



Light Rail Communities Station Area Planning

Final Report
January 2020



Submitted by



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EXECUTIVE SUMMARY

Snohomish County hired Perteet Inc. to lead a consultant team for light rail station area planning in advance of the upcoming Sound Transit Everett Link Extension that is part of Sound Transit 3 (ST3). This planning effort focused on the future light rail stations near the Interstate 5 (I-5) / 164th Street interchange and near the I-5 / 128th Street interchange. Sound Transit had developed a representative alignment with station locations to extend Light Rail to Everett that was approved by voters in the fall of 2016. The Perteet consultant team (Perteet) helped the County, in partnership with other agencies, review alternative station locations and light rail alignment options and then refined those options that supported opportunities for transit-oriented development (TOD), connections to bus transit, non-motorized accessibility, engineering considerations, and public opinion.

As part of the planning effort, the following tasks were completed for each potential station area:

- Economic market analysis to assess redevelopment potential near the station area
- Stakeholder coordination, including multiple meetings
- Preliminary station area locations, including necessary alignment refinements
- Qualitative evaluation of preliminary station locations and alignments focusing on transit connectivity, walksheds, and TOD potential
- Open house presentation of preliminary station locations to gain public feedback on alternatives
- Reduction of alternatives to two station locations per station area, based on the elements outlined above
- Concept graphics of refined station locations
- Open house presentation of refined station locations to gain public feedback on alternatives
- Feasibility evaluation for an alternative light rail alignment on the east side of I-5 between 164th Street and 128th Street, including high-level opinion of cost to compare the east side alternative to Sound Transit's representative alignment on the west side of I-5

The two recommended station locations near the I-5 / 128th Street interchange are at the intersection of 128th Street and 8th Avenue and at 130th Street between 8th Avenue and 4th Avenue. The two recommended station locations near the I-5 / 164th Street Interchange are at the Ash Way Park-and-Ride and on the east side of I-5 in the northeast quadrant of the interchange. The 8th Avenue and Ash Way Park-and-Ride station location alternatives fall on the Sound Transit representative alignment. The 130th Street alternative deviates from the representative alignment, but only near the station location.

The two recommended station locations near the I-5 / 164th Street interchange are at the Ash Way Park-and-Ride and a station in the northeast quadrant of the I-5/164th Street interchange. The consultant team evaluated an alternative light rail alignment along the east side of I-5 between 164th Street and 128th Street that would support a station in the northeast quadrant of the I-5/164th Street interchange. The horizontal and vertical geometry of this alternative appears feasible at a planning level, so the consultant team prepared a high-level cost comparison between this alignment and the representative alignment that is on the west side of I-5. The results of that comparison was that the east side of I-5 alternative alignment would have a cost approximately 5 percent more than the west side of I-5 representative alignment. As costs appear comparable, the project team recommends that Sound Transit evaluate the east side of I-5 alternative alignment and station further as part of their environmental process moving forward.

1.0 INTRODUCTION

Snohomish County hired Perteet Inc. to lead a consultant team in light rail station area planning in advance of the upcoming Sound Transit Everett Link system expansion as part of Sound Transit 3 (ST3). This planning effort, named Light Rail Communities, focused on the planned light rail stations near the Interstate 5 (I-5) / 164th Street interchange and near the I-5 / 128th Street interchange. Perteet and the project team helped the County review alternative station locations and light rail alignment alternatives and then refined those alternatives via engineering considerations and public opinion.

1.1 Project Need

ST3 funding for expansion of the Sound Transit Link system was approved during the November 2016 election. The Everett Link Extension component of that system expansion will extend light rail from the northern terminus of Lynnwood Link Extension, which is the final component of the Sound Transit 2 (ST2) program, north to Everett. A representative alignment and representative station locations for the Everett Link Extension were included in the package approved by voters. The estimated opening date for the Everett Link Extension is 2036. The corridor extension will add six new stations to the light rail system, including stations near the I-5 / 164th Street and I-5 / 128th Street interchanges in south Snohomish County. A provisional seventh station near the intersection of Airport Way and Evergreen Way was included in the voter approved package. This seventh station may be added in the future but is not anticipated to be part of the initial construction.

Although Sound Transit has not yet started design on the Everett Link Extension, Snohomish County initiated this station area planning project to better understand the opportunities for transit-oriented development (TOD) and the resulting land use impacts, how to create great connections between Community Transit's Bus Rapid Transit (BRT) system that runs east-west in the area, and the accompanying infrastructure improvements that may be beneficial to construct nearby to support Everett Link.

1.2 Summary of Prior East-West High Capacity Transit Analysis

Starting in 2015, the project team began evaluating existing and potential east-west corridors in south Snohomish County for Snohomish County Public Works, an effort known as the East-West High Capacity Transit project. The East-West High Capacity Transit project consisted of two phases and focused on identifying roadway improvements that could increase mobility in the County between State Route (SR) 527 to the east and SR 99 to the west across I-5, which currently has limited crossings to connect neighborhoods and cities on either side of the interstate. The consultant team evaluated the 164th Street and 128th Street east-west corridors during the East-West High Capacity Transit project with an emphasis on ways to improve transit speed and reliability.

The project team developed the following near-term (by 2023), longer-term (by 2036), and very-long-term recommended projects as part of Phase II of the East-West High Capacity Transit evaluation. General location of each is illustrated in Figure 1-1:

Near-Term Recommendations

1. Construct interim improvements to 164th Street from 36th Avenue to SR 527 to support Community Transit's Swift Orange Line.
2. Widen and realign SR 524 near I-405.
3. Connect the Ash Way Park-and-Ride to the 164th Street and Meadow Road / 13th Avenue intersection via a high-occupancy vehicle (HOV) and transit bridge across the northbound I-5 lanes.

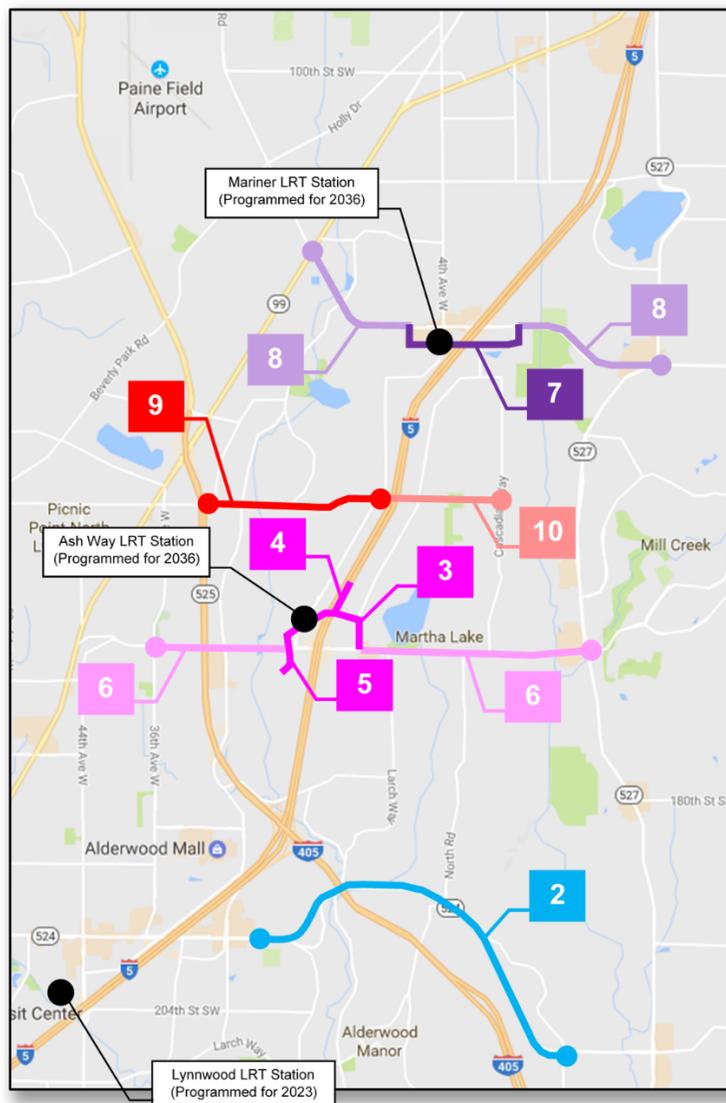
4. Build the north leg of the HOV direct-access ramps north of 164th Street.
5. Realign Ash Way to 22nd Avenue.

Longer-Term Recommendations (Purple in Figure I-1)

6. Widen 164th Street from 35th Avenue to Ash Way and from 13th Avenue to SR 527 and install HOV / business-access and transit (BAT) lanes.
7. Construct a new crossing of I-5 at 130th Street between 8th Avenue W and 3rd Avenue SE for HOV and transit.
8. Widen 128th Street / Airport Road from SR 99 to 8th Avenue W and SR 96 from 3rd Avenue SE to SR 527 and install HOV / BAT lanes.
9. Expand 148th Street to five lanes between SR 99 and Ash Way.

Very-Long-Term Recommendations

10. Extend the 148th Street corridor east from Ash Way to Cascadian Way with a new I-5 overcrossing.



Final Study Recommendations, Winter 2017

Figure I-1. – Recommended Projects from Prior East-West High Capacity Transit Analysis

1.3 Station Area Planning

ST3 specifies that light rail stations will be constructed near the 164th Street and 128th Street interchanges with I-5. However, precise locations were not specified in the voter-approved package. Sound Transit will begin reviewing station locations in detail starting in 2020 in order to prepare environmental documentation. This planning study for Snohomish County is not intended to replace or dictate that environmental process. To that end, the station area planning done by the project team did not provide a singular recommendation for either interchange area—instead, it narrowed recommended station locations down to two sites near each interchange.

The consultant team completed the following tasks for each interchange:

- Economic market analysis to assess redevelopment potential near the interchange
- Ongoing stakeholder coordination, including multiple meetings
- Preliminary station area locating, including necessary alignment refinements
- Qualitative evaluation of preliminary station locations and alignments, focusing on transit connectivity, walksheds, and TOD potential
- Open house presentation of preliminary station locations to gain public feedback on alternatives
- Reduction of alternatives to two station locations per intersection, based on engineering assessments and public comments
- Open house presentation of refined station locations to gain public feedback on alternatives
- Feasibility evaluation for an east side of I-5 alternative light rail alignment between 164th Street and 128th Street, including high-level cost estimating to compare the east side of I-5 alternative alignment to Sound Transit's representative alignment

The consultant team developed station area renderings and other graphics to assist with many of the above tasks. These are presented and described in more detail later in this document.

1.3.1 Project Team

Jay Larson with Snohomish County Public Works and David Killingstad with Snohomish County Planning and Development Services led this planning effort for the County. Project direction was provided by the Project Steering Committee made up of management-level representatives of various Snohomish County departments, including Public Works, Planning and Development Services, Parks Human Services, Prosecuting Attorney, and the County Council. The consultant team was led by Perteet and included the following subconsultants (with project roles as shown):

- MAKERS – urban design and renderings
- WSP – light-rail transit design
- EnviroIssues – public involvement
- Leland – market analysis

1.3.2 Stakeholder Coordination

While the two station areas near the 164th Street and 128th Street interchanges with I-5 are in unincorporated Snohomish County, there were multiple critical stakeholders whose interest and expertise made it advantageous to include in the planning process. This Agency Support Team (AST) was made up of transit agencies (Sound Transit, Community Transit, and Everett Transit); local municipalities (The Cities of Mill Creek, Everett, and Lynnwood); Snohomish County, and the Washington State Department of Transportation.

1.3.3 Public Outreach Plan

Because of the transformative potential of this study, it was determined early on that the planning effort would include a robust public process. Public outreach for this effort was led by Jay and David, as the co-managers of the project, along with the Snohomish County Public Works Communication Team. The project hosted three online and two in-person open houses to receive feedback at three stages of the planning process. The first online open house occurred before the project team developed any alternatives for the stations, so comments focused on desired features of the stations or particular items to consider during the planning process. The second online open house featured three alternatives at each study location, and respondents could select their preferred alternative. The third online open house presented two alternatives for each intersection, which mirrored the in-person open houses that were held in mid-2019.

2.0 MARKET ANALYSIS

Leland led a market analysis effort to document the anticipated growth in the station areas near the 164th Street and 128th Street interchanges with I-5. The 164th Street interchange with I-5 zone is also referred to as the 164th/Ash Way Station area, and the 128th Street interchange with I-5 zone is also referred to as the 128th/Mariner Station area. Leland’s evaluation focused on strategies for maximizing TOD potential near each station. Leland’s analysis did not distinguish between any of the station location alternatives at either interchange area; they reviewed each interchange area in general. Table 2-1 summarizes the existing conditions for each station area, and what is the projected aggressive/high end growth opportunities for the future.

	164 th / Ash Way Station Area	128 th /Mariner Ave Station Area
Transit Connections	Served by many transit lines, connecting to regional activity centers. Swift Orange (2023) and Green (2019) BRT lines will increase connectivity and can help improve 164 th streetscape.	Served by many transit lines, connecting to regional activity centers. Swift Green line (2019) will increase connectivity and can help improve 128 th streetscape.
Multifamily Development	Significant capture rate of regional MFR development. Market momentum.	Significant new development east of I-5, older properties west of I-5. Weaker multifamily market.
Commercial Development	Auto-oriented, single story development on the east, which is challenging for TOD. Existing TOD-style commercial on West is connected to multifamily and forms a “nucleus”.	Existing auto-oriented commercial appears healthy but expected to struggle in the future. Industrial properties may be displaced and redeveloped during light rail construction.
Light Rail	West-side alignment and station.	West-side alignment (on 128 th St between 4 th and 8 th Avenues, or on 4 th Avenue) due to better-connected road grid, and light rail route towards Paine Field.
Station-specific 20-year Development Forecast (Aggressive/high-end projections shown below)		
Housing (units)	1,400 units: Highest-density TOD contingent on redevelopment of properties close to Ash Way Station, including park and ride and stormwater facility.	800 units: Redevelopment will be required as there are few vacant sites. Redevelopment is most likely on sites that are commercial, industrial, or publicly-owned.
Office (sq. ft.)	50,000 square feet: White-collar, neighborhood serving and/or medical office.	100,000 square feet: Increased demand due to commercial service at Paine Field.
Retail (sq. ft.)	150,000 square feet: Potentially grocery (on 164 th), food and beverage, neighborhood serving, entertainment, other.	80,000 square feet: Redevelopment and intensification of existing commercial on 128 th .
Other	Potential for connections with Edmonds Community College, UW Bothell, etc. Make Swamp Creek natural area an open space amenity that is connected to new TOD. County leadership and funding tools needed to invest in infrastructure and redevelopment activities. Extend quality Ash Way improvements south.	Potential for more healthcare uses near the Swedish Medical Center. Additional lodging is possible as Paine Field commercial service accelerates. Craft industrial development may occur. County leadership and funding tools needed to invest in infrastructure and redevelopment activities.

Table 2-2- Station Area Existing Use Conditions and Potential Opportunities

The full market planning summary with supporting responses to Snohomish County questions is included in Appendix A to this report.

3.0 PRELIMINARY STATION AREA PLANNING

This chapter documents the identification of criteria for choosing preliminary station area locations, with an ultimate deliverable of two possible locations for each of the station areas. This effort included staff and stakeholder workshops as well as public involvement via two online open houses. This phase of the project began in April 2018 and continued into January 2019.

3.1 Workshop #1

The first expert review panel workshop was held on the May 23, 2018, with the project Steering Committee, and was conducted by Perteet, MAKERS, and WSP. The purpose of the workshop was to identify the important attributes of possible station locations. Using roll plots as exhibits, a series of discussion questions were asked of attendees to elicit ideas. The main results from this workshop were that (1) the station area planning should strongly consider pedestrian, bicycle, and transit connectivity as a key goal for each location and (2) because densification in the station areas is so important, redevelopment potential should be strongly considered. Several members of the group stressed the importance that at least one of the two stations be “community-oriented,” meaning that it would be designed to enhance the surrounding blocks as opposed to disrupting the existing character in the vicinity.

Full meeting minutes and the presentation of the aerial maps are included in Appendix B.

3.2 Online Open House #1

The first online open house was developed by Snohomish County staff and EnviroIssues. The open house was live between June 22 and July 23, 2018, and it requested public comment on desired station features, interest in using the future light rail service, and general comments on items that should be considered in the planning process. The open house had almost 1,500 visitors and garnered over 160 comments. Participants saw both concerns and opportunities in the coming of light rail. Frequent comments included concerns about housing affordability and area accessibility as well as the desire for increased amenities such as green spaces and retail. A summary and full text of the online open house is included in Appendix C.

3.3 Workshop #2

The second expert review panel workshop, held on July 23, 2018, brought together 30 individuals from the project team, the Steering Committee, and the Agency Support Team, as well as other Snohomish County staff with beneficial expertise. The goal of this meeting was to lay out candidate station locations while considering multiple sources of input from various agencies and team members. Attendees were divided into four groups of seven or eight people each, with each group facilitated by a consultant team member from Perteet, MAKERS, or WSP. Each group had aerial exhibits that included recommended access improvements from the earlier East-West High Capacity Transit study, locations of wetlands, and a parcel-level estimate of redevelopment potential. Parcel redevelopment potential was determined by Leland and MAKERS using available parcel data from the County GIS system. Each group was also given to-scale acetate cutouts for light rail track (tangent and curved) and station locations (see Figure 3-1). The groups used these pieces to locate stations and develop approximate light rail lines that could connect the stations to the ST3 representative alignment. Groups were given minimal direction for how and where stations could be located, which led to five different station locations for the Ash Way/164th Street station area and nine different station locations for the Mariner / 128th station area.



Figure 3-1. Workshop #2 groups using acetates to locate stations

The groups generated 14 alternatives—nine for the Mariner / 128th Street station area and five for the Ash Way / 164th Street station area. The alternatives for the Mariner/128th Street station area showed a clear pattern, as all but one located the station in the block bound by 128th Street to the north, 132nd Street to the south, 8th Avenue to the west, and 4th Avenue to the east. At the Ash Way/164th Street station area, four of the alternatives located the station at the Ash Way Park-and-Ride or at the intersection of 164th Street and Ash Way. The fifth alternative for 164th Street introduced the concept of an east side of I-5 station location placed near the intersection of 164th Street and 13th Avenue, with the goal of maximizing redevelopment potential by avoiding the Swamp Creek wetland to the west of Ash Way.

After the workshop, the consultant team prepared summary graphics documenting the location of the station for each of the 14 alternative locations and how that station area would interact with the light rail alignment, Swift Green Line BRT, and non-motorized and parking accessibility. An example of the summary graphic is shown in Figure 3-2. All 14 summary graphics are located in Appendix B together with the meeting minutes from the workshop.

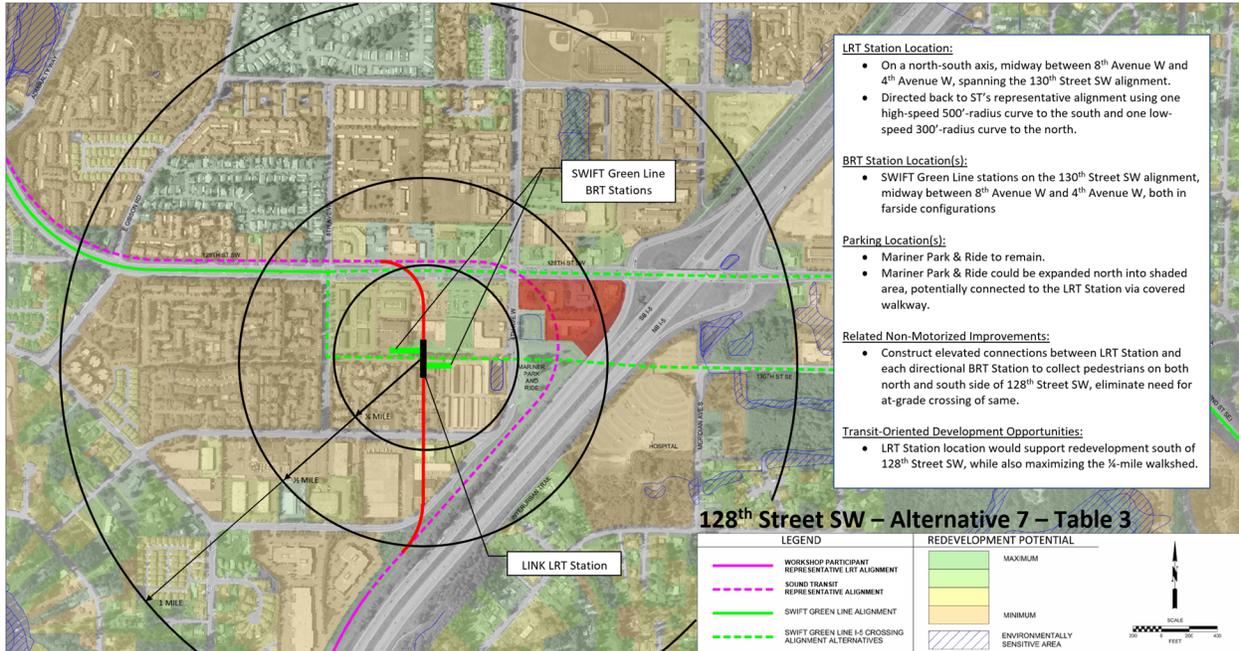


Figure 3-2. Example Workshop #2 Summary Graphic

3.4 Workshop #3

The third expert panel workshop was held on August 17, 2018, with the project Steering Committee and additional Snohomish County staff. The goal of this workshop was to reduce the 14 alternatives that were developed down to 3 at each of the station areas. To assist with this evaluation, Perteet had developed both preliminary concept graphics and evaluation matrixes for each concept that were reviewed. This consisted of nine concepts for possible light rail stations in the vicinity of the Mariner/128th Street station area, and five concepts in the vicinity of the Ash Way/164th Street station area. The evaluation matrices developed by Perteet consisted of a quarter-point scoring system, with scores of a full point (a complete circle) for meeting the established goals and quarter-circle or empty-circle scores for alternatives not achieving the desired goals. An example of the evaluation matrix used for the Ash Way/164th Street station area light rail station alternatives is shown in Figure 3-3.

Corridor Alternative	Geometric Constraints		Accessibility to SWIFT	Connections to Bike/Ped	TOD Opportunities
	At-Grade	Elevated			
1	¼ Circle	Full Circle	¾ Circle	½ Circle	¼ Circle
2	Empty Circle	¾ Circle	¾ Circle	½ Circle	¾ Circle
3	Empty Circle	¾ Circle	Full Circle	½ Circle	¼ Circle
4	Empty Circle	Full Circle	Full Circle	¾ Circle	Full Circle
5	Empty Circle	Full Circle	Full Circle	½ Circle	¼ Circle

Figure 3-3. Evaluation matrix for Ash Way/164th Street station area presented in Workshop #3

A complete copy of the PowerPoint slides used at the beginning of the workshop to illustrate alternative concepts and Perteet’s initial scoring of those concepts is included in Appendix B as part of the August 17, 2018 meeting minutes.

The August 17th workshop attendees then completed an exercise of evaluating the degree to which the alternatives satisfied the station area goals that were agreed to during Workshop #1. The workshop participants used the information provided by Perteet in the PowerPoint presentation as a starting point to provide their own input and assessment of the alternatives. After discussion, the workshop participants made the decision that the 14 alternatives could be grouped into 3 options at both the Ash Way/164th Street station area and the Mariner/128th Street station area as described below.

None of the five alternatives at the Ash Way/164th Street station area were eliminated from consideration. Instead, the two alternatives that located the station at the Ash Way Park-and-Ride were consolidated into one alternative for further study. Similarly, the two alternatives that located the station at the Ash Way/164th Street intersection were combined. The east of I-5 alternative was retained for additional review because it received the highest score during the quarter-point evaluation by the workshop participants. The three alternatives carried forward are illustrated in Figures 3-4 to 3-6.

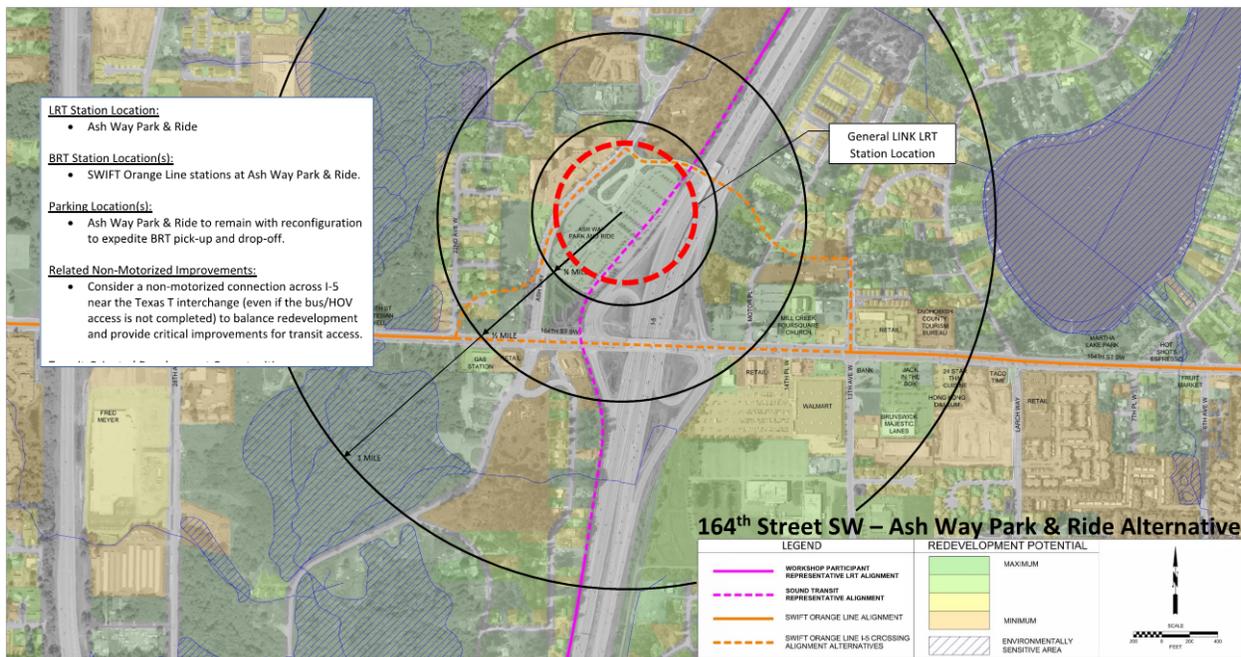


Figure 3-4 Station Location at Ash Way Park & Ride

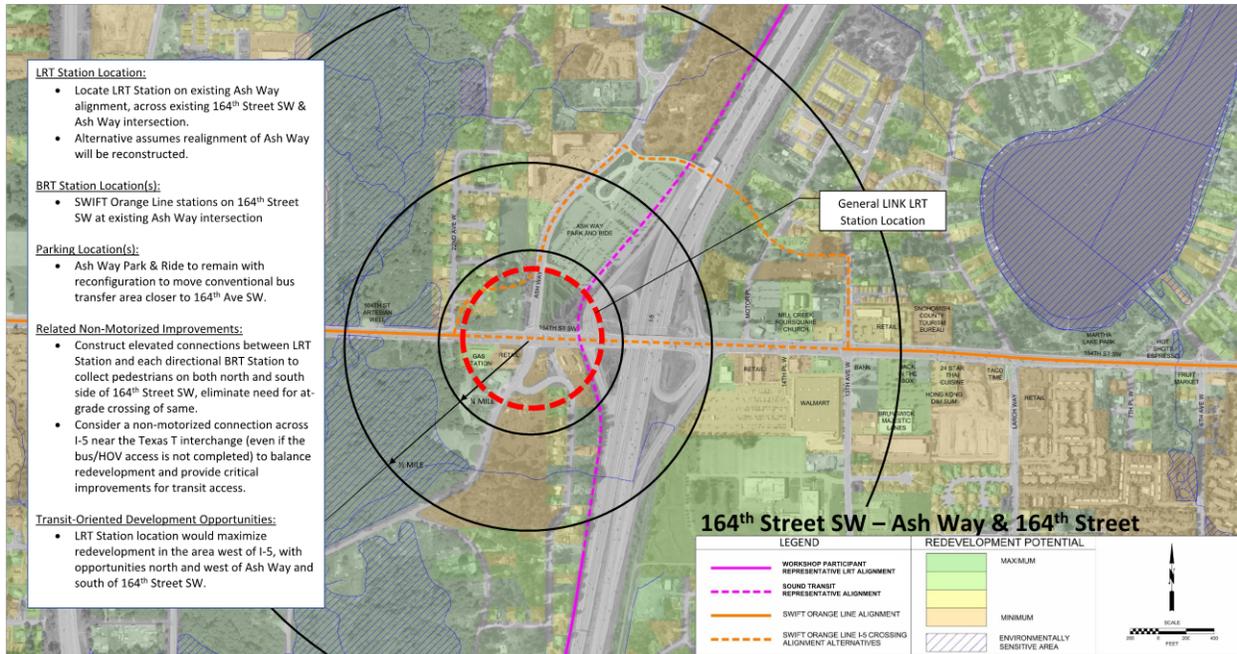


Figure 3-5 Station Location at 164th St SW and Ash Way

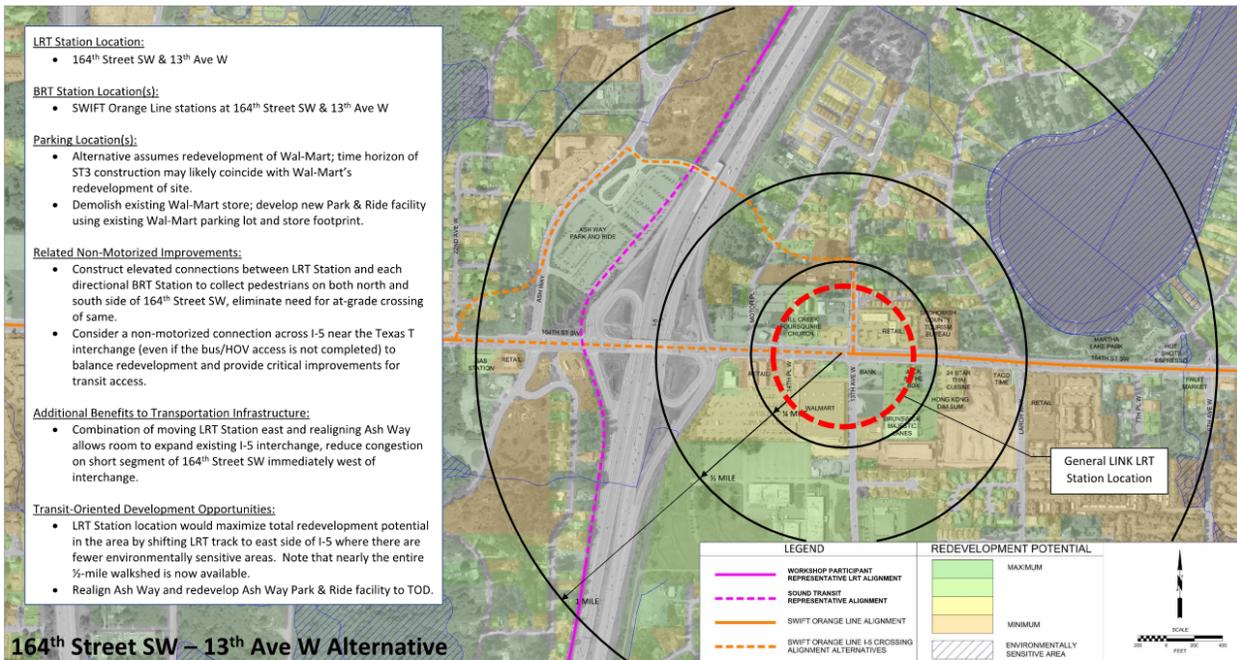


Figure 3-6 Station Location on East Side of I-5 near 13th Ave W

At the Mariner/128th Street station area, the 4th Avenue alternative scored highest during the quarter-point exercise, so it was advanced for further study. Four of the alternatives placed the station along 128th Street between 4th Avenue and 8th Avenue. Since a 4th Avenue station was already advanced due to scoring, the County directed the project team to consolidate these four alternatives into one 8th Avenue alternative. Three other alternatives located the station between 128th Street, 132nd Street, 4th Avenue, and 8th Avenue, which the group coined the “superblock.” These three alternatives were combined into one “superblock” alternative for

further analysis. Alternative 3 that was developed during Workshop #2, which showed a station on the southern portion of 4th Avenue W running parallel to I-5, was eliminated from further consideration due to its low scores for transit connectivity. The three alternatives carried forward are illustrated in Figures 3-7 to 3-9.

