

Appendix E

Memorandum – SR 99 Lynnwood and Unincorporated Snohomish County Pre-Design Study Level 1 and Level 2 Options Screening

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SUBJECT: SR 99 Lynnwood and Unincorporated Snohomish County Pre-Design Study
MP 45.7 to 52.3

Memo Purpose

This memo outlines the Level 1 and Level 2 screening of potential improvement concepts for the SR 99 corridor between 212th Street (St) Southwest (SW) and Airport Road (Rd). The evaluation process considers corridor-wide cross-sections, systemic treatments and spot improvements based on the Draft Purpose and Need, Methods, and Assumptions, Existing and Future Conditions, the Environmental Scan, agency feedback and initial community feedback. The screening process ensures a structured approach to refining feasible concepts that enhance safety, mobility and accessibility.

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ATTACHMENT A: SPOT TREATMENTS, LOCATION MAP & DESCRIPTIONS

ATTACHMENT B: LAND USE MAP

ATTACHMENT C: SR 99/SR 525 INTERCHANGE ASSESSMENT

ACRONYMS AND ABBREVIATIONS

Acronym / Abbreviation	Definition
ADA	Americans with Disabilities Act
APS	Auditory Pedestrian Signals
ARR	Access Revision Report
BAT	Business Access and Transit Lanes
BLTS	Bicycle Level of Traffic Stress
BRT	Bus Rapid Transit
CMA	Critical Movement Analysis
DM	Design Manual
EHD	Environmental Health Disparities
ESA	Endangered Species Act
HEAL	Healthy Environment for All Act
LOS	Level of Service
LPI	Leading Pedestrian Intervals
LTS	Level of Traffic Stress
MPH	Miles Per Hour
NROR	No Right on Red
NA	Not Applicable
PGIS	Pollution Generating Impervious Surfaces
PHB	Pedestrian Hybrid Beacon
PLTS	Pedestrian Level of Traffic Stress
RDI	Route Directness Index
ROW	Right-of-Way
RRFB	Rectangular Rapid Flashing Beacon
SCOPI	Snohomish County Online Property Information
SR	State Route
TSP	Transit Signal Priority
WSDOT	Washington State Department of Transportation

1 CONCEPTS AND SCREENING STRATEGY

The screening and evaluation of potential improvement concepts follows a structured methodology designed to systematically assess and refine viable solutions. This approach applies screening criteria that ensure proposed improvements effectively address study needs and align with the Purpose and Need as defined in Appendix A. The screening process is depicted in Figure 1, illustrating how criteria are applied with increasing levels of complexity as options are refined.

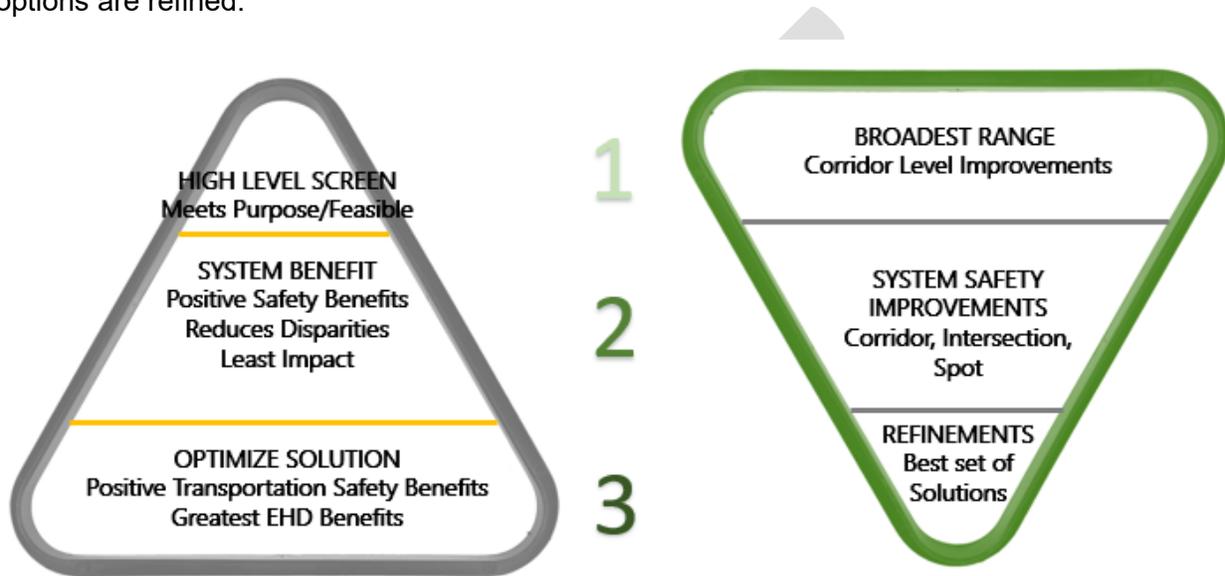


Figure 1. Screening Criteria and Levels of Complexity

2 LEVEL 1 SCREENING

2.1 Level 1 Options

Level 1 options were developed using early community engagement feedback, analysis of the existing conditions and coordination with partner agencies. To comprehensively assess potential options, they have been categorized into three primary types:

- **Corridor Wide Concepts** – Linear treatments that can be applied throughout extended segments or the full corridor.
- **Systemic Treatments** – Strategies that enhance corridor-wide operations and safety.
- **Spot Treatments** – Targeted enhancements at specific locations to enhance localized mobility and safety challenges.

In the Level 1 screening each option will be evaluated independently. As the screening progresses, the Level 1 options will be combined into more complete options in Level 2 and ultimately result in one recommendation. The corridor wide concepts, systemic treatments and spot treatments considered are summarized in Table 1.

Corridor Wide Concepts	Systemic Treatments	Spot Treatments
Corridor-wide Business Access and Transit (BAT) Lanes	Modify Access Management Classification	Intersection Enhancements
Continuous Sidewalks with buffer	Speed Limit Reduction	Driveway Treatments
Continuous Bicycle facility with buffer	Meet Access Management Designation	Transit Enhancements
Landscaped medians	Automated Enforcement	Protected Mid-Block Crossings
Removal of Through General-Purpose Lanes	Utility Undergrounding	Increased Lighting
Center-Running Buses		Signal Phasing Enhancements
Narrow Lanes		Grade Separated Crossing

2.2 Level 1 Criteria

The Level 1 screening process evaluated options based on three key criteria to determine their feasibility and alignment with study objectives:

- **Meets Study Purpose and Need** – Does the option contribute to one or more of the study’s goals of reducing the level of traffic stress (LTS) for people walking, biking,

rolling and accessing transit especially vulnerable populations and overburdened communities and maintaining vehicular access and reliability? Does the solution enhance safety for all users? Does the solution negatively impact one of the other goals?

- Level of Complexity and Risk – Is the concept likely to secure the necessary regulatory permits and approvals from relevant agencies? Is it an option not typically found on WSDOT roadways that may introduce risk to the design or construction? Does it require high levels of input and coordination from other agencies?
- Cost-Effectiveness – Does the solution provide benefits that justify its cost, or could a lower-cost concept achieve similar results?

2.3 Level 1 Screening Results

This initial screening phase was a qualitative analysis of the above criteria that identifies and eliminates options that do not meet one or more of the criteria. The options were scored as either passing (✓), failing (✗) or not applicable (--). Options that did not fail any criteria moved on to Level 2 screening, where they were further refined and combined into more comprehensive options. In some cases, options that do not fully meet all criteria on their own may still be viable when integrated with other complementary strategies.

Table 2 provides a summary of the Level 1 screening results.

Table 2. Level 1 Screening Matrix

Option	Description	Meets Project Purpose and Need	Level of Complexity and Risk	Cost Effectiveness	Discussion
Corridor Wide Concepts					
Corridor-wide Business Access and Transit (BAT) Lanes	Extend BAT lanes throughout the corridor and enhance/add transit priority including signal priority.	✓	✓	✓	Extending BAT lanes for corridor BRT-type service (Swift) will support corridor wide transit reliability.
Continuous Sidewalks	Close sidewalk gaps, add ADA-compliant infrastructure and create buffered pedestrian pathways to meet at minimum LTS 2	✓	✓	--	A continuous sidewalk with buffer is required to meet Pedestrian Level of Traffic Stress (PLTS) 2 and will be part of all options moving forward. Additional ROW is required for the complete sidewalks; the amount will depend on the developed corridor wide concept.
Continuous Bicycle facility	Develop continuous separated bicycle lanes or shared-use paths along the corridor to meet minimum LTS 2	✓	✓	--	A continuous bicycle facility separated from vehicles is required to meet Bicycle Level of Traffic Stress (BLTS) 2 and will be part of all the options moving forward. The type of bicycle facility, whether a shared use path, or separate facility, will have differing amounts of cost and ROW impacts depending on the ultimate design. The type of facility will be evaluated in Level 2.
Landscaped medians	Landscaped medians enhance access management, increase canopy, improve aesthetic and add visual friction slowing vehicles down.	✓	✓	✓	For the next level of screening the right-of-way (ROW) impacts of the width of the median will be weighed against the benefits of having a wide enough median to support successful tree growth.
Removal of Through Lanes	Reduce the number of Through travel lanes to reallocate space for active transportation.	✗	✓	✓	Existing volume counts show high numbers of thru vehicles all along the corridor. While reallocating through lanes to active transportation is a cost-effective way to achieve PLTS and BLTS needs, decreasing through capacity could jeopardize transit reliability. Removal of lanes would require a larger network level analysis outside of the scope of this study.
Center-Running Busses	Dedicated center-lane transit operation with median stops.	✓	✗	--	Center-running buses can enhance transit reliability, improve access to transit and provide pedestrian refuges. They can also lengthen crossing distances depending on final destination, require additional signal phases and may require additional ROW. The design and study would require significant involvement from transit agencies. Center-running buses may be a good option for this corridor in the long term but evaluating that is out of the scope of this study.
Narrowing Lanes	Narrow through and turning lanes to the minimum required for the design speed and design vehicle.	✓	✓	✓	Narrower lanes encourage vehicles to follow design speeds and create more space for active transportation in a cost-effective way.
Systemic Treatments					
Transit Multimodal Hubs	Establish hubs at high passenger volume transit stops with integrated bike racks, micromobility stations (e.g., scooters, bikes), park-and-ride facilities and enhanced pedestrian plazas.	✓	✓	✓	Opportunity in concert with development such as proposed in the City of Lynnwood's Highway 99 Subarea Plan. May require public/private partnership.
Reduce Speed Limit (40, 35 MPH)	Reduce speed limits along the corridor.	✓	✓	✓	Speed limit reduction is a potential near term action that addresses the needs of the study and brings this segment of SR 99 in line with other similar segments. Proposed changes within this study would support changing corridor context and reduced speed limits.
Meet Access Management Designation	Implement current access management designations including consolidating driveways or identifying alternative access and adding raised medians or hardened centerlines to restrict midblock left-turn	✓	✓	✓	Consider WSDOT and local agency access requirements and crash data to identify priority driveways to consolidate or locations to install medians. Requires close coordination with property owners and local agencies. May require signal modifications.

	movements. Accommodate U-turns at signal-controlled intersections and other designated locations.				
Modify Access Management and Limited Access	Modify access classification of SR 99 and SR 525 limited access classification to managed access.	✓	✓	✓	Requires coordination and approval by WSDOT HQ for modifications of limited access. Requires close coordination with property owners and local agencies. May require signal modifications.
Utility Undergrounding (General)	Underground corridor utilities such as secondary electric, telecom and cable to improve streetscape character, increase reliability and free space for corridor amenities.	✓	✓	✓	Requires close coordination with utility franchisees and local agencies, related to trenching and vault work, and service conversions. May require permits and traffic control planning. Does not directly meet the project purpose and need on its own but provides partnership and aesthetic benefits and can be packaged with other improvements.
Utility Undergrounding (High-Capacity Lines)	Underground high-capacity lines that serve regional loads.	✗	✗	✗	Very high cost, long lead time, complex cutover sequencing, substation and thermal constraints, and significant permitting and outage coordination with utility owners. Does not directly address study purpose and need.
Spot Treatments					
Controlled Mid-Block Crossings	Install controlled pedestrian crossings at midblock locations or minor intersections.	✓	✓	✓	Consider transit, route directness, crash data, local land uses and roadway geometrics to identify controlled pedestrian crossing locations at midblock or minor intersections applying half signals or pedestrian hybrid beacon.
Signal Enhancements	Implement leading pedestrian intervals (LPIs), auditory pedestrian signals (APS), no right on red (NROR) and protected pedestrian phases at signalized intersections to reduce vehicle-pedestrian conflicts.	✓	✓	✓	Phasing modifications will depend on the intersection. All signalized intersections should have LPIs and APS.
Driveway Treatments	Upgrading existing driveways to perpendicular driveways, narrowing driveways, removing redundant driveways that don't meet access management	✓	✓	✓	Driveways are a conflict point between vehicles and active transit users
Intersection Treatments	Upgrading intersections with complete streets treatments like reducing corner radii, truck aprons, raised crossings, refuge islands, bicycle conflict marking, slip lane elimination or signalization.	✓	✓	✓	The type of treatments will vary depending on the context of the intersection and multiple treatments will need to be packaged together to enhance safety at intersections.
Increased Lighting	Adding pedestrian lighting to locations with low light levels	✓	✓	✓	The location of additional pedestrian lighting will need a lighting study to define the locations based on land use and transit context. A maintenance agreement may also be required for lighting additions within city boundaries.
Bus Stop Relocations	Relocate selected bus stops, consolidate closely spaced stops and align stop locations with controlled crossings to enhance pedestrian and bicycle safety and transit reliability.	✓	✓	✓	Coordinate with Community Transit, Everett Transit and Sound Transit. Integrate with BAT lanes. Maintain ADA access, lighting and sight distance. Lynnwood and Snohomish County to work with Community Transit to approve new bus stop locations along SR 99. WSDOT will need to approve locations in unincorporated Snohomish County.
Grade Separated Crossing	Build a pedestrian and bicycle bridge over SR 99	✓	✓	✗	A grade separated crossing meets the purpose and need of the study but is expected to be a high-cost strategy that does not match the planned mixed-use vision for the corridor. The one exception is a long-term improvement at Airport Way in coordination with Sound Transit to integrate a pedestrian bridge as part of the provisional station.
Light Rail Integration at Airport Road	As part of the Everett Link Light Rail Extension project, Sound Transit plans a station at the intersection of Airport Road and SR 99. This station is currently not fully funded but is considering connections to other transit services and modifications to the intersection.	✓	✓	✓	As noted above, a future transit station at the intersection of Airport Road/SR 99 may change interactions with transit and may facilitate a potential grade-separated link for pedestrians and bicyclists as part of an elevated station. Channelization and geometrical changes at Airport Road may also result from the provisional station and light rail planning.

2.4 Level 1 Summary

The following Level 1 options were screened out:

- Removal of Through Lanes
- Center-Running Transit
- Utility Undergrounding (High-Capacity Lines)
- Grade Separated Crossings
- Light Rail Integration at Airport Road

Note that although center-running transit with median stations was screened out in Level 1 due to scope, cost and access management constraints, it remains a promising long-term concept for improving speed and reliability. A future focused study should compare center-running to enhanced curb BAT lanes on candidate segments, addressing station spacing and locations, left-turn and U-turn management, signal phasing and transit signal priority (TSP) needs, ROW and utility implications, and order-of-magnitude costs and benefits. Coordination with Community Transit, Everett Transit, Sound Transit, Lynnwood and Snohomish County is essential, and the analysis should leverage opportunities created by the Airport Road overcrossing and Everett Link station access planning. Results would guide if and where a later conversion from curb BAT lanes to center-running should be pursued.

While these options may be considered for the corridor in the future, they will not be assessed further within the scope of this study. The remaining options were advanced and combined for the Level 2 screening.

3 LEVEL 2 SCREENING

3.1 Level 2 Options

The Level 2 options are based on the refined and combined options that passed Level 1 as well as continued input from the community and partner agencies. The options remain organized in the same categories as the Level 1 screening and are summarized in Table 3.

Table 3. Level 2 Options		
Corridor-Wide Concepts	Systemic Treatments	Spot Treatments
Concept 1 – Phased implementation of Shared Use Paths on both sides with a median	SR 525 Access Management Change	Packages of spot treatments at signalized intersections, unsignalized intersections/ driveways and midblock
Concept 2 – Separate bicycle and pedestrian facilities on both sides with a median	Implement Private Access Connection Spacing Requirements	SR 525 Interchange and 35th Avenue (Ave) West (W)
	Speed Limit Change from 45 MPH to 40 MPH	Driveway Enhancements
	Utility Undergrounding (General)	New Bus Stops and Relocation
		Increased Lighting

3.1.1 Corridor-Wide Concepts

To meet the purpose and needs of the corridor, the Level 1 options were combined into different cross-section concepts that can be applied to all or part of SR 99 from Airport Road to 212th Street Southwest. The concepts include:

- Extend Business Access and Transit (BAT) lanes north of 148th Street Southwest to Airport Road. This will require removal of any shoulder parking.
- A landscaped median when feasible where there is an existing two-way left-turn lane

The concepts show a typical cross-section. The cross-section will vary at transit stops, intersections, midblock crossing and may need to be altered at points due to other constraints. The spot treatments in Section 3.1.3 show options for transit stops and driveways.

