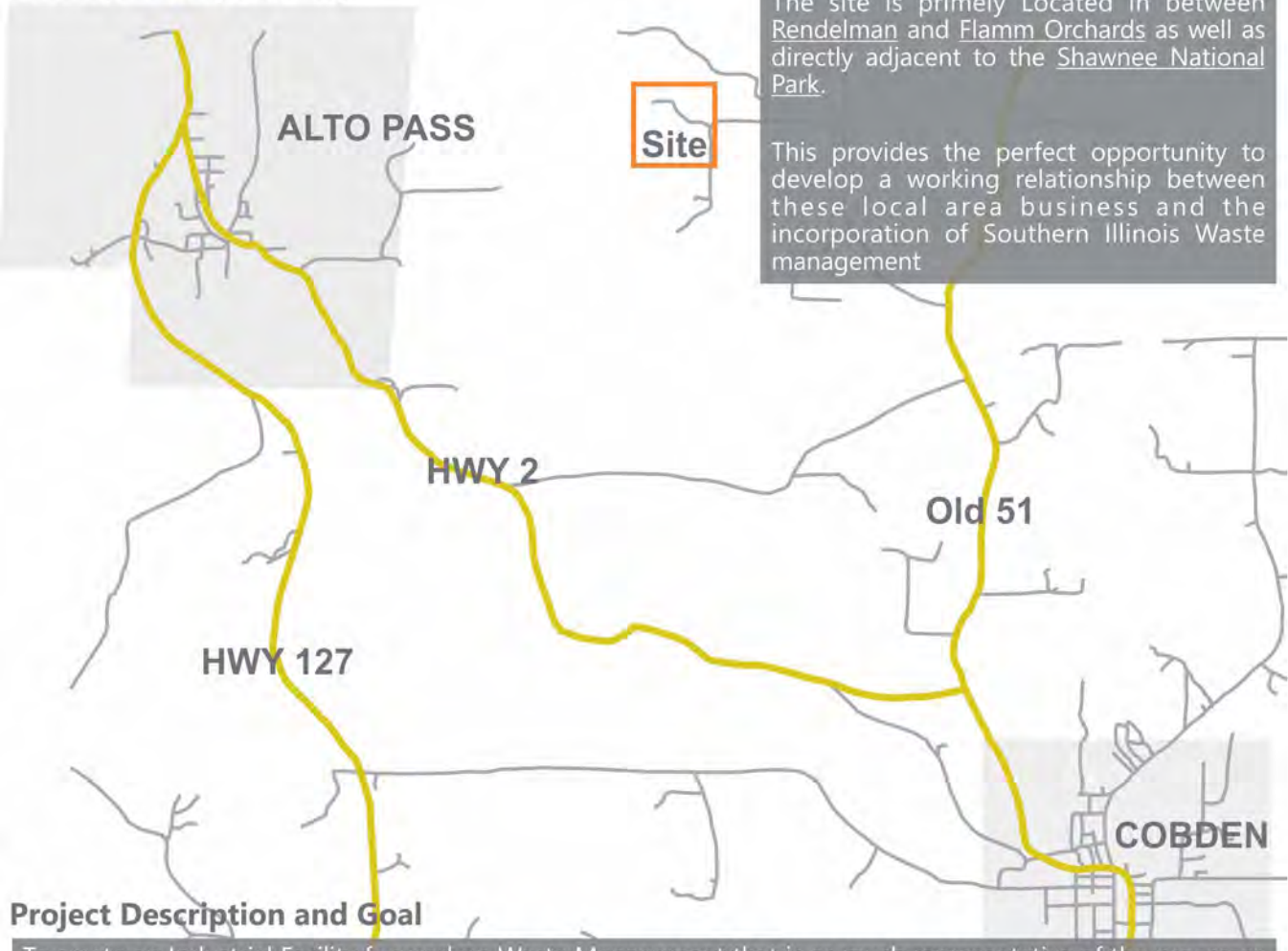
End

Southern Illinois Waste Management

Agro-Waste and Biomass Repurposing

Cobden, Illinois [37.8,-89.2]



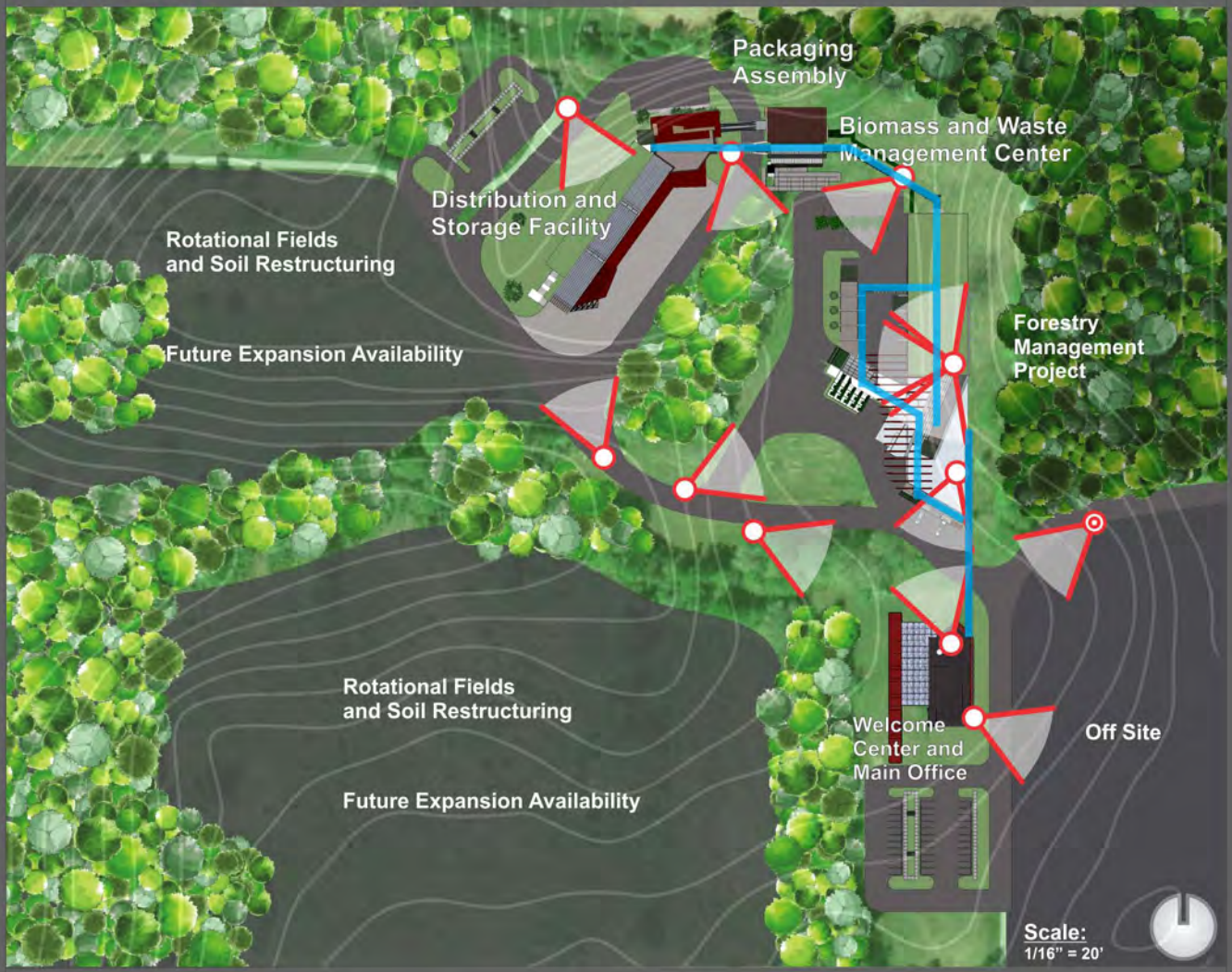
The site is primely Located in between Rendelman and Flamm Orchards as well as directly adjacent to the Shawnee National Park.

