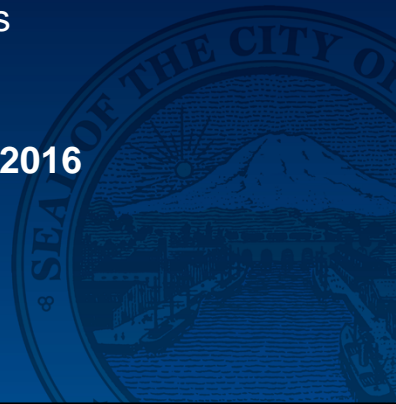


North 21st Power Pole Replacement and Roadway Projects

City of Tacoma:
Tacoma Power, Public Works

December 6, 2016



Outline

- Pole Replacement Project
- Roadway Design / Policies
- Traffic Study
- Community Engagement
- Refined Options
- Next Steps



Pole Replacement Project

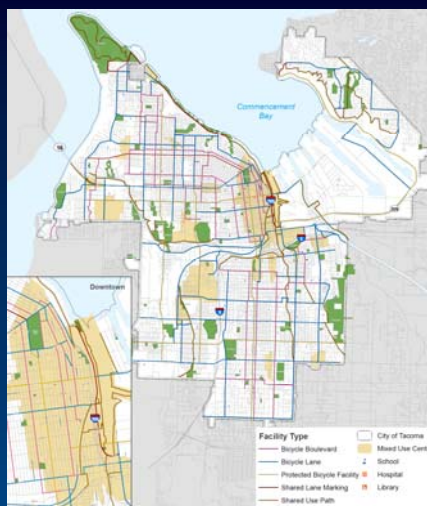
- Replace Towers in North 21st Street and Westgate Center:
 - Remove 19 towers and old wire
 - Replace with 12 steel poles and new wire
- Upgrade three Tacoma Power substations
- Bypass & Retire Cushman Substation



3

Roadway Design Policies

- Every street is a pedestrian priority street.
- The TMP identifies priority corridors for each mode.
- North 21st is a priority corridor for automobiles, transit, and bicycles.



4

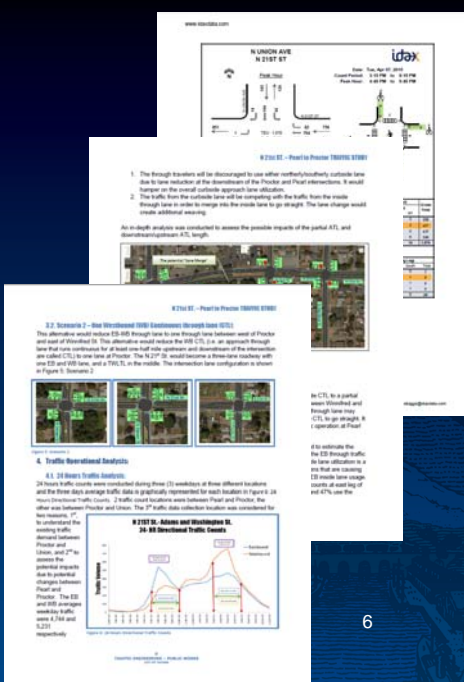
Roadway Design Policies: Pedestrian Priority



5

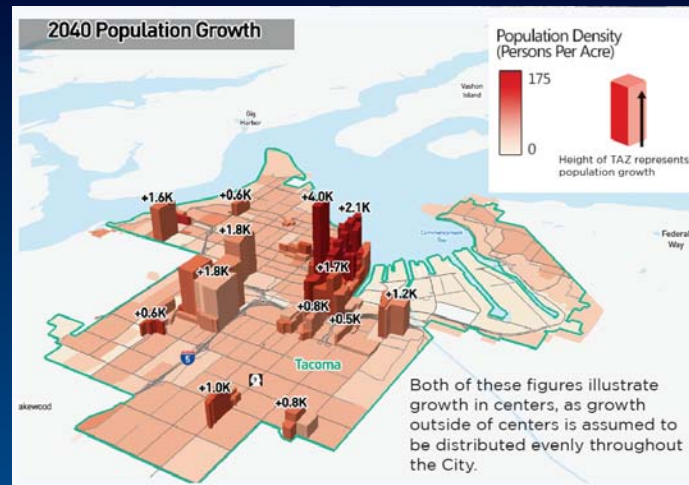
Traffic Study: Overview

- 20-year forecast of future volumes
- Used to determine constraints
- Left turn lanes reduce delays



