

August 15, 2019 - 3:00 p.m.
Service Delivery & Capital Committee Meeting



Pierce Transit Training Center
3720 96th Street SW
Lakewood, WA
Rainier Conference Room

AGENDA

CALL TO ORDER

APPROVAL OF MINUTES

CEO COMMENTS:

SPECIAL BUSINESS:

1. Election of Vice Chair

DISCUSSION/UPDATE:

1. Costs of Implementing and Maintaining an Electric Fleet
(Presentation)
2. Review of June 2019 Safety Department Monthly Report
(Presentation)
3. Update on BRT Project
(Presentation)

Skip Huck
Executive Director of Maintenance

Reggie Reese
Safety Manager

Darin Stavish
Principal Planner

COMMISSIONER COMMENTS

EXECUTIVE SESSION

ADJOURNMENT



**Pierce
Transit**

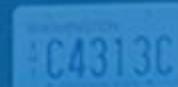
**Service Delivery and Capital
Committee
Electrification Briefing**

Skip Huck

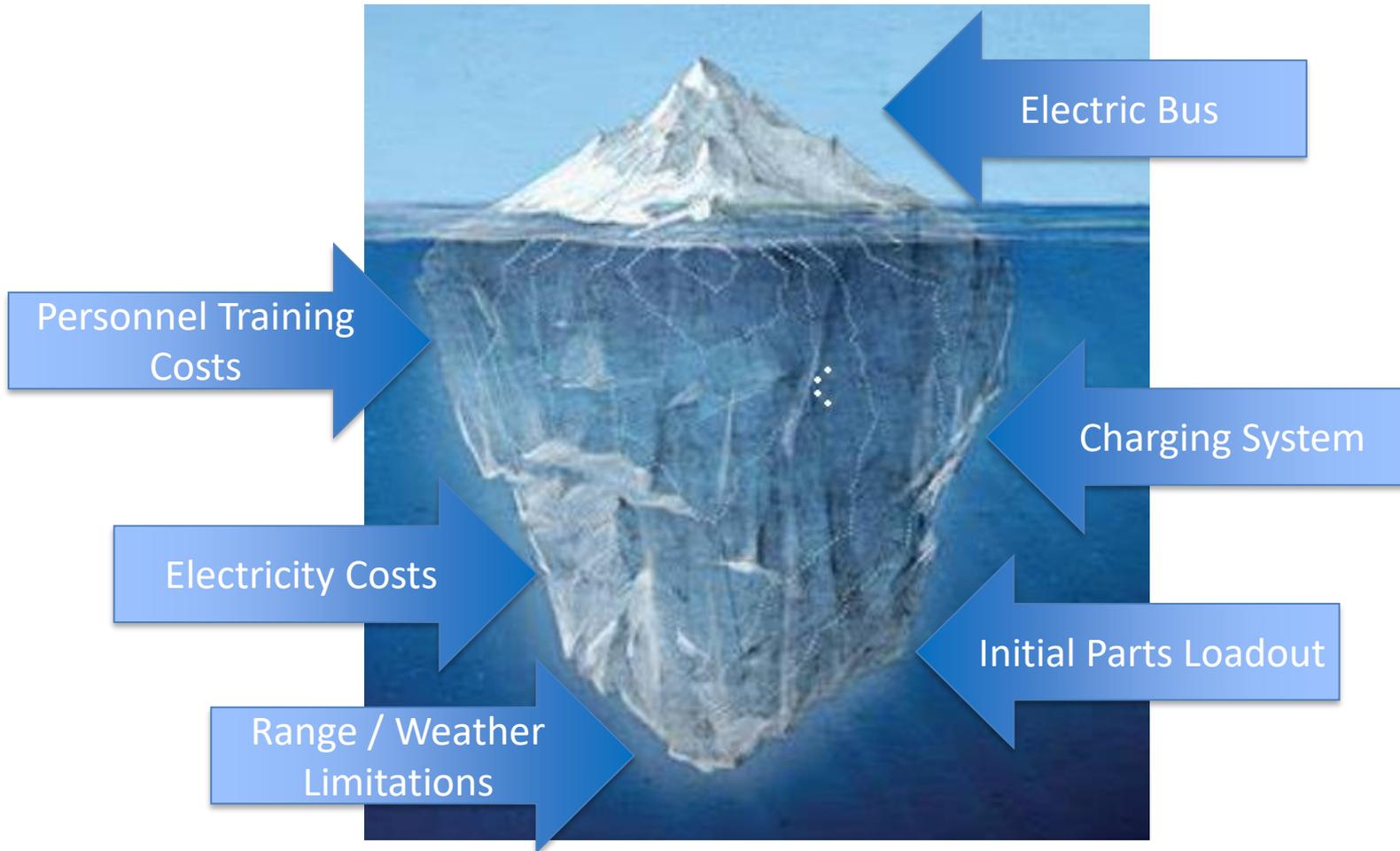
Executive Director, Maintenance
shuck@piercetransit.org