This provides the perfect opportunity to develop a working relationship between these local area business and the incorporation of Southern Illinois Waste management

Project Description and Goal

To create an Industrial Facility focused on Waste Management that is as much representative of the processes going on within internally and externally. The highlights of design will be based on Mechanical process, the landscape and picturesque views. An Intentional educational component [via the Walking Tour and Gallery Space] implemented makes this facility a regional attraction as well as advancing regenerative and recyclical processes and mindsets to the local business and communities.

Site Plan



Site Analysis

Wind
S/SW
7.4mph

Rainfall
47 inches

Climate
< 2000 CDD
4kD-5499 HD
Avg Temp 52°

Views

Picturesque Views

The topography of this site creates many articulate and encompassing views. By utilizing this and only minor cut and filling, the site will bring the separate structures together in a much more enjoyable and cohesive manner

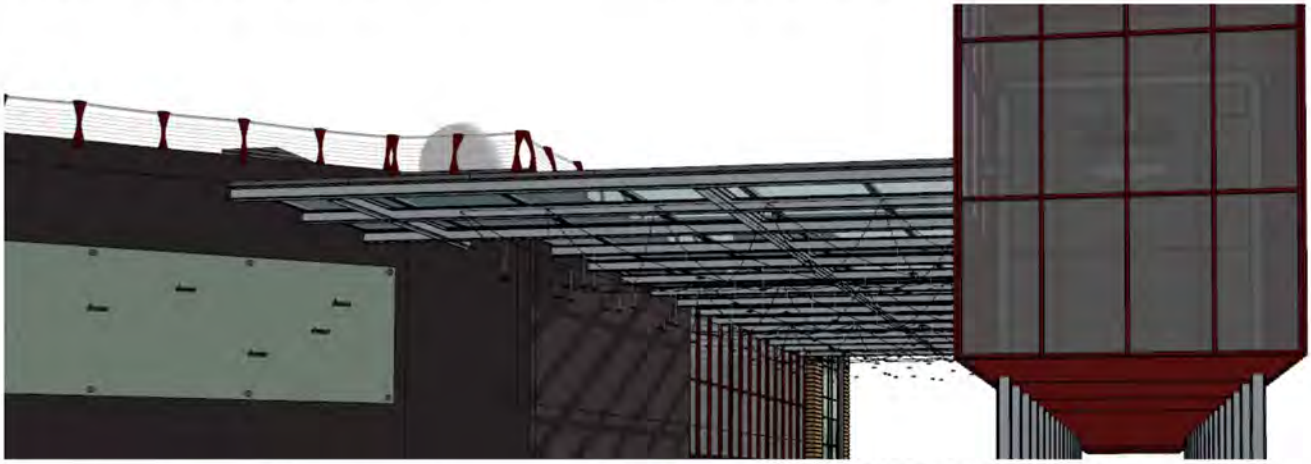
Welcome Center

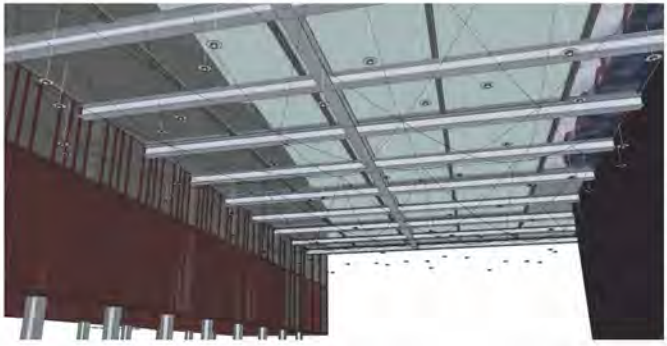
Visitor Parking and Tour Signup

All commuter traffic parks in the back of the Welcome Center; unless special needs apply. This is where the journey begins. In the meantime there is plenty to learn just across the way in the Gallery

Gallery Space

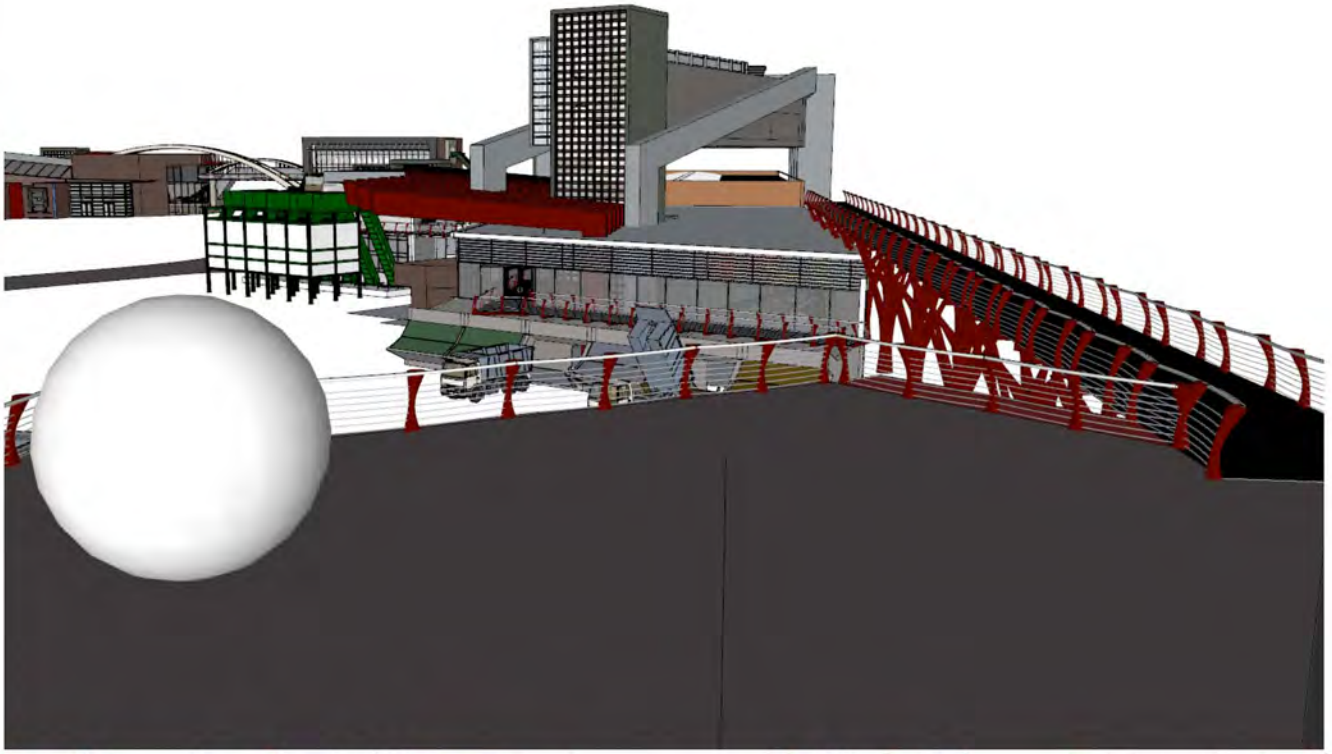
This is where we learn the history of Garbage, and how it is revolutionizing. There are interactive displays to teach about the technologies and methods that are paving the way for a brighter future.