The concepts vary in the type of bicycle and pedestrian facilities provided and the amount of ROW required. These concepts are designed to enhance multimodal accessibility, safety and transit efficiency while considering ROW constraints and potential enhancements to pedestrian and bicycle infrastructure.

The existing cross-section varies along the corridor, but a typical representation is shown in Figure 2. The existing ROW is 100 feet wide and typically includes unbuffered sidewalks, BAT lanes, acceleration/deceleration lanes with shoulders or shoulders, four through lanes and a median turn lane.

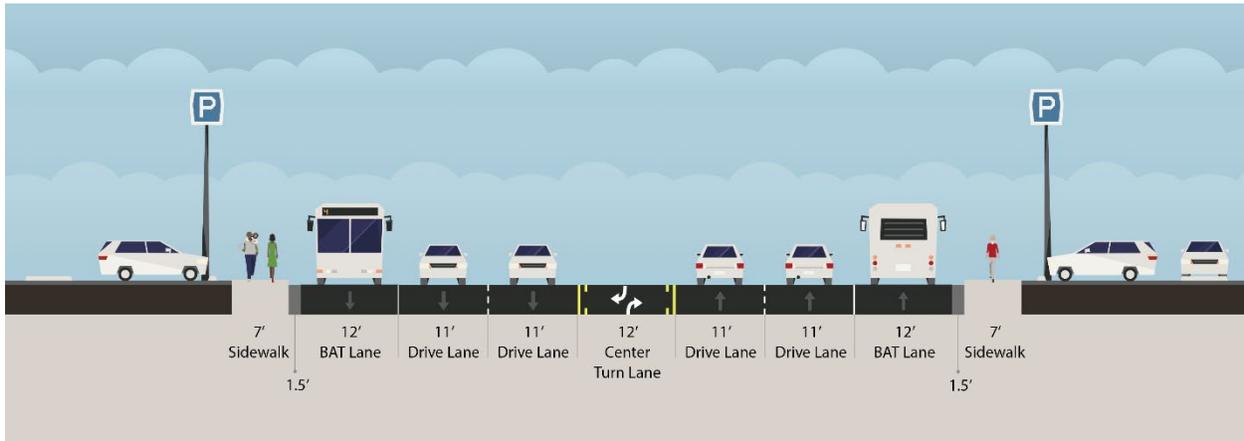


Figure 2. Existing Cross-Section – 100 ft Right-of-way (Source: Streetmix)

3.1.1.1 Corridor Wide Crossing Concept 1

The first concept is a phased approach to building shared use paths on both sides of SR 99, as shown in Figure 3. This concept requires five feet of additional ROW in phase A and 10 more feet of additional ROW in phase B. Phase A holds one curb line while constructing a shared use path on one side of the road and a median while narrowing the turn and BAT lanes.

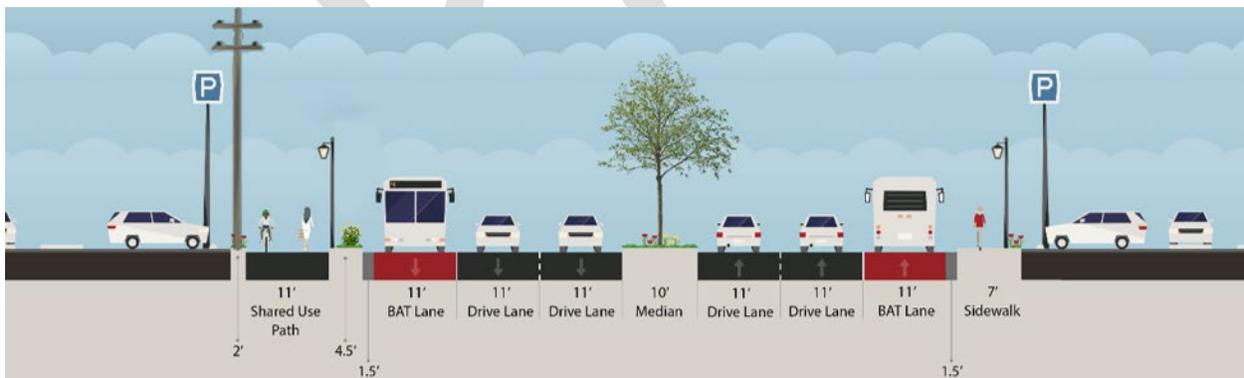


Figure 3. Corridor-Wide Concept 1A – 105ft Right-of-way (Near Term) (Source: Streetmix)

Phase B constructs a shared use path on the other side of the road and requires 10 more feet of ROW, as shown in Figure 4.

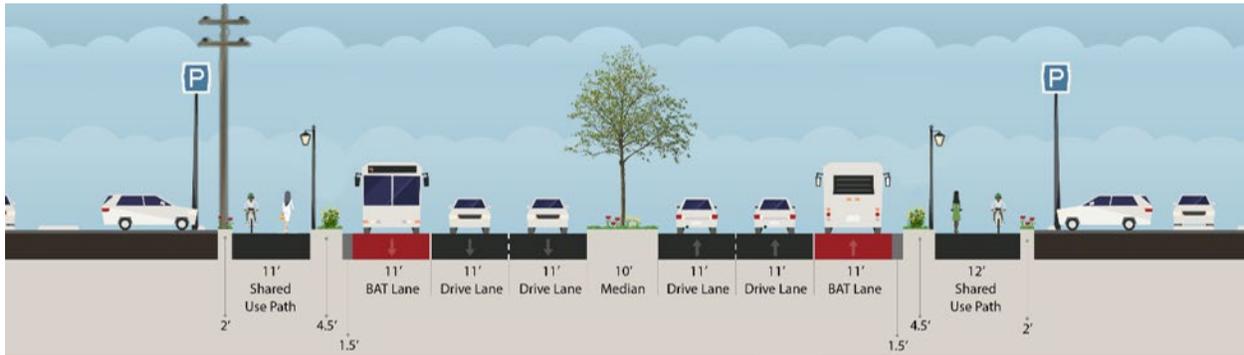


Figure 4. Corridor-Wide Concept 1B – 115ft Right-of-way (Long-Term) (Source: Streetmix)

3.1.1.2 Corridor Wide Crossing Concept 2 (Long-Term)

The second concept expands the ROW to 120 feet as shown in Figure 5. The additional 20 feet of ROW can either all come from one side or be split to both sides of the corridor. The concept includes raised separate bicycle lanes and sidewalks as well as a wide enough buffer to support trees on both sides of the roadway.

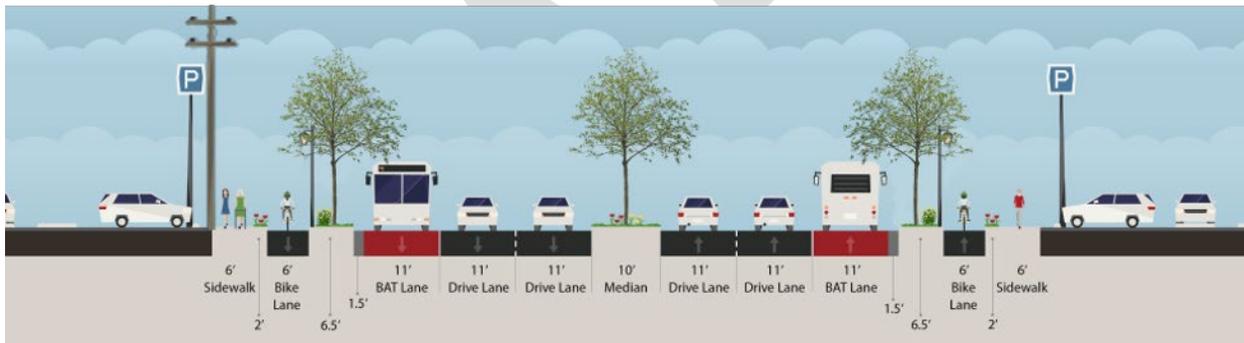


Figure 5. Corridor-Wide Concept 2 Cross Section (Source: Streetmix)

3.1.2 Systemic Treatments

3.1.2.1 Access Management

The SR 99 and SR 525 Interchange is currently classified as limited access. Revisions within this limited access boundary would need to follow an access revision process as described in the WSDOT Design Manual Freeway Access Revision Chapter 550 (WSDOT DM 550). Outside the SR 99 and SR 525 Interchange the study area is classified as Managed Access Class 3 or 4. Managed Access Class 3 and 4 require no more than one access connection per individual parcel and a minimum distance between access points of 330 feet (Class 3) and 250 feet (Class 4) on the same side of the highway (WSDOT DM 540.03). SR 99 in the study limits currently has multiple parcels that have more than one access point and there are access points that do not meet the required spacing. The additional access points create conflict points between vehicles and active transportation users as well as other vehicles. This option

proposes working with the city of Lynnwood to update access management requirements and policies to better align local and state requirements. In the future driveway consolidation will be considered as properties redevelop, in coordination with land use context and property owners. The goal of updating requirements and policies and consolidation during redevelopment is to better meet spacing requirements and minimize potential conflict points.

3.1.2.2 Speed Limit Change from 45 MPH to 40 MPH

The existing SR 99 speed limit of 45 MPH is higher than the surrounding sections of SR 99 which are at 40 MPH. It is also higher than the intent of the access control designation which is 30 to 40 MPH for Class 3 in urbanized areas and 30 to 35 MPH for Class 4 in urbanized areas (WSDOT DM 540.03). Speeding was the leading contributing factor in crashes along this corridor from 2019 to 2023 and was involved in 21% of injury crashes (See Existing and Future Conditions Report Table 21). Reducing the speed limit to 40 MPH is recommended as a near-term step within segments with supportive land use context that aligns with access classification guidance while addressing high operating speeds. At the time of design start, the project team and agencies should reassess conditions and consider a 35 MPH limit where land use, crossing density and speed study results support a lower target speed. A speed limit of 35 MPH could also support narrowing some lanes to 10.5' further encouraging slower speeds and decreasing ROW needs.

3.1.3 Spot Treatments

3.1.3.1 Packages of Spot Treatments

To simplify the analysis of the corridor rather than analyzing every location that treatments could be applied four packages of spot treatments were created for four different reoccurring contexts. The four spot treatments packages are:

- Package 1: Enhancements at Traffic Lights
- Package 2. New Controlled Crossing at Intersections
- Package 3. New Mid-Block Controlled Crossing
- Package 4. Enhancements at Driveways and Intersections without Traffic Lights

These packages include treatments focused on enhancing the safety of active transportation users including enhanced pedestrian level lighting. The spot location packages have some elements specific to the different corridor wide concepts (green markings for separated bicycle lanes) and will have to be modified to not only fit specific locations but the selected surrounding cross section. Details of what is included in the packages and the locations proposed for each kind of package can be found in **Attachment A**.

3.1.3.2 SR 525 Interchange and 35th Avenue West

The SR 525 Interchange on-ramps and off-ramps and the 35th Avenue West intersection are unique in the study area as it is the only interchange in the area and is serviced with higher speed acceleration and deceleration lanes. On SR 99 through the interchange there are gaps in the pedestrian, bicycle and transit facilities. To address these gaps, three concepts for the interchange and three concepts for 35th Avenue West were developed. **Attachment C** provides details for these concepts and a high-level analysis of their potential impacts. All concepts include continuous separated bicycle lanes and sidewalk. If a shared use path is pursued in any segment, additional design work would be required to convert the concept to a two-way facility.

SR 525 Concepts:

- Concept 1 – Re-align ramps closer to a 90 degree angle with SR 99, re-allocate acceleration and deceleration lanes for BAT lanes, add facilities to accommodate those walking, biking or rolling with raised ramp crossings controlled by rapid rectangular flashing beacons (RRFB).
- Concept 2 – Everything in concept 1 with the addition of the reconfiguration of the SR 525 northbound ramps
- Concept 3 – Everything in Concept 2 with the addition of ramp displacements and consolidated ramp movements

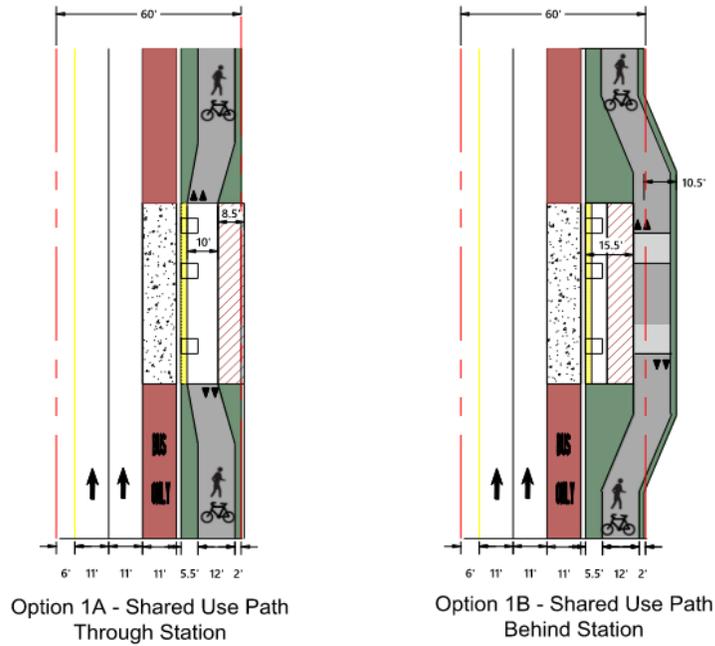
35th Avenue West Concepts:

- Concept 1 – Signalize control between 35th Avenue West entrance and a transit-only lane northbound on SR 99 to provide protected crossings for those walking, biking or rolling.
- Concept 2 – Align the 35th Avenue West connection to SR 99 with a “T” Intersection that is perpendicular to SR 99 providing better sight distance and a stop-controlled crossing for those walking, biking or rolling.
- Concept 3 – Close the connection to 35th Avenue West and relocate these trips to 148th Street Southwest.

3.1.3.3 Transit Stop and Active Transportation Integration

Transit stops need to be integrated with the active transportation facilities shown in Corridor Wide Concepts 1 and 2 in Section 3.1.1. For each concept there are two different options for integrating the transit stop with the pedestrian and bicycle facilities, as shown in Figure 6.

Corridor Wide Concept 1 - Bus Station Integration



Corridor Wide Concept 2 - Bus Station Integration

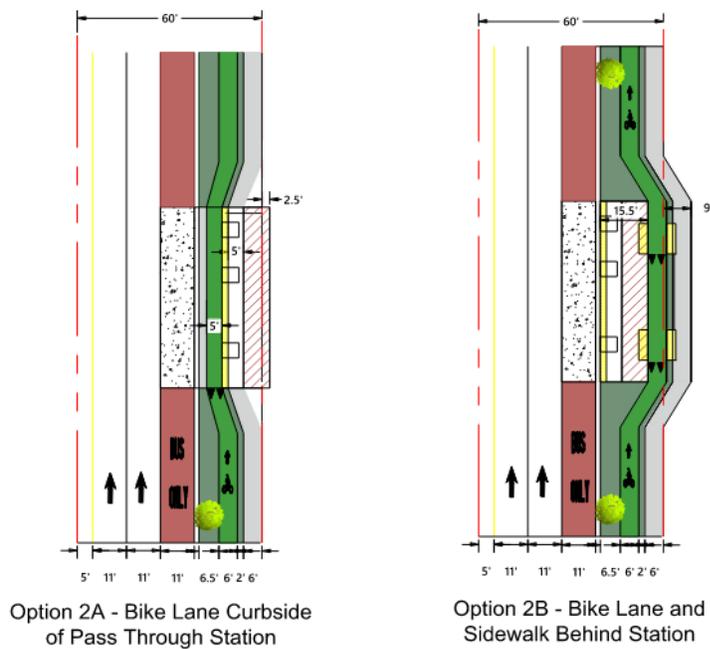


Figure 6. Transit Stop Integration Concepts

3.2 Level 2 Criteria

Criteria for the Level 2 screening were developed using the purpose and need statement, feedback from the community and discussions with agency partners. The criteria were broken into five categories:

- Improving Active Transportation
- Improved Transit Service
- Practicality
- Land Use Compatibility
- Environmental Constraints

Each of the criteria has multiple components. Components of the criteria are either baseline or relative. Baseline criteria are scored on whether the option meets the criteria or if it is not applicable (NA). Relative criteria comparing the concepts to each other or to the existing condition are scored higher, lower or NA. For relative criteria, higher scores indicate the concept provides a greater benefit. Not all criteria will apply to all concepts. The criteria provide a framework for comparing concepts and defining opportunities to improve concepts to best enhance safety, mobility and accessibility along the SR 99 corridor.

3.2.1 Improved Active Transportation Facilities

The baseline requirements for complete streets for this study are a PLTS and BLTS of 1 or 2. The PLTS and BLTS are a rating of pedestrian and bicyclist comfort utilizing separation, width and speed. For SR 99, a corridor with a recommended posted speed of 40 mph and three through lanes in one direction, PLTS 2 can be achieved with a minimum sidewalk width of five (5) feet with a robust physical barrier or a 3 foot minimum buffer from traffic lanes. BLTS 2 can be achieved with a bicycle lane that has a minimum of two (2) feet buffer from traffic lanes. Both PLTS and BLTS 2 can be achieved with a shared-use path that follows all the requirements in chapter 1515 of the WSDOT Design Manual.