253-581-8028

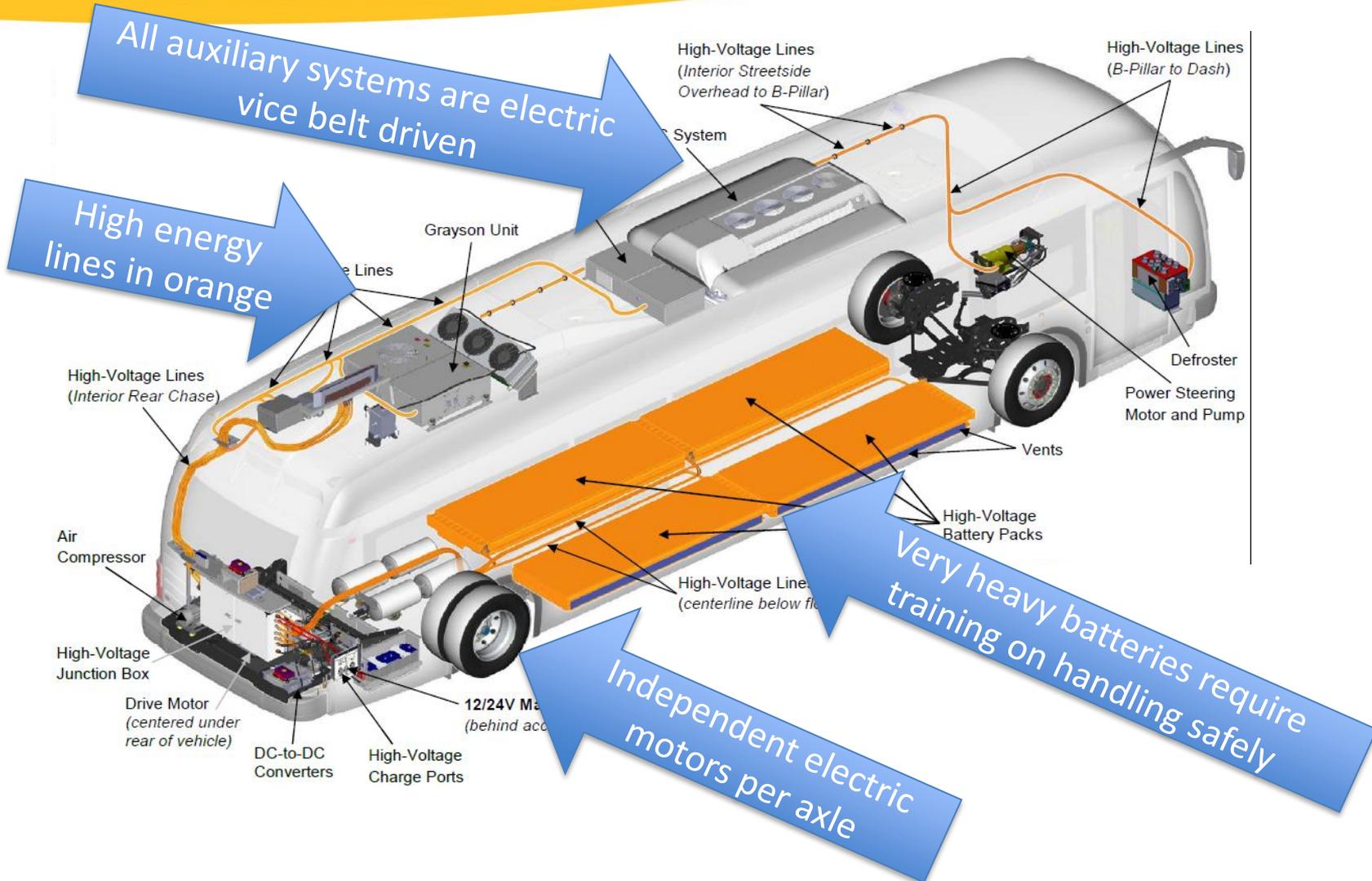
C: 253-625-4378



Costs of Implementing and Maintaining an Electric Fleet



Overview of an Electric Bus The 'Tip of the Iceberg'





Differing Deployment Modes of Electric Buses



- **Extended Range (Charging) Buses**

- Charging is done prior to Bus Run
- Charge is accomplish over an extended amount of time, up to 6 hours
- **Pros:** Bus does not rely on outside resources to charge
- **Cons:**
 - Buses tend to need to be charged en masse, requiring more extensive charging matrices
 - Limitations on range dictate capability of bus

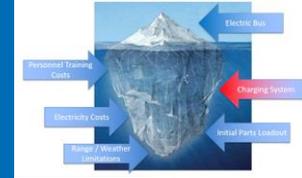


Differing Deployment Modes of Electric Buses



- **Shorter Range (Fast Charging) Buses**
 - Portion of the charging is done off base
 - Charging is accomplished several times during run, requiring up to 7 minutes per charge
 - Bus capacity is more closely monitored and fuel management required on when to receive a charge
 - **Pros:**
 - More charging done off premises, relieving size of charging matrix
 - Distance is less of an issue
 - **Cons:**
 - Agreements need to be made, possibly with more than one community and power source
 - Inflexible on routes without chargers
 - May be more than one utility company to deal with

Charging Station Types



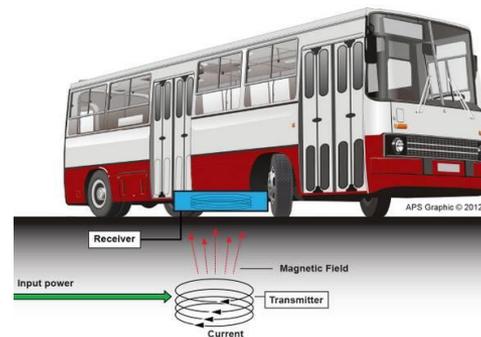
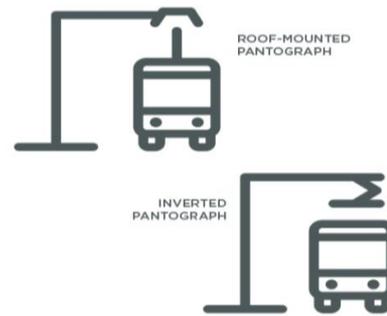
- SAE J1772 Plug in



- SAE J2954 Energy Transmission



- SAE J3105 Pantograph





Electricity Storage 2MW system....