6

Traffic Study: Travel Forecasts

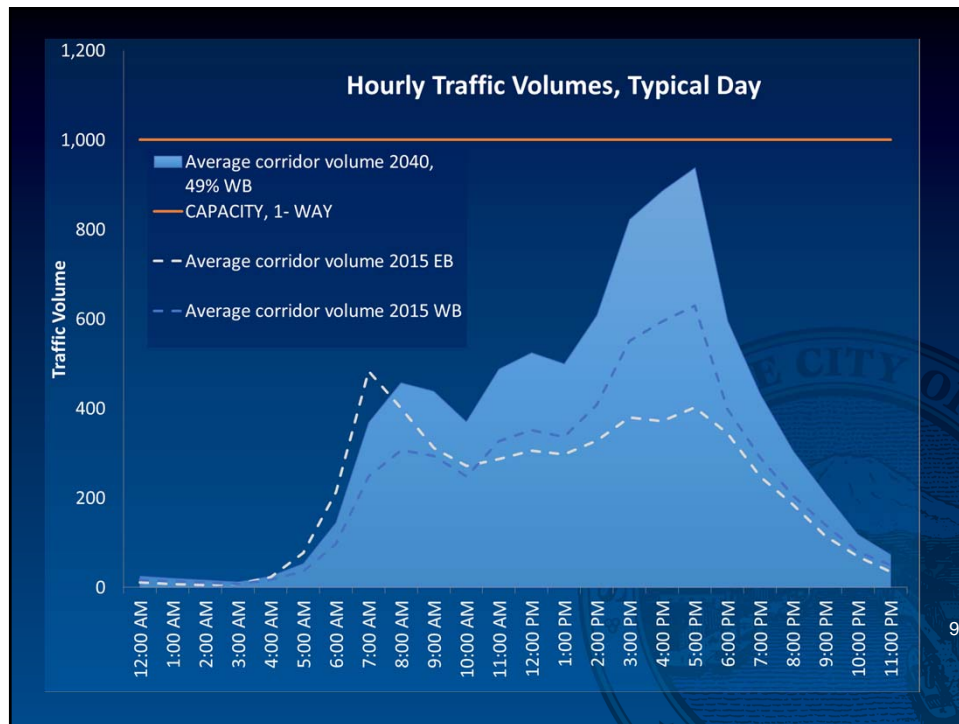


7

Traffic Study: Growth Rates

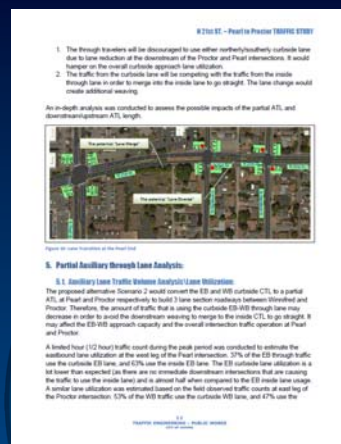
Comparative Growth Rate	Annual Compound Growth Rate	Cumulative Growth, 2012-2040
Historical (2007-2015)	-2.1% (-15% total)	N/A
Model Growth / Study Assumptions	0.5%	14%
High Growth Scenario tested	1.4%	49%

8

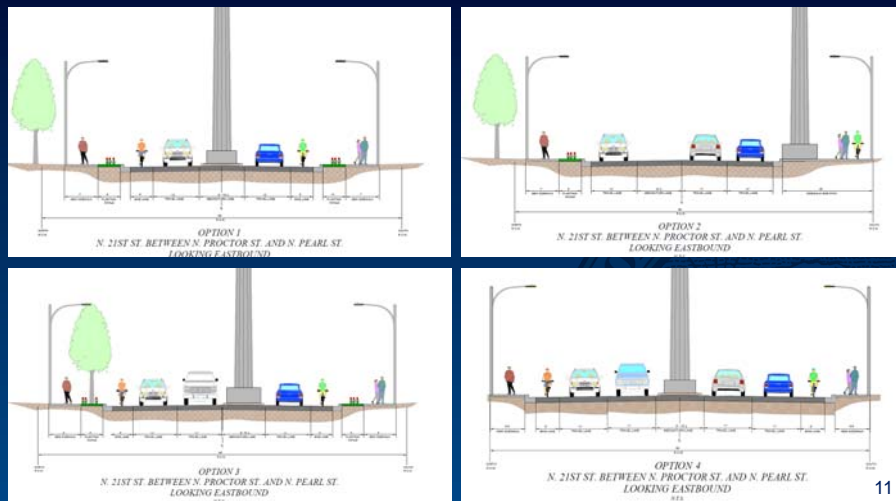


Traffic Study: Conclusions

- Left turn lanes reduce delays
- 2nd westbound lane for two blocks after Proctor
- 2nd westbound lane not needed for the rest of the corridor, except for turn lanes at major intersections



