

Restoring Forgotten Land at Packard Park

Masters Thesis by Matthew Jacobson

Thesis Narrative

This thesis will explore the potential of using phytoremediation to reduce PM2.5 pollution in Detroit. Phytoremediation is a type of environmental remediation that uses plants to remove, neutralize, and stabilize contaminants in soil and groundwater. This approach has the potential to be a cost-effective and sustainable solution for addressing pollution in urban areas, such as Detroit. Detroit is a city with a long history of industrialization and pollution. The city's industries, including automotive manufacturing and heavy industry, have contributed to air and water pollutions, as well as soil contamination. Phytoremediation offers a promising solution for addressing pollution in Detroit. Different plants have different abilities to re mediate different types of contaminants, making phytoremediation a versatile and adaptable approach. This thesis has identified a location in Detroit MI.

Packard Plant was in operation until 1958, when the Packard Motor Car Company went bankrupt. After its closure, the plant was used for a variety of purposes, including storage and manufacturing. In recent years, the plant has fallen into disrepair and has become a symbol of the decline of the automotive industry in Detroit. Packard Plant still remains a significant historical and architectural landmark

This location offers a unique opportunity to create a cultural green zone that focuses around the community while also passively impacting the PM2.5 pollution rates. A potential application of phytoremediation at Packard Plant would be the use of green roofs. Green roofs, also known as living roofs or vegetated roofs, are roofs that are covered in vegetation. These roofs can provide a number of benefits when it comes to air quality and pollution reduction. They can be designed to include plants that can re mediate pollutants in the soil and water that collects on the roof. While combating air pollutants from the green roofs, this thesis also incorporates several other phytoremediation planting techniques along the main pathway that focus on the soil contamination. Ranging from lead to sulfuric acid countering plants. This thesis uses a range of planting techniques including; Potted Plants, controlled wild grass and sunflower seed dispersal, and ball and bur lapped saplings planted in an effort for them to normalize with the landscape faster.