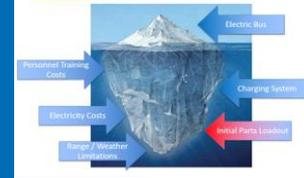
- We have extended range buses
 - 3 Proterra Buses with 440 kWh Range.
 - J1772 plug in capability
- 1,500kW Transformer
 - Conduit for 30 buses already laid in trench in alignment with the base master plan
- Three Chargers Express CPE 200 Chargers (50kW/h)
 - To be changed out with CPE 250 chargers end of August (62.5kw/h)
 - Will improve charging time from 6-8 hours to 4-7 hours.

2018 Installation Estimated Construction Cost

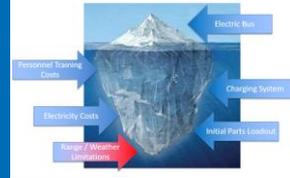
Item	Cost
LLP 1500 kVA transformer and connection fees	\$36,500
Express Plus Chargers (3)	\$90,000
Power Cube (1)	\$75,000
Power Modules (12)	\$120,000
Pierce Transit Construction Contract	\$384,000
Total	\$705,500



Initial Parts Loadout Costs



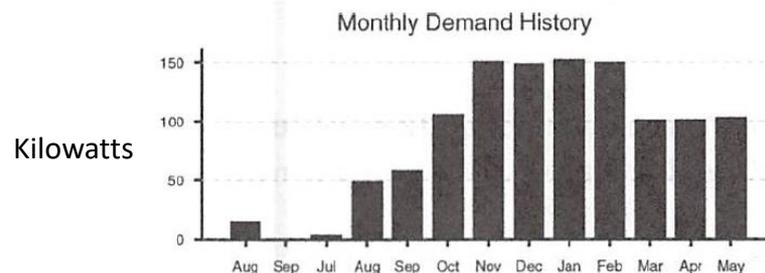
- Months of planning and reorganizing in our warehouse to accommodate the new parts value streams.
 - Proterra parts for three Buses
- Initial Loadout purchase was made with coordination with King County Metro and their experiences with their Proterra Fleet
 - Entailed 34 part numbers.
 - \$130,809 initial cost.
 - Follow on parts purchased based on trends we are seeing are ongoing.



- Electric Buses are limited to the size of their battery storage and usage of power while in operation
 - Range of Battery is 85% of capacity.
 - Cannot run battery down to zero.
 - Electric Bus Specifications
 - Resistive Heat is 14 kW/H
 - A/C is 8 kW/H
 - Average performance 1.5-2.5 kW/Mile
 - Calculation of range is based on hours of use and mileage.
- To Calculate Range:
 - 85% of 440kW = 374kW
 - Summer (A/C Usage on 10 hour day) = $374\text{kW} - (10 \text{ hrs} * 4\text{kW}) = 334 \text{ kW}$ available (222 to 133 mile range)
 - Winter (Res Heat on 10 hour day) = $374\text{kW} - (10\text{hrs} * 14\text{kW}) = 234 \text{ kW}$ available (156 to 93.6 mile range)
- Pierce Transit is finding success in using the Electric Buses on Split Runs (Rush Hour times).
 - Morning Run – Charge – Evening Run



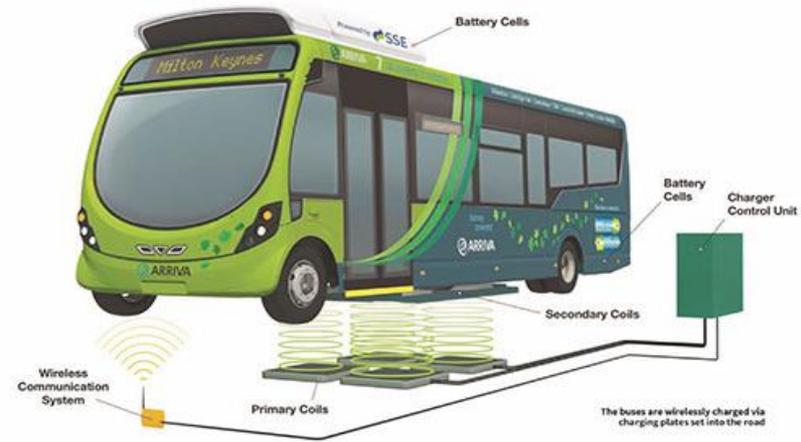
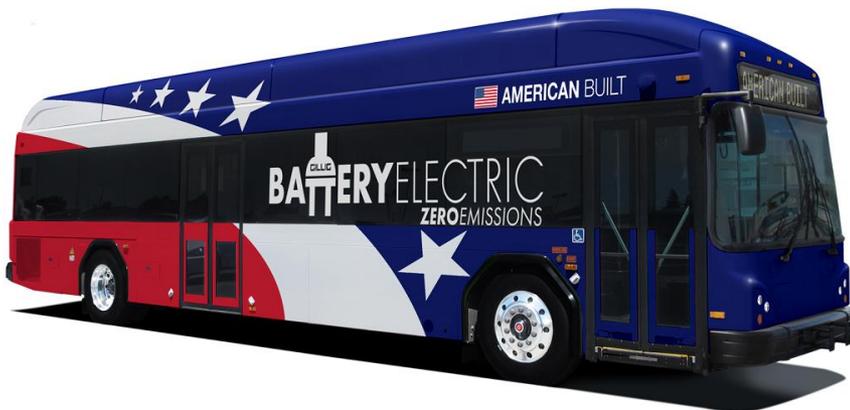
- Electricity cost challenges are manageable with three vehicles, but grows in costs, complexity, when managing a larger fleet.
 - Costs at peak hours versus off peak hours.
 - Charging the fleet at night when the buses are available.
- Costs in Winter versus Costs in Summer





- Electric buses require different training that what is typically done in a transit shop.
 - High Energy Systems
 - Arc Flash Requirements
 - De-Energizing high voltage systems
 - Lock Out Tag Out Procedures
 - Computer based troubleshooting
 - Special Laptops for identifying computational issues
 - Managing large Li-Ion Batteries
 - Storage
 - Emergency Procedures
 - Transportation
 - Inspection and Planned Maintenance intervals and tasks are completely different than in petroleum based buses.
 - Time based versus mileage based.

