Agenda

Metro
600 NE Grand Ave.
Portland, OR 97232-2736

Meeting:	Regional Enhanced Transit Concept Table Setting Workshop
Date:	Thursday, January 18, 2018
Time:	10 a.m. to noon
Place:	Metro Regional Center, Council Chambers
Purpose:	Kick off for the Enhanced Transit Concept Workshops
Outcome(s):	Shared understanding of the Enhanced Transit Concept, workshop purpose and timing and next steps.

10:00 a.m.	Welcome and introductions
10:15 a.m.	What is the Regional Enhanced Transit Concept? Discussion of Regional Enhanced Transit Concept and why now.
10:30 a.m.	How did we get here? Discussion of how we got from the universe of potential Enhanced Transit projects to a reasonable number to consider through the workshop process.
10:45 a.m.	What is purpose of the Enhanced Transit Concept workshops and how will it work? Discussion of examples of Enhanced Transit Concept tools, where has this been applied around the region and elsewhere around the country and what are the expectations for the workshops.
11:00 a.m.	What is next? Share and discuss the Enhanced Transit Concept Pilot program schedule, the Request for Interest (RFI) process and desired outcomes and how all this fits into the 2018 Regional Transportation Plan and Regional Transit Strategy.
11:10 a.m.	Discussion
noon	Adjourn

Memo

Metro
600 NE Grand Ave.
Portland, OR 97232-2736

Date: Thursday, January 18, 2018
To: Regional Enhanced Transit Concept Table Setting Participants
From: Jamie Snook, Principal Planner, Metro
Subject: Enhanced Transit Concept Pilot Proposed Work Plan (DRAFT)

Purpose

The purpose of this memorandum is to provide an overview of the Regional Enhanced Transit Concept (ETC) Pilot Work Plan. This memorandum is intended to provide background and context for the upcoming Table Setting Workshop. The goals of this work plan are to:

- Increase transit ridership to level sufficient to meet regional and local mode split goals by improving transit reliability, speed, and capacity through hotspot bottleneck locations in congested corridors and throughout the region through moderate capital and operational investments from both local jurisdictions and transit agencies.

- Identify, design and build a set of Enhanced Transit projects, either as hotspot bottlenecks or across whole congested corridors or, in partnership with local jurisdictions and facility owners where improvements are most needed and can be deployed quickly to produce immediate results.

- Develop a pipeline of Enhanced Transit projects so they are ready to advance for to construction as funding is identified.

Action Requested

- Jurisdictional partners should come to the **Table Setting Workshop on January 18th 10 a.m. to noon at Metro** ready to learn about the ETC Pilot workplan and ask questions about how they can improve transit hot spots in their jurisdictions.

- Commit to attending workshops for their jurisdictions to review the feasibility of potential near term improvements to increase transit capacity, reliability, and travel times in congested frequent transit service corridors identified as potential ETC corridors in your jurisdiction.

ETC Background

Per direction by JPACT at their October 19, 2017 meeting to utilize bond proceed revenues of $5 million to support the funding of an "Enhanced Transit" program. As our region grows and congestion increases, the need to connect people to their jobs, homes and daily activities is becoming more and more important. The goal of the Enhanced Transit concept is to develop strong partnerships between service and capital improvements that provides increased transit capacity and reliability, yet is relatively low-cost to construct, context sensitive and could deployed quickly.

Through the TGM grant-funded Enhanced Transit Corridors Plan, TriMet and the City of Portland have been developing a toolbox of potential improvements that could apply to congested transit corridors that could increase capacity and reliability with moderate capital and operational investments and could be deployed quickly. Metro and TriMet are working with the 2018 Regional Transportation Plan Transit and Equity Work Groups to discuss and ground criteria and data sources to identify potential locations for applying the Enhanced Transit Concept region-wide. The Working Groups in conjunction with TPAC will help develop and finalize the criteria to be applied.

The Enhanced Transit work program will develop a policy framework and criteria to identify enhanced transit candidate corridors, as well as identify opportunities for service improvements, capital investments and policy commitments to enhance transit service in the corridors that need it most. Metro, TriMet and the jurisdictional partners will develop enhanced transit corridors to move forward towards implementation and construction.

Process and Timeline

This is envisioned as a 9-18 month (depending on how far a project advances through design to construction readiness) process and pilot project to develop Enhanced Transit projects across the region, led by Metro and TriMet in partnership with local jurisdictions. Metro will also work with SMART to develop their approach, as appropriate. There will be a local Request for Interest (RFI) this May- June 2018. Most of the work leading up to the RFI will be through the Regional Transit Working Group (TWG) and workshops, with local jurisdiction representatives. There are several decision points where Metro and TriMet will return to TPAC.

Metro and TriMet are ready to engage the local jurisdictions to identify and evaluate the relevant corridors and segments for consideration in the ETC pilot program, including the tools that would be appropriate in those corridors. Next steps are listed below.

January 18, 2018: Table Setting Workshop (all jurisdictional partners and their traffic teams).

- Discuss the goals of ETC program
- Discuss regional mode split goals and the benefit of faster and more reliable transit
- Explain the toolbox and its applicability in various contexts (see attachment)
- Explain the data-based criteria for developing proposed universe of projects
- Display local and national examples of implementing the tools in the toolbox
- Overview of ETC process, how local jurisdictions will identify and put forward their priorities (drawn from proposed universe of projects), and how projects will move from prioritization and evaluation to design/implementation

January – April 2018: Local Workshops

These workshops are designed to assess the applicability of various Enhanced Transit tools in the locations identified in each jurisdiction, with the intent of informing what project elements could be appropriate to advance towards design and implementation. The workshops will also be used to help assess whether a transit segment is ready and ripe, appropriate for this pilot ETC project, or should be moved forward in a different planning process.

- Washington County w/ODOT and w/SMART and other impacted transit agencies, as appropriate
- Clackamas County w/ODOT and w/SMART and other impacted transit agencies, as appropriate
- Multnomah County w/ODOT and other impacted transit agencies, as appropriate
- City of Portland w/ODOT and other impacted transit agencies, as appropriate
- ODOT
- Other?

April 2018: Based on what is learned from the workshop(s), local jurisdictions identify their priorities and what local commitments work for them.

May-June 2018: Request for Interest (RFI) to advance to 15% using RFFA funds. This the opportunity for local jurisdictions to propose projects that have made it through Filters 1 and 2 described below, and to indicate the policy and funding commitments they will make to each project as it nears completion. Projects submitted through this process will support the 2018 RTP second round of call for projects.

June-December 2018: Filter 3 applied to projects submitted through the RFI; 15% design, traffic analysis, and benefit/cost estimation.

January 2019-October 2019: Design to 100% for identified projects coming out of Filter 3 described below.

Filtering Process

The following describes the filtering process for narrowing the range of potential Enhanced Transit Corridors that might move forward through design and construction as part of this pilot program.

Filter 1

- **Purpose:** Potential projects are identified through assessment of potential applicability of ETC toolkit to locations within proposed universe through Local Workshops. Potential projects are located along a Frequent Service route or a route identified as future Frequent Service (in SEP or RTP) on TriMet system, or corollary on SMART system, and have potential for high ridership. Analysis on equity and anticipated growth can also help inform prioritization.
- **Result:** Local partners can choose to advance projects further based on toolkit applicability and merit identified through workshop.

Filter 2 (Presumes project is a priority based on Filter 1)

- **Purpose:** Local support (ripeness) to pursue is identified by local jurisdiction, including what project elements to advance further through the process, considering potential tradeoffs with other modes.
    - As part of Filter 2, jurisdictions indicate their local commitments to support the project, including financial commitments, policy changes such as roadway engineering changes and local parking policy changes (either at the county or local level), and their project-specific public outreach process, and local partnerships.
    - Projects put forward at this point will support the 2018 RTP second round call for projects. Local jurisdictions will need to update their project lists.

- **Result:** Local partners can choose to submit through RFI.

Filter 3 (Applies only to projects submitted through RFI)

- Project fills the Enhanced Transit niche between Frequent Service and High Capacity Transit (i.e., small scale capital investments and/or supportive policies will produce sufficient ROI)
- Projects fitting this niche go to 15% design, after which they will be sorted into four categories:
    1. Local Project: Ripe and Ready
        - Definition: Local jurisdiction and transit agency agree project has merit and support
        - Result: Advances to 100 % design using RFFA funding and enters funding pipeline
        - Lead: TriMet or SMART with local jurisdiction and ODOT, as appropriate
    2. Local Project: Ripe but not Ready
        - Definition: Local jurisdiction and transit agency agree project has merit but does not currently have support to advance, either due to lack of funding capacity or willingness to
        - Result: Part of future pipeline of potential projects for consideration when funding becomes available and/or willingness to address tradeoffs changes
        - Lead: Metro and local jurisdiction
    3. Local Project: Not Ripe
        - Definition: Project does not meet the goals of the ETC pilot program or otherwise insufficient interest in moving the project forward by the local jurisdiction or the transit agency
        - Result: Project not in future pipeline
        - Lead: Local jurisdiction, as appropriate
    4. Regional Project:
        - Definition: Project does not align with goals of ETC (i.e., investments required are too significant in order to produce sufficient ROI or ROI is sufficient but more appropriate to pursue as New Starts/Small Starts due to scale)
        - Result: Transit System Expansion Policy Process for projects seeking federal funds
        - Lead: Metro

Proposed ETC Pilot Program Process and Timeline Summary

Timing	Activity	Lead
1/18/18	Table Setting Workshop	Metro and TriMet
January – April 2018	Local workshops to assess toolkit applicability in "Proposed Universe" of potential locations	TriMet & Metro
April 2018	Identify subset of the "Ripe Universe" coming out of workshops	Local Jurisdictions and Facility Owners in consultation with TriMet & Metro
May – June 2018	RFI to advance to 15% design using RFFA funds (projects that make it out of Filter 1 and 2)	Metro and TriMet
June – December 2018	15% design, traffic analysis and benefit/cost estimation	TriMet
December 2018	Apply Filter 3 based on results of 15% design	Metro & TriMet, in consultation with project sponsors
January 2019	TPAC Presentation of results of Filter 3	TriMet & Metro
January – October 2019	For Category 1 projects, • 15-30% design • Filter for readiness • 30- 100% design and traffic analysis and benefit/cost estimation	TriMet
Starting October 2019	Implement designed projects as funding is available	Project sponsors
June 2020	Projects to be completed and operational	Project sponsors

Enhanced Transit Corridors Plan

Toolbox Applicability Matrix

06.07.17

Laneways and Intersection Treatments	Reliability	Transit Speed	Dwell Time	Context/Applicability
Dedicated Bus Lane	●	●		Most effective in high-volume, highly-congested corridors or hot spots; cost and impacts vary depending on context and available space.
Business Access and Transit (BAT) Lane	●	●		Provides partially dedicated bus lane while maintaining business and residence access. May be applicable where there is more than one lane in each direction.
Intersection Queue Jump/Right Turn Except Bus Lane	●	●		Most effective at high-traffic intersections; general purpose right-turn lane enables bus to bypass traffic backups and move through intersection more quickly.
Transit-Only Aperture	●	●		Best suited for intersections where the benefit of prioritizing transit (and bicycles) is great and the impacts of limiting vehicle traffic are lower – often where a large multi-lane street changes character to a smaller neighborhood street.
Pro-Time (Peak Period Only) Transit Lane	●	●		Used in highly-congested locations where restricting parking during peak hours can move transit more quickly through time-limited traffic backups (e.g. access to bridgeheads during rush hour).
Bus on Shoulder	●	●		Can be applied on freeways and highways with adequate shoulder width (10 feet or more); signage and re-striping can create a low-cost dedicated transit lane.
Multi-Modal Interaction				
Bikes Behind Station		●	●	Most appropriate on heavily-used transit routes that are also heavily-used or protected bikeways. May require reallocation of existing roadway space, or acquisition of additional right-of-way.
Left-Side Bike Lane	●	●	●	Appropriate for one-way streets with heavily used transit routes where traffic speed and volume requires separated bicycle facilities. Can minimize or eliminate bus/bike conflicts for right-side boarding.
Dedicated Bike Signal	●		●	Can be applied on heavily used bicycle routes where transit/bicycle interactions present safety challenges or impact transit performance; organizes interaction among modes and can improve safety but does not necessarily improve transit travel time.
Shared Bus/Bike Zone		●		Not a preferred treatment, but can be applied in transit stop/station areas where full separation between buses and bikes is not feasible.
Stops and Stations				
Curb Extensions for Stations/ Stops	●	●	●	Typically applied where there is on-street parking. Applicable in both mixed-flow and dedicated transit lane conditions; can be installed mid-block or at intersections.
Level Boarding	●	●	●	Application varies based on adjacent building entrance locations, right-of-way widths and availability, and integration with the sidewalk environment; cost varies widely depending on the need for new platforms or rolling stock.
All-Door Boarding	●	●	●	Can be combined with off-board fare collection and/or on-board electronic fare technology at each door to facilitate quick entry and compliant fare payment.
Far-Side Bus Stop Placement	●	●	●	Stop placement depends on corridor land use, street/intersection design, sidewalk availability, driveway locations, and other conditions; most effective when used in combination with transit signal priority (TSP).
Bus Stop Consolidation	●	●	●	May be appropriate in corridors with a large number of closely spaced stops where roadway and pedestrian conditions allow for safe access to consolidated stops.
Operations/Other				
Rolling Stock Modification			●	Longer vehicles can accommodate more passengers, and/or on-board amenities; this may help address crowding. Modern low-floor vehicles enable level boarding and all-door boarding. May require new or retrofitted maintenance facilities.
Street Design Traffic Flow Modifications	●	●		Applicability dependent on context and conditions.
Transit Signal Priority and Signal Improvements	●	●		Signal adaptations may include extending a green light, triggering a transit priority phase, and/or progression changes to improve conditions for all traffic.
Headway Management	●			Strategies may include monitoring/management for specific lines or groups of lines, or headway-based service that operates without published schedules. Often requires new software, hardware and staff.

Enhanced Transit Corridors Plan
Capital/Operational Toolbox

PBOT TRIMET
ch2m: HDR

Contents

List of Tools

ETC Capital and Operational Toolbox Memorandum

This Toolbox is a collection of potential capital and operational treatments that can be applied to improve transit performance or create safer, more predictable interactions with other travel modes. It was developed as part of the Enhanced Transit Corridors Plan.

Toolbox Organization

For ease of navigation, potential treatments are organized into categories that reflect the purpose and function of specific tools. Within the categories, treatments are organized in descending order from most to least capital intensive. Tools may be applied individually or in combination – including tools from multiple categories.

Individual toolbox sheets are intended to give an overview of each tool, including the type of problem it seeks to solve, key features, and typical context for application.

ETC Toolbox Purpose

As one component of the Enhanced Transit Corridors Plan, this Toolbox accompanies the ETC Existing Conditions & Methodology Memorandum, which describes criteria and performance measures to inform the evaluation and prioritization of ETC Candidate Corridors. Transit operations criteria and performance measures address Reliability, Transit Speed, and Dwell Time. These measures help identify different types of delay along potential ETC corridors. Toolbox treatments can be used to address this delay and help improve transit operations.

Based on the Methodology evaluation, the consultant team will recommend Toolbox treatments for further consideration based on the type of delay measured in particular corridors. This high-level assessment will be based on indicator measures and a general understanding of the roadway context.

Toolbox Application

More detailed analysis is needed to assess which of the Toolbox treatments are likely to be feasible and effective in particular corridors. Appropriate application of individual tools will require additional corridor-level analysis regarding the specific existing conditions and context – as well as the needs of other travel modes. The Enhanced Transit Corridors project will conduct this detailed analysis on up to 3 corridors.

In addition to detailed corridor analysis on up to 3 corridors, the consultant team will develop a matrix that describes which tools are most appropriate for which types of corridors – and which types of problems. This matrix will describe at a conceptual level which potential treatments merit additional study in other ETC corridors.

It is important to note that not all Toolbox treatments are possible in every street context. Some treatments can only be applied under specific conditions or with significant changes to the street and cross-section, which may not be feasible or practical. Therefore, some treatments may not be applicable in some corridors.

Finally, some treatments may involve trade-offs in the public right-of-way, or require acquisition of additional private property to widen the right-of-way. For example, widening can impact adjacent properties and buildings. Trade-offs could also impact vehicle access and space for parking or other modes. Where such trade-offs arise, additional stakeholder and public engagement is often necessary.

Dedicated Transit Lane

$$$$

Dedicated bus lanes are exclusive lanes allowing transit use only during all times of day. Dedicated lanes improve reliability and reduce travel time by providing separated space for buses, allowing free flow through otherwise congested traffic conditions.

Key Features

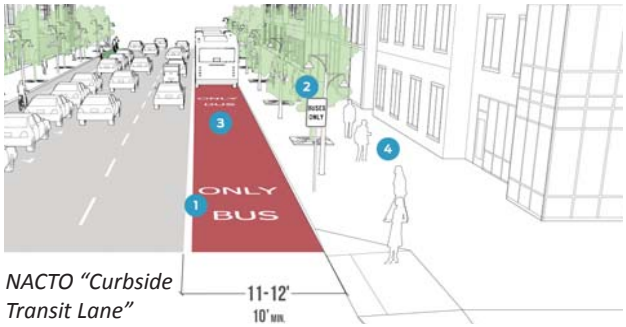
- All-day separation from mixed through traffic (physical barriers or pavement markings)
- May require or be accompanied by dedicated signal(s)/phases

Application

- High-volume, highly-congested corridors
- Can be center-running, curb tight, or floating lanes adjacent to parking/bike facilities

Cost Considerations

- Dedicated transit lane costs can vary considerably depending on context. The cost of moving curbs to accommodate a dedicated lane may be significant – especially if property acquisition is required. Simple roadway re-striping is less expensive, but may necessitate other tradeoffs.



NACTO "Curbside Transit Lane"

Local Example

Southbound 5th Avenue approaching I-405 (Portland, OR)

CH2M

Business Access and Transit (BAT) Lane

**$$$**$

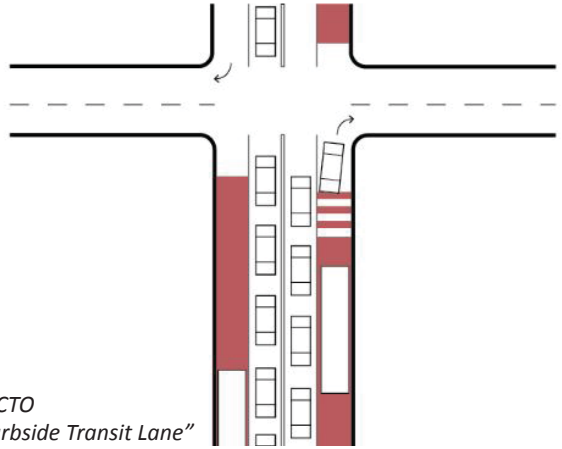
BAT lanes are primarily dedicated for transit use, but allow some general traffic circulation for turning into driveways or onto intersecting streets. Even limited separation from mixed traffic allows for more efficient transit movement through otherwise congested conditions. At the same time, BAT lanes lessen the impact of dedicated bus lanes by maintaining business and residence access.

Key Features

- Separation from mixed through traffic (pavement markings)
- Markings and signage that prohibit general traffic use except in limited locations for limited access purposes

Application

- High-volume, highly-congested corridor segments
- Can be right- or left-side running in a curb-tight lane depending on access requirements and context



NACTO
"Curbside Transit Lane"

Local Example

Southbound SW 11th Avenue approaching SW Columbia Street (Portland, OR)

Intersection Queue Jump/Right Turn Except Bus Lane

**$$$**$

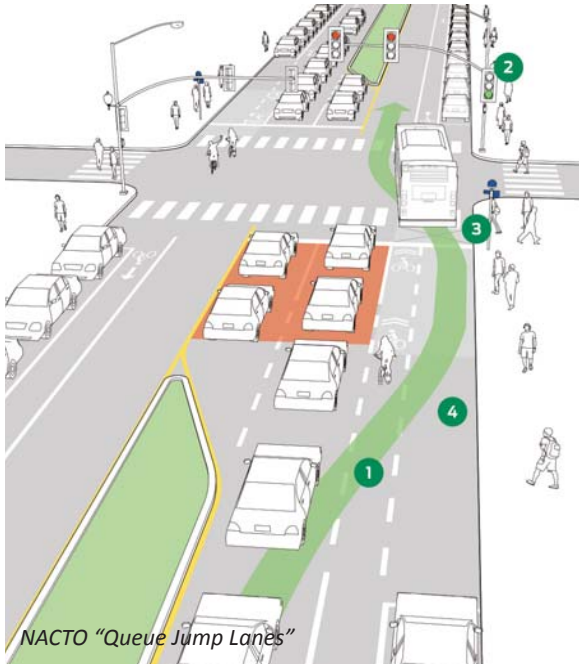
Intersection queue jumps are often applied in tandem with Right Turn Except Bus lanes. A short section of exclusive transit lane approaching a signalized intersection allows the bus to "jump the queue" of traffic waiting at a red light. In a queue jump, the bus may get a special "early green" signal before the adjacent vehicular lanes, and thereby jumps to the front of the line of traffic. This treatment allows for quicker, more reliable transit movement through congested intersections. The lanes can also be used by emergency vehicles to improve response time.

Key Features

- If there is not a Right Turn Except Bus lane or a far side bus pullout, a queue jump requires an exclusive signal phase that allows transit to get a green light first, bypassing the general traffic waiting at the signal
- If paired with a Right Turn Except Bus lane, no dedicated signal phase is needed
- Requires a far-side stop out of lane/in a bus pocket, or a near-side stop for the bus in its own lane
- Bus detection and signal control can increase queue jump effectiveness. Otherwise, the bus must accelerate and merge with general traffic while crossing an intersection, which is not recommended

Application

- High-traffic intersections where a general purpose right turn lane can also serve as a transit queue jump lane
- Queue jump lanes can either be curb-tight or center-running, depending on intersection design and operations
- Queue jump lane may be dedicated or shared with a general purpose turn lane (left or right turn), as long as a dedicated transit signal is present
- Right Turn Except Bus lanes are curb-tight or in floating lanes adjacent to parking/bike facilities
- In some queue jumps, the bus feeds into a bus stop pullout even if no advanced signal phase is present



NACTO "Queue Jump Lanes"

Local Examples

Queue jump only – Eastbound SE Powell Boulevard at SE Foster Road (Portland, OR)
Queue jump with Right Turn Except Bus lane – Westbound SE Madison Street approaching the Hawthorne Bridge
Queue jump with bus pullout, no advanced signal phase – Westbound SE Powell at Milwaukie

CH2M

Transit-Only Aperture

$$$$

This treatment prohibits or redirects general traffic away from a transit route that continues through an intersection. An exclusive lane at the far side of the intersection is dedicated for transit and/or bicycle use only. Transit-only apertures reduce friction between buses and general traffic, allowing for more efficient travel through congested and/or strategically located intersections.

Key Features

- Traffic diversion features (curbs, pavement markings and or median islands) are accompanied by signage prohibiting general vehicle travel through the aperture
- Operation can be enhanced with dedicated signal phasing
- May include contra-flow bus and/or bicycle lanes

Application

- Intersections where it is beneficial for transit function or bicycle safety to limit through or turning traffic and prioritize bus movement
- Can be applied to either through lanes or turning lanes

Local Example

Northbound SE 52nd Avenue at SE Division Street (Portland, OR)

PBOT


PBOT

PBOT

Pro-Time (Peak Period Only) Transit Lane

$$$$

Pro-time transit lanes are dedicated for exclusive bus use during specific times of day – often during peak commute hours. They convert to general purpose travel lanes or parking lanes at other times of day. Separation from general purpose traffic during congested peak periods improves bus travel time and reliability; allowing off-peak parking or travel lessens the impact of that separation on adjacent land uses.

