

# Banfield Substation Replacement Project

Portland Design Commission - June 5, 2025

TriMet – Joe Recker

# What is a traction power substation (TPSS)?

A substation is an unoccupied facility that is critical utility of the Light Rail infrastructure

- Converts high voltage AC into DC power to power the train
- Located at approximately one mile intervals along the alignment
- Substations are interconnected; two adjacent substations can power a section of the line if one is off-line



# Project scope and goals

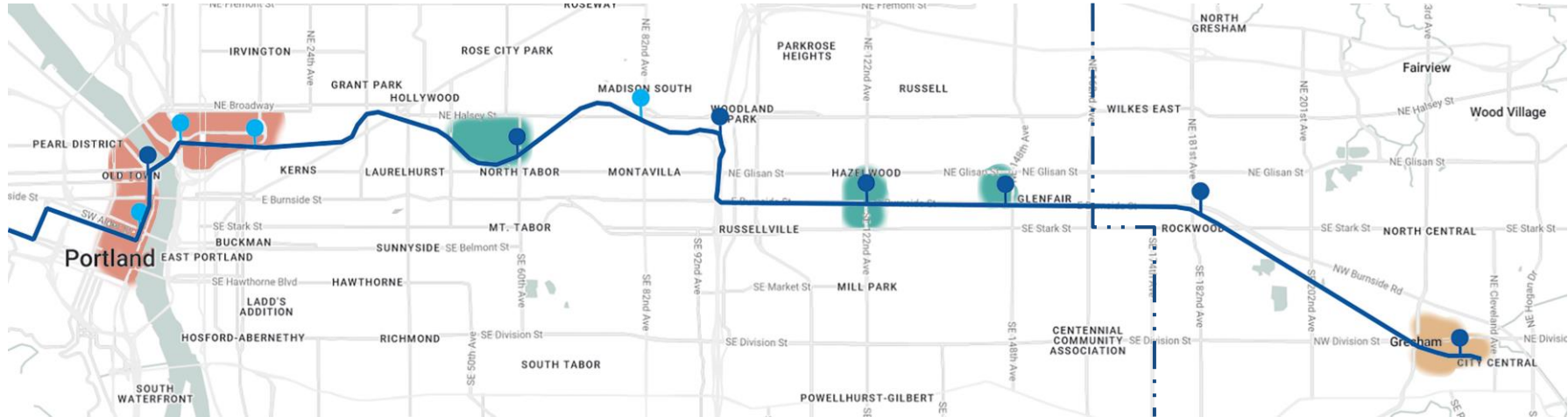
## Replace TriMet's oldest traction power substations

- 11 MAX Blue Line Banfield Segment substations are past the end of their lifecycle
- Replacement parts are no longer available
- Improve access and working space to comply with current National Electric Code (NEC) rules and regulations
- Minimize impacts to MAX service and patrons
- Provide resiliency in substation lifecycle through addition of HVAC system