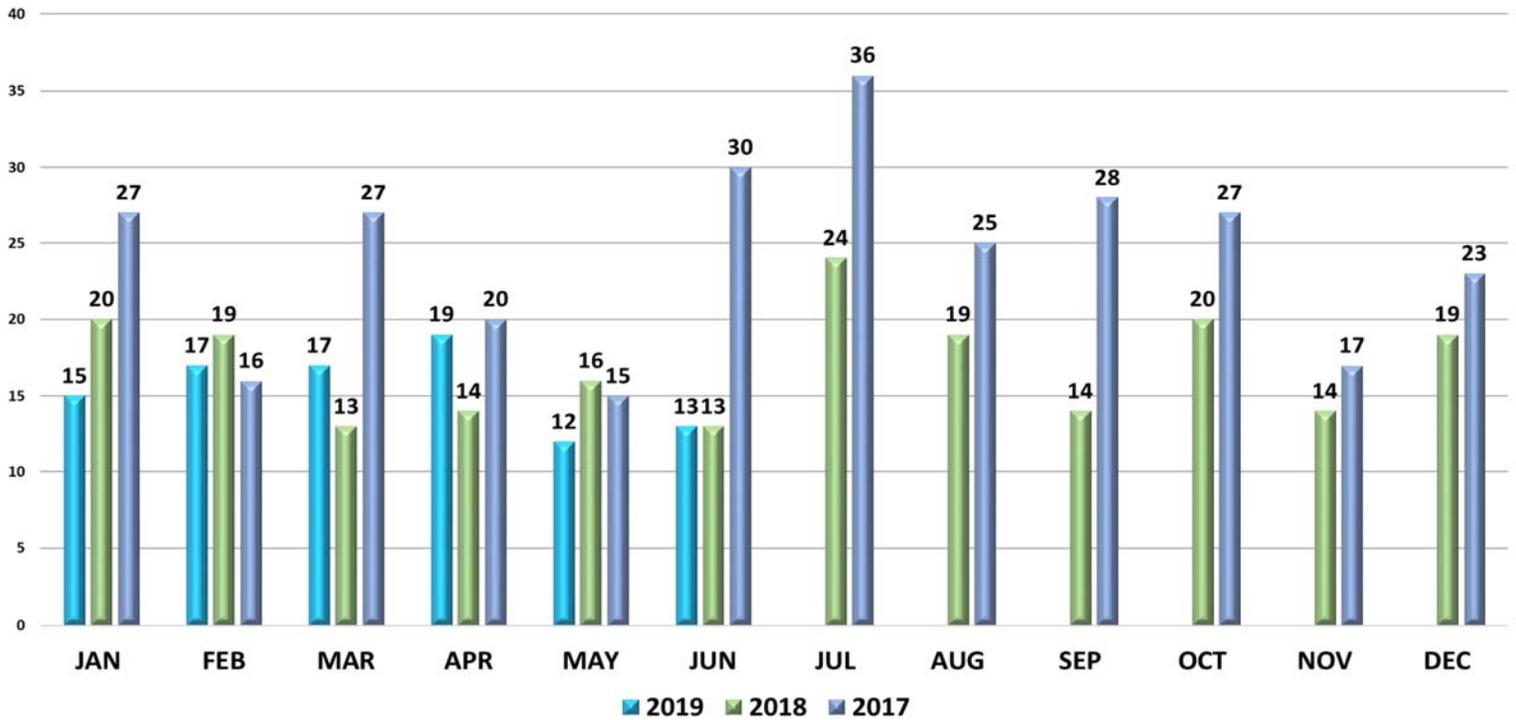
Questions?