Key Features

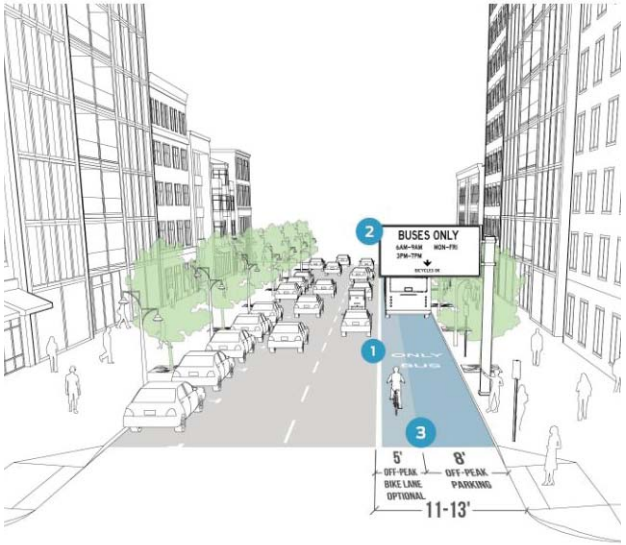
- Signage and/or pavement markings indicating peak hour restrictions
- Consistent enforcement of transit exclusivity is needed, especially for parking violations

Application

- High-volume, highly-congested locations that are particularly affected by peak hour traffic fluctuations and backups (e.g. access to bridgeheads)
- Lanes are typically curb-tight along existing parking lanes

Local Example

Westbound SE Morrison Street approaching the Morrison Bridge (Portland, OR)



NACTO "Peak-only" bus lane

Bus on Shoulder

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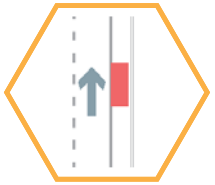


On freeways and highways, shoulders can be re-purposed to provide transit-only operating space with very little cost. Providing separated space that is restricted to buses only can improve bus reliability and travel time by enabling free movement through otherwise congested traffic conditions.

Key Features

- Creates a transit-only lane with very low capital cost and low impact to other modes
- Typically only requires signage and some re-striping
- Can require bus operator training for use

Application

- High-speed freeways and highways with adequate shoulder width (10 feet or more)
- May be allowed during all times of the day or only during peak periods

TriMet

Regional Example

The Washington Department of Transportation (WSDOT) has a Bus on Shoulder corridor operating on sections of southbound I-405. The system operates from 6AM to 9AM only, when regular traffic is moving at or below 35 mph

Minneapolis, Metro Transit

Bikes Behind Station

$$$$

Often called “island” stations, these side-boarding bus platforms feature a channelized bike “wrap-around” behind the station area. This allows for continuous bicycle separation from general traffic and transitways, minimizing conflicts between buses, passengers, and bicycles at stations. In addition to improving safety, this type of stop layout typically keeps the bus in-lane, reducing delay and friction associated with merging into and out of traffic – and enabling faster and more reliable transit operations.

This station configuration is designed to improve safety for bicyclists and pedestrians, and clarify interactions among all modes. Some locations may necessitate context-specific tradeoffs for transit users at the station.

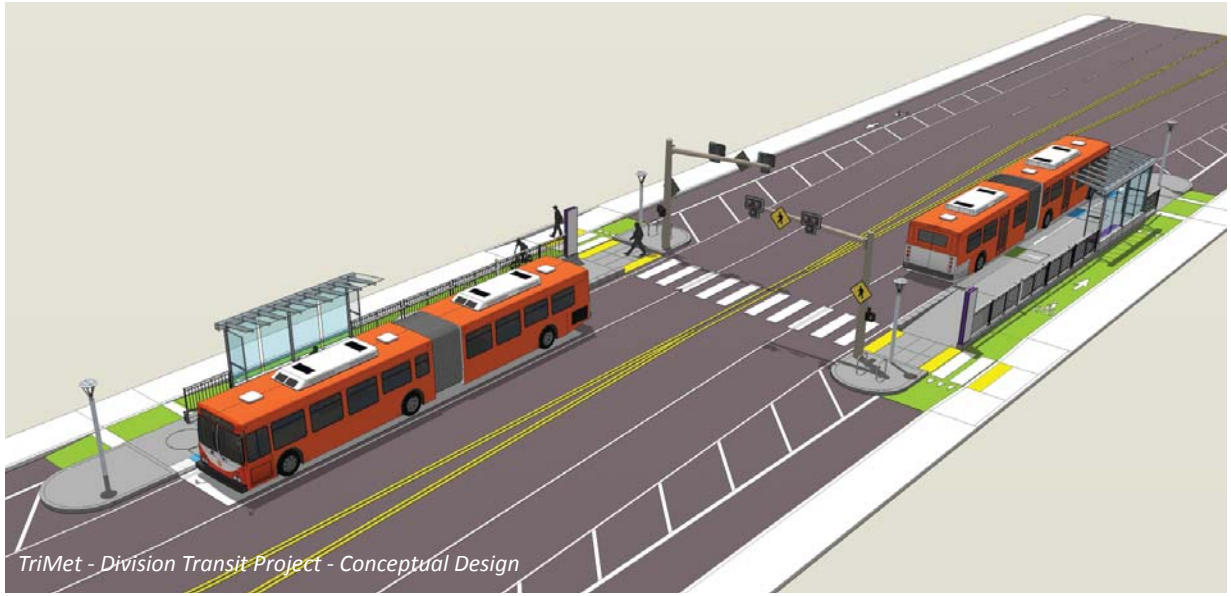
Key Features

- Concrete platform constructed along the right side of the roadway, typically within a current parking area or travel lane. Alternatively, the roadway may be widened to accommodate the platform and bikeway
- Pavement markings (including green pavement treatment) and signage create a separate lane that directs bicycle riders around the back of transit boarding areas
- Pedestrian access across the bike lane is delineated with recognizable crosswalk treatments (ladder striping, yield markings, tactile warning), creating clear connections to/ from the platform and sidewalk
- A raised the crosswalk is preferred across the bike lane to the bus stop island. This channelizes pedestrian crossings and alerts cyclists to yield to pedestrians

Application

- Streets with heavily-used transit routes and protected bikeways where adequate right-of-way permits the “island” configuration
- Where right-of-way is limited, bicycles may be directed up onto a shared platform/sidewalk environment around the back of a transit stop. This requires adequate platform space, clear markings, and features that slow bicycles down as they move through the station area
- This treatment is most appropriate for wider roadways, with a high level of interaction among bicycles, pedestrians, and transit.

TriMet - Moody and Gaines Traffic Island



TriMet - Division Transit Project - Conceptual Design

Left-Side Bike Lane

**$$**$$

Dedicated bike lanes running on the left side of one-way streets can minimize or eliminate bus/bike conflicts for right-side boarding buses, improving safety and allowing for more efficient transit operation.

Application

- One-way streets with heavily used transit routes where traffic speed and volume requires separated bicycle facilities

Jonathan Maus/BikePortland

Dedicated Bike Signal

**$$**$$

Dedicated bike signal phasing near a transit stop – or at intersections where the bus turns – can improve multi-modal integration and reduce conflicts by clarifying the interaction among bicycle riders, pedestrians, and transit vehicles and users.

In some cases, dedicated bike signals can minimize transit delay by providing reliable and specifically-timed separation of transit and bicycle movements. However, the primary purpose is to improve safety for bicyclists.

Key Features

- Requires a dedicated signal head, a specialized signal controller, and adequate queuing space for bicycles

Application

- Heavily used bicycle routes where transit/ bicycle interactions present safety challenges or impact transit performance
- These treatments do not always increase transit travel time. The benefits are more for organizing interaction between the modes and increasing safety

J.Maus/BikePortland

Local Example

SW Moody Ave at Tilikum Crossing Bridge (Portland, OR)

HDR


HDR

HDR

Capital/Operational Toolbox: Multi-Modal Interaction

Shared Bus/Bike Zone

$$$$

Shared bike/bus zones are dedicated for use by buses and bicycles only. Designed to clarify multimodal interactions and improve safety, shared zones are typically short segments near stops or stations that provide bicycle connections to exclusive bike lanes.

This type of treatment is appropriate only in highly constrained locations. It is not ideal for either bicycle safety or bus operations, and should be avoided if more separation is possible.

Key Features

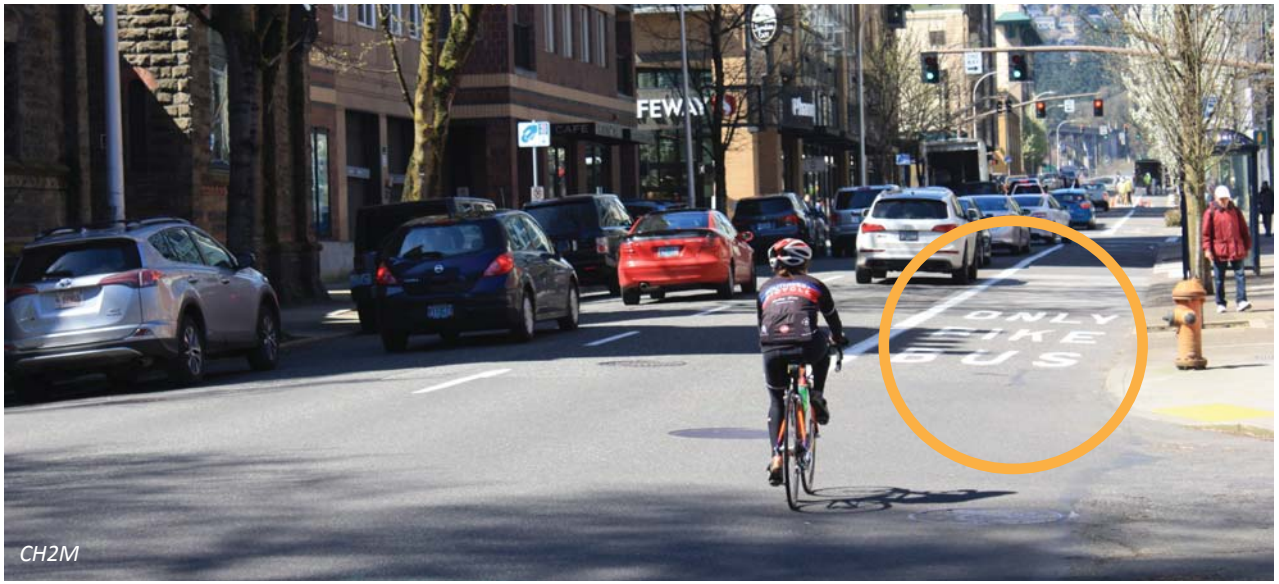
- Signage and pavement markings clarify expected bus and bicycle movements
- Not appropriate for long distances or areas where buses are traveling at speed
- Preferred configuration separates bikes from buses at stations/stops, with buses stopping in the lane and bikes separated from buses behind the station

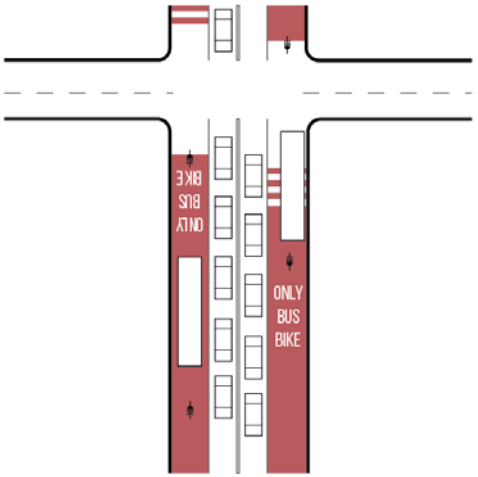
Application

- Transit stop/station vicinity where full separation is not feasible, and buses and bicycles must share space safely as buses move into and out of from stop or station areas

Local Example

Westbound SW Jefferson at SW 10th Avenue (Portland, OR)





NACTO "Shared Bus - Bike Lane"

Curb Extension for Stations/Stops

**$$$**$

Also known as "bus bulbs," these sidewalk curb extensions provide a larger passenger waiting area and allow buses to stop in lane. They help minimize bus delay, reducing time spent waiting for gaps in traffic to re-enter the travel lane. Curb extensions provide other benefits, as well: they can improve pedestrian safety by shortening crossing distance at intersections, and minimize parking removal by reducing the transition area needed for a bus to reach the curb.

Key Features

- The curb extension must be long enough to accommodate passengers boarding and alighting by the front and rear doors of the vehicle
- Strategic placement can aid in crossing safety and traffic calming

Application

- Can be applied in both mixed-flow and dedicated transit lane conditions
- Can be installed at near or far side of an intersection, or at mid-block stops
- Requires a street cross section with on-street parking or other curbside uses between curb extensions (cannot interrupt a general purpose travel lane)

Local Example

Northbound and southbound at NW 23rd Avenue at NW Irving Street (Portland, OR)

Level Boarding

$$$$

To achieve near-level or level boarding stop/station platform, heights are raised to match the height of the bus floors, allowing for easier access into and out of the bus at the front and back doors. Level boarding means less time raising and lowering ramps (or the bus itself), facilitating faster boarding and alighting for all passengers, especially those using mobility devices and strollers. In turn, this minimizes overall bus dwell time, improving transit speed and reliability.

Key Features

- Buses have ramps and bridge plates that extend or fold out to cover any horizontal gap between vehicle and station platform

Application

- Application varies based on adjacent land uses, right-of-way availability, and integration with the sidewalk environment

Cost Considerations

- The cost of level boarding improvements can vary widely, depending on the need for new or rebuilt boarding platforms – and whether buses must be retrofitted with specialized equipment for ease and safety of boarding

Local Example

EmX Bus Rapid Transit System (Eugene, OR) and Portland Streetcar (Portland, OR)

CH2M

Railroadforums.com

All-Door Boarding

**$$$**$

All-door passenger boarding allows riders to board and alight using all doors of a transit vehicle, minimizing passenger queues and delay associated with longer dwell time at busy transit stops.

While it can improve travel time and reliability, all-door boarding also raises fare payment considerations, since bus operators do not automatically serve as fare inspectors as they would with front door-only boarding.

Key Considerations

- All-door boarding can be combined with off-board fare collection and/or on-board electronic fare technology at each door to facilitate quick entry and compliant fare payment
- In areas where electronic fare technology is in place, cash fare payment is still accepted at the front door
- Designated "pre-queuing" areas at boarding platforms help identify locations where bus doors will open, orienting passenger line-ups to reduce passenger conflict and streamline the boarding process
- The efficiency of all-door boarding is increased further by level boarding

Case Study

San Francisco, CA: 36% reduction in dwell times reported with all-door boarding evaluation (Source: SFMTA, 2014)

SFMTA All Door Boarding Evaluation Final Report

Far-Side Bus Stop Placement

$$$$

In general, buses move more efficiently through signalized intersections when a stop is placed on the far side of the intersection. This enables the bus to clear an intersection before stopping, minimizing delay at traffic signals. In addition, it allows the bus to pull back into the travel lane by moving into the gap created by a signal phase. Bus stops can occupy less space since the transition to curbside is partially accommodated within the intersection. In addition to minimizing transit delay, far-side stops minimize conflicts with right-turning vehicles and can make pedestrians safer, since pedestrians are crossing behind the bus (rather than in front of it) and are visible to other roadway users.

Application

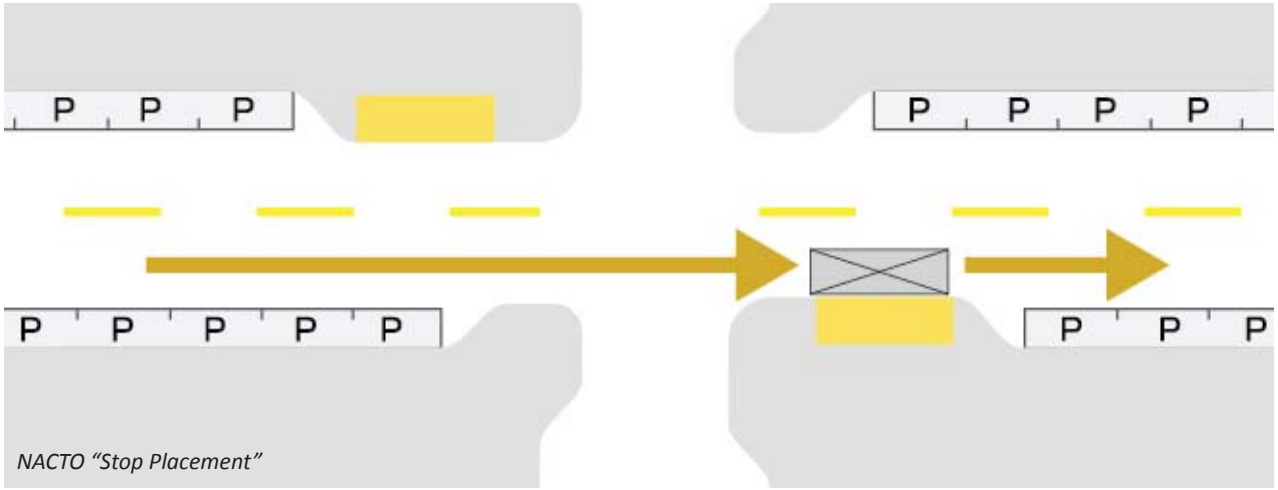
- Far-side placement is most effective when used in combination with transit signal priority (TSP)
- Stop placement depends on corridor land use, street/intersection design, sidewalk availability, driveway locations, and other conditions
- Stops can be placed in lane or in the shoulder
- Far-side placement can accommodate dedicated lane configurations and median stops (either right-side or left-side)

Cost Considerations

- Far-side bus stop costs vary based on specific stop configuration. "Bus bulbs" (as shown in the figure to the right) that allow the bus to stop in-lane increase the cost of this treatment considerably. These are rare, however; in general, buses cross the intersection and pull over to the curb.

Local Example

Westbound Stop at SE Division Street and 148th Avenue (Portland, OR)



NACTO "Stop Placement"

Bus Stop Consolidation

$$$$

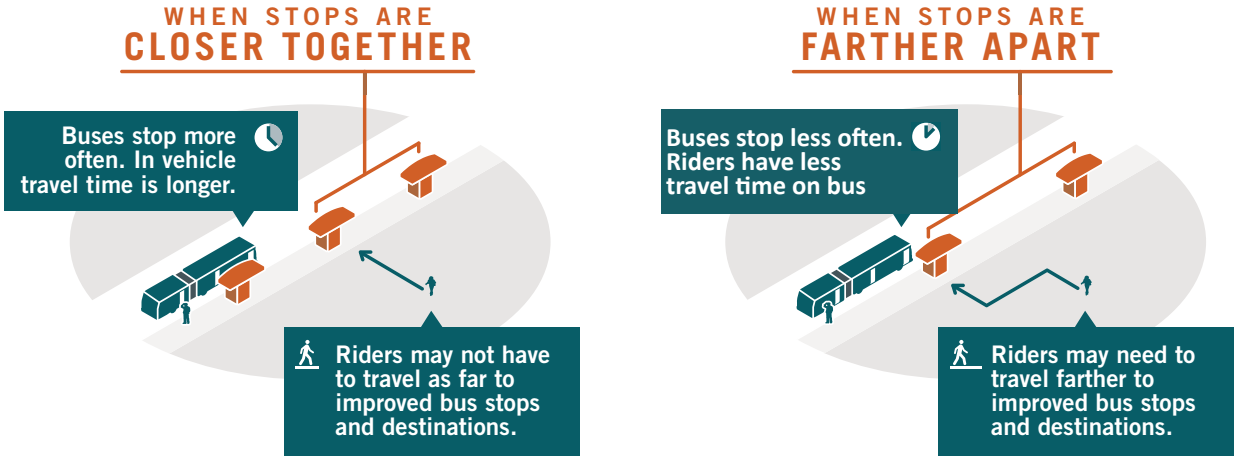
Consolidating stops can improve bus travel time by reducing delay associated with deceleration to, acceleration from, and dwell time at bus stops.

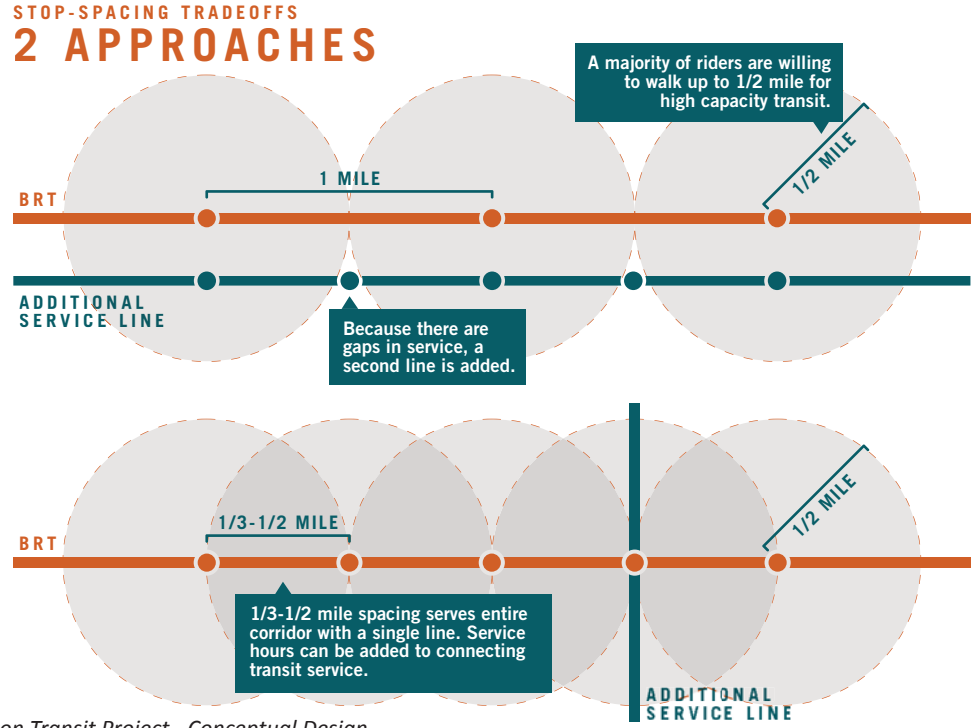
Key Features

- Creating "super stops" at major transfer points can provide rider amenities in addition to improving bus travel time
- Consolidating stops and removing underutilized stops requires public outreach and education
- Different types of service (e.g. local, limited, express) can exist in the same corridor, utilizing a different subset of stops

Application

- Corridors with a large number of closely spaced stops where roadway and pedestrian conditions allow for continued safe access to consolidated stops
- Consolidating bus stops may create opportunities for enhanced pedestrian crossing treatments
- Existing transit operating and maintenance facilities may need to be retrofitted or redesigned to accommodate longer vehicles, adding to the cost and time line for implementation





TriMet - Division Transit Project - Conceptual Design

Rolling Stock Modification

$$$$

Procurement and deployment of larger, modern buses offers a range of benefits to transit agencies, operators, and passengers alike.

- **Longer vehicles accommodate more passengers**, reducing pass-ups and adding capacity while minimizing the need for more frequent headways (including more buses and more operators)
- Modern **low-floor vehicles better accommodate level boarding and all-door boarding** more easily; these vehicles may be designed with left-side or right-side boarding (or both) to accommodate a range of station locations and designs
- **Precision docking technology** enables better platform/curb alignment, requiring less roadway space for stops
- Larger capacity vehicles have more space to **accommodate on-vehicle fare machines, bicycles, and passengers with mobility devices.** However, these features may reduce the space available for additional passengers
- Articulated configuration of a 60-foot bus can **improve bus turning radius**
- Existing transit **maintenance facilities may need to be retrofitted or redesigned** to accommodate longer vehicles, adding to the cost and timeline for implementation

BYD 60' Articulated Bus *BYT.com*

New Flyer Xcelsior- 60' Articulated Bus *Newflyer.com*

Portland Street Car

Capital/Operational Toolbox: **Operations/Other**

Street Design Traffic Flow Modifications

**$$$**$

Street design modifications to improve traffic flow can also improve transit vehicle speed and reliability. Adding right or left turn lanes provides roadway space for turning vehicles that would otherwise block transit and/or general traffic lanes. Using signage, pavement markings, and/or raised traffic barriers to manage access and turning movements at driveways and intersecting streets can reduce travel time, improve reliability, and increase safety by reducing multi-modal friction.

