Final Design Report Draft for Better Naito

Project Number #BB-2015-01

by

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Project Disclaimer:

This report was prepared as a class project for the Civil Engineering Project Management and Design course at Portland State University. The contents of this report were developed by the student authors and do not necessarily reflect the views of Portland State University. The analyses, conclusions and recommendations contained in the report should not be construed as an engineering report or used as a substitute for professional engineering services.

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Executive Summary

Better Naito is a temporary three week redesign that makes Naito Parkway, a major thoroughfare in downtown Portland, OR, more pedestrian and bicycle-friendly. This is accomplished by repurposing one northbound lane into a multi-use pathway. The pathway runs from SW Salmon Street to NW Couch Street and will provide north and southbound travel by both pedestrians and cyclists. A three week trial of Better Naito will be implemented during the Rose Festival from May 22 to June 5, 2015.

Introduction

For this project, Better Block PSU (BBPSU) has partnered with Better Block PDX (BBPDX) to design a more bicycle, pedestrian, and community friendly Naito Parkway. Naito Parkway is located in downtown Portland, Oregon. It runs from south to north along the Willamette River, adjacent to Waterfront Park (Figure 1).
This report contains Project Objectives, Site Description and Project Background, Alternatives Analysis, and Facility Design sections. The Project Objectives section provides an in depth description of why there is a need to redesign Naito Parkway. It includes the benefits of the redesign. The Site Description and Project Background section describes the Naito Parkway site; including the geography, environment, and history. The Alternatives Analysis section provides a description of the proposed designs and details how they were analyzed using a Pugh matrix. The Facility Design section provides a detailed description of the selected design alternative. Additionally, this report contains an Appendix, which includes Cost Estimates, Calculations Package, Design Drawings and Construction Schedule.

**Project Objectives**

Portland, Oregon is a city undergoing tremendous growth and change. Over the past several decades, city planners have developed walkable, multi-use spaces that encourage multi-modal transportation options to accommodate the city’s growing transportation needs. Specifically, many roadways have been retrofitted to incorporate bike lanes and encourage multi-modal use. BBPDX has identified a twenty-one block segment of Naito Parkway in downtown Portland as a significant roadway that would benefit from a multi-modal redesign. Currently, Naito does not adequately meet the needs of pedestrians and bicyclists. The west side of the street does not have continuous sidewalks for large segments, and the existing bicycle lanes begin and end abruptly. Limited and difficult access to the existing bike lane segments is responsible for safety concerns and diminished ridership on Naito. These issues produce an uninviting atmosphere for pedestrians and bicyclists alike. Additionally, the current roadway design does not meet the changing needs of the surrounding community. Bicycle and pedestrian infrastructure will become increasingly vital to meet the needs of city residents as central Portland’s population density increases.

The objective of this project is to increase pedestrian and bicycle access and safety on Naito while minimizing the vehicle delays. New lane configurations will incorporate better accommodations for alternative modes of transportation and will be implemented on a short-term basis. To encourage attendance and facility use, BBPDX is collaborating with
the Portland Rose Festival to implement the design for their three weeks of festival activities. This report will reference to the designs and event as “Better Naito”. The event hopes to incorporate food, entertainment, and bicycle-oriented vendors into the existing Rose Festival plans. The event is scheduled for May 22 through June 5 and will be managed by a combination of BBPDX, BBPSU, and Rose Fest security. These groups will work together to collect pedestrian and bicycle counts, as well as record video for at least three days to get vehicle counts. The data collected may be used to demonstrate that the proposed redesign increases bicycle ridership on Naito Parkway without producing traffic delays that exceed the allowable parameters. The data may be used by BBPDX to obtain additional permits for extended future trials. The ultimate goal of Better Naito is a permanent implementation of the project design for Naito Parkway. As part of the global Better Block movement, BBPDX has experience executing similar projects in the city of Portland. Accordingly, BBPDX is working closely with BBPSU to make this plan a reality.

Site Description & Project Background

Site Description

Naito Parkway is a 3.1 mile multi-lane arterial road in Portland, Oregon. The roadway is located near the west bank of the Willamette River. It is the primary north/south vehicle route through the city center. Naito Parkway extends from SW Barbur Boulevard near the Ross Island Bridge to NW Front Avenue near the Fremont Bridge. The project site comprises of a 0.6 mile segment of Naito Parkway between SW Salmon Street and NW Couch Street, with temporary traffic signs positioned adjacent the roadway five to seven blocks north and south of the site. This section of Naito Parkway passes under the Morrison and Burnside Bridges, with businesses bordering on the west and Tom McCall Waterfront Park on the east (Figure 2).
Naito carries north and south bound traffic, with two through lanes in each direction. Directional flow is usually separated by a median. When northbound traffic is permitted to turn west, sections of the median are replaced with a left turn lane. These motor vehicle lanes will be numbered for reference purposes, starting from the east side. Lanes 1 & 2 are the northbound lanes, and lanes 4 & 5 are the southbound lanes. Where left turn lanes exist in place of the median, they will be referred to as Lane 3. Directional bike lanes run parallel to the outermost traffic lanes. Sidewalks and on-street parking lanes are provided along the west side of Naito only. A cross sectional diagram of the roadway is shown in Figure 3.
The site occupies a very unique space within the city. Naito Parkway acts as a division between Portland’s downtown business core and one of the city’s most popular public spaces, Waterfront Park. The park hosts large concerts and festivals throughout the spring and summer, attracting locals and tourists alike. Salmon Street Springs, the Portland Saturday Market, and other popular attractions are located within the park. Downtown workers, and neighborhood residents mix with park goers and transients, making the area around the site a cultural and economic melting pot. The success of this project requires garnering public support for the redesign of the roadway, so it is important to consider the needs of the community stakeholders located near the site.

Project Background

The first Better Block Project took place in Dallas, TX in April of 2010. A group of community activists planned and implemented a temporary redesign of an underused city block. The community enjoyed the results, and the project led to the revitalization of the neighborhood. After the Dallas Better Block Project, coordinator Jason Roberts encouraged people to form community groups and develop similar “Better Block” projects in their areas. Groups have since formed around the globe, carrying out over 100 successful Better Block projects (Better Block, 2011). Projects are site specific, they follow the same general formula of temporarily blocking streets and converting them into interactive spaces. The interactive spaces encourage the use of alternative transportation. Events take place for a short trial period, and positive impacts are presented to the city as justification for a permanent redesign. Better Block describes a project as a “Demonstration tool that acts as a living charrette so that communities can actively engage in the build out process and provide feedback in real time” (Better Block, 2011).