# Substation Replacement Locations

## City of Portland

## City of Gresham



## Design Districts

## Design Phases

Central City Design Review Downtown Gresham

Phase 1 Phase 2

# Current Banfield Line Substations

## City of Portland

## City of Gresham



Morrison

Steel  
Bridge

Rose  
Quarter

Lloyd  
Center

60th

82nd

Gateway

122nd

148th

181st

Gresham  
Central

Central City Design District

Design  
Review

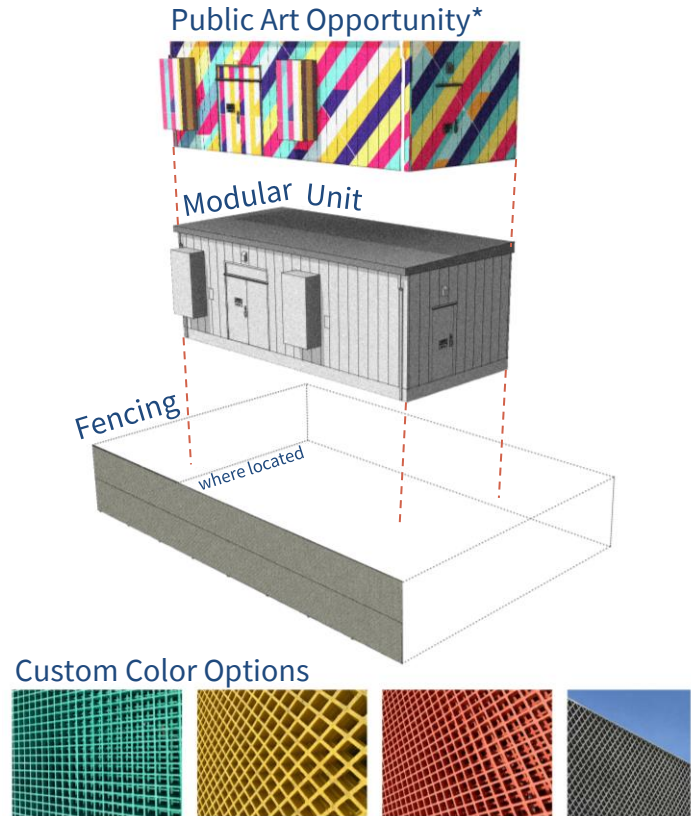
Design Review

Downtown Gresham  
Design District

Phase 1  Phase 2 

# Kit of Parts Approach

- Establish standard design elements used throughout the MAX Blue Line Banfield Segment
  - Modular Unit
  - Public Art
  - Non-metallic Fencing – color options
- Durable structure, including any additional finishes to the modular unit (i.e. public art)
- Provide required security of critical infrastructure
- Finishes that reflect the context & neighborhood



\*Image not representative of design

# Advantages of Proposed Approach

- Reduces Substation Downtime:
  - Civil infrastructure can be built with existing substation in operation
  - Modular unit manufactured concurrently with civil infrastructure construction
  - Reduce time between disconnection/removal & delivery/reconnection
  - Ensure infrastructure resiliency
- Minimizes:
  - Risk of unplanned MAX outage and impact transit users
  - New construction by reusing the existing foundation and grounding mat
  - Construction time
  - Site impacts compared to site-built facility



# Design Guidelines for Light Rail Substations

## GUIDE TO STANDARD LIGHT RAIL AND BUS RAPID TRANSIT IMPROVEMENTS IN PUBLIC STREETS



TRI MET



UPDATE JUNE 2023  
FINAL

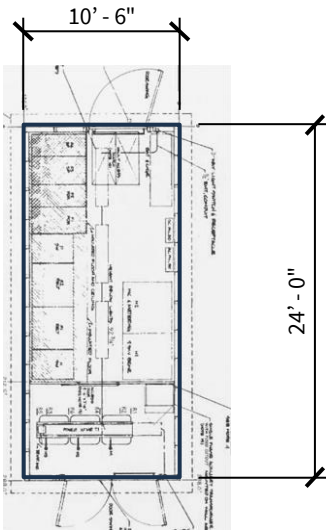
Prepared by WSP



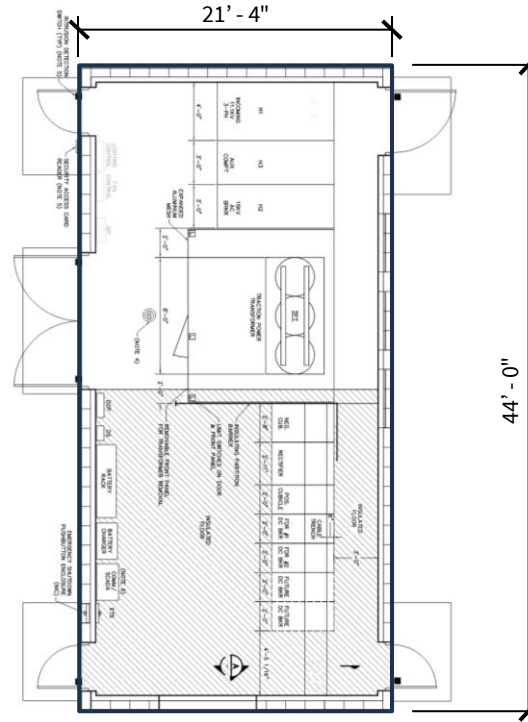
- Guidelines only include site-built options
- Examples are newly built on the MAX Orange Line
- Propose adding to guidelines for the “kit of parts” approach for substation replacement