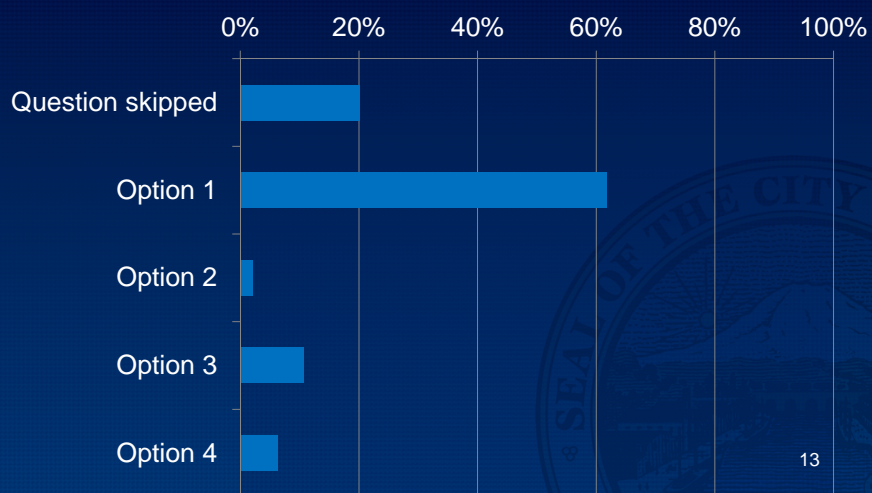
Community Engagement: Initial Options



Community Engagement / Outreach

- North End Neighborhood Council
- Proctor Business District
- Public Meeting at UPS (over 2,000 invitations mailed)
- Proctor Farmers Market
- West End Neighborhood Council
- BPTAG
- Transportation Commission

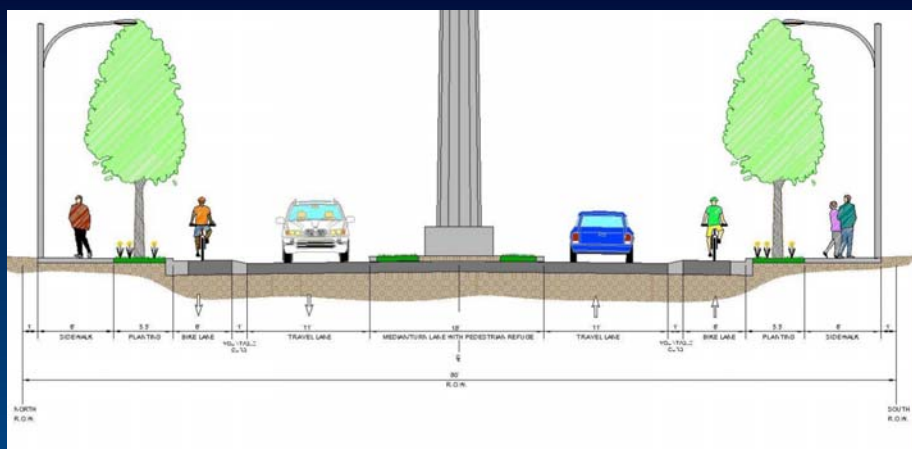
Which street option do you prefer? *



*Question not included during first two

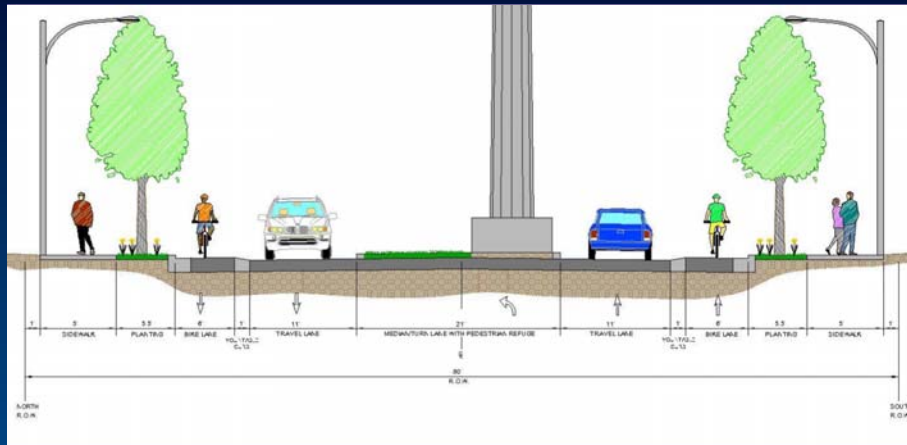
13

Option 1



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Option 3A (Hybrid)