Tools to do this may include:

- Adding **right or left turn pockets** at intersections
- **Restricting left turns** to/from corridor driveways
- Striping bus **acceleration/deceleration lanes**
- Adding two-way left turn lanes
- **Driveway consolidation**
- Using **raised medians and other physical barriers** to direct traffic flow and minimize conflicts

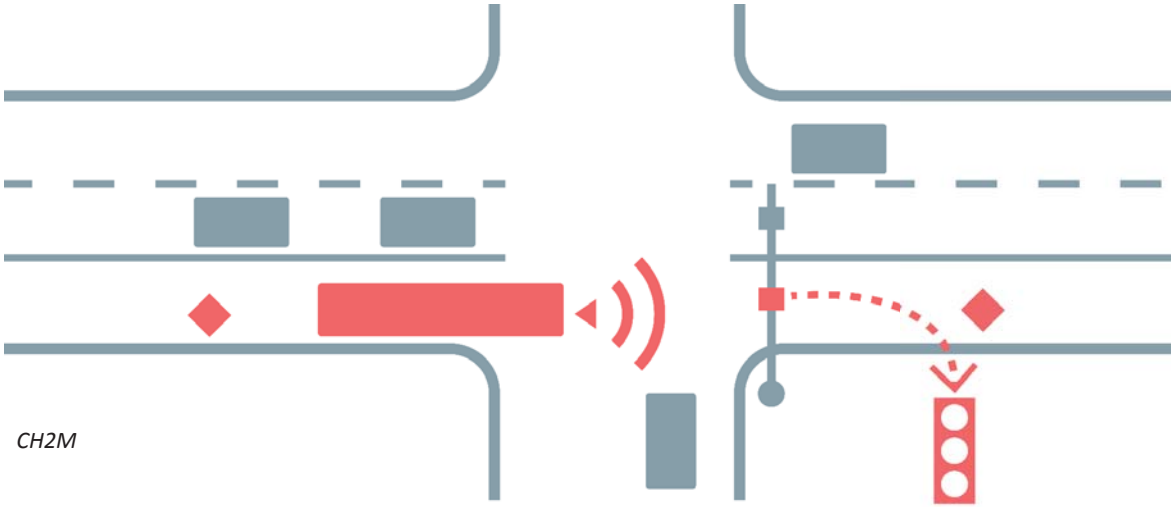
Regional Example

Rainer Avenue South Safety Corridor Project (Seattle, WA)

Transit Signal Priority and Signal Improvement

**$$$**$

Transit signal priority (TSP) uses a variety of signal technologies to give transit vehicles some measure of preference moving through intersections. The technology enables communication between transit vehicles and traffic signals (or the traffic control system) to alter signal timing/phasing and/or trigger a transit-only or transit-inclusive phase. TSP reduces transit delay at intersections, facilitating faster, more efficient – and in many cases safer – transit vehicle movement, while improving overall corridor operations. TSP is often an important element of queue jump effectiveness.



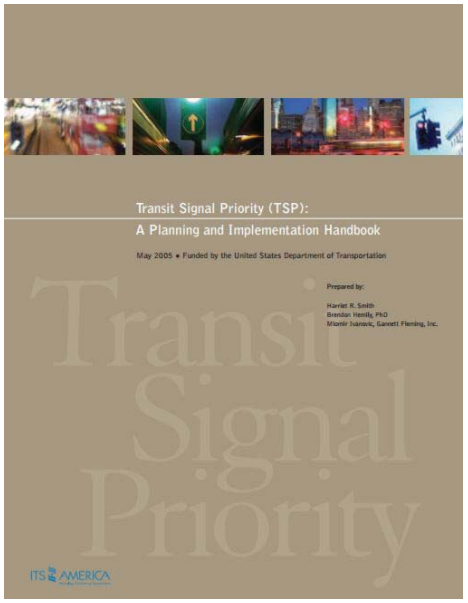
CH2M

Signal adaptations may include:

- Truncating a red light or extending a green light
- An advanced call to clear a traffic queue
- Triggering a transit priority phase (either conditional or unconditional)
- Signal timing modifications or progression that improves conditions for all traffic, including transit vehicles
- Dynamic phase change rotation

Technological characteristics may include:

- TSP communication (DSRC vs. cell-based central system)
- Peer-to-peer communication
- Block signals dedicated to transit
- Dynamic messaging and signing



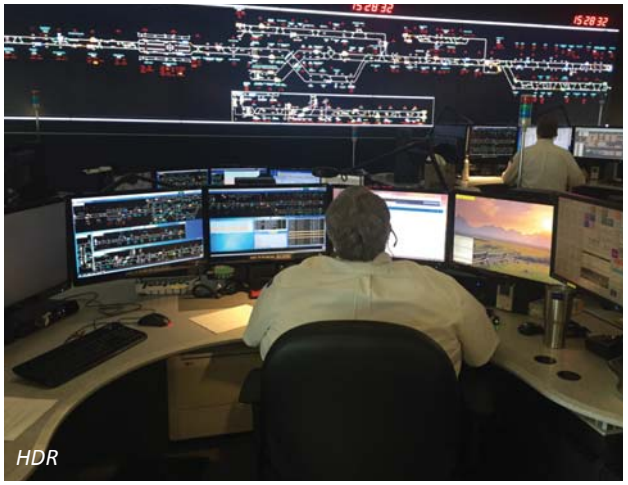
NACTO Planning and Transit Signal Priority Handbook, 2005
Regional Transit Signal Priority Study

Headway Management

**$$**$$

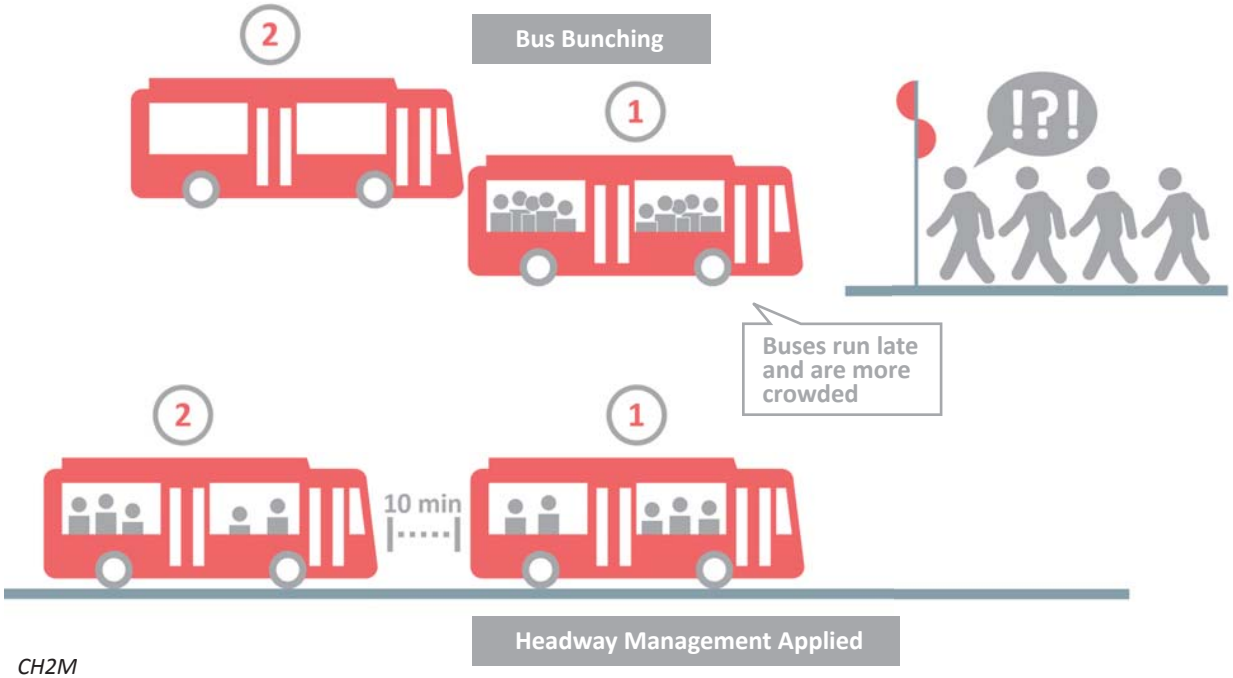
Bus bunching occurs when two or more buses immediately follow one another (or "bunch") when they were scheduled to be evenly spaced running along the route. Transit agencies use a variety of transit operation strategies to address this problem and improve on-time performance as well as reliability and safety. These strategies include:

- **Line management** – where dedicated supervisors and dispatch staff monitor headways and manage operations performance for specific lines or groups of lines, including the use of CAD/AVL and modern dispatch technology, and managing departure from terminals to improve on-time performance.
- **Headway-based service** – in which service operates without published schedules, eliminating the requirement for an operator to follow time-point schedules. This can reduce time-point waits, improving travel times and operating speed. Headway-based service may include advisory schedules for passengers, but typically relies on real-time information (connected to CAD/AVL systems) for "next arrival" times.



HDR

SounderBruce-Flickr



CH2M

Regional Enhanced Transit Concept Workshop Schedule

Workshop 1: Clackamas County | 1/25/2018 | 9:00 – 1:00pm

33	5th & Washington (Oregon City) to Oregon City Transit Center
33	SE McLoughlin & Jennings to Oregon City Transit Center
35	Pacific Hwy & Furman to Lake Oswego Transit Center
72	Clackamas Town Center Mall to SE 82nd & Flavel

Workshop 2+3: Portland: Central City (overlap with CCIM) | 2/1/2018 | 9:00 am – noon/1:00 – 4:00pm

- W Salmon
- Columbia/Jefferson
- Madison
- Multnomah
- Belmont (mostly done)
- East Burnside bridgehead
- Rose Quarter
- Wheeler

Workshop 4+5: Portland: Central City | 2/8/2018 | 9:00 am – noon/1:00 – 4:00pm

- Washington/11th/Morrison
- West Burnside
- MLK from Hawthorne to north Everett
- 1st/Harrison
- Weidler/9th
- 15/16th in Lloyd East Burn/Couch

Workshop 6: Washington County | 2/14/2018 | 9:00am – 1:00pm

52	TV Highway to 26 in full – skip the segment north of 26

Workshop 7: Portland: NON Central City | 2/22/2018 | 1:00 – 5:00pm

73	122nd & Burnside to 122nd & Shaver
73	122nd & Burnside to 122nd & Powell/Rhone
75	N Lombard & Portsmouth to Lombard TC

Workshop 8: Multnomah County | 3/1/2018 | 9:00am – 1:00pm

Broadway/Halsey NE 201st to NE Marine Drive	
87	181st Avenue Clackamas to Columbia Hogan Division to Halsey

Workshop 9: Portland: NON Central City | 3/8/2018 | 9:00am – 1:00pm

20	E Burnside & NE 82nd to E Burnside & Chavez
20	E Burnside & SE 82nd to SE Stark & 122nd
20	E Burnside & SE Sandy/NE Couch to E Burnside & SE Chavez

Workshop 10: Washington County | 3/14/2018 | 9:00am – 1:00pm

12	Barbur TC to Tigard TC; both directions
76	SW Boones Ferry Rd & Seneca to Tualatin Park & Ride
76	Beaverton Transit Center to SW Hall & Hart; both directions

Workshop 11: Portland: NON Central City | 3/22/2018 | 1:00 – 5:00pm

14	SE Hawthorne & 12th to SE Hawthorne & Chavez
14	SE Hawthorne & Chavez to SE Foster & Powell
15	Gateway TC to SE 102nd & Washington

Workshop 12: Portland: NON Central City | 4/5/2018 | 9:00am – 1:00pm

44	SE Capitol & 25th to SW Capitol & Sunset
12	E Burnside & SE Sandy to NE Sandy & 42nd
12	Parkrose/Sumner TC to NE Sandy & 82nd

Workshop 13: Washington County | 4/12/2018| 9:00am – Noon

48	185th and Saltzman
57	TV Highway revisited

Workshop 14: Oregon Department of Transportation | 4/19/2018 | 9:00am – 1:00pm

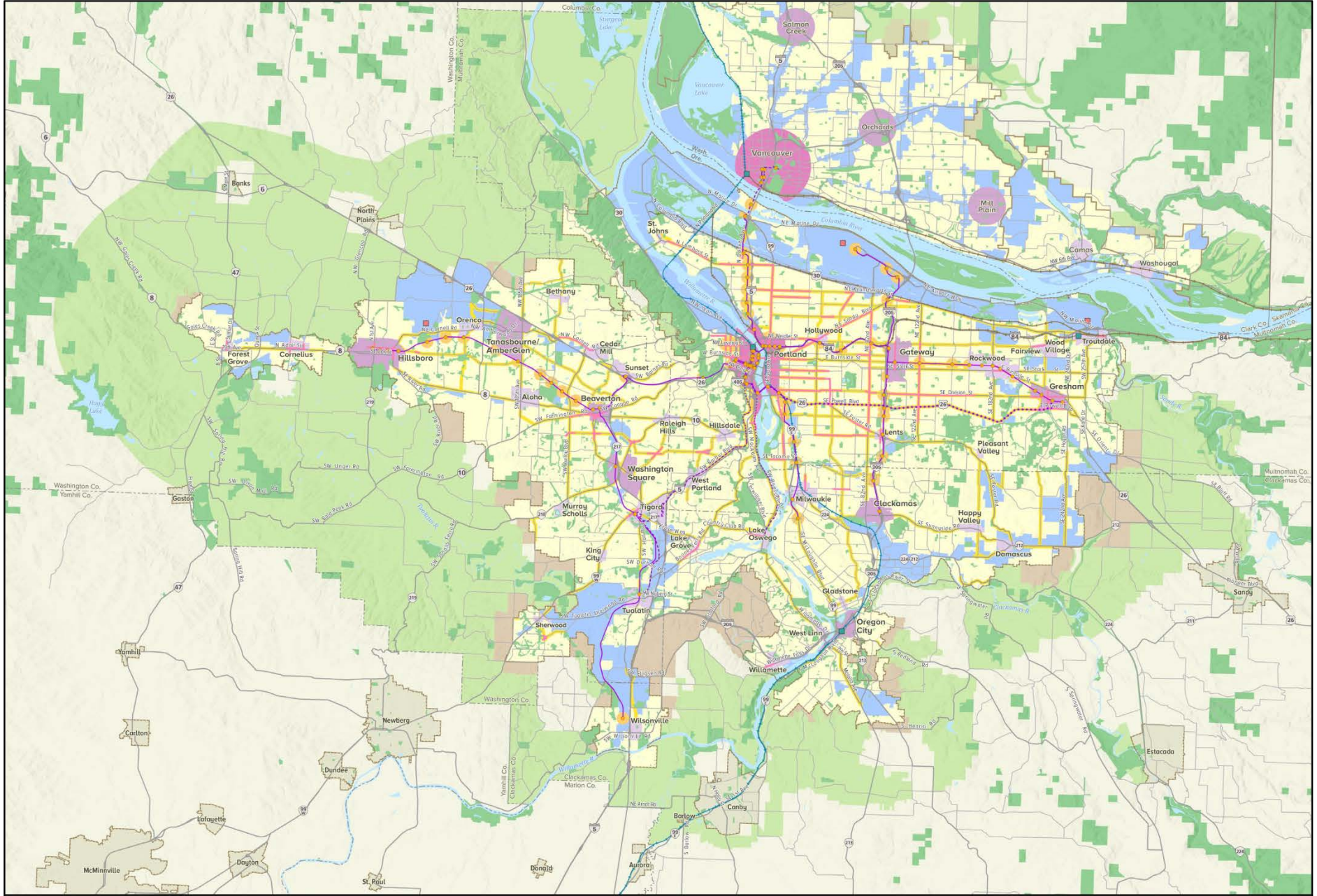
Any/all segments expected/desired to proceed in/on ODOT Facilities

Regional Enhanced Transit Concepts:
Table Setting Workshop

Metro Council Chambers: January 18, 2018

Agenda

- Welcome and Introductions
- What is the Enhanced Transit Concept?
- How did we get here?
- What is the purpose of Enhanced Transit Workshops?
- What is next?



2040 Growth Concept Map

September 2014

0 2 4 miles

The Metro 2040 Growth Concept defines the form of regional growth and development for the Portland metropolitan region. The Growth Concept was adopted in December 1995 through the Region 2040 planning and public involvement process. This concept is intended to provide long-term growth management of the region.

The map highlights elements of parallel planning efforts including: the 2035 Regional Transportation Plan that outlines investments in multiple modes of transportation, and a commitment to local policies and investments that will help the region better accommodate growth within its centers, corridors and employment areas.

For more information on these initiatives, visit http://www.oregonmetro.gov/2040

- Central city
- Regional center
- Town center
- Station communities
- Main streets
- Corridors
- Employment land
- Parks and natural areas
- Neighborhood
- Rural reserve
- Urban reserve
- Urban growth boundaries
- Existing high capacity transit
- Planned high capacity transit
- Proposed high capacity transit tier 1
- Mainline freight
- High speed rail
- County boundaries
- Neighboring cities
- Airports
- Intercity rail terminal

Metro
Making a great place

oregonmetro.gov

MAKING A GREAT PLACE
Metro

Climate Smart Strategy

for the Portland metropolitan region

oregonmetro.gov/climatestrategy

2014

The Future of TRANSIT

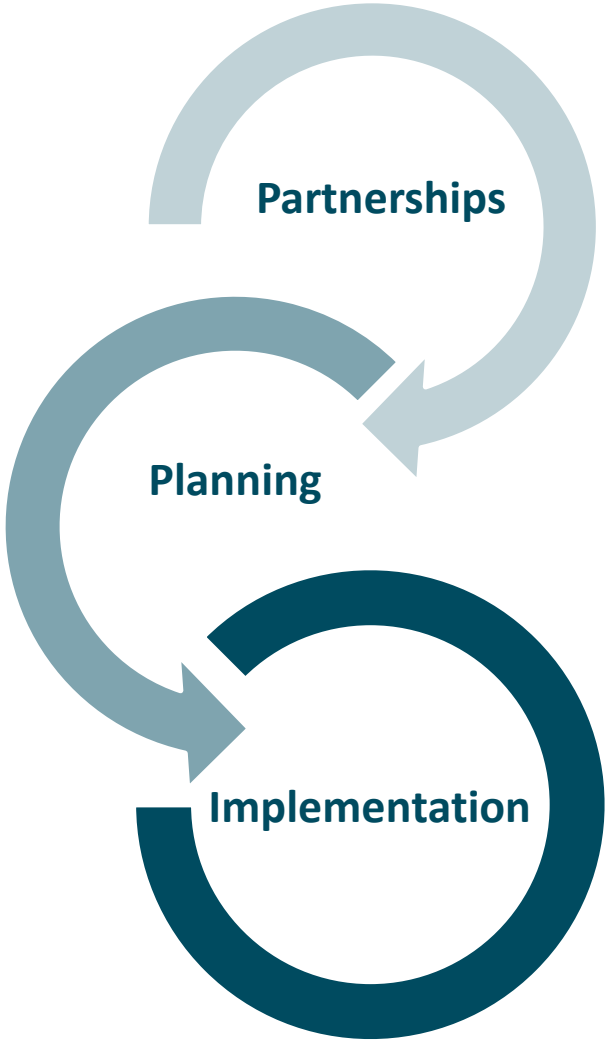
Regional Transit Vision

“The greatest barriers to the use of public transportation are time and reliability. If people can’t count on transit to get them there at a specific time, they’re not going to use it.”

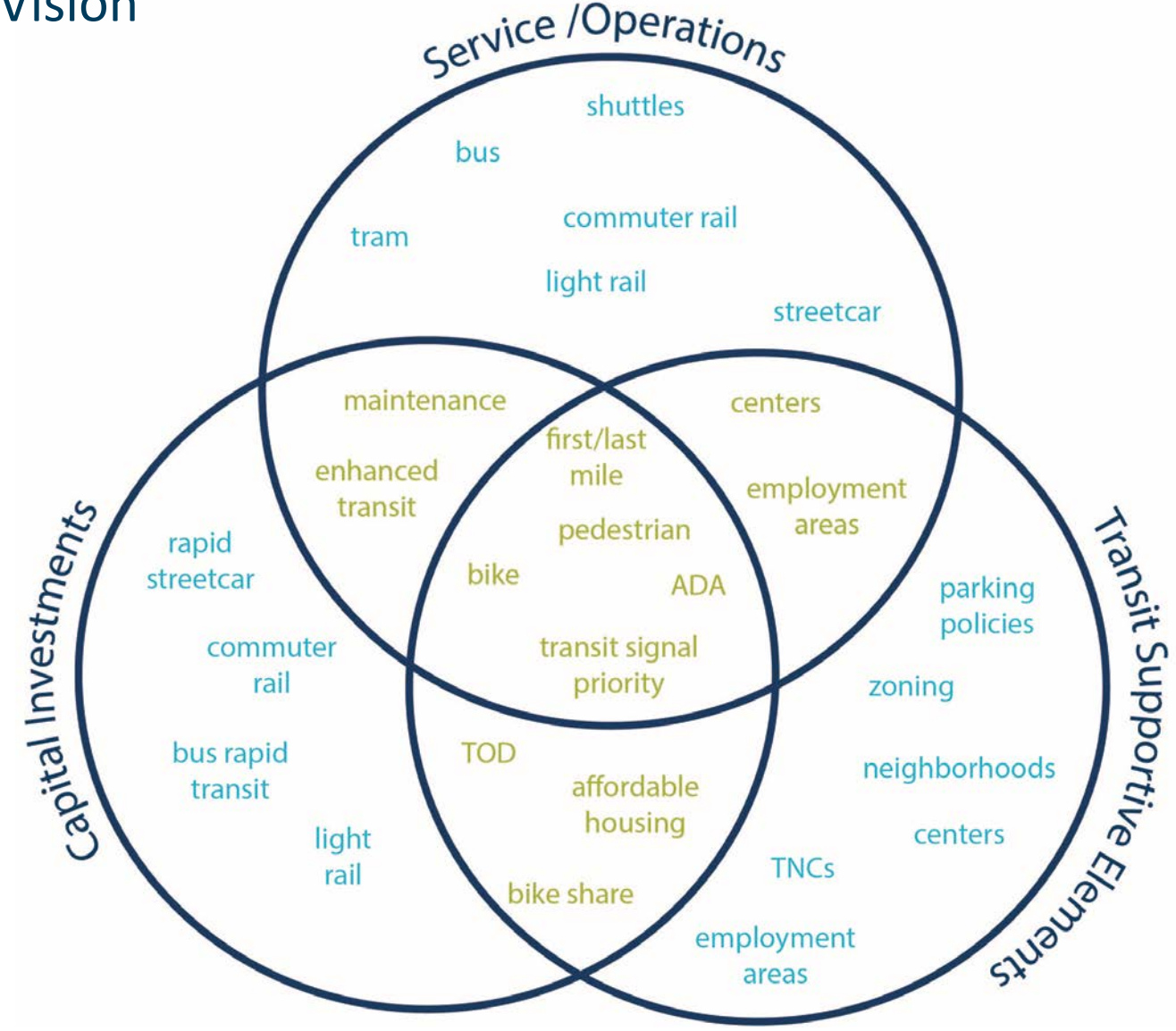
–Adria Decker Dismuke, Milwaukie resident