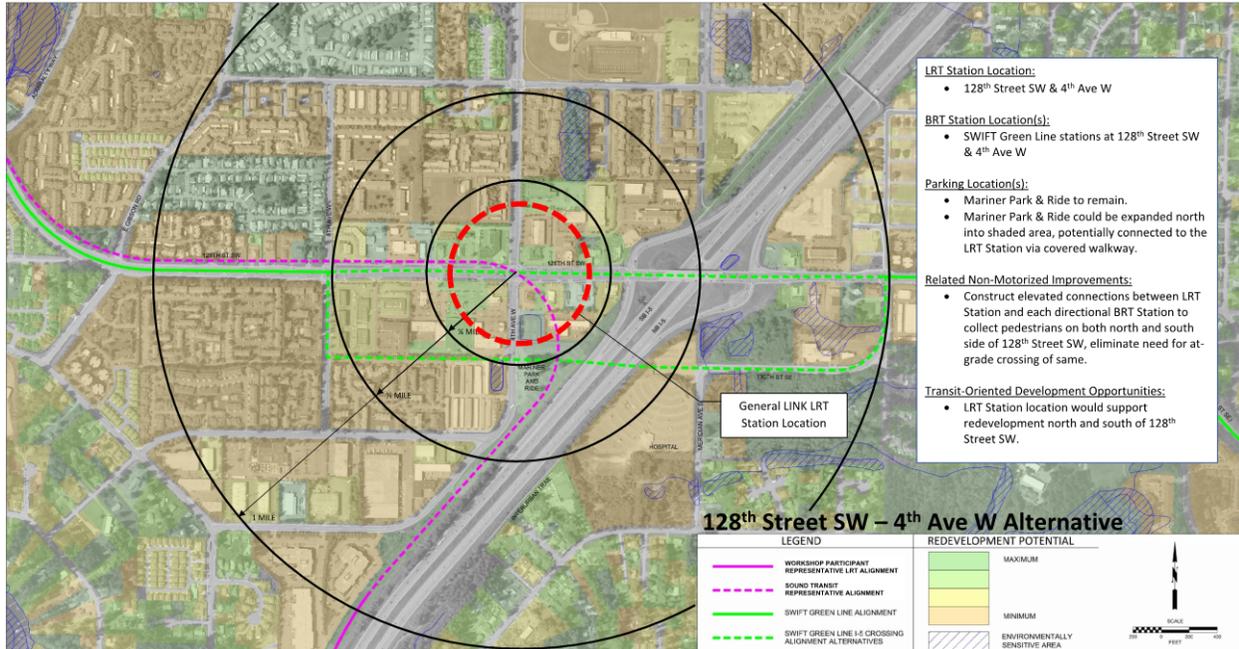


Figure 3-7 Station Location at 128th St SW and 4th Ave W

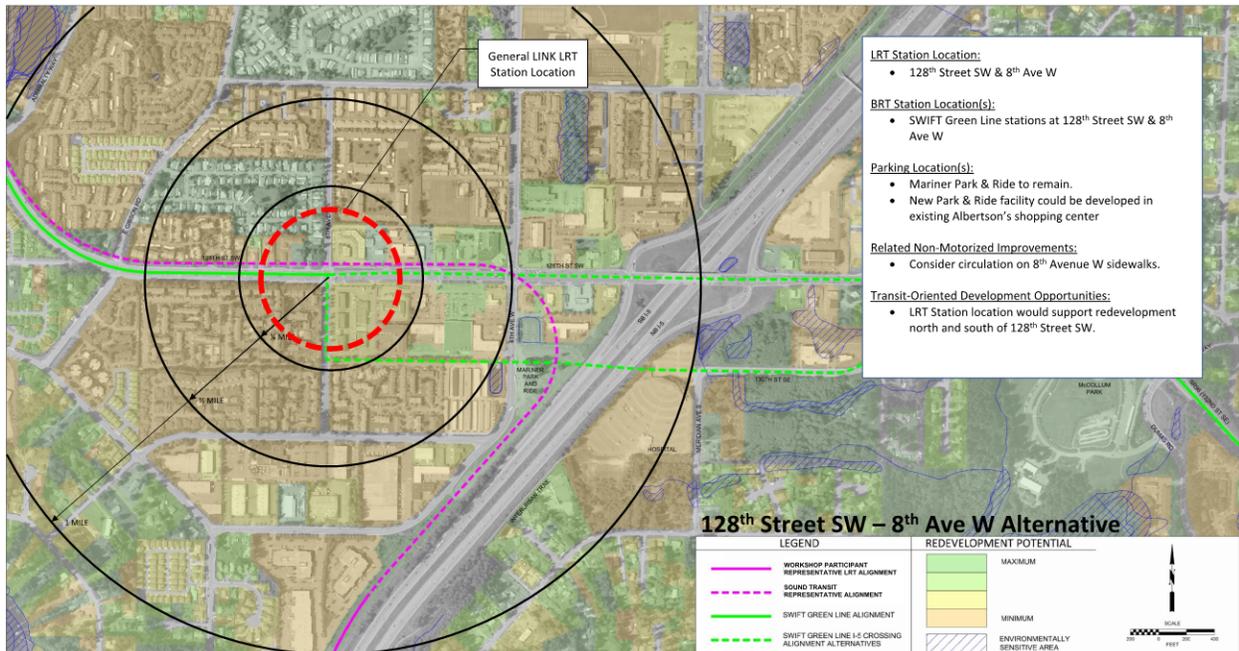


Figure 3-8 Station Location at 128th St SW and 8th Ave W

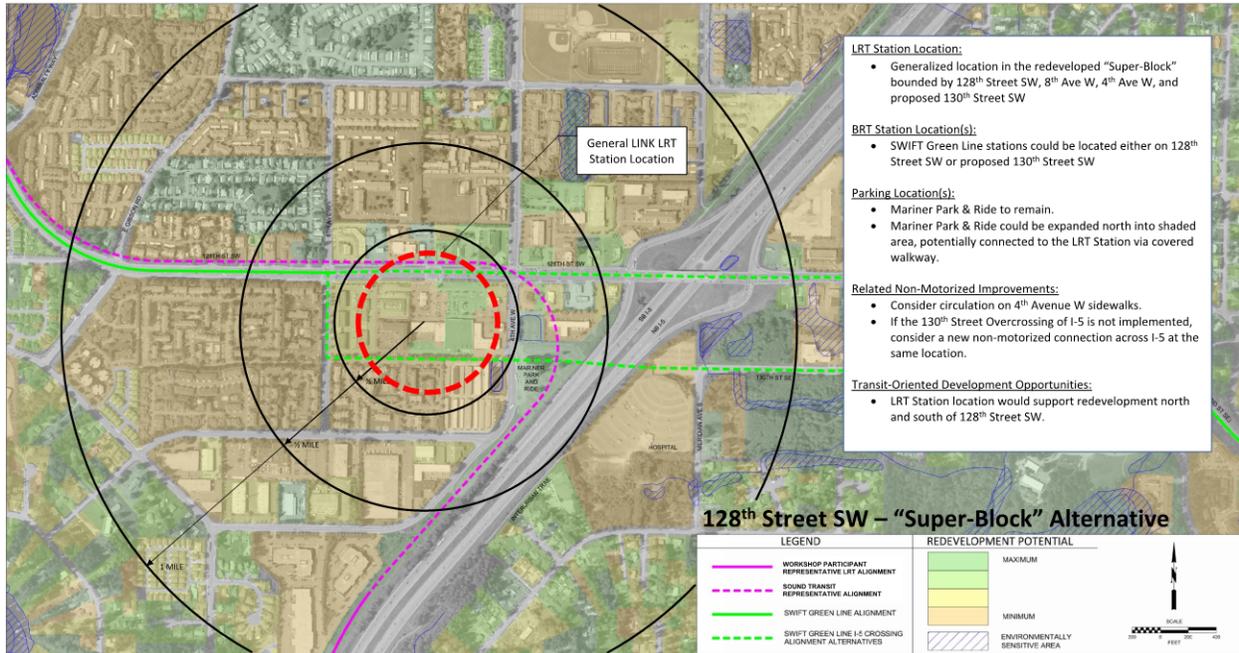


Figure 3-9 Station Location between 128th St SW and 130th St SW

The meeting minutes and presentation materials from the August 17th, 2018 meeting are included in Appendix B.

3.5 Online Open House #2

The Online Open House #2 was held from October 31 through November 30, 2018. Over 3,000 people visited the open house, with 325 people commenting and answering the surveys. After the three preferred station locations were selected at each interchange area during Workshop #3, Perteet and the consultant team revised the station location renderings and associated decision matrix for use in the online open house and stakeholder outreach presentations.

Figure 3-10 is an example of the exhibits used for the Online Open House for a potential station location. Each exhibit identified a general location for a station on an aerial background with a potential light rail alignment. The applicable Swift BRT route is also shown on each map, as are walksheds from the center of the general station location.

EAST OF I-5 ALTERNATIVE

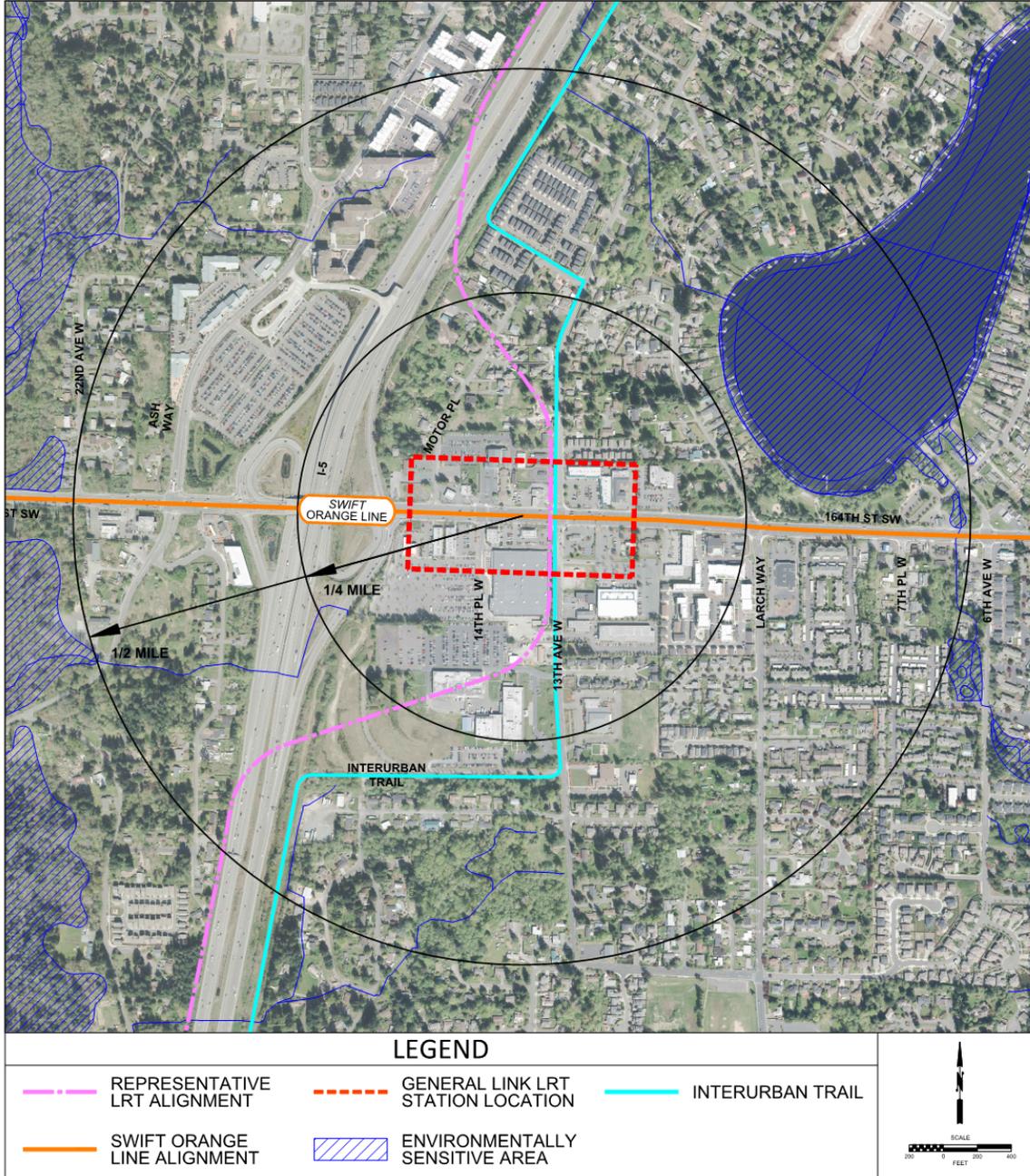


Figure 3-10. Example Online Open House #2 map graphic.

Perteet also revised the decision matrices for use in this online open house. These matrices listed brief descriptions and used red/yellow/green indicators to show how well the station location alternatives achieved the station goals that were determined at Workshop #1.

The second online open house provided an evaluation of which Workshop #1 goals were most and least important to respondents. Across both intersections, rankings of the most and least important station goals were consistent:

connectivity to transit (including Swift BRT) was most frequently the highest priority and access to bike routes was the least prioritized. Figures 3-11 and 3-12 show the public rankings of selection criteria.

Mariner Station Area: Criteria Ranking

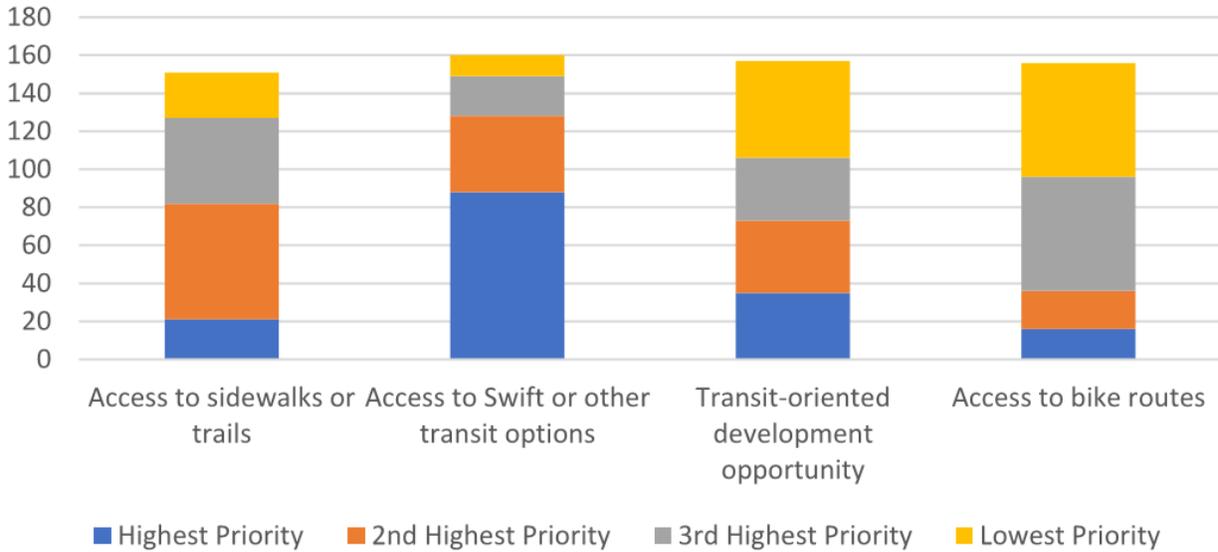


Figure 3-11. Mariner/128th Street station area criteria ranking from Online Open House #2.

Ash Way Station Area: Criteria Ranking

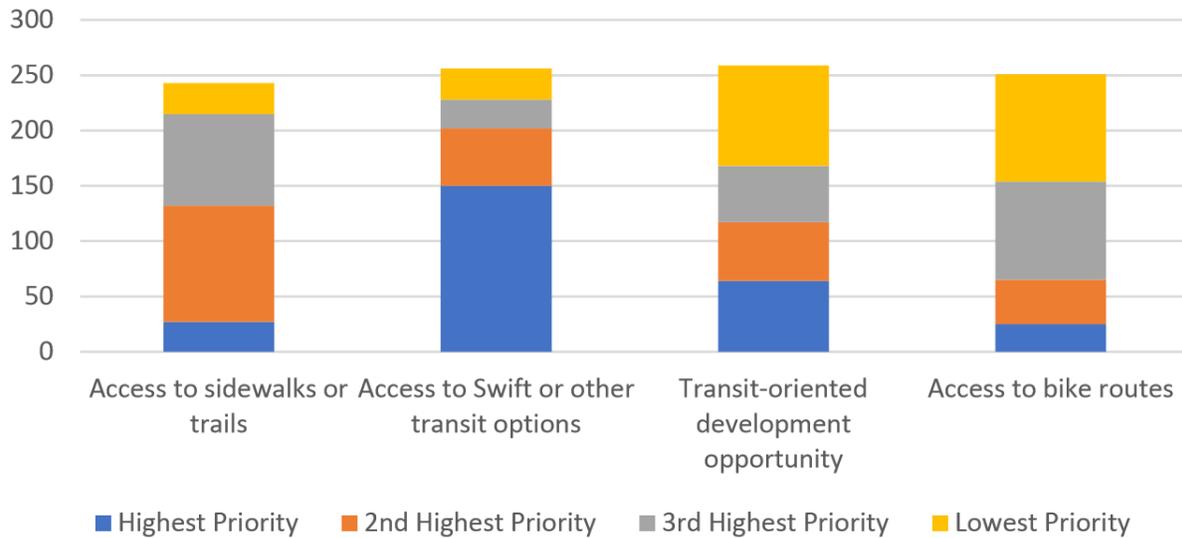


Figure 3-12. Ash Way/164th Street station area criteria ranking from Online Open House #2.

Using the rendering of the six station locations and the decision matrix, the online open house also asked participants about their location preference. As can be seen in Figure 3-13, for the Mariner/128th Street station area location, the 130th Street alternative (previously called the “superblock” alternative) was most often preferred, followed by 4th Avenue W and then 8th Avenue W alternatives.

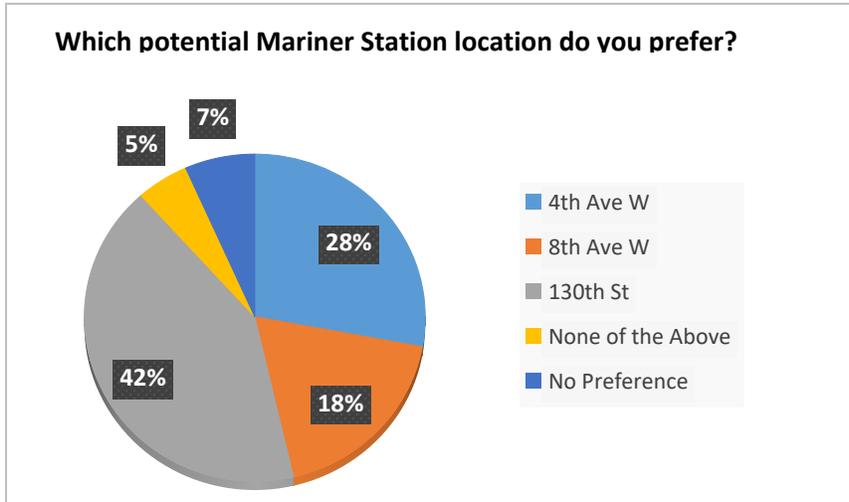


Figure 3-13. Mariner/128th Street Station Area Location Preference from Online Open House #2

For the Ash Way/164th Street station area location, half of the respondents selected the Ash Way Park-and-Ride station location as their preferred alternative, followed by the east of I-5 alternative, and then the 164th Street and Ash Way intersection alternative. The Ash Way/164th Street station area results can be seen in Figure 3-14.

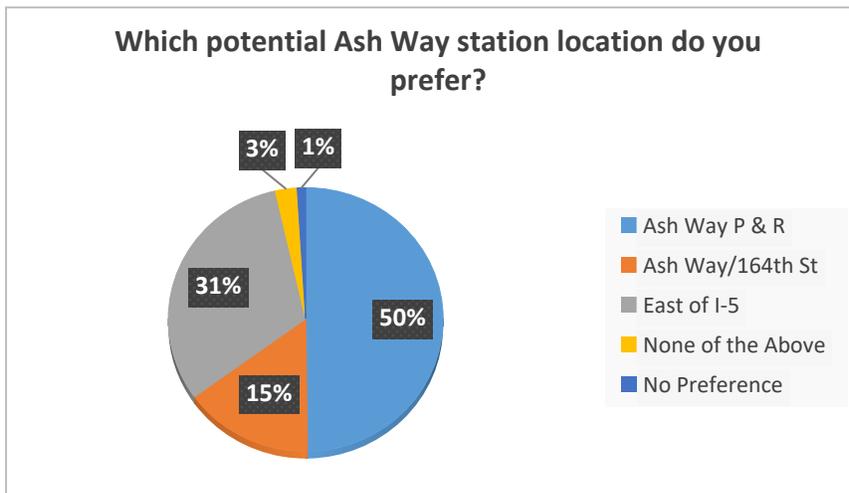


Figure 3-14. Ash Way/164th Street Station Area Location Preference from Online Open House #2

The full set of online open house exhibits, and a summary of the public comments are included in Appendix C.

3.6 Analysis of Alternative Refinements

After receiving input from two online open houses and the three expert panel workshops, the project team proceeded to analyze the six remaining station locations with the idea of getting down to four to take into the concept development phase. The County and project team decided that the analysis should concentrate on quantifying three criteria; TOD opportunities, transit performance, and cost.

The TOD potential required further analysis of the development potential surrounding each station. Whereas the prior analysis was general for each interchange area, this analysis narrowed in on the specific development opportunities at each candidate station location. The project team performed this development analysis and produced summary graphics showing the developable area and key related statistics. Figures 3-15 to 3-18 show the graphics that were produced to illustrate the development potential at the Mariner/128th Street station area locations, and Figures 3-18 to 3-21 show the Ash Way/164th Street station area locations.

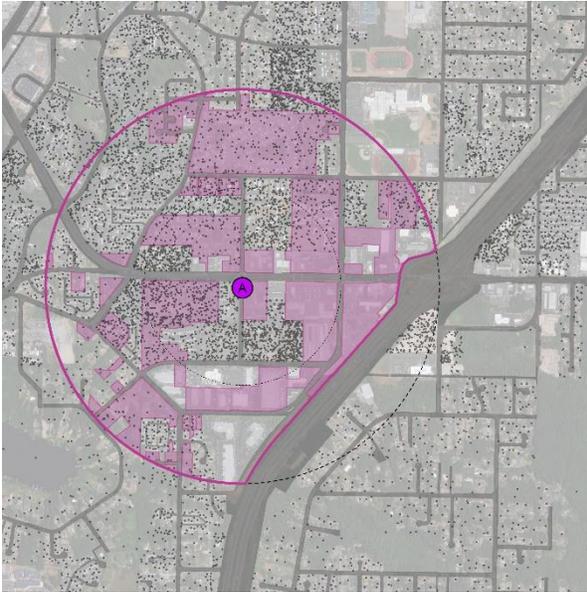


Figure 3-15. Mariner/128th Street Station Area Location A

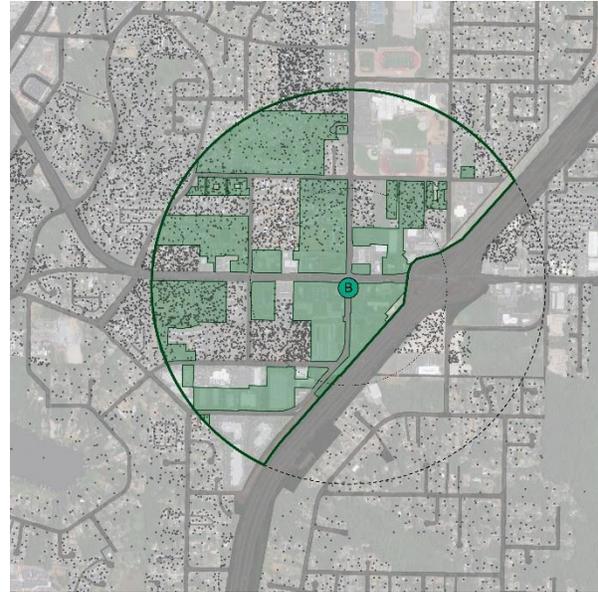


Figure 3-16. Mariner/128th Street Station Area Location B



Figure 3-17. Mariner/128th Street Station Area Location C

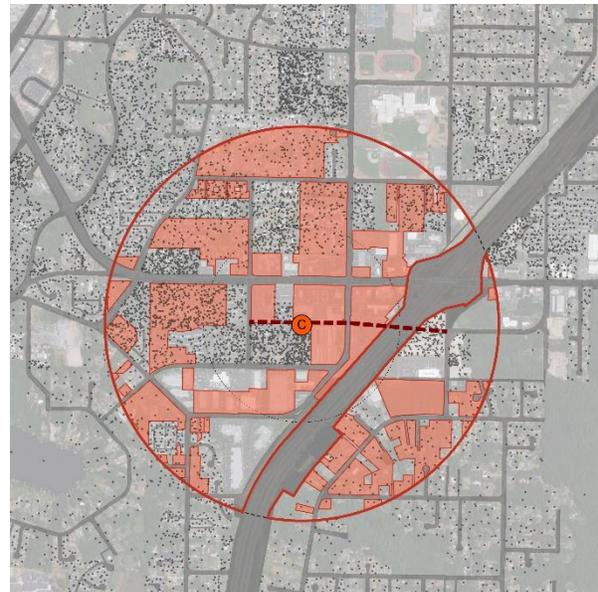


Figure 3-18. Mariner/128th Street Station Area Location C with I-5 Crossing

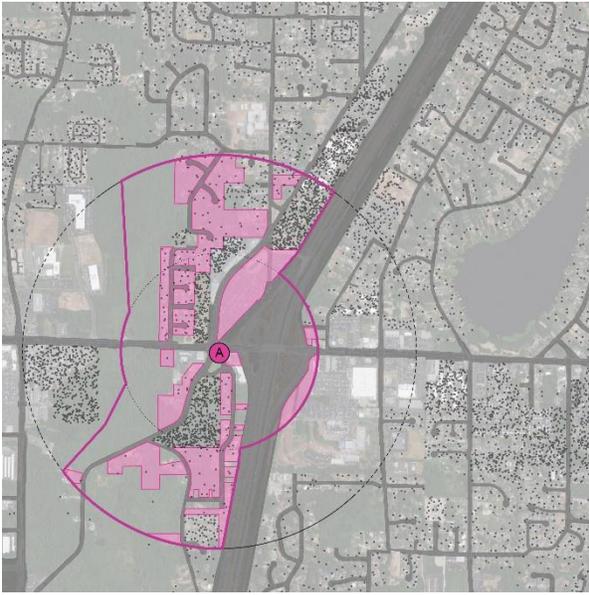


Figure 3-19. Ash Way/164th Street station area Location A

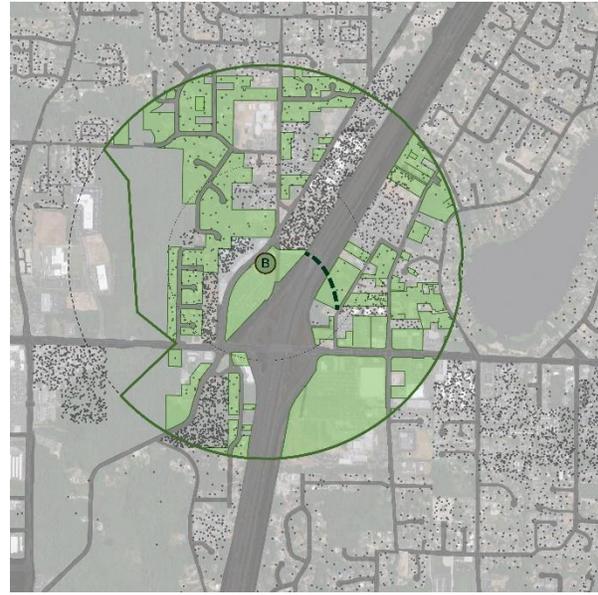


Figure 3-20. Ash Way/164th Street station area Location B

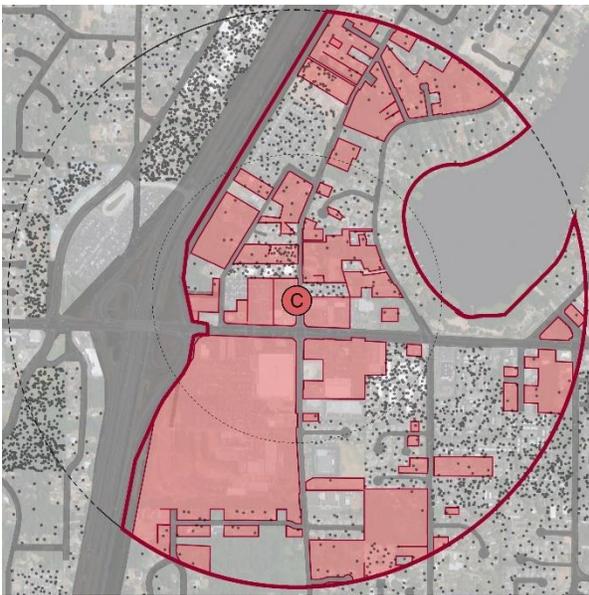


Figure 3-21 Ash Way/164th Street Station Area Location C w/o I-5 Crossing

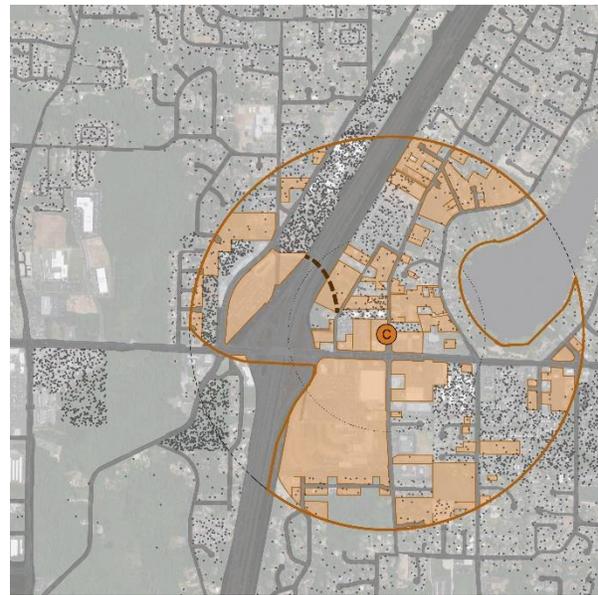


Figure 3-22. Ash Way/164th Street Station Area C with I-5 Crossing

A comparison matrix was produced using the development data and travel time data from the East-West High Capacity Transit project that was completed in August 2017. Note that the transit operational analysis in that earlier study did not evaluate these particular station locations—they all evaluated transit traveling east-west on 164th Street and 128th Street and not to the specific station locations that were considered in this study.

