



West Kitsap Way Planning Study



Appendix C

Alternatives Analysis

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Alternatives Analysis

This appendix describes the development and analysis of three corridor alternatives to address existing and future conditions along the West Kitsap Way corridor.

Planning and Design Criteria

The study identified several planning and design criteria important to the development of a successful corridor. These criteria were applied by the consultant team to the West Kitsap Way corridor, who developed and reviewed design alternatives and options. The following lists the criteria used in the study.

- Public and stakeholder input
- Safety
- Bicycle mobility
- Pedestrian environment
- Business access
- Parking needs
- Traffic operations
- Transit access
- Travel speeds
- Street crossings
- Property impacts
- Geotechnical
- Stormwater
- Maintenance requirements
- Right of way
- Cost

Alternatives Development

The study team used a two-step process to develop alternatives. The first step evaluated roadway configuration options to establish the number of vehicle lanes on Kitsap Way using the planning and design criteria. The second step applied the selected roadway configuration to develop alternatives for different levels of corridor improvements including pedestrian and bicycle facilities and intersection controls and treatments. This process was done to limit the number of alternatives and to streamline the analysis.

Kitsap Way Roadway Configuration Options

Kitsap Way is classified as a minor arterial roadway within the City's Street Classification System. Minor arterials may have as many as 5 travel lanes (including center turn lanes), but within Bremerton, most are typically 2 or 3 lanes wide. The City's design standards for minor arterial roadways include bicycle lanes, but do not allow on-street parking.

By 2050, traffic on Kitsap Way is projected to reach 14,000 vehicles per day. The existing four-lane configuration, which has a capacity of approximately 30,000 vehicles per day, will remain underutilized. The four-lane configuration encourages higher driving speeds and requires vehicles to make left turns from through lanes — both of which are primary causes of crashes along the corridor.

Kitsap Way Right-of-Way

City-owned right-of-way on the corridor is between 100' and 170' wide with most places having 140' of width. However, much of the roadway's right of way is steep slopes or devoted to stormwater facilities.

At the narrowest point, just north of the Burchfield Drive intersection, only about 75' of the right-of-way is suitable for construction. Some additional width could be achieved by modifying stormwater facilities or construction of retaining walls, but these measures would add to overall construction costs.

Most of the corridor has approximately 72' wide of paved roadway and shoulder areas. Additionally, there are varying amounts of unpaved shoulder areas, providing a minimum of a 75' width for construction.

Roadway Alternatives Studied

The analysis reviewed the trade-offs between 5-lane, 4-lane, and 3-lane options. Each option was evaluated against the planning and design criteria to determine the preferred option. The 3-lane section was selected as the preferred roadway option for the corridor.

- **5-lane section** – This option has two travel lanes in each direction with a center left turn lane. This option would further increase excess capacity of the roadway, encourages higher travel speeds, has high construction costs, high impacts to adjacent properties, and would only allow for limited non-motorized facilities.
- **4-lane section** – This option maintains two travel lanes in each direction without a left turn lane. This option lacks a center left turn lane and reduces safety, encourages higher travel speeds, and has high construction and stormwater costs.
- **4-lane + Left turn lane** – This hybrid option would allow two lanes in one direction, one lane in the opposite, with a center left turn lane to facilitate business access and improve intersection safety. This option does not address high travel speeds and would have higher costs for roadway construction and stormwater.
- **3-lane section (preferred)** – The 3-lane option reduces roadway capacity to a single lane in each direction and a center left turn lane. Analysis of existing and future traffic volumes found that 3-lanes could accommodated future traffic growth and benefits safety and reduces impacts to adjacent property.

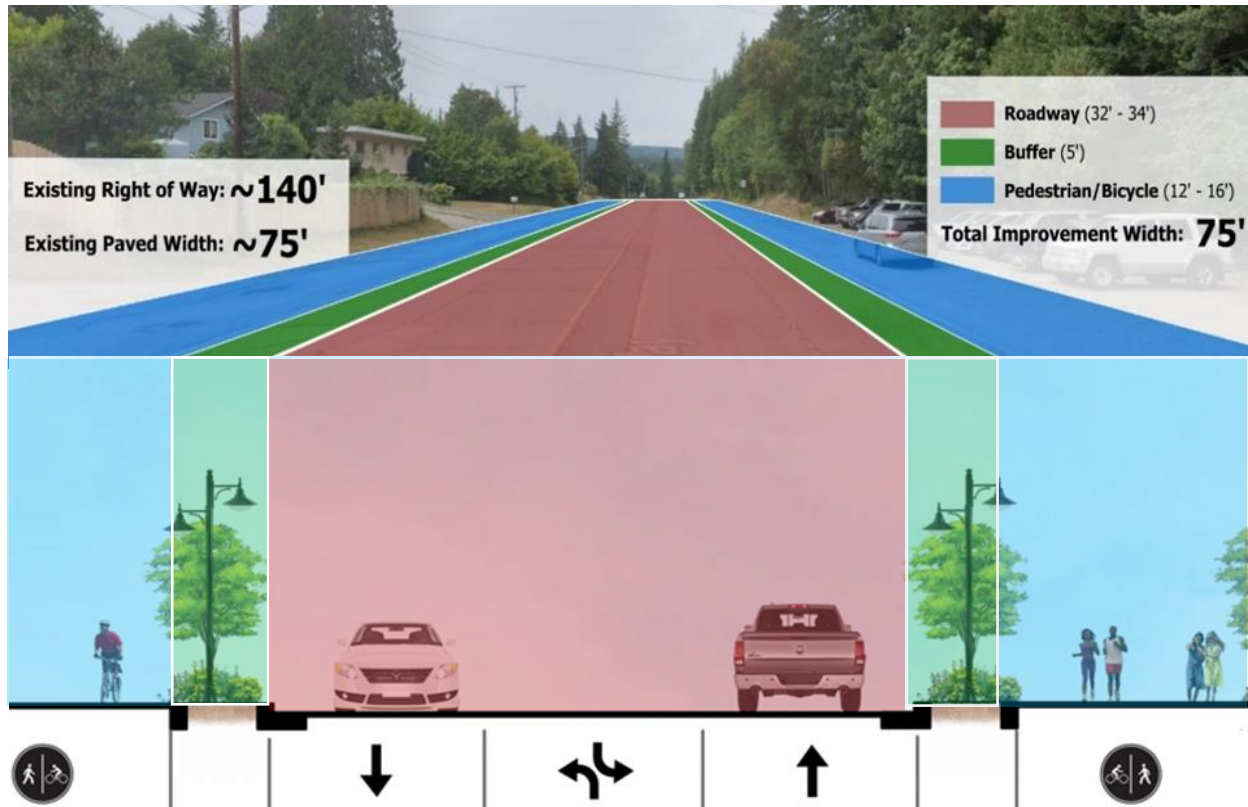
Table C-1 shows the strengths and weaknesses of each of the alternatives using the planning and design criteria.