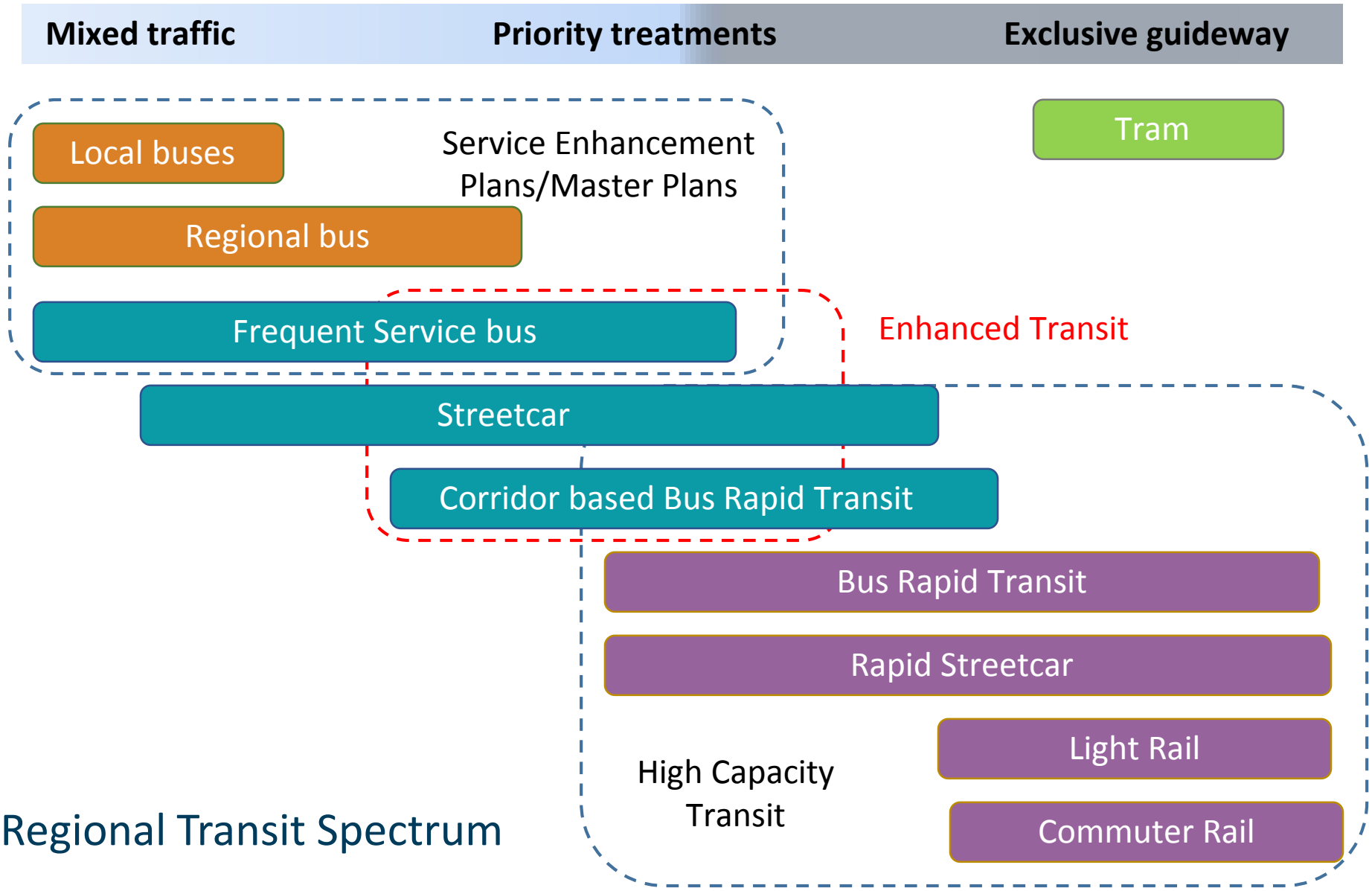
Regional Transit Vision

To make transit more frequent, convenient, accessible and affordable for everyone



Regional Transit Vision





Regional Transit Spectrum

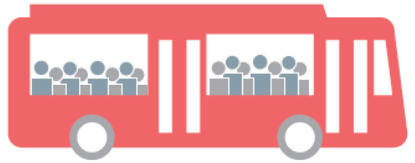
New opportunities and a mandate emerging: Enhanced Transit Concepts

Transit capital and operating partnerships:

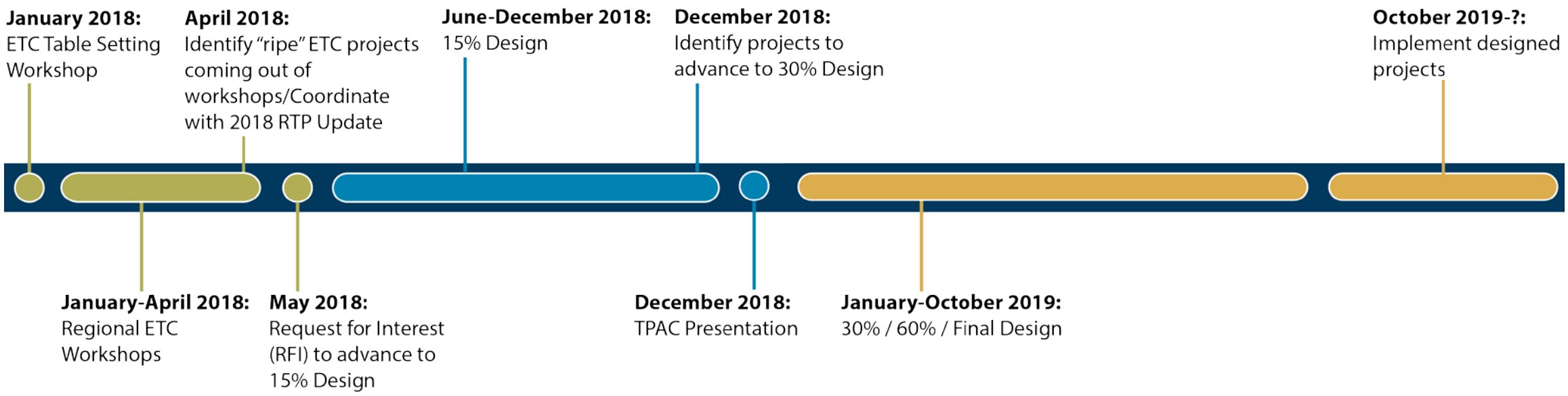
- Increase capacity and reliability where needed
- Relatively low-cost to construct, context-sensitive, and able to be deployed more quickly

Enhanced Transit Concept Pilot Program

- Improve transit reliability, speed, and capacity
- Identify, design and build a set of Enhanced Transit projects
- Develop a pipeline of Enhanced Transit projects

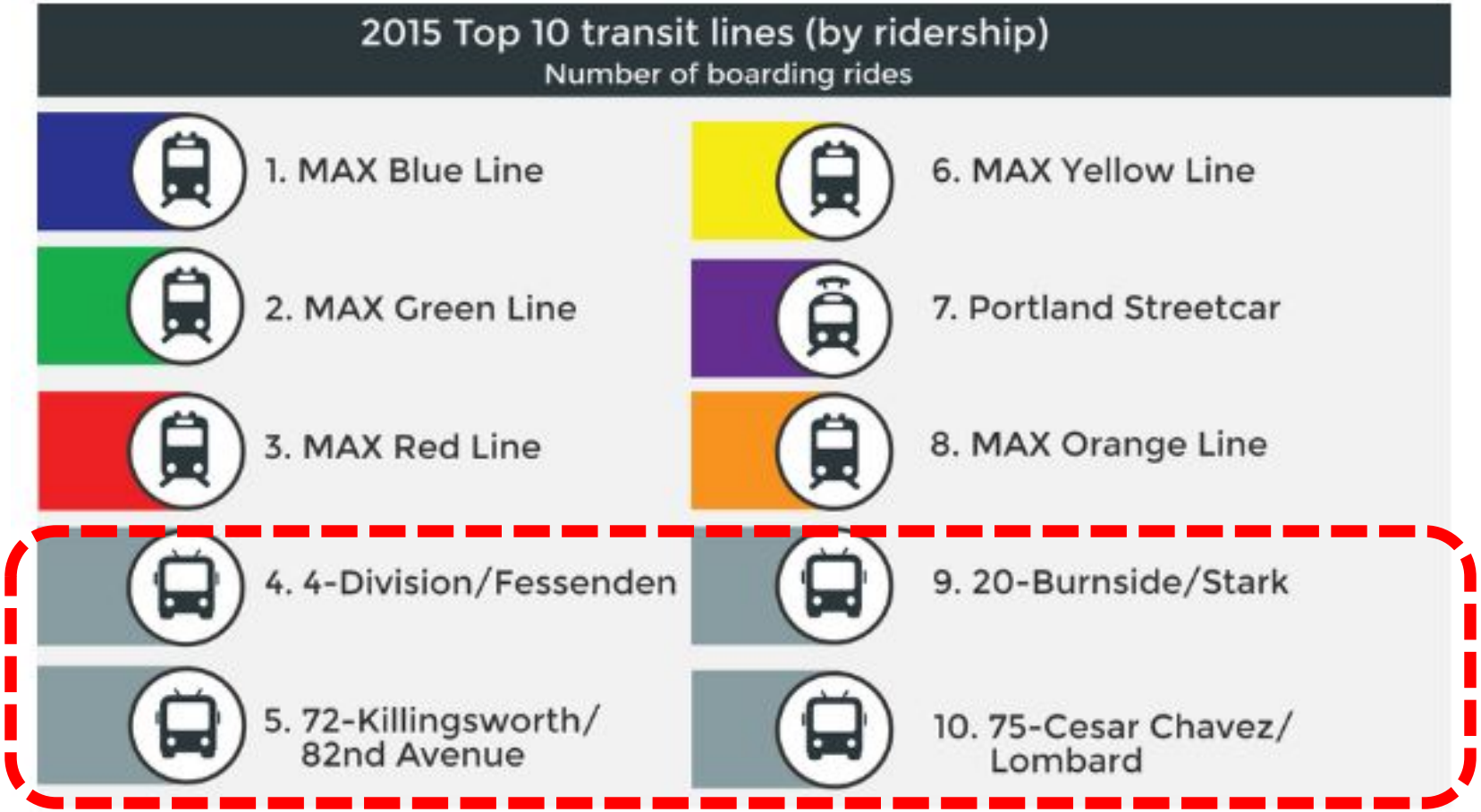


Regional ETC Project Schedule

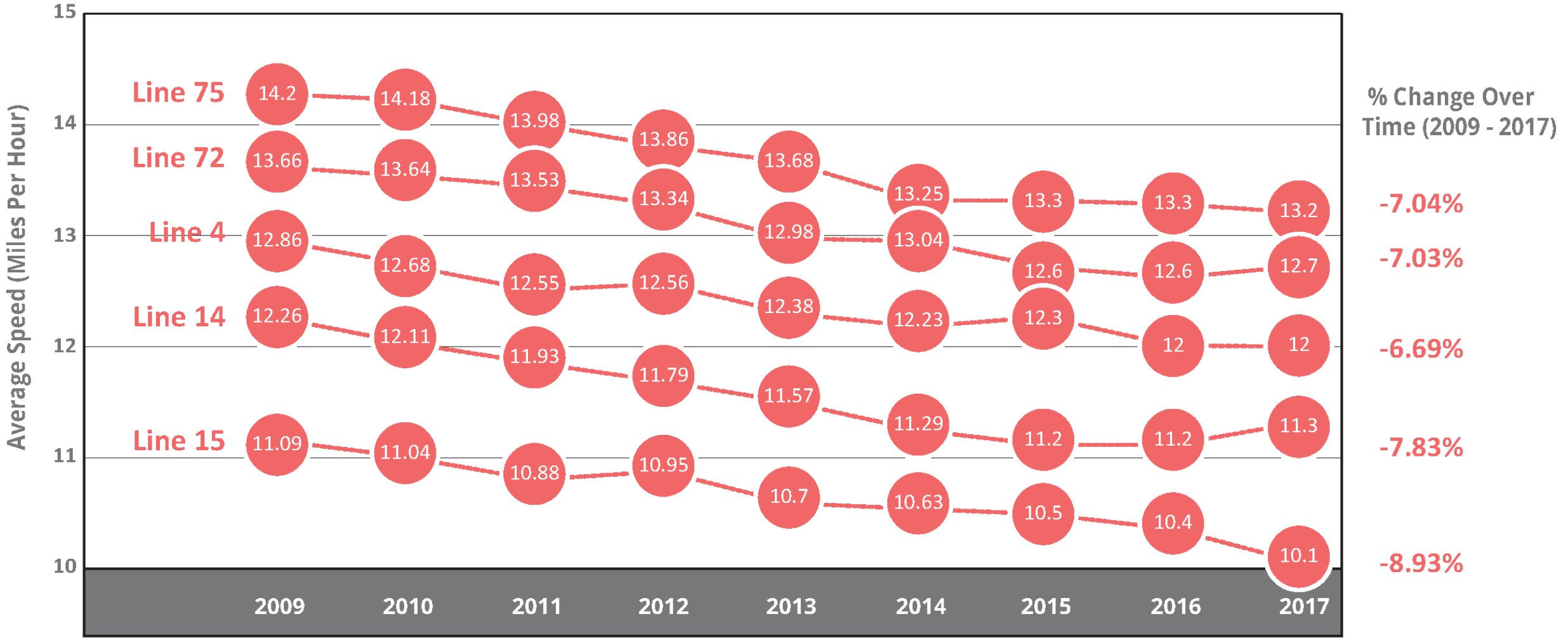


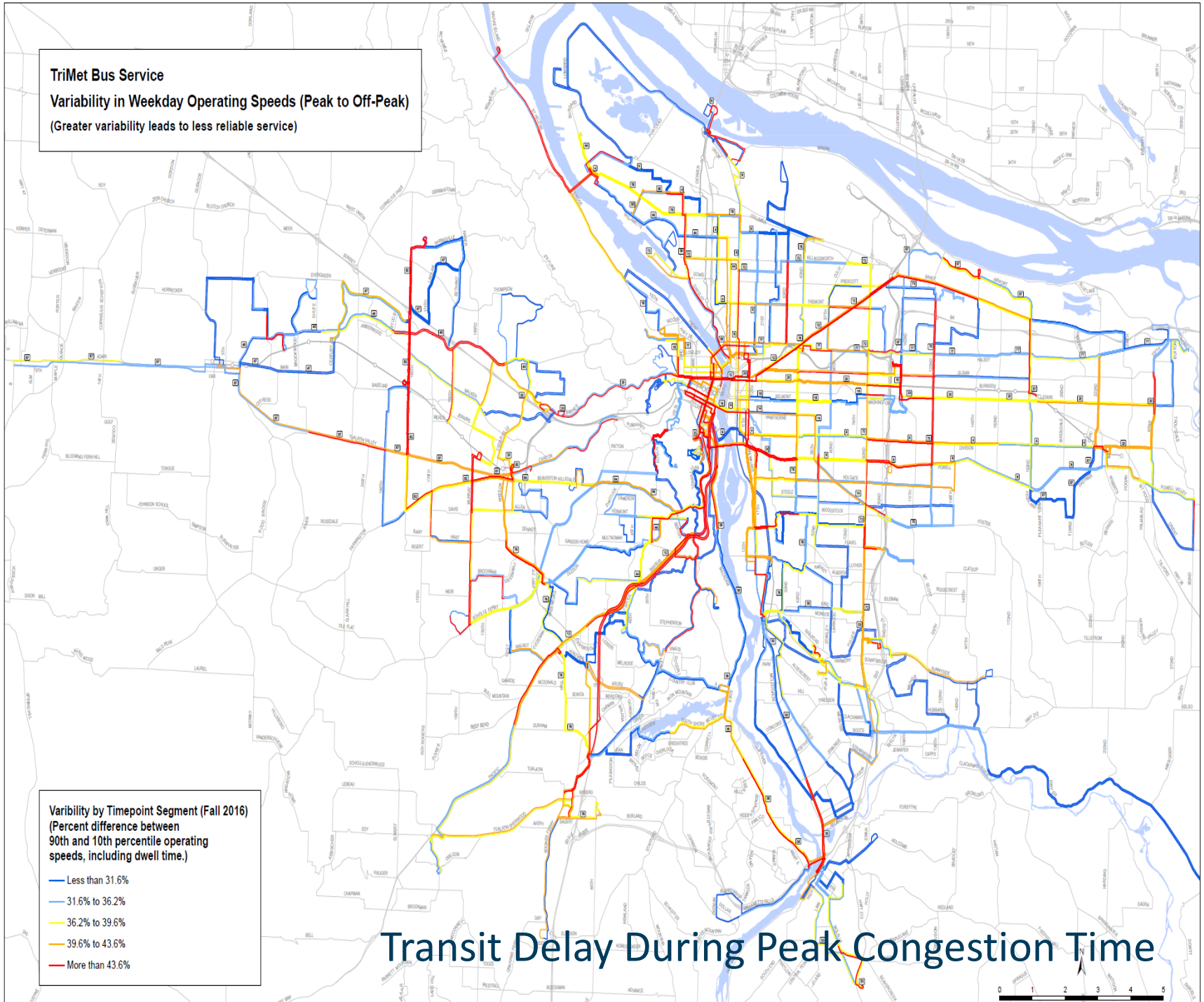
Why now?

Buses are a “work horse” and carry significant ridership regionally, up there with MAX



Buses are getting stuck in traffic and trips take longer





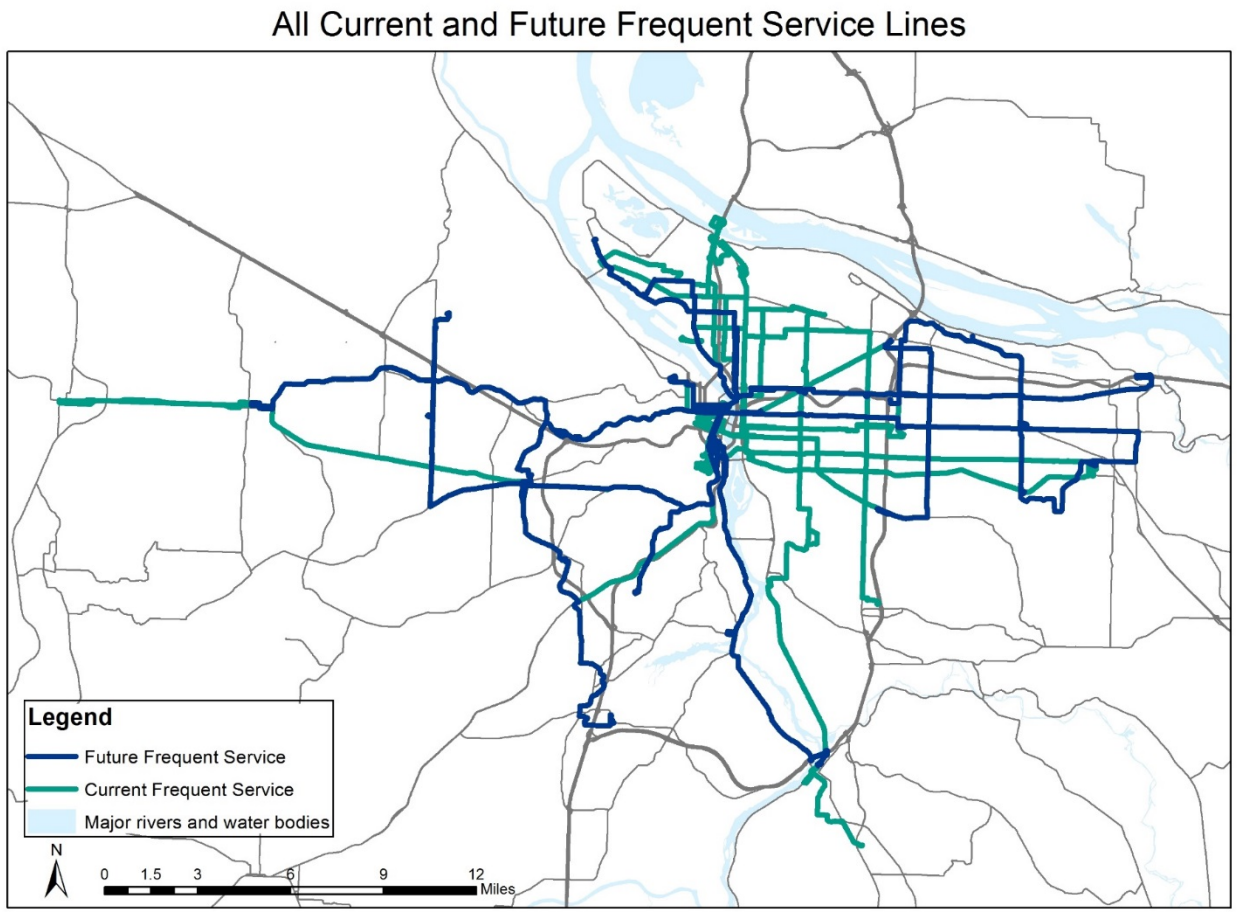
Transit Delay During Peak Congestion Time

Metro

How Did We Get Here?