BBPDX is a grassroots group of urbanists that develops Better Block projects in Portland, Oregon. According to its website, BBPDX tries to “create interactive spaces that challenge the notion that streets are only for cars” (Better Block PDX, 2013). The organization’s projects emphasize walkability and shared public space over existing auto-centric roads. The organization has a history of successfully executing projects in the Portland area. The largest and most recent of which was called “Old Town/Chinatown Re-Imagination”.

Better Naito CE 494 - Capstone Project #BBPDX_2015_01

The project comprised of closing and blocking segments of Third Avenue in Portland’s Old Town district. The closed segments were converted into bike lanes and public seating areas. The event took place from Friday to Sunday, October 3-5, 2014. It was received favorably by the community, and the Portland Bureau of Transportation (PBOT) has since dedicated $10,000 to implement the temporary crosswalk designs developed for the event into permanent changes to the roadway.

BBPSU was formed by a group of senior engineering students from Portland State University (PSU) interested in working on a Better Block project. Evan Kristof, the project advisor, connected BBPSU members with BBPDX and presented a list of possible project sites. BBPSU held an internal meeting on January 11, 2015 and selected a site along Naito Parkway from the list. On January 13, BBPSU members met with Boris Kaganovich from BBPDX and began planning a Better Block project on Naito. A rough timeline was estimated, with a project completion goal of early May 2015. BBPSU conducted a site visit and began design work the next day.

The successful completion of this project has continuously relied on approval from the City of Portland. Once the initial plans were drafted, a meeting was arranged with the Portland Bureau of Transportation (PBOT) to assess the feasibility of our plan. After meeting with Greg Raisman from PBOT on February 27th, the scope of the project was scaled down to meet the needs of the city. Additional adjustments have been made over time to meet city requirements and best accommodate the many stakeholders in the project. In late April, the Portland Rose Festival, a major project stakeholder, approached BBPSU about conducting the project concurrently with their Waterfront Park "CityFair" carnival. The project timeline was further adjusted, with the design now to be implemented from May 22 - June 5, running alongside the carnival. BBPSU has worked closely with the community to develop the final design, which meets city requirements while best accommodating all involved stakeholders.
Alternatives Analysis

Since the initial client meeting on January 13, 2015, six design alternatives have been considered (Table 1). Alternative 1 is a no build plan. Alternative 2 proposes blocking off all northbound lanes and converting the space into a two-way cycle track with a separate pedestrian area. To handle automobile traffic, existing southbound Lane 4 and Lane 5 (Figure 3) will be reconfigured into a two-way street with a lane running in each direction. This alternative was analyzed along three different stretches of Naito, as shown in Alternatives 2a, 2b, and 2c. Alternative 3 repurposes the easternmost 16 feet of the roadway into a two-way cycle track without pedestrian facilities. This option requires the northbound bike lane and Lane 1 to be adjusted; all other lanes remain the same. Alternative 4 repurposes the easternmost 16 feet of the roadway into an adjustable, multi-use pathway, and it requires the northbound bike lane and Lane 1 to be reconfigured.

Table 1. Design Span and Lane Usage for Each Alternative

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Design Span</th>
<th>Lane Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative 1</td>
<td>No Build</td>
<td>No Build</td>
</tr>
<tr>
<td>Alternative 2a</td>
<td>SW Harrison to NW Couch</td>
<td>Converts Lanes 1 and 2 into a cycle track and pedestrian walkway. Reconfigures Lanes 4 and 5 into a two-way street.</td>
</tr>
<tr>
<td>Alternative 2b</td>
<td>SW Clay to NW Couch</td>
<td>Converts Lanes 1 and 2 into a cycle track and pedestrian walkway. Reconfigures Lanes 4 and 5 into a two-way street.</td>
</tr>
<tr>
<td>Alternative 2c</td>
<td>SW Salmon to NW Couch</td>
<td>Converts Lanes 1 and 2 into a cycle track and pedestrian walkway. Reconfigures Lanes 4 and 5 into a two-way street.</td>
</tr>
<tr>
<td>Alternative 3</td>
<td>SW Salmon to NW Couch</td>
<td>Converts northbound Lane 1 into a two-way cycle track. All other lane configurations remain the same.</td>
</tr>
<tr>
<td>Alternative 4</td>
<td>SW Salmon to NW Couch</td>
<td>Converts Lane 1 into a bidirectional multi-use pathway to accommodate cyclists and pedestrians. All other lane configurations remain the same.</td>
</tr>
</tbody>
</table>
Alternatives 2 and 3 were designed to be implemented over an unspecified three day trial period. Alternative 4 was designed to be implemented during the 2015 Portland Rose Festival, running from May 22 - June 5, 2015. All design alternatives incorporate the collection and analysis of traffic data. A series of counts will be taken on site, and steps for calculating the average delay will be provided to our Better Block clients. Additionally, all proposed alternatives except for Alternative 4 feature an event, Better Naito, where local businesses, vendors, and community members are invited to celebrate and show support for the improvement of better public spaces and more bicycle focused areas. Plans for a farmers market, bicycle parking facilities, bicycle tune-up shops, arts and craft workshops, and other community activities are included in these proposed alternatives.

**Alternative 1 – No Build**

This design alternative requires no changes to the existing conditions of Naito Parkway. It is included in this analysis to compare the five proposed redesigns with the existing roadway conditions.

**Alternative 2a – SW Harrison Street to NW Couch Street**

This design alternative represents the original design concept requested by BBPDX. It converts the two northbound lanes into a cycle track and pedestrian walkway, and reconfigures the two southbound vehicle travel lanes into a temporary two-way street. This design alternative consists of the longest roadway segment (twenty-one blocks). In addition to being the longest segment, it includes two high volume intersections where Naito crosses SW Market and Clay Streets. These two arterials connect US-26 on the west side of downtown Portland with I-5 on the east side of the city center. The northbound Hawthorne Bridge on-ramp is closed to vehicle access, which requires a detour. Reconfiguration of Lanes 1 and 2 to accommodate two-way traffic includes disabling existing traffic signals for the proposed segment and replacing them with temporary stop signs. This requires the employment of a professional traffic engineer to oversee vehicle travel lane designs.
Alternative 2b – SW Clay Street to NW Couch Street

This design alternative was developed on January 30, 2015 at the second client meeting with PPBDX. It begins at the north side of the intersection at SW Clay, which eliminates traffic concerns created by Alternative 2a. The design shortens the project site from twenty-one blocks to seventeen blocks. This alternative has fewer traffic problem areas and maintains the arterial connections with SW Clay and SW Market. The major intersections at SW Harrison and SW Market are not included in this design alternative. All lane adjustments are north of SE Clay, creating less delay than alternative 2b. Traffic delays resulting from the design configuration of Alternative 2a were determined to be greater than the benefits gained by implementing the bicycle and pedestrian right-of-way in this segment. Reconfiguration of Lanes 1 & 2 to accommodate two-way traffic includes disabling existing traffic signals for the proposed segment and replacing them with temporary stop signs. This requires the employment of a professional traffic engineer to oversee vehicle travel lane designs.