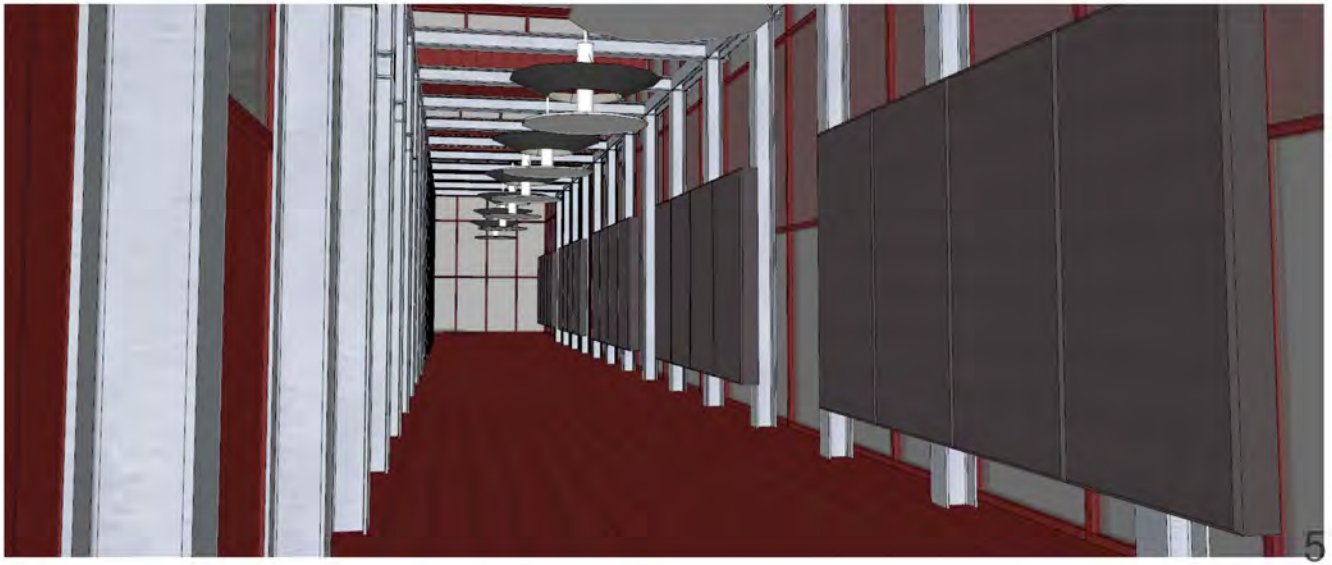




Exterior Lighting

Because of the glass ceiling natural daylight is maximized. For the darker times of the day a suspended LED lighting array has been implemented to ad lighting that is neither spotty or blinding.





Walking and Tour Paths

Tree Supports

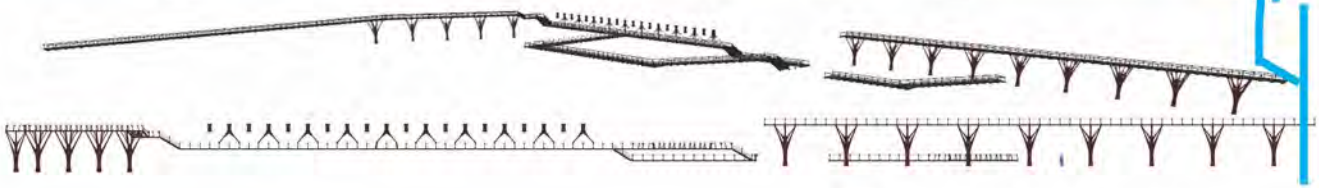
40 ft spacing from another, these support the walking/tour paths when outside. This not only is functional but also gives the illusion as if the treeline were supporting the path

Hanging Supports

A canopy adaptation to the support idea; this form works ideally in the interior locations where space is a premium due to the large machinery located within. This keeps the floor space open and therefore more acceptable to change in the future. It also affords a unique experience as you can see even directly below as you walk over

Railings

To incorporate an unique look throughout the structures these elements are repeated helping to connect the structure together physically and mentally. Also, this helps to tie in the organic nature of the site.



Suspended Support

In other cases as such with this part of the walkway, a suspension bridge has been used to convey the people and product over the roadway to allow for trucks to pass underneath to access the Distribution Facility.

Pellet Facility

Waste Intake

There are six large bins, capable of hold about 10 tons of waste material each, separated into **3 categories**

Agro-Waste | Wood Waste | Paper Waste

Utilizing a similar mechanism to the compost intake, materials are dumped directly from a dump truck, into their appropriate bins, and then ground and chopped and in order to be analyzed and conveyed to further processing

Process

- **Presort**
- **Pre-crush|Pre-dry**
- **Analysis** [weight and content]
- **Sorting** [weight and content]
- → **Crushing** and **Grinding**
- **Drying**
- **Pelletization**
- **Cooling**
- **Screening**
- **Packaging**
- **Storage**

They can be used as fuel, food and bedding for animals; they can be used to heat your home and water supply, or simply burned in a stove

An Array of Machines

This is to allow for different types of pellets to be manufactured. Different ingredients create various kinds of pellets, as well as irregularities in moisture content. In order to produce a wider variety smaller machines were used to maximize quality and variety over quantity. This in the end could mean a more valuable commodity to the local communities and agriculture