Defining the ETC Universe

- Existing and future Frequent Service lines
- Broken into time point segments



Segment Scoring

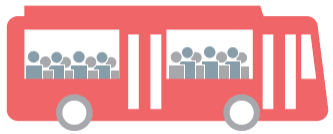
Each segment was scored from 1-5 on three variables:

- Reliability
- Dwell Time
- Ridership Per Mile

Segments that scored a 1 or a 2 on ridership were removed from the list

Composite scores were assigned to the remaining segments based on

- Ridership per mile + Dwell + (Reliability*2) = Composite score 5-20

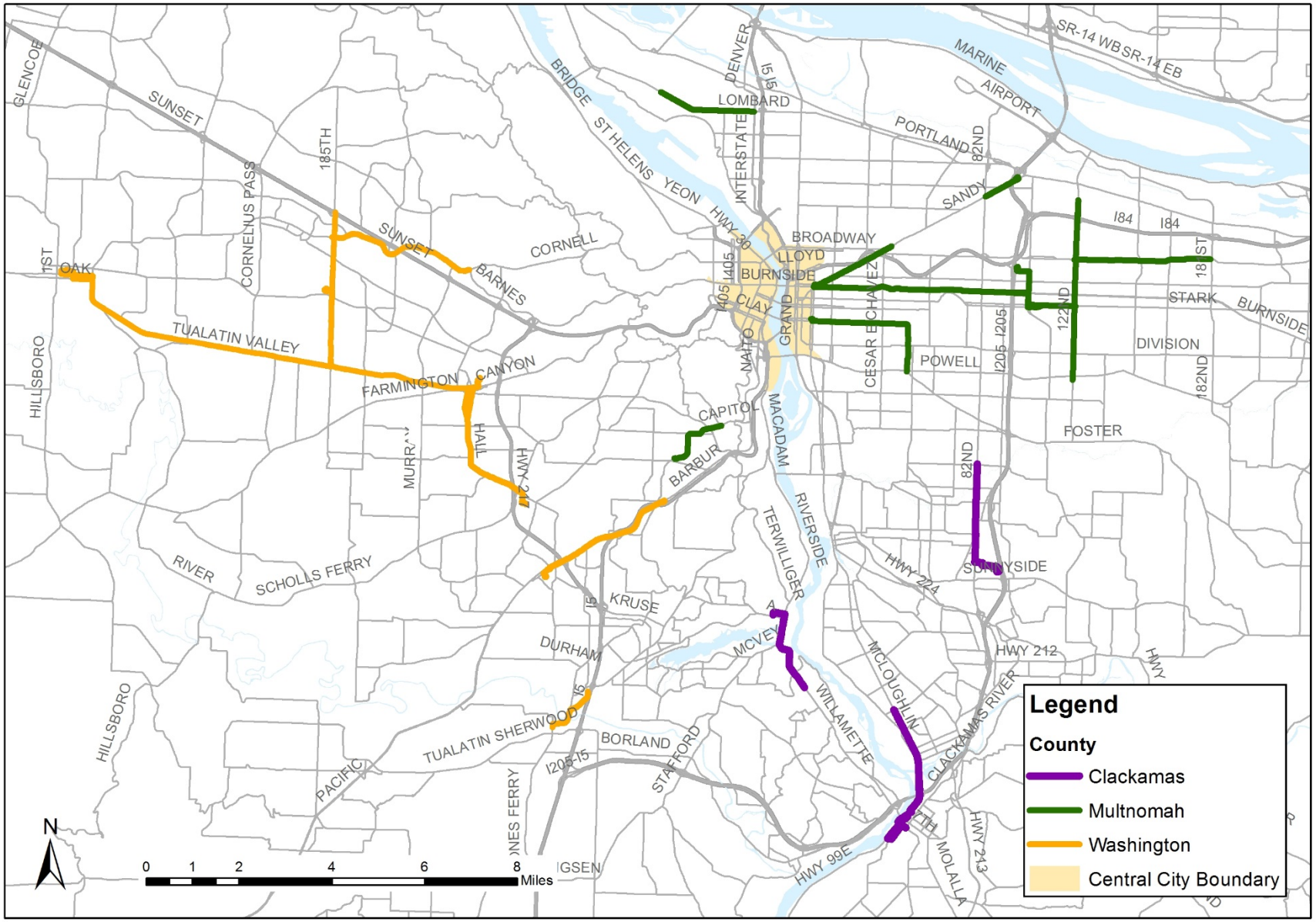


Segment Scoring

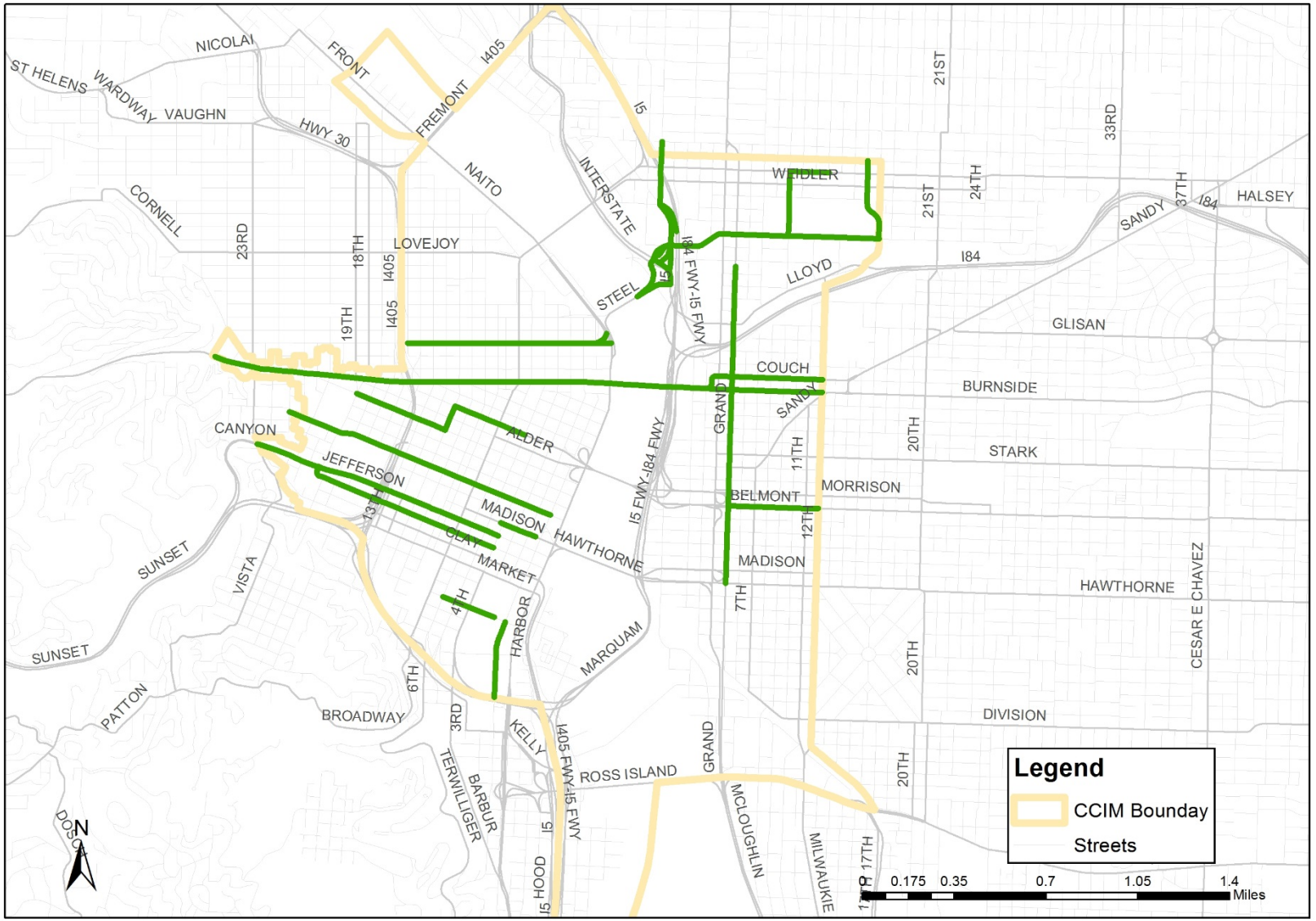
- Segments that scored <10 were removed
- There were 177 segments that scored 10 or greater

Jurisdictions to Participate in Enhanced Transit Workshops	Segments (Total = 177)
Portland Central City (CCIM boundary)	30
Portland Outside Central City	91
Multnomah County outside Portland	1
Clackamas County	14
Washington County	27
ODOT	Varies
Already studied (as part of Portland ETC Plan)	14

Workshop Segments (outside Portland Central City)



Workshop Segments within the Central City



Where is ETC?


SE MADISON ST
SE 10TH AV
P
SPEED 25
ONLY
BUS

Minneapolis Arterial Bus Program

Queue Jumps

All Door Boarding

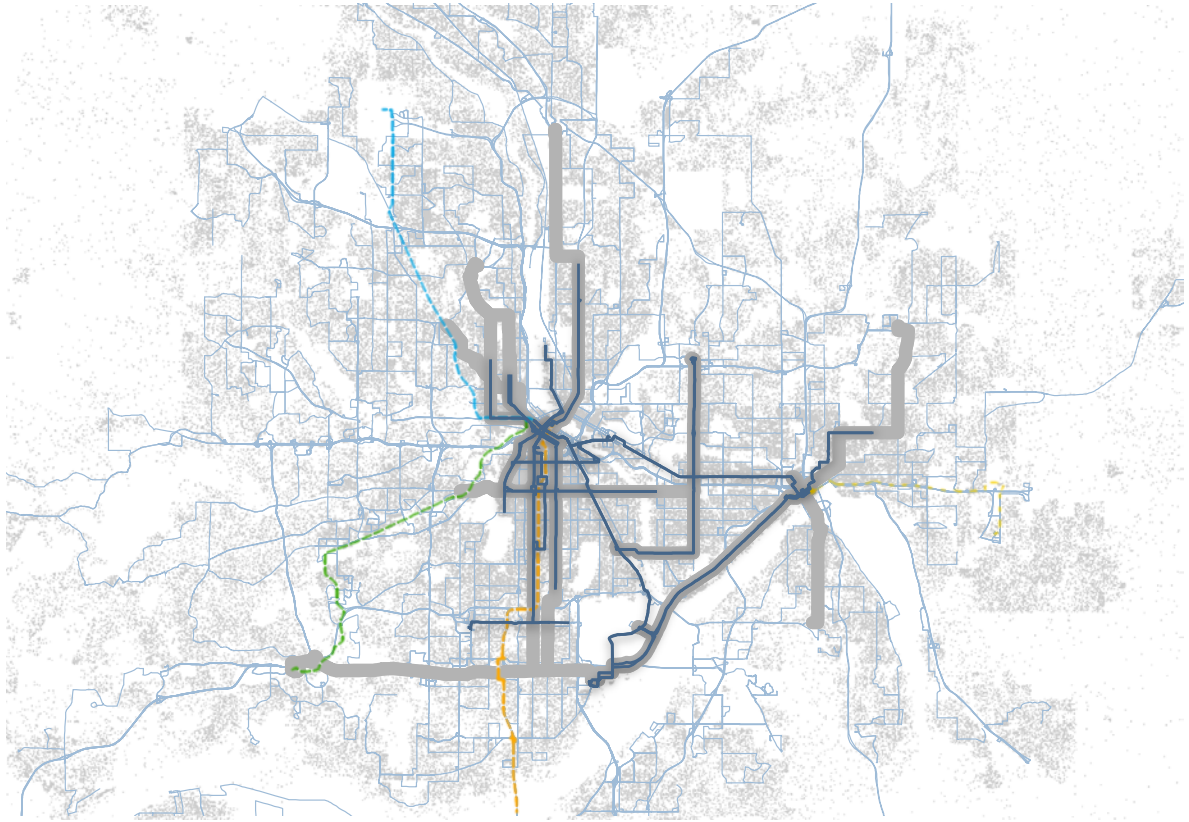
Electronic Fare Payment

Rolling Stock Modification

Far Side Stop Placement

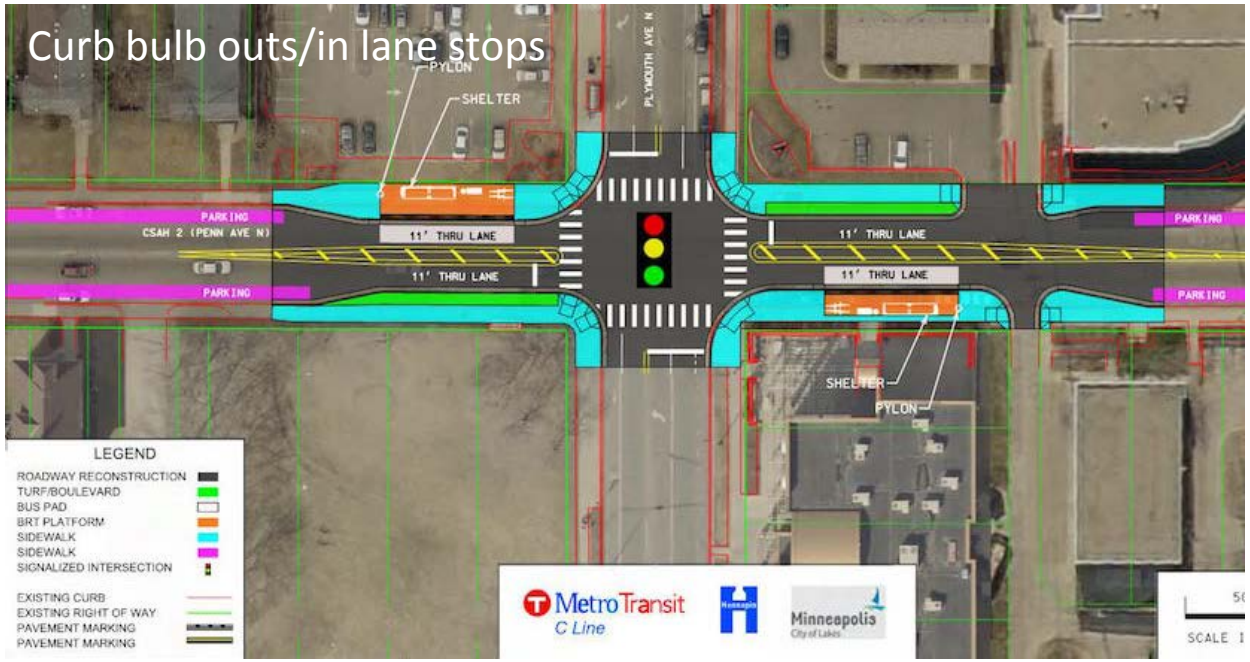
Stop Consolidation

Transit Signal Priority



All door near level boarding

Specialized vehicles with wider doors, open layout



Seattle Rapid Ride Program

Bus Only Lanes

BAT Lanes

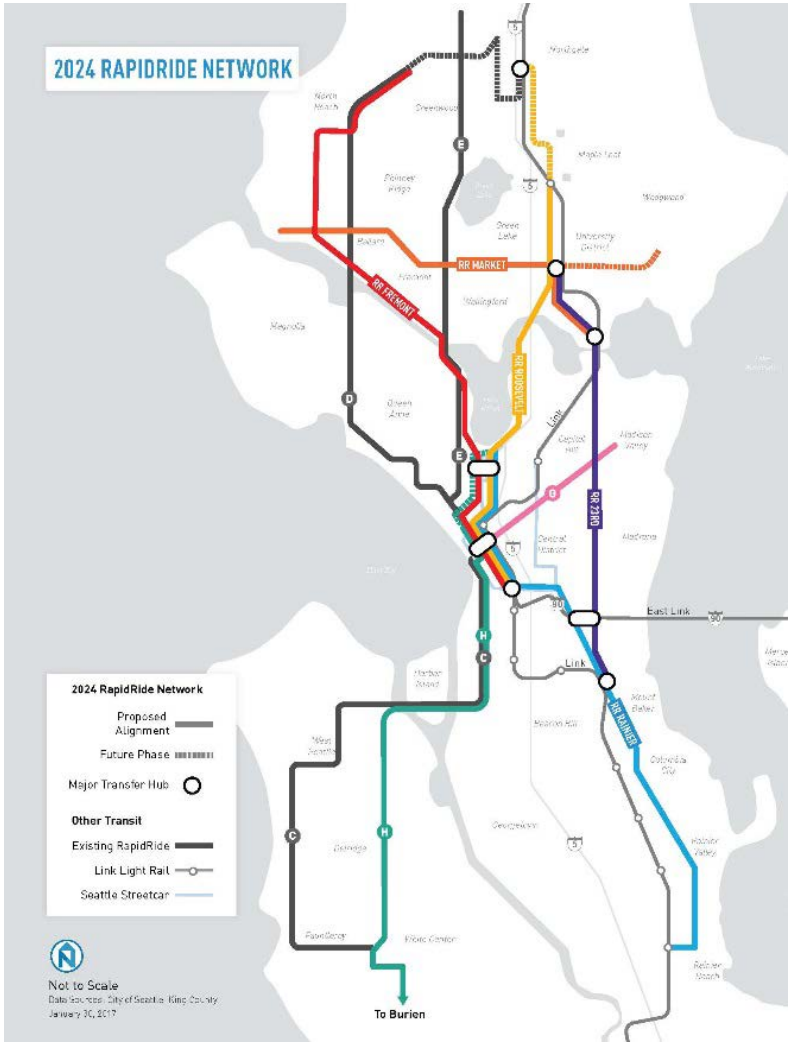
All Door Boarding

Electronic Fare Payment

Far Side Stop Placement

Stop Consolidation

Transit Signal Priority



Opportunistic about partner projects

Extensive use of BAT lanes

Significant stop consolidation

Strategic Bus Only Lanes

All door boarding and electronic fare payment

Chicago CTA Loop Link

Bus Only Lanes

BAT Lanes

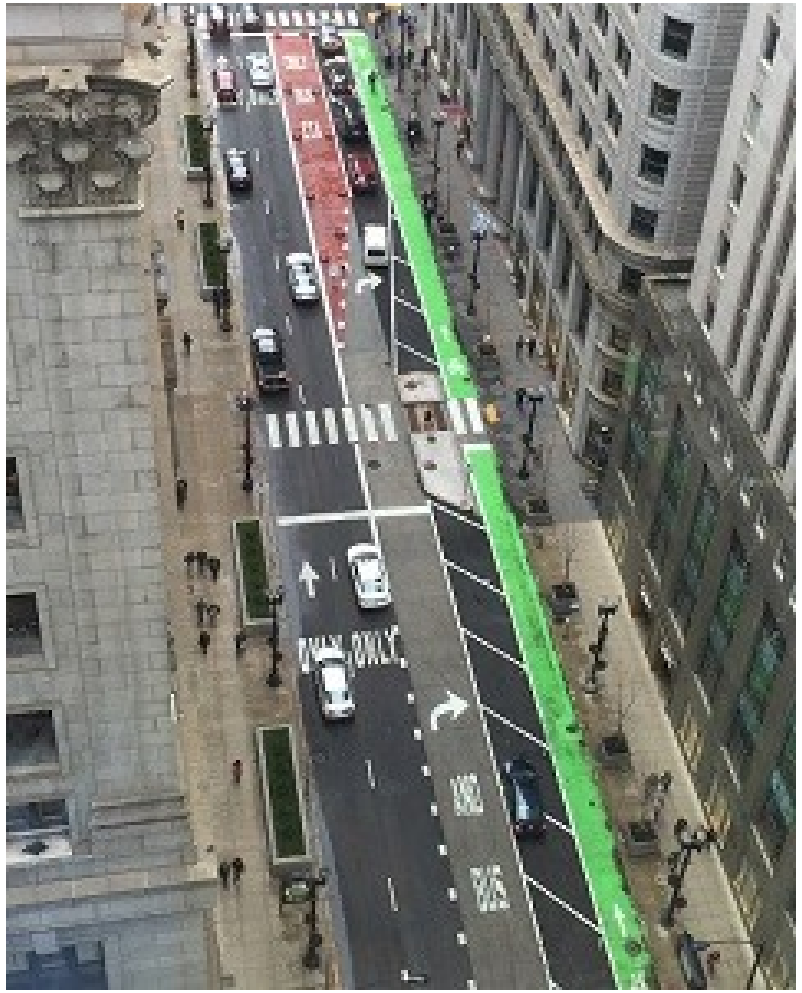
Queue Jumps

Multimodal Interaction

Level Boarding

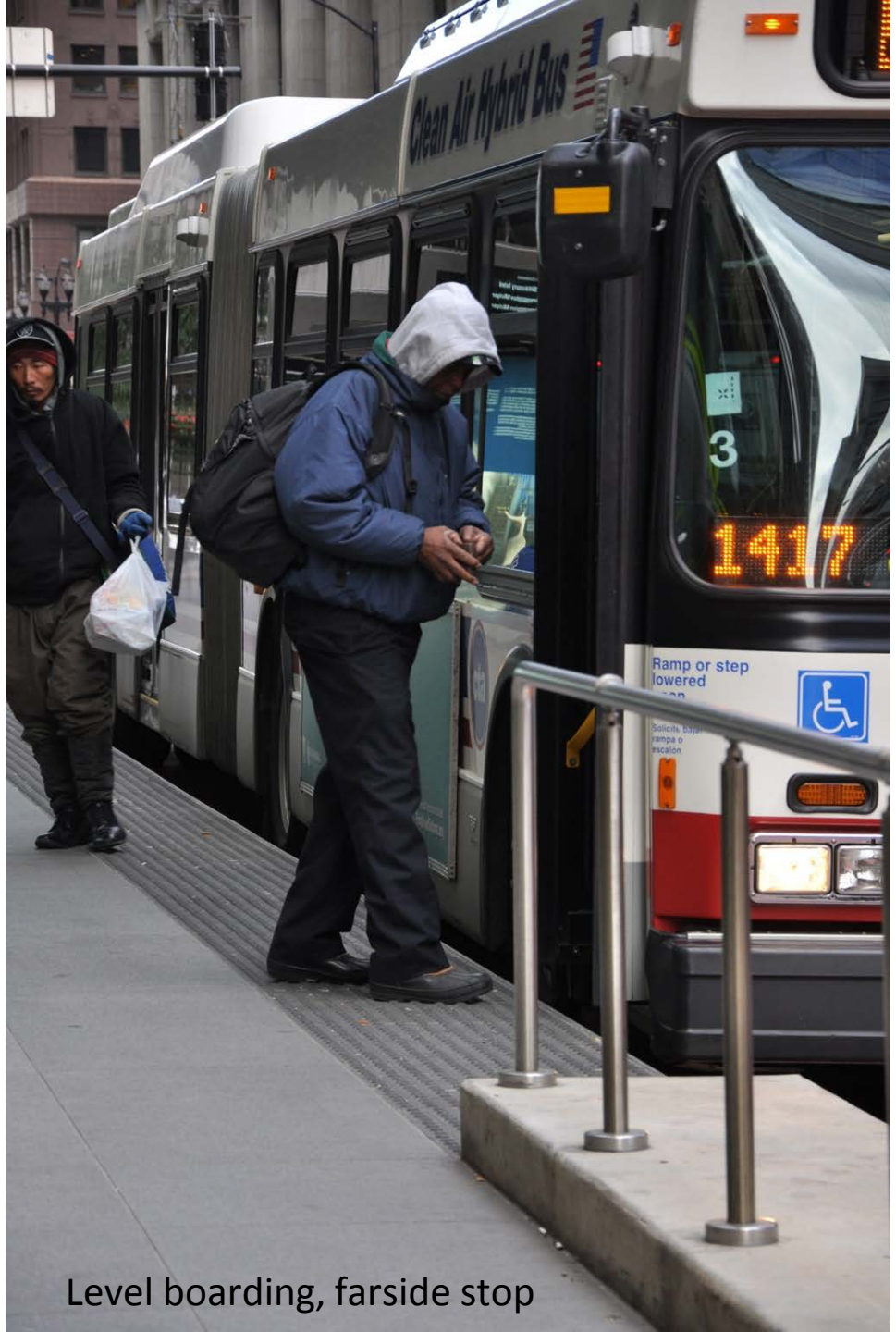
All Door Boarding

Electronic Fare Payment

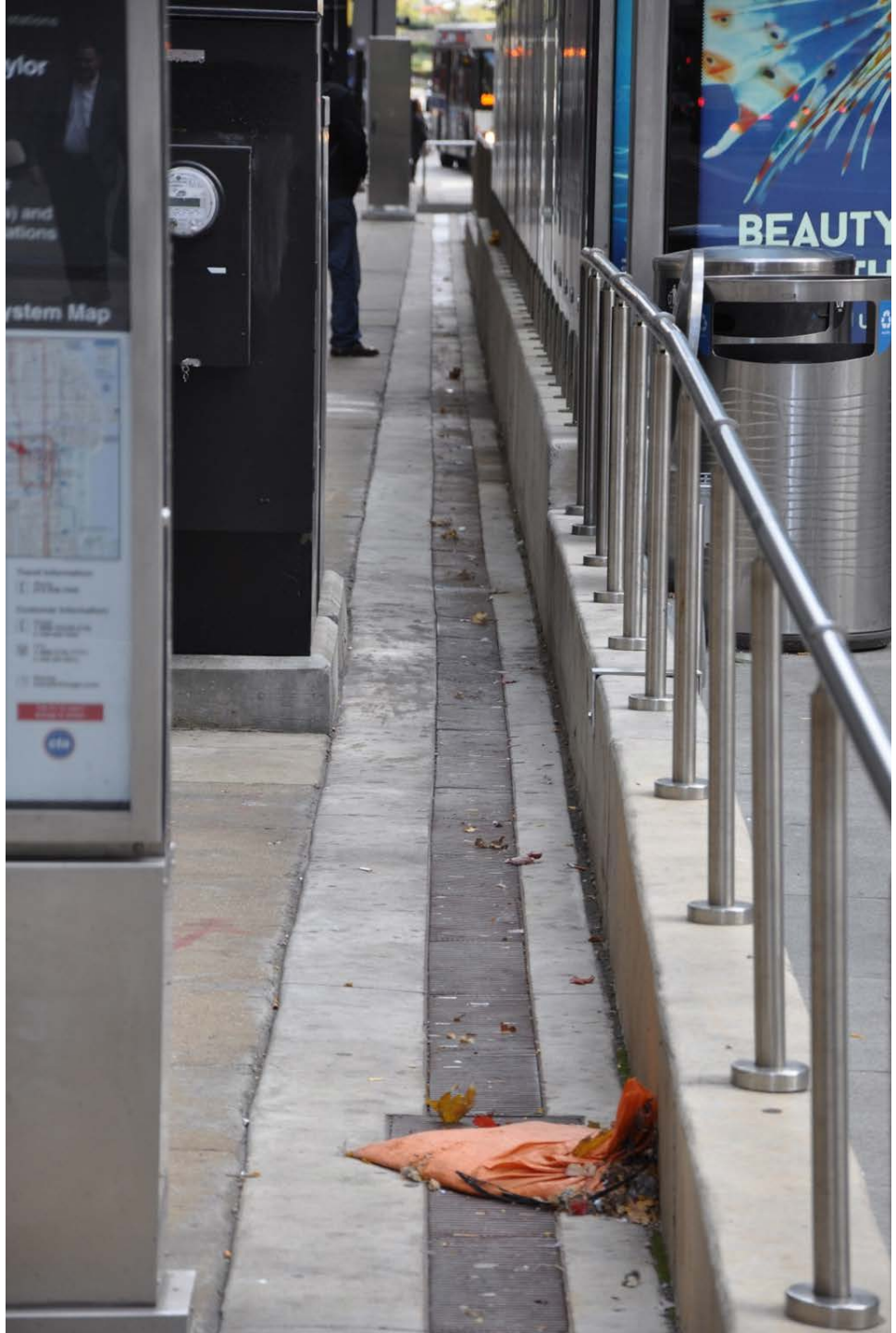


Bus Only lanes, level boarding, TSP combined

Queue Jump, Multimodal Interaction, TSP



Level boarding, farside stop



San Francisco MUNI increments

Transit-Only lanes

All door boarding

Curb bulbouts

Transit Signal Priority

Laneway treatments are key…

But the small moves of curb bulb outs…

and all door boarding really drove their performance

New York City Transit Program

Bus Only Lanes

BAT Lanes

Near-level boarding

Farside Stops

Transit Signal Priority

Multimodal Interaction

Incremental and cost effective retrofitting of existing streets

What tools do we have?

