MEMORANDUM

TO: Gabriel Graff
Portland Bureau of Transportation (PBOT)

FROM: Peter Craig
David Evans and Associates (DEA)

DATE: February 26, 2018

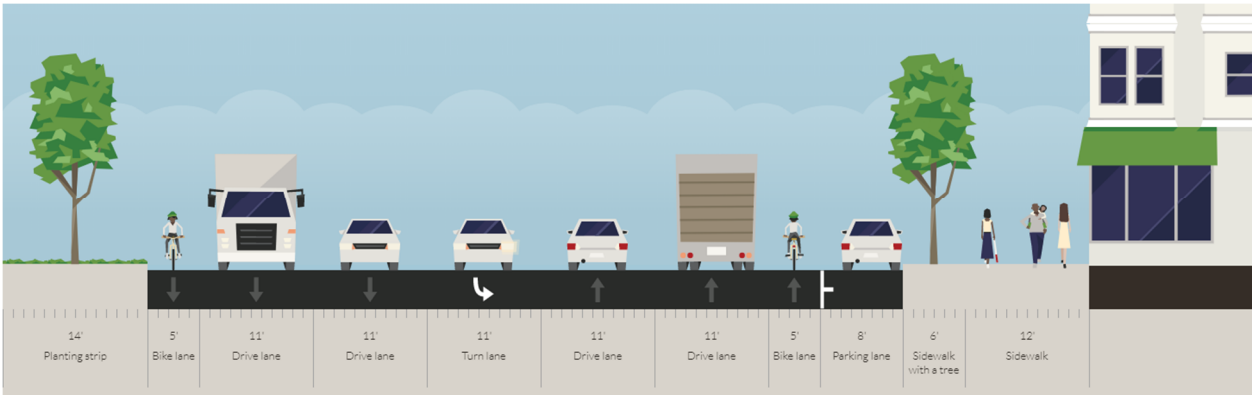
CC: Norberto Adre (PBOT)

RE: **Permanent Better Naito - Conceptual Cost Estimates**
SW Naito Pkwy: SW Couch St to SW Main St

This memo and supporting materials document DEA's efforts in estimating the cost of constructing a permanent cycle track on SW Naito Pkwy, between SW Couch St and SW Main St, along Waterfront Park in Portland, Oregon. PBOT has implemented a temporary version of the project (known as "Better Naito") during the summer festival season since 2015.

Existing Conditions

The roadway in the project area includes 2 auto lanes and a bike lane in both the northbound and southbound directions and a northbound left turn lane, as shown in the figure below (facing south).



Proposed Improvements

The Better Naito concepts include 3 options for constructing a 12 foot wide, two way cycle track and 8 foot wide sidewalk along the east side of SW Naito Pkwy, between the roadway and Waterfront Park. The combined 20 foot wide multiuse facility will function similarly to the improvements planned on SW Naito Pkwy between SW Jefferson St and SW Harrison St, currently under development by PBOT and DEA. The figure to the right shows DEA's rendering of these improvements, looking north near SW Harrison St.

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Each of the proposed options (developed by PBOT and refined by DEA) will affect the roadway and park to varying degrees. The concepts cover a range of approaches that each balance these impacts differently. As a result, the options collectively provide a complete view of the possible ways the project could be incorporated into the context of the existing conditions.

DEA and PBOT previously assembled a cost estimate of $13.2 million to extend the bikeway design we are developing on SW Naito Pkwy between SW Jefferson St and SW Harrison St. This concept requires reconstruction of most curbs, drainage, lighting, and traffic signals within the project area. The team designed the new options to minimize these costs.

The table below describes our team's development approach for each of the new options. The roll maps submitted with this memo show the concepts with scoping notes listing assumptions and observations from our work.

Concept	Development Approach
Option A	Option A places the cycle track and sidewalk behind the existing curb to minimize impacts to traffic on SW Naito Pkwy. This maintains both northbound auto lanes, but has the greatest impact on Waterfront Park.
Option B	Option B balances Options A and C by retaining 2 northbound auto lanes south of SW Morrison St, but removing 1 lane to the north. This balances the competing needs to maintain traffic and avoid impacts to Waterfront Park.
Option C	Option C removes 1 northbound auto lane and places the cycle track and sidewalk adjacent to the roadway to minimize impacts to Waterfront Park. This retains the maximum number of trees and park area, but does not address stakeholder concerns about queuing or travel time delays.