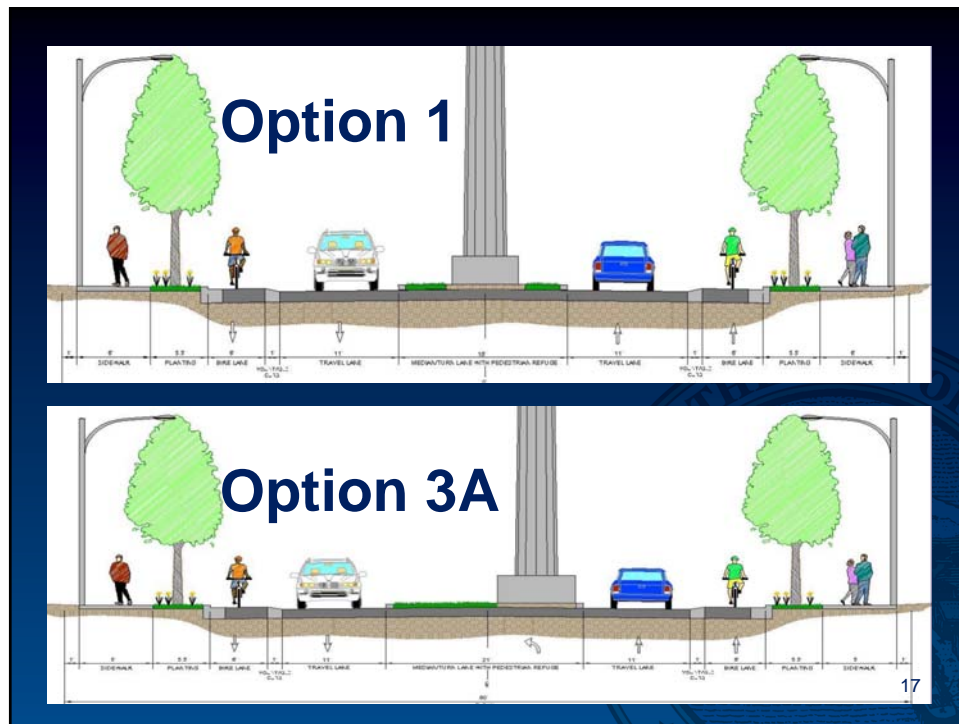


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Option Comparison

Option 1	Option 3A (Hybrid)
Provides for 20-year traffic forecast	Provides for 20-year traffic forecast
Buffered / protected bike lanes	Buffered / protected bike lanes
Pedestrian refuge / single lane crossing	Pedestrian refuge / single lane crossing
Sidewalks with planter strips	Sidewalks with planter strips
Adds left turn lanes	Adds left turn lanes
Room for Green Stormwater Infrastructure	Room for Green Stormwater Infrastructure
~3-4' more for amenities	Less future diversion
Opening year flexibility	Future year flexibility
Pole centered in median	

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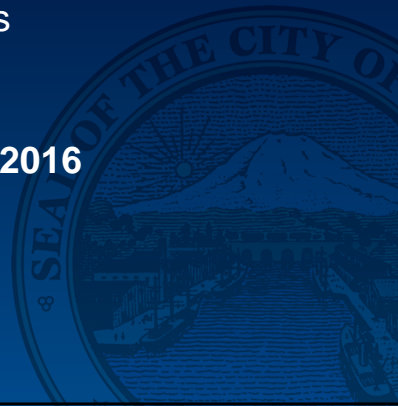
Next Steps