Enhanced Transit Corridors Plan

Capital/Operational Toolbox

Tools deployed/discussed at various scales

Regional
Bus on Shoulder
Transit Signal Priority and Signal Improvements
Headway Management
Corridor
Level Boarding
All-Door Boarding
Bus Stop Consolidation
Rolling Stock Modification
Transit Signal Priority and Signal Improvements

Hotspot
Dedicated Bus Lane
Business Access and Transit (BAT) Lane
Intersection Queue Jump/Right Turn Except Bus Lane
Transit-Only Aperture
Pro-Time (Peak Period Only) Transit Lane
Bikes Behind Station
Left-Side Bike Lane
Dedicated Bike Signal
Shared Bus/Bike Zone
Curb Extensions for Stations/Stops
Far-Side Bus Stop Placement
Street Design Traffic Flow Modifications

We have introduced many of these tools within our region and could amplify their impact

Regional
Bus on Shoulder
Transit Signal Priority and Signal Improvements
Headway Management
Corridor
Level Boarding
All-Door Boarding
Bus Stop Consolidation
Rolling Stock Modification
Transit Signal Priority and Signal Improvements

focus of the workshops

Hotspot
Dedicated Bus Lane
Business Access and Transit (BAT) Lane
Intersection Queue Jump/Right Turn Except Bus Lane
Transit-Only Aperture
Pro-Time (Peak Period Only) Transit Lane
Bikes Behind Station
Left-Side Bike Lane
Dedicated Bike Signal
Shared Bus/Bike Zone
Curb Extensions for Stations/Stops
Far-Side Bus Stop Placement
Street Design Traffic Flow Modifications

Hotspot Scale – addressed in the workshop

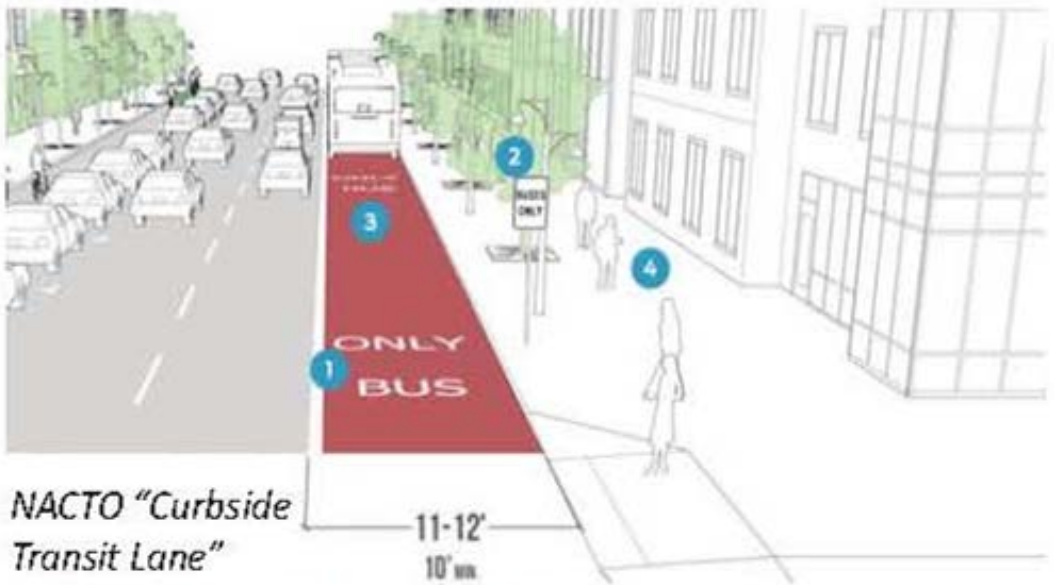
Capital/Operational Toolbox: Laneways and Intersection Treatments

Dedicated Transit Lane

$$$$

Local Example

Southbound 5th Avenue approaching I-405 (Portland, OR)



NACTO "Curbside Transit Lane"

Hotspot Scale – addressed in the workshop

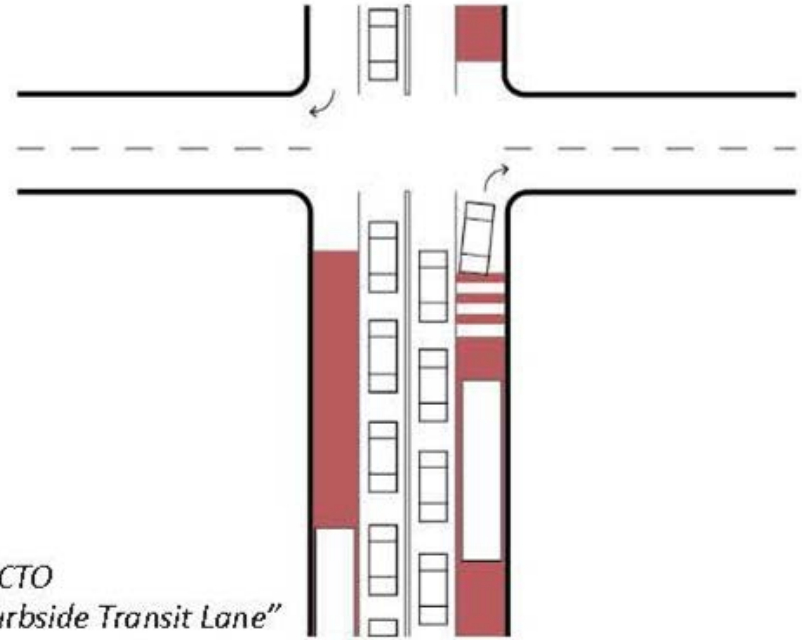
Capital/Operational Toolbox: **Laneways and Intersection Treatments**

Business Access and Transit (BAT) Lane

**$$$**$

Local Example

Southbound SW 11th Avenue approaching SW Columbia Street (Portland, OR)



NACTO
"Curbside Transit Lane"

Hotspot Scale – addressed in the workshop

Capital/Operational Toolbox: Laneways and Intersection Treatments

Intersection Queue Jump/Right Turn Except Bus Lane

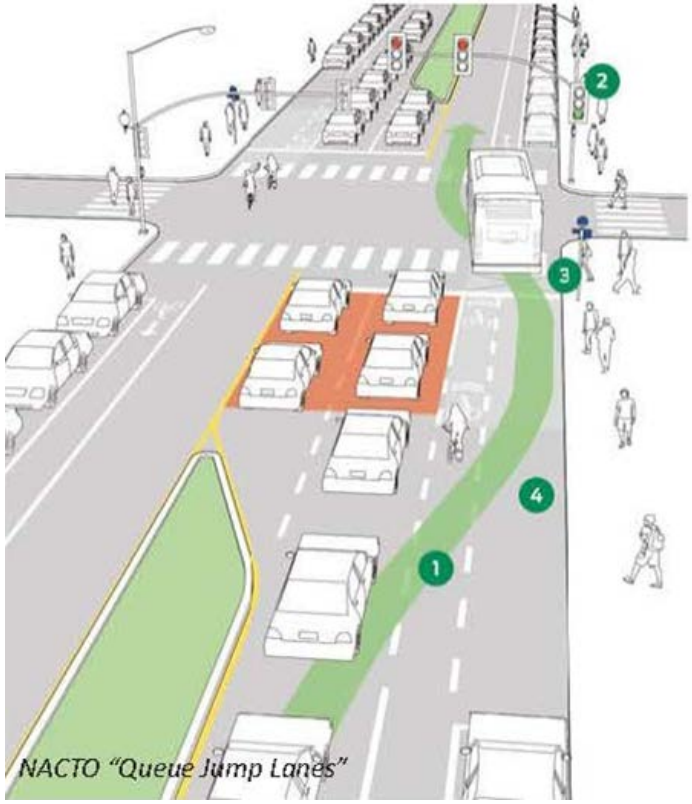
$$$$

Local Examples

Queue jump only – Eastbound SE Powell Boulevard at SE Foster Road (Portland, OR)

Queue jump with Right Turn Except Bus lane – Westbound SE Madison Street approaching the Hawthorne Bridge

Queue jump with bus pullout, no advanced signal phase – Westbound SE Powell at Milwaukie



Hotspot Scale – addressed in the workshop

Capital/Operational Toolbox: Laneways and Intersection Treatments

Transit-Only Aperture

$$$$

Local Example

Northbound SE 52nd Avenue at SE Division Street (Portland, OR)

Hotspot Scale – addressed in the workshop

Capital/Operational Toolbox: Laneways and Intersection Treatments

Pro-Time (Peak Period Only) Transit Lane

$$$$

Local Example

Westbound SE Morrison Street approaching the Morrison Bridge (Portland, OR)

Hotspot Scale – addressed in the workshop

Capital/Operational Toolbox: **Stops and Stations**

Curb Extension for Stations/Stops

$$$$

Local Example

Northbound and southbound at NW 23rd Avenue at NW Irving Street (Portland, OR)

Hotspot Scale – addressed in the workshop

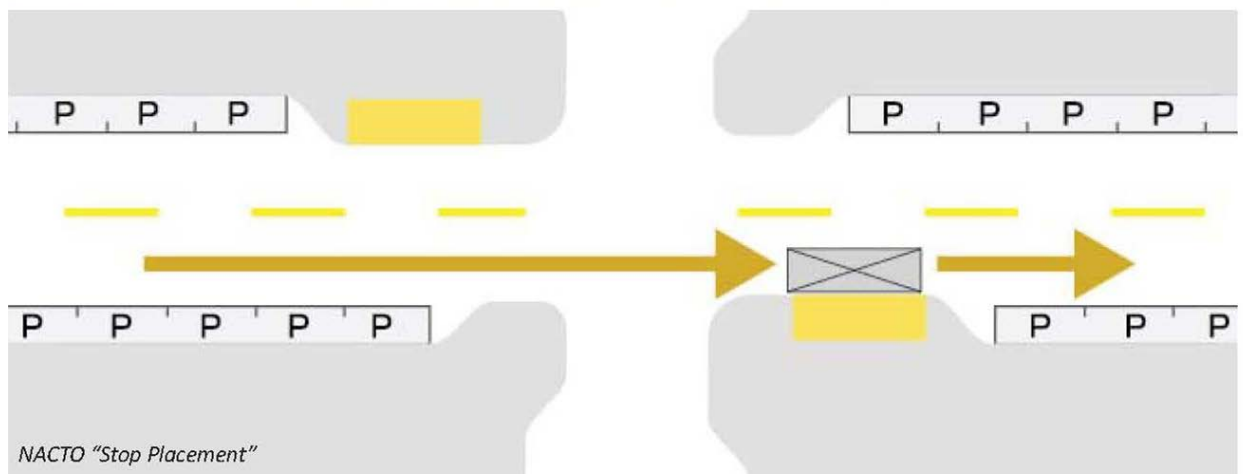
Capital/Operational Toolbox: **Stops and Stations**

Far-Side Bus Stop Placement

$$$$

Local Example

Westbound Stop at SE Division Street and 148th Avenue (Portland, OR)



NACTO "Stop Placement"

Hotspot Scale – addressed in the workshop

Capital/Operational Toolbox: **Operations/Other**

Street Design Traffic Flow Modifications

**$$$**$

Regional Example

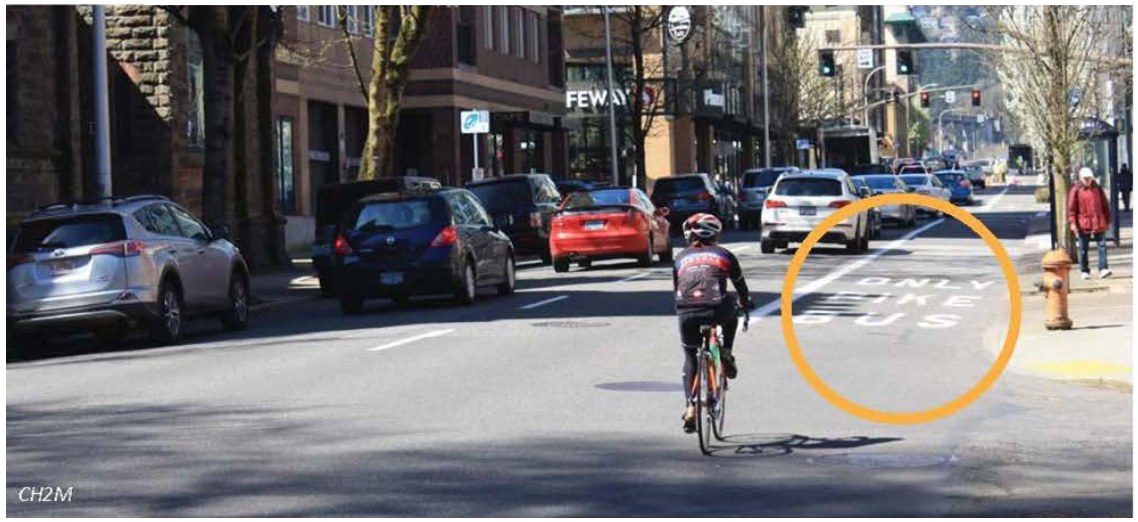
Rainer Avenue South Safety Corridor Project (Seattle, WA)

Tools to do this may include:

- Adding **right or left turn pockets** at intersections
- **Restricting left turns** to/from corridor driveways
- Striping bus **acceleration/deceleration lanes**
- Adding two-way left turn lanes
- **Driveway consolidation**
- Using **raised medians and other physical barriers** to direct traffic flow and minimize conflicts

Hotspot Scale – addressed in the workshop

Capital/Operational Toolbox
Multimodal Interaction

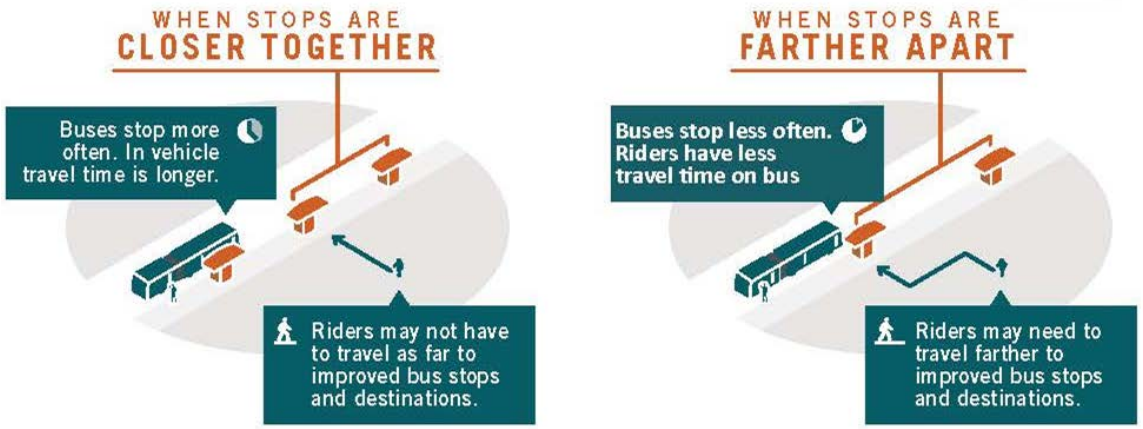


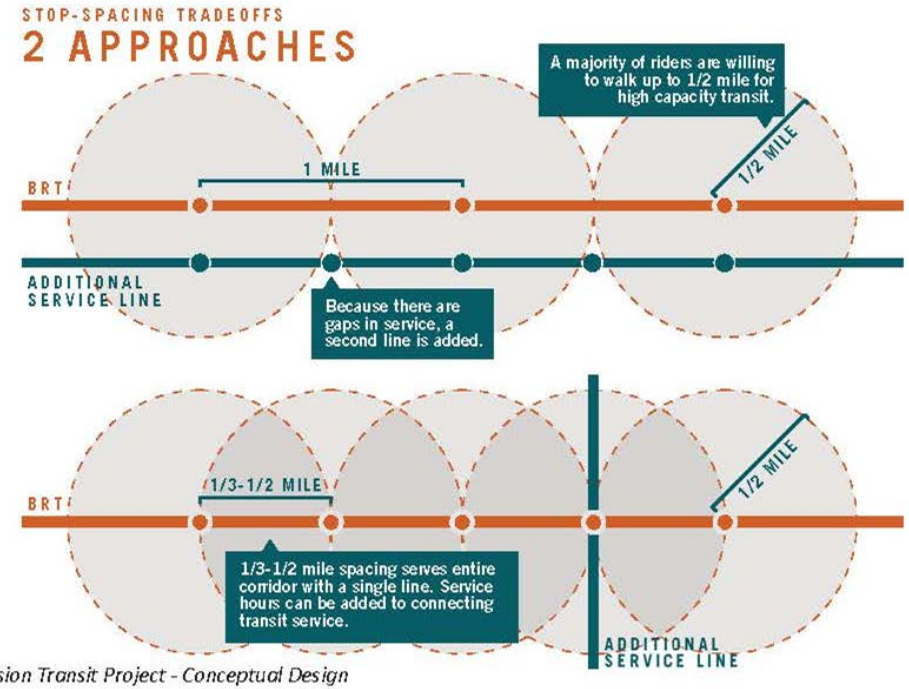
Capital/Operational Toolbox: Stops and Stations

Bus Stop Consolidation

$$$$

Corridor Scale





TriMet - Division Transit Project - Conceptual Design

Capital/Operational Toolbox: **Stops and Stations**

Level Boarding

$$$$

Local Example

EmX Bus Rapid Transit System (Eugene, OR) and Portland Streetcar (Portland, OR)

Corridor Scale

Capital/Operational Toolbox: Stops and Stations

All-Door Boarding

$$$$

Corridor Scale

Case Study

San Francisco, CA: 36% reduction in dwell times reported with all-door boarding evaluation
(Source: SFMTA, 2014)

SFMTA All Door Boarding Evaluation Final Report

Capital/Operational Toolbox: **Operations/Other**

Rolling Stock Modification

$$$$

BYD 60' Articulated Bus *BYT.com*

New Flyer Xcelsior- 60' Articulated Bus *Newflyer.com*

Portland Street Car

Corridor Scale

Regional Scale

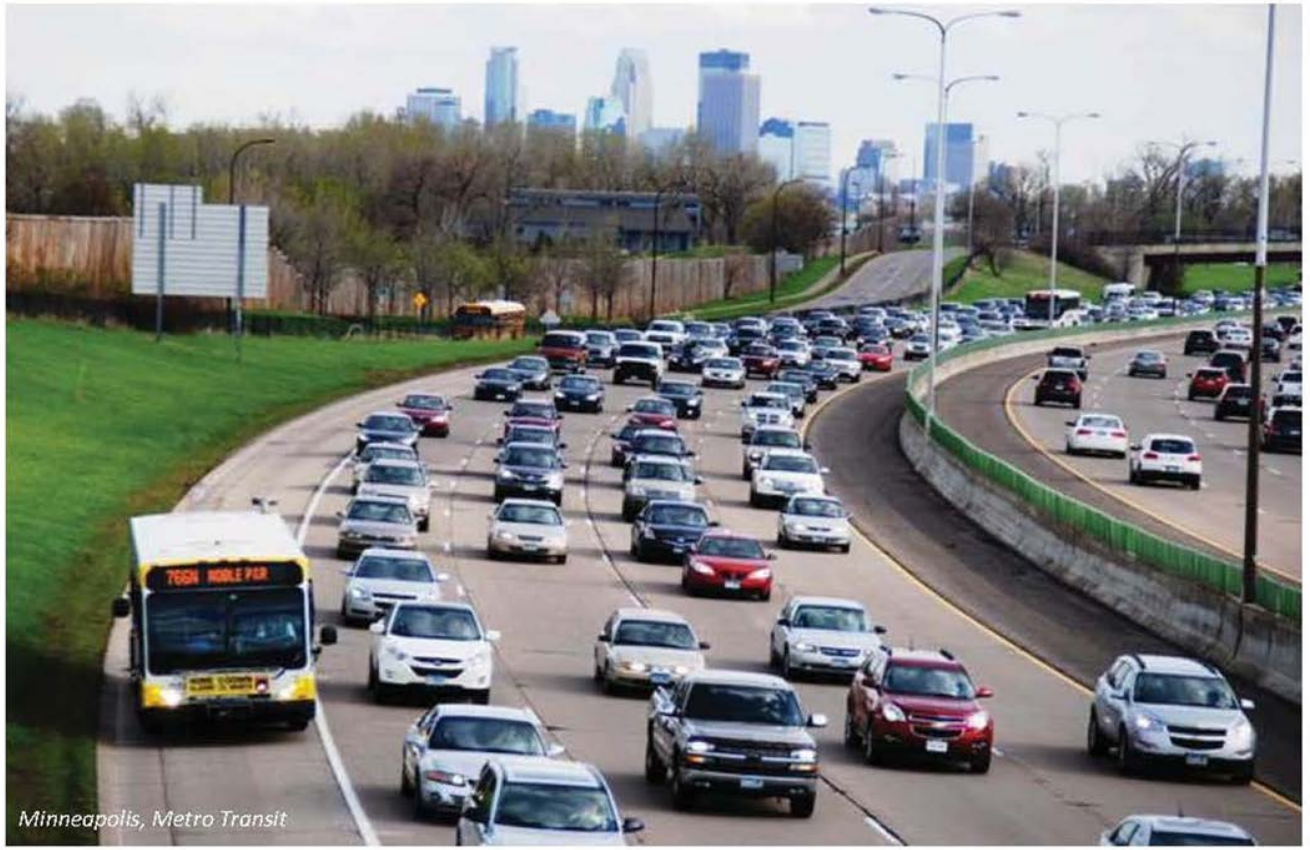
Capital/Operational Toolbox: Laneways and Intersection Treatments