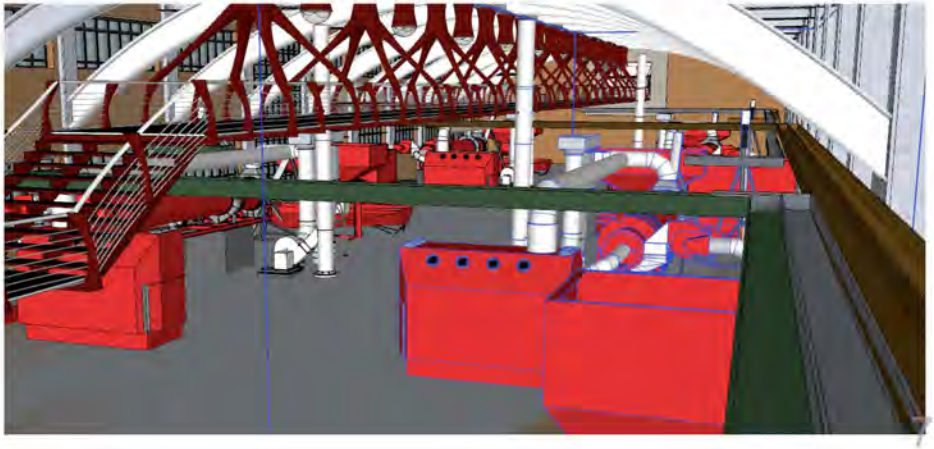
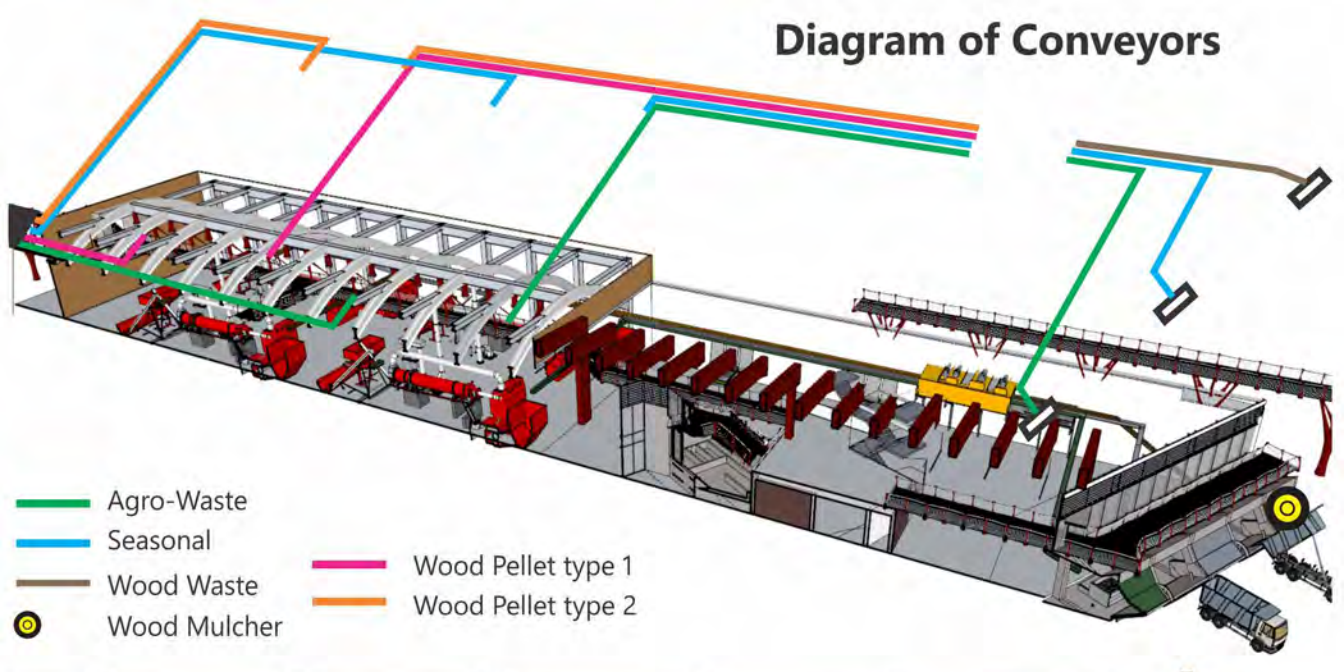
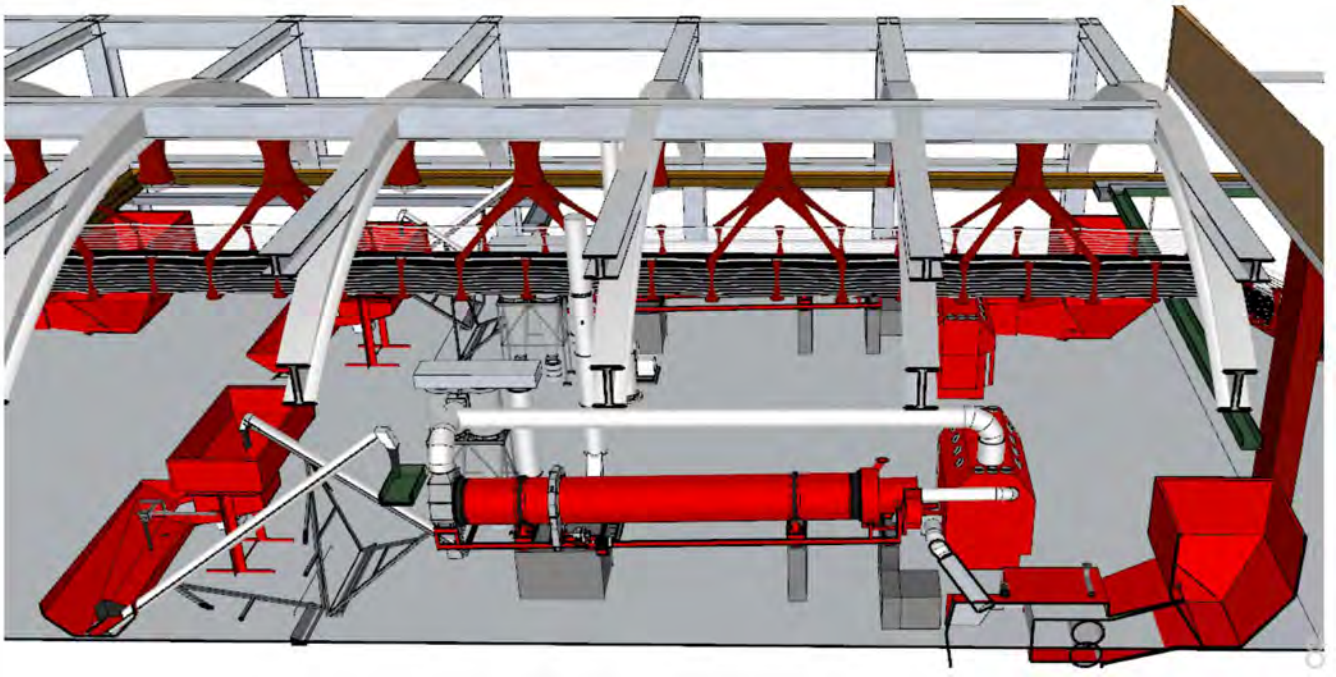


Diagram of Conveyors



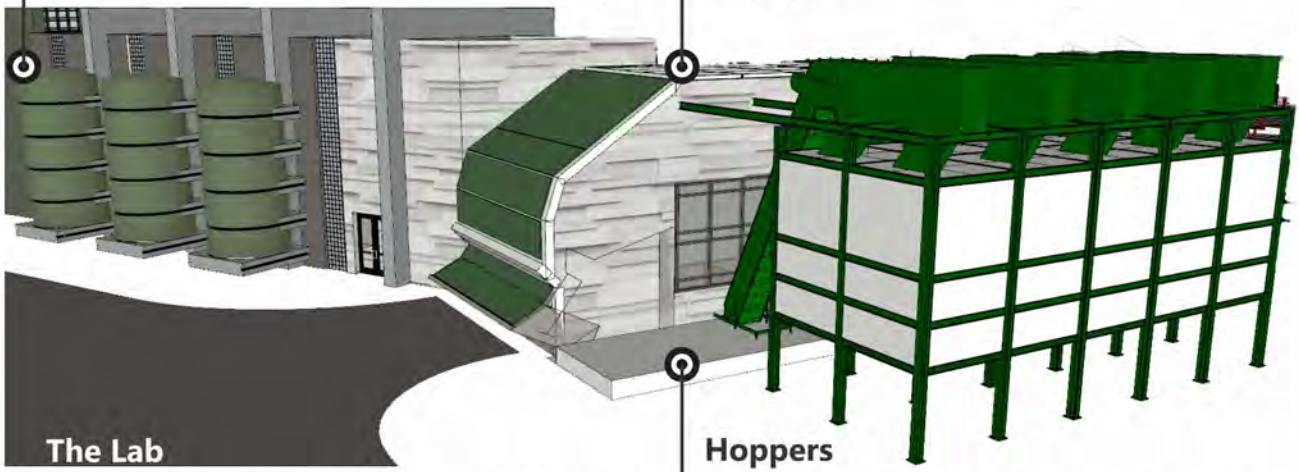


Water Collection

Because of the need for fresh uncontaminated water for the compost, 3 Large containers can sustain this operation continuously with no external water for 1 month at maximum capacity

Food Intake

Food waste is directly dumped into an auto-feed, all inclusive screening and grinding mechanism to bet materials to appropriate size before putting it in the VCU.



The Lab

Directly adjacent is the labs to immediately test the mixes as they are being crushed so proper mixture can be easily controlled

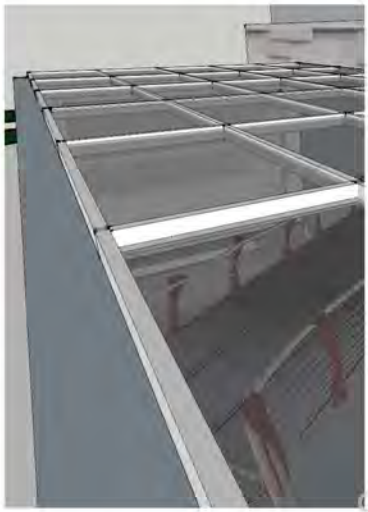
Hoppers

Hopper/Conveyors make the process extremely easy. Just keep loading the waste and in a few weeks you have a viable compost ready to use!