Alternative 2c – SW Salmon Street to NW Couch Street

This design alternative was developed on February 27, 2015 after the group’s initial meeting with Greg Raisman, PBOT’s active transportation professional. Greg raised concerns about the feasibility of the existing design alternatives, and recommended that BBPSU consider a design alternative that maintains vehicle access to the northbound Hawthorne Bridge on-ramp from Naito Parkway. This alternative is similar to 2a and 2b, but reduces the proposed project segment to twelve blocks, from SW Salmon to NW Couch. It provides a seamless connection from the existing northbound bicycle lane to the proposed cycle track. This design alternative is the shortest project segment in the Alternative 2 subcategory. It is the most feasible for reducing vehicle travel lanes to one in each direction. Reconfiguration of Lanes 1 & 2 to accommodate two-way traffic includes disabling existing traffic signals for the proposed segment and replacing them with temporary stop signs. This requires the employment of a professional traffic engineer to oversee vehicle travel lane designs.
Alternative 3 – SW Salmon Street to NW Couch Street – Cycle Track Only

This design alternative was developed on March 1, 2015 after BBPSU members were contacted via email by Greg Raisman. Greg recommended that BBPSU consider a design alternative that utilizes the same project segment proposed in Alternative 2c but only includes repurposing Lane 1 for a two-way cycle track. This design alternative maintains two southbound travel lanes (Lanes 4 & 5), and it reduces the northbound travel lanes from two to one (Lane 2). The pedestrian pathway is eliminated in this design alternative. The existing traffic signals are used to control traffic, and the employment of a professional traffic engineer is not required to oversee roadway designs. A preliminary site plan for this alternative can be found in Appendix D.

Alternative 4 – SW Salmon Street to NW Couch Street – Multi-Use Pathway

This design alternative alters the easternmost 16 feet of roadway stretching from SW Salmon to NW Couch. It requires Lane 1 to be blocked from motor vehicles and uses temporary plastic drums and planter boxes to separate the repurposed area. This alternative incorporates two different designs for the repurposed area, implemented in phases. The phases address the safety concerns of implementing a bidirectional multi-use pathway (MUP) for the extended three week period. Phase 1 accommodates bidirectional pedestrians and northbound cyclists. Phase 2 adds southbound cyclists, creating a full two-way MUP.

Alternative Selection Methods

Each of the proposed alternatives were screened and evaluated using the criteria presented in Tables 2 and 3. This analysis defines a numerical score for each of the criteria assessed. A higher score reflects “better” characteristics. The evaluation criteria were scored on a relative scale, and they were assigned values based on how they compare to the other alternative designs. An example of this is for the Maintenance/Set-up criterion; Alternative 2a will receive a lower score than Alternative 3 because it requires the largest segment of
roadway to be reconfigured for the design alternative. Additionally, each of the criteria are assigned different weights to reflect their significance in the overall decision process.

Table 2. Criteria and Weighting

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Weighting</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feasibility</td>
<td>High</td>
<td>This criterion measures the probability that the plan will be accepted by PBOT and other community stakeholders (e.g. Fire Department, Police Station, and Mayor’s Staff).</td>
</tr>
<tr>
<td>Client Preference</td>
<td>High</td>
<td>This criterion measures if the needs and desires of the client, BBPDX, are met - assuming that the more modes given access and the more space redistributed would result in a higher score.</td>
</tr>
<tr>
<td>Traffic Impacts</td>
<td>High</td>
<td>This criterion evaluates effects on traffic caused by the design. Overall delay and safety will be the most important measures to consider. Displaced traffic volume, signage, and visibility of the changes will also affect the score.</td>
</tr>
<tr>
<td>Cost</td>
<td>Low</td>
<td>This criterion will score options based on the cost of implementation for the trial period. Costs will include building supplies, equipment rentals, and marketing/recruitment materials.</td>
</tr>
<tr>
<td>Environmental Impacts</td>
<td>Low</td>
<td>This criterion examines the sustainability of the project by looking at changes in storm water runoff, waste management, and traffic emission.</td>
</tr>
<tr>
<td>Maintenance/Setup</td>
<td>Medium</td>
<td>This criterion evaluates the effort required to set-up, take-down, and maintain the project over the trial period. The number of volunteers and additional workers needed are included in this evaluation.</td>
</tr>
<tr>
<td>Pedestrian Access</td>
<td>High</td>
<td>This criterion considers the pedestrian accessibility of the project site. This includes crosswalk safety, and connectivity to existing pedestrian infrastructure.</td>
</tr>
<tr>
<td>Bicycle Access</td>
<td>High</td>
<td>This criterion considers cyclists accessibility to the project site. This includes measures like safe transitions on/off the lane or track, and easy access to existing bicycle infrastructure and parking.</td>
</tr>
<tr>
<td>Aesthetics</td>
<td>Medium</td>
<td>This criterion evaluates the overall look of the proposed plan - taking into consideration the conformity with surrounding areas, the integrity of the city’s standards and the visual appearance.</td>
</tr>
</tbody>
</table>