Table C-1. Analysis of Roadway Options

| | Strengths | Neutral | Weaknesses |
|--------------------------------|---|---|--|
| 5-Lane Section | <ul style="list-style-type: none"> • Business Access • Traffic Operations • Transit Operations | <ul style="list-style-type: none"> • Safety | <ul style="list-style-type: none"> • Cost • Right of Way • Property Impacts • Stormwater • Traffic Calming • Parking Impacts • Non-motorized facilities |
| 4-Lane Section | <ul style="list-style-type: none"> • Transit Operations | <ul style="list-style-type: none"> • Traffic Operations • Cost • Right of Way • Property Impacts • Stormwater • Parking Impacts • Non-motorized facilities | <ul style="list-style-type: none"> • Safety • Traffic Calming • Business Access |
| 4-Lane w/Left Turn Lane | <ul style="list-style-type: none"> • Safety • Traffic Operations • Transit Operations • Business Access | <ul style="list-style-type: none"> • Cost • Parking Impacts • Non-motorized facilities • Traffic Calming | <ul style="list-style-type: none"> • Right of Way • Property Impacts • Stormwater |
| 3-Lane Section | <ul style="list-style-type: none"> • Safety • Cost • Right of Way • Property Impacts • Stormwater • Traffic Calming • Parking Impacts • Non-motorized facilities • Business Access | <ul style="list-style-type: none"> • Traffic Operations • Transit Operations | |

Benefits of 3-Lane Section: Preferred Option

The analysis determined that Kitsap Way has excess capacity and could be reduced from four lanes to three lanes, with one travel lane in each direction and a center turn lane. An advantage of the 3-lane option is that it fits all of the improvements within the existing roadway and shoulder areas of Kitsap Way, reducing stormwater and construction costs, and avoiding impacts to adjacent property.



Development of Corridor Alternatives

Based on the preferred option (3-Lane Option) the project team, City staff, and the project steering committee developed three corridor alternatives for consideration. The alternatives reflect differing levels of improvements and costs.

The street segment alternatives were developed as cross-sections to describe the look and feel of the corridor. These alternatives include vehicle travel lanes, pedestrian and bicycle facilities, landscaped areas, and elements such as street lighting. For the commercial district of the corridor between Northlake Way and Harlow Drive, the design team developed a layout of each alternative to better understand the impacts to property access and parking. The study alternatives were also paired with intersection alternatives to consider different traffic control options such as constructing turn lanes, adding traffic signals, providing pedestrian crossings, or constructing roundabouts. The following describes the alternatives developed for the project. These alternatives were presented the second open house to allow for community comment and feedback. The table below shows main elements of each alternative.

| | Alternative A: Lower cost improvements | Alternative B: Additional features but at higher costs | Alternative C: Most improvements but at highest cost |
|---------------------------------|--|--|--|
| Cost | \$ | \$\$ | \$\$\$ |
| Kitsap Way | One lane in each direction with a center turn lane | One lane in each direction with a center turn lane | One lane in each direction with raised center median |
| Non-Motorized Facilities | Shared Path Concept | Shared Path and Downhill Bike Lane | Raised Walkways and Bike Path |
| Access Controls | Two-Way Left Turn Lane | Combination of Center Turn Lane and Medians | Raised Median with U-turn locations |
| Kitsap Junction | Parking Aisles with Center Turn Lane | Public Angle Parking with Center Turn Lane | Roundabouts and Median |

Alternative A

Alternative A: Parking Aisles and Shared Use Paths

Alternative A has lower cost improvement options while including new non-motorized facilities and new traffic signals at Chico Way/Northlake Way intersection and at Austin Drive/Lyle Avenue intersections. Within Kitsap Junction a parking aisle concept was developed that consolidates parking access while keeping existing access to business parking areas and driveways.



LEGEND—ALTERNATIVE A



New traffic signal



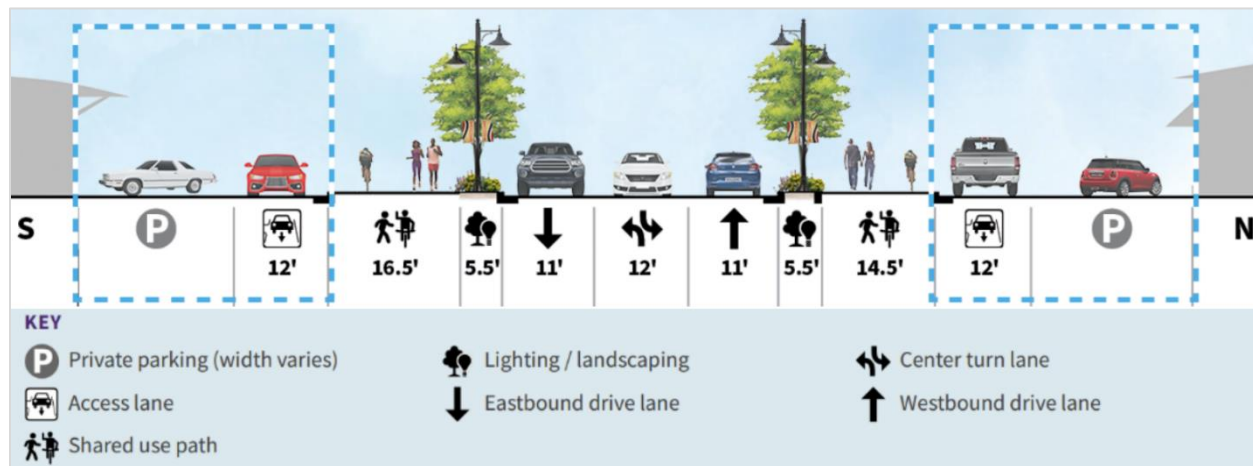
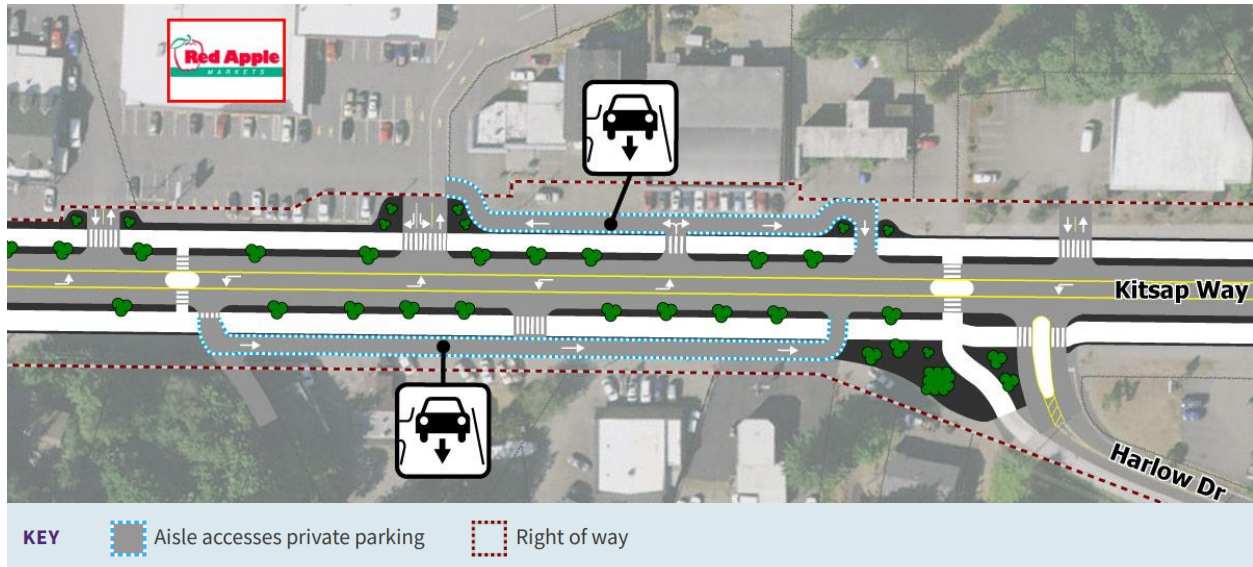
Kitsap Junction improvements: *Parking aisles, shared use pathways, and landscaping to improve non-motorized access*