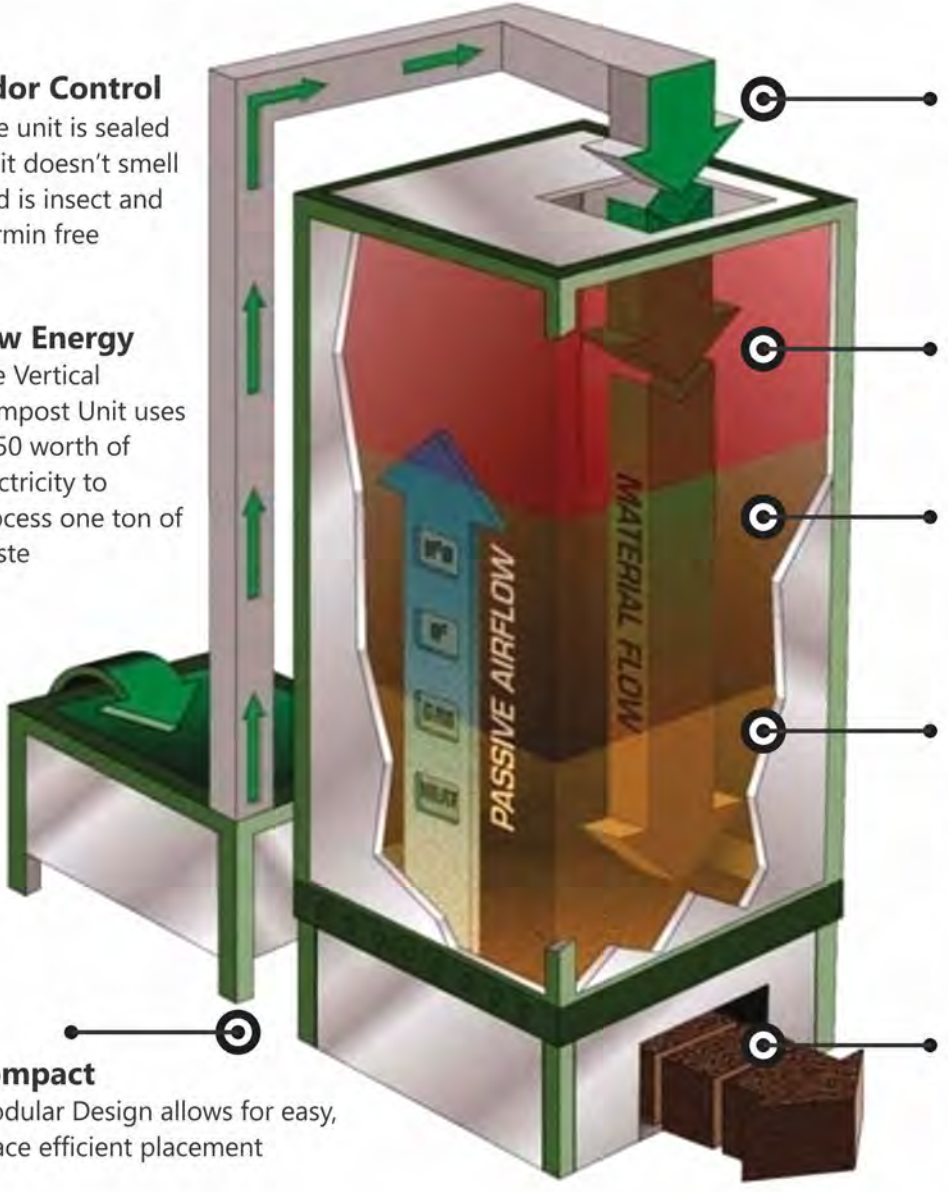
Various Stone is used from the local mills.

Here it is evident that the structure plays multiple roles, not only being exposed but also carrying the load of the walkway

This facility receives natural light via glass light shelves, and skylights



How This Vertical Compost Unit Works



Odor Control
The unit is sealed so it doesn't smell and is insect and vermin free

Low Energy
The Vertical Compost Unit uses $1.50 worth of electricity to process one ton of waste

Compact
Modular Design allows for easy, space efficient placement

Feed System
Organic Wastes are mixed and fed into the top of the unit

Upper Pile Very Hot
Where pathogens and seeds are destroyed

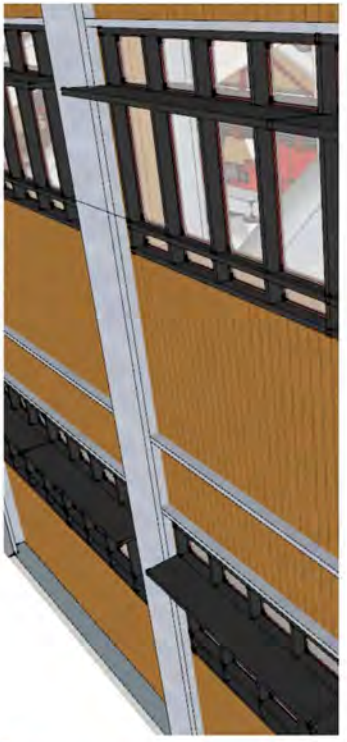
Middle Pile Hot
Hot - bacteria break down fats and proteins
Material reduces in size

Lower Pile Cooler
Cooler - fungi further reduces and stabilizes the material as it matures

Harvest Pile
Fresh, clean compost, full of micro-organisms that benefit the soil

Worker Entrance and Parking

Apposable clerestories with light shelves as well as the large bay door help to give provide light and air



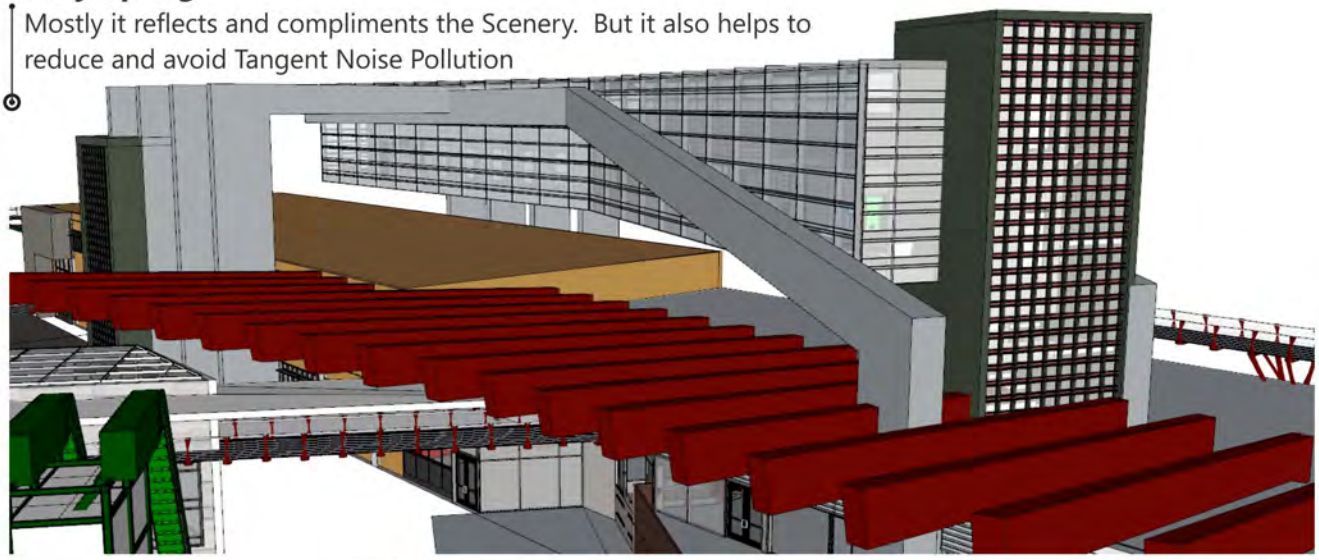
Customer Entrance and Drop Off

Easy loading and unloading for the non commercial customers must be made therefore a more "drive thru" version for small loads and unsorted materials can be dropped off. During operating hours, it can be unloaded for them but after hours, only a drop-box is available on the outermost corner of the site closest to the entrance

Offices

Why up high?

Mostly it reflects and compliments the Scenery. But it also helps to reduce and avoid Tangent Noise Pollution



Access to the restrooms. The 4 offices and the end conference room all that utilize indirect lighting through the window and from an open ceiling design

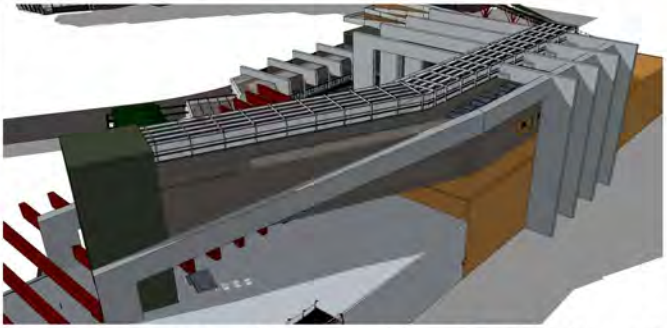
Atrium Design

In order to maximize light and create an open and interactive space, an Atrium was used providing a very well lit and open corridor.