13
<table>
<thead>
<tr>
<th>Factors</th>
<th>Possible Scores</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Feasibility</strong></td>
<td>10</td>
<td>PBOT will probably approve</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>PBOT will probably NOT approve</td>
</tr>
<tr>
<td><strong>Client Preference</strong></td>
<td>10</td>
<td>Bicycle and pedestrian facility</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Bicycle or pedestrian facility</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>No improvements</td>
</tr>
<tr>
<td><strong>Traffic Impacts</strong></td>
<td>10</td>
<td>Little or no impact</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Medium impact</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>High impact</td>
</tr>
<tr>
<td><strong>Cost</strong></td>
<td>3</td>
<td>No cost</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Under $1000</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Over $1000</td>
</tr>
<tr>
<td><strong>Environmental Impacts</strong></td>
<td>3</td>
<td>No storm water issues and vehicle emissions decrease</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Some storm water issues and/or vehicle emissions decrease</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Major storm water issues and/or no vehicle emissions decrease</td>
</tr>
<tr>
<td><strong>Maintenance/Setup</strong></td>
<td>5</td>
<td>Light set-up and maintenance</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Medium set-up and maintenance</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Heavy set-up and maintenance</td>
</tr>
<tr>
<td><strong>Pedestrian Access</strong></td>
<td>10</td>
<td>Increase in access</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>No change in access</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Decrease in access</td>
</tr>
<tr>
<td><strong>Bicycle Access</strong></td>
<td>10</td>
<td>Increase in access</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>No change in access</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Decrease in access</td>
</tr>
<tr>
<td><strong>Aesthetics</strong></td>
<td>5</td>
<td>Attractive and inviting environment</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Attractive but not inviting</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Unattractive and not inviting</td>
</tr>
</tbody>
</table>
Selected Alternative

The preferred design alternative identified by the adjusted Pugh matrix analysis is Alternative 4 (Table 4). Detailed descriptions of Alternative 4 can be found in the Facility Design portion of this report, with detailed drawings included in Appendix D.

Table 4. Adjusted Pugh Matrix

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Score Range</th>
<th>Alt 1</th>
<th>Alt 2a</th>
<th>Alt 2b</th>
<th>Alt 2c</th>
<th>Alt 3</th>
<th>Alt 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feasibility</td>
<td>1 to 10</td>
<td>10</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Client Preference</td>
<td>1 to 10</td>
<td>1</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Traffic Impacts</td>
<td>1 to 10</td>
<td>10</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Cost</td>
<td>1 to 3</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Environmental Impacts</td>
<td>1 to 3</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Maintenance/Setup</td>
<td>1 to 5</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Pedestrian Access</td>
<td>1 to 10</td>
<td>5</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Bicycle Access</td>
<td>1 to 10</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Aesthetics</td>
<td>1 to 5</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td><strong>TOTAL SCORE</strong></td>
<td></td>
<td>41</td>
<td>37</td>
<td>37</td>
<td>39</td>
<td>48</td>
<td>55</td>
</tr>
</tbody>
</table>

Facility Design

Alternative 4 is the preferred alternative for this project. It comprises of a two phase road reconfiguration that creates a multi-use pathway (MUP). The design incorporates the usage of temporary signage in combination with existing traffic control devices and existing pavement markings (Figure 4). Additionally, Rose Festival loading zones have been added. Detailed drawings of the selected design can be found in Appendix D.

Figure 4. Creative Rendering of Preferred Facility Design Alternative (Google SketchUp)
Road Configuration

Alternative 4 converts the outside northbound travel lane of Naito (Lane 1) into a MUP for bicycles and pedestrians from SW Main to NW Couch, while leaving the remaining roadway configuration unchanged. This alternative comprises of two phases.

Table 5. Phase 1 and Phase 2 Roadway Configurations

<table>
<thead>
<tr>
<th>Lane #</th>
<th>Phase 1 Use</th>
<th>Phase 2 Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Northbound bicycle &amp; bidirectional pedestrian MUP</td>
<td>Bidirectional bicycle &amp; pedestrian MUP</td>
</tr>
<tr>
<td>2</td>
<td>Northbound vehicle travel lane</td>
<td>Same as Phase 1</td>
</tr>
<tr>
<td>3</td>
<td>Center median &amp; northbound left turn lane</td>
<td>Same as Phase 1</td>
</tr>
<tr>
<td>4</td>
<td>Southbound vehicle travel lane</td>
<td>Same as Phase 1</td>
</tr>
<tr>
<td>5</td>
<td>Southbound vehicle travel lane</td>
<td>Same as Phase 1</td>
</tr>
</tbody>
</table>

Phase 1 converts Lane 1 into a northbound bicycle and bidirectional pedestrian MUP (Figure 5). Phase 2 adds southbound bicycles to the MUP described in Phase 1 (Figure 6).
Traffic Control Devices

This design alternative utilizes the existing traffic signals to control vehicle traffic and provide protected pedestrian crossings throughout the proposed project site. Traffic barrels and planters delineate the MUP from the northbound vehicle travel lane. Barrel tapering length is 350 feet in accordance with the *Oregon Temporary Traffic Control Handbook*. Barrels are spaced 20 feet on center for the length of the project site per the *2009 MUTCD, Part 6: Temporary Traffic Control* and OTTCH guidelines, with planters spaced between barrels at the end of the blocks to provide a buffer and prevent vehicles from entering Lane 1 nearest to the pedestrians.

Pavement Markings

Vehicle and bicycle travel lane markings remain as striped by PBOT. No formal lane designations are made for bicycles or pedestrians on the MUP in either phase of this alternative; however, pavement markings are used to suggest which spaces bicycles and
pedestrians should occupy and provide warning of potential conflict zones at intersections. Pavement markings are similar to those found on the Hawthorne Bridge, including bicycle and pedestrian symbols, caution shark's teeth, and "Yield to Peds".

For Phase 1, pedestrian pavement markings are located in the existing bicycle lane adjacent to the crosswalk at both ends of an intersection. Northbound bicycle markings, including shark's teeth and "Yield to Peds" are located in Lane 1 at the entering crosswalk only (Figure 7).

![Figure 7. Phase 1 MUP Pavement Markings](image)

For Phase 2, southbound bicycle markings, shark's teeth and "Yield to Peds" markings are added to the Phase 1 marking schematic at the exiting crosswalk to accommodate southbound bicycle traffic and enhance site safety (Figure 8). All pavement markings are made using stencils and temporary spray chalk.
Signage & Wayfinding

Temporary traffic signs are placed in advance of the project site at SW Clay and SW Madison to provide advance warning of the traffic revisions. Temporary traffic control barricades are placed at inside edge of Lane 1 in the middle of each intersection (Figures 7 and 8). Wayfinding signs are placed at the westbound Hawthorne Bridge off-ramp and waterfront path under the Hawthorne Bridge. For Phase 2, "Shared Use Path" signs are placed at the edge of the crosswalks on each block to enhance pedestrian safety (Figure 8).