Major Project Elements

Phytoremediation Walk

Ecosystem Restoration

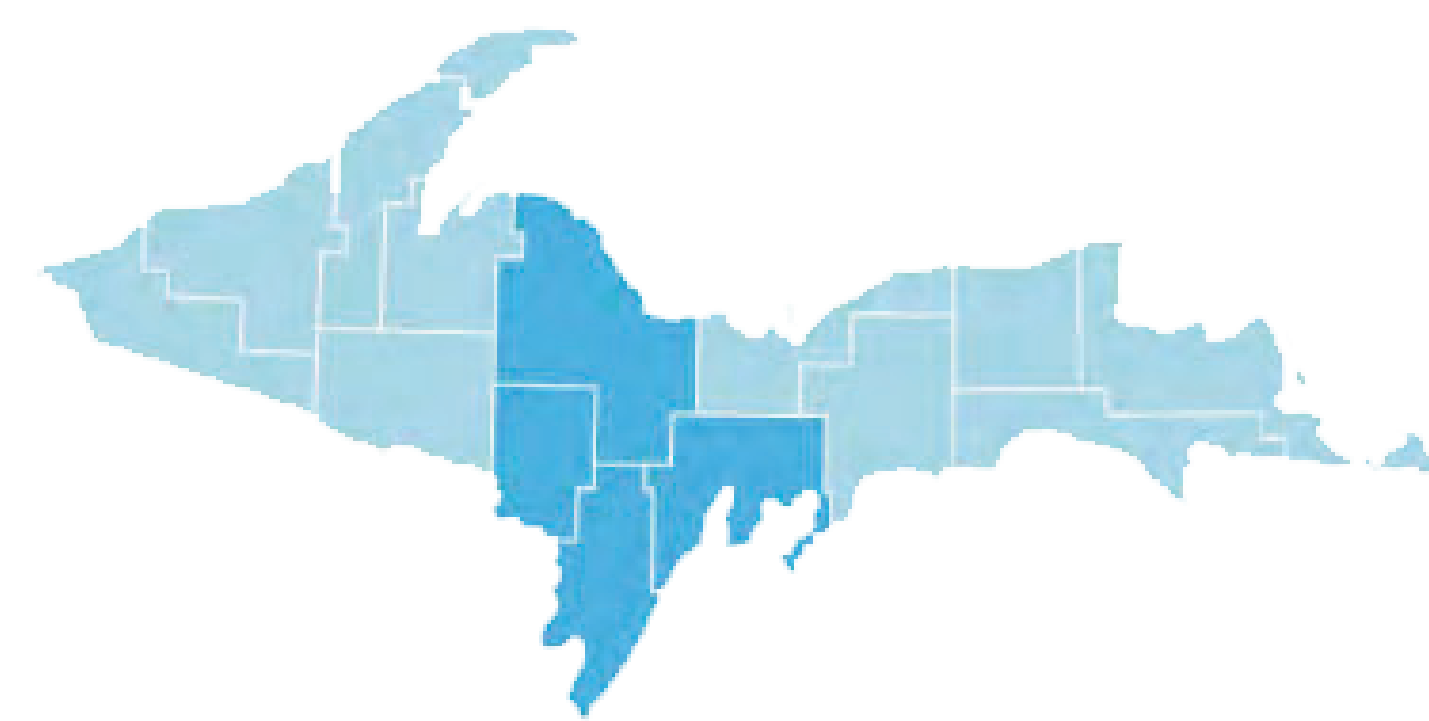
Integrated Green Roofs

Food Truck Plaza

Community Center Plaza



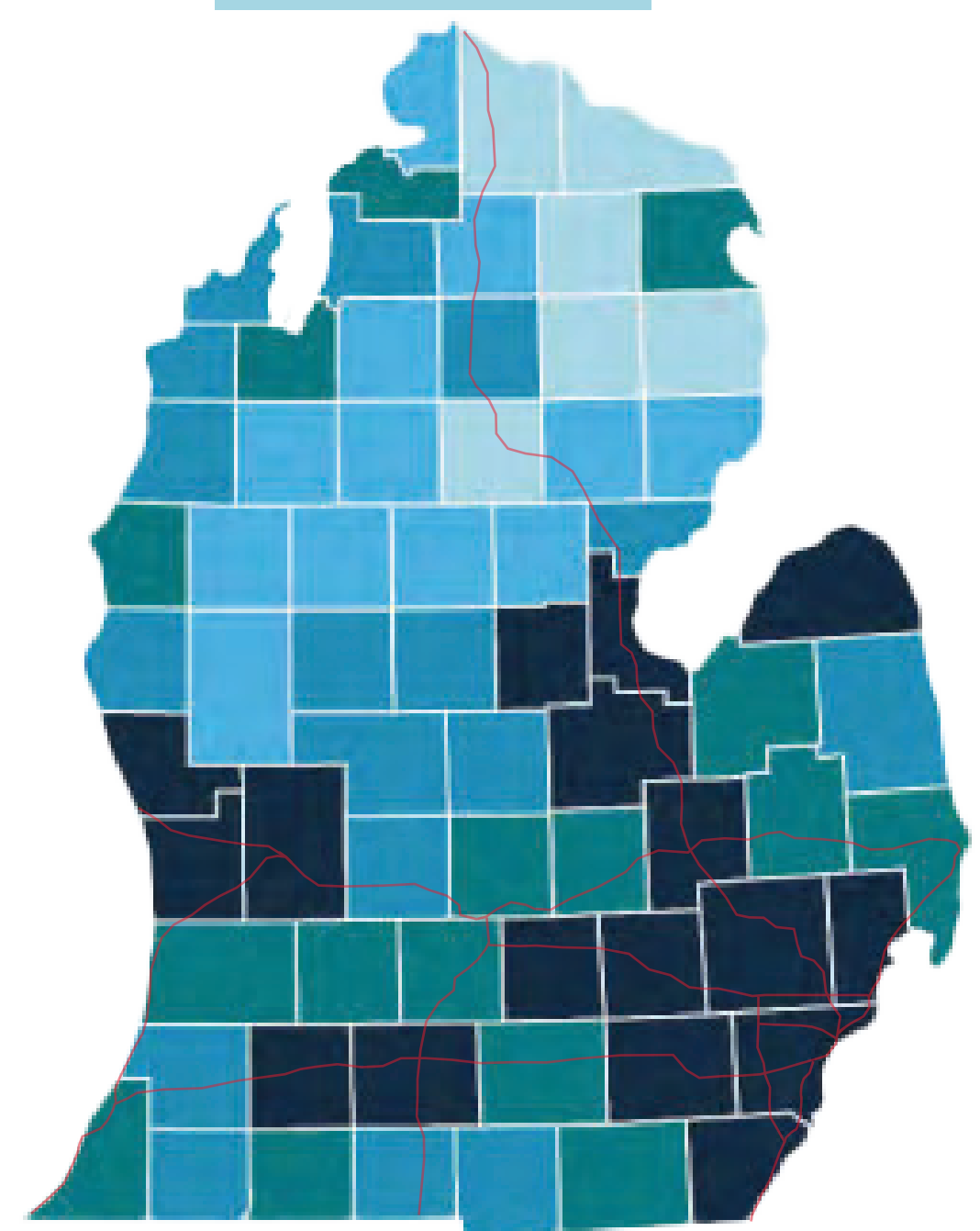
Phytoremediation Walk - 5:50 pm



PM2.5 Pollution Tons Per Square Mile



0 - 0.4839

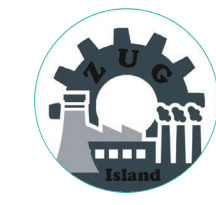


PM2.5 Pollution