There are two stairwells one on this end and to the west connected via a vestibule. This back side faces the tree line and has windows that overlook

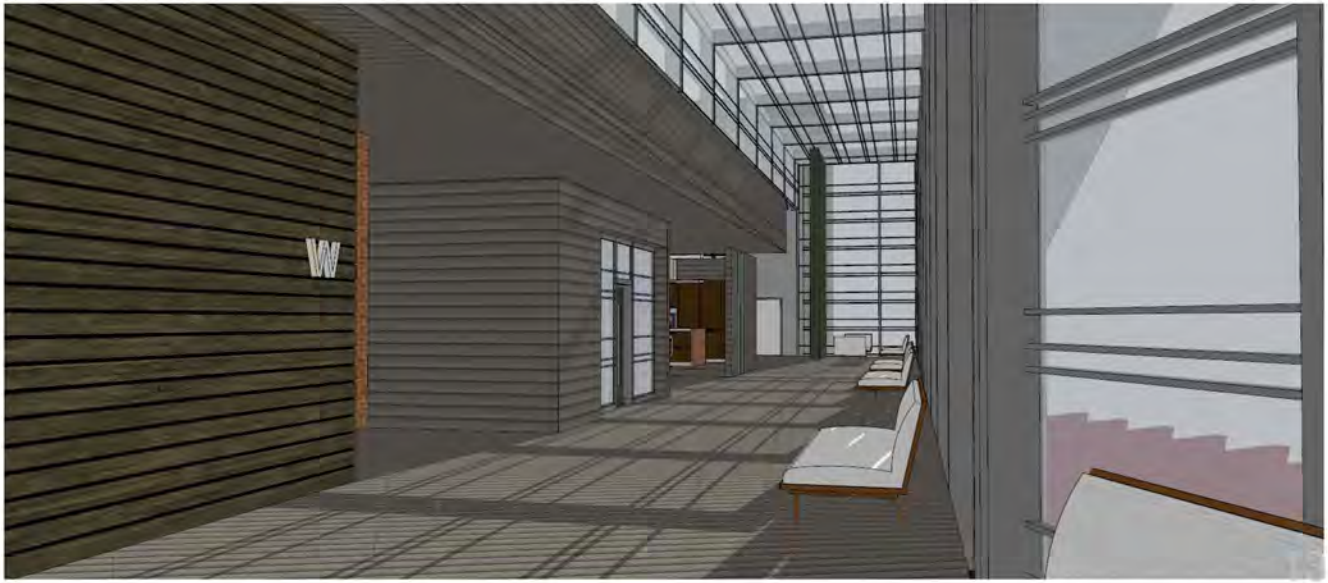
Rooftop

All Mechanical equipment to condition the spaces is housed on the rooftop in order to keep the spaces open and unobstructed



There are two stairwells one on this end and to the west connected via a vestibule. This back side faces the tree line and has windows that overlook

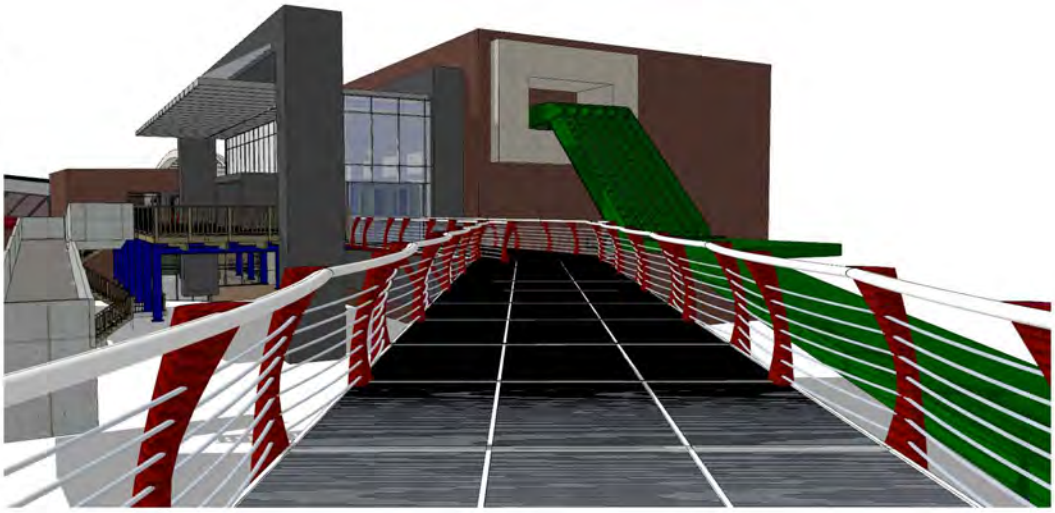
Access to the restrooms, a server and storage room, a break room and kitchen, and a lounge at the end are all visible. These facilities are located in a grouped fashion as these are the most public and open components



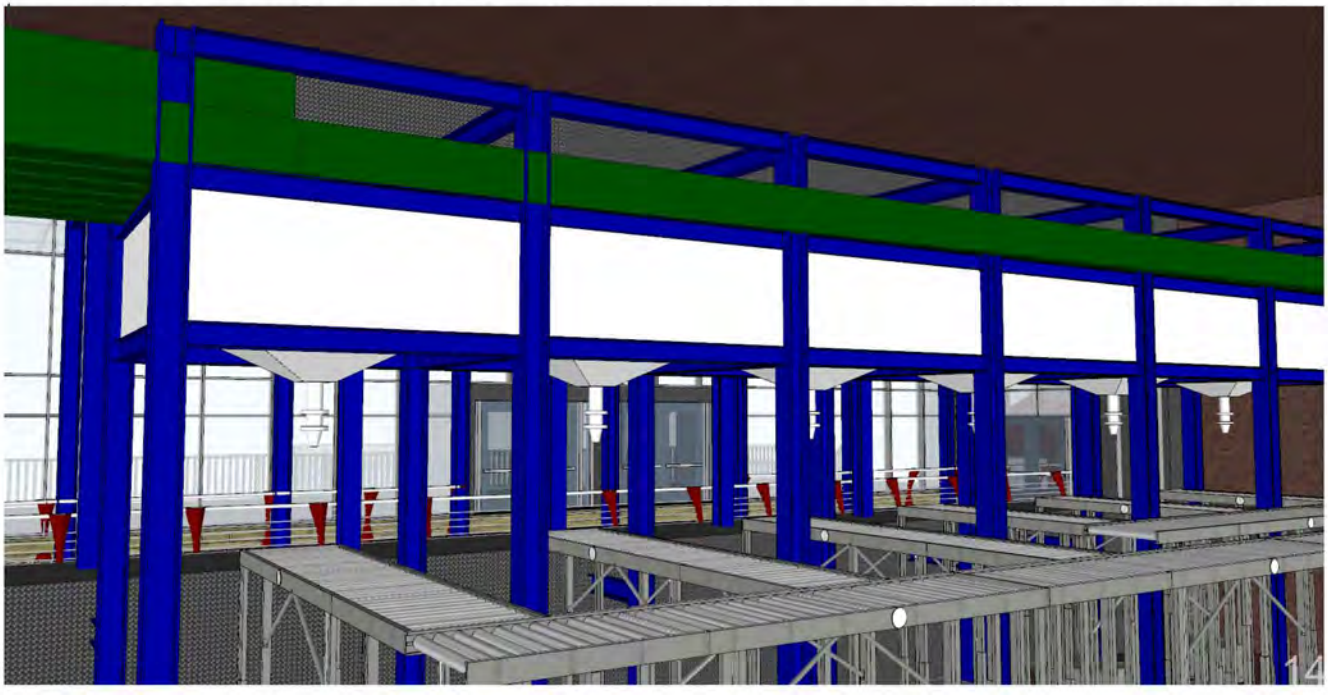
Packaging

Sorting, Bagging

Conveyed here adjacent the walking path, the pellets are dropped in a container that carefully measures the weight and fills bags accordingly. Then it heads down another conveyor to the storage and distribution center