Kitsap Way improvements: *Shared use path on both sides of the roadway*

Alternative A: Parking Aisle Concept for Kitsap Junction

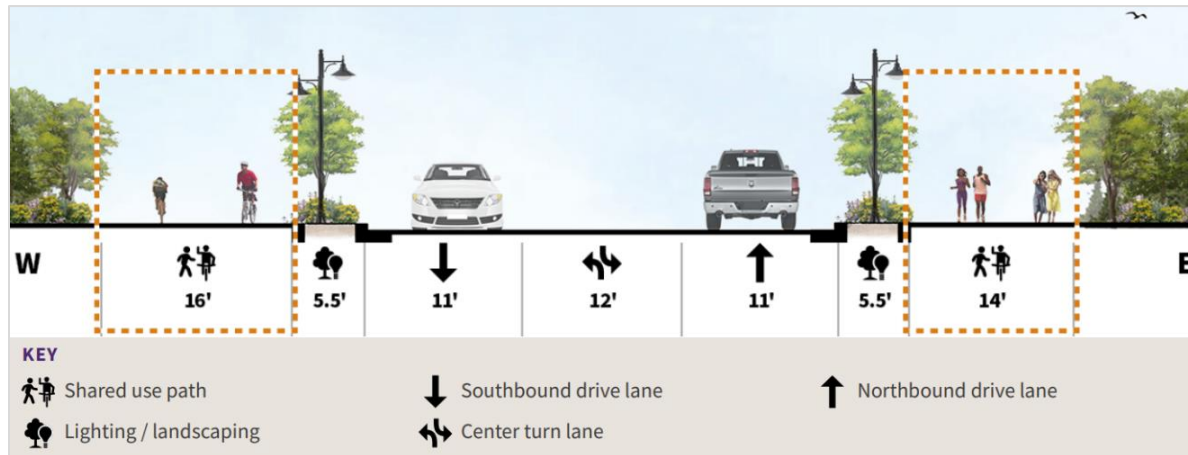
- Retains majority of business parking and access.
- North side parking aisle splits traffic flow at a mid-point entry.
- Center median left turn locations could be formalized by striping or raised medians.



Alternative A

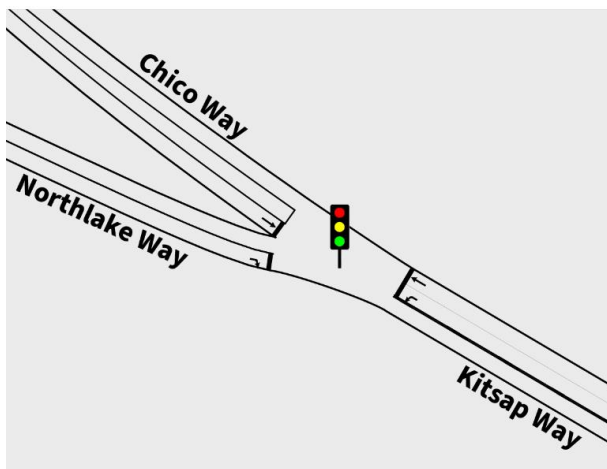
Alternative A: Shared Path Concept

- One 11' travel lane in each direction with a shared left turn lane.
- Landscaped buffers on both sides between street and non-motorized facilities.
- Bicycles allowed to travel in both directions.
- Shared use pathways mix people walking, rolling, and bicycling.

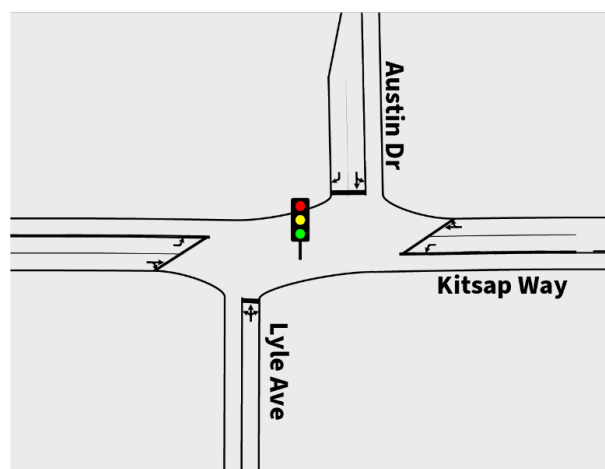


Alternative A: Intersections

Alternative A would signalize key intersections to improve safety and operations. Traffic signals would also allow for pedestrian crossings of Kitsap Way. Signal timing changes were suggested for the SR 3 interchange intersections to more efficiently use signal timing.



NEW Traffic Signal at
Chico Way/Northlake Way






NEW Traffic Signal at
Austin Drive/Lyle Ave


Alternative B: Public Angle Parking and Downhill Bike Lane


Alternative B includes a downhill bike lane between Austin Drive and Wilmont Street and realigns Austin Drive and Lyle Way to improve intersection operations and safety. Within Kitsap Junction, Alternative B adds on-street angle parking on the south side of Kitsap Way.