The relative criteria for complete streets requirements are exposure and Route Directness Index (RDI). Exposure is a measure of how vulnerable active transportation users are to vehicle traffic. Longer crossing distances, faster vehicle speeds and being closer to moving vehicles all increase exposure. RDI evaluates how well infrastructure minimizes out of direction travel. Providing additional protected crossing of SR 99 reduces RDI.

This study applies a concise package of proven countermeasures to reduce speeds, shorten and simplify crossings, and separate modes. Treatments include continuous separated bicycle lanes, protected and controlled crossings at midblock or minor intersections (Pedestrian Hybrid Beacons (PHB) or half signals) with median refuges, protected intersection elements, signal enhancements such as LPIs, APS, protected pedestrian phases, bicycle signals and appropriate no-turn-on-red, access management of driveways and medians with defined U-turns, and pedestrian-scale lighting with high-visibility crosswalks. Table 4 summarizes the complete streets criteria components and how they are scored.

Table 4. Complete Streets Requirements Criteria for Pedestrians and Bicyclists		
Criteria	Type	Assessment
PLTS	Baseline	Meets PLTS 2 or better
BLTS	Baseline	Meets PLTS 2 or better
Lower Exposure	Relative	Ability to reduce crossing distances, lower vehicle speeds and provide buffer between active modes and the vehicle lanes
RDI	Relative	Ability to improve route directness along large blocks with new or improved controlled crossing of SR 99
Safety Improvements	Relative	Ability to provide proven safety countermeasures for all users

3.2.2 Improved Transit Service

SR 99 is a critical transit corridor, carrying both the Community Transit Swift Blue Line and local route 101. Transit is a critical component of complete streets and having continuous BAT lanes has been identified as a baseline need of this corridor. Transit reliability and access to transit are other criteria that are used to differentiate the Level 2 options. A preliminary analysis of the delay to transit was also performed to assist in evaluating the options. See Attachment D for details. Table 5 summarizes the complete streets criteria.

Table 5. Complete Streets Requirements Criteria for Transit		
Criteria	Type	Assessment
BAT Lanes	Baseline	Includes Continuous BAT Lanes
Transit Reliability	Relative	Ability to improve transit reliability or remove obstacles, has elements that could mitigate transit reliability through signal timing, or other obstacles; preliminary analysis includes transit delay
Access to Transit	Relative	Ability to enhance or maintain access to transit

3.2.3 Practicality

Practicality criteria is a broad category to capture the various other factors that can influence and pose risks to design. These criteria are only used to differentiate between options, not between options and the existing conditions. None of these criteria are baseline requirements but will inform the development of options. Table 6 summarizes the practicality criteria.

Table 6. Complete Streets Requirements Criteria for Practicality		
Criteria	Type	Assessment
Constructability	Relative	Ability to phase improvements and reduce impact to the public
Minimizes ROW Required	Relative	Ability to minimize ROW
Agency Coordination	Relative	Ability to closely coordinate with agency partners regarding implementation of improvements e.g. permitting
Cost Effective	Relative	Ability to lower costs. Note, excludes ROW acquisition which is captured in another criteria
Vehicle and Freight Mobility	Relative	Ability to maintain vehicle and freight access to businesses and locations

3.2.4 Land Use / Partner Agency Compatibility

Land use/partner agency compatibility is a baseline check that options do not conflict with future land use plans or partner agency plans. Existing local and regional land use plans include the City of Lynnwood’s Highway 99 Subarea Plan, College District Subarea Plan and South Lynnwood Neighborhood Plan. Ensuring compatibility with zoning regulations, future development goals and transit-oriented planning efforts helps maximize the effectiveness of corridor enhancements. Table 7 summarizes land use/partner agency compatibility criteria. A summary of land use plans for the area is provided in **Attachment B**.

Table 7. Complete Streets Requirements Criteria for Land Use/ Partner Agency Compatibility		
Criteria	Type	Assessment
Land Use	Baseline	Does not conflict with existing land use plans
Partner Agency	Baseline	Does not conflict with existing partner agency plans

3.2.5 Environmental Impacts

WSDOT works with the Washington Department of Fish and Wildlife and Tribal governments to address fish passage barriers on state-owned roadway facilities. Appendix D Environmental Screening identified three culverts that are considered fish barriers within the potential project limits. This relative criterion identifies whether the options would include fish barrier correction work.

Pollution Generating Impervious Surfaces (PGIS) refers to paved surfaces, including roadways, driveways and parking lots, that increase stormwater runoff and contribute to water pollution. The WSDOT Highway Runoff Manual’s definition of PGIS states that “paved bicycle pathways separated from roads for motor vehicles... and infrequently used maintenance access roads” are not considered PGIS. As part of compliance with the Endangered Species Act (ESA), any modifications to SR 99 will need to account for changes in impervious surfaces and meet all applicable stormwater treatment requirements. This criterion estimates the amount of additional (new, replaced or a combination of the two) PGIS that would be generated under each concept to inform the potential level of ESA consultation and stormwater treatment requirements.

Historic preservation evaluates the extent to which SR 99 corridor improvement concepts would impact historically significant landmarks. Keeler’s Korner, a National Register of Historic Places-listed site on SR 99, is the primary location of concern. This criterion evaluates the relative impact the option could affect this historic site.

The final environmental criterion evaluates how options along SR 99 affect historically underserved communities, particularly those identified through the Washington Environmental Health Disparities (EHD) Map. The goal is to enhance mobility options for vulnerable populations, ensuring equitable access to transit, pedestrian infrastructure and multimodal facilities. This aligns with Washington State’s Healthy Environment for All (HEAL) Act, which focuses on the identification and mitigation of environmental health disparities in overburdened communities.

Table 8 summarizes the environmental impact criteria.

Table 8. Environmental Impacts Criteria

Criteria	Type	Assessment
Fish Passage Impact	Relative	Whether fish passage work will be included
Minimizes New PGIS	Relative	Ability to minimize PGIS based on a high level evaluation of the option
Historic Preservation	Relative	Ability to lessen impacts to historic sites
Reduces EHD	Relative	Ability to reduce risk to vulnerable communities as defined in Environmental Health Disparities through complete streets improvements

3.3 Level 2 Screening Results

The Level 2 options from Section 3.1 are evaluated on the Level 2 criteria from Section 3.2. For baseline criteria the concepts are scored either meets (✓), does not meet (✗) or not applicable (-). For the relative criteria the concepts either score higher (↑), lower (↓), even (=) or not applicable (--) than the competing option. Where there are not multiple competing options or for the environmental constraints the relative criteria are evaluated compared to the existing condition.

3.3.1 Corridor-Wide Concepts

The two corridor wide concepts are evaluated on all the criteria in Table 9. Concept 1 is evaluated as the completed 1B phase with shared use paths on both sides.

Table 9. Level 2 Corridor-Wide Cross-Section Options Screening Matrix

Criteria	Type	Concept 1 – Shared Use Paths	Concept 2 – Separate Bike Lanes
Improved Active Transportation Facilities			
PLTS	Baseline	✓	✓
BLTS	Baseline	✓	✓
Lower Exposure	Relative	↓	↑
Route Directness	Relative	--	--
Safety Improvements	Relative	↓	↑
Improved Transit Service			
Transit Lanes	Baseline	✓	✓
Transit Reliability	Relative	=	=
Access to Transit	Relative	↑	↓
Practicality			

Constructability	Relative	↑	↓
Minimizes ROW Required	Relative	=	=
Agency Coordination	Relative	=	=
Cost Effective	Relative	=	=
Vehicle and Freight Mobility	Relative	=	=
Land Use/ Partner Agency Compatibility			
Land Use	Baseline	√	√
Partner Agency	Baseline	√	√
Environmental Impacts			
Fish Passage Impact	Relative	=	=
Minimizes New PGIS	Relative to Existing	↑	↑
Historic Preservation	Relative to Existing	↓	↓
Reduces EHD	Relative to Existing	↑	↑

Concept 1 provides better access to transit since the shared use paths allow bi-directional travel for bicyclists on both sides of the corridor, where the separate bike lanes do not. Concept 2 is better at reducing exposure as the physical separation of pedestrians from bicyclists reduces potential conflicts between the modes. Concept 2 is also better operationally for interactions between bicyclists and motor vehicles because the bicyclists are operating in the direction of vehicles; vehicles can expect bicycles moving in the same direction. The two concepts will be advanced to the next stage of analysis as they each may be a better fit for different segments of the study corridor.

3.4 Systemic Treatments

3.4.1.1 Access Management

The option of updating access management to consolidate access points is compared to maintaining the existing access points in Table 10.

Table 10. Level 2 Access Management Plan Screening Matrix			
Criteria	Type	Maintain Existing Access Points	Consolidate Access Points
Improved Active Transportation Facilities			
PLTS	Baseline	--	--
BLTS	Baseline	--	--
Lower Exposure	Relative	↓	↑
Route Directness	Relative	--	--

Safety Improvements	Relative	↓	↑
Improved Transit Service			
Transit Lanes	Baseline	--	--
Transit Reliability	Relative	↓	↑
Access to Transit	Relative	↓	↑
Practicality			
Constructability	Relative	--	--
Minimizes ROW Required	Relative	--	--
Agency Coordination	Relative	↑	↓
Cost Effective	Relative	↓	↑
Vehicle and Freight Mobility	Relative	↑	↓
Land Use/ Partner Agency Compatibility			
Land Use	Baseline	✓	✓
Partner Agency	Baseline	✓	✓
Environmental Impacts			
Fish Passage Impact	Relative	=	=
Minimizes New PGIS	Relative to Existing	--	--
Historic Preservation	Relative to Existing	↑	↓
Reduces EHD	Relative to Existing	--	--

Consolidating access points improves active transportation facilities by eliminating conflict points between active transportation users and vehicles thus reducing their exposure. It also improves access to transit service by making it easier to get to stations as there are not as many driveways to cross. Consolidating access points also makes it easier to locate transit stations in ideal locations, for example near signal-controlled intersections as there are less obstacles to avoid. Vehicles pulling out of driveways enter bus lanes, so a greater frequency of driveways can create greater delays for transit. Consolidating access points is a cost-effective way to enhance safety as it takes little capital investment, but it does require greater coordination with local partners and can have impacts to freight and vehicle mobility. The existing access point spacing along SR 99 does not meet WSDOT's access management requirements, coordination is needed to better meet requirements. Consolidating access points could impact historical buildings like Keelers Corner.

3.4.1.2 Speed Limit Change

The existing 45 MPH speed limit is evaluated compared to a 40 MPH and 35 MPH speed in Table 11. The Land Use/ Partner Agency Compatibility and the Environmental Impacts criteria were not used for evaluation as they are not applicable.

Table 11. Speed Limit Screening Matrix				
Criteria	Type	Existing 45 MPH	40 MPH	35 MPH
Improved Active Transportation Facilities				
PLTS	Baseline	X	√	√
BLTS	Baseline	X	√	√
Lower Exposure	Relative	↓	=	↑
Route Directness	Relative	--	--	--
Safety Improvements	Relative	↓	=	↑
Improved Transit Service				
Transit Lanes	Baseline	√	√	√
Transit Reliability	Relative	=	=	=
Access to Transit	Relative	--	--	--
Practicality				
Constructability	Relative	↑	↑	↓
Minimizes ROW Required	Relative	↓	↓	↑
Agency Coordination	Relative	--	--	--
Cost Effective	Relative	↓	↑	↑
Vehicle / Freight Mobility	Relative	↑	=	↓

The existing 45 mph speed limit makes achieving a lower PLTS and BLTS more difficult, lowering the speed limit gives greater options to meet PLTS and BLTS goals. The lower the speed limit, the lower the exposure for people walking biking or rolling. For transit reliability a speed limit of 35 mph may slow buses, but it is far from the biggest factor in bus delays. A speed limit lower than 45 MPH also improves transit reliability by allowing buses to stop in lane rather than requiring a bus pullout. To get to a 35 mph speed limit, greater infrastructure changes are needed to reinforce the lower speed limit, requiring more construction. However, getting down to 35 mph allows for narrower lanes which reduce the ROW required for improvements. Lowering speed limits is a cost-effective way to enhance safety along a corridor, as by design it slows down vehicles and freight.

3.4.2 Spot Treatments

3.4.2.1 Packages of Spot Treatment

The packages of spot treatments are evaluated on all criteria in Table 12. Spot treatments packages are for different scenarios, so they are evaluated compared to existing conditions, not each other.

- Package 1: Enhancements at Traffic Lights
- Package 2: New Controlled Crossing at Intersections

- Package 3. New Mid-Block Controlled Crossing
- Package 4. Enhancements at Driveways and Intersections without Traffic Lights

Table 12. Level 2 Packages of Spot Treatments Screening Matrix					
Criteria	Type	Enhancements at Traffic Lights (Package 1)	New controlled crossings at intersections (Package 2)	New Midblock Controlled Crossing (Package 3)	Enhancements at Driveways and Intersections without Traffic Lights (Package 4)
Improved Active Transportation Facilities					
PLTS	Baseline	✓	✓	✓	✓
BLTS	Baseline	✓	✓	✓	✓
Lower Exposure	Relative to Existing	↑	↑	↑	↑
Route Directness	Relative to Existing	--	↑	↑	--
Safety Improvements	Relative to Existing	↑	↑	↑	↑
Improved Transit Service					
Transit Lanes	Baseline	✓	✓	✓	--
Transit Reliability	Relative to Existing	↓	↓	↓	=
Access to Transit	Relative to Existing	↑	↑	↑	=
Transit Delay	Relative	--	↓	↓	--
Practicality					
Constructability	Relative to Existing	--	--	--	--
Minimizes ROW Required	Relative to Existing	↓	↓	↓	=
Agency Coordination	Relative to Existing	↓	↓	=	=
Cost Effective	Relative to Existing	--	--	--	--
Vehicle and Freight Mobility	Relative to Existing	↓	↓	↓	↓
Land Use/ Partner Agency Compatibility					
Land Use	Baseline	✓	✓	✓	✓
Partner Agency	Baseline	✓	✓	✓	✓

Environmental Impacts					
Fish Passage Impact	Relative	--	--	--	--
Minimizes New PGIS	Relative to Existing	↑	↑	↑	↑
Historic Preservation	Relative to Existing	↑	=	=	=
Reduces EHD	Relative to Existing	↑	↑	↑	↑

The spot improvement packages meet all baseline criteria. Package 1 can lower transit reliability by separating the ped/bike phase from the right-turn phase potentially resulting in the bus in the BAT lane being stuck behind right-turning vehicles. Signal phasing solutions like flushing the right-turn lane before the ped/ bike signal may address this and further analysis is needed. The additional phase and the no right turn on red in Package 1 also lower vehicle and freight mobility compared to the existing condition by signaling or eliminating slip lanes as well as potentially protecting pedestrian and bicycle phases. Preliminary analysis of transit delay shows Packages 2 and 3 also lower transit reliability, see Table 13 on transit delay by package. Further analysis is needed to better determine the extent of this delay and how much of the delay to transit may be able to be mitigated by coordinating signals and having far-side stops. Package 4 lowers vehicle and freight mobility by limiting the space to turn into and out of businesses. Coordination with property owners would ensure that business access is maintained while the Package 4 improvements are implemented. Packages 1 through 3 also require additional ROW to fit multimodal facilities and provide buffers from the roadway. All packages lower exposure, enhance safety and likely do not have any environmental impacts.

Table 13 Transit Delay by Spot Treatment Package

Spot Treatment Package	Transit Delay increase in seconds
	Total
Package 1	Decrease 1 second on average per intersection
Package 2 and Package 3	Increase of 16 – 17 seconds
Package 4	No Change

3.4.2.2 SR 525 Interchange and 35th Avenue West

The SR 525 Interchange concepts and 35th Avenue West concepts are evaluated on all criteria in Table 14. The relative criteria compare the concepts to each other. The details for the SR 525 Interchange and the 35th Avenue West concepts are found in **Attachment C**.

Table 14. SR 525 Concepts				
Criteria	Type	Concept 1	Concept 2	Concept 3
Improved Active Transportation Facilities				
PLTS	Baseline	√	√	√
BLTS	Baseline	√	√	√
Lower Exposure	Relative	=	↑	↑
Route Directness	Relative	↑	↑	↑
Safety Improvements	Relative	↑	↑	↑
Improved Transit Service				
Transit Lanes	Baseline	√	√	√
Transit Reliability	Relative	=	↓	↓
Access to Transit	Relative	--	--	--
Practicality				
Constructability	Relative	↑	=	=
Minimizes ROW Required	Relative	--	--	--
Agency Coordination	Relative	↑	=	=
Cost Effective	Relative	↑	=	↓
Vehicle / Freight Mobility	Relative	=	↓	↓
Land Use/ Partner Agency Compatibility				
Land Use	Baseline	--	--	--
Partner Agency	Baseline	--	--	--
Environmental Impacts				
Fish Passage Impact	Relative	=	=	=
Minimizes New PGIS	Relative	↓	=	↑
Historic Preservation	Relative	--	--	--
Reduces EHD	Relative	=	=	=

All three interchange concepts meet the baseline needs. When compared relatively, Concept 1 maintains interchange operations; however, active transportation exposure is not as reduced compared to the other concepts.

Concepts 2 and 3 introduce additional signal control and vehicle movements at the interchange. This both reduces active transportation exposure and vehicular network operations; however, signal control may impact transit reliability. In addition, the change in operations and infrastructure may result in added agency coordination, cost and potential environmental impacts as shown in Table 15.