Similarly, cost data for the 130th Street overpass and completion of the direct access ramps were borrowed from the East-West Capacity Transit project cost estimating work that was completed in August 2017. The east of I-5 station alternative in the Ash Way/164th Street station area introduced a new cost component into the study: potential of increased light rail track costs. WSP provided standard Sound Transit per linear foot light rail track costs to Perteet. These costs distinguished between standard aerial track and long-span track that would be used on an I-5 overcrossing. Perteet relied on these costs to evaluate the increased costs to cross over I-5 south and north of the station to rejoin the representative alignment. Perteet assumed that the east of I-5 station would be aerial for this analysis. The matrices are provided on the following pages as Figures 3-23 and 3-24; the matrix memorandum and its appendices are provided in Appendix D to this report.

Metric	164th Street SW at Ash Way	Ash Way Park & Ride	Ash Way Park & Ride with full Texas-T	East of I-5	East of I-5 with full Texas-T
Transit-Oriented Development¹					
Existing dwelling units	1,586	1,970	2,355	1,253	2,378
Re-developable acres	78	88	165	137	161
Potential new units ²	7,801	8,808	16,451	13,729	16,075
Existing units on re-developable parcels	149	214	304	194	231
Total potential dwelling units	9,238	10,564	18,502	14,788	18,222
Transit Performance³					
Ridership ⁴	4,600 Bus 38,000 LRT	4,600 Bus 38,000 LRT	4,800 Bus 39,000 LRT	4,600 Bus 38,000 LRT	4,800 Bus 39,000 LRT
Travel Time to LRT Station (Alderwood Mall Pkwy to SR 527)	10 min WB 3 min EB	13 min WB 5 min EB	10 min WB 5 min EB	4 min WB 8 min EB	4 min WB 10 min EB
Cost Relative to Baseline					
Sound Transit (2017 \$) ⁵	+\$7.5M	\$0	\$0	+\$107.5M	+\$107.5M
Snohomish County (2030 \$) ⁶	\$224.9M ⁷	\$224.9M ⁷	\$350.8M ^{8,9}	\$224.9M ⁷	\$350.8M ^{8,9}
Total Costs	\$232.4M	\$224.9M	\$350.8M	\$332.4M	\$458.3M

Notes: ¹ Limited to a 1/2-mile walkshed.
² Potential dwelling units calculated assuming 100 dwelling units per re-developable acre.
³ Assumes BAT lanes added along 164th Street SW through the study area.
⁴ Ridership was modeled for a general light rail station location; specific station locations were not modeled and there may be ridership differences between the three candidate sites.
⁵ Costs are planning-level, relative to Sound Transit's "Representative Alignment". Costs are limited to design and construction of additional light rail track and/or parking; right-of-way costs are not included.
⁶ Costs are concept-level and include right-of-way negotiation and acquisition, design, and construction.
⁷ Includes the installation of BAT lanes on 164th Street SW from 36th Ave W to SR 527
⁸ Includes the installation of BAT lanes on 164th Street SW from 36th Ave W to Ash Way and from Meadow Road/13th Ave W to SR 527
⁹ Includes the realignment of Ash Way and Meadow Road, completion of the "Texas T" interchange, and the raising of the existing bridge over SB I-5 by 5' to avoid clearance issues across NB I-5

Figure 3-23. Ash Way/164th Street Station Area Location Comparison Matrix



Notes: ¹ Limited to a ½-mile walkshed.
² Potential dwelling units calculated assuming 100 dwelling units per re-developable acre.
³ Assumes BAT lanes are installed along 128th Street SW/SE the study area.
⁴ Ridership was modeled for a general light rail station location; specific station locations were not modeled and there may be ridership differences between the three candidate sites.
⁵ Costs are planning-level, relative to Sound Transit's "Representative Alignment". Costs are limited to design and construction of additional light rail track and/or parking; right-of-way costs are not included.
⁶ Costs concept-level and include right-of-way negotiation and acquisition, design, and construction.
⁷ Includes the installation of BAT lanes on 128th Street SW/SE from 36th Ave W to SR 527.
⁸ Includes the installation of BAT lanes on 128th Street SW/SE from 36th Ave W to 8th Ave W and from 3rd Ave SE to SR 527.
⁹ Includes the construction of a three-lane segment of 130th Street SW/SE between 8th Ave W and 3rd Ave SE with a two-lane overcrossing of I-5 for transit/HOV.

Figure 3-24. Mariner/128th Street Station Area Location Comparison Matrix

These matrices were used by the County Steering committee to help in reduce the variety of station locations considered earlier down to two for each station area. For the Ash Way/164th Street station area, the potential station near the intersection of 164th Street and Ash Way was eliminated from future consideration, primarily because it offered the lowest potential for transit-oriented development near the station. Similarly, for the Mariner/128th Street station area, the potential station near the 4th Avenue W / 128th Street SW intersection was eliminated from further consideration. This potential station location also offered the lowest potential for transit-oriented development near the station. In addition, this location was anticipated to pose significant challenges in creating good connections to Community Transit's Swift Green Line BRT system, with its close proximity to the congested I-5 / 128th Street interchange.

Based on the information provided in the comparison matrix, the 164th Street and Ash Way alternative was eliminated from consideration. The primary reason for its elimination was that it provided the lowest development potential of any 164th Street configuration. Similarly, at the Mariner/128th Street station area, the lowest rated alternative—4th Avenue—was eliminated from further analysis because of the lower transit-oriented development opportunities it would offer.

4.0 STATION AREA CONCEPTS

The remaining two alternatives at the Ash Way/164th Street Station Area (Ash Way Park-and-Ride, East of I-5) and Mariner/128th Street station area (8th Avenue, 130th Street) were advanced to the refined station area planning stage based on the results shown in the comparison matrix in January 2019.

This chapter explains the additional analysis that went into the development of the final four alternatives. Each alternative was refined based on more detailed analysis for each alternative, and feedback from stakeholders. To assist with conveying a sense of place and location for each alternative MAKERS produced multiple sets of concept renderings. Perteet continued the planning-level evaluation of the station location and light rail feasibility and coordinated with partner agencies. During this stage of station alternative development, these efforts are described and illustrated in section 4.1.

As in the preliminary station area planning phase, the refined station locations were presented for public comment using a third online open house. Additionally, Snohomish County held two in-person open houses to receive feedback on the alternatives.

4.1 Development of Concepts

Beginning in January 2019, MAKERS worked with Perteet and Snohomish County staff to create concepts for each of the station areas. Initial diagrams were penciled out as a group in coordination meetings, and MAKERS carried those graphics through to presentation-level figures. These figures were shared as part of the third online and the in-person open houses. Each of the concepts are discussed in the following pages.

4.1.1 8th Avenue W Station Location

The proposed 8th Avenue W station location would be on 128th Street SW just east of 8th Avenue W. This station location replicates the one identified in the ST3 representative alignment and would be an elevated station. Connections to the Swift BRT Green Line would benefit from a grade-separated crossing of 128th Street SW to allow riders to safely cross the congested 128th Street SW corridor with its three lanes in each direction. ST3 anticipated a park-and-ride for this station. Potential locations are illustrated in Figure 4-1, which provides a street map illustration of the potential station location and associated features. Included in those associated features could be completion of the street grid system in the area to provide alternative routes for both motorized and non-motorized users and creation of a plaza or park as an area focal point.

A benefit of this location includes:

- The light rail station and alignment could be constructed with less right-of-way acquisition than the alternative concept.

Some of the challenges of this location include the following:

- The location on 128th Street SW does not provide a comfortable environment for pedestrians.
- Congestion around the 128th Street SW interchange creates schedule reliability problems for Swift Green Line BRT.
- The park-and-ride location may be at the edge of the desirable walkable distance to the station location.

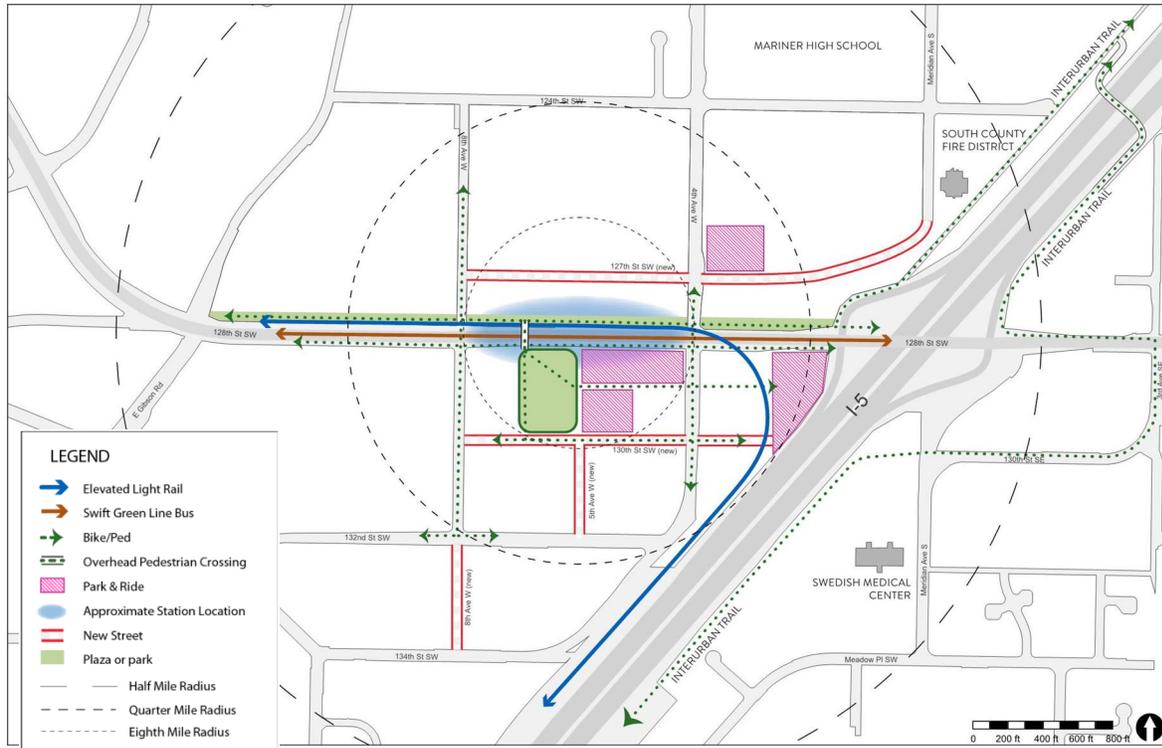


Figure 4-1. Street map illustration of 8th Avenue W Station Location

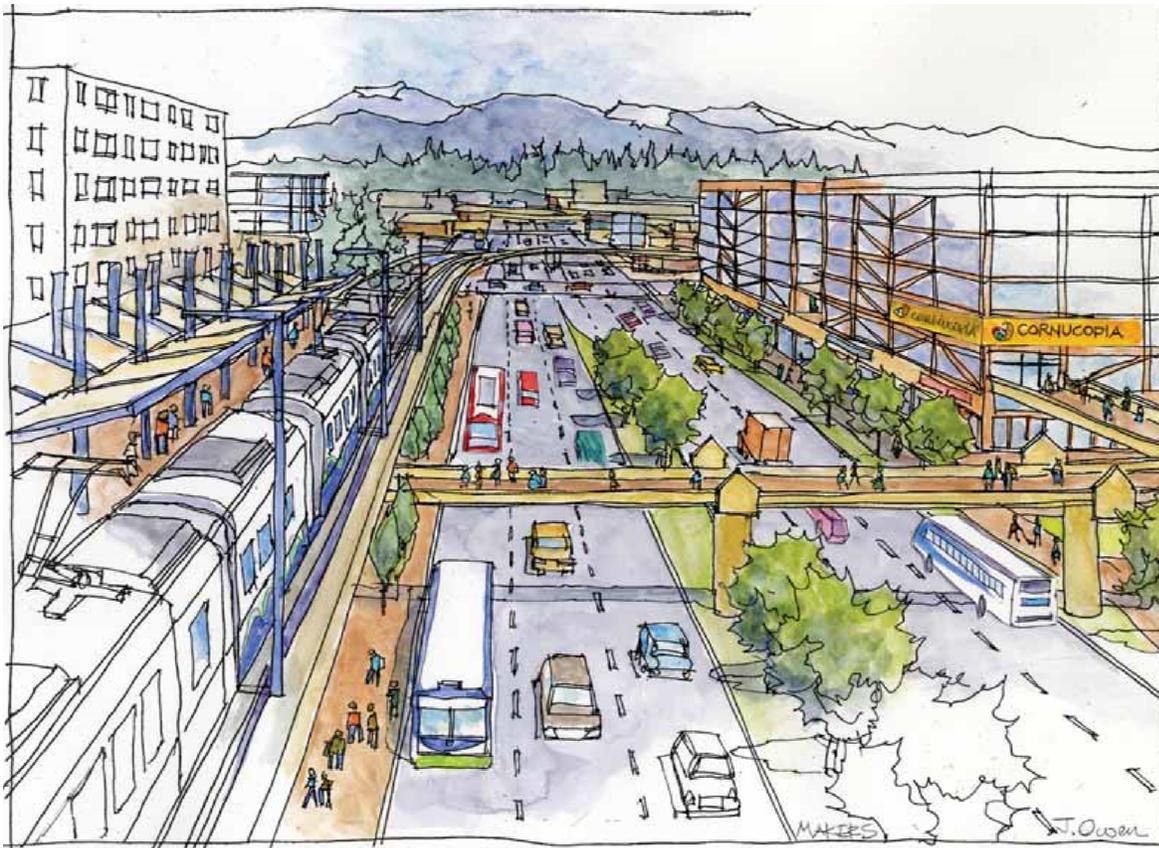


Figure 4-2. Potential light rail station on 128th Street SW near 8th Avenue W, looking east



Figure 4-3. Bird's eye view of potential light rail station on 128th Street SW near 8th Avenue W

4.1.2 130th Street Station Location

The proposed 130th Street station location would be an elevated station perpendicular to the proposed 130th Street corridor between 4th Avenue SW and 8th Avenue SW. Community Transit's Swift Green Line would run on the proposed 130th corridor, with a station directly below the proposed LRT station to allow for easy transfers between the two transit systems. ST3 anticipated a park-and-ride for this station. A potential location is illustrated in Figure 4-4, which provides a street map illustration of the potential station location and associated features. Included in those associated features could be completion of the street grid system in the area to provide alternative routes for both motorized and non-motorized users and creation of a plaza or park as an area focal point.

A benefit of this location includes:

- This alternative provides easy connections between the different transit modes
- Provides an alternative for the Swift Green Line to avoid the congestion in the vicinity of the I-5/128th Street interchange.
- Access to the Interurban trail is easier than the 8th Avenue W alternative (with the completion of the 130th Street corridor)

Some of the challenges of this location include the following:

- Requires construction of the 130th Street corridor.
- Would require additional right-of-way acquisition, disrupting existing land uses.

- Congestion around the 128th Street SW interchange creates schedule reliability problems for Swift Green Line BRT.

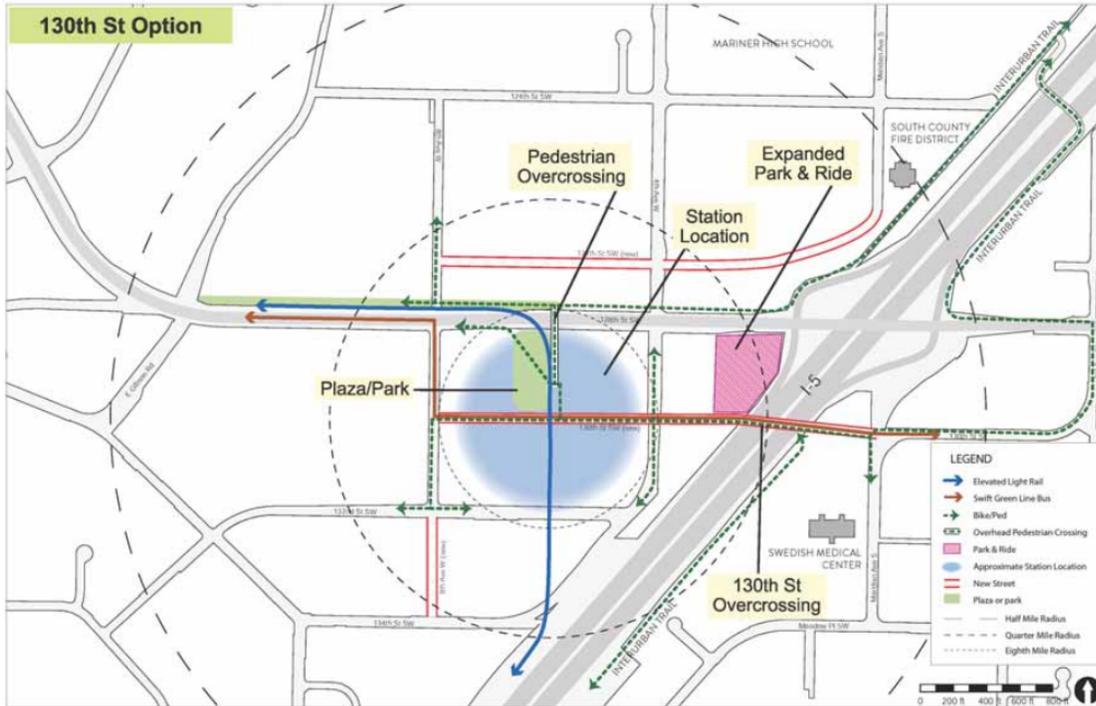


Figure 4-4. Street map illustration of 130th Street Station Location



Figure 4-5. Potential light rail station on 130th Street SW

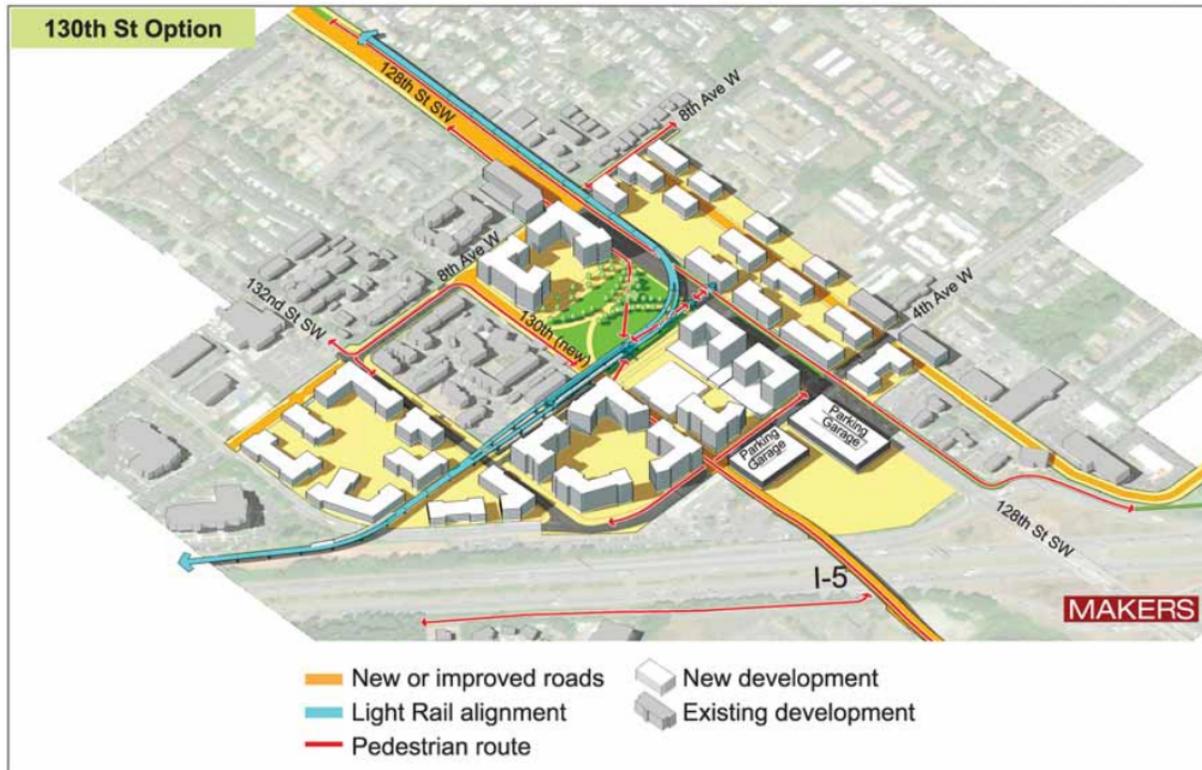


Figure 4-6. Bird's eye view of potential light rail station on 130th Street.

4.1.3 Ash Way Park-and-Ride Station Location

The proposed Ash Way Park-and-Ride station location would be an elevated (or at-grade) station located within the existing Ash Way Park-and-Ride. The current HOV direct access from southbound I-5 would be extended to both side of I-5 creating an overcrossing to provide bus, bike and pedestrian crossing over I-5. Community Transit's Swift Orange line would be relocated off of the 164th Street corridor to use this new crossing of I-5. The section of Ash Way from the Park-and-Ride entrance to 164th Street would be removed and realigned to 162nd Place SW to reduce congestion on 164th Street SW by eliminating turn movements so close to the I-5 interchange. The Park-and-Ride would be redeveloped into structured parking with development above. A centrally located plaza/park would adjoin the station to provide a focal point for the community.

A benefit of this location includes:

- This alternative provides easy connections between the different transit modes
- Provides an alternative for the Swift Orange Line BRT to avoid the congestion in the vicinity of the I-5/164th Street interchange.
- Takes advantage of the land associated with the existing Ash Way Park-and-Ride.

Some of the challenges of this location include the following:

- Requires construction of the new connection across I-5.
- New development north of the station constricts available space for constructing light rail to the north.
- Would reduce the number of stalls available in the Ash Way Park-and-Ride during construction (and possibly take the facility out of service, similar to South Bellevue Park-and-Ride during construction of East Link).



Figure 4-7. Street map illustration for Ash Way Park-and-Ride Station Location



Figure 4-8. View looking east on 22nd Ave W near Ash Way Park-and-Ride

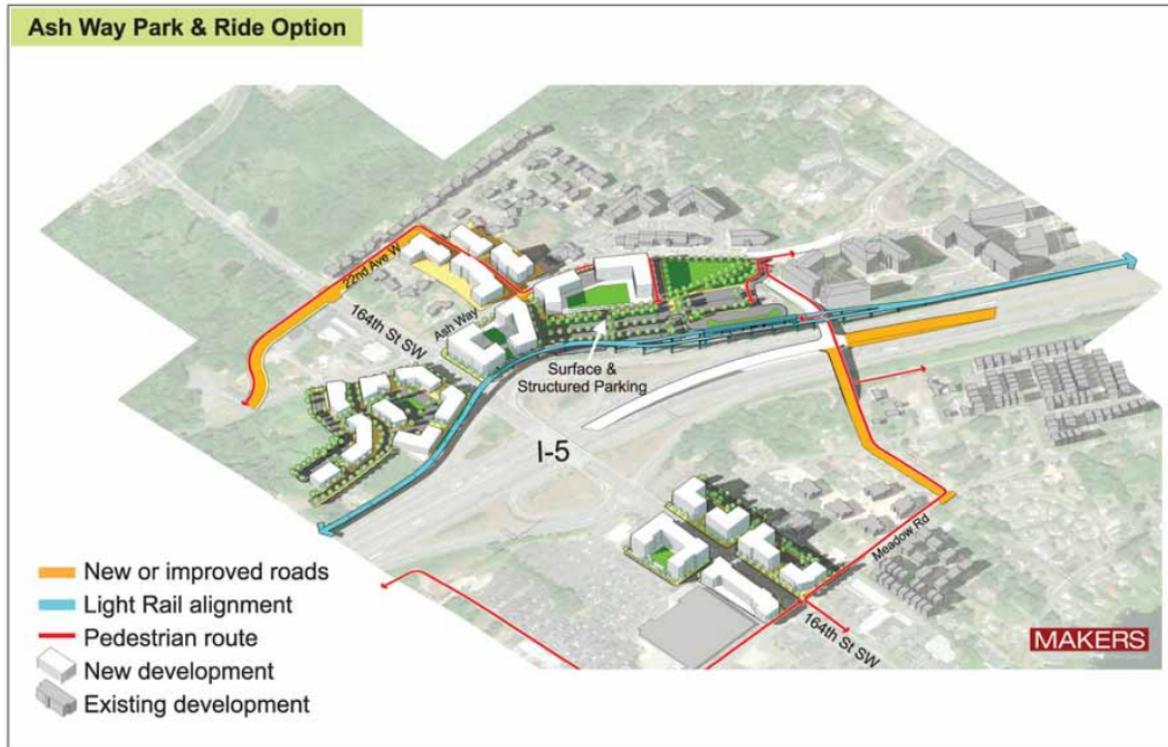


Figure 4-9. Bird's eye view of potential light rail station at Ash Way Park-and-Ride

4.1.4 East of I-5 Station Location

The proposed station would be a below-grade station on the east side of I-5 north of the 164th Street corridor. The Interurban trail would be reconfigured to adjoin the LRT alignment under the 164th Street corridor. The current HOV direct access from southbound I-5 would be extended to both sides of I-5 creating an overcrossing to provide bus, bike and pedestrian crossing over I-5. Community Transit's Swift Orange line would be relocated off of the 164th Street corridor to use this new crossing of I-5. A new road in the 163rd Street corridor would provide a secondary connection between Larch Way and the light rail station. The Ash Way Park-and-Ride would be surplus and redeveloped as transit-oriented development. A new structured Park-and-Ride would be constructed near the light rail station. A centrally located plaza/park would adjoin the station to provide a focal point for the community.

A benefit of this location includes:

- This alternative provides easy connections between the different transit modes
- Provides an alternative for the Swift Orange Line BRT to avoid the congestion in the vicinity of the I-5/164th Street interchange.
- Access to the Interurban trail is easier than the Ash Way Park-and-Ride alternative.
- The existing Ash Way Park-and-Ride can remain in operation while the light rail station and new parking structure is constructed.

Some of the challenges of this location include the following:

- Requires construction of the new connection across I-5.
- Would require additional right-of-way acquisition, disrupting existing land uses.
- Requires two additional crossings of I-5 for light rail.