LEGEND—ALTERNATIVE B

-  New traffic signal
-  New stop sign
-  Intersection realignment

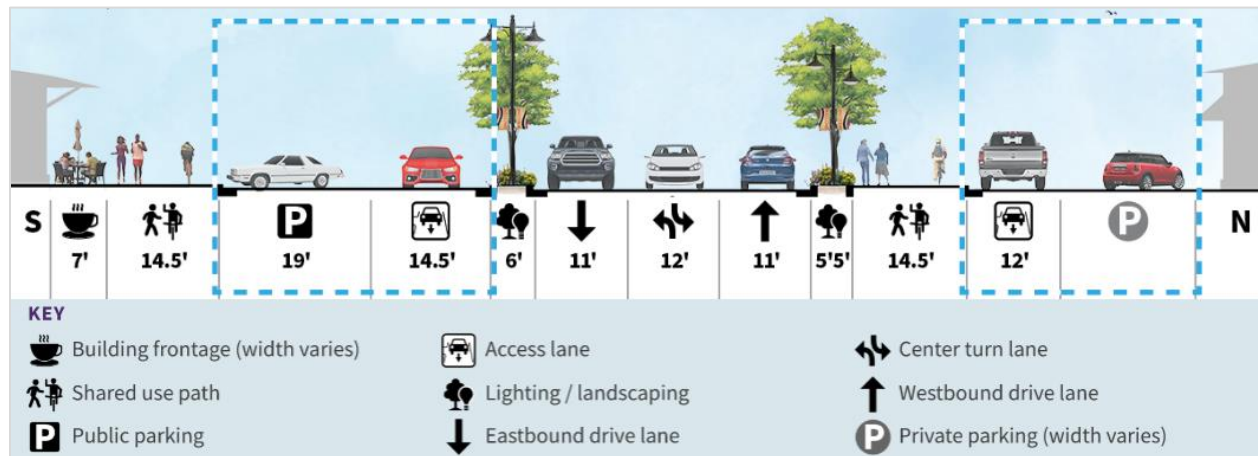
 Kitsap Junction Improvements *Public angle parking, shared use pathways, and landscaping to improve non-motorized access*

 Kitsap Way Improvements *Shared use path and bike lane hybrid on both sides of the roadway*

Alternative B

Alternative B: Angle Parking Concept for Kitsap Junction

- Adds public angle parking on south side adjacent to businesses.
- North side has counterflow parking aisle.
- Center median turns could be formalized by striping or raised medians.

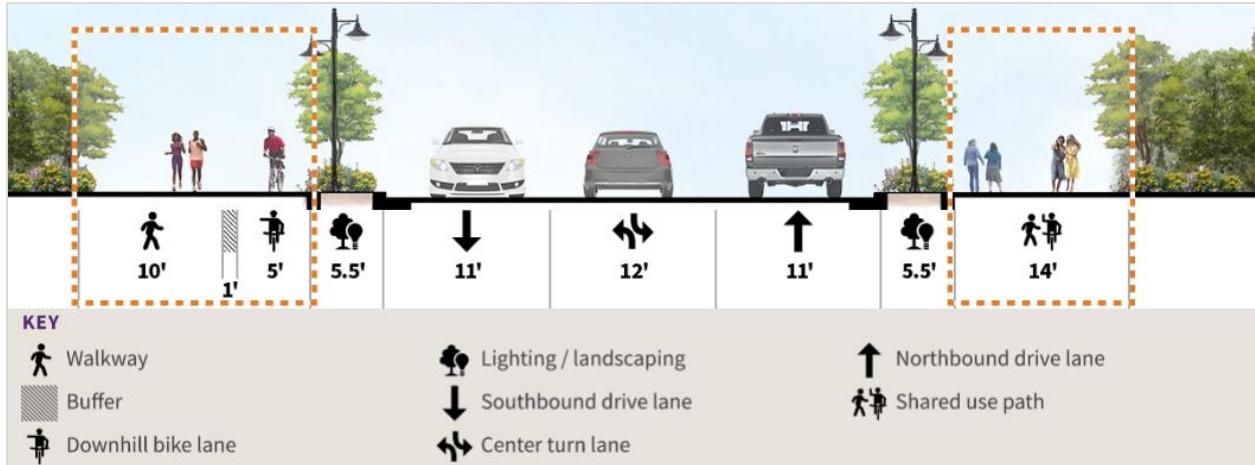


Alternative B: Shared Path and Bicycle Lane (Hybrid)

- One 11' travel lane in each direction with a shared left turn lane.
- Landscaped buffers for between vehicle and non-motorized users.
- Shared use pathway (east side) mixes people walking, rolling, and bicycling.
- Raised bicycle lane (west side, downhill) separates quick-moving cyclists from both vehicles and pedestrians.

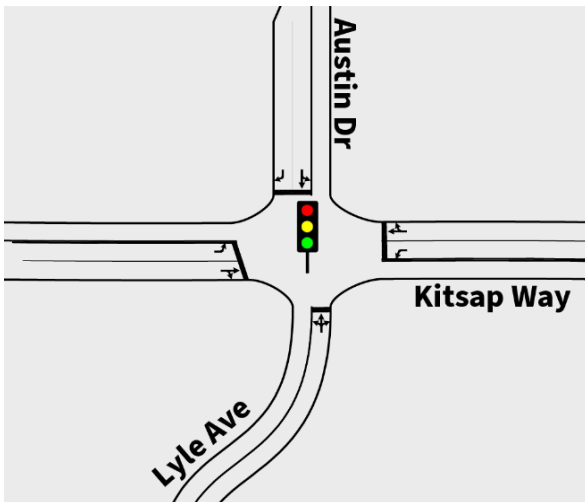
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Alternative B

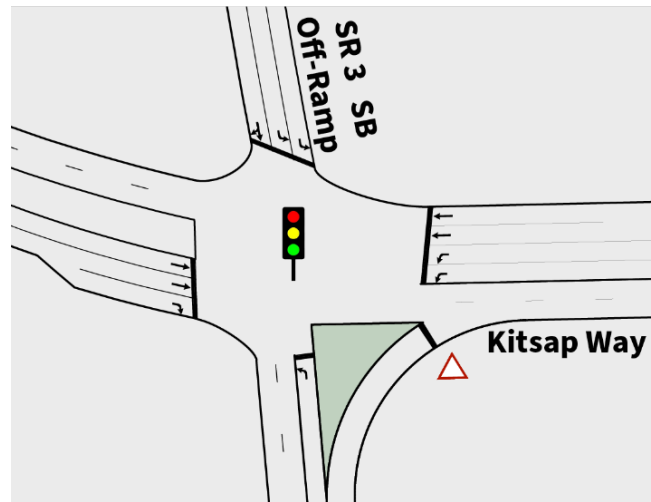


Alternative B: Intersections

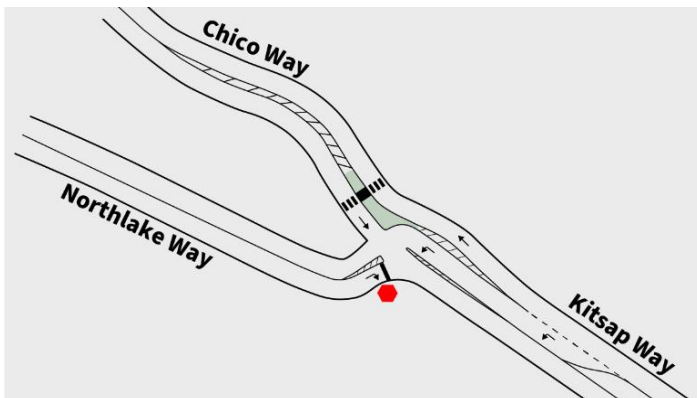
Alternative B reconstructs key intersections and realigns roadway approaches, improving safety and operations. A traffic signal would be added at a realigned Austin Drive/Lyle Avenue intersection.