Table 15. 35th Avenue West Concepts

Criteria	Type	Concept 1	Concept 2	Concept 3
Improved Active Transportation Facilities				
PLTS	Baseline	√	√	√
BLTS	Baseline	√	√	√
Lower Exposure	Relative	=	=	↑
Route Directness	Relative	=	=	↑
Safety Improvements	Relative	=	=	↑
Improved Transit Service				
Transit Lanes	Baseline	--	--	--
Transit Reliability	Relative	↓	↑	↑
Access to Transit	Relative	--	--	--
Practicality				
Constructability	Relative	=	↓	↑
Minimizes ROW Required	Relative	--	↓	--
Agency Coordination	Relative	=	=	↓
Cost Effective	Relative	=	↓	↑
Vehicle/ Freight Mobility	Relative	=	=	↓
Land Use/ Partner Agency Compatibility				
Land Use	Baseline	--	--	--
Partner Agency	Baseline	--	--	--
Environmental Impacts				
Fish Passage Impact	Relative	--	--	--
Minimizes New PGIS	Relative	=	=	↑
Historic Preservation	Relative	--	--	--
Reduces EHD	Relative	=	=	↑

At the intersection of 35th Avenue West and SR 99, all concepts meet the baseline need. Concept 1 largely maintains the current alignment of 35th Avenue West, which decreases construction impacts. However, the concept introduces a signal to manage traffic merging into the BAT lane, which may impact transit reliability.

Concept 2 modifies 35th Avenue West to a more perpendicular connection with SR 99. This would introduce additional retaining walls and added cost as well as analysis of sight lines due to change in elevation.

Concept 3 eliminates vehicle access from 35th Avenue West to SR 99, instead shifting traffic to the signalized intersection of 148th Street Southwest and SR 99 or other network connections. The benefit is elimination of a conflict point for active transportation users; however, additional agency engagement and analysis may be needed.

3.4.2.3 Transit Stop and Active Transportation Integration

The transit bus stop options are tied to the corridor wide concepts. The concepts are shown in Figure 6. Transit Stop Integration Concepts. For relative criteria, options 1A and 1B are compared to each other and options 2A and 2b are separately compared, as shown in Table 16.

Table 16. Transit Stop Integration Screening					
Criteria	Type	Option 1A	Option 1B	Option 2A	Option 2B
Improved Active Transportation Facilities					
PLTS	Baseline	✓	✓	✓	✓
BLTS	Baseline	✓	✓	✓	✓
Lower Exposure	Relative	↓	↑	↓	↑
Route Directness	Relative	--	--	--	--
Safety Improvements	Relative	=	=	=	=
Improved Transit Service					
Transit Lanes	Baseline	--	--	--	--
Transit Reliability	Relative	--	--	--	--
Access to Transit	Relative	=	=	=	=
Practicality					
Constructability	Relative	=	=	=	=
Minimizes ROW Required	Relative	↑	↓	↑	↓
Agency Coordination	Relative	=	=	=	=
Cost Effective	Relative	↑	↓	↑	↓
Vehicle / Freight Mobility	Relative	--	--	--	--
Land Use/ Partner Agency Compatibility					
Land Use	Baseline	✓	✓	✓	✓
Partner Agency	Baseline	✗	✓	✗	✓
Environmental Impacts					
Fish Passage Impact	Relative	=	=	=	=
Minimizes New PGIS	Relative	=	=	=	=
Historic Preservation	Relative	=	=	=	=
Reduces EHD	Relative	=	=	=	=

Partner agencies expressed a strong preference for the B options as they allow for greater separation between thru traffic and their transit operations. While both B options require greater cost and ROW the strong preference by partner agencies and the reduced exposure make them the preferred option. Option A is a backup for constrained stations where the B options are not possible.

3.5 Level 2 Summary and Next Steps

All options that pass the baseline criteria will be advanced to the next phase of the study where the options will be further refined and combined into a recommendation.

The options analyzed in this memo have also been shared with the public through an online open house, focus groups and community meetings. In addition, the options are being discussed with partner agencies through committee and one on one meetings. The feedback from the community and partner agency meetings will be used with the analysis in this memo to develop the recommendations.

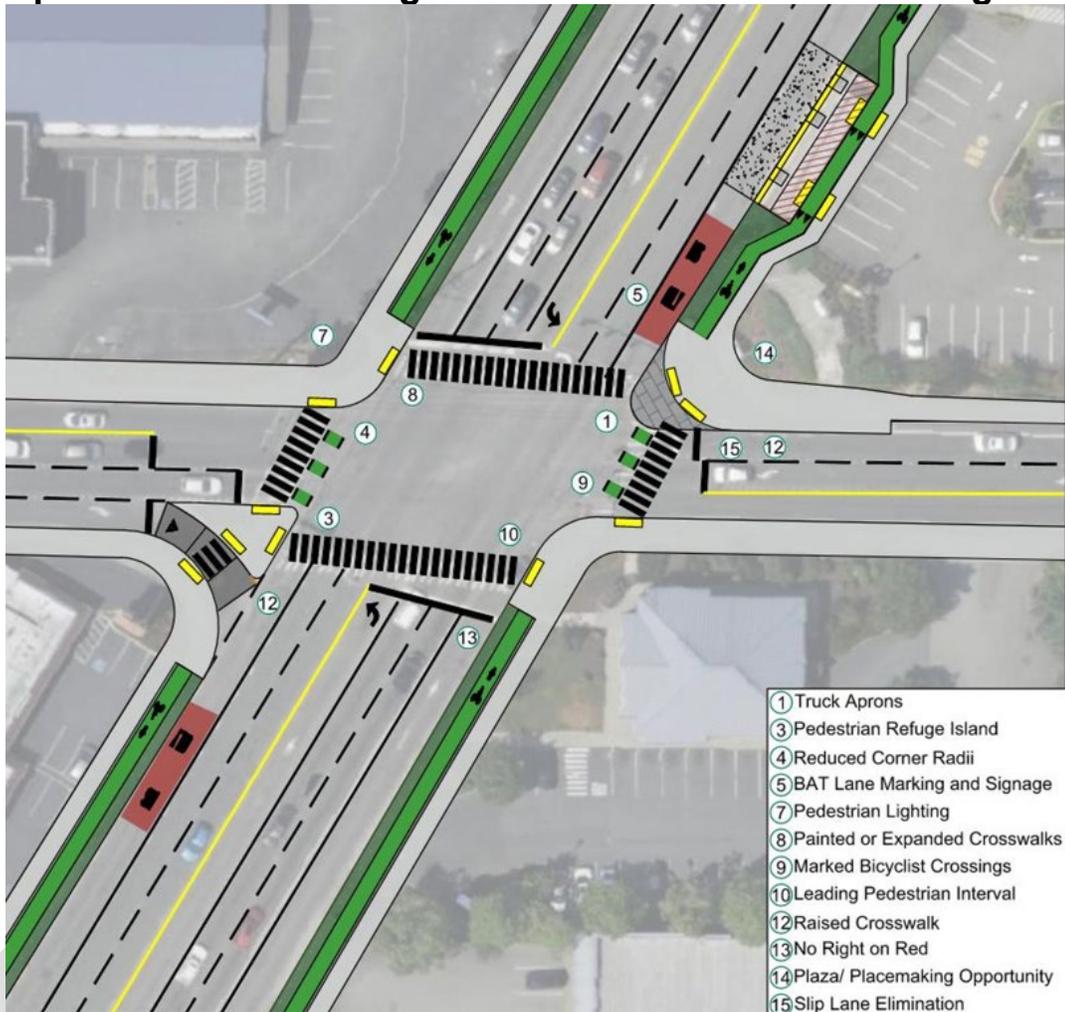
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ATTACHMENT A: SPOT TREATMENTS, LOCATION MAP & DESCRIPTIONS

DRAFT



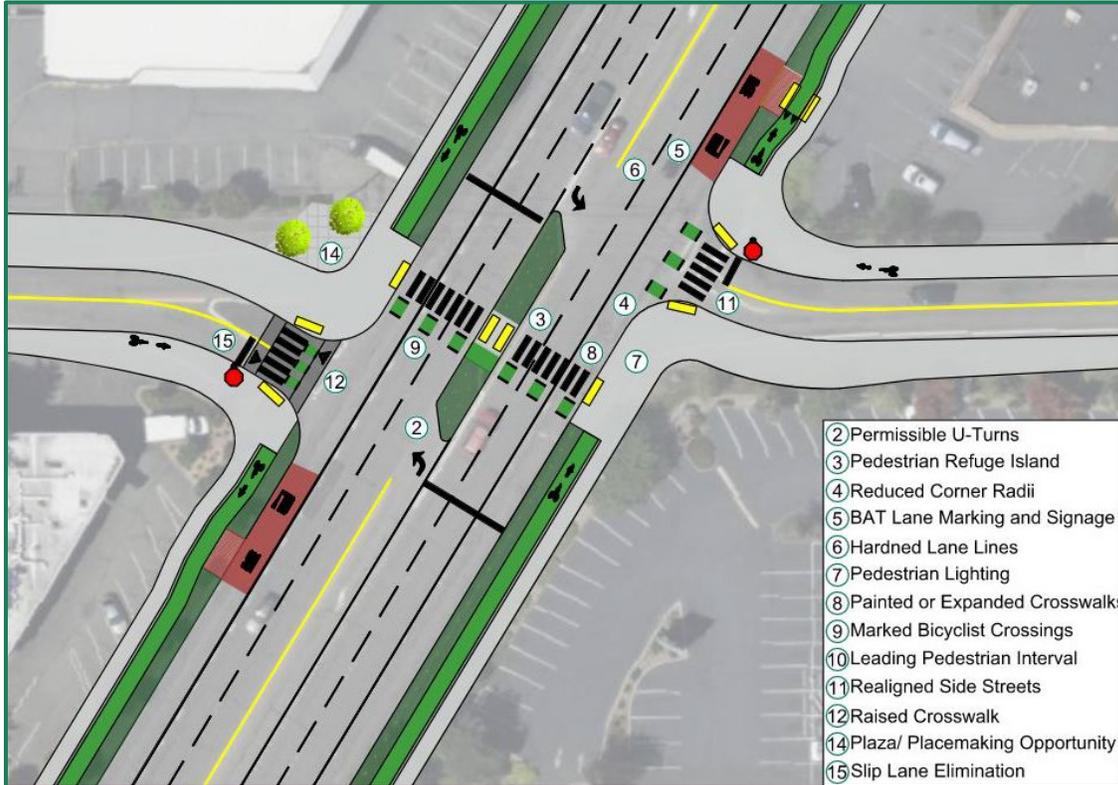
Spot Treatment Package 1: Enhancements at Traffic Lights



Spot treatment includes:

- Leading Pedestrian Interval
- Truck Aprons
- Slip Lane Elimination
- Slip Lane Narrowing w/ Raised Crosswalk
- Painted or Expanded Crosswalks
- Pedestrian Refuge Island
- No Right on Red
- Reduced Corner Radii
- ADA Compliant Ramps
- Lighting
- BAT Lane Markings
- Marked Bicyclist Crossings

Spot Treatment Package 2: New Controlled Crossings at Intersections

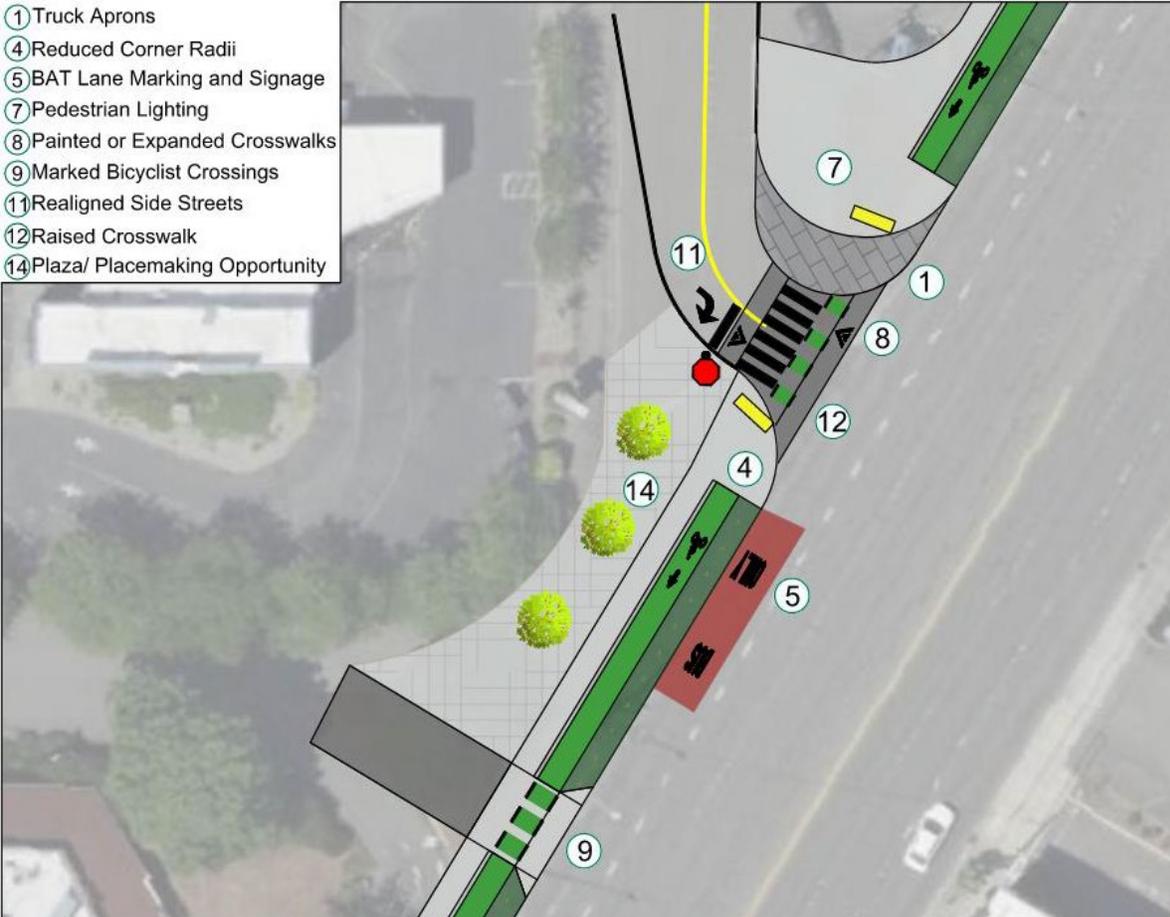


Spot treatment includes:

- Realigned Side Streets
- Permissible U-Turns
- Truck Aprons
- Raised Crosswalks
- Painted or Expanded Crosswalks
- Pedestrian Refuge Island
- Pedestrian Signal
- Advanced Stop Bars
- Hardened Lane Line
- Reduced Corner Radii
- ADA Compliant Ramps
- Lighting
- Marked Bicyclist Crossings
- Plazas
- BAT Lane Markings

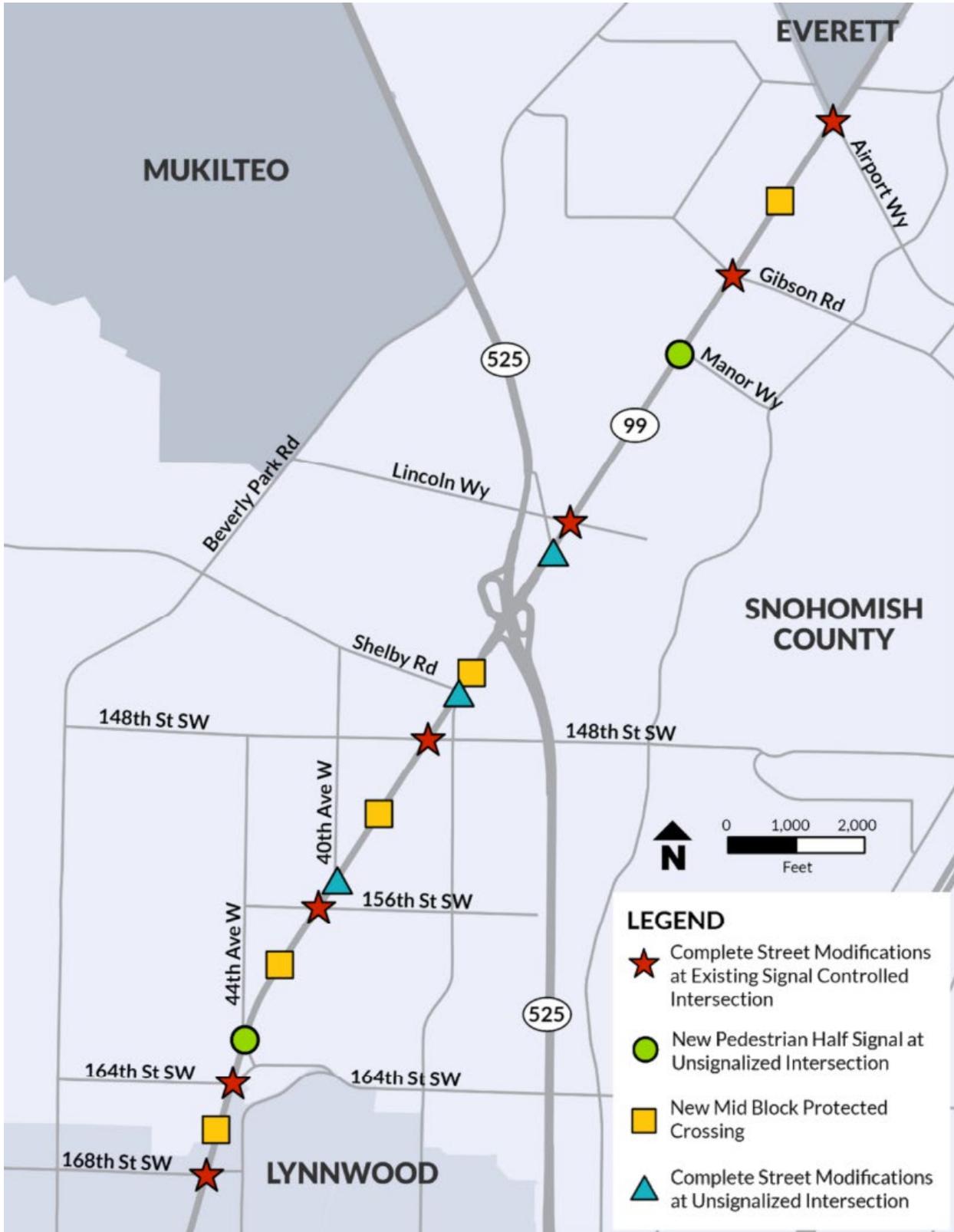
Spot Treatment Package 4: Complete Streets Modifications at Unsignalized Intersections and Driveways