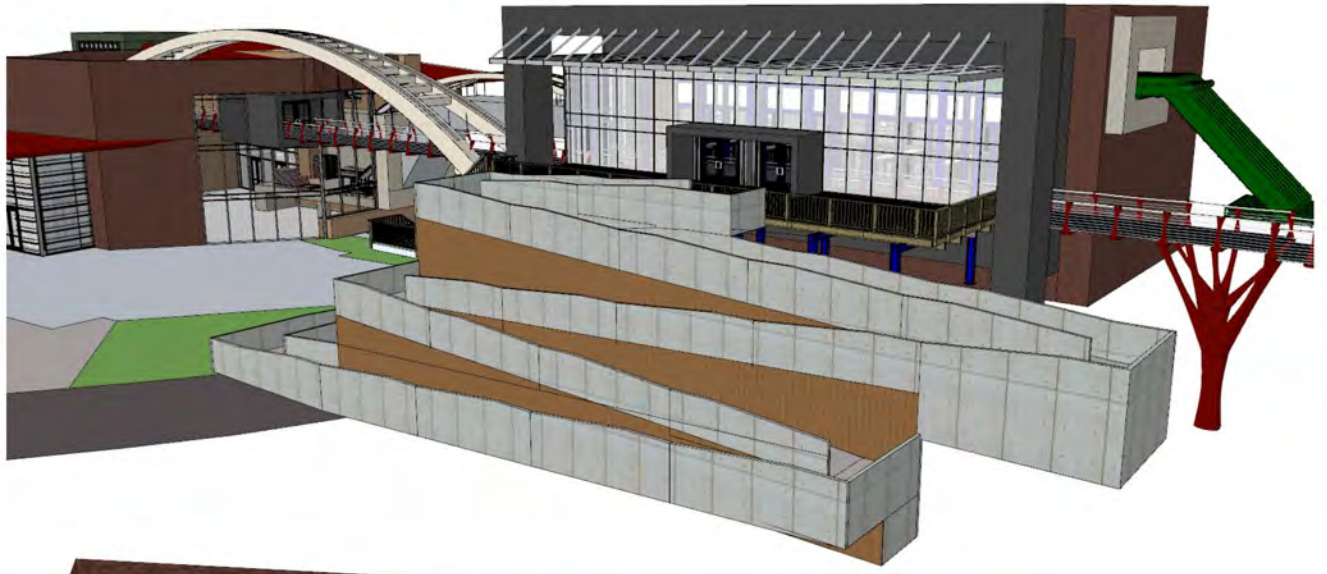


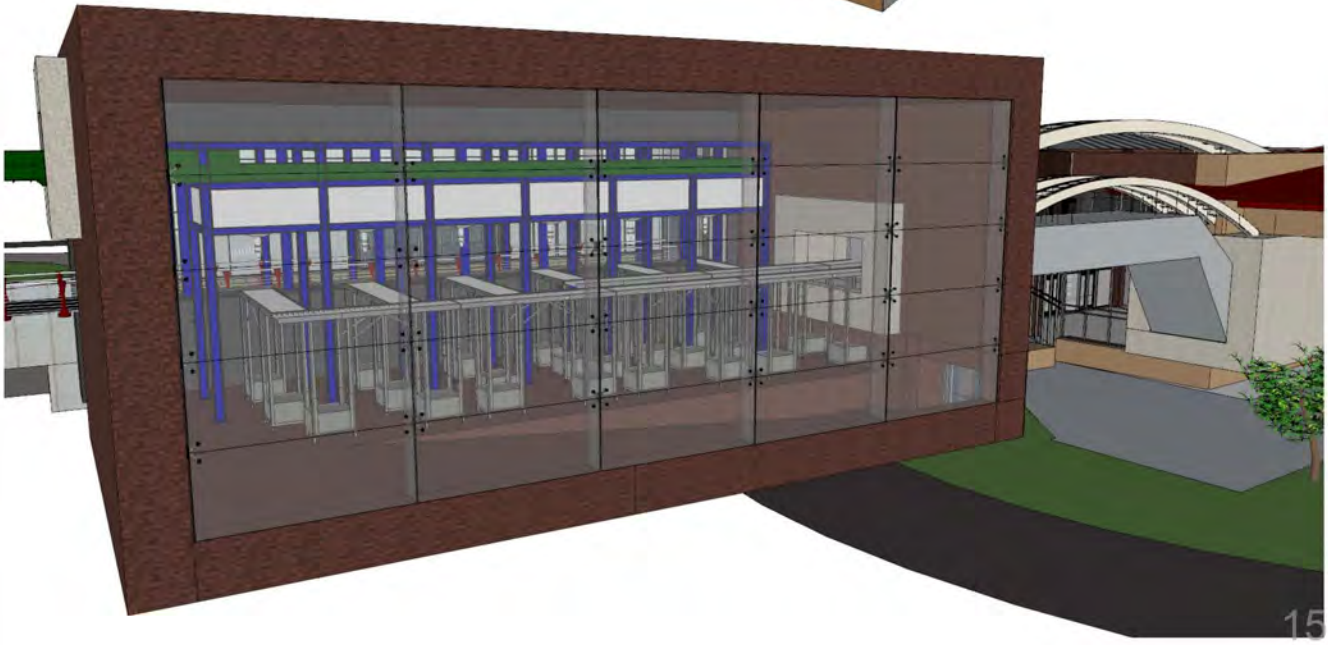
There are a total of 6 stations, with the intent that 4 are for pellets and two for compost. They can be ran continuously and the design of this facility accommodates room for double the capacity as these are modular



Ramps

A ramp system was add to make things more accessible in more areas, besides also providing a good escape route in case of an emergency, it is representative of the conveying action that is throughout this process