REALIGNED Lyle Avenue and **NEW** Traffic Signal at Austin Drive/Lyle Avenue



OFF-RAMP REVISION and **SIGNAL TIMING** Improvements at the SR 3 Southbound Ramp

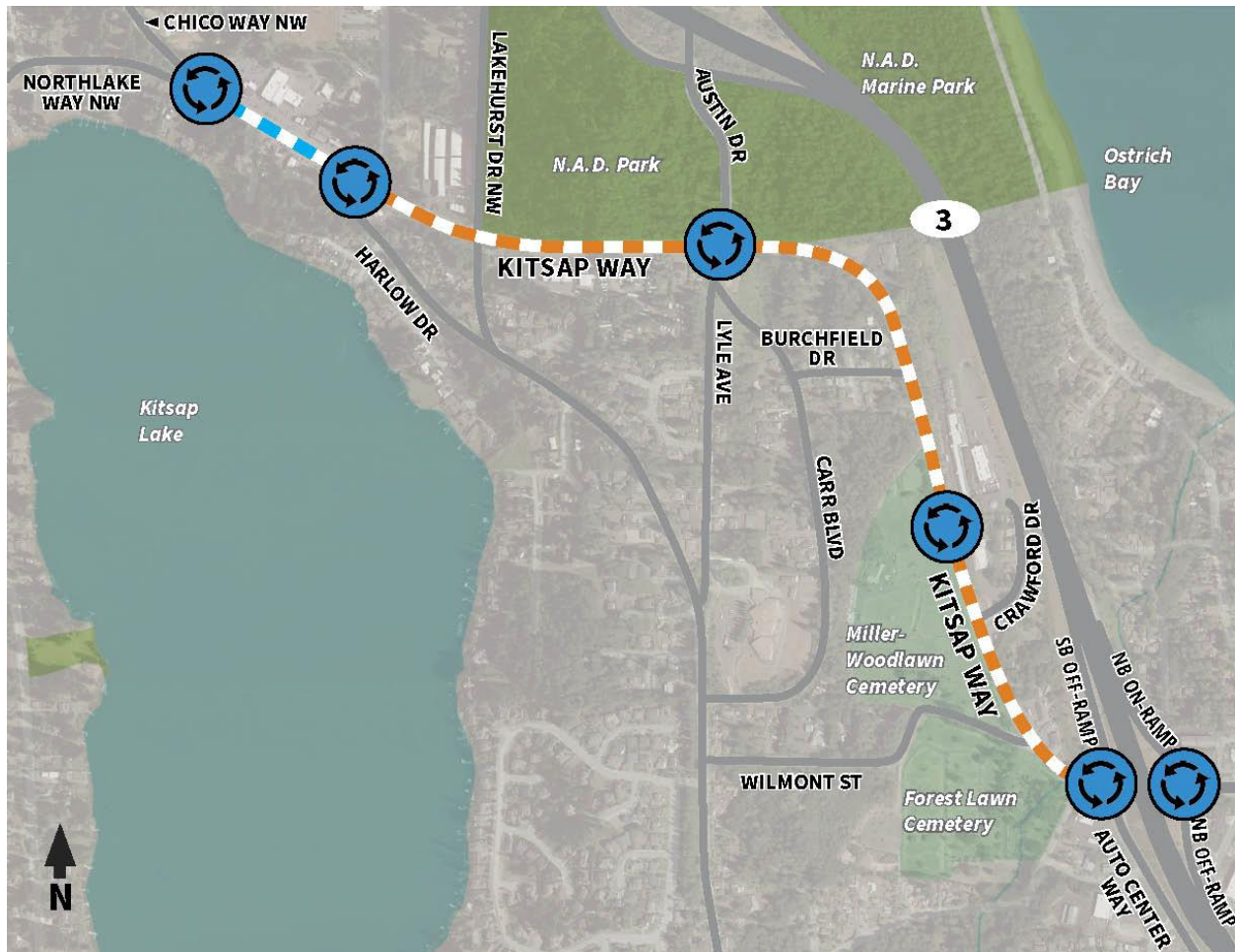


NEW Chicane and Stop Sign at Chico Way/Northlake Way




Alternative C

Alternative C: Roundabouts and Medians

Alternative C constructs a two-lane Kitsap Way with one lane in each direction of travel and a raised center median. At key intersections, Alternative C also constructs roundabouts to improve the safety and efficiency of the roadway, while providing U-turn locations for local street and driveway access.

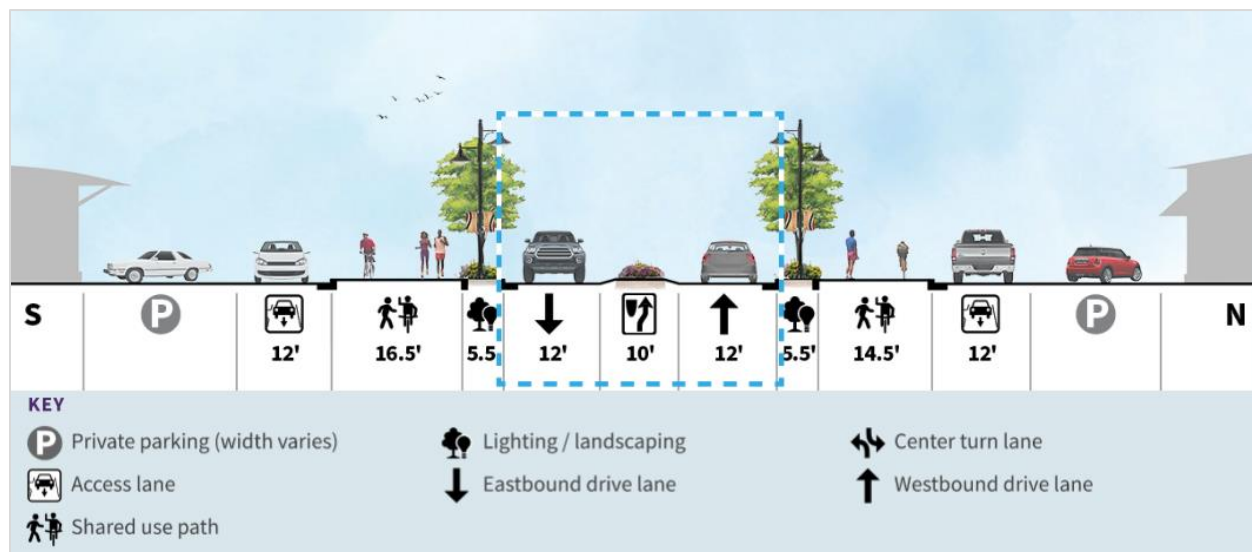
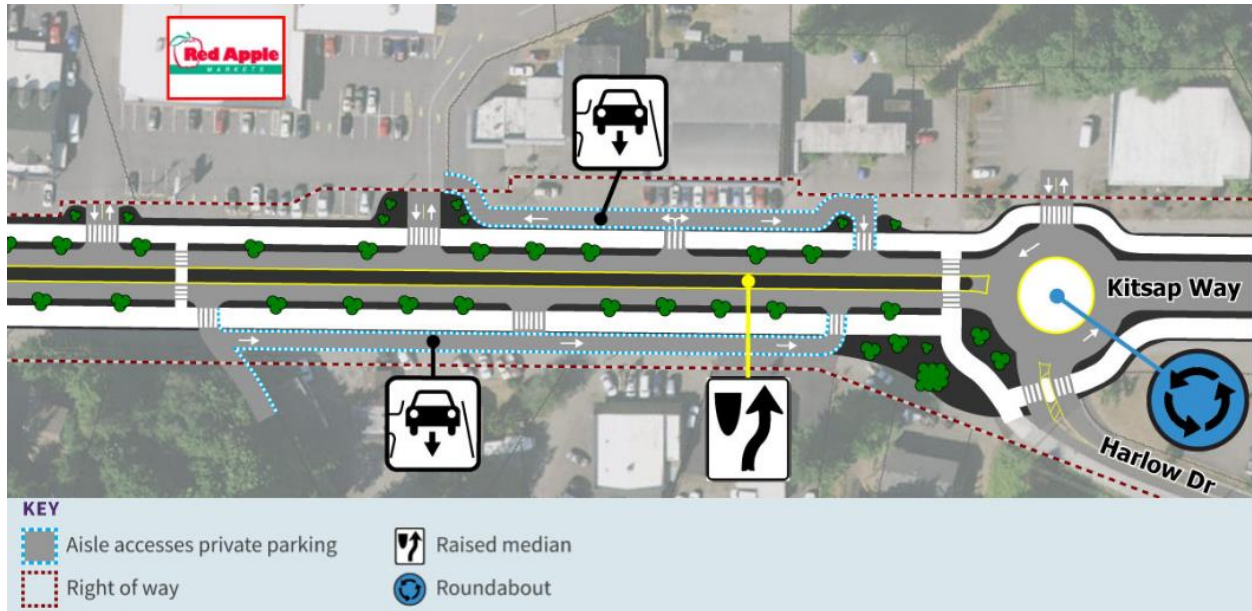