- ① Truck Aprons
- ④ Reduced Corner Radii
- ⑤ BAT Lane Marking and Signage
- ⑦ Pedestrian Lighting
- ⑧ Painted or Expanded Crosswalks
- ⑨ Marked Bicyclist Crossings
- ⑪ Realigned Side Streets
- ⑫ Raised Crosswalk
- ⑭ Plaza/ Placemaking Opportunity



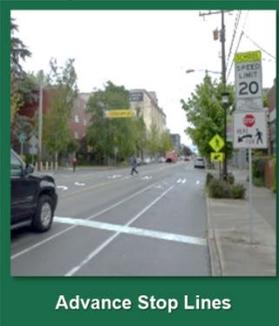
Spot treatments include:

- Realigned Side Streets
- Truck Aprons
- Painted or Expanded Crosswalks
- Advanced Stop Bars
- Reduced Corner Radii
- ADA Compliant Ramps
- Lighting
- Marked Bicyclist Crossings
- Plazas
- BAT Lane Markings
- Narrowed / Defined Driveways

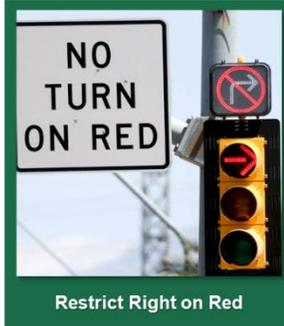




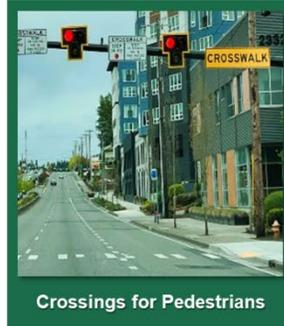
Improvement Ideas



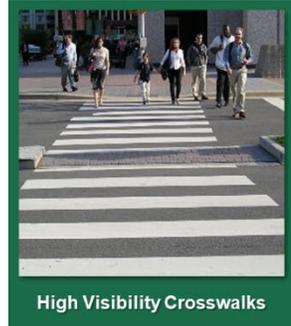
Advance Stop Lines



Restrict Right on Red



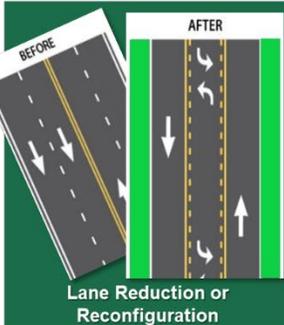
Crossings for Pedestrians



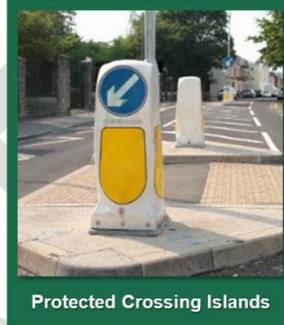
High Visibility Crosswalks



Hardened Centerline/
Turn Hardening



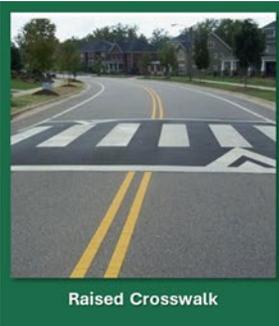
Lane Reduction or
Reconfiguration



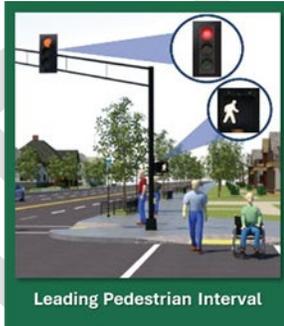
Protected Crossing Islands



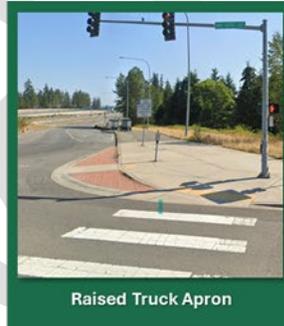
Protected Bike Signals



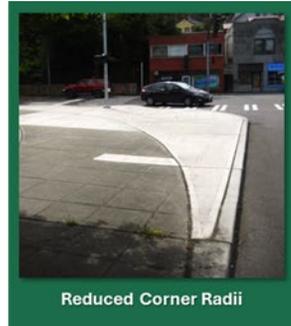
Raised Crosswalk



Leading Pedestrian Interval



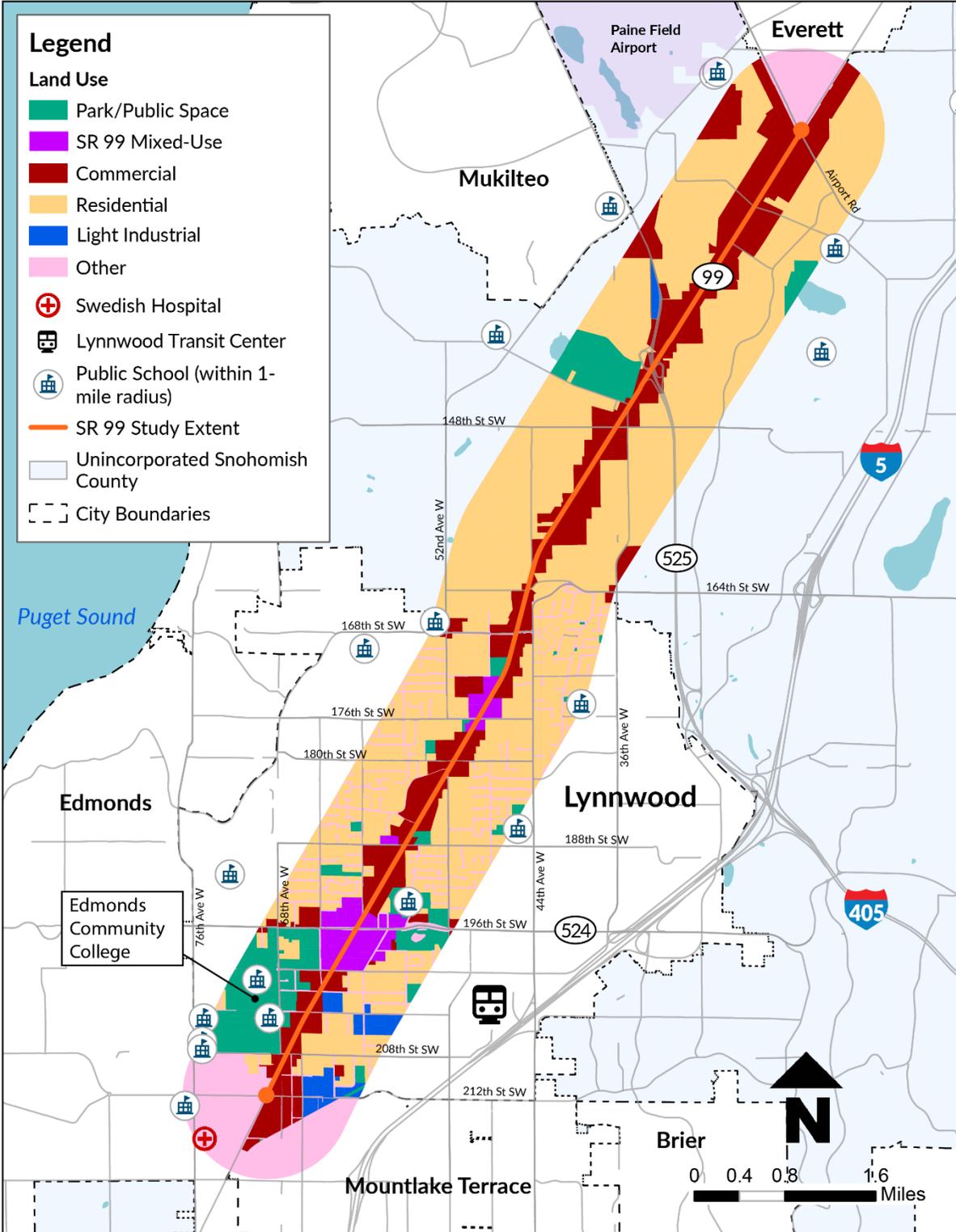
Raised Truck Apron



Reduced Corner Radii

ATTACHMENT B: LAND USE MAP

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ATTACHMENT C: SR 99/SR 525 INTERCHANGE ASSESSMENT

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Purpose

This attachment evaluates concepts for the SR 99/SR 525 interchange segment of the SR 99 Lynnwood and Unincorporated Snohomish County Pre-Design Study. SR 99 is within limited-access control from Shelby Road to Lincoln Way since the interchange provides a connection to the SR 525 freeway. The concepts are intended to advance WSDOT's Complete Streets commitments and to accommodate the planned extension of Business Access and Transit (BAT) lanes from 148th Street Southwest to Airport Road through the interchange. Each concept's expected benefits, challenges and tradeoffs are described.

Study Context

The study covers SR 99 between mileposts 45.7 and 52.3. The SR 99/SR 525 interchange is a grade-separated connection between two limited-access highways with high-speed ramps to SR 99 that lack facilities for people walking, biking, rolling and accessing transit. Although most of the SR 99 corridor includes dedicated BAT lanes, these do not currently extend north of 148th Street Southwest or through the interchange.

South of the SR 99/SR 525 interchange is a northbound acceleration lane from 148th Street Southwest/35th Avenue West onto SR 99 that is a barrier for people walking, biking, rolling and accessing transit along northbound SR 99. This acceleration lane is within the interchange context and options for improving conditions for people walking, biking, rolling and accessing transit are also considered below.

Preliminary coordination has been conducted with Snohomish County, the cities of Lynnwood, Everett, Mukilteo and Edmonds, as well as other agencies such as Sound Transit, Community Transit and Everett Transit. WSDOT is also engaging with local community-based organizations to address needs identified by the community within the study area.

Existing Conditions / Challenges

The interchange has a range of conditions that are barriers for people walking, rolling, bicycling and taking transit along the corridor. These include:

- **Limited Lighting**
The interchange lacks sufficient lighting, reducing visibility and comfort for all users.
 - **Lack of Dedicated Pedestrian and Bicycle Facilities**
Sidewalks are absent, and no dedicated bicycle facilities exist. Additionally, high vehicle speeds and low-angle ramp connections discourage traveling along SR 99 on foot or by bicycle. The wide shoulder that currently functions as the pedestrian path has frequently been used for truck and other vehicle parking (See Figure 1). While WSDOT has recently posted no-parking signs along the
-

shoulders within the interchange vicinity, trucks continue to park in this shoulder, further deterring use by pedestrians or bicyclists.

- **Large Footprint with High-Speed Acceleration and Deceleration Lanes**
Free-flow ramps, wide lanes and wide roadway sections create higher-speed conflict points between motorists, people walking, bicycling and rolling.
- **Lack of Dedicated Transit Facilities**
With no BAT lanes through the interchange, transit vehicles must weave or change lanes, which is not desirable.



Figure 1 SR 99 at SR 525 Looking Northbound with truck parking (prior to sign placement)

Key Considerations

Options and strategies for improving the interchange are framed with the following considerations.

Transit Performance

- **Bus Travel Times and Reliability**
Maintaining or improving travel times and schedule reliability, particularly between 148th Street Southwest and Lincoln Way.
- **Stop Location at 148th Street Southwest**
Currently the northbound Swift station is a near-side stop; far-side stops are desirable for all transit.
- **Dedicated Lanes & Signal Priority**
BAT lanes are currently programmed to start design in 2028 (additional info below in “Future Projects”). This includes potential to add queue jumps and integrate transit signal priority to support reliable operations.

Pedestrian and Bicycle Level of Traffic Stress

- **High-Speed Acceleration and Deceleration Lanes**
The existing lane configuration poses significant challenges for people walking, biking, rolling and accessing transit traveling along SR 99. Eliminating acceleration or deceleration lanes, creating more perpendicular intersection connections, narrowing lane widths, reducing crossing distances, and installing controlled and raised crossings can mitigate vehicle–pedestrian and vehicle–bicyclist conflicts while supporting active transportation.
- **State Level of Traffic Stress (LTS) Guidance**
WSDOT provides guidance setting an acceptable LTS of 2 or better for people walking, biking, rolling and accessing transit along SR 99. This is not met along the corridor or through the interchange.
- **Trucks Parking on Shoulder**
Trucks currently park on wide segments of shoulder as shown above in Figure 1, and the shoulder is currently the only accessible path. No parking signs have been placed along the highway through the interchange but trucks continue to park in these shoulders. The shoulder will be removed as part of the improvement concepts, and alternative locations for truck parking in the region should be explored.

Future Projects

- **SR 99/148th Street Southwest Vicinity to Airport Road Vicinity - Corridor Improvement (WSDOT)**
Preliminary engineering for paving and ADA compliance will begin in 2025 – 2027 Biennium. Currently, construction is anticipated to begin in the 2027 – 2029 Biennium. The SR 99 Pre-Design Study will inform the paving and ADA project scope for active transportation improvements.
- **SR 99/148th Street Southwest Vicinity to Airport Road Vicinity - Corridor Improvement (WSDOT)**
Preliminary engineering for BAT lanes from 148th Street Southwest to Airport Road will begin in 2028. As currently programmed, construction is anticipated to begin in 2034 and be completed in 2037. The SR 99 Pre-Design Study will inform the BAT lane project scope for active transportation improvements and the configuration of the interchange.

Physical Constraints

- **Utility Pole Location**
A utility transmission pole is positioned on a traffic island in the southwest

quadrant of the SR 525 interchange, which must be avoided or mitigated as part of strategy development.

- **Cross-Sectional Width Under Interchange Bridge**

Under the SR 525 bridge, the northbound pavement width is ~58 - 60 feet, and the southbound pavement width is ~60 - 70 feet between the existing walls and median curbs and barrier that protect the bridge columns. Strategies identified must conform to these sections. The cross-section width is defined in Figure 2 and Figure 3.

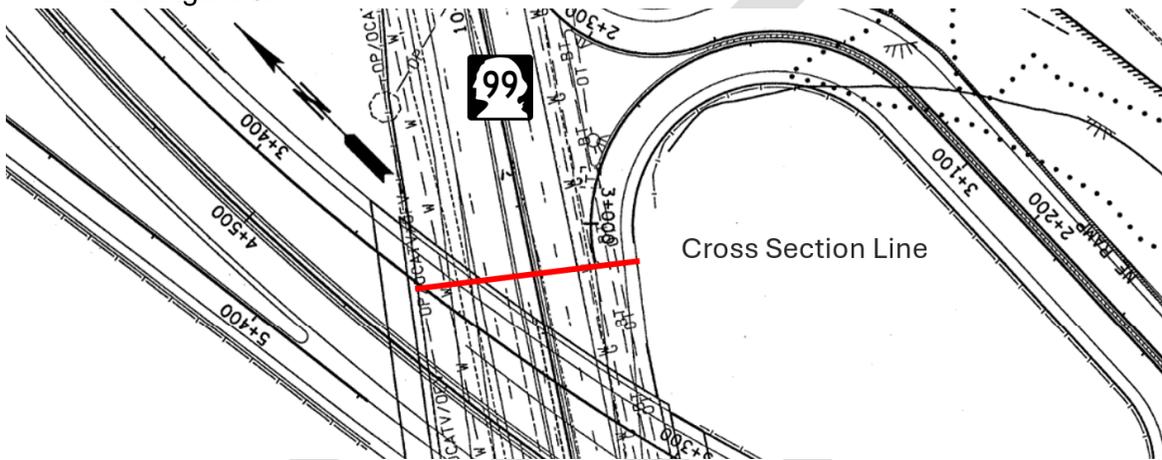


Figure 2: Cross section line across SR 99 under the SR 525 bridge. WSDOT.



Figure 3: Existing SR 99 cross section under the SR 525 bridge. See cross section line in Figure 2 above. (Source: Streetmix)

Traffic Operations

The interchange has five ramps to accommodate unimpeded traffic movements between SR 99 and SR 525. Ramps and volumes are shown in Figure 4.