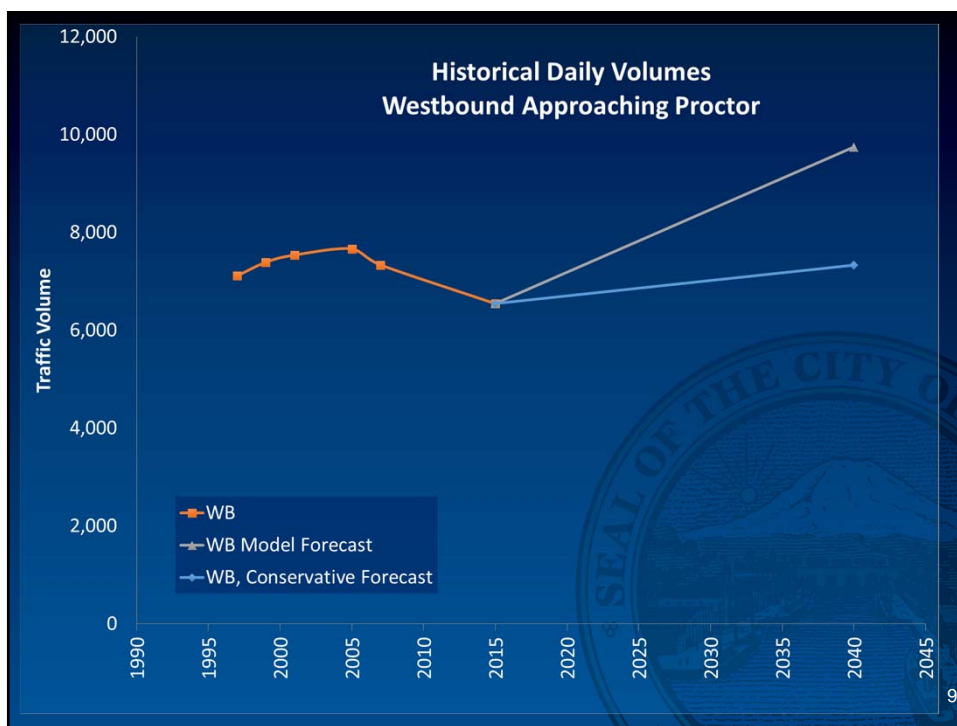
- PW refines roadway concepts in early 2017, begins applying for roadway grants
- Based on refined roadway design, TPU orders poles in 2017 for construction in 2018

North 21st Power Pole Replacement and Roadway Projects

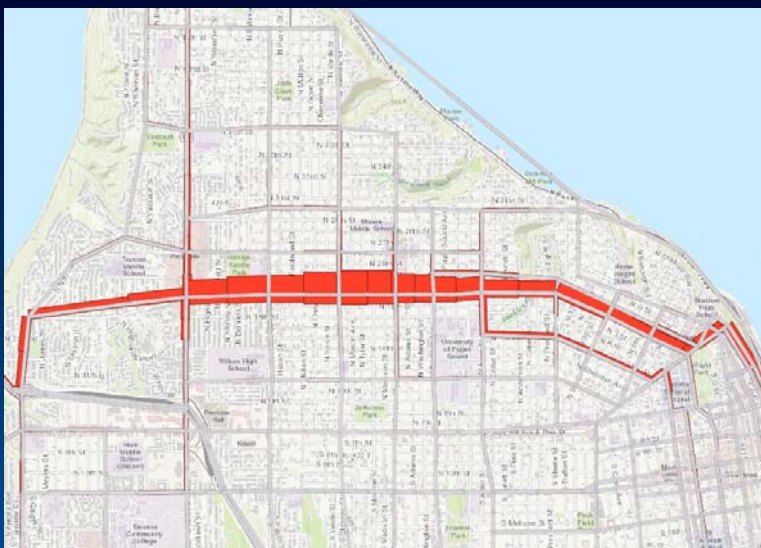
City of Tacoma:
Tacoma Power, Public Works

December 6, 2016





Traffic Study



Non-SOV Mode Choice

2015



2040



Table 8.4 Home-Based Work Mode Choice Model Parameters

Variable	Drive Alone	Shared Ride 2	Shared Ride 3+	Transit-Auto Access	Transit-Walk Access
Level of Service					
In-Vehicle Travel Time (Minutes)	-0.0253	-0.0253	-0.0253	-0.0253	-0.0253
Out-of-Vehicle Travel Time (Minutes) - Walk Time and Wait Time < 7 Minutes				-0.0633	-0.0633
Out-of-Vehicle Travel Time (minutes) - Wait Time > 7 Minutes				-0.0506	-0.0506
Number of Transit Boardings				-0.3060	-0.3060
Walk time (Minutes)					
Bicycle time (Minutes)					
Ratio of Drive Time to Total Time				-6.0000	-6.0000
Travel Cost (cents) for Low-Income Households (Income 1)	-0.0038	-0.0038	-0.0038	-0.0038	-0.0038
Travel Cost (Cents) for Low-Medium Income Households (Income 2)	-0.0021	-0.0021	-0.0021	-0.0021	-0.0021
Travel Cost (Cents) for Medium-High Income Households (Income 3)	-0.0014	-0.0014	-0.0014	-0.0014	-0.0014
Travel Cost (Cents) for High-Income Households (Income 4)	-0.0011	-0.0011	-0.0011	-0.0011	-0.0011
Socioeconomic					
Market Segmentation Parameter				See Table 8.3	
CSO Variable	0.199	-0.268	2.167	0.593	
Alternative-Specific Constant		-2.355	-3.968	-0.169	0.351