SAFETY KPI'S

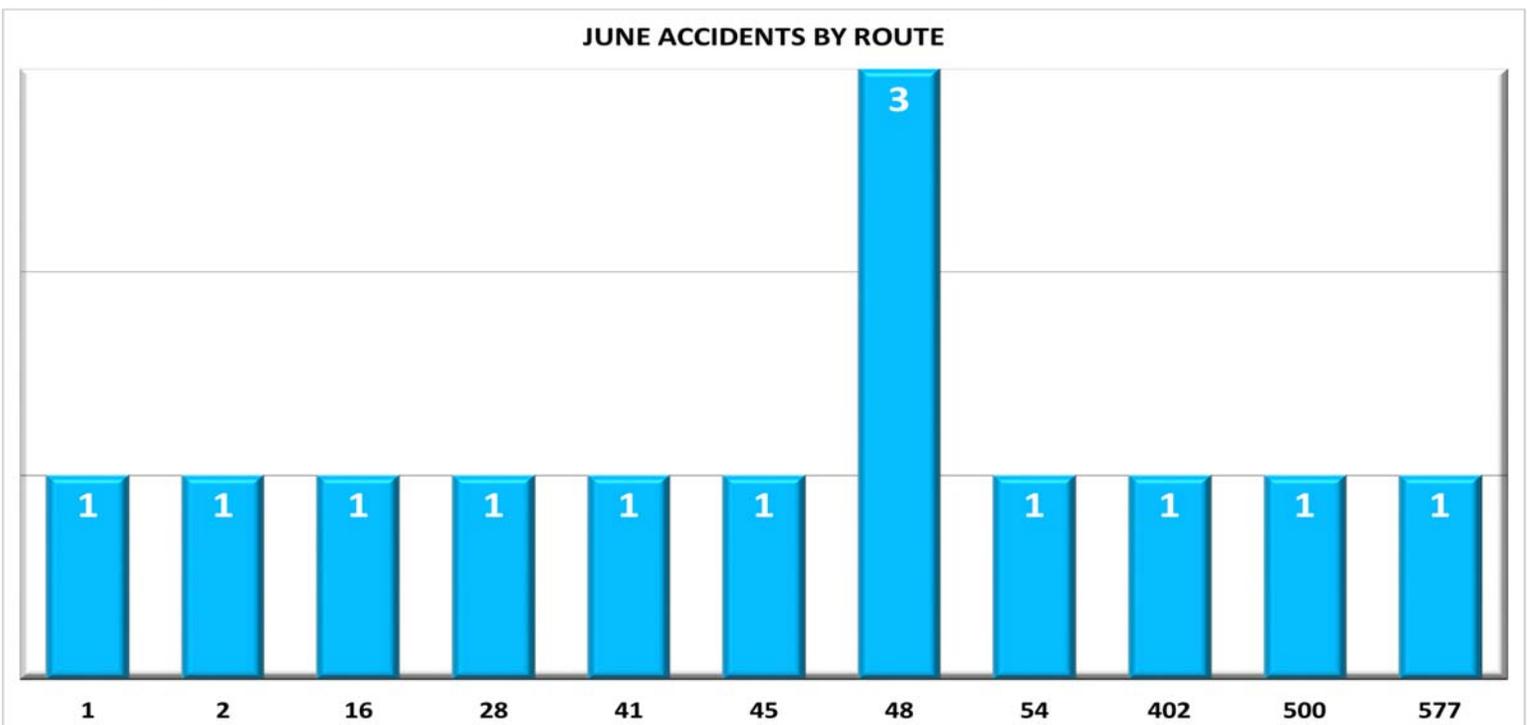
This report includes data through June 30, 2019. Preventable accidents came in the same as June 2018. Our preventable monthly accident totals were considerably lower than 2017. See the Month over Month Preventable Monthly Accident Totals below.

**PREVENTABLE ACCIDENTS MONTH OVER MONTH
3 YEAR COMPARISON**



The June Accidents by route shows three for route 48. The remaining are at one per route and still down to zero for the lot and supervisors.

JUNE ACCIDENTS BY ROUTE

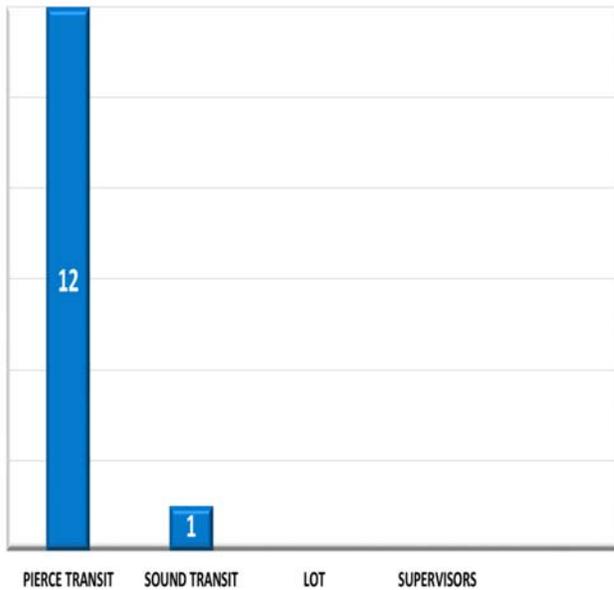


SAFETY KPI'S CONTINUED

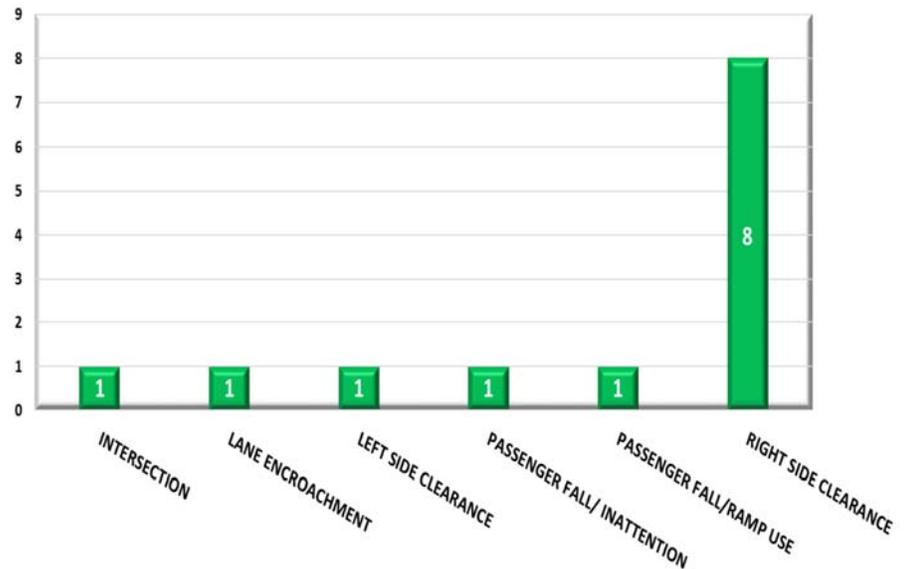
Preventable Accidents by Service Type shows Sound Transit at 1, Pierce Transit with 12 and zero for the lot and supervisors.