The nearby intersections of SR 525/Lincoln Way, Lincoln Way/31st Avenue West, 31st Avenue West/SR 99 and Lincoln Way/SR 99 serve three movements not provided by the interchange:

- Southbound (SB) SR 99 to northbound (NB) SR 525
- SB SR 525 to NB SR 99
- NB SR 525 to SB SR 99

Potential modifications of the interchange could change traffic patterns. Three concepts that incorporate facilities for people walking, biking, rolling and accessing transit are addressed herein ranging from ramp alignment changes to more significant interchange modifications, including consolidating and closing some ramps.

2050 Volume Forecasts

To assess options, a conservative assessment of the interchange concepts was conducted using projected 2050 traffic volumes. These were developed by applying a single annual growth rate taken from PSRC's 2050 SoundCast model. Notably the SoundCast model assumes extension of Link light rail to Everett. The growth rates applied were 0.66% per year for the AM peak hour and 0.68% per year for the PM peak hour. Estimated 2050 traffic volumes for the AM and PM peak hours are shown in Figure 4.

Planning-level LOS using Critical Movement Analysis (CMA)

Critical-Movement Analysis (CMA) from Transportation Research Circular 212¹ is a planning-level tool that estimates an intersection's Level of Service (LOS) using only peak-hour turning-movement volumes and a sketch of the signal phasing. Because a signalized lane cannot discharge more than about 1,500–1,800 vehicles per hour, Circular 212 provides threshold values (Table 6) that relate the summed critical volume to LOS A–E. If the total approaches the threshold, delays rise and LOS degrades to D or E. The method is simplified for planning studies where only turning-volume counts are available and the goal is to screen options or flag locations that may require more detailed analysis.

A planning-level operations analysis was calculated using 2050 volumes for the no-build and three interchange concepts to provide context. Concepts that may move forward in the planning and pre-design process would need additional analysis.

¹ TxDOT Research Library - Publication Details. (2021). Utxas.edu.
<https://library.ctr.utexas.edu/Presto/content/Detail.aspx?ctID=UHVibGijYXRpb25fMTE2MTA%3D&rID=MjA5MjQ%3D&ssid=c2NyZWVuSURfMTQ2MDk%3D&bmdc=MQ==>

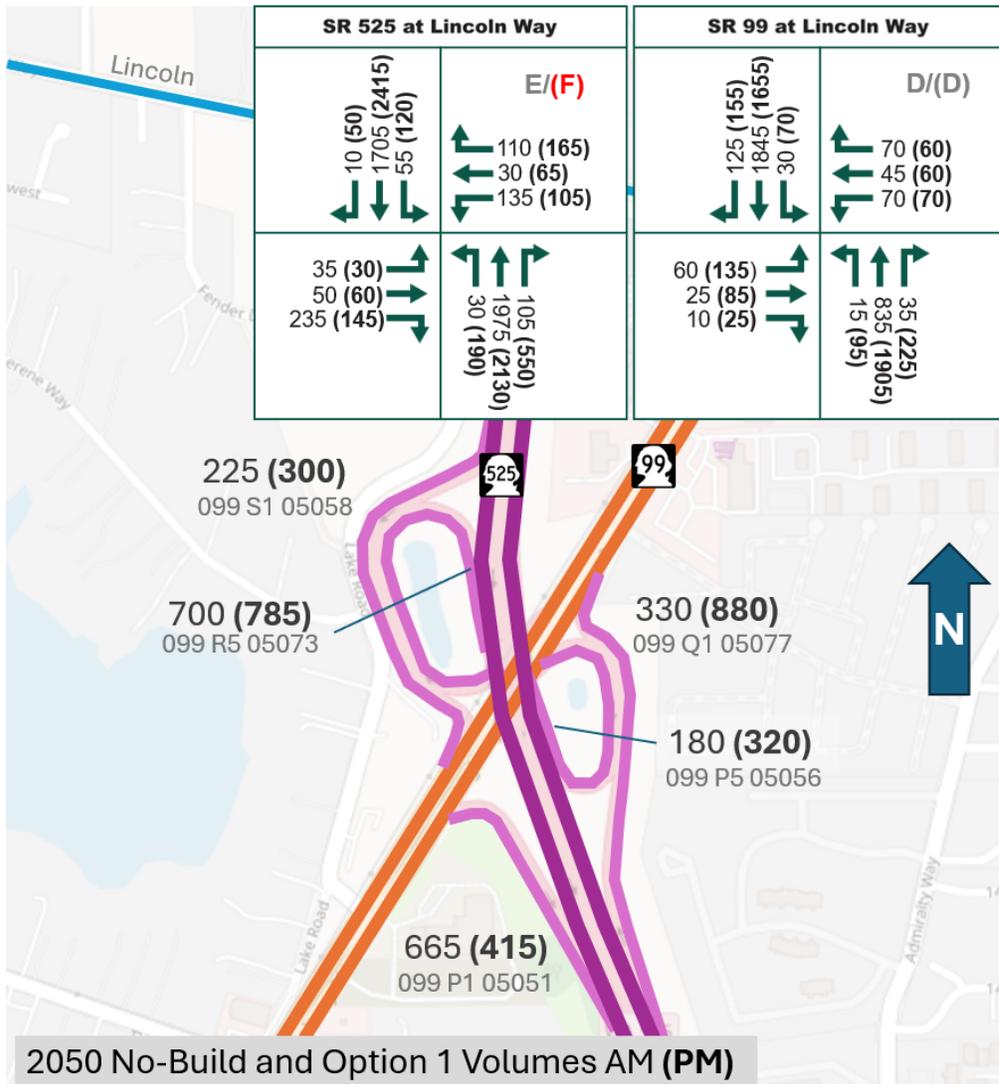


Figure 4: 2050 volumes and planning-level LOS for No-Build and Option 1

Concepts for Interchange Improvements

The study defined three concepts to improve the interchange to accommodate the BAT lanes as well as people walking, rolling and biking while accounting for traffic operations and physical constraints.

Concept 1 – Enhanced Ramp Crossings

This option maintains ramp configurations but re-aligns ramps to eliminate the high-speed connections and improve conditions for non-motorized and transit users. This concept is shown in Figure 5 and is described below.

Concept 1 Features

- Active transportation and transit
 - Dedicated active transportation facilities that meet or exceed WSDOT's Complete Streets requirements including required buffers throughout the interchange
 - Raised crossings for people walking, rolling and biking across the SR 525 on-ramps and off-ramps.
 - On-ramp crossings augmented with Rectangular Rapid Flashing Beacons (RRFBs)
 - Off-ramps crossings controlled with stop signs or a full traffic signal
 - In both directions, the right lane of SR 99 will function as BAT lanes and will be signed as "right-turn only except for transit" at the on-ramps to SR 525.
 - Reconfigure the 35th Avenue West ramp onto northbound SR 99 to accommodate the BAT lane
- Ramp connections
 - Realign all ramp connections with SR 99 closer to a perpendicular alignment, reduce curb radii, add truck aprons and narrow ramp lanes to improve pedestrian crossings

These treatments enhance safety for people walking, bicycling and rolling by encouraging reduced speeds and creating more visible crossing locations. Improving crossings with RRFBs, stop signs or a full traffic signal prioritizes and enhances safety for pedestrians and bicyclists.

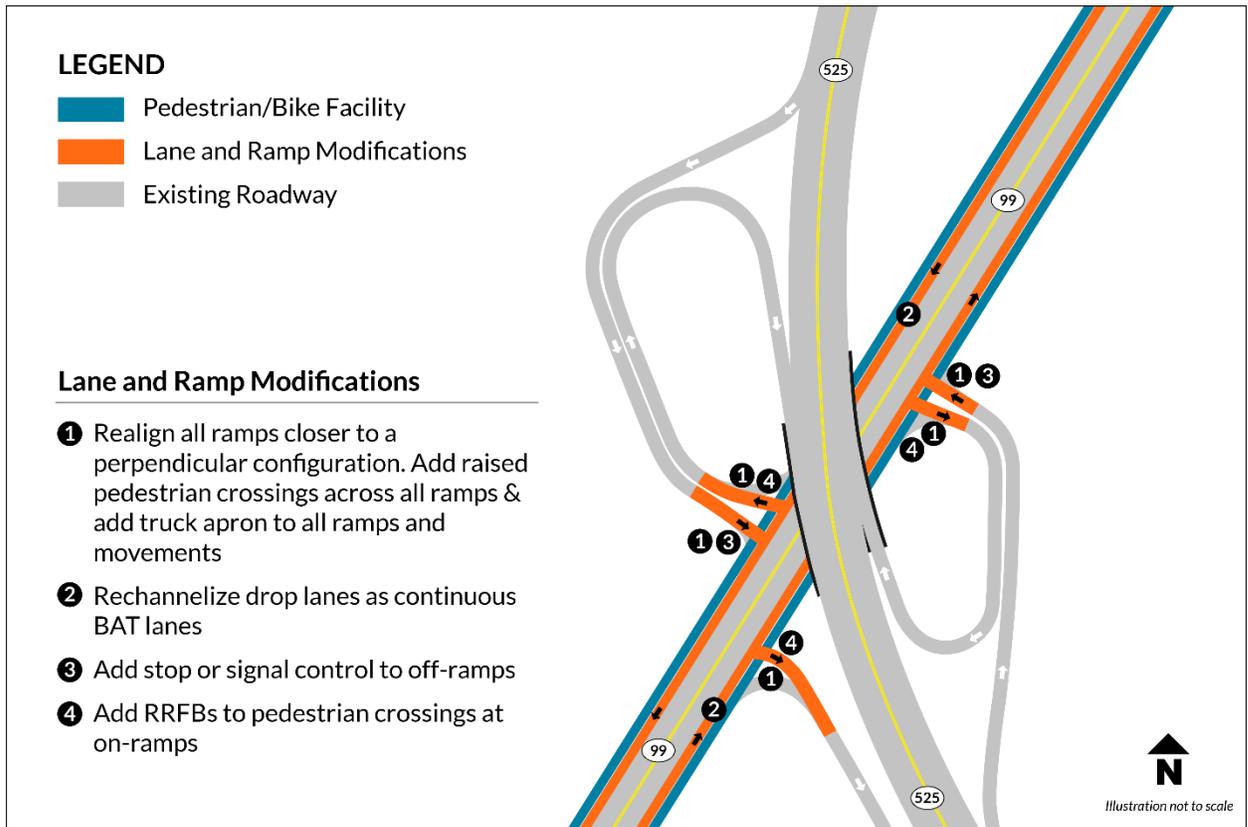


Figure 5: Concept 1 – Enhanced Ramp Crossings

Concept 1 Traffic Operations

Concept 1 may reduce the ability to process vehicles making right turns from the two off-ramps to SR 99, which may prompt a demand shift to other parts of the network. The higher volume from NB SR 525 to NB SR 99 off-ramp may experience queuing compared to the existing uncontrolled ramp connection. This option does not have a direct impact on volumes at the Lincoln Way intersection; however, traffic diverting to alternate routes may affect operations at adjacent intersections.

Concept 2 A & B – SR 525 Northbound Ramp Reconfiguration

This concept builds upon Concept 1 and increases the scope of interchange modification by closing the NB SR 99 to NB SR 525 ramp. This removes potential vehicle conflicts with transit in addition to signaling all conflict points between vehicles and people walking, bicycling and rolling. Two concepts were assessed: **2A** reconfigures the NB SR 525 to NB SR 99 ramp to allow for dual rights and **2B** reconfigures this same northbound ramp to accommodate left and right turns to add access from NB SR 525 to SB SR 99, so drivers would not have to continue north to Lincoln Way to access southbound SR 99.

Concept 2 Features

Concept 2, shown in *Figure 6*, builds upon Concept 1 and adds the following:

- Fully signalize movements to and from SR 525 ramps to control vehicle interaction with people walking, rolling and people bicycling
- Remove the NB SR 99 loop on-ramp to NB SR 525, repurposing that space to provide the following:
 - A signal-controlled dual right-turn from NB SR 525 onto NB SR 99 (**Concept 2A**)
 - An optional dual-left turn from NB SR 525 to SB SR 99, which is currently served via Lincoln Way (**Concept 2B**). This reduces traffic at the Lincoln Way intersection.

Additional Considerations

Closing the on-ramp from NB SR 99 to NB SR 525 would require an Access Revision Report (ARR).

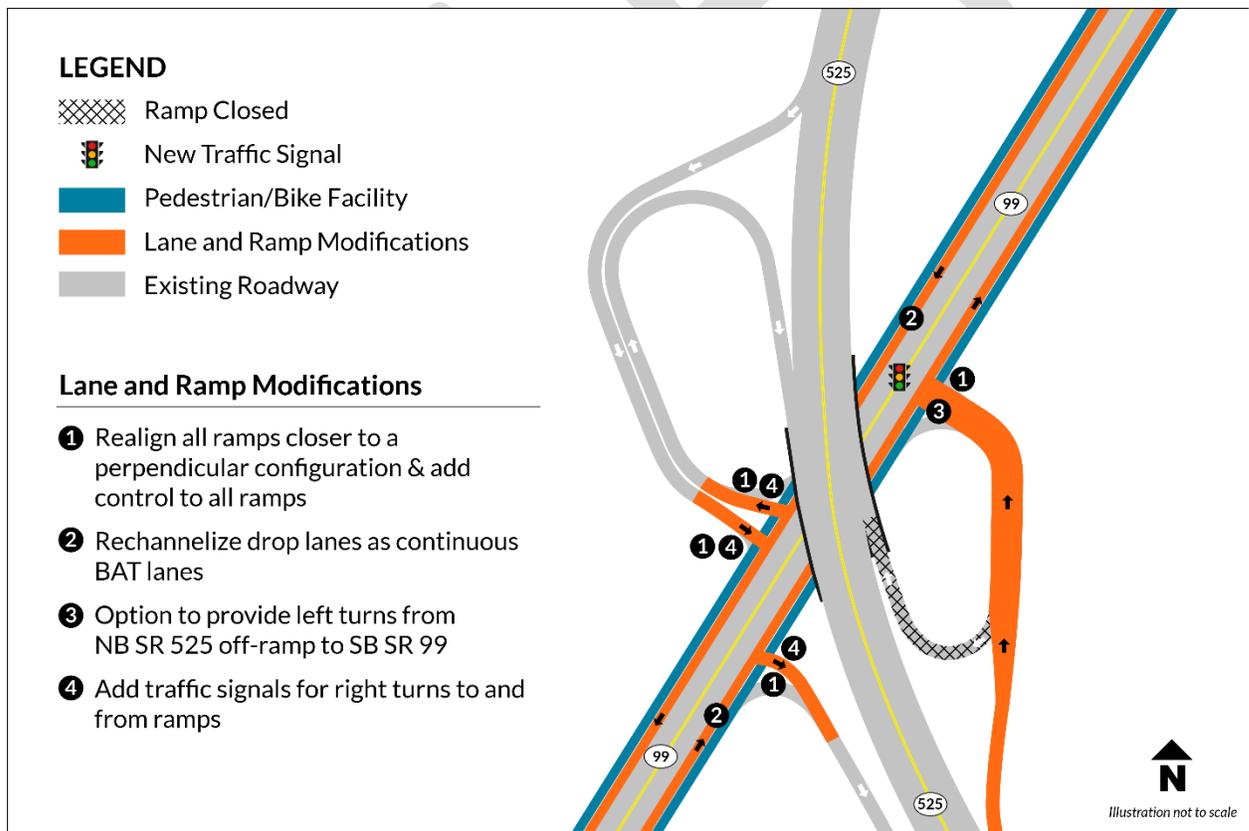


Figure 6: Concept 2A and 2B: Add Right-turn Lanes, Signalize Turns and Reconfigure Northern Ramp Terminal

Concept 2A Traffic Operations and Implications

The defining change in Concept 2A is the closure of the loop ramp that carries NB SR 99 traffic onto NB SR 525; no additional turning movements are introduced at the ramp terminals. Figure 7 illustrates the traffic shift and resulting planning-level LOS.

- Traffic shift
 - ~320 vph (2050 PM peak) displaced to northbound SR 99 left turn to Lincoln Way.
- Planning-level LOS
 - SR 525/Lincoln Way – LOS F (PM peak)
 - SR 99/Lincoln Way – LOS F (PM peak)

Implications: Concept 2A introduces signalization of ramp intersections, which may increase delay for some vehicular movements. In addition, removing the northbound-to-northbound loop ramp could shift traffic to Lincoln Way resulting in additional queue storage or alignment modifications.

Concept 2B Traffic Operations and Implications

Concept 2B starts with the same loop-ramp closure as 2A and then adds a signal-controlled dual left-turn movement from the NB SR 525 off-ramp to SB SR 99. Figure 8 illustrates the traffic shift and resulting planning-level LOS.

- Traffic shift
 - ~400 vph removed from eastbound Lincoln Way (traffic now turns directly onto southbound 99).
- Planning-level LOS
 - SR 525 northbound off-ramp/SR 99 – LOS E (PM peak)

Implications: Adding a left turn movement to the SR 525 NB off-ramp provides an opportunity to remove traffic from eastbound Lincoln Way. This would subsequently reduce the volume of traffic on 31st Avenue West making a right turn to southbound SR 99, which would reduce the frequency of conflicts between vehicles and people who walk, bicycle or roll at the minor intersection. However, the planning-level LOS remains F at both intersections of SR 525/Lincoln Way and SR 99/Lincoln Way due to the heavy volumes of the other movements at each intersection.