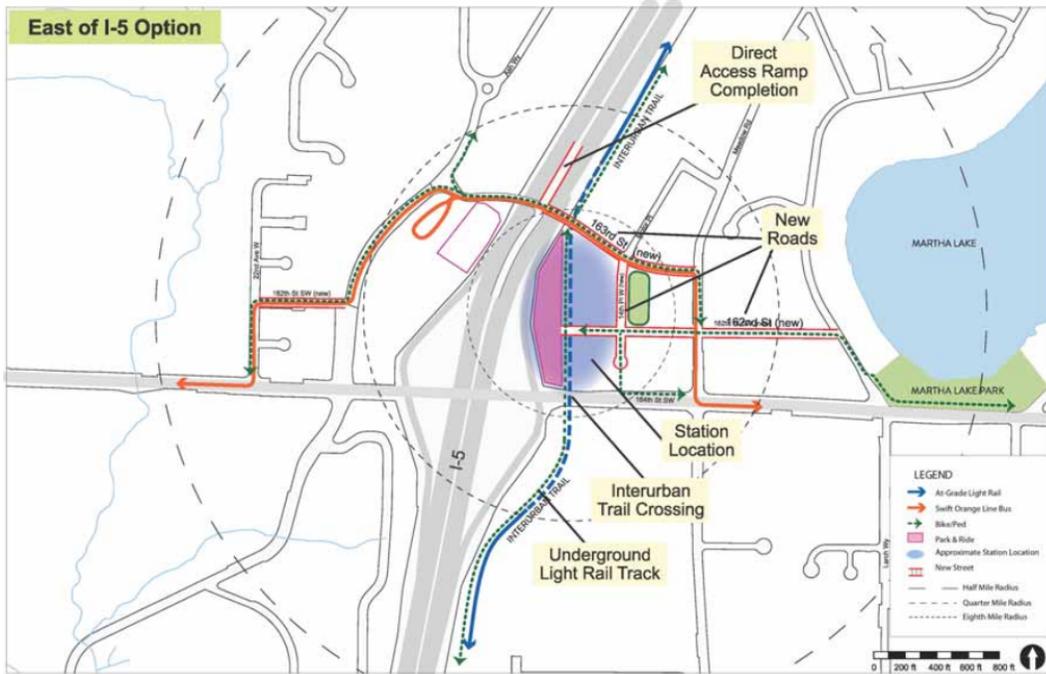


Figure 4-10. Street map illustration for potential station location east of I-5



Figure 4-11. View looking west on new 162nd Street near east side station location

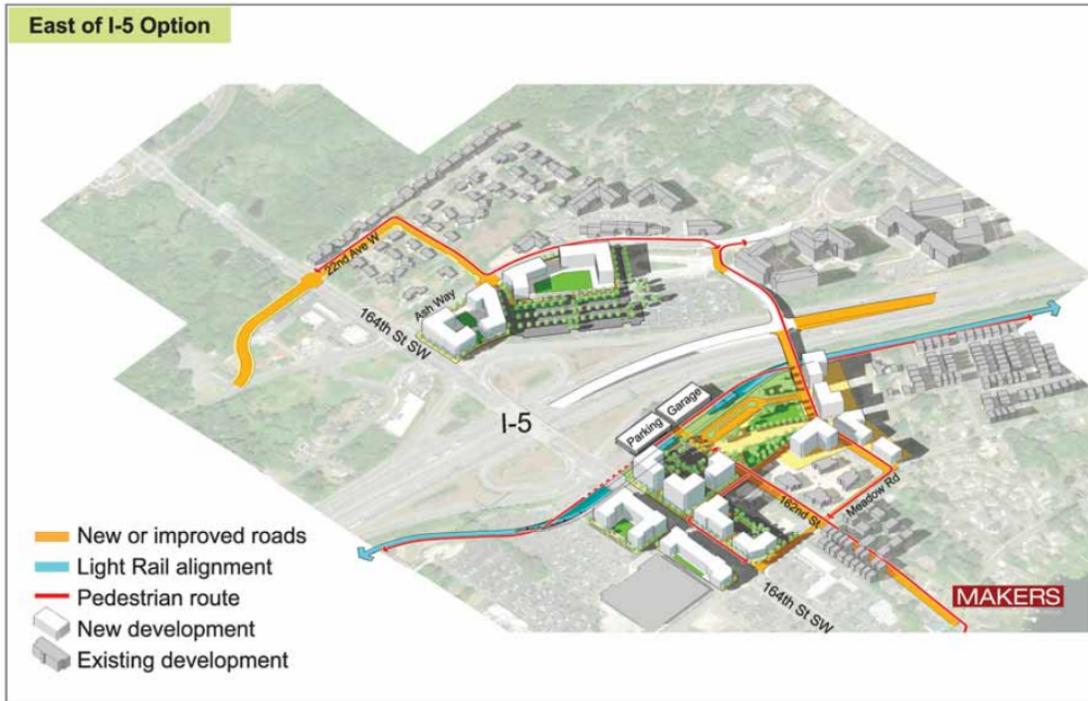


Figure 4-12. Bird's eye view of potential light rail station on east side of I-5

4.2 Online Open House #3 and In-Person Open Houses

The third online open house ran from July 1 to July 31, 2019. Over 3,200 people visited the online open house, with over 1,000 commenting or answering the survey. The in-person open houses were on July 18 at Mariner High School and July 25 at Oak Heights Elementary School. Between the two in-person open houses, these events were attended by 86 people. Information presented online and at the in-person open houses were the same. Attendees were shown the concepts and, for each location, were asked whether concept they would be more or less likely to use the station area, how they would access the station area, and what are their concept preferences in each station area. For the Mariner/128th Street station area, over 90 commenters said they would be more likely to use the station at 130th Street than at 8th Avenue. In total, 62 percent preferred the 130th Street location compared to only 20 percent who preferred the 8th Avenue location. The distribution for where participants preferred the station to be located in the Mariner/128th Street station area is summarized in Figure 4-13.

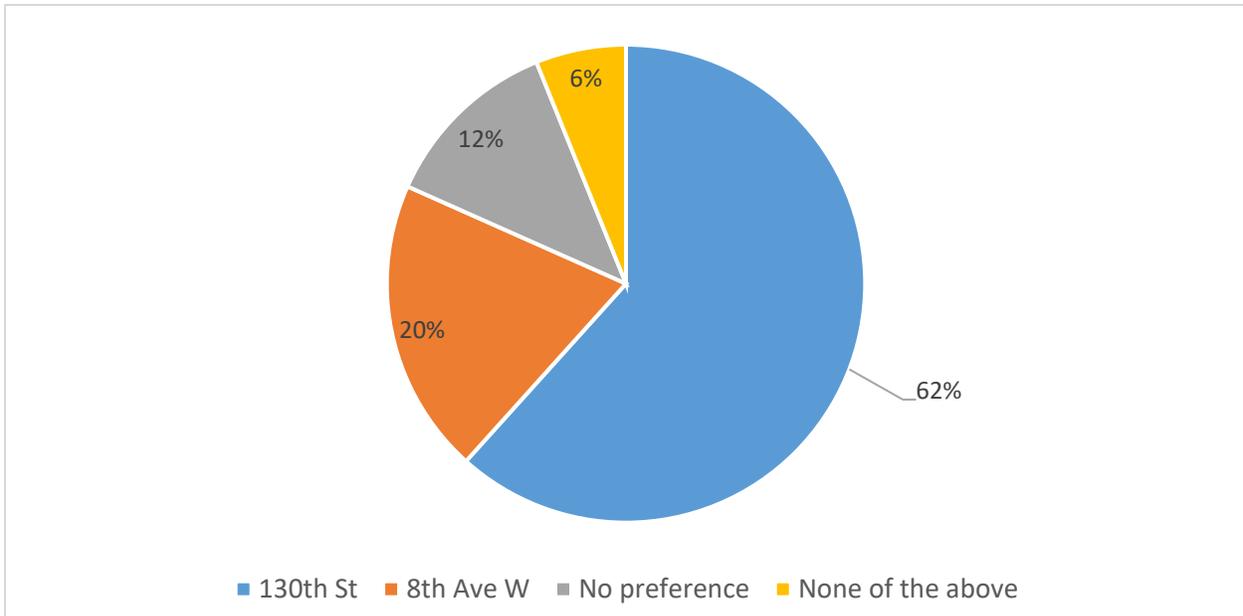


Figure 4-13. Station Location Concept Preference for the Mariner/128th Street station area from Online Open House #3

For the Ash Way/164th Street Station Area, about 40 commenters said they would be more likely to use the station at Ash Way Park-and-Ride than at the East of I-5 station location. In total, 55 percent preferred the Ash Way location compared to 36 percent who preferred East of I-5. The distribution for where participants preferred the station to be located in the Ash Way/164th Street station area is summarized in Figure 4-14.

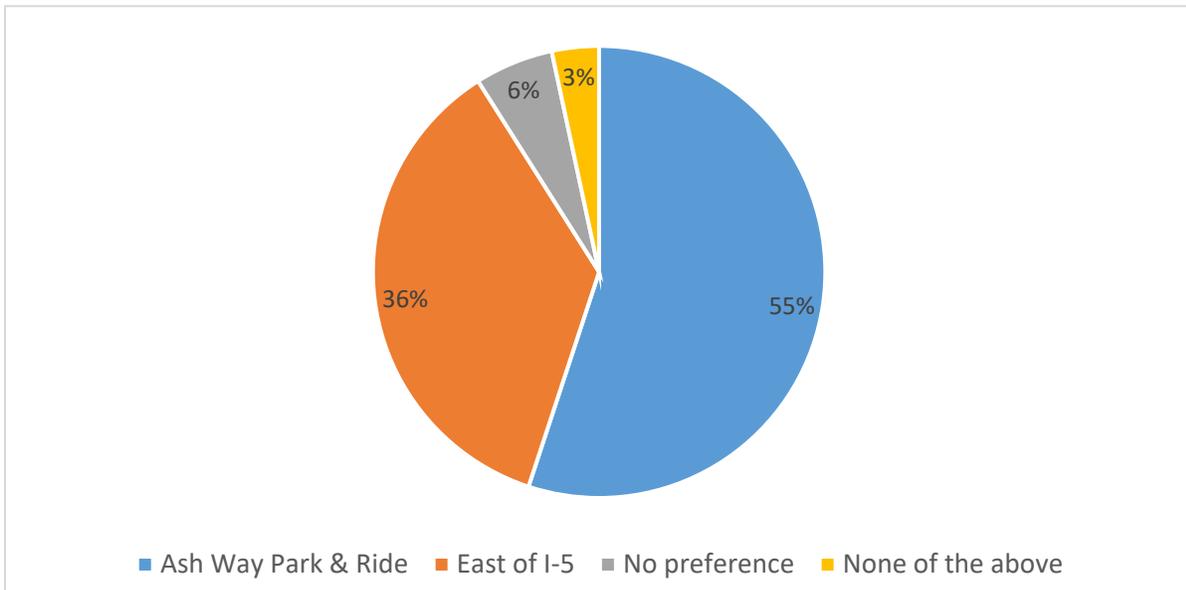


Figure 4-14. Station Location Concept Preference for the Ash Way/164th Street station area from Online Open House #3

At both Ash Way/164th Street station area locations, responders were asked what method they would likely use to access the light rail station, and the most common response was “drive,” by a margin of approximately 40 more the next highest response of “bus.” The full data results are included at the end of Appendix C.

4.3 Light Rail Alternatives Evaluation

Workshop #4

In preparation for the fourth and final project workshop (Workshop #4) on September 26, 2019, the consultant team evaluated an east side of I-5 alternative alignment that would provide access to an East of I-5 station location in the Ash Way/164th Street station area. Perteet created a detailed surface model on both sides of the I-5 corridor of existing ground elevations generated from LiDAR data provided by the County. This surface model was used to model the existing ground elevations along the light rail corridor and then a conceptual alignment was created that complies with the Sound Transit *Design Criteria Manual*. The alignment on the east side of I-5 is within WSDOT and Snohomish County Public Utility District (PUD) right-of-way (which currently serves the Interurban Trail and overhead power lines) instead of being located fully in WSDOT right-of-way as is the representative alignment. During this alignment development process, Perteet met separately with Snohomish County PUD and Sound Transit to gain information about necessary design parameters for the alignments.

After finding a feasible alignment, Perteet prepared high-level opinions of cost to compare the west of I-5 representative alignment to the east of I-5 alternative alignment to assess if a cost difference would constitute a fatal flaw for either alternative. Perteet captured major items like earthwork and track structures at a preliminary planning-level and found that the east side alignment costs would be less than 5 percent higher than the west of I-5 representative alignment.

Perteet prepared roll plots showing the horizontal and vertical geometry used in the alignment evaluation and a summary memorandum providing greater detail on the methodology for the comparison of the two light rail alternative alignments. That memorandum, including the roll plots, is included as Appendix E to this report.

The east side of I-5 alternative alignment information described above, along with the results of Online Open House #3 and In-Person Open Houses was shared with the AST at Workshop #4 on September 26, 2019. At that meeting, Perteet shared their initial ratings of each station option in terms of how each performed in relation to five different categories: transit performance, non-motorized, TOD opportunities, costs, and public opinion. Each category was assigned a weight to recognize that some categories may be important than others, and a score for how well the station alternative (option) met that category. Both the category weight and score ranged from a low of one point, to a high of five points. AST members attending the meeting then individually determined what they thought of how each category should be weighted, and how each station alternative (option) was to be individually scored. At the conclusion of the meeting, each AST member shared their scoring.

On average, the weighted overall scores for each site were closer at Ash Way than at Mariner. Three of the 20 attendees scored the Ash Way Park and Ride better (all by 5 points or fewer), while nine scored east of I-5 higher by 10 points or fewer, and the remaining eight ballots had a score difference of over 10 points.

In general, the attendees did not change their category weights between the Mariner and Ash Way evaluations. However, there were some modifications between the locations. Figure 7, on the following page, shows the count of each weighting option for each metric, as well as which weightings changed between sites.

Transit performance and TOD opportunities generally saw the highest weightings, though cost and non-motorized also had some rankings of 5. Across the board, the group valued transit performance; that weighting was never below 4 at either station location. Non-motorized was also deemed important, with all scores at 3 or above. In general, public opinion was the least valued category with most weights coming in at 2 or 3 and zero at 5. Cost were valued slightly more, with a typical weight of 3, but some in the 4 or 5 range. The average for the

ratings for the two sites at the Ash Way/164th Street station area are illustrated in Figure 4-15, and the average for the ratings for the two sites at the Mariner/128th Street station area are illustrated in Figure 4-16. A complete summary of the meeting can be found in Appendix B.

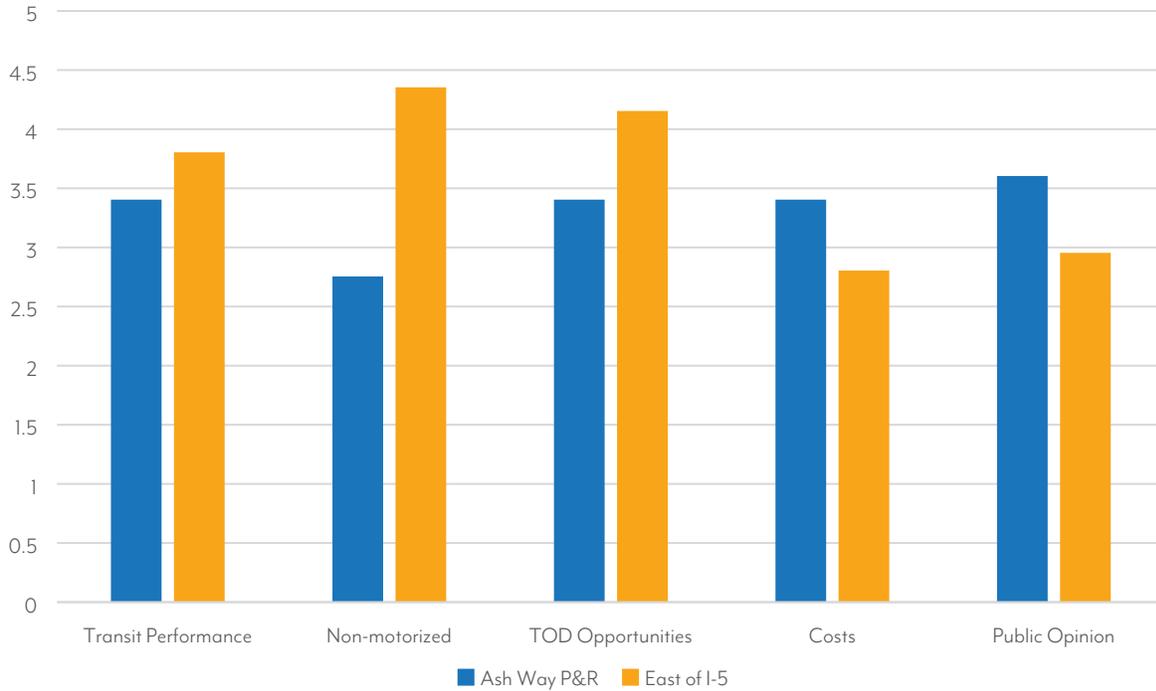


Figure 4-15 Average of Ratings for Ash Way/164th Station Area

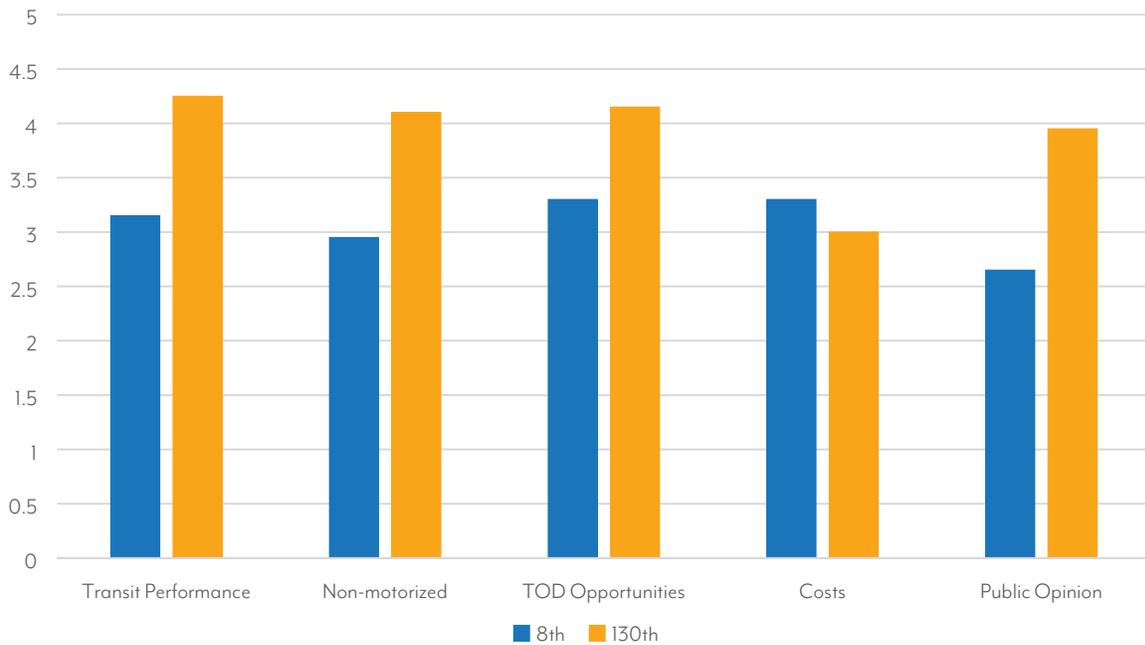


Figure 4-16 Average of Ratings for Mariner/128th Station Area

5.0 STUDY SUMMARY

This study focused on reviewing and narrowing Everett Link Extension preferred station locations for the Mariner/128th Street station area and Ash Way/164th Street station area locations. This study leveraged information from the previous East-West High Capacity Transit project work that considered options to improve connectivity between SR 99 and SR 527 to potential light rail stations. Stakeholders, including Sound Transit, and the public helped narrow down a wide variety of alternative station locations to the refined two alternatives at each station area. The public was able to comment on the planning work at multiple stages of alternatives development, and comments from the public helped shape which configurations were advanced for further analysis.

In order to allow Sound Transit to complete a full environmental process, this report does not recommend a specific station location or light rail configuration within the study area. Two locations are identified at each station area as being worthy of further evaluation in Sound Transit's process to move Everett Link forward.

5.1 Conclusions

The construction of the Everett Link Extension will provide an option for Snohomish County residents to move about the region in a reliable manner. It will have a significant impact on land use near the light rail station locations at the Mariner/128th Street station area and at the Ash Way/164th Street station area, regardless of how stations are configured or where they are located. There are many different factors involved in selecting a specific light rail station site. At the start of this study, County staff and the Agency Support Team (AST) identified the following factors as being the most important when siting a light rail station:

- Good connectivity between the light rail station and bus transit, in particular Community Transit's Swift Bus Rapid Transit (BRT).
- Opportunity to create transit-oriented development (TOD) within no more than a half-mile of the light rail station.
- Provide good connections for pedestrians and bicyclists to access the light rail station—connections to the Interurban Trail in particular.

As noted consistently in public comments and by County staff, BRT and bus connectivity to the proposed station locations will be critical. Transit connectivity was the most frequently listed top priority for online open house responders, exceeding votes for TOD or strong pedestrian-light rail connectivity. County staff and participants at AST meetings also felt that great connections between proposed light rail station locations and BRT are important to connect potential light rail riders. This is especially true when considering the already congested transportation corridors in southern Snohomish County that make it difficult for potential light rail riders to reach park-and-ride facilities in order to board light rail. Community Transit's Swift Green and Orange BRT lines will transport Link riders to and from the light rail system, and the infrastructure that supports that connection can increase or decrease that transfer volume.

Another important element for light rail station ridership will be the opportunity to create density in the form of TOD within a half-mile radius of the station, and ideally within a quarter-mile. Locating a light rail station so that it creates the greatest possible opportunity for TOD is a challenge because of the existing critical areas and the I-5 corridor that minimize TOD opportunities within the desired proximity of the light rail station.

In addition to bus transit, the station designs need to accommodate and promote pedestrian and bicycle connections. Bicycle connections at the light rail station locations to the nearby regional Interurban Trail will provide a great alternative way for potential riders to reach a light rail station. At the Ash Way/164th Street Station Area, the East of I-5 alignment alternative could include a rerouting of the Interurban Trail to avoid the current crossing of 164th Street; the realigned trail could connect directly into the light rail station.

At the Ash Way/164th Street station area, construction of the Ash Way direct access ramps to the north and construction of a bridge across the northbound I-5 lanes to connect to the existing Ash Way direct access structure will improve transit connectivity to the light rail station, regardless of where the station is ultimately located. The new connection across I-5 would also will facilitate TOD on either side of I-5 that is opposite the eventual station location. Completion of the direct access bridge across I-5 to the east will provide a safe and comfortable connection for pedestrians and bicyclists to a light rail station, regardless of which side of I-5 a station is located.

At the Mariner/128th Street station area, the final station location has the potential to complete some of the nearby street grid that is not in place. In particular, 130th Street can be constructed between 4th Avenue W and 8th Avenue W and extended farther east across I-5 to 3rd Avenue. This new 130th Street route will improve Community Transit's Swift Green Line BRT speed and reliability in the area and provide a safe and comfortable option for pedestrians and bicyclists to cross I-5 to reach a light rail station. The 130th Street project would not be required if the 8th Avenue station location is selected for final design.

5.2 Recommendations

Based on the evaluation process documented in this study, there are two viable locations for an Everett Link light rail station in the vicinity of the Mariner/128th Street station area identified in the ST3 representative alignment. The project team recommends additional detailed consideration of a station be considered on 130th Street between 4th Avenue W and 8th Avenue W and on 128th Street SW near 8th Avenue W. The analysis conducted in this study, and input from the public, resulted in a preference for the station location on 130th Street. However, the study also recognizes that additional analysis needs to be conducted to confirm a decision on a final station location.

For the light rail station location in the vicinity of the Ash Way/164th Street Station Area, which was identified in the ST3 representative alignment, the project team recommends that both a station at the Ash Way Park-and-Ride and that a station on the east side of I-5 near the 164th Street interchange be carried forward in future analysis. Costs between a light rail station on the east side of I-5 near the 164th Street interchange and the ST3 representative alignment on the west side of I-5 are of a similar magnitude. The analysis conducted in this study, and input from the public, resulted in a preference for the station location on the east side of I-5 near the 164th Street interchange. The project team recognizes that additional analysis needs to be conducted to confirm a decision on a final station location.

Regardless of where the light rail station is located, good connections to the Swift BRT system is critical to facilitate use of the light rail station to the maximum number of users. At all locations, good bus transit access to the station will require an additional crossing of I-5 to get bus transit out of the busy I-5 interchanges. At the Mariner/128th Street station area, a 130th Street crossing has the potential to directly serve a 130th Street station or an 8th Avenue station. At the Ash Way/164th Street station area, good bus transit access to both locations will require completion of the Ash Way Direct Access ramps across to the east side of I-5.

Snohomish County should continue to partner with Sound Transit on the planning effort for the station locations in south Snohomish County. Doing so will enable the County to stay current on the light rail planning and design process. This will be important to enable the County to be in the best position possible to respond to the land use and infrastructure needs of the final Everett Link Extension design.

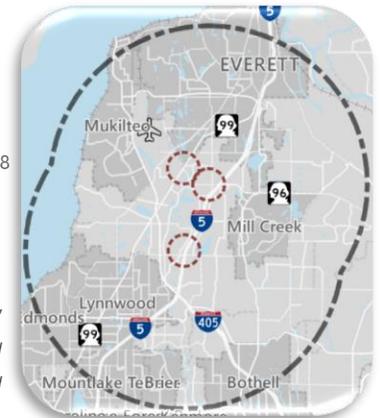
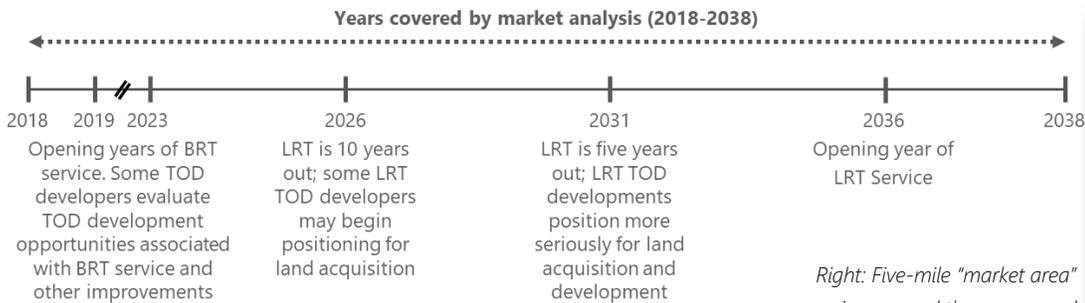
APPENDIX A

Market Planning Summary and Responses to Questions

Snohomish County TOD Market Analysis

This document summarizes the key findings and recommendations of the Snohomish County Light Rail Station Area Planning Market Analysis.

The market analysis covers a 20-year period. Given most developers' near-term focus, developers' response to light rail is likely to be measured until about 2026. The expected 2036 opening date for the light-rail stations means that projects built today will not benefit from LRT for about 20 years. The further we look into the future the amount of uncertainty becomes ever greater, particularly because urban development and transportation are changing faster than ever before. However, near-term development activity in the station areas could increase due to Bus Rapid Transit (BRT), proximity to Paine Field and other activity centers, and ongoing population and employment growth.



General Findings

- Future land uses are likely to cluster near other similar or complementary land uses, with uses that are perceived to be non-complimentary or incompatible, such as residential and industrial, are less likely to develop on adjacent parcels.
- Low value properties near high value properties are the most likely to redevelop because this pairing suggests the location of a valuable amenity (e.g., transit station, attractive neighborhood) that the lower-value properties could capitalize on.
- Building form follows parking and achieving the right volume and type of parking is critical to new development. The market is unlikely to support structured parking on private development in the near term because the high construction cost requires much higher rents. If/when the market improves, structured parked development types may be feasible, but in the meantime, lower parking requirements and creative parking solutions (e.g. shared parking) can mitigate these challenges.
- The station areas have the potential to leverage multimodal connections by connecting with existing bus service, the new BRT lines, and existing and future trails.
- New infrastructure is likely to be built on a project-by-project basis as required by the county. However, increasing connectivity and improving the right-of-way in each station area – the 164th/Ash station area in particular – will help improve the pedestrian environment and encourage alternate means of transportation.
- Significant mixed-use, mid-rise TOD requires the County to be proactive and invest in pedestrian- and TOD-appropriate infrastructure. Recommendations include land acquisition, both with South Transit and on their own, entering into public-private partnerships, actively attracting investment and institutions, and working with Community Transit to build TOD.
- Developable vacant land is limited. The Ash Way Park and Ride is the most compelling location for TOD redevelopment, as are the two mobile home parks in the Mariner Station Areas (but requires affordable housing discussions). In the long-term, light rail construction will involve land acquisition, new parcels, and present prime development opportunities.
- Three TOD case studies were selected with similar characteristics to the proposed station areas (i.e. suburban location, near/adjacent to interstate). They demonstrated that (1) great TOD places are phased and can take many years to fully develop; (2) the highest quality places are often located on perpendicular streets and/or set back from the main arterial; (3) while initial phases may be modest or lower-density, they can set the stage for projects that are more ambitious; and (4) light rail service does not necessarily mean that new development will occur, especially where large format retail exists.

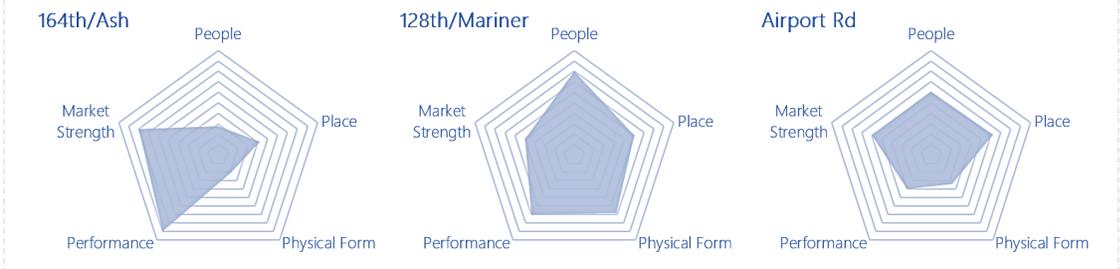
Real Estate Market

The Puget Sound Metropolitan Area is a global metropolis with a diverse and growing industry base of technology, media, manufacturing, and professional services. The strength of the regional market has an important impact on the overall feasibility of new development in the proposed station areas. There has been significant growth throughout the region, with even higher growth within the station areas, which creates demand for new development.

The market area is an **EMERGING** or on the cusp of being considered a **STRONG** market and may be ideally suited for catalytic investments to enhance local market strength. Market conditions in the greater market area appear to support TOD, and recent developments have seen higher rents and absorption rates, indicative of greater market support.