Source: 2000 PSRC Mode Choice Model Parameters, FTA guidelines, EPA Commuter Model.

Highway operating cost is calculated using the following relation

$$\text{Operating Cost} = (\text{Distance} \times \text{Cost per Mile}) + \text{Vehicle Toll} + P$$

Where:

Distance = the travel distance obtained from the a.m. peak 15 skims.

Cost per Mile = the travel out of pocket cost for the auto m currently set at 12 cents per mile.

In the year 2000, the ferry toll is the only toll in the system. parking costs for carpool and non-carpool users are assessed

Table 3 - Volume Delay Functions

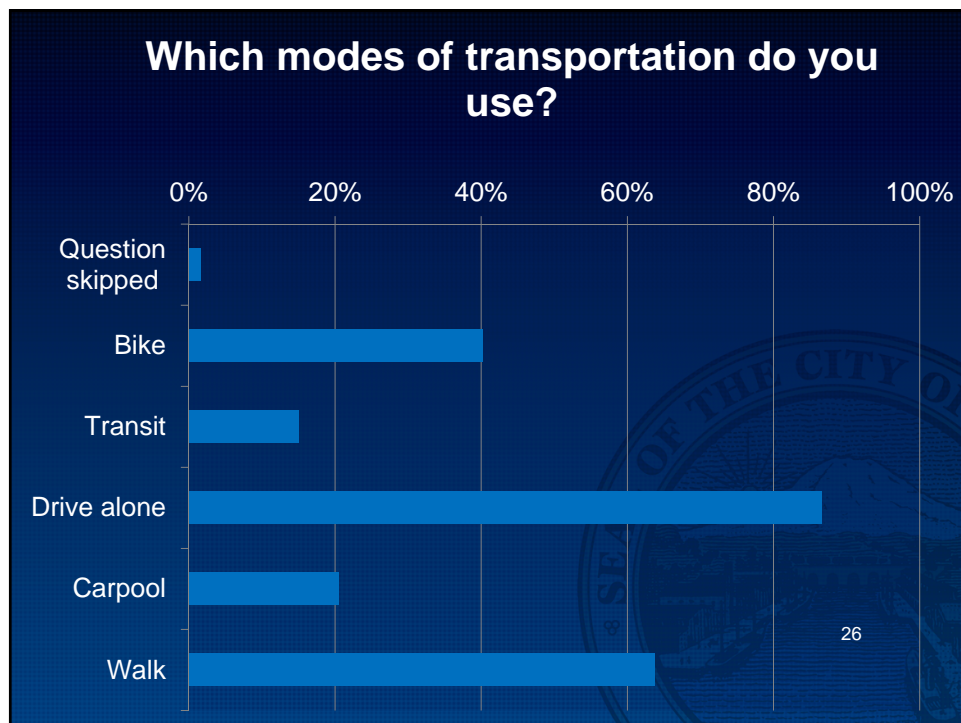
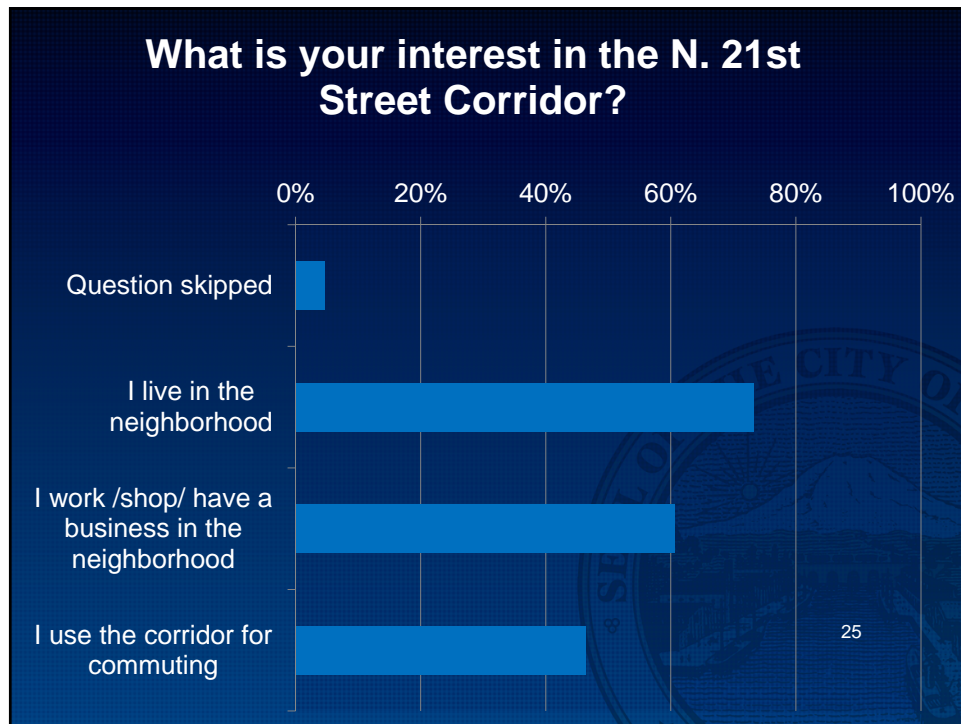
Speed (MPH)	PSRC Version 1.00b	Tacoma Travel Model
< 30		$f_{d1} = (\text{length} * 60 / u_2)^{1.1} * 1.5 * (\text{HFRAC} * \text{volau}) / (\text{lanes} * u_1)^{1.4}$
30		$f_{d2} = (\text{length} * 60 / u_2)^{1.1} * 1.2 * (\text{HFRAC} * \text{volau}) / (\text{lanes} * u_1)^{1.5}$
35	$f_{d3} = (\text{length} * 60 / u_2)^{1.1} * 0.6 * (\text{HFRAC} * \text{volau}) / (u_1 * \text{lanes})^{1.5} + f_{d1} / (1 - \text{get}(1)) * \text{max}(0.01)$	$f_{d3} = (\text{length} * 60 / u_2)^{1.1} * 1 * (\text{HFRAC} * \text{volau}) / (\text{lanes} * u_1)^{1.5}$
40		$f_{d4} = (\text{length} * 60 / u_2)^{1.1} * 0.7 * (\text{HFRAC} * \text{volau}) / (\text{lanes} * u_1)^{1.5}$
45		$f_{d5} = (\text{length} * 60 / u_2)^{1.1} * 0.72 * (\text{HFRAC} * \text{volau}) / (\text{lanes} * u_1)^{1.5}$