Distribution and Storage

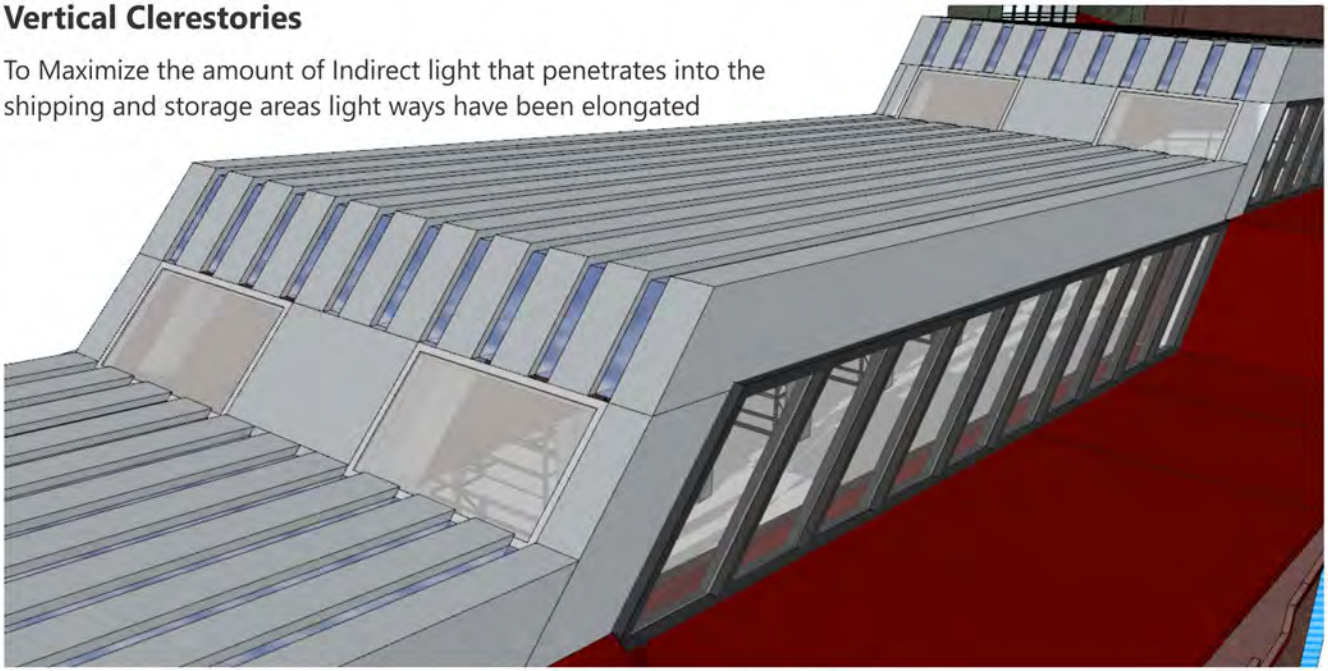
Secondary Entry

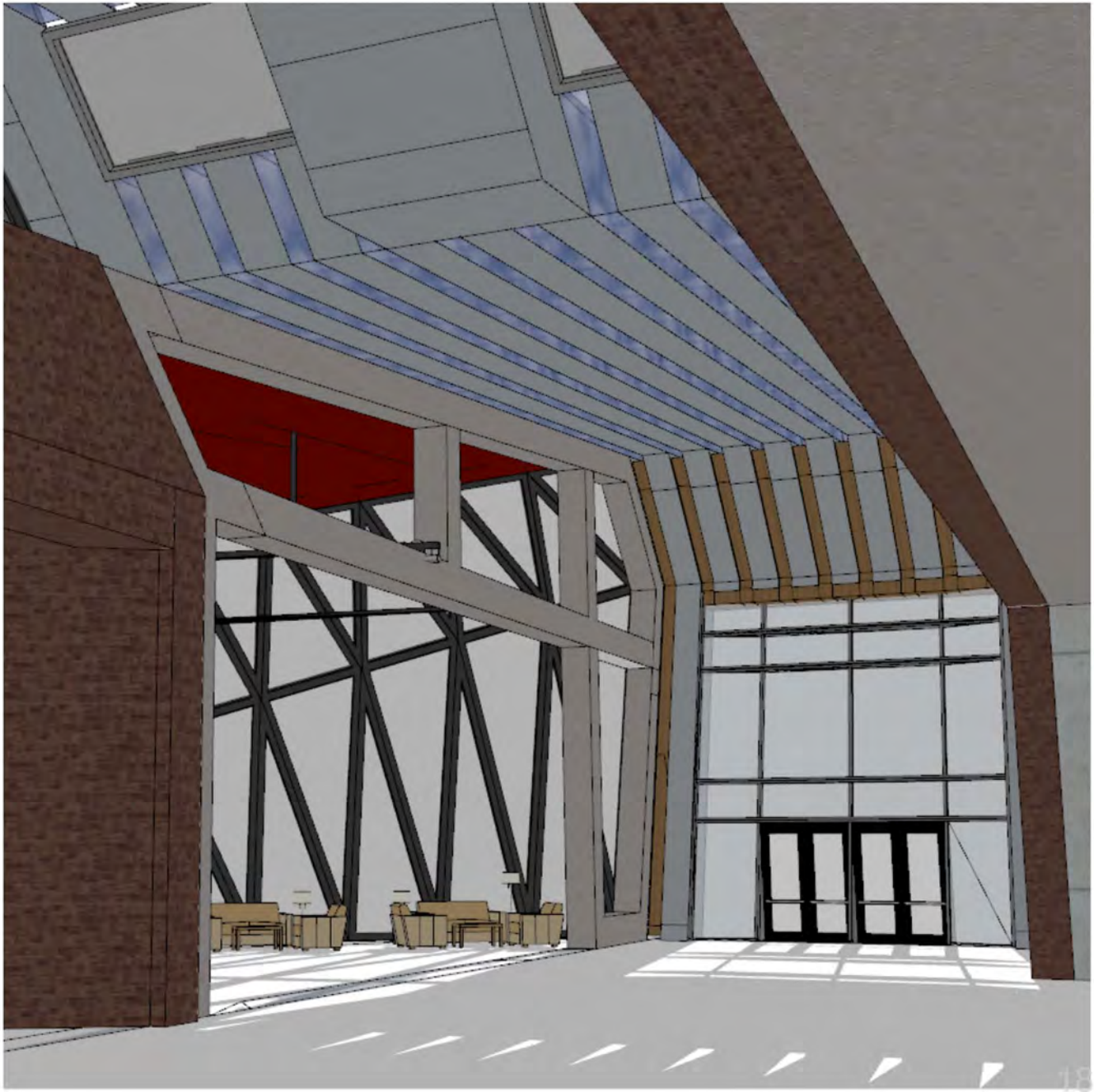
Primary Customer Entry
and Loading Bays

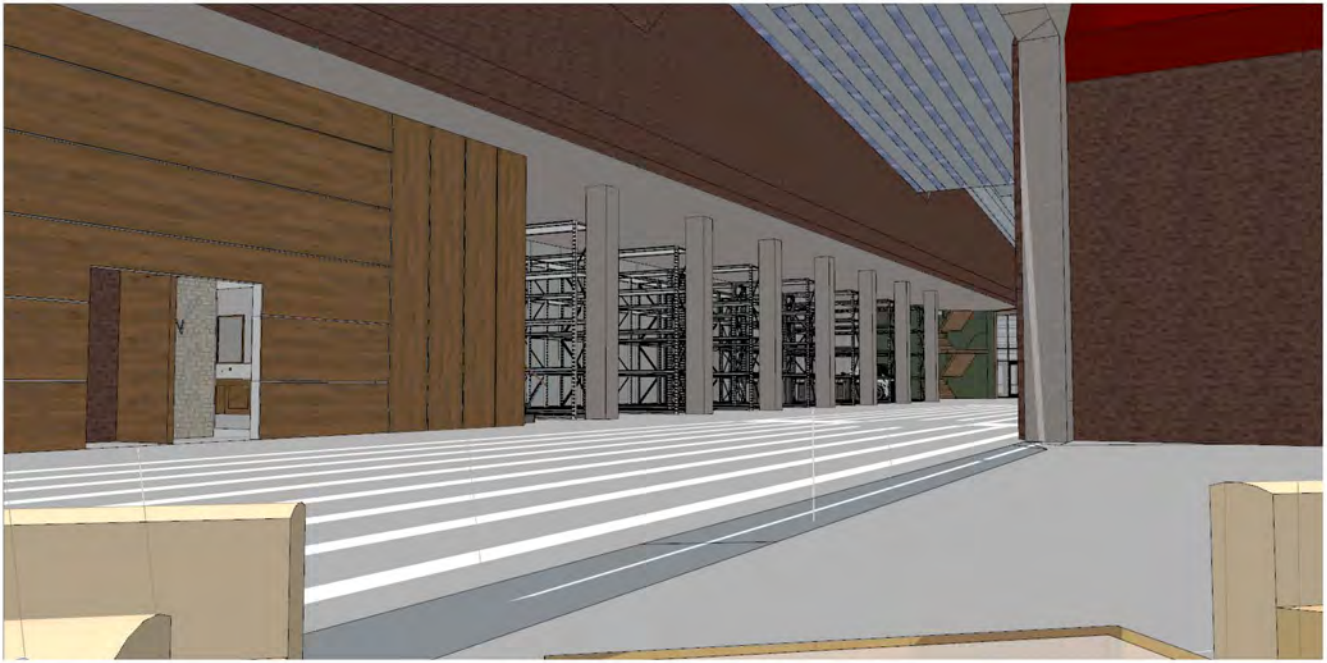
Worker Entry

Vertical Clerestories

To Maximize the amount of Indirect light that penetrates into the shipping and storage areas light ways have been elongated





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