The market is strongest for residential uses, with high population growth rates, rent growth, and low vacancies. Residential will likely continue to be the predominant building type in the area.

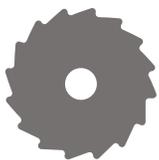
Transit Orientation. The 128th station area is the most ‘well-rounded’ but does not have the same market strength or performance of 164th, while is clearly heavily influenced by the Ash Park and Ride (limiting density, connectivity, and mobility). Airport Road is the least “transit-oriented” station area in its existing state.



Residential development is anticipated to increase because of continuing population growth in the Puget Sound region, new high-capacity transit service and significant momentum from elsewhere in the region. Nationally, infill, TOD, and mixed-use development prospects favor residential development. Since multifamily development is a key component of TOD, this is positive for the prospects of TOD in Snohomish County’s station areas. Single-family residential development is not anticipated in the station areas.



Office is regionally strong, and when commercial service commences at Paine Field, the office market is likely to gain momentum in Snohomish County. We project 20-year demand for an additional 1.33 million square feet in the market area. Considering about 63,500 square feet per year has been built in the market area since 2010, and net absorption has averaged about 120,000 square feet per year during this period, this may be conservative. Office development is unlikely to overtake residential as the primary use in the station areas.



For industrial we project market-area demand for an additional 3.28 million square feet of new industrial/flex development over the next 20 years, with manufacturing comprising over half of total demand. Most of the remaining demand for new industrial demands falls within the industries of wholesale trade, transportation and warehousing, and construction. Major office, flex, and industrial development is likely to continue near established clusters (Paine Field, Bothell Canyon Park) and smaller-scale industrial (Lynnwood, Mukilteo).



Retail is currently undergoing a seismic shift and transformation as traditional brick-and-mortar retailers shut up shop while ecommerce grows, and American buying habits change from goods to experiences. We project total 20-year market area demand for an additional 853,000 square feet of retail. If new households spend significantly more than current households, then an aggressive forecast may be possible. Further, the market area is currently experiencing significant sales leakage, indicating that a significant chunk of new demand is leaving the market area as people shop in more established centers. This is likely to continue.

Station Area Opportunities and Constraints

Opportunities/Strengths	Constraints/ Weaknesses
<ul style="list-style-type: none"> • Growing regional prominence as global market, which is key to driving continued domestic and foreign investment. • High levels of economic growth due to increased wealth in the market, in spite of the high cost of living and doing business. • Availability of a highly educated workforce and a significant density of talent. • Introduction of commercial flight service to Paine Field. • High quality of life with attractive outdoor activity • Puget Sound attractive to Millennials • Shared use parking • Nexus/multimodal hub (BRT, trail systems, bike infrastructure) provides opportunities for shared use parking, dense mixed-use development, and high activity centers. • Development activity shows developer interest/suitability • Strong employment base is positive for commercial and residential demand, and proximity to Paine Field provides immediate opportunities for growth, especially with new commercial service starting in the next two years. 	<ul style="list-style-type: none"> • Lack of affordable housing – an issue that could have a negative impact on future growth. • High general business and living costs, which could become a headwind to future growth if solutions cannot be developed. • High construction costs require rents to be high. • Land supply is limited, requiring costly and sometimes prohibitive redevelopment of existing properties. • Development Prospects, 2018 • Current land use/transportation patterns are difficult to change. • A 20-year horizon will reduce developer near-term interest • Prospective development will face challenging competition from other established centers with superior market metrics. • There are regionally significant differentiators, such as the County as implementing agency, funding, and focus. • Potentially prohibitive transportation, zoning, and parking standards • Lack of experienced local TOD developers • Distance from major office concentration

TOD Opportunities

164th/Ash Way Station Area

- **Build on existing assets**, which form a TOD “nucleus:” the Newberry Square, recent multifamily projects, Ash Way, and the park and ride.
- **Start now.** The County and its partners can look to kick start TOD now and in the near future, well in advance of light rail. This is due to abundant existing transit service, planned Swift BRT service, a reasonably strong market, and the existing TOD nucleus surrounding the Ash Way park and ride.
- **Refine the vision** for the area. In particular, it will be important for the County and stakeholders to identify how the uses and experiences in this station area may be different from other “competing” activity centers, such as central Lynwood, Mill Creek, Alderwood Mall, etc.
- **Capitalize on BRT.** The introduction of Swift BRT could provide a major opportunity to improve the experience of 164th Street for pedestrians, bicyclists, and transit riders. Improving the 164th and Ash Way intersection is a major opportunity, since it could facilitate the extension of TOD development from the north to south sides of 164th Street.
- **Ash Way stormwater management facility** is a significant redevelopment opportunity but would require finding another site within the Swamp Creek watershed. Further study would be needed to understand future potential uses for this wetland.
- **The Ash Way Park and Ride** presents a compelling but challenging development opportunity.
- **Capitalize on natural amenities, particularly Swamp Creek.** Residents and businesses that locate in mixed-use TOD projects place a very high value on open spaces. They will accept more compact private dwelling units and offices partially in exchange for high-quality public open spaces. This should be a regional amenity.
- **Other properties.** Evaluate the potential for the redevelopment of rural/underutilized properties near the Ash Way park and ride. There are properties near the park and ride that could become part of future TOD; however, they are currently used as a mix of residential and low-density suburban/rural commercial. Some properties may be wetlands and therefore undevelopable.
- **Improve Connectivity.** New pedestrian and/or multimodal bridges across I-5 would be beneficial. Such improvements are costly but could be implemented concurrently with the build out of Link light rail.

128th/Mariner Station Area

- **Impacted properties.** Because the light rail line will curve to the west, it is likely to impact numerous properties, and require many property acquisitions. This will present planning and financial challenges for Sound Transit and for some property owners. However, it means that Sound Transit may end up owning properties that could be sold and redeveloped as TOD.
- **Start now but be patient.** The County and its partners should look to kick-start TOD now and in the near future by building off of the Swift BRT Green line. However, the market is not as strong as at Ash Way, and the supply of vacant land is limited.
- **Capitalize on BRT.** The introduction of Swift BRT could provide a major opportunity to improve the experience of 128th Street for pedestrians, bicyclists, and transit riders, through improved stops/stations, wider sidewalks, north-south crossings, median refuges, landscaping, signage, street furniture, street lighting, and other features.
- **Workforce and Mixed-income TOD.** LCG believes there is an opportunity to work with Housing Authority of Snohomish County (HASCO), and/or other workforce and affordable housing developers, to build a high-quality housing project proximate to the Green Line. As stated, this should be an attractive residential location for some Paine Field employees. Such a project could establish an initial, first phase of TOD place making in this area.
- **Park and Ride.** The Mariner Park and Ride, like the Ash Way Park and Ride, could be a TOD redevelopment opportunity. However, due to its smaller size, and the fact that it could be located some distance from the light rail station, it may be a less transformational redevelopment site.
- **Redevelopment following light rail.** Long-term (concurrent or after the construction of Link light rail), Sound Transit is likely to acquire numerous properties, then sell in order to build TOD. The County should work with Sound Transit in this endeavor.
- **Paine Field Commercial Service.** Alaska Airlines, Southwest Airlines and United are all expecting to begin commercial service out of Paine Field in Everett beginning in 2019. This—together with the Green Line—could have a positive impact on demand for housing and lodging, and potentially other uses.

Station Area Existing Conditions and Planning Context

	164 th /Ash Way Station Area	128 th /Mariner Ave Station Area
Transit Connections	Served by many transit lines, connecting to regional activity centers. Swift Orange (2023) and Green (2019) BRT lines will increase connectivity and can help improve 164 th streetscape.	Served by many transit lines, connecting to regional activity centers. Swift Green line (2019) will increase connectivity and can help improve 128 th streetscape.
Multifamily Dev't.	Significant capture rate of regional MFR development. Market momentum.	Significant new development east of I-5, older properties west of I-5. Weaker multifamily market.
Commercial Dev't.	Auto-oriented, single story development on the east, which is challenging for TOD. Existing TOD-style commercial on West is connected to multifamily and forms a "nucleus"	Existing auto-oriented commercial appears healthy but expected to struggle in the future. Industrial properties may be displaced and redeveloped during light rail construction.
Light Rail	West-side alignment and station.	West-side alignment (on 128th St between 4th and 8th Avenues, or on 4 th Avenue) due to better-connected road grid, and light rail route towards Paine Field.
Station-specific 20-year Development Forecast (Aggressive/high-end projections shown below)		
Housing (units)	1,400 units: Highest-density TOD contingent on redevelopment of properties close to Ash Way Station, including park and ride and stormwater facility.	800 units: Redevelopment will be required as there are few vacant sites. Redevelopment is most likely on sites that are commercial, industrial, or publicly-owned.
Office (sq. ft.)	50,000 square feet: White-collar, neighborhood serving and/or medical office	100,000 sq. ft.: Increased demand due to commercial service at Paine Field
Retail (sq. ft.)	150,000 square feet: Potentially grocery (on 164 th), food and beverage, neighborhood serving, entertainment, other.	80,000 square feet: Redevelopment and intensification of existing commercial on 128 th .
Other	Potential for connections with Edmonds Community College, UW Bothell, etc. Make Swamp Creek natural area an open space amenity that is connected to new TOD. County leadership and funding tools needed to invest in infrastructure and redevelopment activities. Extend high-quality Ash way improvements south.	Potential for more healthcare uses near the Swedish Medical Center. Additional lodging is possible as Paine field commercial service accelerates. Craft industrial development may occur. County leadership and funding tools needed to invest in infrastructure and redevelopment activities.

Snohomish County TOD Market Analysis

Additional Questions and Answers

Date December 7 2018
To Snohomish County
From Brian Vanneman and Sam Brookham,
Leland Consulting Group
Project Snohomish County Light Rail Station Area Planning



Introduction

Following the completion of a Market Analysis for the Ash, Mariner, and Airport/Highway 99 light rail station areas early this year, Leland Consulting Group (LCG) received a series of follow up questions from Snohomish County staff. The County's questions, and LCG's answers, are shown below.

How would a greater frequency of light rail trips at both the Mariner and Ash Way stations, when compared to the three stations north of Mariner, affect redevelopment potential?

- **All Stations North of Mariner.**
 - The light rail stations that we are aware of that are proposed to the north of Mariner are listed below. We assume this question pertains to the three stations listed in bold below:
 - (Everett Station/Central Everett)
 - **SR 526/Evergreen**
 - **SW Everett Industrial Center**
 - **SR 99/Airport Road**
 - Of these stations, Leland Consulting Group (LCG) only reviewed the conditions at the Airport Road station; and we reviewed the Airport Road station in less detail than the Mariner and Ash stations, in part because the Airport Road station is potential/proposed.
- **Effect of Transit Frequency on TOD.**
 - Transit frequency is one input into the Transit Orientation model used in the Market Analysis, and therefore, greater frequency would be expected to have a positive impact on TOD at all stations.
 - The five TOD measures used are People, Place, Physical Form, Performance, and Market Strength. Frequency is a component of (Transit) Performance. In addition to frequency, other factors that should increase transit Performance include hours of operation, and quality of transit stations and vehicles.

- According to Metro (Portland), “High quality, frequent bus and rail service makes public transportation a more reliable means of getting around and can be correlated to stronger and emerging market categories.”
- According to the Transit Cooperative Research Program (TCRP), “Transit service improvements and system upgrades can trigger TOD activities, especially in settings with expensive housing markets and a pent-up demand for transit-oriented living. “Choice” transit users are highly sensitive to service quality; therefore, running frequent and reliable trains and minimizing the need to transfer can be critical to the future of TOD. (*Transit Oriented Development in the United States* (Report 102), TCRP, 2004.)
- **SR 526/Evergreen and SW Everett Industrial Center Stations**
 - LCG did not carefully review conditions in these station areas as part of our market analysis, and therefore it is difficult to opine on the likely impacts of greater frequency at these stations. However, some notes on these station areas are included here.
 - **SW Everett Industrial Center Stations (Paine Field)**
 - This station area has an industrial/aeronautics character. Many properties are large, industrial properties. As shown in the market analysis report, this station area and surrounding areas are major employment destinations and the locations of thousands of jobs. Due to the size of properties, discontinuous road networks, and dispersion of jobs, “last mile” transportation solutions (which make connections from the station to the front door of employment or residential sites) will be important here. In 2019, airlines are expected to begin offering general commercial service/passenger flights to Paine Field; this has the potential to significantly change the market dynamics in this station area. The station area is largely or entirely located within the City of Everett.
 - In general, TOD nationwide has tended to be driven by mixed-use (housing over commercial) development. Some households will be attracted to this area, given the proximity to jobs; however, there will be significant challenges to developing mixed-use projects, including zoning and regulation; (industrial) uses that are not mutually supportive with housing; a lack of residential amenities in the area; and large and valuable properties that will be economically and logistically difficult to displace.
 - TOD can also be driven by office, lodging, and other types of employment/commercial development. These uses, particularly lodging, and to a lesser degree office, are attracted to commercial airport locations. However, development of these uses may also be challenged by current zoning; existing large, occupied properties that may be difficult and costly to displace; and other factors.
 - Therefore, this station area deserves careful study. It is also reasonable to assume that some zoning/regulatory changes are in order, to at least allow for a range of development types.

- SR 526/Evergreen
 - This station area appears to share some physical characteristics with the Mariner and Ash stations: a grade-separated highway (526); large arterial roads; few arterial crossings of the highway; a mix of land uses including retail/commercial, single and multifamily residential, and other (school) land uses; and a lack of local-road connectivity. The station area is located within the City of Everett. More study would be needed to understand market dynamics in this location, and specific development opportunities.

How would more transit service and automobile traffic at the Mariner Station due to riders avoiding the light rail segment between Everett and Paine Field, affect redevelopment?

- **Premise**
 - Our understanding is that a premise of this question is that travelers (particularly, south-bound travelers) seeking to avoid the (“detour”) light rail segment between Central Everett and Paine Field might drive to Mariner Station, park, and ride transit from Mariner, rather than board to the north. This seems like a reasonable premise.
- **Effects of more automobile traffic at Mariner**
 - LCG sees several potential impacts of more automobile traffic in the Mariner station area:
 - **Greater demand for parking.** If more drivers are driven to Mariner to park and ride, this might mean more demand for more parking spaces. This could mean more land would be required for surface parking lots. However, it is more likely that it would mean more demand for spaces in a parking structure.
 - LCG does not necessarily see more demand for more parking spaces as a negative, as long as the location of these parking spaces does not preclude mixed-use development, which is a key critical component of TOD. Surface lots are undesirable in TOD. Parking structures can be compatible with TOD, as long as they are sited and designed properly, and integrated with nearby mixed-use development.
 - Great parking demand can also be mitigated and managed, by charging for parking, expanding transit service over time, and other measures. For example, if demand for park and ride spaces exceeds the supply, the price of parking can be increased. This will encourage some travelers to take other actions, such as starting their rides at stations further to the north.
 - **More auto traffic at the station.**
 - LCG believes that auto traffic caused by those traveling to the park and ride is likely to be a small share of overall auto traffic in the station area. This assumption could be further evaluated through transportation modeling.

- More auto traffic can have both positive and negative impacts on TOD. Positive impacts include increasing visibility and accessibility, which is usually seen as a benefit by developers of retail, office, and multifamily apartment projects. Conversely, wide arterials with high levels of traffic, congestion, and speeds, can reduce the quality of place and pedestrian-orientation, and reduce the desirability of a place for TOD. Because LCG believes that auto traffic caused by those traveling to the park and ride is likely to be a small share of overall auto traffic in the station area, we believe that the negatives can be managed at Mariner if transportation facilities and development is thoughtfully planned.
- Effects of superior service at Mariner on other stations to the north
 - As discussed above, TOD residents are likely to seek out station areas with better transit service. Therefore, potential TOD residents are likely to prefer the Mariner station compared to other stations to the north, where service will not be as frequent.

Of the five areas noted in the Transit Orientation (pentagon diagram), which ones could be most easily influenced or implemented by Snohomish County?

The Market Analysis relies on five measures of Transit Orientation: People, Place, Physical Form, Performance, and Market Strength. These are shown below. "Summary and Metrics" briefly describes what these measures are and some ways that they can be measured. "Influence Rank" shows which measures the County has the greatest opportunity to influence; 1 indicates the highest opportunity and 5 indicates the lowest. The measures have been ordered from highest to lowest rank. "Rationale" describes LCG's rationale for the ranking.

Measure	Summary and Metrics	Influence Rank	Rationale
Physical Form	<ul style="list-style-type: none"> • Connectivity. • Street intersections per square mile. • Pedestrian and bicycle facility density. 	1	<ul style="list-style-type: none"> • The County and other governments typically design, fund, and build major transportation improvements, including roadways, sidewalks, bicycle facilities, signals, and crossings. The County also has the power (via their zoning and land use approval process) to require private developers and other parties to build smaller transportation projects such as local roads, sidewalks, etc. The County may also work with other parties such as Sound Transit and WSDOT to plan and make transportation improvements. The County could also form a Public Development Authority (PDA) or comparable public corporation to organize planning and construction of public right of way improvements. • Naturally, the County's capacity to effect changes to physical form are constrained by the County's budget and other factors, however, improvements and

			alterations to the physical forms of the station areas are a core County/government function.
Place	<ul style="list-style-type: none"> • Number of destinations that can be easily accessed. (Walk Score). • Special destinations and amenities. 	2	<ul style="list-style-type: none"> • Public amenities and destinations. While LCG often emphasizes the types of places that are built by the private sector (e.g., coffee shops, grocery stores, etc.) some “special destinations and amenities” are typically built and operated by public agencies. These include parks, plazas, multiuse paths, open spaces (including natural areas and habitat), schools, libraries, community centers, and other destinations. The County (along with other public agency partners) can influence the location of these places and could seek to locate them in station areas. • “Third Place” amenities and destinations. The County can also influence the location of other amenities and destinations, which are sometimes called “third places” (implying that home and work are the primary places that people spend their time). These third places can include grocery stores, coffee shops, other retail, restaurants, and cultural and entertainment facilities (all of which are components of Walk Score). <ul style="list-style-type: none"> ○ A Supportive Planning and Regulatory Environment is one way to incentivize or require transit- and pedestrian-oriented commercial uses. This can be accomplished via the zoning code (including incentives or requirements), overlays, a planned action and Environmental Impact Statement (EIS), or other regulatory means. Also, simply having a clear, adopted TOD plan and vision for the area provides clear direction for developers and begins to “make the right thing easy.” ○ Public Land. Another way to incentivize these uses to locate in a station area is via the development of publicly owned land. There are a number of existing publicly-owned properties in the station area (and the potential for additional future acquisitions for right-of-way or development). These could be developed via a public-private partnership, with the private partner being required to build a grocery store (for example) or other use. The agencies most likely to own public property are WSDOT, Sound Transit, and the County.

			<ul style="list-style-type: none"> ○ Public Infrastructure/Investments. Public investments (transportation, utilities, public places, other) should be designed and targeted to lead to more pedestrian and transit-oriented “places.” For example, a new roadway investment could be coupled with a zone change requiring some ground-floor retail, or be placed in a location where the County knows that private developers are strongly considering TOD type redevelopment. ○ Other strategies. It may also be possible for the County to work with private developers seeking to redevelop their property with TOD features to incorporate desired “places” into their projects; it is possible this would be a win-win outcome. ○ Additional approaches to increasing the likelihood that “places” will be developed in the station area can be found in the Encouraging TOD section of the Market Analysis, and in the Implementing TOD (Sources) section at the end of this document. The range of incentives and actions above are described in the PSRC’s Growing Transit Communities strategy report.
<p>Performance</p>	<ul style="list-style-type: none"> • Transit service quality. • Number of trains/buses per day. 	<p>3</p>	<ul style="list-style-type: none"> • While the County cannot mandate changes to transit service quality, it can work with the primary transit providers in the area, Sound Transit and Community Transit (as well as Everett Transit). • In LCG’s experience, transit agencies are most likely to implement service enhancements that will be embraced by riders and lead to more ridership, and/or are supported by other public agencies and private business. If possible, the County should seek to demonstrate that enhanced service is likely to be mutually supportive with area-wide growth and station-area TOD, and is likely to increase ridership. • One case study featured by WSDOT is Portland’s Lloyd District, where over the course of 20 years, a private business association lobbied for much improved transit service along with major new real estate development (See Sources section for details.)

<p>People</p>	<ul style="list-style-type: none"> • Population and Employees 	<p>4</p>	<ul style="list-style-type: none"> • The County cannot directly control the number of residents or employees in the station areas. Decisions about the location and amount of housing and commercial development are made by private sector actors, however, they can be influenced by the County in the same types of ways that are listed in the “Places” section above. Strategies include: <ul style="list-style-type: none"> • Supportive Planning and Regulatory Environment. Having a completed planned action, Environmental Impact Statement (EIS), and SEPA review that allows for significant housing and employment development, and shows how the impacts of this development will be mitigated, is important. • Leveraging Public Land; and, • Leveraging Public Infrastructure and Investments.
<p>Market Strength</p>	<ul style="list-style-type: none"> • Population and employment growth. • Rents and sale prices PSF. • Vacancy 	<p>5</p>	<ul style="list-style-type: none"> • Improvements to the Physical Form, Places, Transit Performance, and People factors should lead to improved Market Strength within the station areas. Data show that residents and businesses will pay more (reflecting stronger real estate fundamentals) for locations that are amenity-rich, walkable, and connected to major employment locations via transit. Therefore, this will be an outcome of other actions rather than the focal point for early phase County actions. • Some components of market strength (e.g., regional job growth and business expansion, regional population growth) are difficult for the County to influence and are far beyond the geographical reach of a station area plan.

What factors or criteria are used to draw conclusions about the effect that bus rapid transit will have on redevelopment in the station areas in the short term?

- Numerous studies have been conducted that demonstrate that BRT can have a significant positive impact on redevelopment outcomes. These include:
 - *More Development for Your Transit Dollar, An Analysis of 21 North American Transit Corridors*, The Institute for Transportation and Development Policy (ITDP), 2013:
 - **“Per dollar of transit investment, and under similar conditions, Bus Rapid Transit leverages more transit-oriented development investment than Light Rail Transit or streetcars.** Cleveland’s HealthLine BRT and Portland’s MAX Blue Line LRT leveraged the most overall TOD investment of all the corridors we studied — \$5.8 billion and \$6.6 billion, respectively.
 - Yet, because the HealthLine BRT cost significantly less to build than the MAX Blue Line LRT, Cleveland’s HealthLine BRT leveraged approximately 31 times more TOD investment per dollar spent on transit than Portland’s MAX Blue Line LRT.
 - Both BRT and LRT can leverage many times more TOD investment than they cost. Of the 21 corridors we studied, 14 leveraged greater than \$1 of TOD investment per \$1 of transit spent. Five of them were BRT, four of them were LRT, two were streetcars, and three were improved bus (non-BRT) corridors.”
 - This ITDP report found that the following factors, in order of importance, were the most likely to lead to significant TOD:
 1. Government support, including leadership and regulation;
 2. Market conditions;
 3. Transit quality and service
 - *Developing the Next Frontier, Capitalizing on Bus Rapid Transit to Build Community*, Urban Land Institute Seattle, 2011, Based on a review of BRT projects in Kansas City, the Twin Cities, and Cleveland, this report (focused on King County) found that:
 - “Arterial BRT can be an important economic and community development tool.
 - ‘ Project partners and champions drawn from a diverse group of public and private stakeholders, including the real estate community, are essential.
 - ‘ Arterial BRT has the potential to become an organizing catalyst that helps focus market demand for higher-intensity development.
 - Another relevant report is *Bus Rapid Transit: Projects Improve Transit Service and Can Contribute to Economic Development*, United States Government Accountability Office (GAO), 2012.
 - In addition to the above studies, LCG’s experience has been that high-quality bus transit service is one of the amenities that can encourage developers to build mixed-use development. For example, LCG has worked with developers building mixed-use projects along frequent service bus lines in the Portland region; the Millenia project in Chula Vista, CA, a LEED Neighborhood project that is served by BRT (<http://www.millenciasd.com>); and developers looking to connect

their projects to the Orange Line BRT in the Twin Cities region. In order to achieve the maximum impact, BRT should be implemented along with a range of streetscape and station-area improvements, signage and branding, and the other improvements to People, Place, and Physical Form.

How would the enactment of the following affect redevelopment?

The County provided a list of “implementation actions” to LCG. We have reordered these actions (in general, from most likely to positively impact TOD, to least likely), and we have added some implementation actions of our own.

Creation of a Public Development Authority (PDA) or Similar Implementation-Oriented Authority

Significant impact.

LCG’s experience is that realizing high-quality TOD requires an organization that is focused on achieving that outcome, including dedicated staff with expertise in development and land use planning, a board or other leadership advisory group, the ability to secure expertise and resources from other parties (e.g., Sound Transit, PSRC, State, others), dedicated funding, and other resources. Simply put, achieving TOD at the Ash and Mariner stations (or other stations) needs to be someone’s job, or it may not happen.

A PDA or similar TOD implementing authority is particularly necessary for county governments, because the focus of county governments is dispersed over large and diverse geographical areas; and because the design standards, public infrastructure design, and nature of public-private partnerships differs significantly in the general county development environment versus TODs. Roads, sidewalks, lighting, bike lanes, building setbacks, frontages and heights, and other features are all different in TODs when compared to the general county environment.

The Contra Costa Centre in California, one of the case studies featured in the market analysis, is the most successful county-led TOD projects that LCG is aware of. This TOD was made possible by the creative and proactive work of the Contra Costa County Redevelopment Agency, an agency whose sole focus is on the TOD area.

Development of a Subarea Plan and Planned Action EIS

Potentially significant impact.

A well-executed subarea plan and planned action EIS can accomplish a number of goals:

- Establish a clear, well-defined, and widely supported vision for the subarea (station area).
- Create a graphical plan that shows where development will occur and where public infrastructure and investments will take place.
- Define a development strategy that shows how publicly owned properties such as park and rides and surplus ROW will be redeveloped as TOD.
- Modify zoning and comprehensive plan designations to ensure compatibility with TOD;

- Completing a planned action environmental impact statement (EIS). On goal of a planned action EIS is to simplify and expedite environmental review of future individual (TOD or infrastructure) projects in a study area, by providing information about environmental conditions, potential development impacts, and mitigation measures.
- Provide cost estimates for key public infrastructure investments, and phased investment and action plan.

Construction of a public parking structure

Significant impact.

A parking structure can encourage TOD in several ways.

First, it can consolidate existing surface parking, which can free up major publicly-owned properties (owned by WSDOT, Sound Transit, or others) for mixed-use TOD. Less surface parking can also translate into a better pedestrian-scaled environment in which TOD is typically found.

Second, parking structures that accommodate transit riders' cars during the day can be shared with other users, particularly residents of adjacent multifamily residents, who need the parking at night. This leads to a lower parking requirement for multifamily or mixed use projects, and enhances their financial feasibility. Such an approach has been used at the Orenco Station TOD in Hillsboro, Oregon, and other urban infill projects. County policy should allow for shared parking between uses that have different peak parking demand hours (e.g., park-and-ride or office, and residential).

While the impact of a parking structure can be significant, the cost is also significant. LCG recommends that the County look to Sound Transit, WSDOT, or another party to bring the capital necessary to construct a parking garage.

Existing requirement parking minimums should also be analyzed and potentially reduced.

In particular, LCG believes that the County's residential parking minimums (1.5 stalls per unit for units larger than 1,000 square feet, and 1 stall per unit for units smaller than 1,000 square feet) could be reduced within the station areas. Numerous TOD projects have been built around the country with lower parking ratios.

Minimum parking standards for restaurants, retail, and office uses appear to be appropriate for TOD, but should be reviewed. In addition, the County should allow for parking reductions for uses that share parking.

Inclusionary housing

Mixed to negative impact.

Inclusionary housing may help to produce more workforce or affordable housing units.

However, inclusionary housing requirements also reduce developers' revenues. In order to meet their return targets, they will tend to increase the cost of the other housing units. If this is not possible (i.e., the market will not support higher rents), then developers will decide not to build marginal projects. In other words, inclusionary housing policies can reduce the amount of TOD and total housing units delivered. Therefore, the economics of inclusionary housing proposals should be studied carefully before being implemented.

Effective inclusionary housing policies will provide cost reductions for developers (e.g., impact fee reductions, property tax abatements, other) in order to offset lower revenues.

Green building/LEED Certification.

Mixed impact.

LCG recommends that the County provide *incentives* rather than *require* green/LEED buildings in the station areas. This is because the economic feasibility of higher-density, mixed-use TOD in these locations is currently marginal, and adding additional costs associated with documentation, study, and compliance could deter development.

Requiring green/LEED buildings could result in some high-quality and more sustainable development, but it will likely also result in *less overall TOD* within the 20-year period considered in the Market Analysis.

The concept of LEED ND (LEED Neighborhood Development) or a similar area-wide sustainability framework, could also be explored through a subarea plan. This designation goes beyond buildings to the entire station area, and considers aspects of sustainable development such as multimodal connectivity, access to natural areas, etc.

Increased building height beyond current code requirements.

Minimal impact in the next 10 years.

LCG's understanding is that the current Urban Center (UC) code allows a base maximum height of 90 feet, and that an additional 35 feet may be approved if the project is within 1/8 mile of a transit station or center. Therefore, projects in parts of the station areas could be up to 135 feet tall (twelve or potentially thirteen stories). Ground floor residential units are required to be 13 feet tall in order to be able to be converted to commercial later.

The County may want to expand the 35-foot bonus area to within 1/4 or 1/2 mile from the station.

LCG does not anticipate that this height maximum will constrain development, at least not in the next decade. This is because LCG anticipates that mid-rise mixed-use development (often five stories of wood-frame housing over a two-story concrete parking and commercial podium, or seven stories to a maximum of eight stories if allowed by building code) would be the tallest development type in the station areas. High rise buildings, which require more concrete and steel building materials, more stringent building codes, more core elements (stairways and elevators) are more expensive and are not expected to be built within the 20-year market analysis horizon.

Doubling of current FAR allowances

Significant impact.

Current FARs permitted in the Urban Center (UC) areas are shown below.