Bus on Shoulder

$$$$

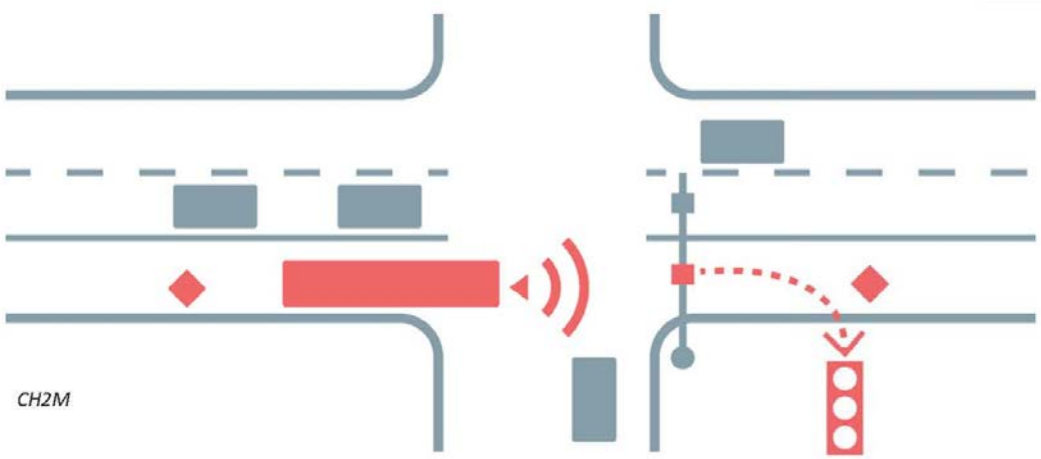
Regional Example

The Washington Department of Transportation (WSDOT) has a Bus on Shoulder corridor operating on sections of southbound I-405. The system operates from 6AM to 9AM only, when regular traffic is moving at or below 35 mph

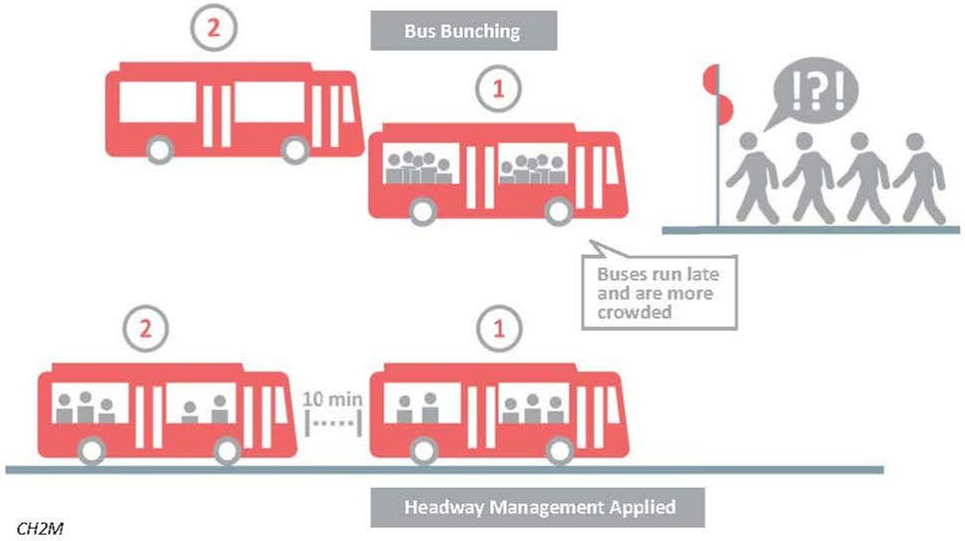


Capital/Operational Toolbox
Operations/Other

Regional Scale



Transit Signal Priority

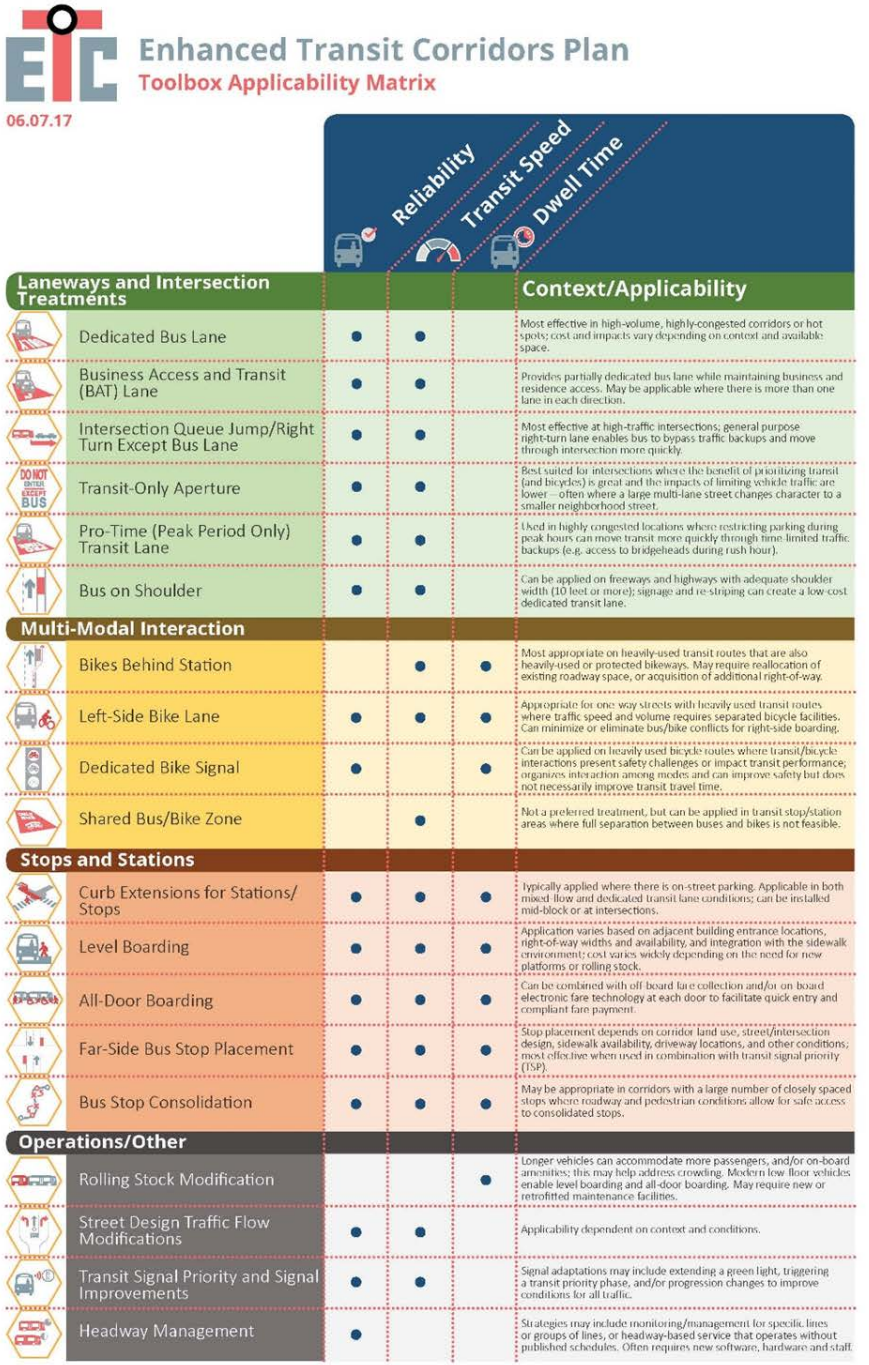


Headway Management

What to expect in the workshops.

Purpose of the Workshops

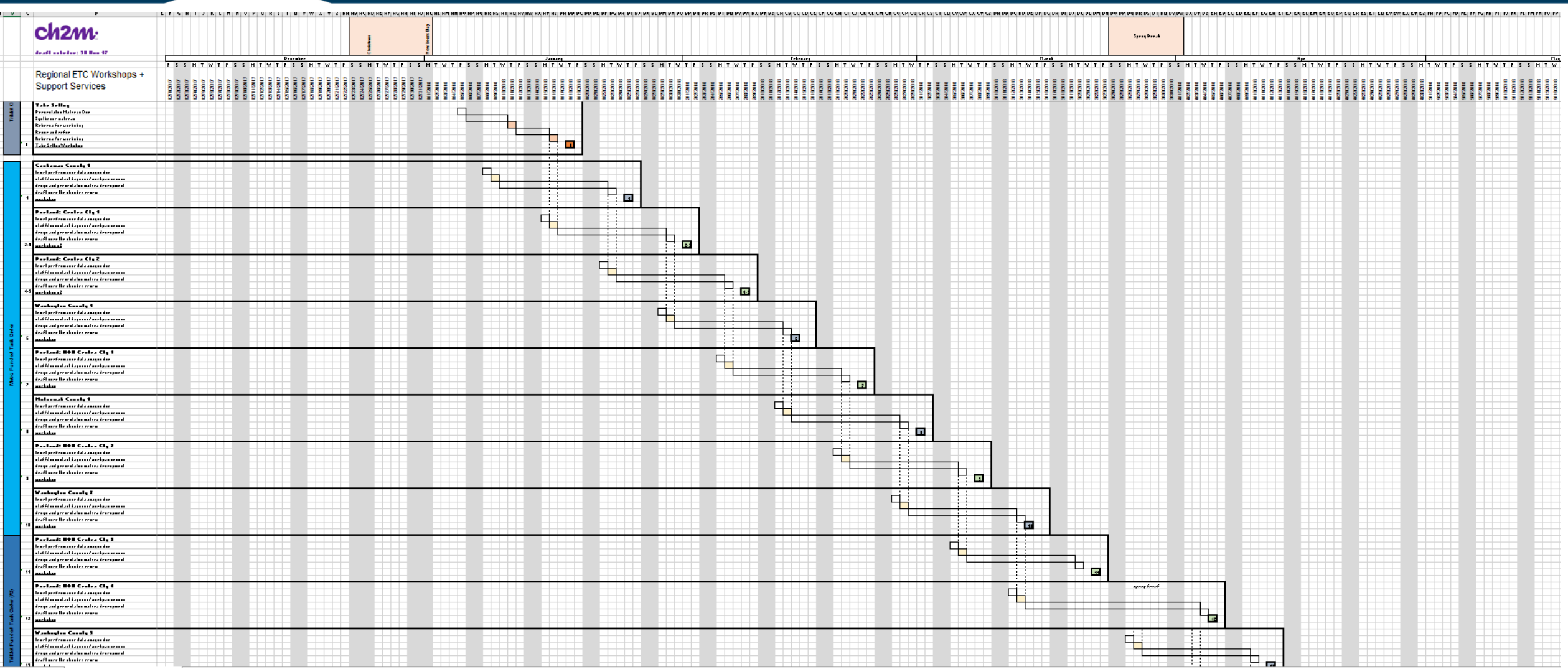
- **Introduce** partner jurisdictions to Regional Enhanced Transit Concepts program and engage them in potential solutions
- **Evaluate** a pre-approved list of corridor segments and hot spots to explore potential design possibilities that achieve transit priority.
- Reach a “go” or “no go” **decision** from the regional partners on which potential ETC projects to advance for further consideration
- **Track** the next steps, scope items, study types and tools in order to advance the projects



Enhanced Transit Corridors Plan
Toolbox Applicability Matrix
06.07.17

	Reliability	Transit Speed	Dwell Time	Context/Applicability
Laneways and Intersection Treatments				
Dedicated Bus Lane	•	•		Most effective in high-volume, highly-congested corridors or hot spots; cost and impacts vary depending on context and available space.
Business Access and Transit (BAT) Lane	•	•		Provides partially dedicated bus lane while maintaining business and residence access. May be applicable where there is more than one lane in each direction.
Intersection Queue Jump/Right Turn Except Bus Lane	•	•		Most effective at high-traffic intersections; general purpose right-turn lane enables bus to bypass traffic backups and move through intersection more quickly.
Transit-Only Aperture	•	•		Best suited for intersections where the benefit of prioritizing transit (and bicycles) is great and the impacts of limiting vehicle traffic are lower—often where a large multi-lane street changes character to a smaller neighborhood street.
Pro-Time (Peak Period Only) Transit Lane	•	•		Used in highly congested locations where restricting parking during peak hours can move transit more quickly through time-limited traffic backups (e.g. access to bridgeheads during rush hour).
Bus on Shoulder	•	•		Can be applied on freeways and highways with adequate shoulder width (10 feet or more); signage and re-striping can create a low-cost dedicated transit lane.
Multi-Modal Interaction				
Bikes Behind Station		•	•	Most appropriate on heavily-used transit routes that are also heavily-used or protected bikeways. May require reallocation of existing roadway space, or acquisition of additional right-of-way.
Left-Side Bike Lane	•	•	•	Appropriate for one way streets with heavily used transit routes where traffic speed and volume requires separated bicycle facilities. Can minimize or eliminate bus/bike conflicts for right-side boarding.
Dedicated Bike Signal	•		•	Can be applied on heavily used bicycle routes where transit/bicycle interactions present safety challenges or impact transit performance; organizes interaction among modes and can improve safety but does not necessarily improve transit travel time.
Shared Bus/Bike Zone		•		Not a preferred treatment, but can be applied in transit stop/station areas where full separation between buses and bikes is not feasible.
Stops and Stations				
Curb Extensions for Stations/ Stops	•	•	•	Typically applied where there is on-street parking. Applicable in both mixed-flow and dedicated transit lane conditions; can be installed mid-block or at intersections.
Level Boarding	•	•	•	Application varies based on adjacent building entrance locations, right-of-way widths and availability, and integration with the sidewalk environment; cost varies widely depending on the need for new platforms or rolling stock.
All-Door Boarding	•	•	•	Can be combined with off board fare collection and/or on board electronic fare technology at each door to facilitate quick entry and compliant fare payment.
Far-Side Bus Stop Placement	•	•	•	Stop placement depends on corridor land use, street/intersection design, sidewalk availability, driveway locations, and other conditions; most effective when used in combination with transit signal priority (TSP).
Bus Stop Consolidation	•	•	•	May be appropriate in corridors with a large number of closely spaced stops where roadway and pedestrian conditions allow for safe access to consolidated stops.
Operations/Other				
Rolling Stock Modification			•	Longer vehicles can accommodate more passengers, and/or on-board amenities; this may help address crowding. Modern low floor vehicles enable level boarding and all-door boarding. May require new or retrofitted maintenance facilities.
Street Design Traffic Flow Modifications	•	•		Applicability dependent on context and conditions.
Transit Signal Priority and Signal Improvements	•	•		Signal adaptations may include extending a green light, triggering a transit priority phase, and/or progression changes to improve conditions for all traffic.
Headway Management	•			Strategies may include monitoring/management for specific lines or groups of lines, or headway-based service that operates without published schedules. Often requires new software, hardware and staff.

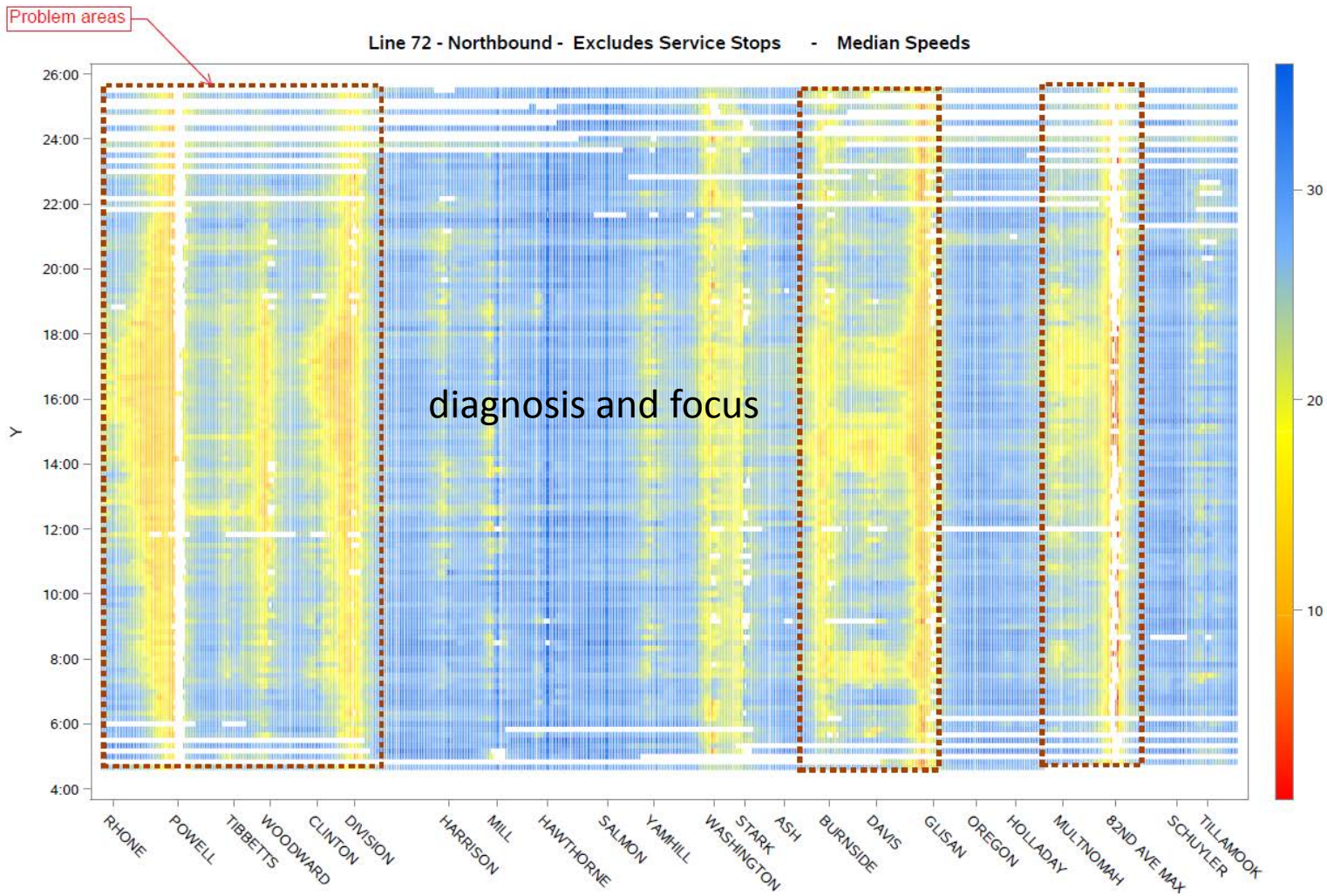
Workshop Cascade



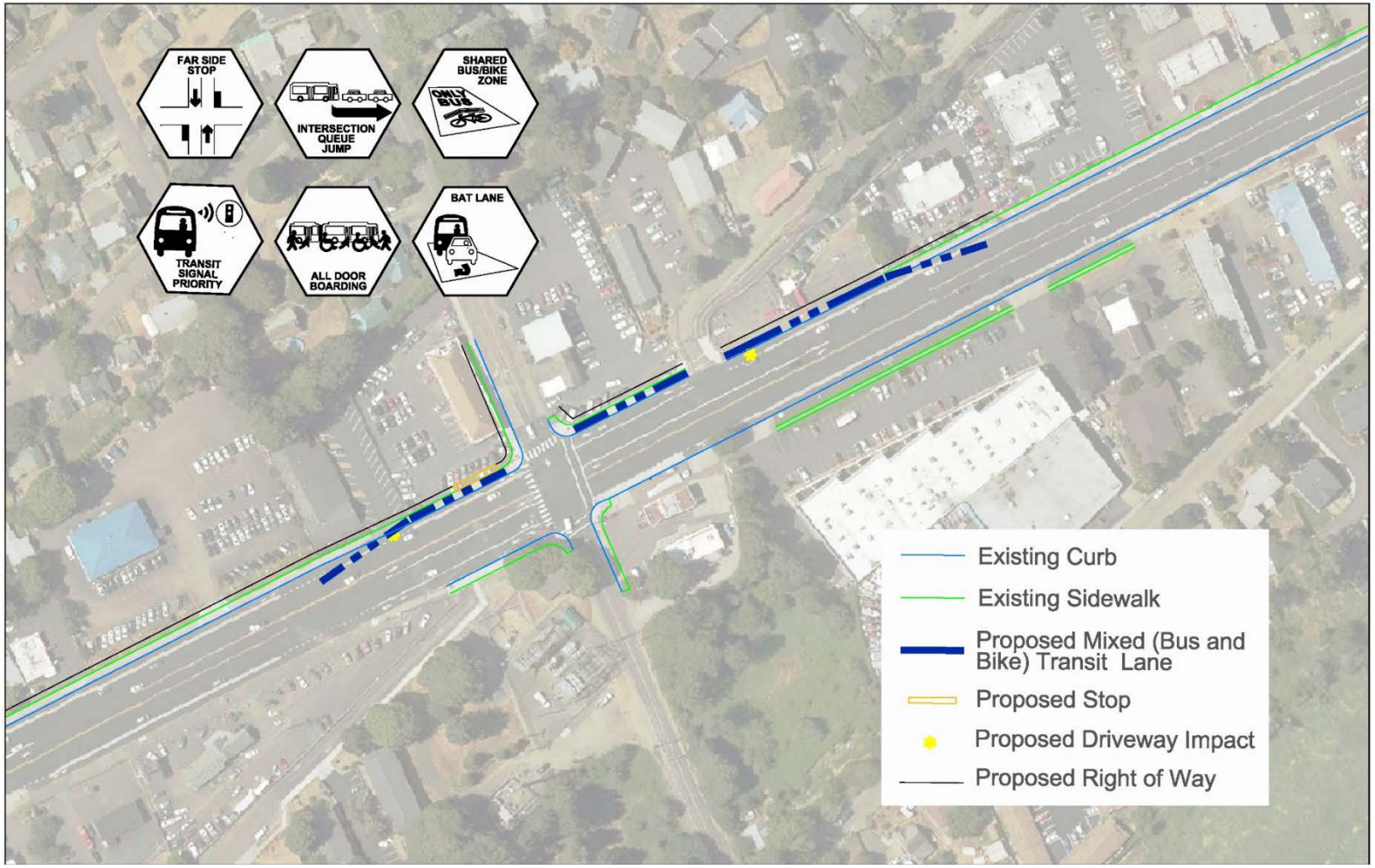
Schedule and Topics

Regional ETC Workshop Cascade	
Workshop 1 1/25/2018	**Clackamas County 1** trimet performance data analysis due – 1/8/2018 staff/consultant diagnosis/workplan session - 1/9/2018 **Segments Under Review:** 33 5th & Washington (Oregon City) to Oregon City Transit Center; 33 SE McLoughlin & Jennings to Oregon City Transit Center; 35 Pacific Hwy & Furman to Lake Oswego Transit Center 72 Clackamas Town Center Mall to SE 82nd & Flavel;
Workshop 2+3 2/1/2018	**Portland: Central City 1 – YES OVERLAP WITH CCIM** trimet performance data analysis due - 1/15/2018 staff/consultant diagnosis/workplan session -1/16/2018 **Segments Under Review:** W Salmon Col/Jeff Madison Multnomah Belmont (mostly done) East Burnside bridgehead Rose Quarter Wheeler
Workshop 4+5 2/8/2018	**Portland: Central City 2 – NO OVERLAP WITH CCIM** trimet performance data analysis due -1/22/2018 staff/consultant diagnosis/workplan session - 1/23/2018 **Segments Under Review:** Washington/11th/Morrison West Burnside MLK from Hawthorne north Everett 1st/Harrison Weidler/9th 15/16th in Lloyd East Burn/Couch
Workshop 6 2/14/2018	**Washington County 1** trimet performance data analysis due - 1/29/2018 staff/consultant diagnosis/workplan session - 1/30/2018 **Segments Under Review:** 52 TV Highway to 26 in full – skip the segment north of 26
Workshop 7 2/22/2018	**Portland: NON Central City 1** trimet performance data analysis due - 2/5/2018 staff/consultant diagnosis/workplan session - 2/6/2018 **Segments Under Review:** 73 122nd & Burnside to 122nd & Shaver 73 122nd & Burnside to 122nd & Powell/Rhone 75 N Lombard & Portsmouth to Lombard TC
Workshop 8 3/1/2018	**Multnomah County 1** trimet performance data analysis due – 2/12/2018 staff/consultant diagnosis/workplan session - 2/13/2018 **Segments Under Review:** 77 Broadway/Halsey NE 201st to NE Marine Drive 87 181st Avenue Clackamas to Columbia Hogan Division to Halsey
Workshop 9 3/8/2018	**Portland: NON Central City 2** trimet performance data analysis due - 2/19/2018 staff/consultant diagnosis/workplan session - 2/20/2018 **Segments Under Review:** 20 E Burnside & NE 82nd to E Burnside & Chavez 20 E Burnside & SE 82nd to SE Stark & 122nd 20 E Burnside & SE Sandy/NE Couch to E Burnside & SE Chavez
Workshop 10 3/14/2018	**Washington County 2** trimet performance data analysis due - 2/26/2018 staff/consultant diagnosis/workplan session - 2/27/2018 **Segments Under Review:** 12 Barbur TC to Tigard TC; both directions 76 SW Boones Ferry Rd & Seneca to Tualatin Park & Ride 76 Beaverton Transit Center to SW Hall & Hart; both directions
Workshop 11 3/22/2018	**Portland: NON Central City 3** trimet performance data analysis due - 3/5/2018 staff/consultant diagnosis/workplan session - 3/6/2018 **Segments Under Review:** 14 SE Hawthorne & 12th to SE Hawthorne & Chavez 14 SE Hawthorne & Chavez to SE Foster & Powell 15 Gateway TC to SE 102nd & Washington
Workshop 12 4/5/2018	**Portland: NON Central City 4** trimet performance data analysis due - 3/12/2018 staff/consultant diagnosis/workplan session - 3/13/2018 **Segments Under Review:** 44 SE Capitol & 25th to SW Capitol & Sunset 12 E Burnside & SE Sandy to NE Sandy & 42nd 12 Parkrose/Sumner TC to NE Sandy & 82nd
Workshop 13 4/12/2018	**Washington County 3** trimet performance data analysis due - 3/26/2018 staff/consultant diagnosis/workplan session - 3/27/2018 **Segments Under Review:** 48 185th and Saltzman 57 TV Highway revisited
Workshop 14 4/19/2018	**Oregon Department of Transportation – all segments review** staff/consultant workplan session - 4/17/2018 **Segments Under Review:** Any/all segments expected/desired to proceed in/on ODOT Facilities