Loading

Three loading zones are permitted as requested by Rose Festival. Entries, drop-offs and exits through the MUP are facilitated by Rose Festival Staff to ensure public safety. Exact locations for the three loading zones are to be determined at a later date.
Set up & Tear down

Project set up is scheduled for 4:00 am on May 22. BBPDX coordinates with volunteer staff to place all traffic control devices, pavement markings and temporary signage. For Phase 2, additional pavement markings and temporary signage are added at 11:00 am on June 3. All traffic control devices and temporary signage are removed at 1:00 pm on June 5, while Naito is closed to vehicles. Pavement markings are temporary and do not require removal.

Site Features & Points of Interest

As part of the design concept for this project, points of interest along the cycle track corridor have been identified in the site. Current and potential attractions identified for this site include the Salmon Street Springs fountain, a food cart pod, a public outreach opportunity for Portland Fire & Rescue, and the Portland Saturday Market.

Salmon Street Springs

Salmon Street Springs is an existing point of interest within the project site. It is located at the southern access point of the cycle track in Tom McCall's Waterfront Park. Temporary bicycle parking facilities will be installed in the southern half of Lane 1 in the intersection at SW Salmon Street, between the south crosswalk and the southern access point for the cycle track. The temporary parking facilities will provide safe and secure parking so visitors can enjoy Salmon Street Springs and Waterfront Park.

Food Cart Pod

The vehicle turnout located on the eastern side of Naito Parkway between SW Taylor and SW Yamhill Streets provides a potential location for a temporary food cart pod. The turnout is a semi-circle with a lane width of 26 feet. The outer 10 feet of the semi-circular turnout will be utilized for food cart parking, while the remaining inside 16 feet will be used for pedestrian and bicyclist access to the food cart pod. Local food cart vendors will be invited to occupy this space for the three day temporary cycle track trial. Permission and permitting from Portland Parks & Recreation as well as utility access will be required and
may result in modification of design plans, limit opportunity, or eliminate the possibility entirely for this proposed site attraction.

*Portland Fire & Rescue Community Outreach*

An outreach opportunity exists for Portland Fire & Rescue at their Old Town fire department located on the west side Naito Parkway between SW Ankeny and SW Ash Streets. The fire department driveway occupies the entire length of the block and may provide space for fire fighters to educate the public about fire safety through interactive activities, including a demonstrative fire engine for children and adults to explore. Permission, permitting and available fire safety vehicles from Portland Fire & Rescue will be required and may result in modification of design plans, limit opportunity, or eliminate the possibility entirely for this site attraction.

*Portland Saturday Market*

The Portland Saturday Market is an existing points of interest located within the project site. The market is located one block south of the northern entrance/exit of the cycle track, near the Burnside Bridge overcrossing. The market spans both sides of Naito Parkway, with the majority of the marketplace situated on the west side of the street. The marketplace occupies parking lots located under the Burnside Bridge overcrossing west of Naito Parkway and at the northwest corner of SW First Avenue and SW Ankeny Street, as well as the plaza located on SW Ankeny Street between Skidmore Fountain and Naito Parkway. The remaining market space is situated in a pavilion at Tom McCall's Waterfront Park on the east side of Naito Parkway. The Portland Saturday Market is a popular destination for locals and visitors alike. Temporary bicycle parking facilities will be installed in the northern half of Lane 1 in the intersection at NW Couch Street, between the north crosswalk and the cycle track entrance/exit. The temporary parking facilities will provide safe and secure parking for bicyclist who wish to shop market vendors by foot.
Regulatory Compliance & Permitting

The Better Naito project relies on the approval of a series of city permits. The closure of Naito Parkway requires a “Community Event Street Closure Permit” from PBOT. An additional “Permit for Public/Special Events” is required from Portland Fire and Rescue. These permits, which require plan sets and a narrative for approval, will allow us to legally hold a non-profit event on a blocked city street, and place temporary structures on the roadway.

As per our partnership agreement, BBPDX is responsible for identifying, financing, and applying for any needed permits. The role of BBPSU is to deliver well designed plans that will meet the permitting requirements to BBPDX. To ensure approval, all of the designs were done in accordance with the MUTCD and OTTCH. The Traffic Control Plans found in Appendix D reference these two documents and provide specific design requirements for each segment of the project. Additionally, the placement and spacing of the roadway planter boxes were designed to meet the permeability requirements set forth by the Portland Fire Department.

Conclusion & Recommendations

Better Naito succeeds in developing a multi-modal redesign of Naito Parkway, which is currently in review for approval of a trial implementation. It meets the needs of stakeholders, and has been adjusted to meet city codes. The modified project site occupies the easternmost 16 feet of the roadway, spanning from NW Couch to SW Salmon. Northbound traffic is reduced to one lane, with the closed lane reconfigured as a multi-use pathway. This space encourages active transportation and access to the South Waterfront for all Oregonians. Upon PBOT approval, the project will be implemented during the Portland Rose Festival CityFair from May 22 - June 5, 2015.

The goal of the Better Block organization is to redesign urban streets into more usable spaces for pedestrians and bicyclists. This is accomplished via a short trial of a redesign
that ideally leads to the permanent modification of a street. Accordingly, BBPSU began this project with the ultimate goal of encouraging the city to make permanent changes to the active transportation infrastructure on Naito Parkway. The final design will be effective in providing a positive experience for the community. This is paramount to raising awareness and building public support for making permanent changes along this roadway.

Tens of thousands of people attend the Rose Festival CityFair each year. In the past, this and other large events at Waterfront Park have caused vehicle, pedestrian, and bicycle congestion due to the large influx of people. Better Naito helps reduce traffic congestion and improves safety by providing an alternative pathway for active transportation. Increased foot and bike traffic in the area will be extremely beneficial to the project, with more people using, remembering, and forming opinions about the design.

A barrier between the existing waterfront pathway and the rest of downtown Portland is created during the Rose Festival. The proposed design provides a connection between the downtown area and the waterfront, which eliminates the current safety concerns held by many Oregonians. The Better Naito MUP provides a separate facility for alternative modes of transportation, which fosters community interaction and creates a pleasant environment for families to enjoy. One of the goals of the Rose Festival is to attract Oregon families from the outer limits of the Portland Metropolitan area, and is encouraged by this design. As such, Better Naito should be standard protocol for any waterfront event.
Literature Cited


Appendix A: Cost Estimate

To be completed at a later date
Appendix B: Calculations
GENERAL

The following calculations determine the numbers of: planters, traffic barricades and drums required for the project.