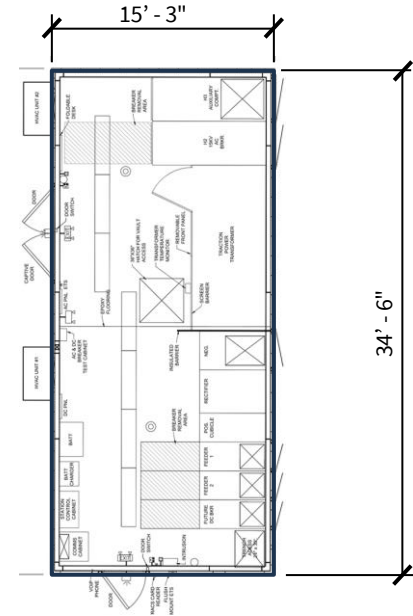
# Evolution of Code Compliant Substation Plan



Existing Substation Plan



Guideline Site Built Plan



Proposed Substation Plan

# TriMet's Public Art Program

- Guide Design Considerations Section 4.3
  - Art as a Graffiti Mitigation Strategy
  - Murals on TriMet substations should be site-specific, original and related to the location and surrounding community
  - Artist selection and concept proposal approval occur through the Program's established public process
  - Murals on existing MAX Blue Line substations at E 148th Ave and E 181st Ave



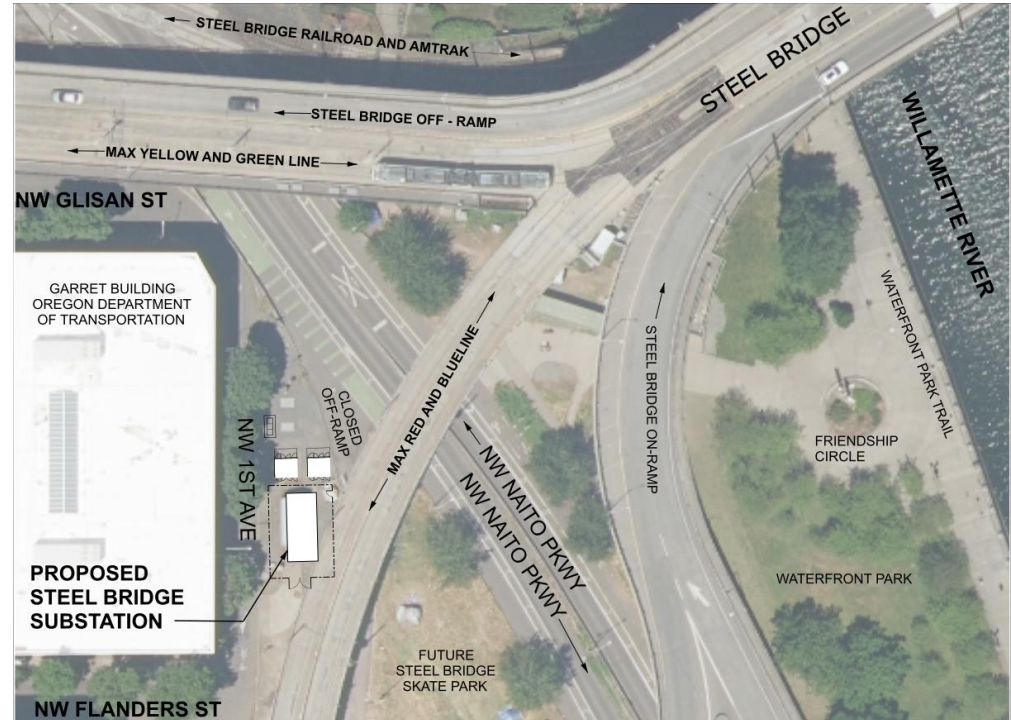
# Examples of Mural in TriMet's Public Art Collection