50	$f_{d6} = \text{put}((\text{length} * 60 / u_2)^{1.1} * 0.56 * (\text{HFRAC} * \text{volau}) / (u_1 * \text{lanes})^{1.5} * (\text{length} * 100 * 5639 * \text{put}(\text{get}(1) / \text{length})^{10} * 0.6398 * \text{get}(2)^{-1} * 0.0712 * \text{get}(2)^{-1} * (0.0004 + 0.00009 * \text{get}(2)))$	$f_{d6} = (\text{length} * 60 / u_2)^{1.1} * 0.74 * (\text{HFRAC} * \text{volau}) / (\text{lanes} * u_1)^{1.5}$
55		$f_{d7} = (\text{length} * 60 / u_2)^{1.1} * 0.1 * (\text{HFRAC} * \text{volau}) / (\text{lanes} * u_1)^{1.5}$
60	$f_{d8} = \text{put}((\text{length} * 60 / u_2)^{1.1} * 0.72 * (\text{HFRAC} * \text{volau}) / (u_1 * \text{lanes})^{1.5} * (\text{length} * 100 * 5639 * \text{put}(\text{get}(1) / \text{length})^{10} * 0.6398 * \text{get}(2)^{-1} * 0.0712 * \text{get}(2)^{-1} * (0.0004 + 0.00009 * \text{get}(2)))$	$f_{d8} = \text{put}((\text{length} * 60 / u_2)^{1.1} * 0.72 * (\text{HFRAC} * \text{volau}) / (\text{lanes} * u_1)^{1.5} * 7.2) * (\text{length} * 10 * \text{max}(0.5639 * \text{put}(\text{get}(1) / \text{length})^{10} * 0.6398 * \text{get}(2)^{-1} * 0.0712 * \text{get}(2)^{-1} * (0.0004 + 0.00009 * \text{get}(2)))$
70		$f_{d10} = (\text{length} * 60 / u_2)^{1.1} * 0.32 * (\text{HFRAC} * \text{volau}) / (\text{lanes} * u_1)^{1.5}$
Centroid	$f_{d9} = (\text{length} * 60 / u_2)$	$f_{d9} = (\text{length} * 60 / u_2)^{1.1} * 1.5 * (\text{HFRAC} * \text{volau}) / (\text{lanes} * u_1)^{1.4}$ or $(\text{length} * 60 / u_2)$