The calculations follow the 2009 MUTCD (Manual on Uniform Traffic Control Devices) Developed by the Federal Highway Administration 2009 (edition)

<table>
<thead>
<tr>
<th>Total Distance of the zone of interest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance Between SW Salmon &amp; NW Couch</td>
</tr>
<tr>
<td>Distance of Tapering (merge)</td>
</tr>
<tr>
<td>Total distance</td>
</tr>
</tbody>
</table>

**Numbers of Barricades**

Temporary traffic control barricade used at all intersection

**TM820** for barricade information - use type III

| Number of barricades | 9 | One barricade per intersection |

**Numbers of Drums**

Assuming 36" in height and 18" width

Assuming the distance between cones is 20 foot on center

| N (number of drums) | 176 |

**Numbers of Planters**

Let's determine the number of planters 8" x 36", with 2 per intersection

| N (number of planters) | 18  |
### Table B1. Data Collection, Equipment Counts, and Event Implementation Information

<table>
<thead>
<tr>
<th>Data Collection</th>
<th>before Better Naito</th>
<th>during Better Naito</th>
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<tbody>
<tr>
<td><strong>Bike Count</strong></td>
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<td><strong>Pedestrians Count</strong></td>
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<td><strong>Automobile Count</strong></td>
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<td><strong>Travel Time by pedestrians</strong></td>
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<td><strong>Numbers of barricades</strong></td>
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<tr>
<td><strong>Numbers of Drums</strong></td>
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<td>176</td>
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<tr>
<td><strong>Numbers of planters</strong></td>
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<td><strong>Recycling Containers</strong></td>
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<td><strong>Equipment</strong></td>
<td>needed equipment</td>
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<td><strong>Volunteers Hours</strong></td>
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<td><strong>Setup Times</strong></td>
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</table>
Appendix C: Construction Schedule

To be completed at a later date
Appendix D: Design Drawings
NAITO REINVENTED
BETTER BLOCK PSU

PLANS FOR PROPOSED PROJECT
TWO-WAY CYCLE TRACK ADDITION

Naito Parkway (SW Salmon to NW Couch)
PORTLAND, OREGON

INDEX OF SHEETS

<table>
<thead>
<tr>
<th>SHEET NUMBER</th>
<th>SHEET DESCRIPTION</th>
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<tr>
<td>100</td>
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<tr>
<td>TM-800, 820, 850, SP100</td>
<td>DETAILS</td>
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<tr>
<td>300-315</td>
<td>PLAN AND PROFILE SHEETS</td>
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<td>400</td>
<td>CROSS SECTIONS</td>
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PORTLAND, OREGON
VICINITY MAP
NOT TO SCALE
### Taper Types & Formulas

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<tr>
<th>TAPER</th>
<th>FORMULA</th>
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<td>Merging (Lane Closure)</td>
<td>&quot;L&quot;</td>
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<tr>
<td>Shifting</td>
<td>&quot;L/2&quot; or 1/2&quot;</td>
</tr>
<tr>
<td>Shoulder Closure</td>
<td>&quot;L/3&quot; or 1/3&quot;</td>
</tr>
<tr>
<td>Flagging (See Drg. TM800)</td>
<td>50 - 100</td>
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<td>Downstream (Termination)</td>
<td>Varies (See Drawings)</td>
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### Concrete Barrier Flare Rate Table

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<th>SPEED (mph)</th>
<th>MINIMUM FLARE RATE</th>
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<td>&lt; 30</td>
<td>8.1</td>
</tr>
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<td>35</td>
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<td>45</td>
<td>12.1</td>
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<td>55</td>
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<tr>
<td>65</td>
<td>20.1</td>
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<tr>
<td>75</td>
<td>24.1</td>
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### Minimum Lengths Table

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<th>&quot;L&quot; Value for Tapers (ft)</th>
<th>BUFFER &quot;B&quot; (ft)</th>
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<tr>
<td>W 15</td>
<td>W 14</td>
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<td>35</td>
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<td>55</td>
<td>45</td>
</tr>
<tr>
<td>65</td>
<td>55</td>
</tr>
</tbody>
</table>

### Traffic Control Devices (TCD) Spacing Table

<table>
<thead>
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<th>SPEED (mph)</th>
<th>Sign Spacing (ft)</th>
<th>Max. Channeling Device Spacing (ft)</th>
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</thead>
<tbody>
<tr>
<td>20 - 30</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>35 - 45</td>
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<td>350</td>
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<td>500</td>
</tr>
<tr>
<td>Freeway</td>
<td>1000</td>
<td>2640</td>
</tr>
</tbody>
</table>

### Excavation Abrupt Edge

- Abrupt edges may be created by paving, operations, excavations, or other roadway work. Use abrupt edge signing for longitudinal abrupt edges of 1 inch or greater.
- Use aggregate wedge when abrupt edge is 2 inches or greater.
- Use aggregate base rock.

### Portable Changeable Message Sign (PCMS) Installation

- Place temporary sign support (TSS) approx. 10' behind barricade.
- Place portable changeable message sign (PCMS) approx. 20' behind barricade.
- Place sequential arrow approx. 20' behind barricade.
- Arrows shown in roadway are not pavement legends, but directional arrows to indicate traffic movements.
- All signs are type "O4" fluorescent orange, unless otherwise shown.

### Portable Changeable Message Sign (PCMS) Details

- To be accompanied by Drg. Nos. TM802 & TM821

### Oregen Standard Drawings

- Notes: All materials and workmanship shall be in accordance with the current Oregon Standard Specifications.

### Tabular Data

#### Traffic Control Devices (TCD)

<table>
<thead>
<tr>
<th>SPEED (mph)</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>Max. Channeling Device Spacing (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 - 30</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>20</td>
</tr>
<tr>
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<td>45 - 55</td>
<td>500</td>
<td>500</td>
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</tr>
<tr>
<td>Freeway</td>
<td>1000</td>
<td>2640</td>
<td>40</td>
<td></td>
</tr>
</tbody>
</table>

### Effective Date

February 1, 2015 - May 31, 2015
**NOTES:**
- Markings for barricade rails shall slope downward at an angle of 45° in the direction traffic is to pass.
- Where a barricade extends entirely across a roadway, it is desirable that the stripes slope downward in the direction toward which traffic must turn in detouring.
- Where both right and left turns are provided for, slope the chevron striping downward in both directions from the center of the barricade.
- For full roadway closures, the C or LR barricade may be used. Extend barricades completely across roadway unless access is required for local road users.