PM2.5 is a fine particulate matter that has a diameter of less than 2.5 micrometers. These particles are small enough to be inhaled into the lungs, where they can cause a range of health problems, including respiratory and cardiovascular disease. In Detroit, PM2.5 pollution is a significant concern.

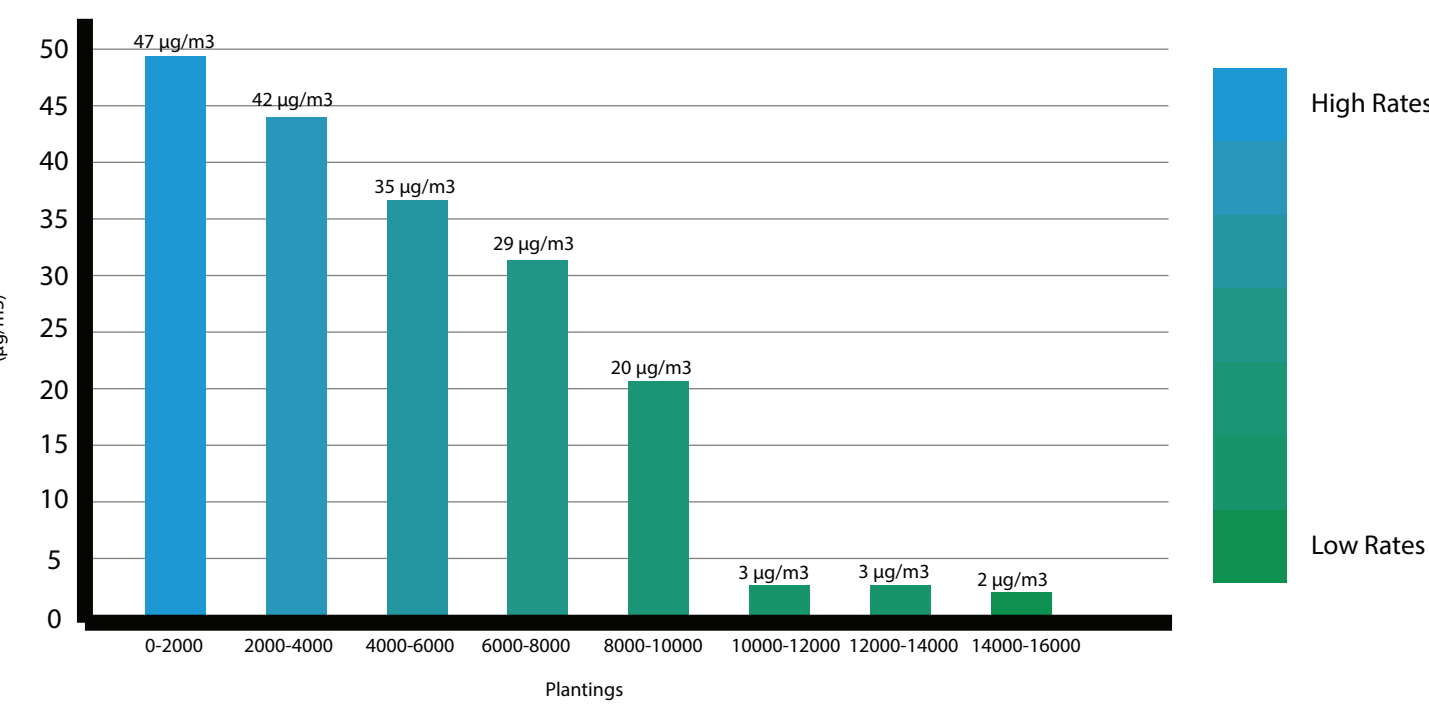
Sulfur Dioxide (SO2)