Notes:

- fd: Function Definition (part of EMM macro language)
- length: Link distance
- UL2: Speed in EMM model
- HFRAC: EMM Time Period Peak Hour Factor (AM=375, PM=35, MD=184, EV=354, N=255)
- Volau: EMM Total Vehicle Demand for Time Period
- Lanes: Number of Lanes
- UL1: EMM Capacity (vphpl)

Generally, the speed to function relation is usually used. During the validation effort some facilities had their VDFs modified to reflect congestion. The VDF for 60 miles per hour was created by WSDOT/TRAC to reflect reliability in freeway operations.

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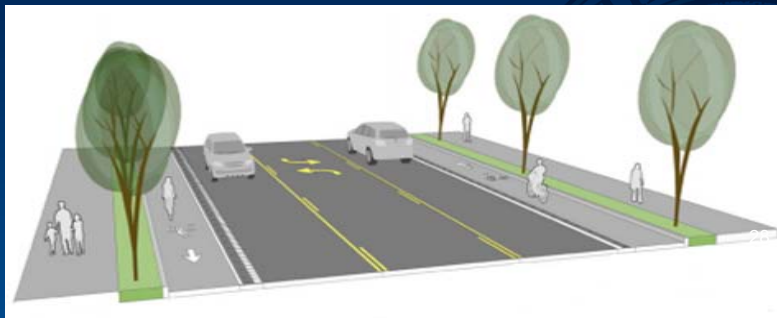
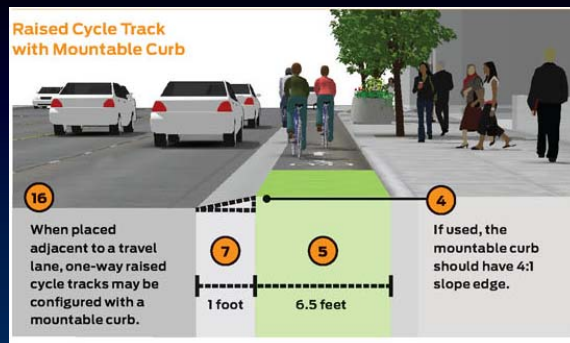


Representative Comments

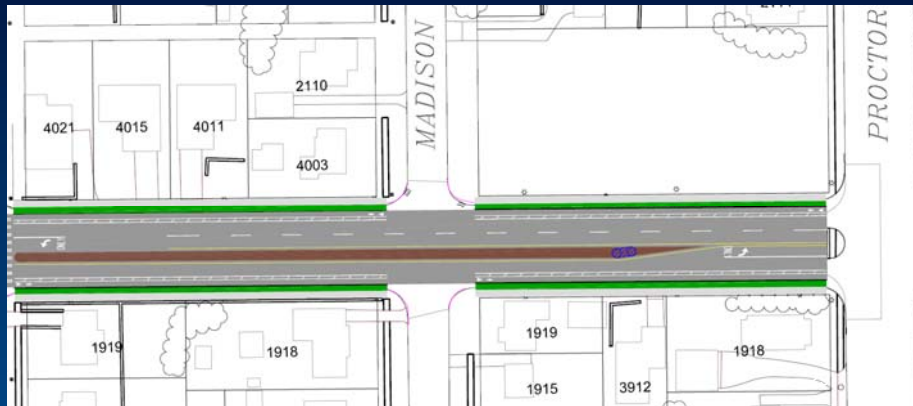
- “Priority is pedestrian and bike safety.”
- “Need to plan for 20-plus years.”
- “I want it all – ride, bike, walk.”
- “Do not widen lanes. Get speeds lower.”
- “4 lanes as is – put bikes on side streets.”
- “Need to control/enforce speed limits.”
- “Protected lanes somewhere!”
- “Option 1 makes sense for kids needing to cross.”

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Bicycle Lane Option



Westbound lane transitions at Proctor



Plan View Concept, Hybrid Option



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