	Minimum FAR	Maximum FAR	Maximum with bonuses
Mixed use	0.5	1.0	3.75
All other Development	0.5	0.75	2.5

LCG believes that the Maximum (by right) FAR figures are too low. The FAR for mid-rise mixed-use buildings are often well above 3.0. While such a building could be built via the County’s bonus system, LCG believes that such a building should be permitted by right. The devil, though, is in the details. If the bonuses are well thought through and relatively easy to achieve

The County should also note that its FARs and heights are probably not well aligned. For example, a 135’ building (allowed by right within 1/8 mile of a light rail station) will exceed a 3.75 FAR.

Setting a minimum FAR of 1.0 or 2.0

Uncertain to negative impacts.

LCG’s preference is to regulate minimum density and design quality via form-based codes or other aspects of the zoning code. For example, large fields of surface parking between buildings and arterials could be restricted via the code. This can achieve a similar outcome to requiring a minimum FAR (the production of buildings that fill more of the site and address the street), while allowing developers more flexibility in the amount of square footage. Form-based or traditional codes can set standards for building orientation, materials, landscaping, and other building attributes that should result in better TOD buildings than just the application of FAR.

In addition, in today’s economic environment, many new office and retail developments are still likely to be built at less than a 0.5 FAR. And a high FAR threshold could limit the amount of major renovation projects that are undertaken, if major investments trigger a higher FAR requirement. Therefore, this becomes a strategic choice:

- Should the County’s policy be to limit the amount of new suburban-density office and retail development, and renovations, in anticipation of higher density mixed-use development later?
- Or should the County allow new, higher-quality, suburban-density commercial development that can replace older, lower-quality commercial developments, anticipating that this will set the stage for more higher-quality and higher-density development later?

LCG generally recommends the latter approach.

Transfer of Development Rights

Minimal impact.

In most cases, cities and counties set maximum heights, FARs, and other development constraints at high levels in designated station areas and growth centers, in order to allow or encourage development. For example, as described above, maximum heights in the station areas is 90 to 135 feet, depending on the location. Often, either the base height allowed, or the total height allowed with bonuses, is greater than developers will want to build. This appears to be the case at the Mariner and Ash station areas. Therefore, allowing developers to transfer development rights (e.g., height or density) from TDR sending areas (e.g., agricultural, natural, or rural residential areas) often has little impact. An exception is if maximum allowed height in station areas is set lower than the desired height.

The number of housing units shown for the 20-year development forecast on the last page of the four-page summary seems low when compared to the past five years of development activity. Could you please provide additional explanation to lead you to your “aggressive” forecast?

We reviewed our residential demand analysis and have prepared a revised estimate, below. These revised high estimates are about twice the high estimates that we provided earlier this year (e.g., 1,400 versus 2,800 total units for the Ash station area, and 800 versus 1,700 for Mariner).

The low estimate begins with a continuation of residential development trends observed between 2008 and 2018 in the station areas, and then adjusts this trendline downwards by 30 percent to account for the potential of slower market conditions and less readily developable land in the station areas. The high estimate assumes faster residential growth in the market area (consistent with PSRC projections), and that the three station areas capture a greater share of this faster growth. Both estimates include rental multifamily, attached, and detached single family housing.

Residential Demand Estimates – Summary

Station Areas	Total Units	
	Low	High
Ash	1,800	2,800
Mariner	1,100	1,700
Highway 99	950	1,500
Total	3,850	6,000

Sources: CoStar, Redfin, PSRC, Leland Consulting Group.

Because we expect demand for about 38,000 new housing units in the market area over the next 20 years, this means that the station areas could capture between 10 to 16 percent of demand for all new housing.

This is reasonably consistent with development trends. For example, between 2008 and 2018, the three station areas captured 29 percent of multifamily development in the market area. More recently (2014 to 2018), the station areas have captured 20 percent of attached single family housing, and 2 percent of detached single-family housing. It should be expected that higher density housing types have been and will continue to be more likely to locate in the station areas compared to low density detached single family development.

The figure below shows more detail regarding the residential development estimate. These estimates are higher than those prepared by LCG earlier this year for several reasons. First, they are more forward looking, i.e., relying on PSRC’s estimates for considerable growth in the market area. Second, they more fully account for attached and detached single family units because data show that these units are still being built in the station areas.

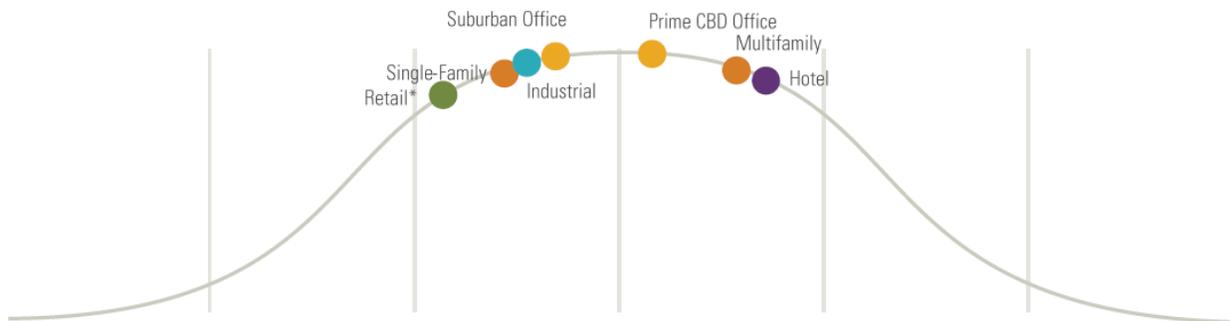
Residential Demand Estimates – Detail

Area	Historic Development		Projection, Next 20 Years				Total Units	
	2008 - 2018		Multifamily (Rental)		Owner Occupied		Low	High
	Multifamily (Rental)		Low	High				
	# Units	Capture Rate, % of Market Area	# Units	Capture Rate, % of Market Area	# Units	# Units	# Units	# Units
Competitive Centers/Locations								
Lynnwood	1,053	18%	1,700	22%	3,250			
Mill Creek TC (incl. along US96)	575	10%	900	10%	1,450			
Bothell Canyon Park	346	6%	550	10%	1,450			
Subtotal	1,974	34%	3,150	42%	6,150			
Station Areas								
Ash	841	15%	1,350	16%	2,350	450	1,800	2,800
Mariner	539	9%	850	10%	1,450	250	1,100	1,700
Highway 99	320	6%	500	7%	1,050	450	950	1,500
Subtotal	1,700	29%	2,700	33%	4,850	1,150	3,850	6,000
Other (General County)	2,104	36%	3,350	25%	3,700			
Total Market Area	5,778	100%	9,200	100%	14,700			
Land availability/market cycle adjustment (vs. historic trend)			-30%				-30%	

Sources: CoStar, Redfin, PSRC, Leland Consulting Group.

Development Cycles

While it is reasonable to expect that, over the long term, the market area and Puget Sound region will continue to grow rapidly due to the region's robust economy, amenities, and world-class setting, real estate development is cyclical. The development industry tends to overbuild particular markets during hot economic times, and then suffer from oversupply (including higher vacancies, slow absorption, and low access to capital for new construction) during downturns. Many real estate professionals in the U.S. believe that multifamily development—which has been hot for many years—is due for a correction, and either a gentle or abrupt downturn. One view of the current (2018) position of each major development type within the U.S. real estate cycle is shown below; conditions in local markets such as Puget Sound and Snohomish County will vary and tend to be stronger than the nation. Nonetheless, LCG believes that there will be a slow down in multifamily development in the market area at some point in the next five years. Multifamily development should also recover within the 20-year study time frame.



Source: *State of the Real Estate Market, Q2 2018, RCLCO Real Estate Advisors.*

How can we move the needle on residential growth beyond the measures listed in the report?

See answers to question beginning on page 4 (regarding the five Transit Orientation factors) and page 9 (regarding various implementation measures).

The case studies listed in the report do not seem to directly correlate to Ash Way and Mariner stations? Clackamas Town Center contains a large mall and Orenco station is not located near an interstate.

The attributes of case studies always differ from the current challenge. LCG chose the case studies for a variety of reasons.

The Contra Costa Centre and Clackamas Town Center projects were selected because they are *County-led* station-area development projects (a majority of successful TODs, in LCG's experience, are City-led projects). In some ways, these two represent a major success (Contra Costa Centre), and a station area that has not fulfilled its potential (Clackamas Town Center). For example, just 92,000 square feet of development has been built at the Town Center since the start of light rail service in 2009. We find that unsuccessful projects can teach as much as successful projects. While the land use specifics at the Clackamas Town Center are different from the Snohomish County station areas, there are relatively high-value retail, commercial, office, and multifamily projects in all locations; discontinuous transportation networks; a freeway that separates the two sides of the station areas; and other similarities. As highlighted above and in the market analysis report, major reasons for Contra Costa Centre's success include the establishment of an ambitious vision and the creation of the Contra Costa County Redevelopment Agency, which is authorized and financially empowered to implement the vision.

Orenco Station is not located adjacent to a major highway. However, it is one of the more successful suburban TODs on the West Coast. In addition, because light rail service started just over 20 years ago, it provides a good opportunity to look at how development patterns have evolved over a long time period.

We find the development patterns, demographics, and other attributes of the case studies to be helpful in understanding and comparing the Snohomish County station areas. For example, it is notable that some demographic indicators (incomes and median ages) at Ash Way are comparable to Contra Costa Centre and Orenco Station, while those at Mariner are more comparable to Clackamas Town Center (see Market Analysis report for details).

Community Transit has some of its highest boarding's occurring at the Airport Road station. Was this factored into the pentagon diagram?

We were not aware of this, nor did we take this into account.

The primary transit performance metric that we used was number of buses per hour during peak transit service. Based on this metric, Ash performs best, followed by Mariner and Airport Road.

If boardings are to be considered, it would be best to have boarding (or other ridership) data from all three transit agencies operating in the area.

In preparing the market conditions report, how did you contact or reach out to area developers?

We did not talk with any developers specifically about the Ash, Mariner, or Airport Road station areas.

This was in part because we wanted to become more familiar with the station areas via driving tours, and more familiar with the County's vision, before reaching out to developers. Also, it was clear from talking to the County that staff did not necessarily want to depend on developers who had built in the area in the past, in order to project the future.

That said, between 2016 and 2018, LCG has been actively working on multiple planning and development projects in the Puget Sound region—in Downtown Everett, Cathcart Way at Highway 9, Shoreline, Bellevue, Woodinville, Renton, Tacoma, University Place, and other locations. We also work in other metro areas such as Portland, Salt Lake City, and Minneapolis. As part of our work we regularly talk with, and sometimes work for, developers.

Puget Sound regional developers that we have talked with in the last two years about their view of regional development dynamics include Skotdal (Everett), Coast Real Estate (Everett), Vulcan, TRF, HAL Real Estate, Main Street Property Group, Spectrum, Lake Union Partners, Capstone Partners, BRIDGE, KOZ, and others. We are particularly focused on understanding the metrics that developers such as these look for when making a go/no go decision in “emerging” suburban TOD markets.

If desired, LCG can work with the County to identify a short list of developers that could provide insight and input on development in the station areas.

Sources - Implementing TOD

The following is a select list of sources cited above:

- The Growing Transit Communities Strategy, PSRC, 2013,
 - <https://www.psrc.org/growing-transit-communities>
 - <https://www.psrc.org/sites/default/files/gtcstrategy.pdf>.
- *Transit Supportive Planning Toolkit*, Puget Sound Regional Council (PSRC), 2013, <https://www.psrc.org/sites/default/files/transitplanningtoolkit.pdf>.
- *More Development for Your Transit Dollar, An Analysis of 21 North American Transit Corridors*, The Institute for Transportation and Development Policy (ITDP), 2013, <https://www.itdp.org/2013/11/13/more-development-for-your-transit-dollar-an-analysis-of-21-north-american-transit-corridors/>.
- *Lloyd District Regional Center Plan and Progress*, Rick Williams Consulting, 2006, https://www.wsdot.wa.gov/sites/default/files/2013/07/02/Lloyd_District_White_Paper.pdf.
- *Transit Oriented Development in the United States* (Report 102), According to the Transit Cooperative Research Program (TCRP), 2004, https://www.valleymetro.org/sites/default/files/legacy-images/uploads/general_publications/TCRP-Report-102_TOD-in-the-US-Experiences-Challenges-and-Prospects_10-04.pdf
- *Developing the Next Frontier, Capitalizing on Bus Rapid Transit to Build Community*, Urban Land Institute Seattle, 2011, <http://your.kingcounty.gov/kcdot/planning/ortp/2011ULISeattleBRTReport.pdf>.

APPENDIX B

Meeting Minutes and Presentation Materials

MEETING ACTION ITEMS

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Client: Snohomish County
Project: 20180071.000 - East-West Corridor HCT Access Study – Station Area Planning
Date/Time: May 23, 2018, 8:30-10:00AM
Location: Snohomish County East Administration Building
Conference Room Conf (O),6A04(025) Mount Pilchuck Conf. Room.
Subject: East-West HCT Access Study Expert Review Panel – Workshop #1

Attendees: Steve Thomsen, Snohomish County, Director of Public Works
Doug McCormick, Snohomish County, Deputy Director of Public Works/County Engineer
Steve Dickson, Snohomish County, Public Works, Special Projects Manager
Max Phan, Snohomish County, Public Works, Engineering Services Director
Jay Larson, Snohomish County, Public Works, Agency Project Manager
Jacqueline Reid, Snohomish County, PDS, Long-Range Planning, Supervisor
David Killingstad, Snohomish County, PDS, Long-Range Planning, Principal Planner
Steve Toy, Snohomish County, PDS, Long-Range Planning, Principal Demographer
Felicia Medlen, Snohomish County, Human Services, Housing & Comm. Dev., Supervisor
Peter De Boldt, Perteet, Consultant Project Manager
Marcus Elliott, Perteet, Consultant Project Engineer
John Owen, MAKERS, Consultant Planner
Andrew Natzel, WSP USA, Consultant Traffic Engineer

Discussion:

1. Workshop Overview

Peter opened the meeting, formally stating that the purpose of Workshop #1 was to identify the important attributes of the two proposed station locations. He drew an important distinction between this task and pinpointing the station locations themselves. He noted that Sound Transit (ST) cannot have station locations nailed down until after it completes the NEPA environmental permitting process. However, the County would like to be able to formulate a coherent message regarding the various factors for the eventual selection of station locations as the process unfolds.

Peter introduced the visual exhibits to be used during the meeting, which included 1":400' and 1":200' aerial views of the I-5 interchanges with 128th Street SW/SE and 164th Street SW. Each drawing featured a planning-level approximation of ST's Lynnwood to Everett LINK Light Rail alignment. Peter stressed that these alignments were two years old, and did not reflect any new information received from ST other than the determination that the Boeing/Paine Field alignment would be used instead of the I-5 alignment north of 128th Street SW/SE.

Doug noted that another light rail station has been proposed at Airport Road & US99. He pointed out that the drawing depicted the light rail alignment on the north side of 128th Street SW/SE and the northeast side of Airport Road. He informed the group that there is currently more public right-of-way on the southwest side of Airport Road, and suggested that this area would be a more likely location for the future light rail line. Jay noted that the Airport Road & US99 station was only provisionally included in ST's future plans, but it needs to be considered just the same.

Steve D. informed the group about ongoing discussions between the City of Lynnwood and ST, noting that both parties had different opinions regarding the proposed alignment and station locations. Lynnwood wants ST to locate a new light rail station at West Alderwood as part of the Lynnwood Link project, but this area is a part of the future ST3 work rather than the current ST2 work. ST is holding fast on their proposed delivery schedule, and has not made public any information to suggest otherwise. Steve explained that this will mean the approach from Lynnwood into the East-West Corridor Study Area is not currently known. He asked that the group be mindful of this as the Station Area Planning task unfolds. He noted that, in his opinion, the County can and should introduce a preferred concept to ST, but stop short of endorsing it and expressed his hope that the group can bring ST along at each step of the process to gain their buy-in incrementally.

2. Potential Evaluation Parameters

Peter posed the question: “What attributes of a light rail station location are important to the County?” He further framed the question by noting that a good location for a light rail station serving primarily transit modes may be different from a station focused on serving pedestrians, or one focused on serving users arriving via SOV’s or carpools.

Steve Thomsen asked how other transit agencies were getting their passengers to light-rail stations next to highways. He further asked whether it was fair to assume that other agencies typically rely on at-grade pedestrian crosswalks vs. aerial structures. Peter noted that ST has used at-grade stations at a number of locations on the Central Link in Seattle, though the urban character of that LINK segment along with the absence of adjacent highways makes it considerably different from the project in question. He explained that, in general, locating transit structures aerially requires more complicated ADA-compliant access, including elevators, which can be difficult and costly to maintain.

Jay suggested that the County wants transit to provide the largest component of light rail riders, but noted that County residents who are currently using the Park & Ride lots will want a continued commitment to maintaining and expanding available parking at the light rail stations. The group speculated on how many people will truly drive to a light rail station to take the train into Seattle.

Peter asked how many people the County wanted to walk to the light rail station as pedestrians. Is the typical half-mile radius a good target to shoot for? Should we be trying to achieve the greatest possible walk-shed?

Felicia suggested that the existing Park & Ride lots were good anchor points to start the discussion. Peter explained that the Park & Ride lots would likely remain in place, but do they need to increase in size to serve more SOV drivers?

Steve D. stated that drive-up access to a station location is easy to quantify; however, the question of pedestrian and bicycle access is an open book. The answer really depends on how much population density the County is willing to permit in and around the proposed station areas.

Max brought up the topics of rideshare and autonomous vehicles. David acknowledged that autonomous vehicle technology may be the direction that urban transportation is headed, but that

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questions exist in when the technology becomes prevalent, and how this will be applied to the planning process. To illustrate this, he used an example of autonomous vehicle riders dropping themselves off at a light rail station and then sending their vehicles back to their home to avoid parking fees. If the County were to alter their planning process to take this into consideration, then Park & Ride lots adjacent to light rail stations become a significantly lower priority. David doubled down on Jay's initial statement, suggesting that future Park & Ride development should target the BRT lines rather than the light rail station: i.e. get the people with cars to various points on the BRT alignment first, then have them take BRT to the light rail station.

Jay explained that the previous analysis work performed on the East-West Corridor recommended widening segments of 128th Street SW/SE and 164th Street SW to seven lanes each, adding that seven lanes of pavement presents a difficult obstacle for pedestrians to cross.

Peter suggested that parking lots and structures will be filled, regardless of how many are built. However, if the BRT connection to the light rail station is really good, then demand for driving to the light rail station diminishes. He cautioned that the more the County crafts their system toward autonomous vehicles and rideshares, the more they steal from transit.

Steve D. noted that inbound autonomous vehicles dropping riders off and returning home means a paired outbound trip would be generated where none existed before. This will put additional strain on the traffic network and is not necessarily what the County wants.

Max suggested that the group locate and design the light rail station based on the technology that exists today, but plan for small changes that can be made in the future to accommodate new technology.

Felicia asked that the group make the light rail station work for the affordable housing land uses currently located in the area to reduce displacement and stressed the importance of being thoughtful on this subject during the planning process.

David suggested building amenities that strengthen a sense of community around the proposed light rail stations, including parks. He drew a distinction between what amenities would build community now vs. when the light rail station is built. John asked what kinds of things can the County do around the light rail station locations that will keep the community growing.

Up to this point, most of the discussion had revolved around 128th Street SW/SE. Peter shifted the discussion to 164th Street SW, pointing out the limited development potential on the west side due to the Swamp Creek wetland but noting the opportunities on the east side. Here, the County could partner with ST and CT to create a "super-transit center" serving light rail, BRT on 164th Street SW, and potentially even BRT on I-5 with the completion of the existing Texas T interchange to provide transit access to-and-from the south.

John stated that light rail stations should be located in areas with the highest redevelopment potential. Jay agreed and noted that this is part of the consultant team's scope. David stated that light rail should be thought of as a catalyst to change the density of an area. Felicia informed the group that the aerial photographs used in the exhibit were out of date. Many new apartment developments now exist around

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the east side of I-5 at the 128th Street SW/SE interchange. Steve D. informed the group that the County was successful in reserving the right-of-way needed for a future 130th Street SW/SE overcrossing of I-5, as described in the previous phases of the East-West Corridor project.

Steve Toy inquired about the feasibility of elevating a light rail station over an arterial roadway to remove the roadway as an obstacle to pedestrians. Steve D. explained that it would be easier to build an elevated light rail station on one side of the roadway or the other, then build a pedestrian overcrossing to the elevated structure. Peter and John noted that pedestrian overcrossings in Seattle often go unused in favor of at-grade access. Steve D. suggested that if the light rail station remains on the south side of 128th Street SW/SE, everything can remain at grade. Peter stated that if providing exceptional pedestrian access is the most important criterion to the County, an at-grade solution becomes much more attractive. David echoed that an at-grade station would also be preferable from a community-building standpoint.

Jay added that ST3 currently proposes 500 new Park & Ride stalls at the Mariner Park & Ride near 128th Street SW/SE, but none at the Ash Way Park & Ride at 164th Street SW. He wondered whether ST would consider swapping the spaces. Steve T. echoed this question, given the difficulty the County has had in trying to carve out space for these additional spaces at Mariner. Peter suggested that if the County wanted to develop the 128th Street SW/SE light rail station as a more walkable, community-focused alternative for pedestrians and the 164th Street SW light rail station as a commuter-focused alternative with greater intermodal transit access, this might be a convincing narrative to persuade ST to shift these funds accordingly.

Jay noted that ST currently is anticipating that the 128th Street SW/SE station would be a location where about one-half of the LRT coaches would begin/end their routes (i.e. only about one-half of the LRT coaches would operate on tracks north of there to Everett). Based on that assumption, the 128th Street SW/SE station would be an end-of-the-line stop. This is because of the lower projected ridership forecast for LINK transit users north of the 128th Street SW/SE station.

Steve D. wasn't convinced that categorizing either of the two stations as community- or commuter-oriented would be valid. He suggested that completion of the Texas T interchange at 164th Street SW would expand the redevelopment potential around that light rail location; in this event, new pedestrian access would be warranted around a station the group was proposing would be commuter-oriented station. Conversely, ST's decision to use the Boeing/Paine Field light rail alignment has caused Community Transit (CT) to see a greater need to get people into the system at 128th Street SW/SE, prompting a need to attract commuters to a station the group was proposing would be community-oriented.

John questioned ST's resolve to maintain the acute-angle curve in their proposed light rail alignment at 128th Street SW/SE, and along with it the east-west segment of track; he suggested that straightening the alignment might be an attractive value engineering solution in later phases of design. Felicia noted that shifting the light rail alignment even one block further south of 128th Street SW/SE would likely discourage people who live north of 128th Street SW/SE from using the light rail station at all. David noted that the apartments around this light rail station were built in the 1970s and 1980s; consequently, they will be approaching a 50-60 year age by the time the light rail is extended to this area. In the world of

MEETING ACTION ITEMS

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multifamily development, this is considered old. Max noted that the group needed to look into Title VI considerations as they move forward.

3. Next Steps

Peter, Steve Thomsen, and Steve D. summarized the meeting discussion using the following points:

- The light rail station locations need to be most responsive to transit and pedestrian modes of travel.
- At least one of the light rail station locations should be community-focused.
- None of the light rail station locations should emphasize SOVs, but must still acknowledge that they exist and continue to be a factor driving ridership.
- Bicycle connectivity will be more important at 128th Street SW/SE.
- 128th Street SW/SE should be thought of as an “end of the line” stop.
- At least one of the light rail stations should be thought of as a countywide destination.
- Land use redevelopment potential must be considered at each light rail station location.

Information from this meeting will be used to guide conceptual station location development as the study moves forward. Next week, Leland Consulting will be meeting staff and visiting the sites as part of their market area analysis effort element for the Study.

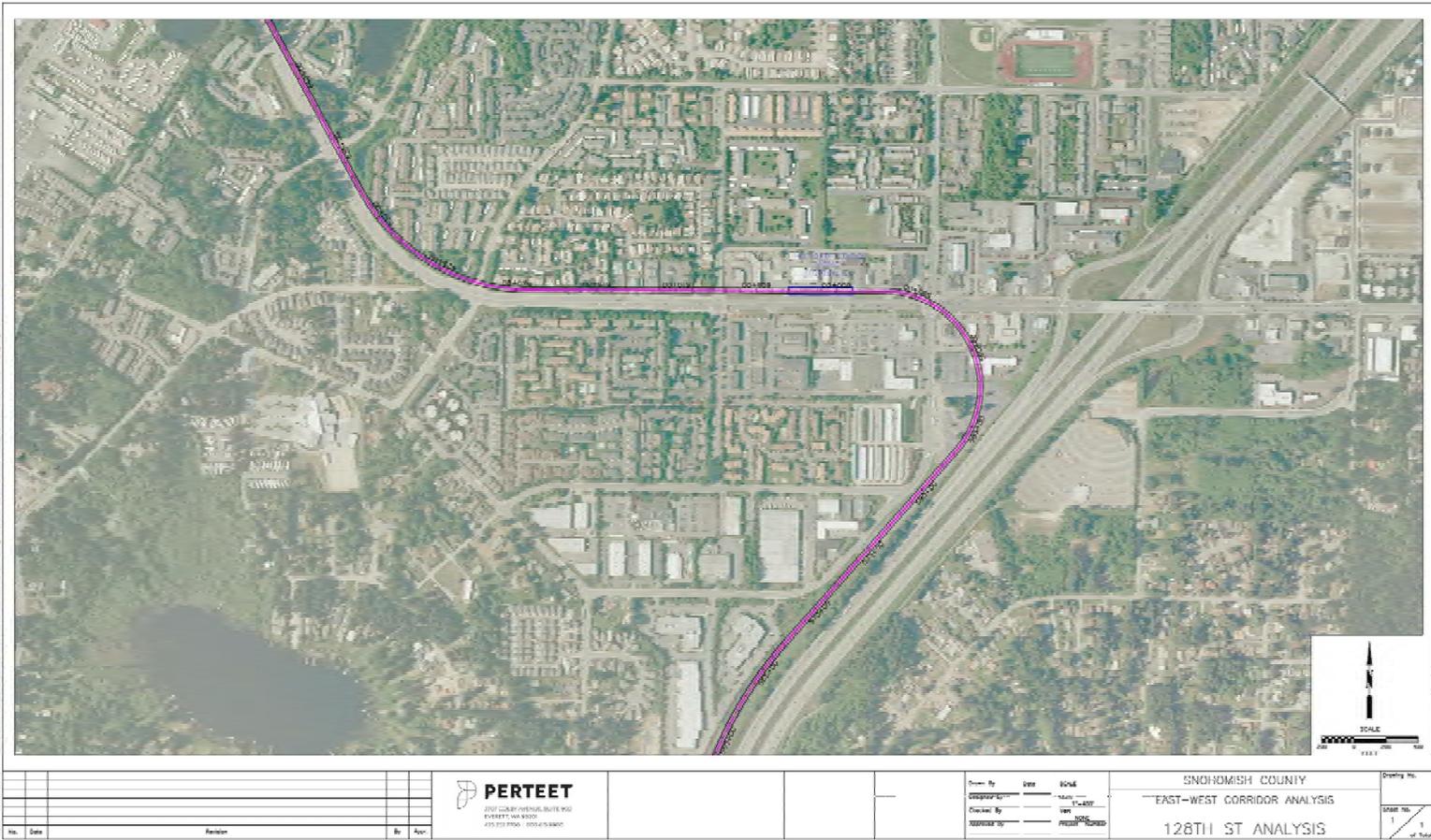
EAST-WEST ACCESS STUDY – STATION AREA PLANNING

Workshop #1

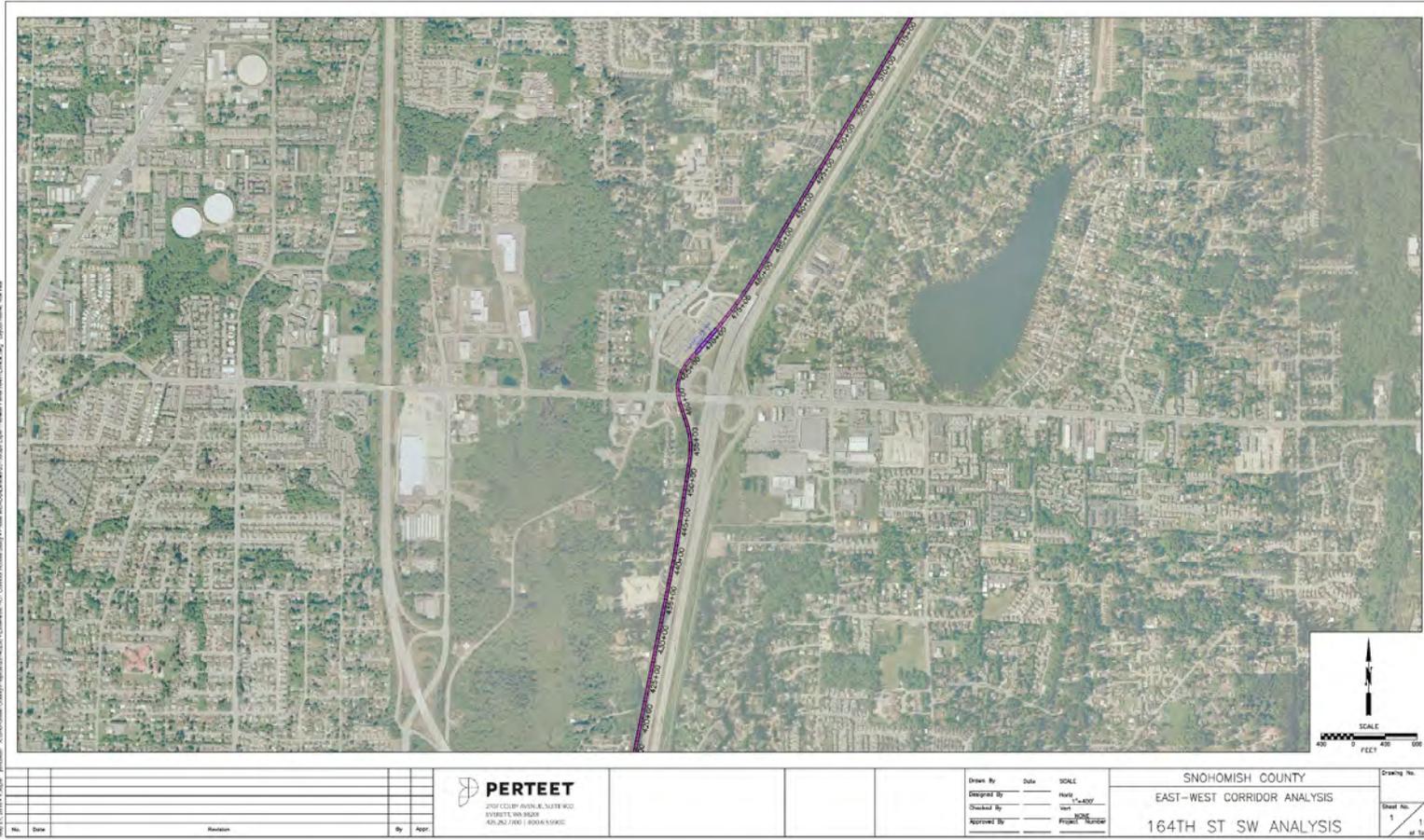
May 23, 2018



128th Station Area



164th Station Area



File: C:\Users\j... \Public\164th Station Area.dwg
 Plot: 164th Station Area.dwg
 Date: 10/26/2011 10:00:00 AM
 Plot Size: 11x17
 Scale: 1/8"=1'-0"
 Author: j...
 Title: 164th Station Area.dwg
 Project: 164th Station Area.dwg
 Drawing No.: 1 of 1

No.	Date	Revision	By	Appr.