Nitrous oxide is produced in Detroit through a variety of industrial processes and activities. The largest source of nitrous oxide emissions in the city is likely the burning of fossil fuels, such as coal and oil, in power plants and vehicles. Nitrous oxide is also produced through the use of fertilizers in agriculture, as well as through the treatment of wastewater and the production of certain chemicals. Additionally, nitrous oxide can be emitted naturally through processes such as soil erosion and the decomposition of organic matter.



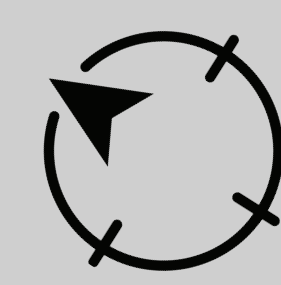
Nitrous Dioxide (NO)

Nitrous oxide is produced in Detroit through a variety of industrial processes and activities. The largest source of nitrous oxide emissions in the city is likely the burning of fossil fuels, such as coal and oil, in power plants and vehicles. Nitrous oxide is also produced through the use of fertilizers in agriculture, as well as through the treatment of wastewater and the production of certain chemicals. Additionally, nitrous oxide can be emitted naturally through processes such as soil erosion and the decomposition of organic matter.



Packard Park - Master Plan

Scale 1 / 64" 1' - 0"