Transit Delay: Prioritizing where to study

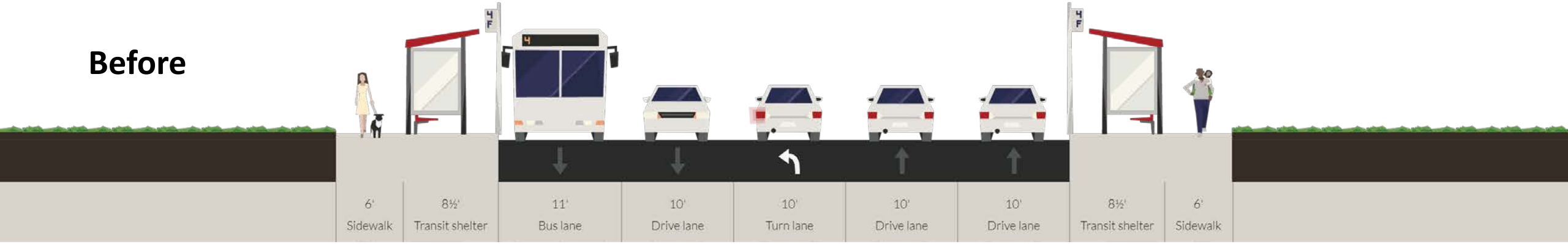


Conceptual Design Toolbox Application

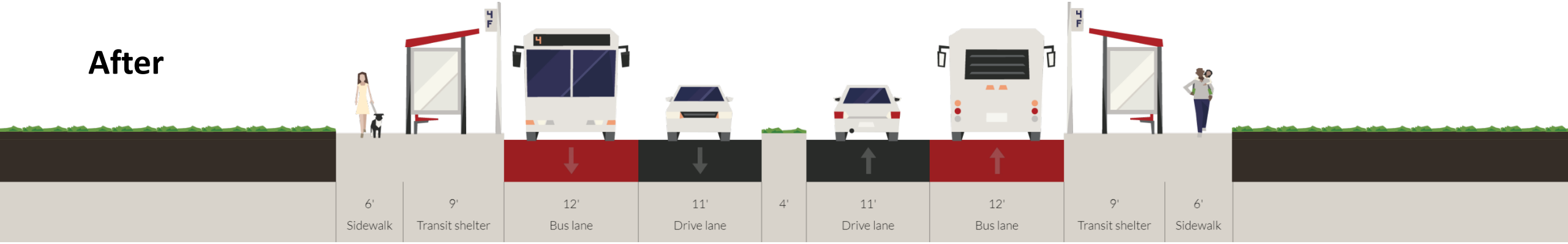


Conceptual Design Toolbox Application

Before



After

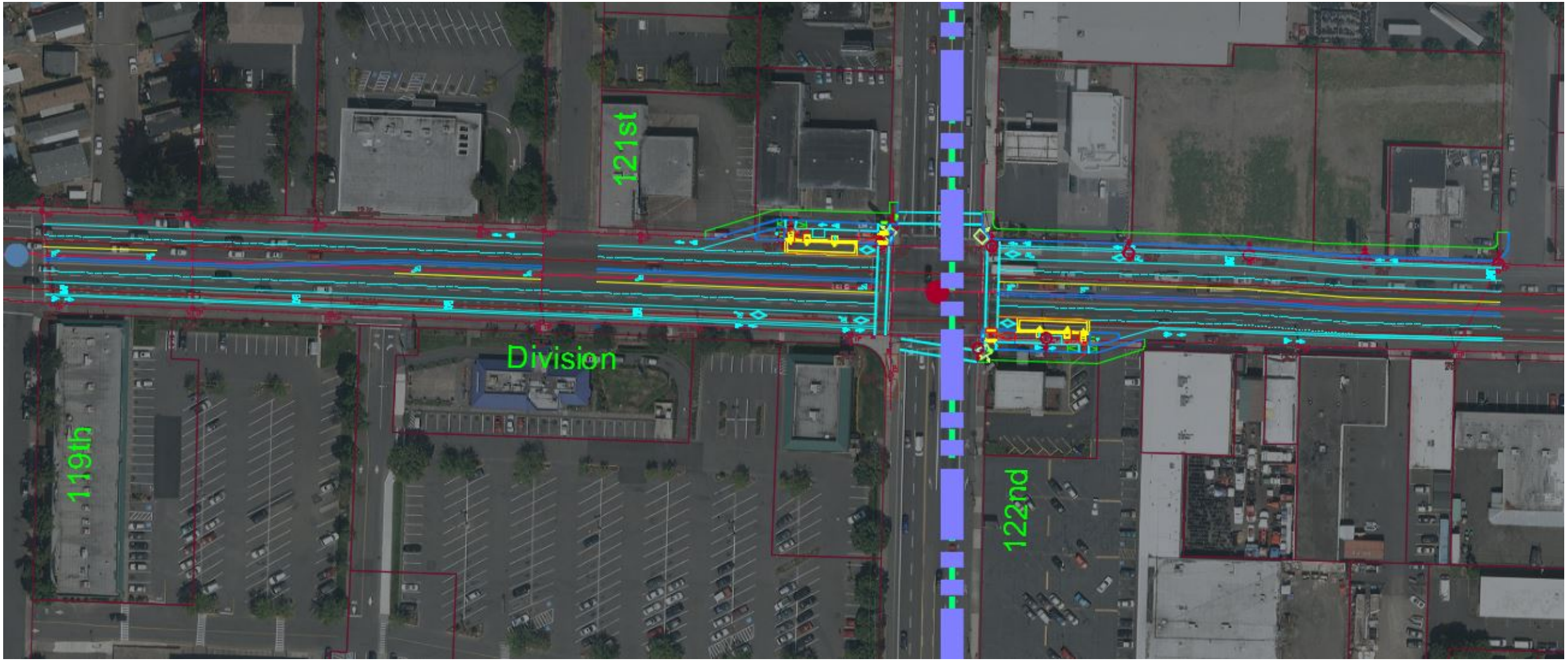


Workshop Process Summary

- **Multiple projectors** – presentation, live CAD/street view
- Start and **confirm segments** to review
- Review the data and **diagnosis**
- Show design and **scales of tools deployment**
- **Capture discussion** and action items
- Make the **“Go/No Go” decision**

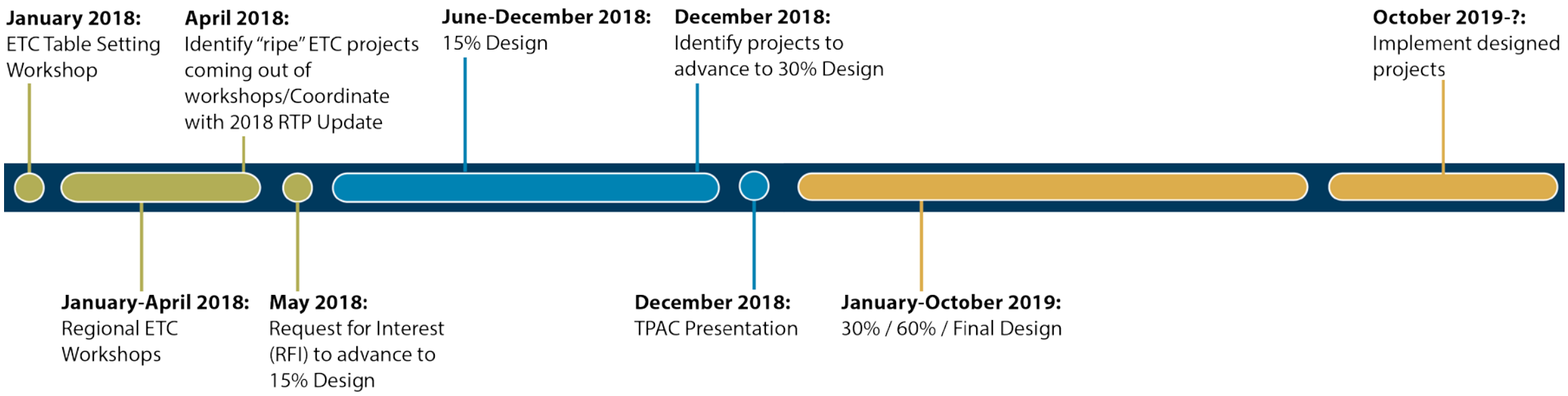
Bring the right team to review and contribute

Looking ahead to further design analysis…

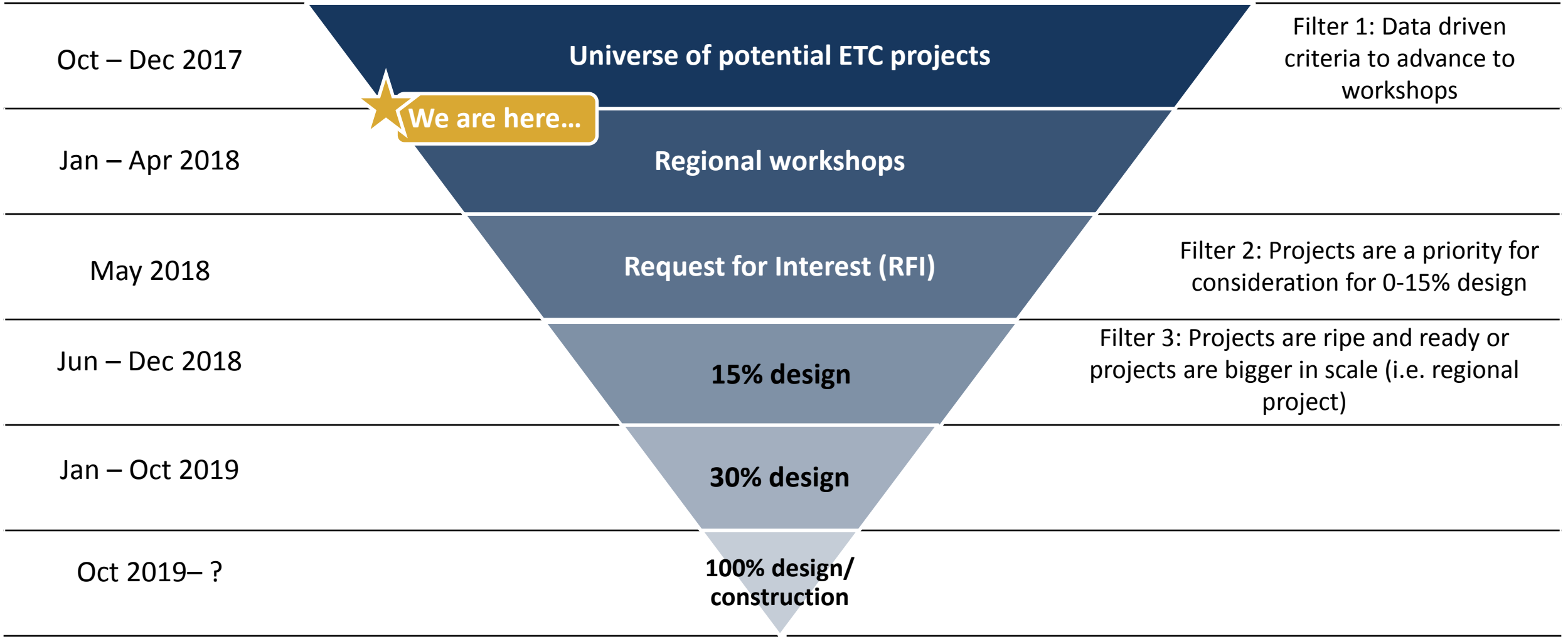


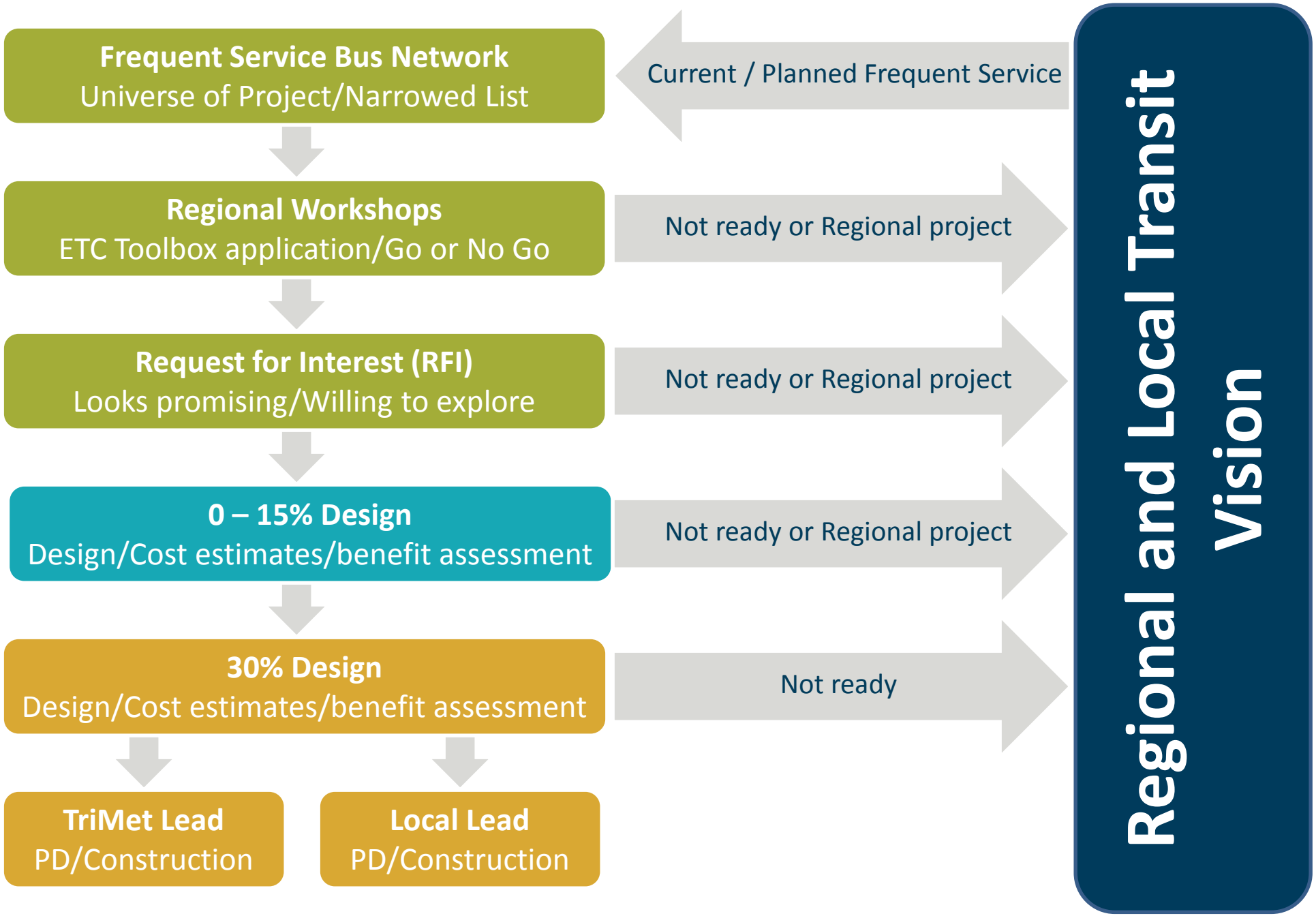
What’s next?

Regional ETC Project Schedule



Enhanced Transit Concept Filtering




Frequent Service Bus Network
Universe of Project/Narrowed List
Regional Workshops
ETC Toolbox application/Go or No Go
Request for Interest (RFI)
Looks promising/Willing to explore
0 – 15% Design
Design/Cost estimates/benefit assessment
30% Design
Design/Cost estimates/benefit assessment
TriMet Lead
PD/Construction
Local Lead
PD/Construction
Current / Planned Frequent Service
Not ready or Regional project
Not ready or Regional project
Not ready or Regional project
Not ready
Regional and Local Transit Vision

Request for Interest (RFI): DRAFT Criteria

Eligibility

- Current or planned frequent service bus network
- Project has been “workshopped” or other regional/local process
- Improves transit reliability and/or travel time

Ranking

- Project can be implemented within two years
- Project has “potential” for implementation funding, including leveraging other projects

What is next?

0-15% Design:

- Scoping
- Design
- Cost estimates
- Benefit assessment

MOU for funding and timeline

15-30% Design:

- Design
- Cost estimates
- Benefit assessment

IGA for funding and timeline

Advance design to 60 % and IFC

Regional Workshops: Next Steps

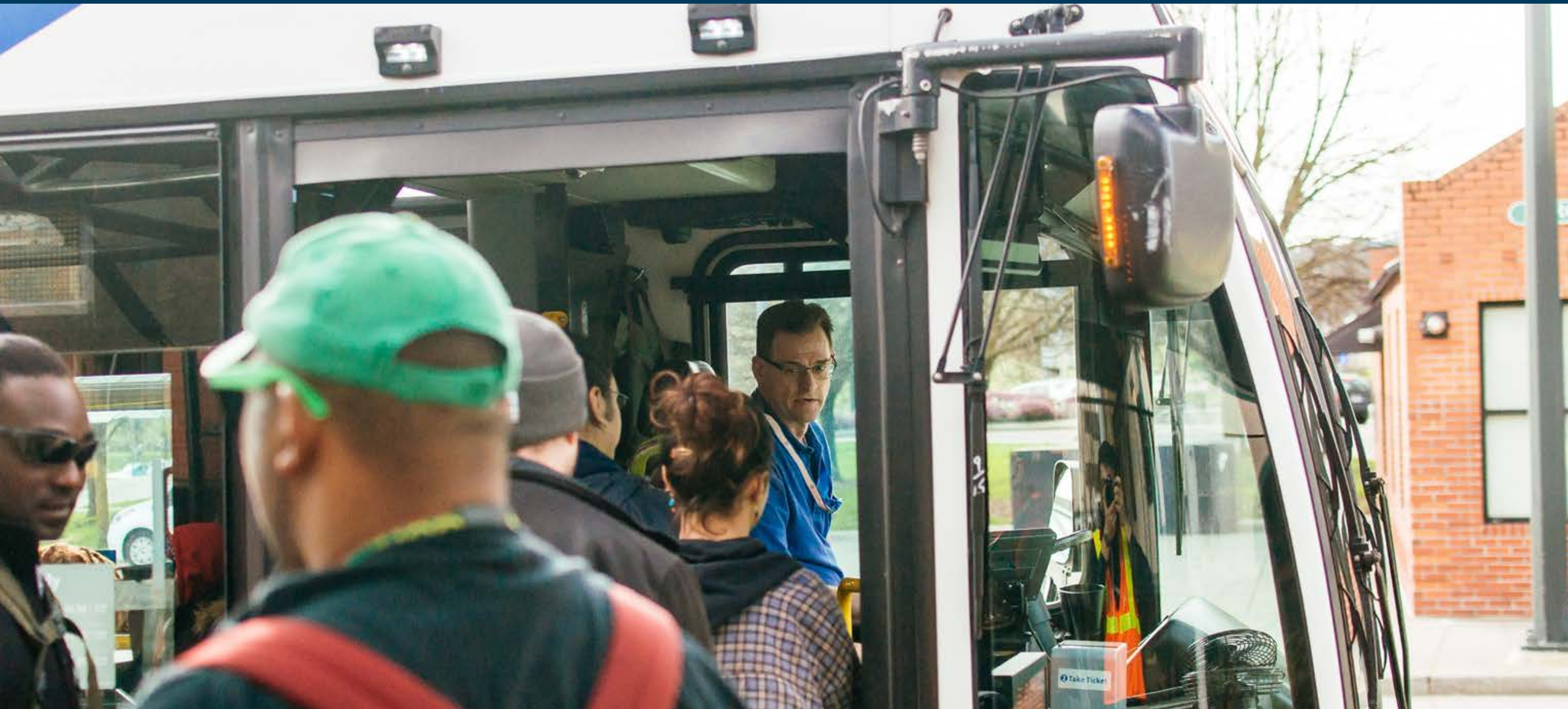
Come prepared
- Available data, other planned projects in the area…

Right people in the room
- Planners, engineers, traffic engineers…

Is something feasible?
- Come with an open mind, think outside the box…

Go/no go discussions
- Are you ready to further explore ideas through the RFI…

Thank you



Segments to be studied

Washington County –

12	Barbur TC to Tigard TC; both directions
52	Willow Creek Transit Center to NW 185th & West Union; both directions
52	NW 185th & West Union to PCC Rock Creek Layover;
52	SW Farmington & Murray to SW 185th & Tualatin Valley Hwy
57	TV Highway – Beaverton Transit Center to Hillsboro
76	SW Boones Ferry Rd & Seneca to Tualatin Park & RideTualatin Park & Ride
76	Beaverton Transit Center to SW Hall & Hart; both directions

Clackamas County –

33	5th & Washington (Oregon City) to Oregon City Transit Center; vice versa
33	SE McLoughlin & Jennings to Oregon City Transit Center; vice versa
35	Pacific Hwy & Furman to Lake Oswego Transit Center
72	Clackamas Town Center Mall to SE 82nd & Flavel; vice versa

Multnomah County –

77	Broadway/Halsey, NE 201st to NE Marine Drive
87	181st Avenue, Clackamas to Columbia
NA	Bridgeheads: Morrison, Hawthorne, Burnside
NA	Hogan - Division to Halsey

City of Portland Non Central City -

12	E Burnside & SE Sandy to NE Sandy & 42nd
12	Parkrose/Sumner TC to NE Sandy & 82nd
14	SE Hawthorne & 12th to SE Hawthorne & Chavez
14	SE Hawthorne & Chavez to SE Foster & Powell
15	Gateway TC to SE 102nd & Washington
20	E Burnside & NE 82nd to E Burnside & Chavez
20	E Burnside & SE 82nd to SE Stark & 122nd
20	E Burnside & SE Sandy to E Burnside & SE Chavez
44	SE Capitol & 25th to SW Capitol & Sunset
72	N Anchor & Channel to NE Alberta & MLK
73	122nd & Burnside to 122nd & Shaver
73	122nd & Burnside to 122nd & Powell/Rhone
75	N Lombard & Portsmouth to Lombard TC
77	Hollywood TC to NE Halsey & 60th

City of Portland Central City – (see map)


75 TO MILWAUKIE
3155
E261660


2153
MAX SHUTTLE