LEGEND—ALTERNATIVE C

-  New roundabout
-  Kitsap Junction improvements *New roundabout with a center median*
-  Kitsap Way improvements *New roundabout with a center median and raised bike lanes*

Alternative C: Roundabouts and Median Concept

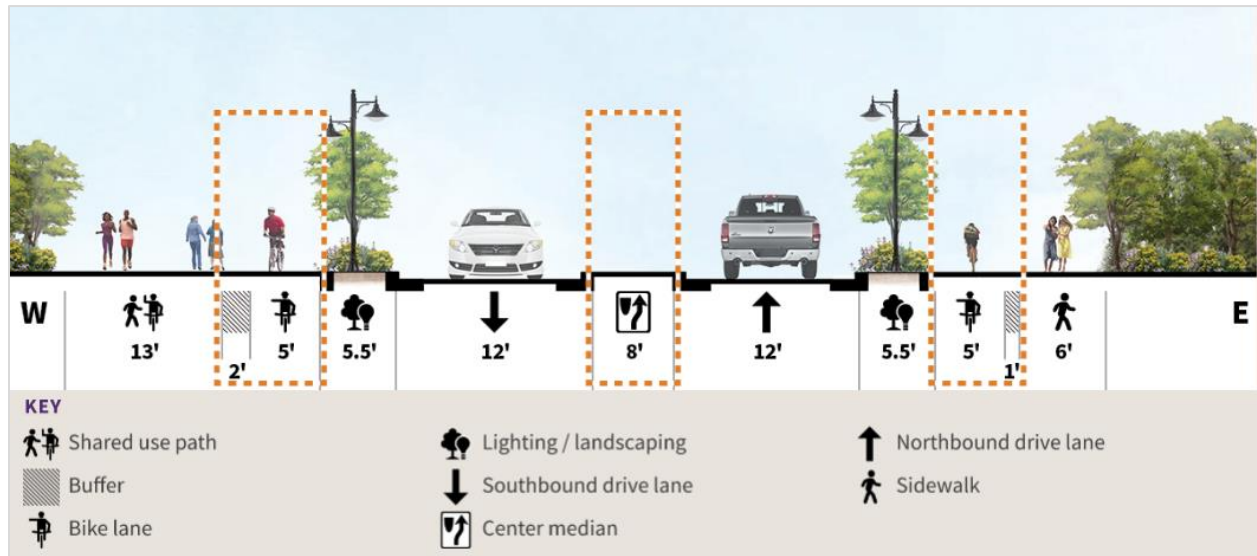
- Adds on-street public parking on south side adjacent businesses.
- Parking aisles are included on both sides of Kitsap Way for property and parking access.
- Center median turns could be formalized by striping or raised medians.



Alternative C

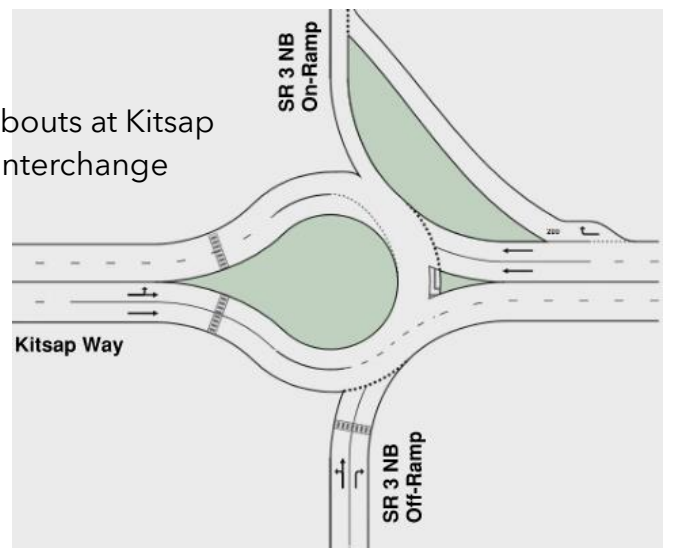
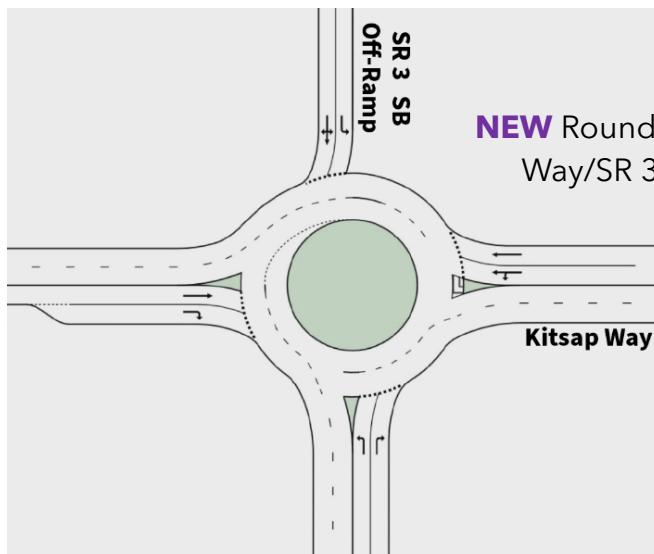
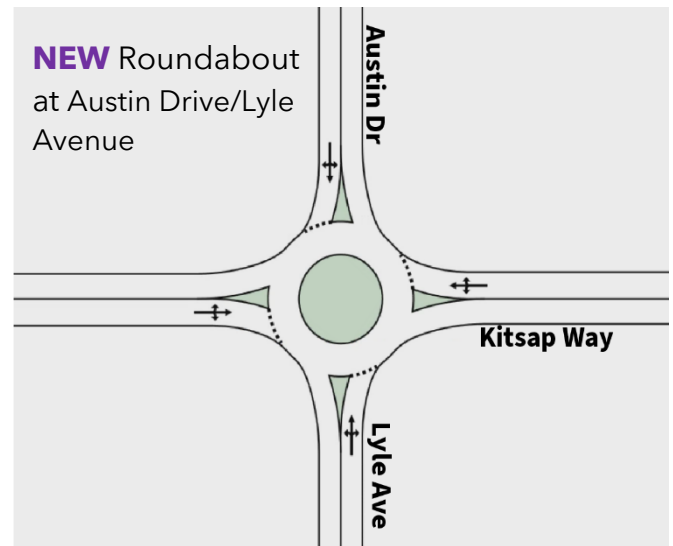
Alternative C: Raised Bicycle Lane Concept