**BARRICADE RAIL LAYOUT**

**BARRICADE NOTATION**

**DIAGRAM FOR BARRICADE PLACEMENT AND SLOPE MARKING**

**GENERAL NOTES FOR ALL DETAILS:**
- All non-reflective surfaces shall be white.
- Sandbags (approximately 25 lb. sack filled with sand) may be placed on lower frame to provide additional ballast.
- Ballast shall not extend above bottom rail or be suspended from barricade.
- For rails less than 36" long, 4" wide stripes shall be used.
- Rails must be 8" min. to 12" max. in height.
- Use barricades from ODOT Qualified Products List (QPL).
- Use 4' Type II barricades where horizontal space is limited.
- Do not block bike lanes or shoulders used by bicycles unless facility is properly closed and signed.
- Do not place barricades in sidewalks unless sidewalk is closed and signed according to the TCP. See Dwg. No. TM 844.

**OREGON STANDARD DRAWINGS**

**TEMPORARY BARRICADES**

**NOTE:** All materials and components shall be in accordance with the current Oregon Standard Specifications.
### DO NOT TIP OVER TSS AT ANY TIME.
- When not in use, locate TSS a minimum of 30' from the roadway and turn away from traffic; or, turn over sign and retain Type (III) barricade for delineation.
- Use either Douglas Fir or Hem Fir, which is surfaced four sides (S4S) and free of heart center (FOHC).
- See “Temporary Sign Placement” detail for sign installation heights.
- Do not place or stack ballast more than 24" above the ground.

### NOTES:
- Use Double Post TSS for a total sign area of 40 sq. ft. or less.
- Position double post TSS 10' behind an 8' (or where space is limited) Type (III) barricade, unless otherwise shown, or if TSS is located behind curb, barrier, guardrail, or other rigid system.
- Use Single Post TSS for a total sign area of 9 sq. ft. or less.
- Position single post TSS 10' behind an 8' Type (III) barricade unless TSS is located behind curb, barrier, guardrail, or other rigid system.
- A barricade is not needed for installation of "Business Access" signs on angle post TSS’s.

### URBAN AREAS WITH CURB

### TEMPORARY SIGN SUPPORTS

**DOUBLE POST TEMPORARY SIGN SUPPORT (TSS)**

- 4"x4"x 4" lag screw per side (typ.)
- 2 - 3/8" dia. bolts per support (typ.)
- Sandbags (25 lb. max.) (as needed)

**SINGLE POST TEMPORARY SIGN SUPPORT (TSS)**

- 36"x 36" sign (typ.)
- 2 - 1/4" dia. bolts
- 2 - 2"x 4" @ 45° angle
- 2 - 2"x 8" @ 37°

### URBAN AREAS - NO CURB

### RURAL AREAS - CURB OR NO CURB

### TEMPORARY SIGN PLACEMENT

- Avoid locating sign supports in areas designated for bicycle or pedestrian traffic. When TSS or post mounted signs are located adjacent to or on a sidewalk or bicycle facility, install secondary sign (placard) at a minimum height of 7'-0" from top of sidewalk or bicycle facility to bottom of rider.

### CONCRETE BARRIER SIGN SUPPORT

- The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

### EFFECTIVE DATE:
February 1, 2015 - May 31, 2015

### TM821
For left shoulder work, place TCD to close the left shoulder.

NOTE: Use the "MINIMUM LENGTHS TABLE" on Drg. No. TM800.

4-LANE, 2-WAY ROADWAY

SHOULDER CLOSURE

4-LANE, 2-WAY ROADWAY

EXTERIOR LANE CLOSURE

4-LANE, 2-WAY ROADWAY

INTERIOR LANE CLOSURE

GENERAL NOTES FOR ALL DETAILS:

- Install temporary striping as directed.
- Signing and other TCD shown to be installed in conjunction with the work area, shall move with the work area.
- To determine Taper Length ("L") and Buffer Length ("B"), use the "MINIMUM LENGTHS TABLE" on Drg. No. TM800.
- To determine sign spacing A, B, and C, use "TRAFFIC CONTROL DEVICES (TCD) SPACING TABLE" on Drg. No. TM800.
- Channelization devices may be placed at 10' spacing around the
  Work Area for emphasis or if the area is exposed to traffic on
  both sides simultaneously.

28" Tubular Markers
See TCD Spacing Table on TM800 for max. spacing

Temp. Plastic Drums
See TCD Spacing Table on TM800 for max. spacing.

UNDER TRAFFIC

UNDER CONSTRUCTION

To be accompanied by Org. Nos. TM820 & TM821

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.
"SHARK’S TEETH" YIELD MARKING

DIRECTIONAL PAVEMENT MODE MARKERS

Markings here are shown for visual – actual design will use layout and dimension of existing pavement markings on the Hawthorne Bridge and SW Moody Cycle Track

LANE CLOSURE COMPONENTS

A non segregated Multi-use pathway sign will be used at each intersection and posted on a Candlestick traffic control cone. Will be rented of created by Better Block PDX.

ADVANCED WARNING, LANE CLOSURE, AND SHARED SPACE SIGN DETAILS

All signs will be rented Traffic Safety Supply and will follow MUTCD guidelines for type and size standards. Expected signs to be used are shown. Actual sign rentals can be provided on request.

“SHARK’S TEETH” YIELD MARKING

DIRECTIONAL PAVEMENT MODE MARKERS

MUTCD

W4-2

W23-2

W9-1

EXPECT DELAYS

Figure 2-1: Work Zone Components

Figure 3B-14. Examples of Yield Line Layouts
Notes:
1. Advanced Warning Sign:
   See DETAILS:
   TM480 for Spacing information
   TM821 for Temporary Sign Support (TSS)
   These signs will use Double Post TSS
   DP100 for Sign Type Information
2. Existing Pedestrian Pathway connecting Naito Parkway to South Waterfront
3. Existing Pedestrian/Bicyclist On-Ramp to Hawthorne Bridge

PLAN
CLAY ST. TO MADISON ST.
Notes:

1. Lane Merge Signage:
   See DETAILS:
   OP100 for Sign Information
   MUTCD – Figure BF-4
   TM221 for Temp. Sign Support
   These signs will use Single-Post TSS

2. Existing Bicyclist Off-Ramp from Hawthorne Bridge

PLAN
MADISON ST. TO MAIN ST.