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Alternatives Comparison

The table below summarizes the benefits and impacts that we anticipate will result from each option. The following subsections further describe these points.

Criteria	Option A	Option B	Option C
Estimated Cost (ROW not included)	$3.0M construction $5.3M total	$2.2M construction $3.9M total	$1.9M construction $3.4M total
Cyclist Protection from Traffic	Landscape buffered cycle track	Option A protection south of Morrison St, Option C protection to north	2 foot buffer with concrete traffic separator and traffic delineators
Tree Impacts	40 removals 4 root impacts	9 removals 11 root impacts	5 removals 14 root impacts
Park Area Impacts	24 feet from existing curb to back of proposed sidewalk	Option A impacts south of SW Morrison, Option C impacts to north	12 feet from existing curb to back of proposed sidewalk
Traffic Impacts	(None)	Removes 1 lane north of SW Morrison St	Removes 1 lane full length
ROW Acquisition	42,000 square feet 0.96 acres	15,700 square feet 0.33 acres	1,000 square feet 0.02 acres

Estimated Cost

The DEA team completed a conceptual level cost estimate for each design option. These estimates are available as attachments at the end of this memo. We developed our estimates using PBOT's cost estimate template, PBOT's published unit prices, and our experience on similar past projects.

The subtotal of estimated construction items is only a portion of estimated construction costs. We added a 40% contingency to this subtotal to account for unknown scope items (i.e. park furnishings, additional signing, etc). If the project advances, we recommend gradually reducing this contingency as the level of completion increases and uncertainty decreases. Ideally, this leads to a stable cost estimate as the team refines the design.

We also provided an estimate of design and administration costs for the project. These estimates are percentage increases to the construction cost and generally follow PBOT and industry rules of thumb. The total combined estimate value represents our estimated total project cost.

Note that all of the concepts we present in this memo minimize costs by avoiding impacts to existing traffic signals and lighting. Previous estimates indicate that relocating these items would add several million dollars to the cost of the project.

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Cyclist Protection from Traffic

The conceptual options present two potential designs for protecting cyclists from auto traffic.

- Landscape buffers for designs located outside of the existing roadway (Option A and Option B south of SW Morrison St)
- Concrete traffic separators with delineators for designs located within the existing roadway (Option C and Option B north of SW Morrison St)

Both methods of protection comply with current PBOT and industry design standards and exceed the level of protection on most bicycle facilities, including the seasonal Better Naito. The photo above (from bikeportland.org) shows a concrete traffic separator protected cycle track. The rendering in the bottom right corner of page 1 shows a landscape buffered cycle track.

Tree Impacts

The DEA team approximated tree impacts by taking measurements in the field (see the photo to the right). For each tree within the project area, we measured:

- The distance from the existing curb to the near face of the trunk (red line)
- The distance from the existing curb to the near edge of the visible root structure (yellow line)

The comparison matrix on page 3 lists anticipated tree removals and root zone impacts for each option. Tree removals represent locations where the anticipated improvements would extend to or past the face of the tree trunk. The project would likely remove these trees. Root zone impacts represent locations where anticipated improvements would extend into the surface root zone. Survey, design development, and consultation with an arborist are necessary to determine whether the project would retain or remove these trees.

Park Area Impacts

We developed this category as a measure of the project's perceived encroachment into Waterfront Park. PBOT owns some amount of right of way behind the existing curb along SW Naito Pkwy, but this area currently functions as part of the park. The public may perceive development in this area to be construction within the park and reduction of park open space.

The conceptual options generally affect the park in one of two ways.

- Options that retain 2 northbound auto lanes extend approximately 24 feet beyond the existing curb (Option A and Option B south of SW Morrison St).
- Options that retain 1 northbound auto lane extend approximately 12 feet beyond the existing curb (Option C and Option B north of SW Morrison St).

Traffic Impacts

Our team was not scoped to study traffic impacts during this task. Further analysis is necessary to understand impacts and mitigations. However, PBOT and DEA made several observations during concept development that may represent opportunities toward minimizing the project's impact on traffic.