- One 12' travel lane in each direction with a raised center median.
- Landscaped buffers for between vehicle and non-motorized users.
- Shared use pathway (west side) mixes people walking, rolling, and bicycling.
- Raised bicycle lanes (both sides) separate cyclists from both vehicles and pedestrians.



Alternative C: Intersections

Alternative C would add roundabouts at intersections along the corridor to provide reconstruct key intersections to improve safety and operations, while providing U-turn locations for local street and driveway access. Roundabouts will include crosswalks. At SR 3 interchange, the northbound and southbound ramp locations would be converted from signals to multi-lane roundabouts.






Evaluation Criteria

Working with City staff and the project steering committee, the following nine criteria were defined for the review of the alternatives. These evaluation criteria are mainly qualitative in nature but help understand the advantages and disadvantages of each alternative.

- Safety – Safety improvements based on Crash Modification Factors.
- Pedestrian and Bicycle – Improves level of traffic stress for non-motorized users.
- Transit Operations – Supports Kitsap Transit operations.
- Intersection Traffic Operations – Calculated intersection delay meets a LOS D standard.
- Access to Property – Manages access while allowing access to parking and driveways.
- Storm Water – Provides opportunities to improve storm water system.
- Property Impacts – Amount of Right of Way required.
- Cost – Estimated cost of the alternative.
- Public Support – Review of open house comments about the alternatives.

Analysis of Alternatives

Each alternative was evaluated based on how well it met the evaluation criteria. Using the indicators below, a green horizontal arrow indicates that the alternative generally meets the criterion, a blue up arrow exceeds the criterion, and a brown down arrow indicates that the alternative does not fully meet the criterion.

| | |
|-------------------------|---|
| Surpasses criterion |  |
| Meets criterion |  |
| Does not meet criterion |  |

Safety

All alternatives greatly improve the safety of the corridor by reducing speeds, modifying intersections, and eliminating left turn movements from through lanes. Studies from the Crash Modification Factors (CMF) Clearinghouse (<https://www.cmfclearinghouse.org/>) indicate that adding left turn lanes at unsignalized intersections corresponds to approximately a 33 percent reduction in crashes. Alternative C with its multiple roundabouts also reduces severe crash types. CMF studies indicate that single lane roundabouts reduce serious injuries by 88 percent compared to stop controlled intersections and 74 percent compared to a traffic signal. Overall, both Alternatives A and B meet the criterion and Alternative C exceeds the safety criterion.

| Criteria | Alternative A | Alternative B | Alternative C |
|----------|---------------|---------------|---------------|
| Safety | ↔ | ↔ | ↑ |

Pedestrian and Bicycle

Level of traffic stress (LTS) is an indicator of how comfortable users are when using pedestrian and bicycle facilities. LTS scores range from low street (LTS 1) to high stress (LTS 5). The analysis follows WSDOT Design Bulletin Designing for Level of Traffic Stress (#2022-01). Under existing conditions, with two travel lanes in each direction without bike lanes or sidewalks, Kitsap Way has a LTS score of 4. All alternatives provide corridor improvements that improve the LTS score to 2. Alternatives B and C were judged to exceed the criterion because the alternatives include facilities that separate higher-speed bicycle riders from other non-motorized users.

| Criteria | Alternative A | Alternative B | Alternative C |
|------------------------|---------------|---------------|---------------|
| Pedestrian and Bicycle | ↔ | ↑ | ↑ |

Transit

This criterion is a qualitative measurement of how well the alternative support transit by improving access to transit and accommodating transit stops. All alternatives were considered to provide equal accommodations for transit.

| Criteria | Alternative A | Alternative B | Alternative C |
|--------------------|---------------|---------------|---------------|
| Transit Operations | ↔ | ↔ | ↔ |

Intersection Operations

The Highway Capacity Manual establishes a Level of Service (LOS) ranking based on the delay experienced at an intersection. **Table C-1** compares the traffic control, LOS, and delay for each alternative. Alternative A, with its new traffic signals and center turn lanes meets the criterion. Alternative B with its improvements that include realignment of corridor intersections has significant improvements to the LOS at Austin Drive and the SR 3 interchange. Alternative C, the roundabout alternative, provides improved operations at its roundabout intersections.