3. Tapering:
   See DETAILS:
   TM600 for Spacing Information
   TM551 for Merging Taper Information
   Oregon Temporary Traffic Control Handbook – Tables 2.1, 2.1 and Figure 2.3

4. Bicycles can start entering roadway from Hawthorne Bridge

1 inch = 30 feet
Notes:

1. Temp. Plastic Drums spacing to accommodate access to Rose Festival employee parking lot. Coordination with Rose Festival security as location poses a potential safety hazard for bicyclists on the pathway.

2. Merging ends: Lane completely cut off to cars

3. Naito Reinvented Shared Use Path BEGINS for Phase 1 and 2
   See Sheet No. 304 and 305 for Phase Details

Plan

Main St. to Salmon St.
**Notes:**

1. Planters will be placed adjacent to the Temp. Plastic Drums located nearest to the north and south crosswalk for each intersection throughout the MUP.

2. Lane Closed Sign placed on each barricade. See DETAILS.

3. Temp. Traffic Control Barricade used at all intersections from here on out. See DETAILS.

4. TMR620 for Barricade information – Use Type III

   DP100 for Sign Type information

5. Shared Use Path Sign: Placed at start of each block from here on out

   These signs will use Single–Post TSS

6. Middle lane occupied by a median, left-turn lane, or some combination of both as shown in the typical block segment.

**PLAN**

**TYPICAL BLOCK SEGMENT.**

**PHASE 1**

Pavement Markings

**PHASE 2**

Pavement Markings
PHASE 1:
Northbound Only Pilot: May 22 - June 3

Notes:
1. "Shark's Teeth" Yield Marking and YIELD TO PIEDS Pavement Marking put at south crosswalks of all intersections.
   See DETAILS: DP100 for Layout and spacing and size information
2. Suggested pedestrian space will be marked by bidirectional Pedestrian markings
   See DETAILS: DP100 for Layout – Similar to Hawthorne Bridge and Moody Ave. pedestrian pathway markings

PLAN
TYPICAL INTERSECTION

1. Suggested NORTHBOUND cyclist space will be marked by directional bicycle markings
   See DETAILS: DP100 for Layout – Similar to Hawthorne Bridge and Moody Ave. pedestrian pathway markings
2. Posters and advertisements could potentially be posted on the back of the Type III Barricades to provide information to MUP users
PHASE 2:
Bidirectional Pilot: June 3 - June 5

Notes:
1. All markings from Phase 1 will remain in Phase 2
2. ADD: Suggested SOUTHBOUND cyclist space will be marked by directional bicycle markings
   See DETAILS: DP100 for Layout – Similar to Hawthorne Bridge and Moody Ave. pedestrian pathway markings
3. ADD: Suggested "Shark's Teeth" Yield Markings and YIELD TO Peds
   Pavement Markings to north crosswalk of each intersection
   See DETAILS: DP100 for Layout – Similar to Hawthorne Bridge and Moody Ave. pedestrian pathway markings

PLAN
TYPICAL INTERSECTION
Notes:
1. Saturday Market occupies both sides of Naito Parkway. We will have to coordinate with them to find alternative loading/unloading zones.
2. Sidewalk is present on the east side of the street for this two-block stretch to accommodate the large pedestrian traffic caused by Saturday Market. We can incorporate this space as part of our event.
3. Connection to Oregon Maritime Museum on the River
4. Portland Fire and Rescue Station 1. Planters are omitted to create a permeable barrier for emergency vehicles.
Notes:
1. Burnside Bridgehead: Another potential space for vendors; especially on Friday before Saturday Market participants start moving in
2. Access to parking lot and businesses
3. ADD: Signage for Southbound entrance to MUP for Phase 2
   See DETAILS
   TM821 for Temp. Sign Support
   These signs will use Single-Post TSS
   DP100 for Sign Type Information
Notes:

1. Signage for lane reopening (Phase 1):
   See DETAILS.
   TM800 for Spacing Information
   TM821 for Temporary Sign Support (TSS)
   These signs will use Double Post TSS

2. END Naito Reinvented Shared Use Path (Phase 1): Termination Tapering
   See DETAILS.
   TM800 for Spacing Information
   TM821 for Temporary Sign Support (TSS)

3. For Phase 2, Homeland Security assumes responsibility for the Multi-Use Pathway extension north of NW Couch St. to the existing Steel Bridge bike path connection.

   Signage for lane reopening and termination tapering will be removed.
### Typical Lane Width Dimensions

<table>
<thead>
<tr>
<th>SB Bike Lane</th>
<th>Outside SB Lane</th>
<th>Inside SB Lane</th>
<th>Median and/or Turn Lane</th>
<th>Inside NB Lane</th>
<th>Outside NB Lane</th>
<th>NB Bike Lane</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
<td>(7)</td>
</tr>
<tr>
<td>5.33</td>
<td>10.50</td>
<td>11.83</td>
<td>9.33</td>
<td>11.83</td>
<td>11.00</td>
<td>4.83</td>
</tr>
</tbody>
</table>

**CROSS-SECTION PROFILE - LOOKING NORTHBOUND**

**Notes:**

1. Dimensions shown came from SW Stark St. and were found using a measuring tape on the street. Cross-sectional measurements were found at the following intersections:

   - **NW Everett St.**
     - N/A
     - 14'8"
     - 12'4"
     - N/A
     - 13'11"
     - 14'9"
     - N/A

   - **NW Davis St.**
     - 3'2"
     - 10'11"
     - 11'0"
     - 10'0"
     - 10'0"
     - 11'3"
     - 5'4"

   - **Saturday Market Crossing**
     - 3'0"
     - 11'0"
     - 11'0"
     - 10'0"
     - 11'0"
     - 10'0"
     - 4'10"

   - **SW Stark St.**
     - 3'2"
     - 10'6"
     - 11'0"
     - 9'4"
     - 11'0"
     - 11'0"
     - 4'10"

   - **NW Salmon**
     - North crosswalk:
       - 12'0"
       - 11'0"
       - 9'8"
       - 12'11"
       - N/A
       - N/A
       - 4'7"

     - South crosswalk:
       - N/A
       - N/A
       - 11'7"
       - 9'8"
       - 11'8"
       - 11'1"
       - 4'11"