PERTEET
 2701 CEDAR AVENUE, SUITE 100
 BOYD, WA 98005
 425.292.7000 | 800.845.5900

Drawn By: _____ Date: _____ SCALE: _____
 Designed By: _____ Name: _____
 Checked By: _____ User: _____
 Approved By: _____ Project: _____

SNOHOMISH COUNTY
 EAST-WEST CORRIDOR ANALYSIS
 164TH ST SW ANALYSIS
 Drawing No. _____
 Sheet No. 1 of 1

MEETING SUMMARY

505 5th Avenue S, Suite 300, Seattle, WA 98104 | P 206.436.0515

Client: Snohomish County
 Project: 20180071.000 - East-West Corridor HCT Access Study – Station Area Planning
 Time/Date: 1:00-3:00PM, July 23, 2018
 Location: Snohomish County East Administration Building, Public Conference Room (First Floor)
 Subject: Station Area Planning Workshop #2

This workshop focused on brainstorming potential light rail station locations in the Mariner (128th Street SW) and Ash Way (164th Street SW) areas. The workshop was structured around the following elements:

1. Introductions/Workshop Overview
2. Split into Workgroups/Brainstorm Ideas
3. Workgroups Report Out
4. Conclusions/Next Steps
 - Summary of ideas
 - Closing

Participants in each of the workgroup tables was as follows:

Table #1	Table #2	Table #3	Table #4
Peter De Boldt (facilitator)	John Owen (facilitator)	Marcus Elliott (facilitator)	Chris Wellander (facilitator)
June DeVoll	Paul Krauss	Doug McCormick	Max Phan
Steve Dickson	Tom Rogers	Fay Lim	Sabina Popa
Kamuron Guroi	Eileen Canola	Nathan Howard	David Killingstad
Jed Gonzales	Roland Behee	Felicia Medlen	Russ Bosanko
Meghan Jordan	Jay Larson	James Yap	Mohammad Uddin
Allen Giffen	Jacqueline Reid	Patrice Hardy	Stephen Toy
Scott Lindquist	Philip Harris		

Discussion:

On earlier phases of the East-West Corridor project, Sound Transit provided the project team with a *representative alignment* to assist with their infrastructure and land use planning efforts in advance of ST3. During the workshop, the project team asked the workgroups to identify potential LRT station locations in terms of the smallest possible deviation from the *representative alignment* each station location would require.

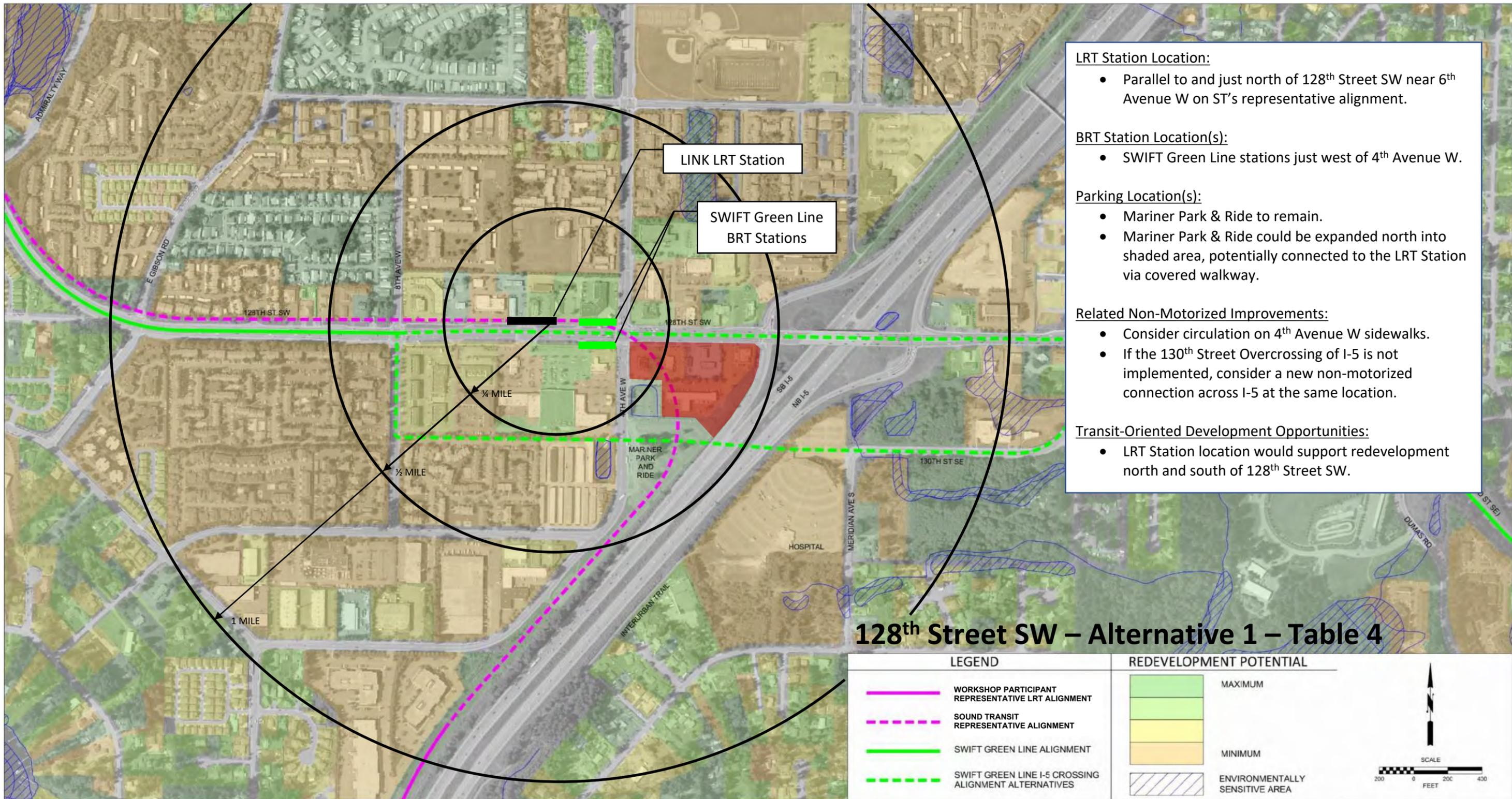
In order to accomplish this, the project team provided each workgroup with a set of scaled geometric elements printed on transparent acetate that they could use to constrain their results. The geometric

MEETING SUMMARY

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The workgroups identified a total of nine (9) unique LRT station locations for the 128th Street SW corridor and a total of five (5) unique LRT station locations for the 164th Street SW corridor. In some cases, different workgroups identified essentially the same LRT station locations with only slight differences. For the purpose of documenting this workshop, these have been consolidated together in a series of exhibits.

Each of the following exhibits documents representative station and alignments concepts developed during the workshop brainstorming session. For each alignment, ideas associated with the concept are summarized in the exhibit.



LRT Station Location:

- Parallel to and just north of 128th Street SW near 6th Avenue W on ST's representative alignment.

BRT Station Location(s):

- SWIFT Green Line stations just west of 4th Avenue W.

Parking Location(s):

- Mariner Park & Ride to remain.
- Mariner Park & Ride could be expanded north into shaded area, potentially connected to the LRT Station via covered walkway.

Related Non-Motorized Improvements:

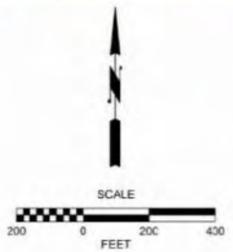
- Consider circulation on 4th Avenue W sidewalks.
- If the 130th Street Overcrossing of I-5 is not implemented, consider a new non-motorized connection across I-5 at the same location.

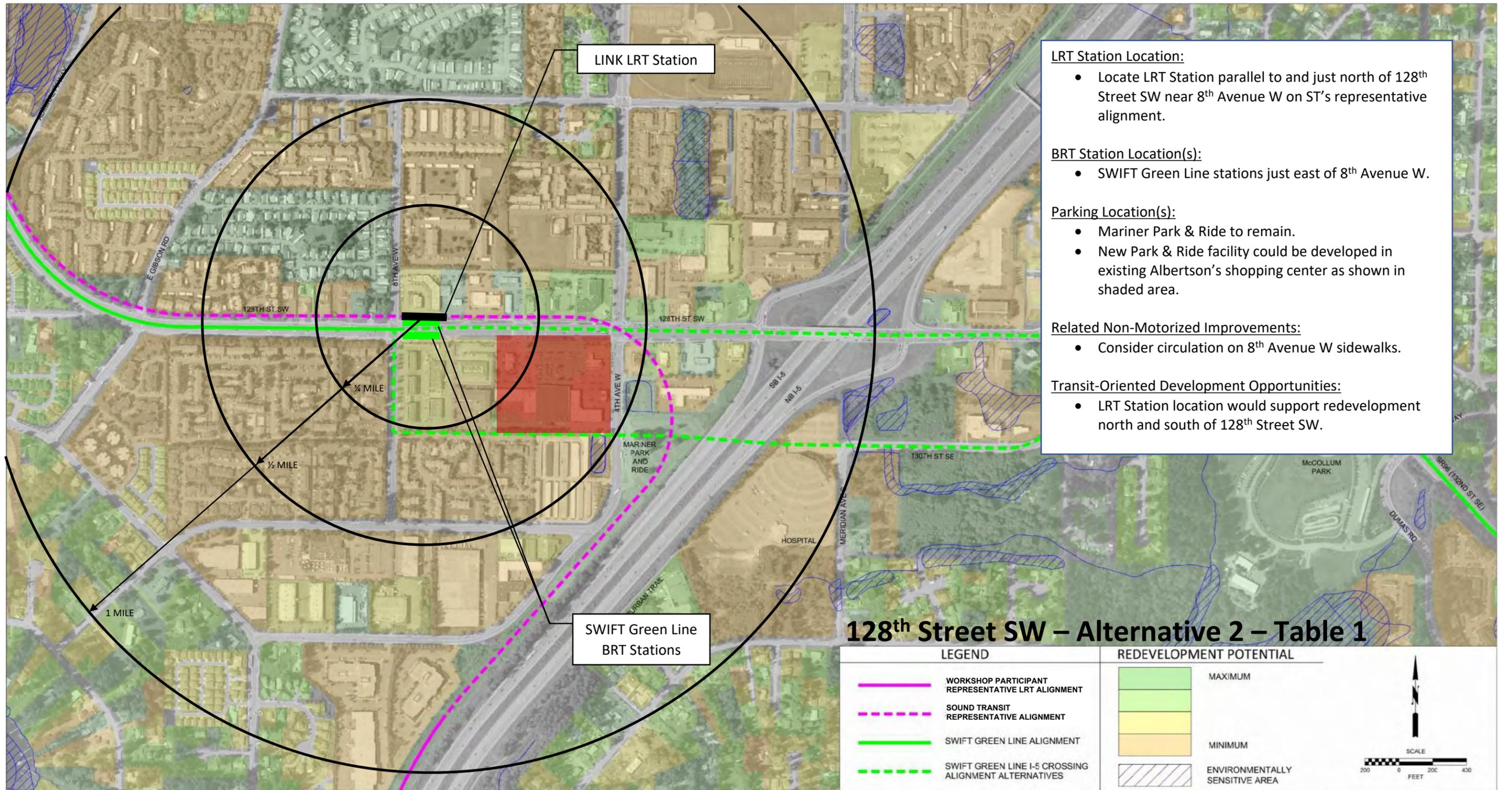
Transit-Oriented Development Opportunities:

- LRT Station location would support redevelopment north and south of 128th Street SW.

128th Street SW – Alternative 1 – Table 4

LEGEND		REDEVELOPMENT POTENTIAL	
	WORKSHOP PARTICIPANT REPRESENTATIVE LRT ALIGNMENT		MAXIMUM
	SOUND TRANSIT REPRESENTATIVE ALIGNMENT		
	SWIFT GREEN LINE ALIGNMENT		MINIMUM
	SWIFT GREEN LINE I-5 CROSSING ALIGNMENT ALTERNATIVES		ENVIRONMENTALLY SENSITIVE AREA

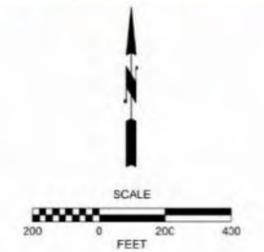


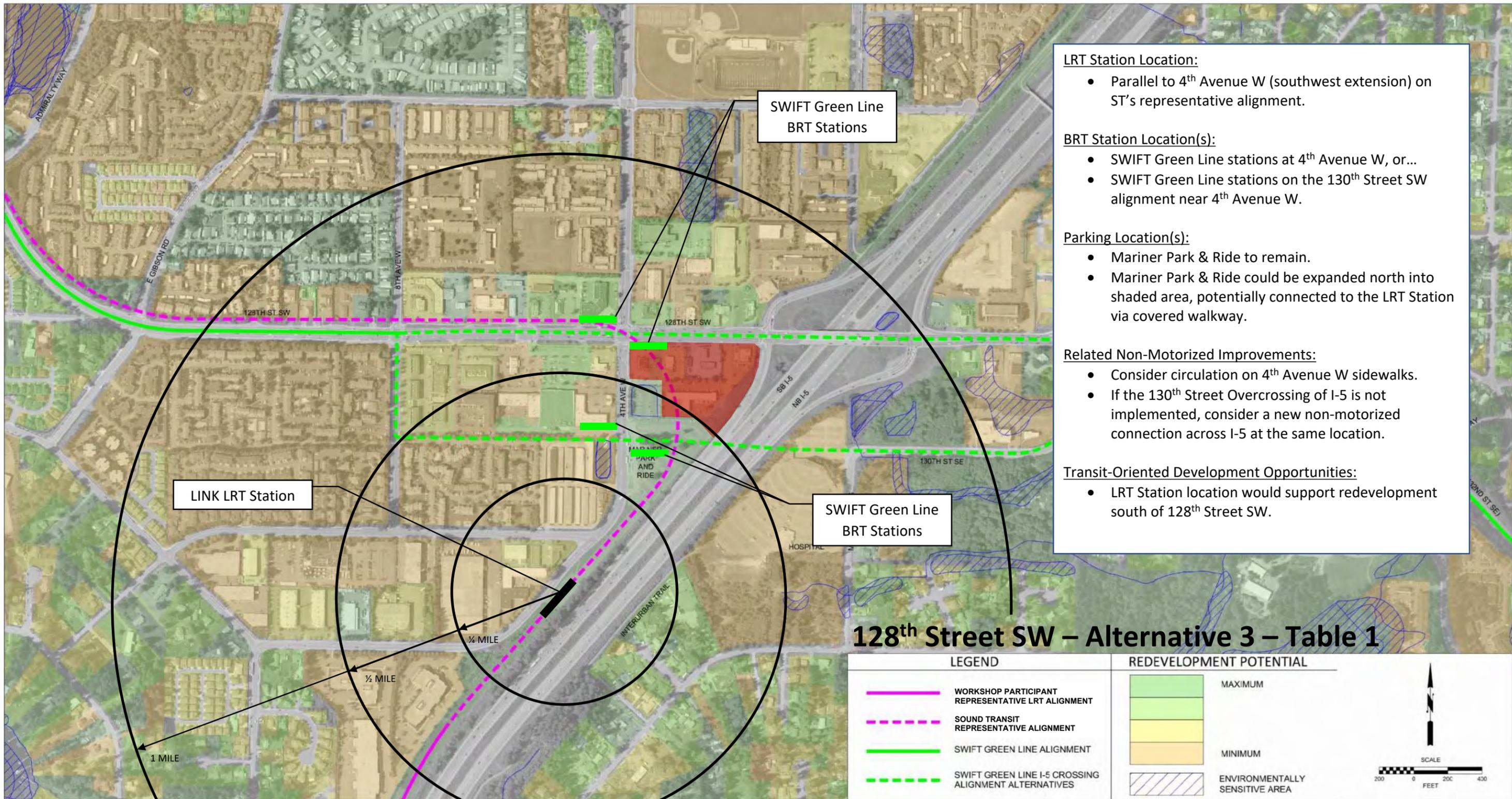


- LRT Station Location:**
- Locate LRT Station parallel to and just north of 128th Street SW near 8th Avenue W on ST's representative alignment.
- BRT Station Location(s):**
- SWIFT Green Line stations just east of 8th Avenue W.
- Parking Location(s):**
- Mariner Park & Ride to remain.
 - New Park & Ride facility could be developed in existing Albertson's shopping center as shown in shaded area.
- Related Non-Motorized Improvements:**
- Consider circulation on 8th Avenue W sidewalks.
- Transit-Oriented Development Opportunities:**
- LRT Station location would support redevelopment north and south of 128th Street SW.

128th Street SW – Alternative 2 – Table 1

LEGEND		REDEVELOPMENT POTENTIAL	
	WORKSHOP PARTICIPANT REPRESENTATIVE LRT ALIGNMENT		MAXIMUM
	SOUND TRANSIT REPRESENTATIVE ALIGNMENT		MINIMUM
	SWIFT GREEN LINE ALIGNMENT		ENVIRONMENTALLY SENSITIVE AREA
	SWIFT GREEN LINE I-5 CROSSING ALIGNMENT ALTERNATIVES		

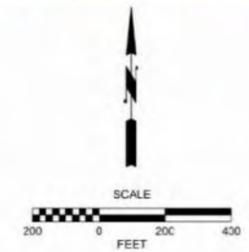


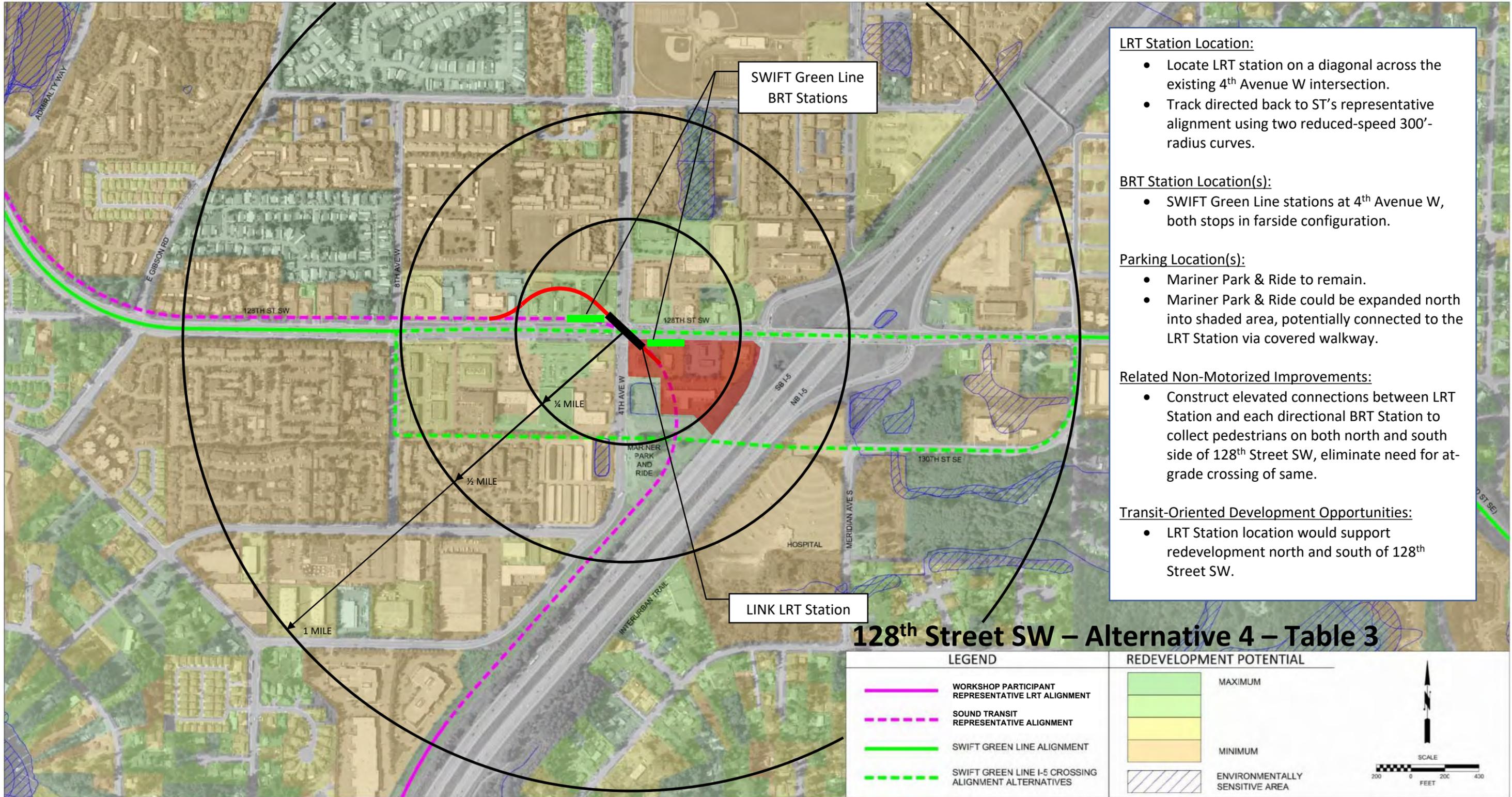


- LRT Station Location:**
- Parallel to 4th Avenue W (southwest extension) on ST's representative alignment.
- BRT Station Location(s):**
- SWIFT Green Line stations at 4th Avenue W, or...
 - SWIFT Green Line stations on the 130th Street SW alignment near 4th Avenue W.
- Parking Location(s):**
- Mariner Park & Ride to remain.
 - Mariner Park & Ride could be expanded north into shaded area, potentially connected to the LRT Station via covered walkway.
- Related Non-Motorized Improvements:**
- Consider circulation on 4th Avenue W sidewalks.
 - If the 130th Street Overcrossing of I-5 is not implemented, consider a new non-motorized connection across I-5 at the same location.
- Transit-Oriented Development Opportunities:**
- LRT Station location would support redevelopment south of 128th Street SW.

128th Street SW – Alternative 3 – Table 1

LEGEND		REDEVELOPMENT POTENTIAL	
	WORKSHOP PARTICIPANT REPRESENTATIVE LRT ALIGNMENT		MAXIMUM
	SOUND TRANSIT REPRESENTATIVE ALIGNMENT		
	SWIFT GREEN LINE ALIGNMENT		MINIMUM
	SWIFT GREEN LINE I-5 CROSSING ALIGNMENT ALTERNATIVES		ENVIRONMENTALLY SENSITIVE AREA





LRT Station Location:

- Locate LRT station on a diagonal across the existing 4th Avenue W intersection.
- Track directed back to ST's representative alignment using two reduced-speed 300'-radius curves.

BRT Station Location(s):

- SWIFT Green Line stations at 4th Avenue W, both stops in farside configuration.

Parking Location(s):

- Mariner Park & Ride to remain.
- Mariner Park & Ride could be expanded north into shaded area, potentially connected to the LRT Station via covered walkway.

Related Non-Motorized Improvements:

- Construct elevated connections between LRT Station and each directional BRT Station to collect pedestrians on both north and south side of 128th Street SW, eliminate need for at-grade crossing of same.

Transit-Oriented Development Opportunities:

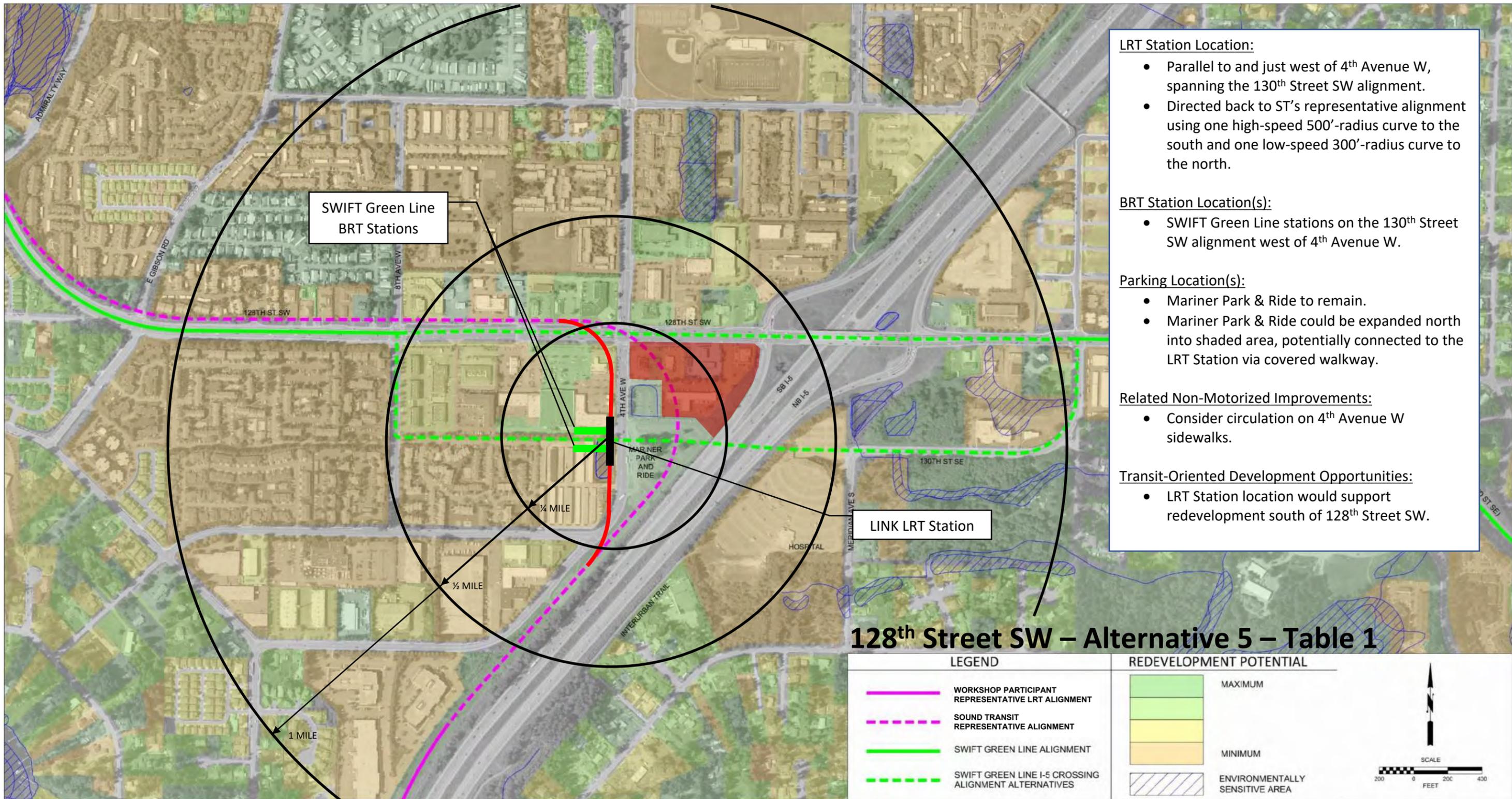
- LRT Station location would support redevelopment north and south of 128th Street SW.