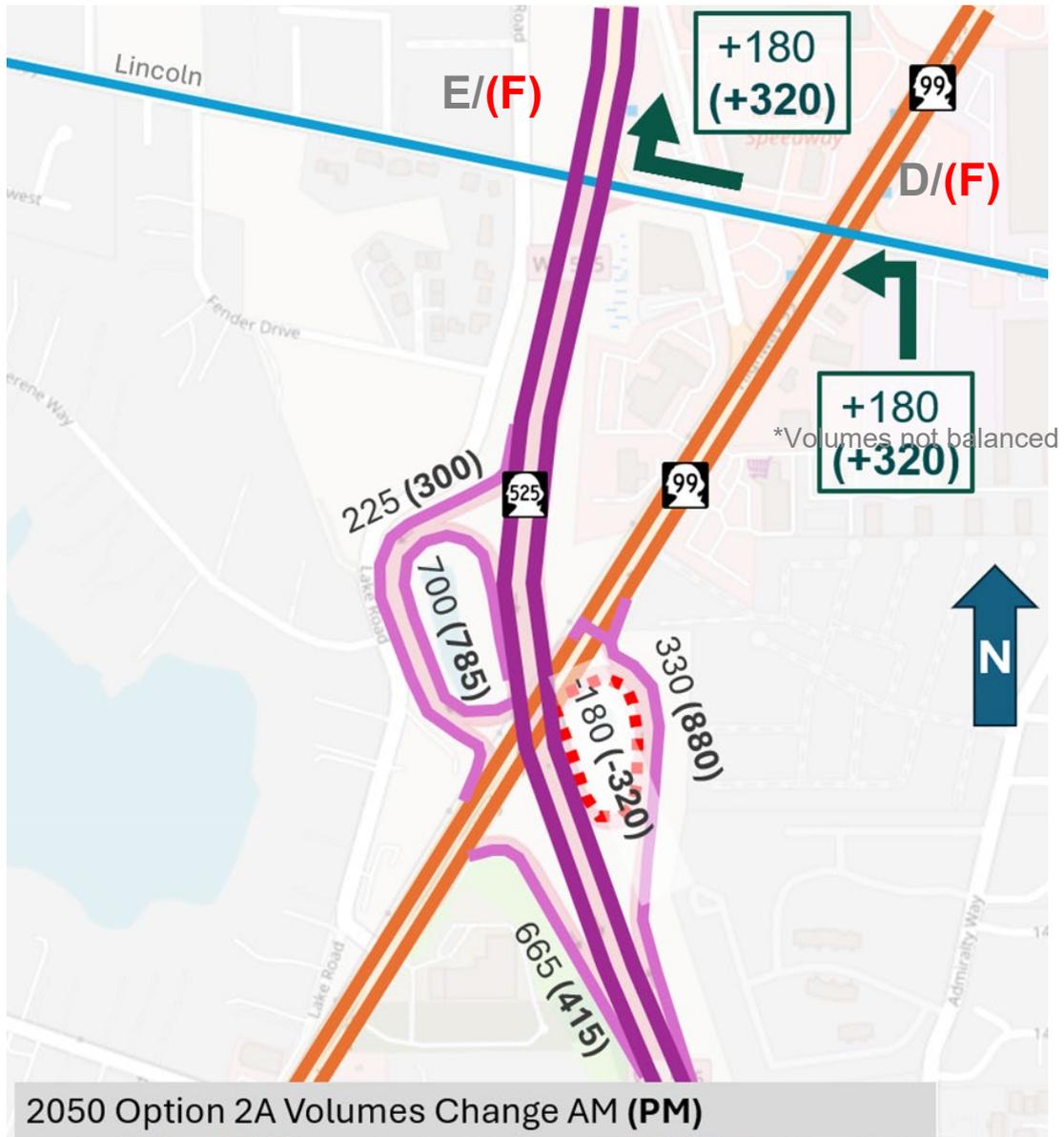


Figure 7: 2050 volumes, estimated shift in traffic and planning-level LOS for Option 2A.

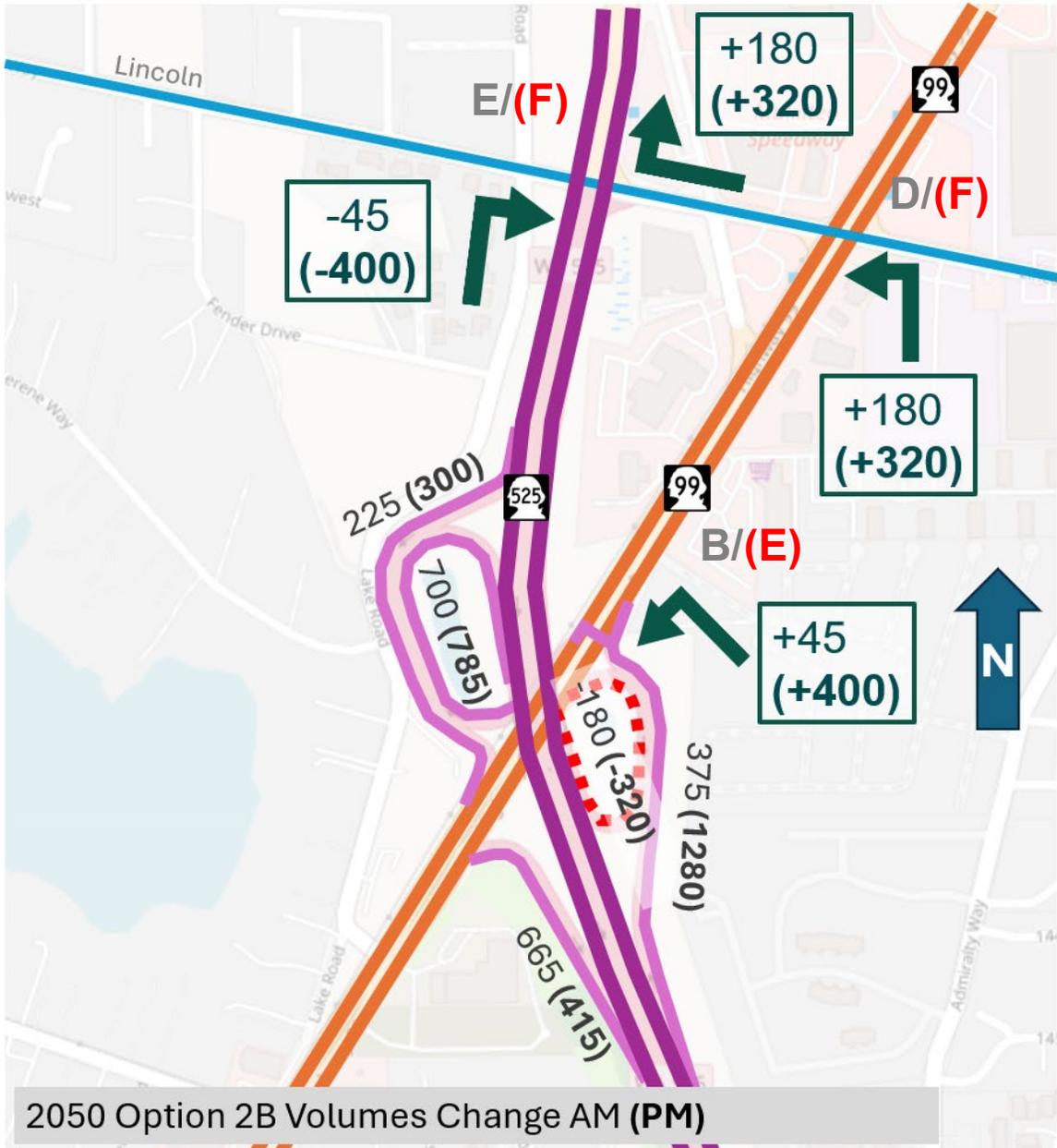


Figure 8: 2050 volumes, estimated shift in traffic and planning-level LOS for Concept 2B

Concept 3 – Multiple Ramp Displacement, Consolidated Ramp Movements

Concept 3 builds upon the previous concepts and proposes to consolidate movements into two ramps: an on-ramp to SB SR 525 and an off-ramp from NB SR 525 as illustrated in Figure 9.

Concept 3 Features

Concept 3 includes the features of concept 2B and adds the following:

- Southern ramp terminal
 - Eliminate on-ramp and the right turn from NB SR 99 to SB SR 525, which will remove vehicles weaving in the transit-only lane and remove a conflict point with people walking and rolling and people bicycling
 - Add signalized left turn from NB SR 99 to SB SR 525 on-ramp; repurpose SB SR 525 off-ramp to accommodate
- Northern ramp terminal
 - Similar to Concept 2B, remove the NB SR 99 loop on-ramp to NB SR 525, repurposing that space to provide:
 - A signal-controlled dual right-turn from NB SR 525 onto NB SR 99
 - A dual-left turn from NB SR 525 to SB SR 99 (currently served via Lincoln Way)

Additional Considerations

This concept provides for a reduction in transit weaving conflicts and removes a conflict point between vehicles and people walking, bicycling and rolling. However, implementing this concept would involve an ARR process to evaluate the removal of three ramp movements and potential traffic pattern shifts.

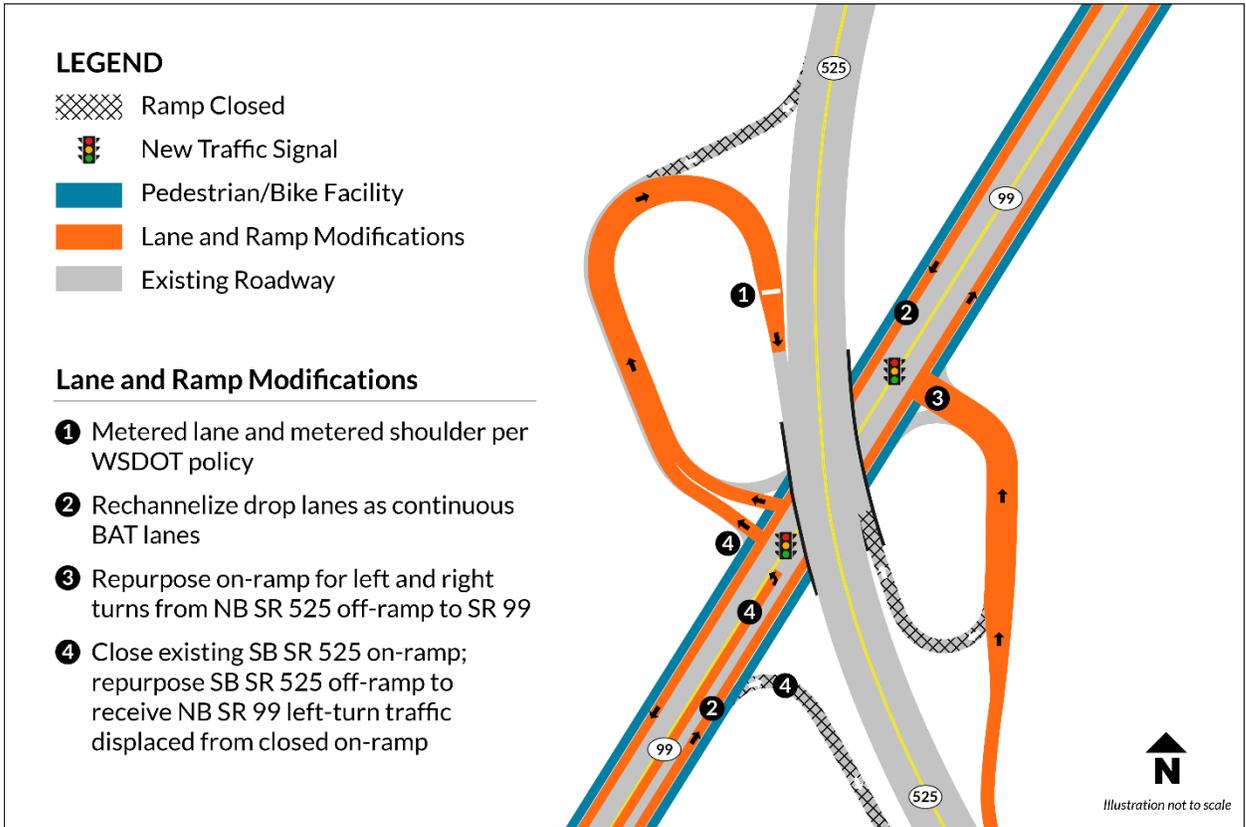


Figure 9: Concept 3 – Consolidated Ramp Movements

Concept 3 Traffic Operations

In Concept 3, two additional ramp movements are proposed to be closed in addition to the NB SR 525 off-ramp:

- NB SR 99 on-ramp to SB SR 525
- SB SR 525 off-ramp to SB SR 99

Displacement of those ramp movements 1) removes the potential vehicle conflict with pedestrians and bicycles at the NB SR 99 on-ramp to SB SR 525 and 2) allows for the displaced traffic to make a new left turn from NB SR 99 to the SB SR 525 loop on-ramp. Traffic volumes and planning level of service are shown in Figure 10.

- Traffic shift
 - ~300 vph (2050 PM peak) from the closed southbound SR 525 off-ramp shifts to eastbound Lincoln Way.
 - ~665 vph (2050 AM peak) from the closed southbound on-ramp is rerouted via the new northbound SR 99 left turn.
- Planning-level LOS (worst period)
 - SR 525/Lincoln Way – LOS F (PM peak)
 - SR 99/Lincoln Way – LOS F (PM peak)
 - SR 525 NB off-ramp/SR 99 – LOS E (PM peak)
 - SR 525 SB off-ramp/SR 99 – LOS E (AM peak)

Concept 3 Implications

While Concept 3 removes two conflict points with the removal of two ramps, it also concentrates volume at Lincoln Way and at the loop terminal to SB SR 525. Ramp metering with a metered shoulder, extended turn lane storage and revised signal timing will be necessary to maintain acceptable operations.

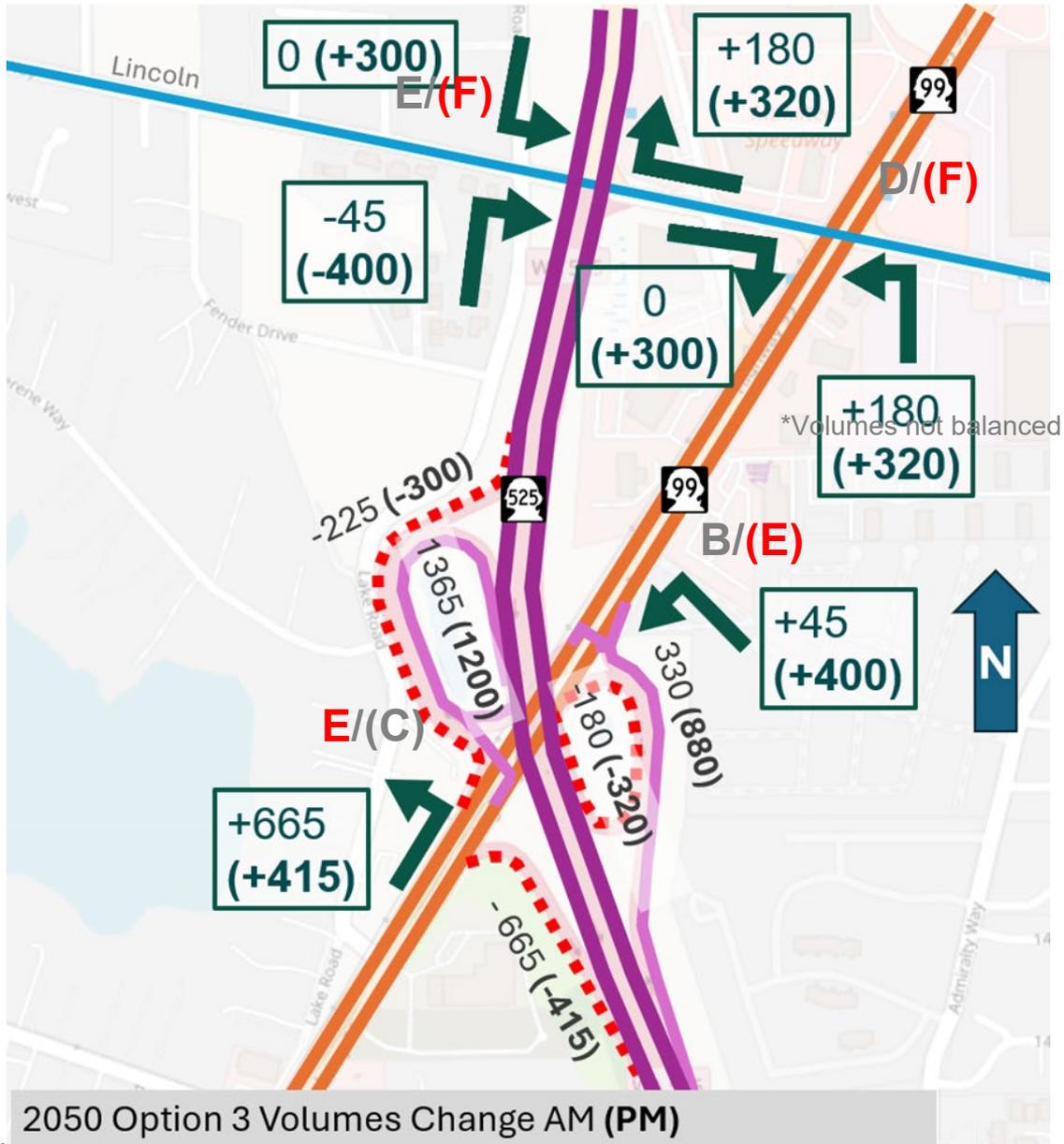


Figure 10: 2050 volumes, estimated shift in traffic and planning-level LOS for Concept 3

35th Avenue West Connection to Northbound SR 99

A key consideration for the corridor and interchange operation is the ramp connection of 35th Avenue West, which adds a third lane to northbound SR 99. This third lane connects to the on-ramp to SB SR 525 and the loop on-ramp to NB SR 525. Notable items include:

*Volumes not balanced

- **NB Constraint in the Vicinity of 35th Avenue West -**
NB SR 99 between 148th Street Southwest and 35th Avenue West only has two northbound lanes and no shoulder. This two-lane segment is approximately 640 feet in length. This is inconsistent with the remainder of the corridor, which either has a three-lane section or two lanes and a full-width shoulder. This segment will require widening to accommodate the NB BAT lane for transit.
- **Traffic operations**
The connection from 35th Avenue West is used by 300-500 vehicles during the commute peak hours, which is generally 7-10 am and 4-7 pm. Traffic from 35th Avenue West continues to the interchange and destinations north. Figure 11 shows approximate PM peak hour movement volumes based on counts from Snohomish County and WSDOT.
- **Right of Way**
There is approximately 100 ft of ROW for SR 99 corridor north and south of the interchange. The segment in the vicinity of 35th Avenue West has a ROW profile consistent with the rest of the corridor even though the paved roadway has one less lane. Figure 12 below is a screen capture of the Snohomish County Online Property Information (SCOPI) interactive web map. While it is not an official right of way plan, it does illustrate that the ROW is consistent along SR 99.
- **Grade difference between 35th Avenue West and SR 99**
The ramp connection transitions from a lower grade up to NB SR 99. Figure 13 illustrates the current slope as viewed from 35th Avenue West looking south. Consideration will need to be given for fill slopes or retaining walls dependent on the preferred corridor cross-section option.
- **Swift Transit Stops**
Currently, Swift Bus Rapid Transit Blue Line operates on SR 99 with large stations, off-board fare payment and frequent service. While Swift far-side stations at intersections are desirable, the Swift NB station at 148th Street Southwest is a nearside station because there is no outside lane for buses (see Figure 14). The BAT Lane extension north of 148th Street Southwest could include moving this stop to a far-side stop.