Right Side Clearance continues to be the most common preventable accident type.

JUNE ACCIDENTS BY SERVICE TYPE

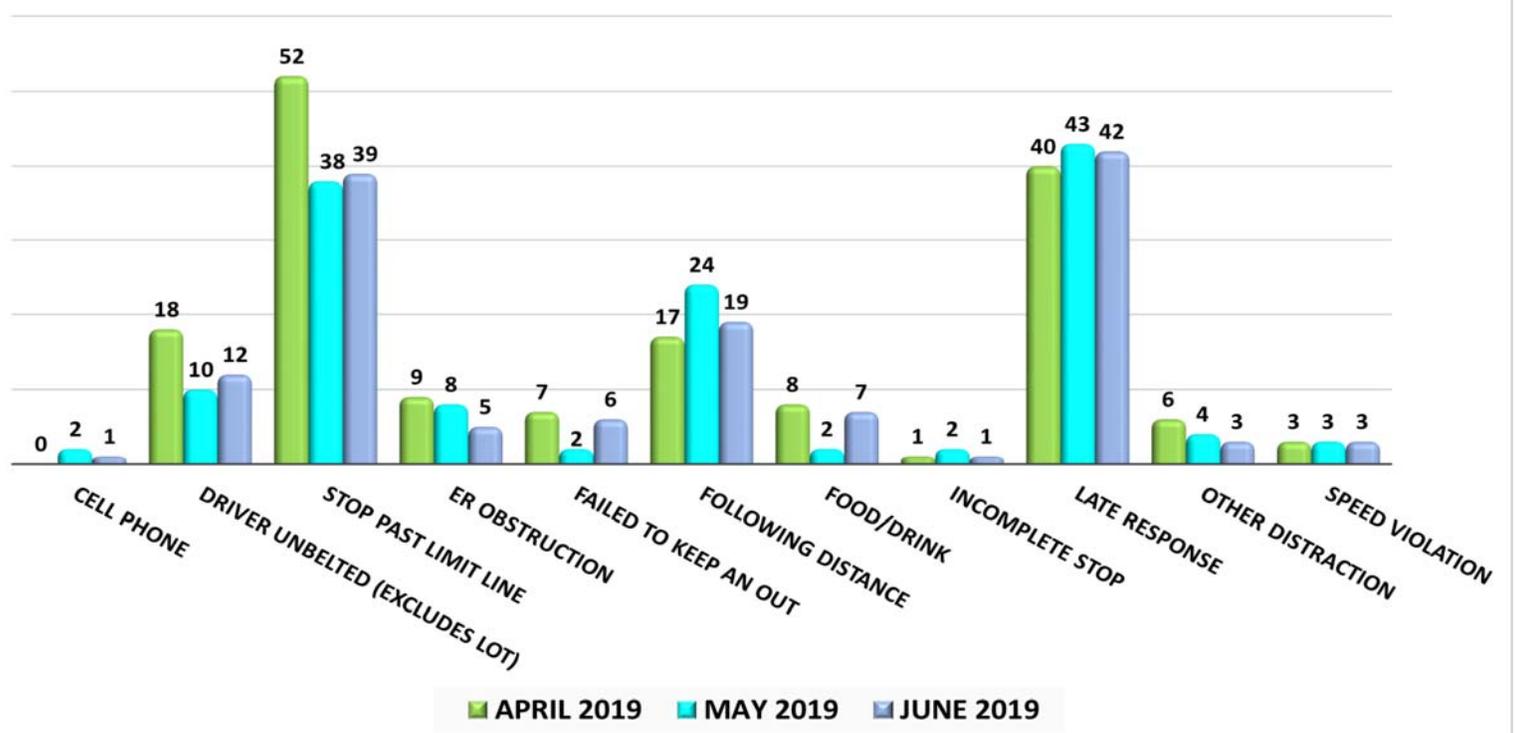


JUNE ACCIDENTS BY TYPE



The DriveCam Risky Behavior chart compares the risky behaviors captured in April, May and June of this year. There has been an increase in Food/Drink, Driver Unbelted, Failed to Keep an Out, and Stop Past Limit Line. Most other areas saw a decrease or remained the same as the previous month.