Table C-1. 2050 AM and PM Peak Hour Intersection Operations – LOS and Delay (Seconds)

| Intersection | Alternative A | | | Alternative B | | | Alternative C | | |
|---|-----------------|--------------|--------------|-----------------|--------------|--------------|-----------------|--------------|--------------|
| | Traffic Control | AM Peak Hour | PM Peak Hour | Traffic Control | AM Peak Hour | PM Peak Hour | Traffic Control | AM Peak Hour | PM Peak Hour |
| Northlake Way - Chico Way / Kitsap Way | Signal | A (8) | C (24) | Yield | A (0) | A (0) | Round about | A (6) | A (8) |
| Harlow Dr / Kitsap Way | Stop Sign | C (15) | D (27) | Stop Sign | C (15) | D (27) | Round about | A (6) | A (6) |
| Lakehurst Dr / Kitsap Way | Stop Sign | C (20) | D (32) | Stop Sign | C (20) | D (32) | Stop Sign | C (20) | D (32) |
| Austin Dr-Lyle Ave / Kitsap Way | Signal | B (14) | C (23) | Signal* | A (6) | B (12) | Round about | A (4) | A (5) |
| Kitsap Way / Burchfield Dr | Stop Sign | B (11) | B (15) | Stop Sign | B (11) | B (15) | Stop Sign | B (12) | C (19) |
| Kitsap Way / Crawford Dr | Stop Sign | B (13) | C (17) | Stop Sign | B (13) | C (17) | Stop Sign | B (15) | C (24) |
| Kitsap Way / Wilmont St | Stop Sign | B (13) | B (14) | Stop Sign | B (13) | B (14) | Stop Sign | B (14) | C (16) |
| SR 3 Southbound Off-Ramp-Auto Center Way / Kitsap Way | Signal | C (27) | D (48) | Signal* | C (26) | C (30) | Round about | A (10) | B (13) |
| SR 3 Northbound Ramps / Kitsap Way | Signal | B (12) | B (14) | Signal | A (4) | A (3) | Round about | A (6) | A (7) |

*Includes intersection approach modifications to improve operations.

Note: LOS calculated using HCM 6th Edition methodology. Side-street stop delay is calculated for the worst stop-controlled approach.

| Criteria | Alternative A | Alternative B | Alternative C |
|---------------------------------|---------------|---------------|---------------|
| Intersection Traffic Operations | ↔ | ↑ | ↑ |

Access to Property

This criterion is a qualitative measurement of how the alternative affects access to property. Both Alternatives A and B include a center turn lane and parking aisle that organize and consolidate access to property. Alternative C also provides access but requires U-turns at roundabouts to access property on the other side of the street.

| Criteria | Alternative A | Alternative B | Alternative C |
|--------------------|---------------|---------------|---------------|
| Access to Property | ↑ | ↑ | ↔ |

Storm Water

All alternatives allow implementation of storm water improvements and were considered to have similar levels of improvements to storm water conveyance, detention, and treatment.

| Criteria | Alternative A | Alternative B | Alternative C |
|-------------|---------------|---------------|---------------|
| Storm Water | ↔ | ↔ | ↔ |

Property Impacts

This criterion was based on the amount and degree of impacts to property for each alternative. Alternative A has limited impacts to property and allows the highest level of access to property. Within Kitsap Junction, Alternative B requires shifting Kitsap Way to the north to accommodate public angle parking, impacting parking areas used by businesses. At intersections, Alternative B also requires additional right of way to realign Lyle Avenue and to construct the chicane feature on Chico Way NW, approaching the Chico Way/Northlake Way intersection. Alternative C has the highest impacts to property and requires acquisition of right-of-way to construct the roundabouts along the corridor.

| Criteria | Alternative A | Alternative B | Alternative C |
|------------------|---------------|---------------|---------------|
| Property Impacts | ↑ | ↔ | ↓ |

Cost

Initial planning-level cost estimates were prepared for each alternative, ranging from \$47 million for \$65 million. Most of this cost is related to reconstruction of Kitsap Way, common to all alternatives. The estimated cost for improvements identified in Alternative A is \$47 million, with Alternative B adding \$3 million more to the cost, and Alternative C adding \$18 million dollars more due of higher amounts of property acquisition and construction.

| Criteria | Alternative A | Alternative B | Alternative C |
|----------|---------------|---------------|---------------|
| Cost | ↑ | ↔ | ↓ |

Public Support

The final criterion was an overall assessment of alternative support based on comments received at the open house. At the open house, the public were asked whether they liked, disliked, or were neutral to the individual elements of each alternative. **Table C-2** summarizes the results 78 people who responded to the survey as part of the open house. The results show that the public found certain elements of each alternative as preferred and other elements less preferred. Additional public comments are found in **Appendix G Public Outreach Summary**.

Table C-2. Summary of Open House Public Review of Alternatives

| | Alternative A | Alternative B | Alternative C |
|---|---|---|---|
| Most Liked Elements (More than 60% Liked) | <ul style="list-style-type: none"> Three-lane roadway with center turn lane. Shared use pathways. | <ul style="list-style-type: none"> Three-lane roadway with center turn lane. Downhill raised bike lane and shared use paths. | <ul style="list-style-type: none"> Roundabout at the Austin Drive/Lyle Avenue intersection. Roundabout at the Northlake Way/Chico Way intersection. |
| More Neutral Opinions (More than 80% either liked or were neutral) | <ul style="list-style-type: none"> Parking aisle access to private parking in Kitsap Junction. | <ul style="list-style-type: none"> Public angle parking in Kitsap Junction. Chicane and stop sign at Northlake Way intersection. Realigned traffic signal at Austin Drive. Reconfigured lanes on southbound off-ramp for SR 3 intersection. | <ul style="list-style-type: none"> Downhill raised bike lane and walkways on both sides. Roundabout at the Harlow Drive/Kitsap Way intersection. |
| Mixed Review (More 30% liked and more than 30% disliked) | <ul style="list-style-type: none"> Traffic signal at Austin Drive (no realignment of Lyle Avenue). | | <ul style="list-style-type: none"> Two-lane roadway with raised center median (Kitsap Junction). Two-lane roadway with raised center median (corridor). |
| Least Liked Elements (More than 50% disliked) | <ul style="list-style-type: none"> Traffic signal at Northlake Way and Chico Way. | | <ul style="list-style-type: none"> Multilane roundabouts at the SR 3 interchange. |

Summary of Alternatives Analysis

Table C-3 summarizes the alternatives and provides an overall assessment of each alternative. Both Alternative A and Alternative B met or exceeded all criteria. Alternative C exceeded in some criteria including safety, pedestrian and bicycle, and intersection traffic operations, but did not perform as well as the other alternatives for property impacts and cost. Overall, the analysis found that each alternative had its strengths and weaknesses. Capitalizing on those strengths and minimizing the weaknesses was important to the development of the preferred alternative.

Table C-3. Summary of Alternatives Analysis

| Criteria | Alternative A | Alternative B | Alternative C |
|---------------------------------|---------------|---------------|---------------|
| Safety | ↔ | ↔ | ↑ |
| Pedestrian and Bicycle | ↔ | ↑ | ↑ |
| Transit Operations | ↔ | ↔ | ↔ |
| Intersection Traffic Operations | ↔ | ↑ | ↑ |
| Access to Property | ↑ | ↑ | ↔ |
| Storm Water | ↔ | ↔ | ↔ |
| Property Impacts | ↑ | ↔ | ↓ |
| Cost | ↑ | ↔ | ↓ |
| Overall | ↑ | ↑ | ↔ |

| | |
|-------------------------|---|
| Surpasses criterion | ↑ |
| Meets criterion | ↔ |
| Does not meet criterion | ↓ |

The alternatives analysis provided an opportunity to review the strengths and weakness of each alternative and to identify the individual elements of the alternatives that formed the preferred concept for the corridor. **The preferred alternative is described in Appendix D.**