Figure 11: Approximate PM Peak Hour Volumes, northbound 99 just north of 148th Street Southwest and 35th Avenue West. Snohomish County and WSDOT



Figure 14: Current implementation of “right-turn only except for transit” on SR 99 northbound at 148th Street Southwest. Google Maps Street View

Concepts for 35th Avenue West Connection

Three preliminary concepts have been identified to maintain, reconfigure or remove the 35th Avenue West connection to SR 99 between 148th Street Southwest and SR 525. Each concept incorporates transit enhancements and enhancements for people walking, rolling and bicycling. The concepts below are assessed by how they would work with the interchange modification concepts.

Concept 1 - Signalize Ramp and add Transit-Only Lane (Figure 15)

Features

- Maintains 35th Avenue West access and approach to SR 99
- Signalize 35th Avenue West
- Widen the segment of SR 99 south of 35th Avenue West to accommodate the NB BAT lane on SR 99
- Relocate the Swift stop to a far-side location north of 148th Street Southwest
- People walking and rolling and people bicycling across 35th Avenue West upstream of the gore point at the traffic signal.

Benefits

- Controlled pedestrian crossing of 35th Avenue West

- Manages the weave between transit and entering traffic without significantly altering the 35th Avenue West alignment
- Maintains capacity on 35th Avenue West

Challenges

- Potential transit delay with signalization of BAT lane
- Additional ROW needed for perpendicular crossing of pedestrian and bicycle facilities to cross 35th Avenue West
- Grade differential and potential for retaining walls with widening of SR 99

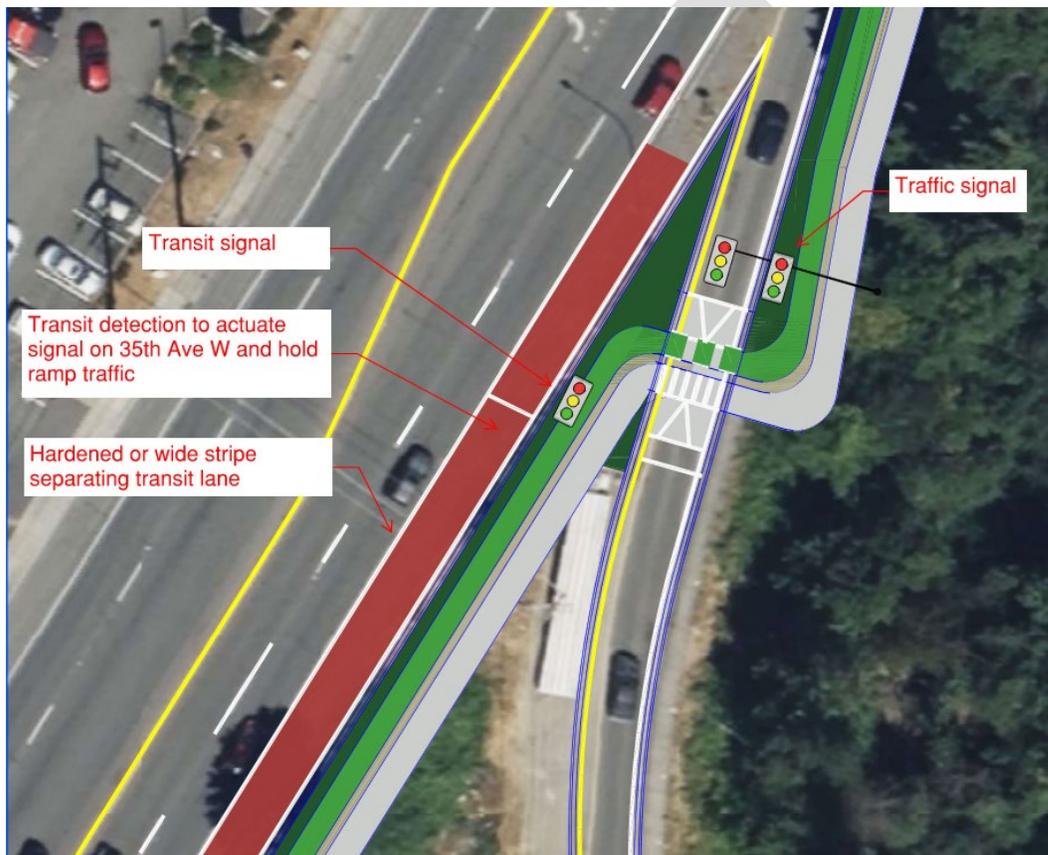


Figure 15: Concept 1 - Signalize Ramp and Transit-Only Lane

Concept 2 - 35th Avenue West “T” Intersection (Figure 16)

Features

- Retains access to SR 99, but Ts-up the intersection and stop-control the right-turn movement from 35th Avenue West to SR 99
- Relocate the Swift stop to north of 148th Street Southwest
- Provide a raised crossing enhanced with stop control on 35th, improving visibility and safety

Benefits

- Controlled pedestrian crossing of 35th Avenue West
- Prioritize transit on SR 99

Challenges

- Reduced capacity on 35th Avenue West due to the alignment change and stop control
- Additional ROW needed to realign 35th Avenue West to form a perpendicular connection to SR 99 and setback of pedestrian and bicycle crossing
- Grade differential may require retaining walls with widening of SR 99
- Maintaining sightlines between pedestrians/bicyclists on northbound SR 99 and drivers on 35th Avenue West; maintaining sightlines between drivers stopped on 35th Avenue West and northbound SR 99.

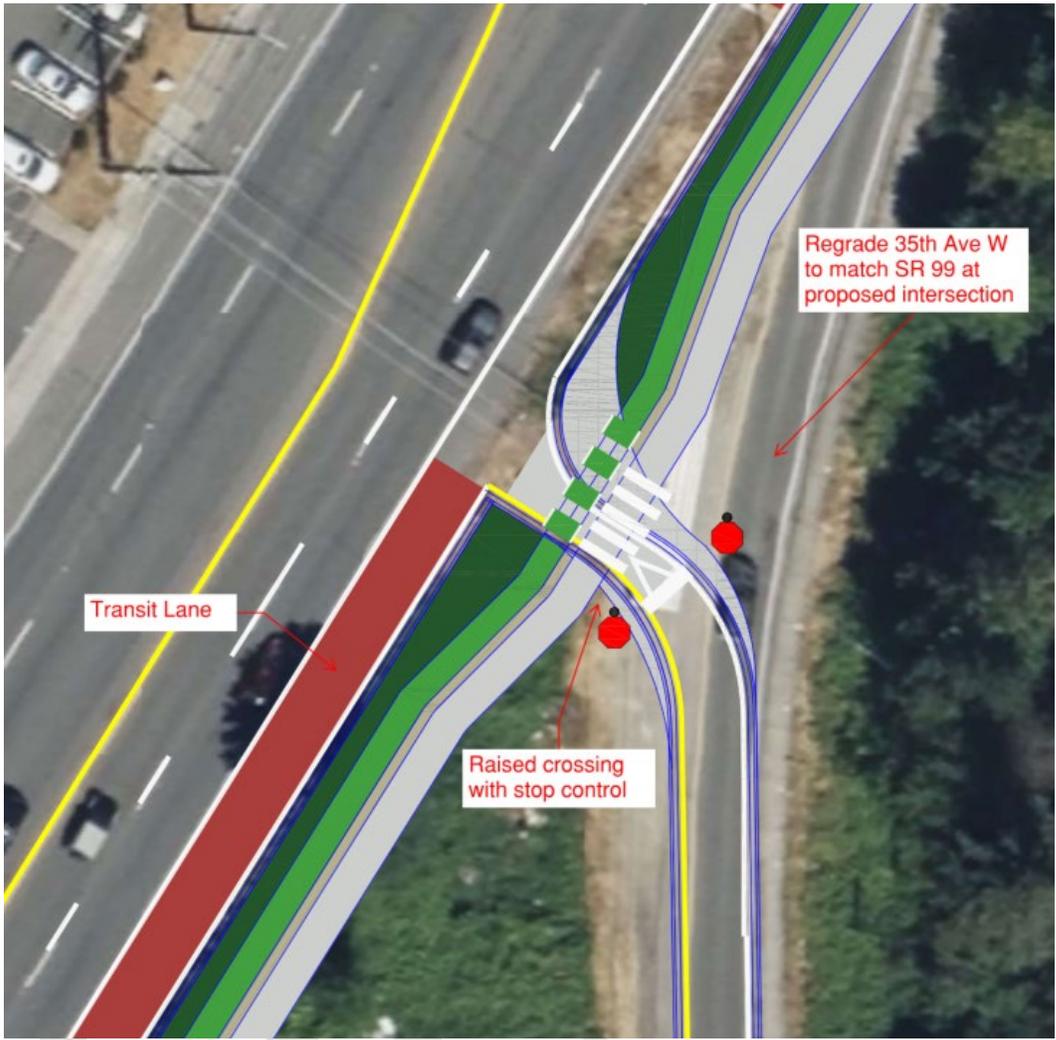


Figure 16: Concept 2 - 35th Avenue West "T" Intersection

Concept 3 - Close 35th Avenue West Connection (Figure 17)

Features

- Eliminate access to SR 99 from 35th Avenue West
- Redistribute traffic through 148th Street Southwest and the local county street network, consolidating movements and possibly reducing conflict points at SR 99
- Relocate the Swift stop to north of 148th Street Southwest
- Optionally repurpose 35th Avenue West as a shared-use path between 148th Street Southwest and SR 99
- Potentially improve westbound 148th Street Southwest at SR 99 to add a right-turn lane to mitigate traffic operations

Benefits

- Eliminates conflict points and removes vehicle-pedestrian and vehicle-bicycle interaction
- Opportunity to redefine a portion of 35th Avenue West for a shared-use path that links 148th Street Southwest to SR 99

Challenges

- Additional analysis needed to identify potential traffic pattern shift with closure of 35th Avenue West
- Grade differential and potential for retaining walls with widening of SR 99

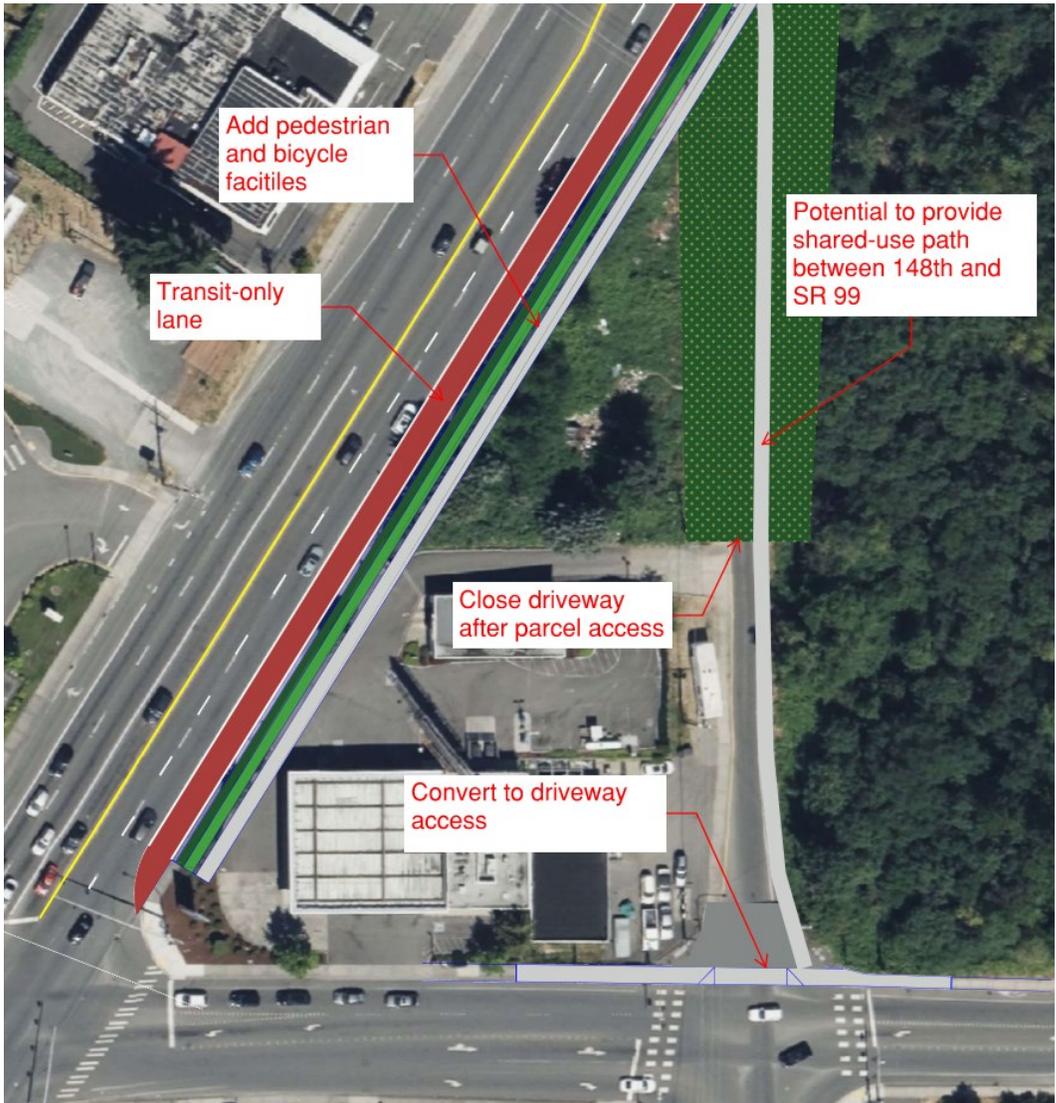


Figure 17: Concept 3 - Close 35th Avenue West Connection

Next Steps

The SR 99/SR 525 interchange is a challenging environment for transit and for people walking, rolling and bicycling due to limited lighting, constrained geometry and high-speed vehicle movements. Three SR 99/SR 525 concepts were developed to enhance conditions for active transportation, safety, transit reliability and overall traffic operations.

- **Concept 1** includes dedicated active transportation infrastructure with traffic calming and crossing enhancements.
- **Concept 2** provides signalization of right-turn movements and removal of the northbound loop on-ramp, allowing additional flexibility in traffic operations and control of conflicts with people walking and rolling and people bicycling.
- **Concept 3** removes the right turn from northbound SR 99 to southbound SR 525 to eliminate a source of conflict for transit and for people walking and rolling and people bicycling.

Additional information is needed to advance concept refinement and support design development include:

- Additional engineering to identify physical constraints and tradeoffs
- Consideration of future traffic operations
- Local agency and community feedback

These interchange concepts are interdependent with the 35th Avenue W concepts. The preferred combination should be selected as a package with consideration for active transportation, transit reliability and network operations.

Recommendations

Advance interchange Concept 1 as the near-term interchange strategy and complete analysis and engagement to select the preferred 35th Avenue West concept to pair with it. Concept 1 best supports early delivery of Complete Streets elements and continuity of business access and transit (BAT) lanes through the interchange.

Further study is needed for interchange Concepts 2 and 3 to determine feasibility. Both concepts introduce more significant ramp and operational modifications and subsequently would need more in-depth analysis and engagement.