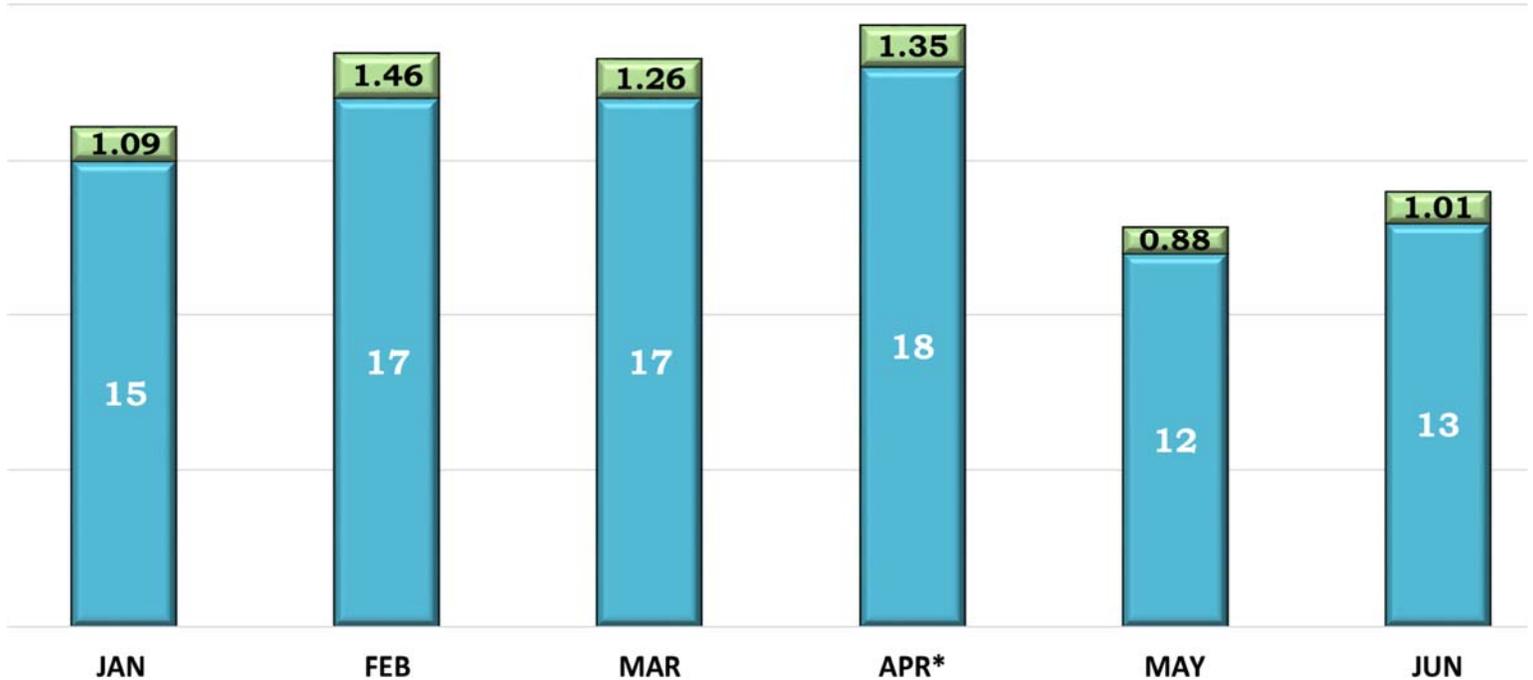
DRIVECAM RISKY BEHAVIORS ROLLING 90 DAYS THRU JUNE 2019



SAFETY KPI'S CONTINUED

The June AFR shows a slight increase in preventable accidents per 100,000 miles from May.

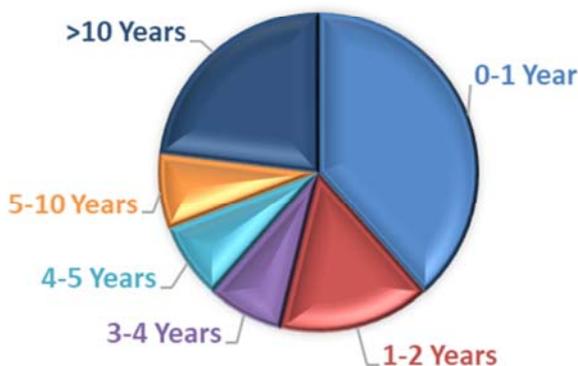
2019 YTD ACCIDENT TOTALS /ACCIDENT FREQUENCY RATE



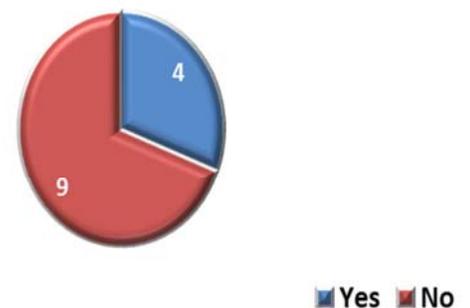
The preventable accidents by employee tenure for June shows over half of the accidents occurred with employees who had a tenure of 2 years or less.

The following chart shows whether the employee involved in the preventable accident attended the Q2 Safety Meeting. Out of the 13 accidents, 9 of the employees involved did not attend the safety meeting.

JUNE REPORTABLE ACCIDENTS BY EMPLOYEE TENURE



JUNE PREVENTABLE ACCIDENTS EMPLOYEES INVOLVED Attended Q2 Safety Meeting?



ADDITIONAL SAFETY DEPARTMENT UPDATES

In the month of June, we completed safety inspections of Buildings 1, 2, 3, 4, 5, 6 and Westbase. Thank you for your cooperation and assistance when we visited your area! Our inspection reports will be distributed soon!

"Bus vs. Trees" issue - A vehicle equipped with a stanchion as tall as our shortest bus now drives the routes and identifies/ corrects low hanging branches. There have only been 3 tree branches hit this year. Typically that number is 4-6 per month. Good Job Team!!

Safety
First!



SAFETY SHAREPOINT Coming SOON!

Our Sharepoint Site has been updated to include our Weekly Safety Chat, our monthly KPI's, and our monthly report. Our Safety Request link is now up and running as well. One new item we are working on is adding forms to our Sharepoint that each department can use to submit their monthly safety inspections. We are trying to work out a way to have these populate a Corrective Action Log that we can use to track abatement as well. More to come soon!

Public Transportation Agency Safety Plan

The PTASP has been sent to the members of the Leadership Council for review. A brief discussion has been scheduled for the next Leadership Council meeting on July 8th. After this meeting, we will be planning the roll out that will include; a meeting with the Executive Team, conducting management training and finally posting on our Sharepoint.



SAFETY HOTLINE

P: 253.983.3330
SafetyHotline@PierceTransit.org

3701 96th St. SW
Lakewood, WA
98499-4431

The Safety Hotline and Safety Suggestion Box is monitored on Monday, Wednesday and Friday of every week. There was one submission this month to the Safety Hotline stating a concern over the length of time the east side door on bldg. 5 stays open. Public Safety was consulted on this and they will work with Facilities to adjust the cycle time to meet the minimum ADA requirements.