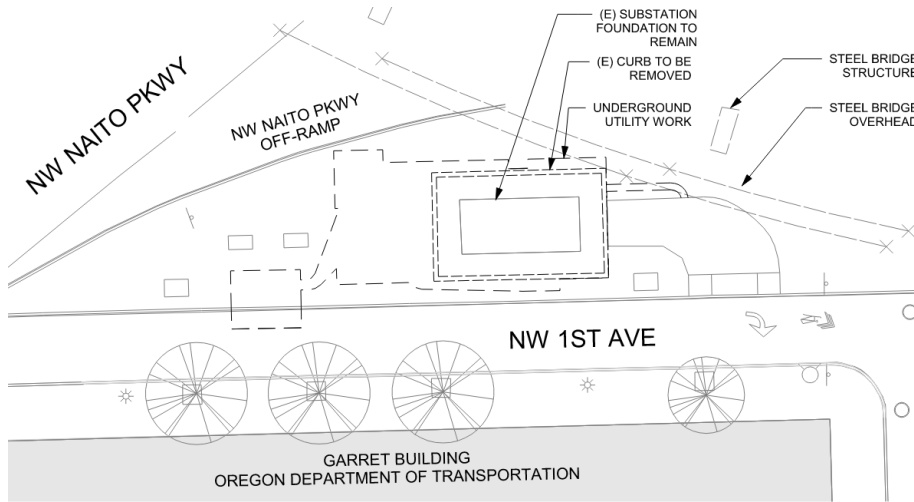


# Steel Bridge Substation Site

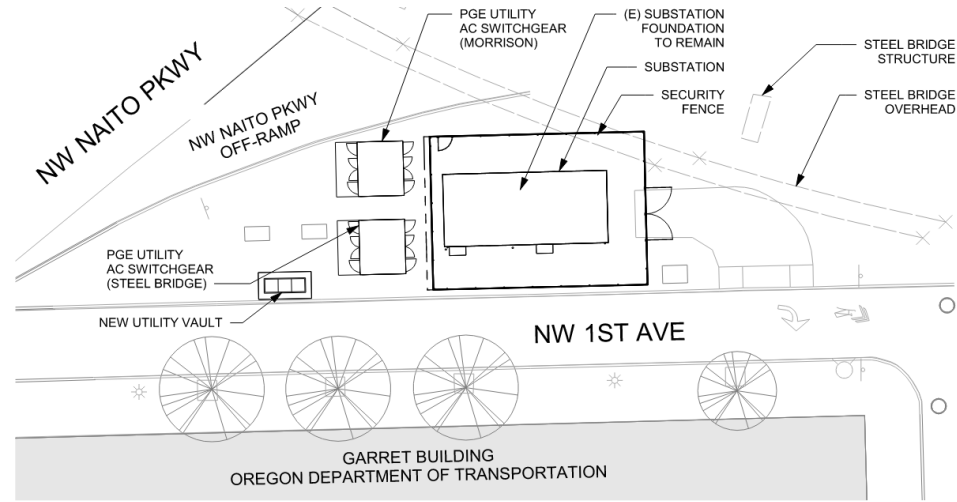
- Replaces an existing substation in the public right-of-way underneath MAX west approach ramp to Steel Bridge
- Proposed replacement is located within the Central City Plan District boundary
- Adjacent to the future Steel Bridge Skate Park