First, we do not anticipate that the project will affect southbound traffic on SW Naito Pkwy. The project will be entirely on the east/northbound side of the roadway and there are few auto destinations on this side of the street.

Next, the Morrison Bridge carries traffic to and from I-5 and I-84 and is a significant destination for vehicles travelling northbound within the project area. Based on observation, there is more traffic south of this point than to the north. This suggests that there may be an opportunity to minimize traffic impacts by retaining 2 northbound lanes in this area, as shown in Options A and B.

Finally, freight traffic impacts are a key project consideration. By retaining 2 northbound auto lanes south of SW Morrison St, the project may benefit freight routes. This point requires further evaluation as the project moves forward.

ROW Acquisition

PBOT must acquire some right of way (ROW) from Portland Parks and Recreation (PPR) to construct the project. This is true for all conceptual options. However, there is a wide range of possible ROW needs. The alternatives comparison matrix on page 3 lists ROW acquisition areas for each option.

Option C, which retains 1 northbound auto lane, requires the least ROW at about 1,000 square feet. This is a minimal acquisition considering the project abuts PPR property for 3/4 miles. Option A, which retains both northbound auto lanes, requires significantly more ROW, at more than 1 acre.

DEA was not scoped to provide ROW acquisition cost estimates as a part of this task. The team should compare these costs to the cost of other impacts as the project moves forward. For example, it may be less expensive to relocate traffic signals or streetlights in specific locations instead of acquiring the property needed to avoid them.

Next Steps

There are several important considerations as the project moves forward, including:

- The team developed the current conceptual designs using aerial photos and GIS data. We must confirm the points stated in this memo with a project survey and design refinement.

- Traffic data may help to inform decision making as the project advances, particularly for northbound auto and freight traffic.
- This project will involve additional disciplines moving forward, including traffic engineers, landscape architects, arborists, and many others. These professionals will help to refine and advance the ideas presented in this memo.

Thank you for the opportunity to help you in advancing this project. Please do not hesitate to contact us if you have questions or require additional information during your review and consideration of these materials.

Submitted 02/26/18

Better Naito Conceptual Estimate Summary
SW Naito Pkwy: SW Couch St to SW Main St
PBOT | Portland, OR

No	Description	Option A	Option B	Option C
1.00	Construction Costs	$ 3,024,672	$ 2,223,327	$ 1,947,229
1.01	Mobilization	$ 185,530	$ 137,379	$ 119,173
1.02	Temporary Traffic Control	$ 96,459	$ 116,454	$ 122,312
1.03	Erosion and Sediment Control	$ 23,136	$ 17,840	$ 15,837
1.04	Earthwork and Removals	$ 229,704	$ 140,640	$ 87,356
1.05	Stormwater Management	$ 170,178	$ 51,983	$ -
1.06	Retaining Walls and Structures	$ 75,000	$ -	$ -
1.07	Pavement, Sidewalks, and Curbing	$ 568,180	$ 367,713	$ 273,506
1.08	Signing and Striping	$ 84,717	$ 91,824	$ 124,904
1.09	Traffic Signal Modifications	$ 545,000	$ 545,000	$ 545,000
1.10	Landscaping	$ 37,200	$ 12,400	$ 9,200
1.11	Contingencies and Anticipated Items	$ 1,009,568	$ 742,096	$ 649,941
2.00	Project Engineering and Management	$ 1,265,355	$ 930,117	$ 814,612
2.01	Project Management	$ 100,755	$ 74,062	$ 64,864
2.02	Design Engineering	$ 302,266	$ 222,185	$ 194,593
2.03	Construction Management	$ 302,266	$ 222,185	$ 194,593
2.04	Overhead	$ 560,068	$ 411,686	$ 360,562
3.00	Additional Contingencies	$ 1,051,706	$ 773,071	$ 677,069
3.01	Inflation (1 Year)	$ 161,417	$ 118,652	$ 103,917
3.02	Estimate Contingency	$ 890,289	$ 654,419	$ 573,152
	Totals	**$ 5,341,733**	**$ 3,926,516**	**$ 3,438,909**

Note: Estimated costs do not include right of way acquisition.