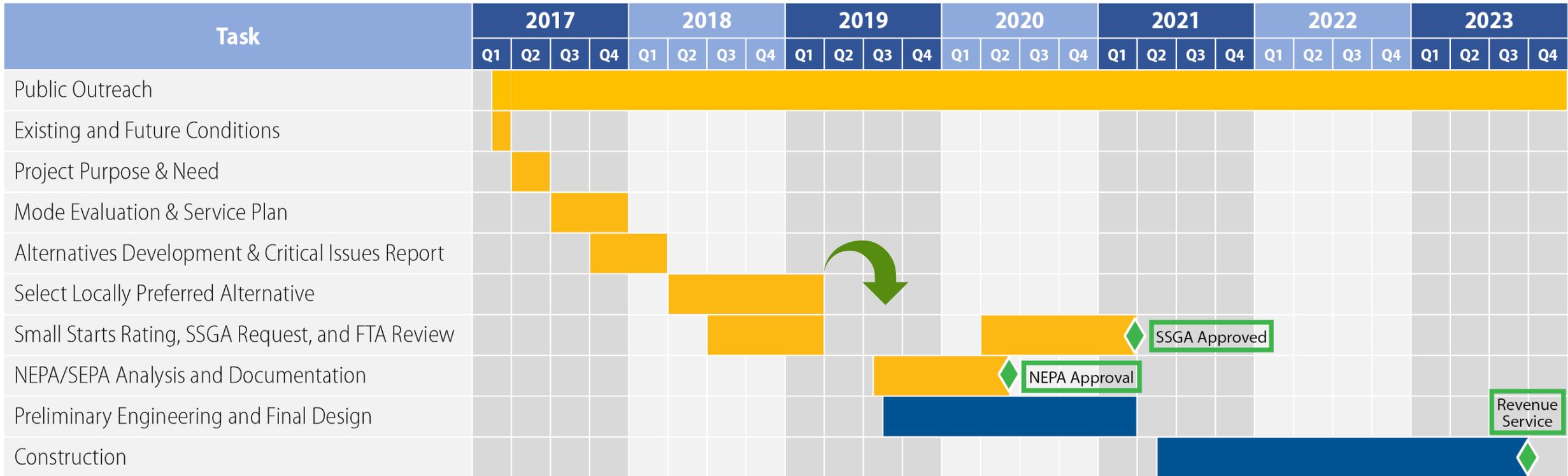


RideBRT

BUS RAPID TRANSIT TACOMA TO SPANAWAY

WSDOT's Intersection Control Evaluation (ICE)
Results and Recommendations
August 15, 2019

PROJECT SCHEDULE



INTERSECTION CONTROL EVALUATION (ICE)



- WSDOT requirement to determine optimal intersection control (including roundabouts)
- Required whenever an existing intersection is modified
- A five-step process
 - Background (existing conditions)
 - Feasibility (could end at this step)
 - Analysis
 - Benefit/Cost
 - Selection



**Washington State
Department of Transportation**

INTERSECTION CONTROL EVALUATION (ICE)



Process, Results, and Recommendation

- Began January 8 (3 Design Workshops and 4 Alternatives Review meetings held)
 - Finalized ICE Report submitted to WSDOT on June 28
 - 19 intersections considered in the initial, corridor-wide evaluation (April 26)
 - 15 intersections, roundabouts determined not feasible, will move forward with rebuilt signalized alternatives
 - 4 intersections recommended, Pierce Transit amenable to roundabouts per WSDOT preference. Due to limited transit LOS benefit, increased cost and budgetary constraints, and generally greater LOS benefit to general purpose traffic, construction costs could offset exclusive use agreement for 3.6-mile section of median running BRT lanes.



**Washington State
Department of Transportation**

COMPARISON OF INTERSECTION ALTERNATIVES



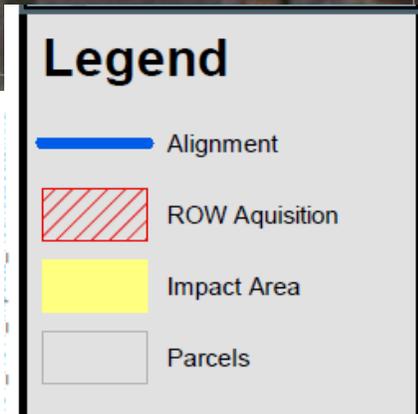
Location (North to South)	Cost Estimate		Right of Way Impact (sq. ft.)		LOS (2045)		Transit LOS (2045)		LOS (2018 Existing)	LOS (2045 No Build)
	Roundabout	Signal Alternative	Roundabout	Signal Alternative	Roundabout	Signal Alternative	Roundabout	Signal Alternative	Signal	Signal
Pacific Avenue/SR 7 & S. 76th Street	\$2,119,000	\$350,000	8,551	2,259	A	B	A	A	A	B
Pacific Avenue/SR 7 & 121st Street S	\$1,823,000	\$350,000	938	204	A	D	A	B	C	D
Pacific Avenue/SR 7 & 138th Street S	\$2,062,000	\$350,000	655	193	A	F	A	C	E	F
Pacific Avenue/SR 7 & 146th Street S	\$1,668,000	\$350,000	1,901	168	A	D	A	B	B	D
Totals	\$7,672,000	\$1,400,000	12,045	2,824						

7/19/2019

Pacific Avenue/State Route 7 Intersections Recommended as Roundabouts



S. 76th Street



121st Street S

Pacific Avenue/State Route 7 Intersections Recommended as Roundabouts

146th Street S



138th Street S



Legend

- Alignment
- ROW Aquisition
- Impact Area
- Parcels