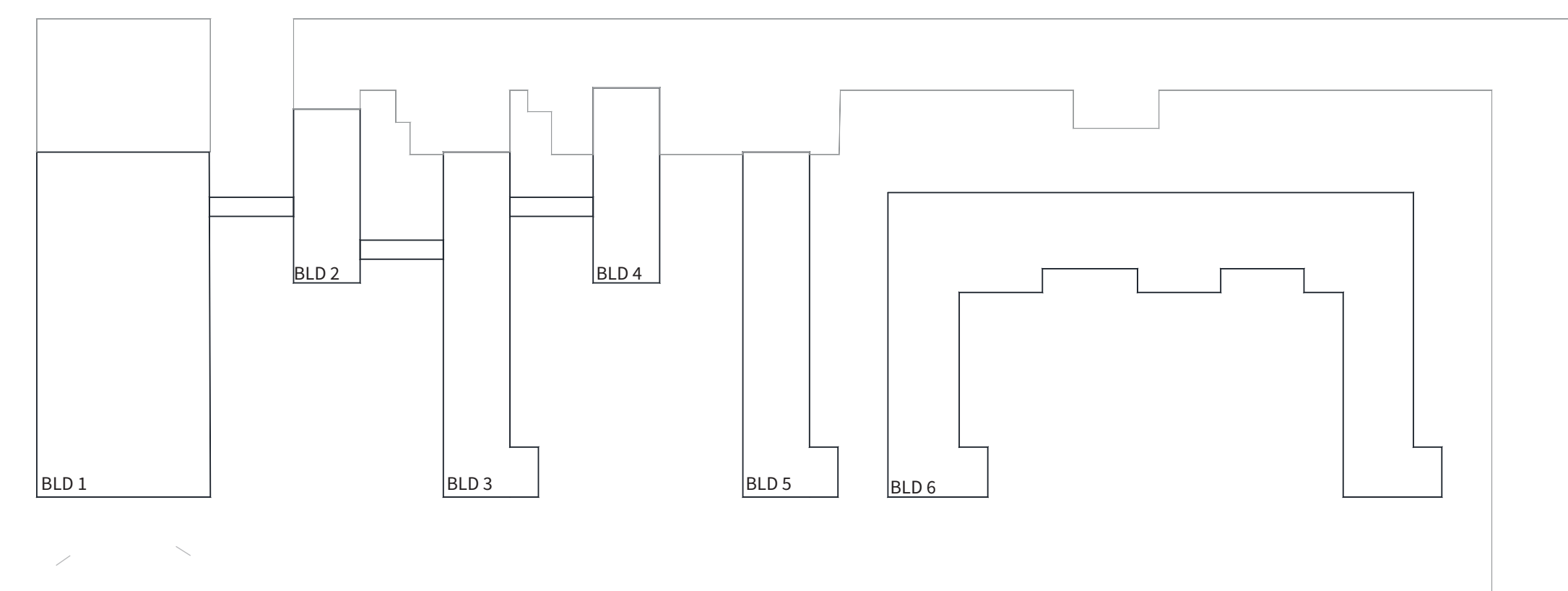


Legend

- PS.1 Perspective 01 - Phytoremediation Walk
- MPE.1 Major Project Element - Phytoremediation Showcase Walk
- SD.1 Section Detail - 0 / 5 / 10 Phytoremediation Zones
- PS.2 Perspective 02 - Fruit Remediation Walk
- MPE.2 Major Project Element - Community Center Demolition Plaza
- SD.2 Section Detail - Integrated Green Roof
- PS.3 Perspective 03 - Food Truck Plaza
- MPE.3 Major Project Element - Community Farmers Market
- EF.1 Existing Feature - Railroad
- PS.4 Perspective 04 - Community Center
- MPE.4 Major Project Element - Food Truck Plaza
- EF.2 Existing Feature - Building Debris
- PS.5 Perspective 05 - Green Roof Look Down
- MPE.5 Major Project Element - Integrated Green Roof (Connected by Bridges)

Packard Park Information

Packard Park was designed to have visual barriers created by either the planting plan or structural elements. Each space is clearly defined by the planting material and there are informational signs located throughout the park. These signs will inform the guest of how what they're walking through works to remediate the land. There will also be other information about Packard Plant from when it was operational. Every aspect of this park is accessible. The main pathway is made from crushed concrete that was found on site. Elevators are available to access the green roofs. Each green roof is connected by a bridge replica of the pedestrian bridge that collapsed in the late 1990s. Utilizing the employee entrances rather than the official entrances, this just adds another level of depth between Packard Park and the community its surrounded by.



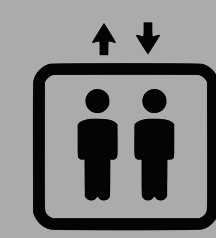
Packard Park's upper level and building involvement is only 6 buildings. The rest of the building not labeled was deemed not safe. Each building plays host to flexible interior and exterior spaces and an integrated green roof and irrigation system. Buildings 1, 3, 5 also have elevator access to the rooftops. Building 1 and 3 have a parking lot integrated into the main floor. Building 1 has 60 parking spaces and would act as overflow parking. The main parking lot is located in building 3 and has 30 parking spaces within.