# Steel Bridge Substation: Existing vs. Proposed



Existing Plan



Proposed Plan

# Steel Bridge Substation: Existing vs. Proposed



Existing Conditions

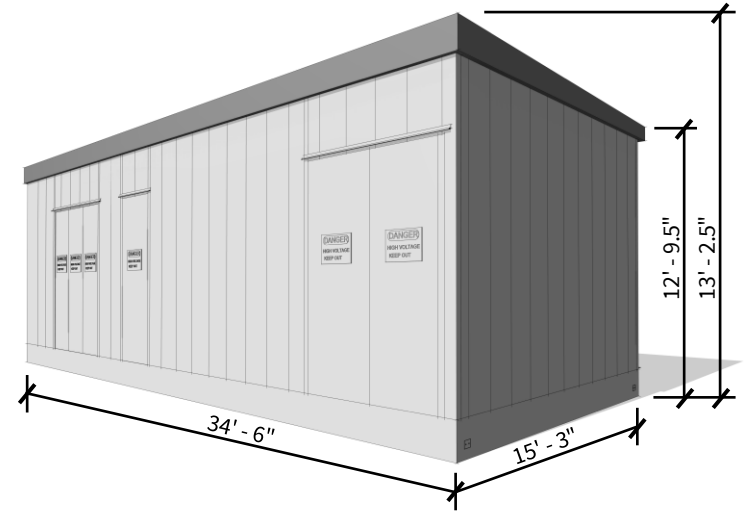


Proposed Conditions

# Modular Substation



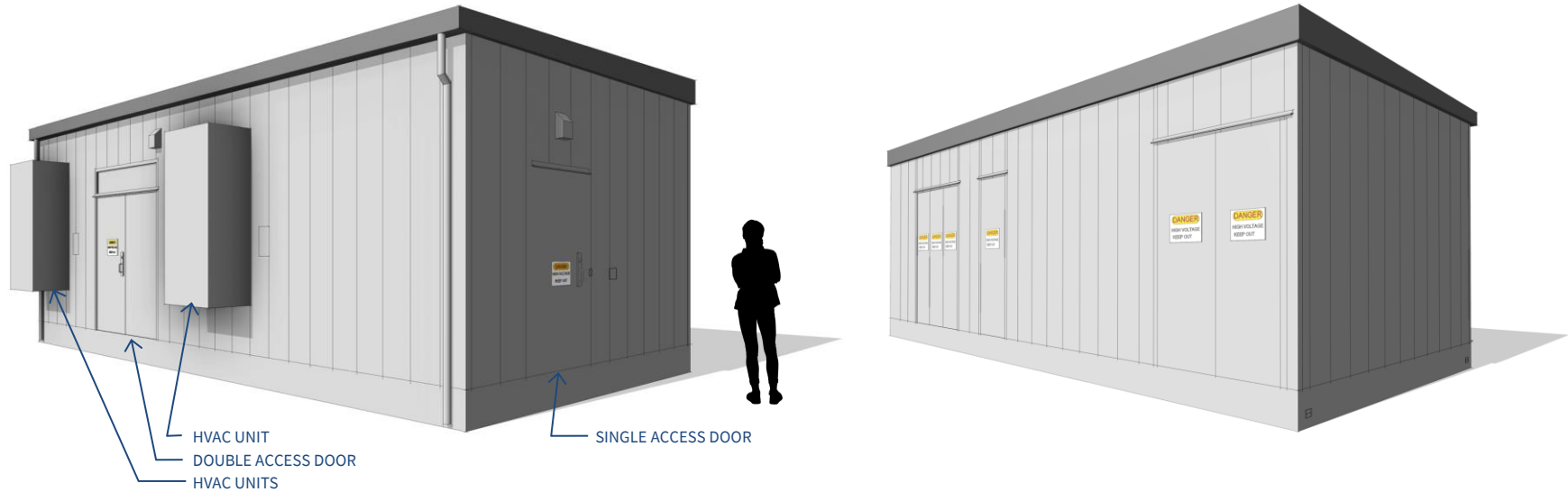
Existing Conditions



Proposed Substation



# Modular Substation



# Proposed Steel Bridge Substation

How Kit of Parts could be implemented at Steel Bridge Substation as the Design Develops



Public Art

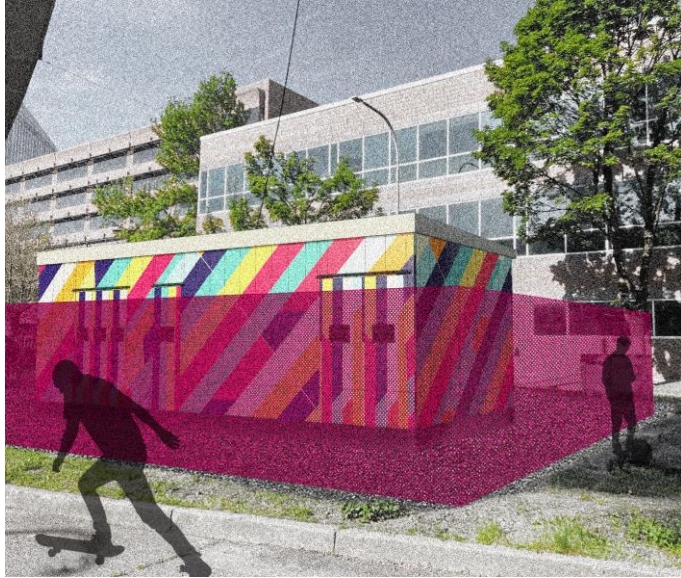


Colored Fence



Public Art and Colored Fence

# Proposed Steel Bridge Substation



# Key Goals for Design Advice Request

Seek guidance from the Portland Design Commission on:

- Use of unique public art on substation walls visible to the public
- Use of color on non-metallic fencing
- Locations where one or both may be more appropriate