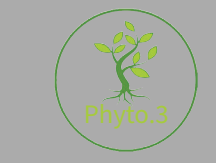
Food Truck Plaza - Master Plan

Scale 1/16" = 1'-0"

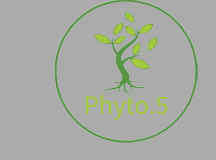
Legend



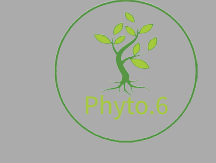
Elevator Access



Phyto Planting 3 - Indian Mustard



Phyto Planting 5 - Sunflowers
Switch Grass
Glacial Plain Grass



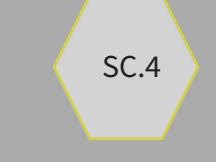
Phyto Planting 6 - Boston Fern
Colored Hyacinth
Glacial Plain Grass



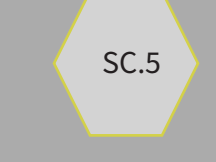
Phyto Planting 8 - Boston Fern
Festuca Ovina Grass
Switchgrass



SC.3 Structural Component - (6) Food Truck Parking



SC.4 Structural Component - (7) Public Tables

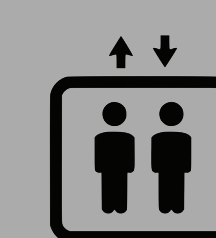


SC.5 Structural Component - Pedestrian Walking Bridges

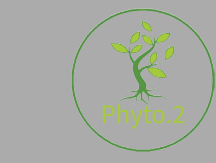
CC Square / Farmers Market Master Plan

Scale 1/16" = 1'-0"

Legend



Elevator Access



Phyto Planting 2 - Douglas Firs
Silver Maples
Native Blue Joint Grass



Phyto Planting 3 - Indian Mustard



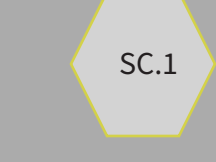
Phyto Planting 4 - Big & Little Bluestem Grass
Switch Grass
Festuca Ovina Grass



Phyto Planting 6 - Boston Fern
Colored Hyacinth
Glacial Plain Grass



Phyto Planting 6 - Oak Tree
Native Blue Joint Grass



SC.1 Structural Component - Seated Planter

Phytoremediation Walk - Master Plan

Scale 1/32" = 1'-0"

Legend



Phyto Planting 1 - Apple, Cherry, Pear Fruit Trees
Willow Trees
Native Dune Grass



Phyto Planting 2 - Douglas Firs
Silver Maples
Native Blue Joint Grass



Phyto Planting 3 - Indian Mustard



Phyto Planting 4 - Big & Little Bluestem Grass
Switch Grass
Festuca Ovina Grass



Phyto Planting 5 - Sunflowers
Switch Grass
Glacial Plain Grass



Phyto Planting 6 - Boston Fern
Colored Hyacinth
Glacial Plain Grass



SC.2 Structural Component - Bridge Replica



Fruit Remediation Walk - 11:15 am PS.1

This perspective shows the fruit orchard that has been planted and allowed to grow. The bridge continuation is the centerpiece of this perspective.



Food Truck Plaza - 6:50 pm PS.2

The food truck plaza offers a flexible space for solo and group activities with the open grass field that is outlined by different phytoremediation zone plantings.



Community Center - 4:45 pm PS.3

Integrated seating within the planters while also showing off different remediation zones and the building footprint of the recently demolished admin building.



Green Roof Look down - 9:30 am PS.4

This perspective offers a unique look at what packard park looks like from the greenroofs. The field was created in place of half the building that was demolished.