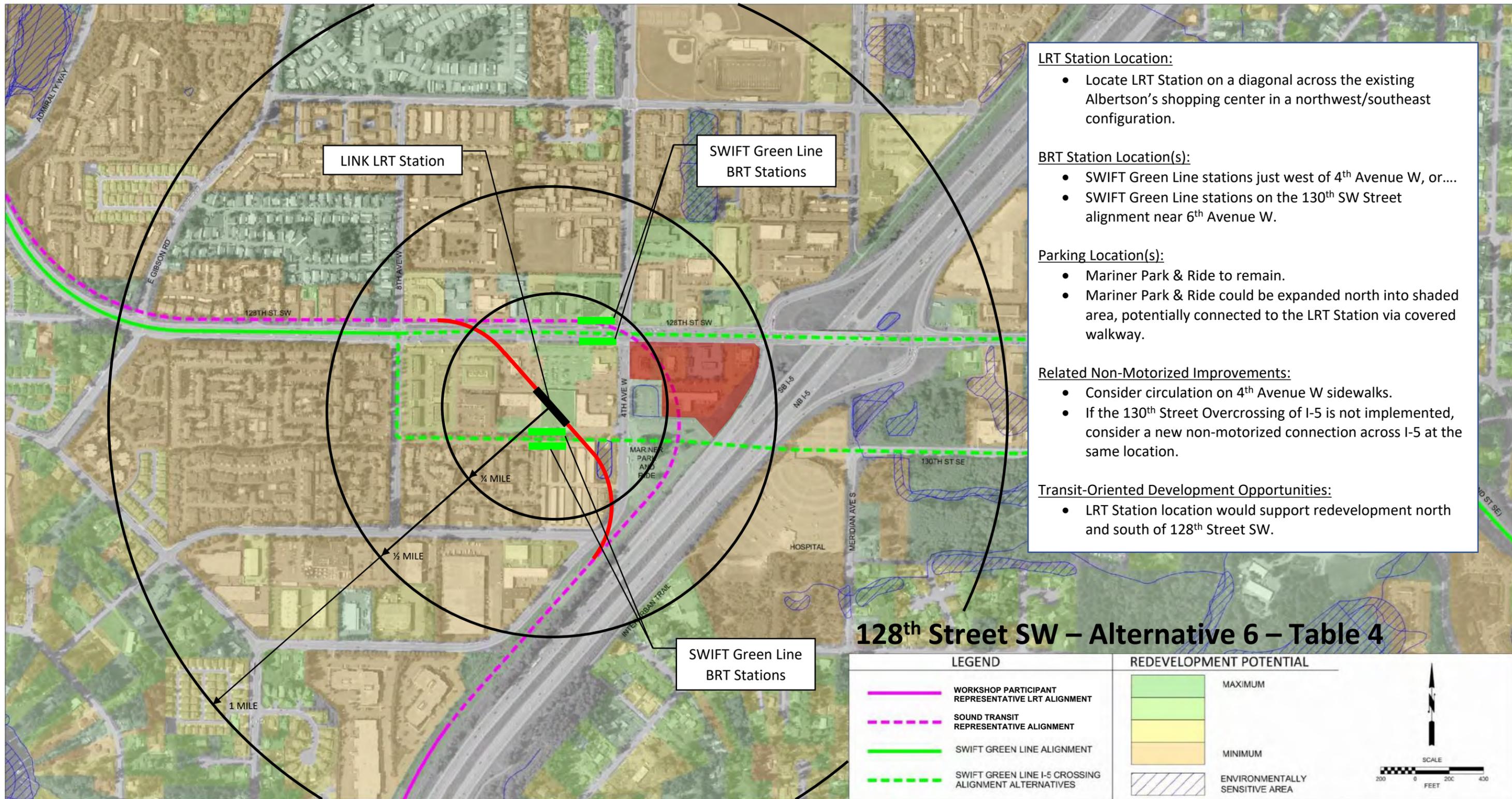
128th Street SW – Alternative 4 – Table 3

LEGEND	REDEVELOPMENT POTENTIAL
WORKSHOP PARTICIPANT REPRESENTATIVE LRT ALIGNMENT	MAXIMUM
SOUND TRANSIT REPRESENTATIVE ALIGNMENT	
SWIFT GREEN LINE ALIGNMENT	MINIMUM
SWIFT GREEN LINE I-5 CROSSING ALIGNMENT ALTERNATIVES	ENVIRONMENTALLY SENSITIVE AREA

SCALE

0 200 400 FEET





LRT Station Location:

- Locate LRT Station on a diagonal across the existing Albertson's shopping center in a northwest/southeast configuration.

BRT Station Location(s):

- SWIFT Green Line stations just west of 4th Avenue W, or....
- SWIFT Green Line stations on the 130th SW Street alignment near 6th Avenue W.

Parking Location(s):

- Mariner Park & Ride to remain.
- Mariner Park & Ride could be expanded north into shaded area, potentially connected to the LRT Station via covered walkway.

Related Non-Motorized Improvements:

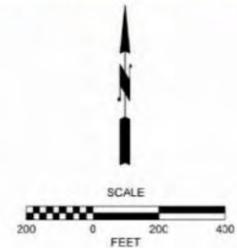
- Consider circulation on 4th Avenue W sidewalks.
- If the 130th Street Overcrossing of I-5 is not implemented, consider a new non-motorized connection across I-5 at the same location.

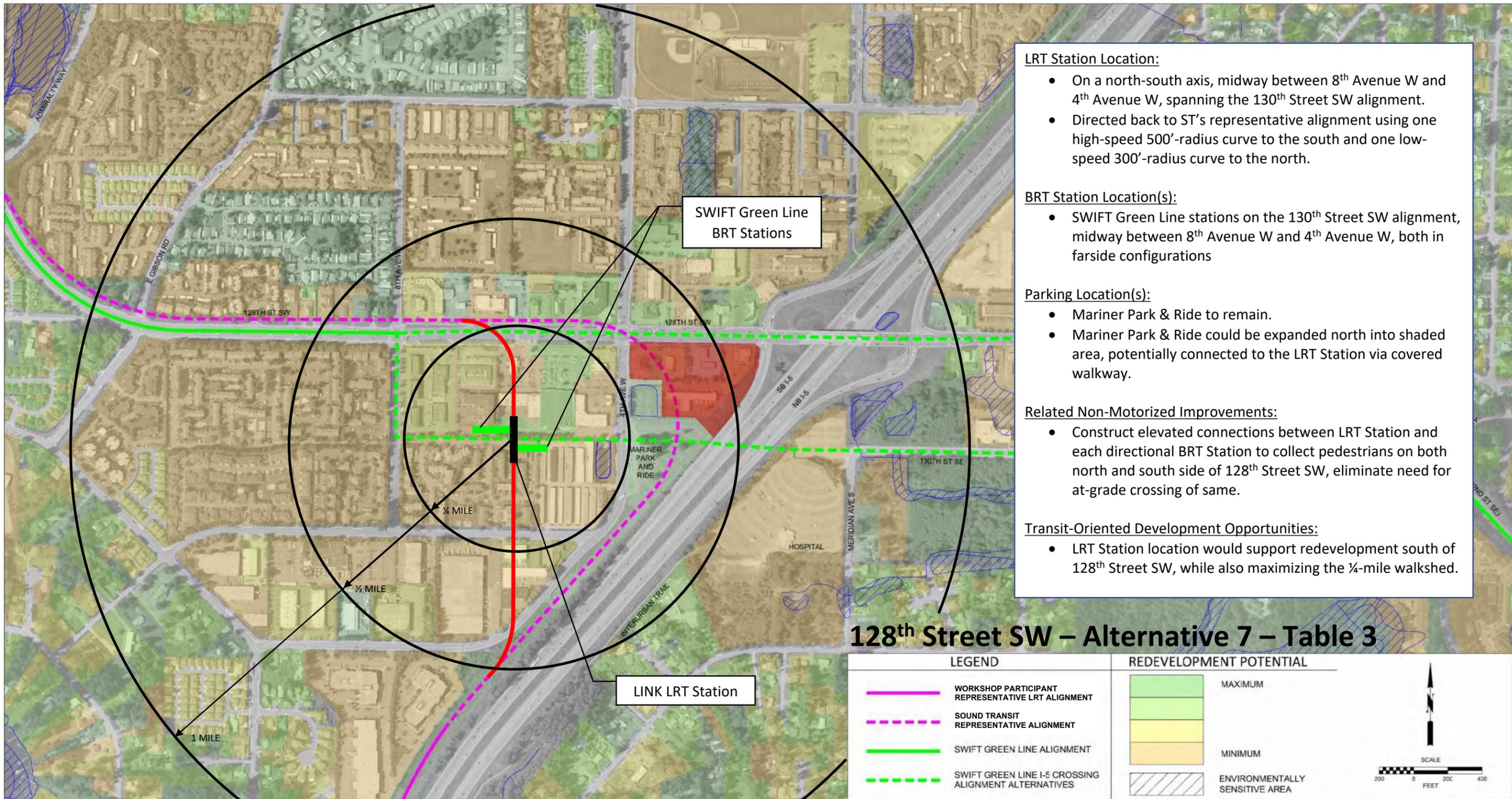
Transit-Oriented Development Opportunities:

- LRT Station location would support redevelopment north and south of 128th Street SW.

128th Street SW – Alternative 6 – Table 4

LEGEND		REDEVELOPMENT POTENTIAL	
	WORKSHOP PARTICIPANT REPRESENTATIVE LRT ALIGNMENT		MAXIMUM
	SOUND TRANSIT REPRESENTATIVE ALIGNMENT		
	SWIFT GREEN LINE ALIGNMENT		MINIMUM
	SWIFT GREEN LINE I-5 CROSSING ALIGNMENT ALTERNATIVES		ENVIRONMENTALLY SENSITIVE AREA





LRT Station Location:

- On a north-south axis, midway between 8th Avenue W and 4th Avenue W, spanning the 130th Street SW alignment.
- Directed back to ST's representative alignment using one high-speed 500'-radius curve to the south and one low-speed 300'-radius curve to the north.

BRT Station Location(s):

- SWIFT Green Line stations on the 130th Street SW alignment, midway between 8th Avenue W and 4th Avenue W, both in farside configurations

Parking Location(s):

- Mariner Park & Ride to remain.
- Mariner Park & Ride could be expanded north into shaded area, potentially connected to the LRT Station via covered walkway.

Related Non-Motorized Improvements:

- Construct elevated connections between LRT Station and each directional BRT Station to collect pedestrians on both north and south side of 128th Street SW, eliminate need for at-grade crossing of same.

Transit-Oriented Development Opportunities:

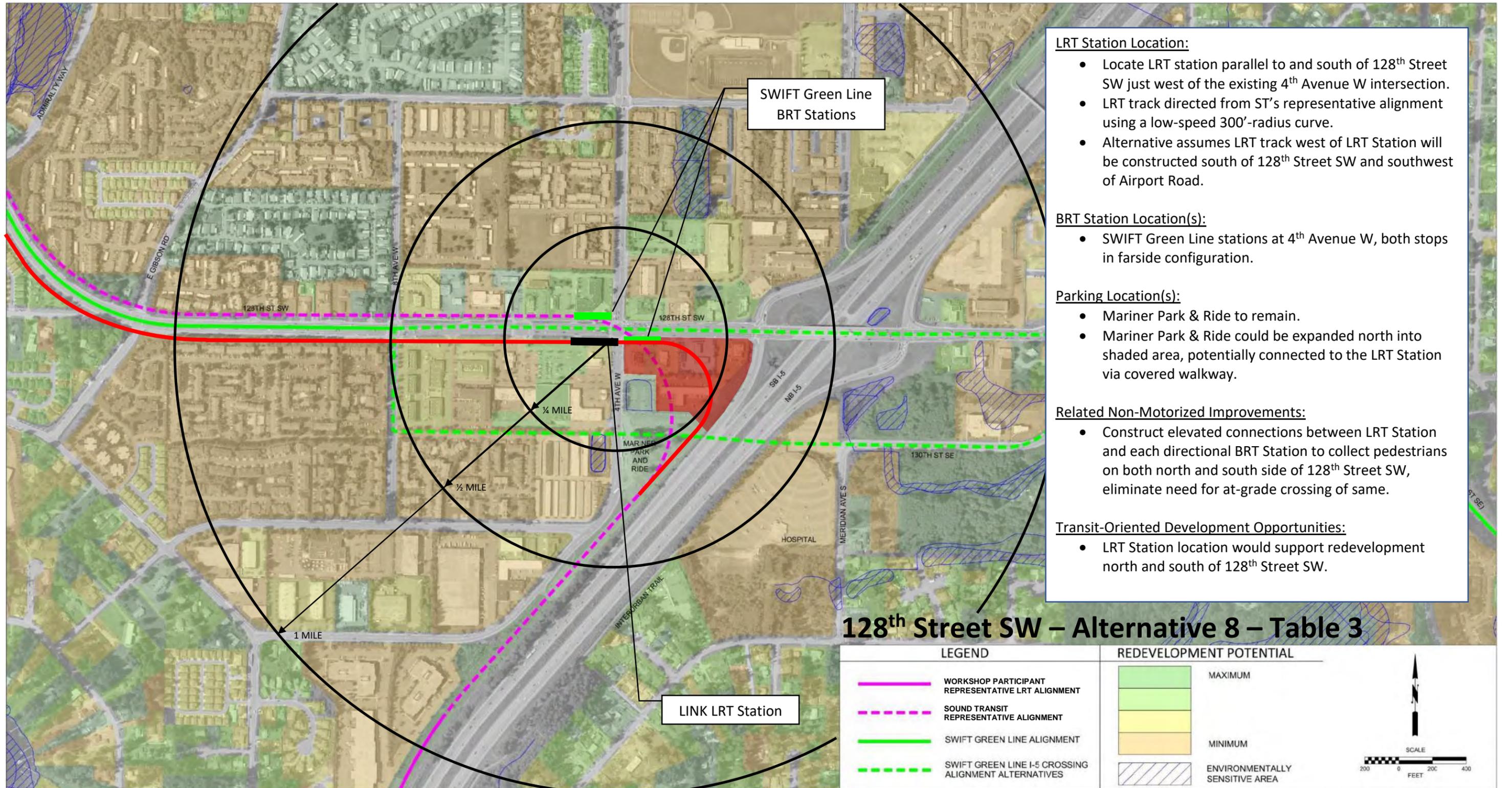
- LRT Station location would support redevelopment south of 128th Street SW, while also maximizing the ¼-mile walkshed.

128th Street SW – Alternative 7 – Table 3

LEGEND		REDEVELOPMENT POTENTIAL	
	WORKSHOP PARTICIPANT REPRESENTATIVE LRT ALIGNMENT		MAXIMUM
	SOUND TRANSIT REPRESENTATIVE ALIGNMENT		MINIMUM
	SWIFT GREEN LINE ALIGNMENT		ENVIRONMENTALLY SENSITIVE AREA
	SWIFT GREEN LINE I-5 CROSSING ALIGNMENT ALTERNATIVES		

SCALE

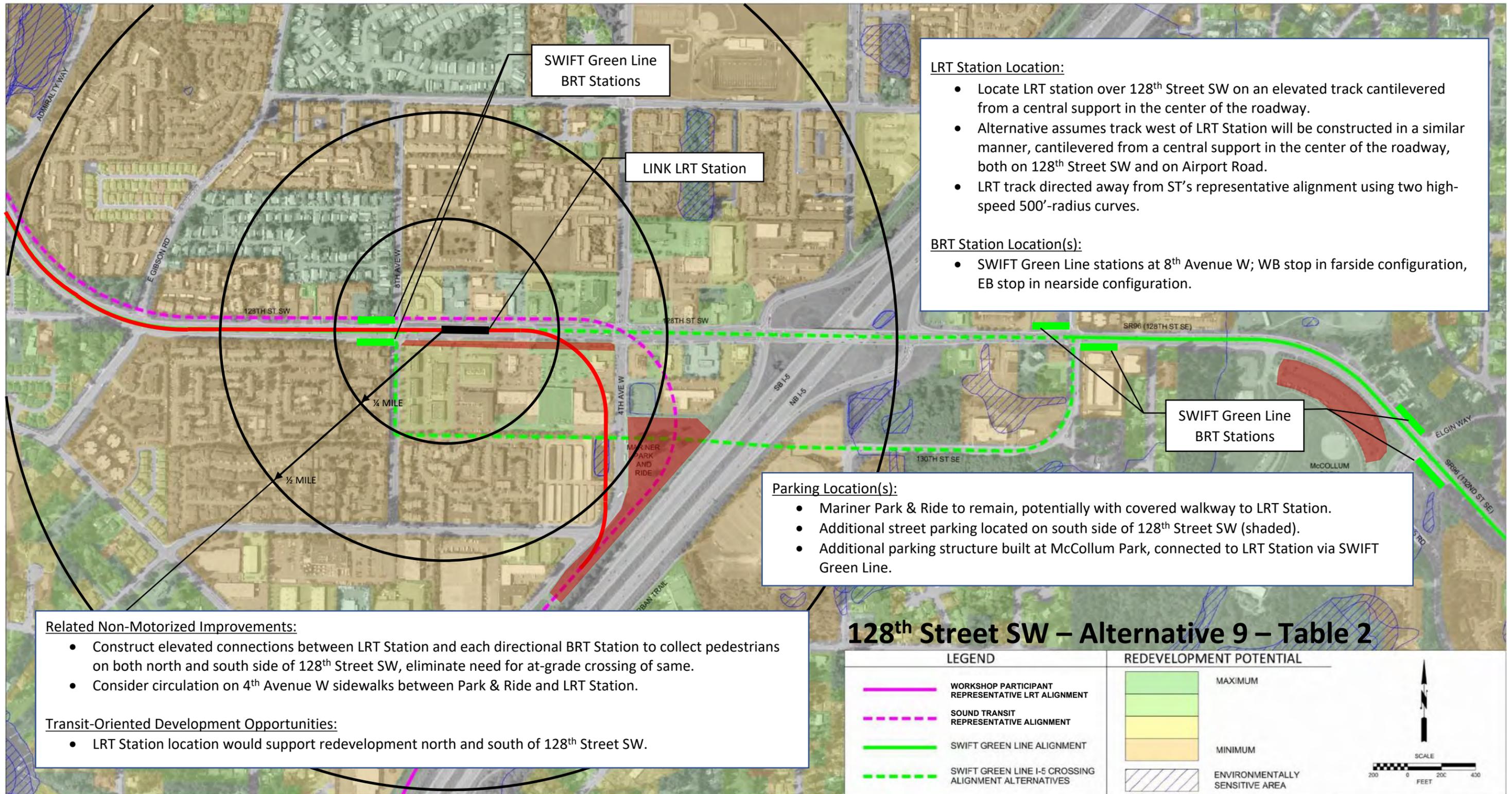
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- LRT Station Location:**
- Locate LRT station parallel to and south of 128th Street SW just west of the existing 4th Avenue W intersection.
 - LRT track directed from ST's representative alignment using a low-speed 300'-radius curve.
 - Alternative assumes LRT track west of LRT Station will be constructed south of 128th Street SW and southwest of Airport Road.
- BRT Station Location(s):**
- SWIFT Green Line stations at 4th Avenue W, both stops in farside configuration.
- Parking Location(s):**
- Mariner Park & Ride to remain.
 - Mariner Park & Ride could be expanded north into shaded area, potentially connected to the LRT Station via covered walkway.
- Related Non-Motorized Improvements:**
- Construct elevated connections between LRT Station and each directional BRT Station to collect pedestrians on both north and south side of 128th Street SW, eliminate need for at-grade crossing of same.
- Transit-Oriented Development Opportunities:**
- LRT Station location would support redevelopment north and south of 128th Street SW.

128th Street SW – Alternative 8 – Table 3

LEGEND		REDEVELOPMENT POTENTIAL	
	WORKSHOP PARTICIPANT REPRESENTATIVE LRT ALIGNMENT		MAXIMUM
	SOUND TRANSIT REPRESENTATIVE ALIGNMENT		
	SWIFT GREEN LINE ALIGNMENT		MINIMUM
	SWIFT GREEN LINE I-5 CROSSING ALIGNMENT ALTERNATIVES		ENVIRONMENTALLY SENSITIVE AREA



LRT Station Location:

- Locate LRT station over 128th Street SW on an elevated track cantilevered from a central support in the center of the roadway.
- Alternative assumes track west of LRT Station will be constructed in a similar manner, cantilevered from a central support in the center of the roadway, both on 128th Street SW and on Airport Road.
- LRT track directed away from ST's representative alignment using two high-speed 500'-radius curves.

BRT Station Location(s):

- SWIFT Green Line stations at 8th Avenue W; WB stop in farside configuration, EB stop in nearside configuration.

Parking Location(s):

- Mariner Park & Ride to remain, potentially with covered walkway to LRT Station.
- Additional street parking located on south side of 128th Street SW (shaded).
- Additional parking structure built at McCollum Park, connected to LRT Station via SWIFT Green Line.

Related Non-Motorized Improvements:

- Construct elevated connections between LRT Station and each directional BRT Station to collect pedestrians on both north and south side of 128th Street SW, eliminate need for at-grade crossing of same.
- Consider circulation on 4th Avenue W sidewalks between Park & Ride and LRT Station.

Transit-Oriented Development Opportunities:

- LRT Station location would support redevelopment north and south of 128th Street SW.

128th Street SW – Alternative 9 – Table 2

LEGEND		REDEVELOPMENT POTENTIAL	
	WORKSHOP PARTICIPANT REPRESENTATIVE LRT ALIGNMENT		MAXIMUM
	SOUND TRANSIT REPRESENTATIVE ALIGNMENT		
	SWIFT GREEN LINE ALIGNMENT		MINIMUM
	SWIFT GREEN LINE I-5 CROSSING ALIGNMENT ALTERNATIVES		ENVIRONMENTALLY SENSITIVE AREA

LRT Station Location:

- Current planned location on ST's representative alignment.

BRT Station Location(s):

- SWIFT Orange Line stations at Ash Way Park & Ride.

Parking Location(s):

- Ash Way Park & Ride to remain with reconfiguration to expedite BRT pick-up and drop-off.

Related Non-Motorized Improvements:

- Consider a non-motorized connection across I-5 near the Texas T interchange (even if the bus/HOV access is not completed) to balance redevelopment and provide critical improvements for transit access.

Transit-Oriented Development Opportunities:

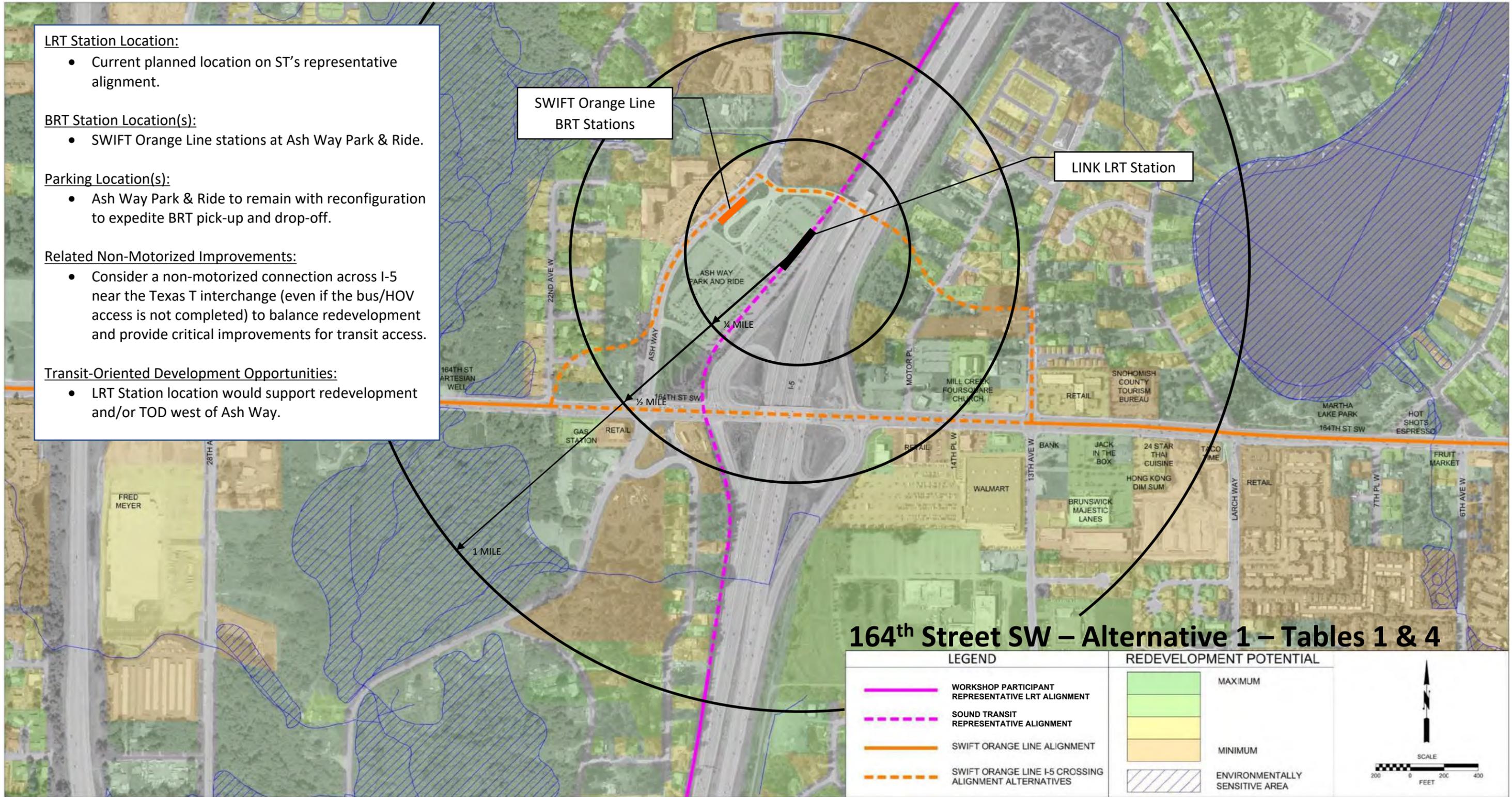
- LRT Station location would support redevelopment and/or TOD west of Ash Way.

SWIFT Orange Line
BRT Stations

LINK LRT Station

164th Street SW – Alternative 1 – Tables 1 & 4

LEGEND		REDEVELOPMENT POTENTIAL	
	WORKSHOP PARTICIPANT REPRESENTATIVE LRT ALIGNMENT		MAXIMUM
	SOUND TRANSIT REPRESENTATIVE ALIGNMENT		
	SWIFT ORANGE LINE ALIGNMENT		MINIMUM
	SWIFT ORANGE LINE I-5 CROSSING ALIGNMENT ALTERNATIVES		ENVIRONMENTALLY SENSITIVE AREA



LRT Station Location:

- Locate LRT Station along Ash Way near southern end of Newberry Square development.
- LRT track directed away from ST's representative alignment using two high-speed 500'-radius curves to the south and two low-speed 300'-radius curves to the north.

BRT Station Location(s):

- SWIFT Orange Line stations at Ash Way Park & Ride.

Parking Location(s):

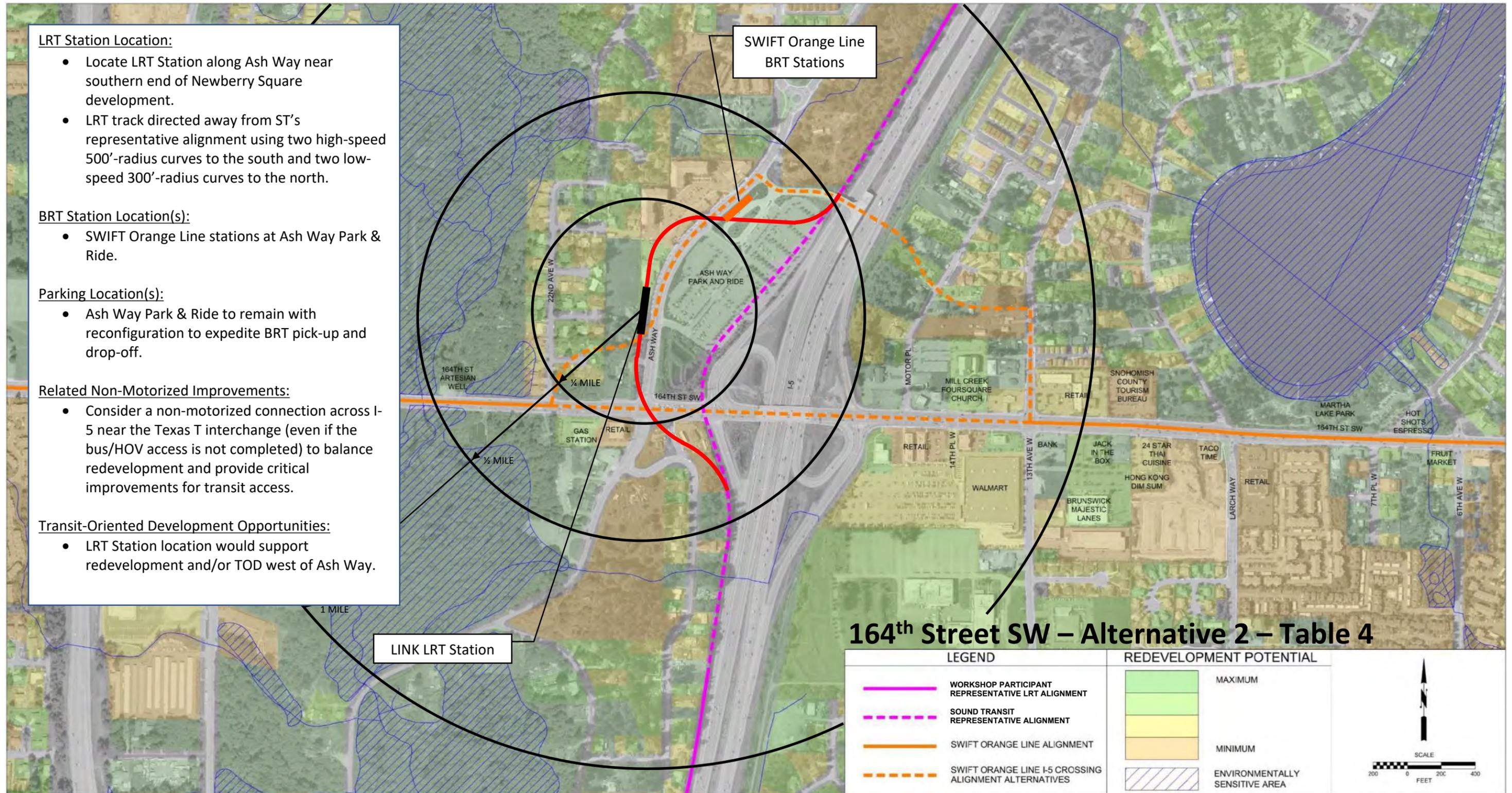
- Ash Way Park & Ride to remain with reconfiguration to expedite BRT pick-up and drop-off.

Related Non-Motorized Improvements:

- Consider a non-motorized connection across I-5 near the Texas T interchange (even if the bus/HOV access is not completed) to balance redevelopment and provide critical improvements for transit access.

Transit-Oriented Development Opportunities:

- LRT Station location would support redevelopment and/or TOD west of Ash Way.



164th Street SW – Alternative 2 – Table 4

LRT Station Location:

- Locate LRT Station on existing Ash Way alignment, across existing 164th Street SW & Ash Way intersection.
- Alternative assumes realignment of Ash Way will be reconstructed.
- LRT track directed away from ST's representative alignment using two high-speed 500'-radius curves to the south and two low-speed 300'-radius curves to the north.

BRT Station Location(s):

- SWIFT Orange Line stations on 164th Street SW at existing Ash Way intersection, farside configurations in both directions.

Parking Location(s):

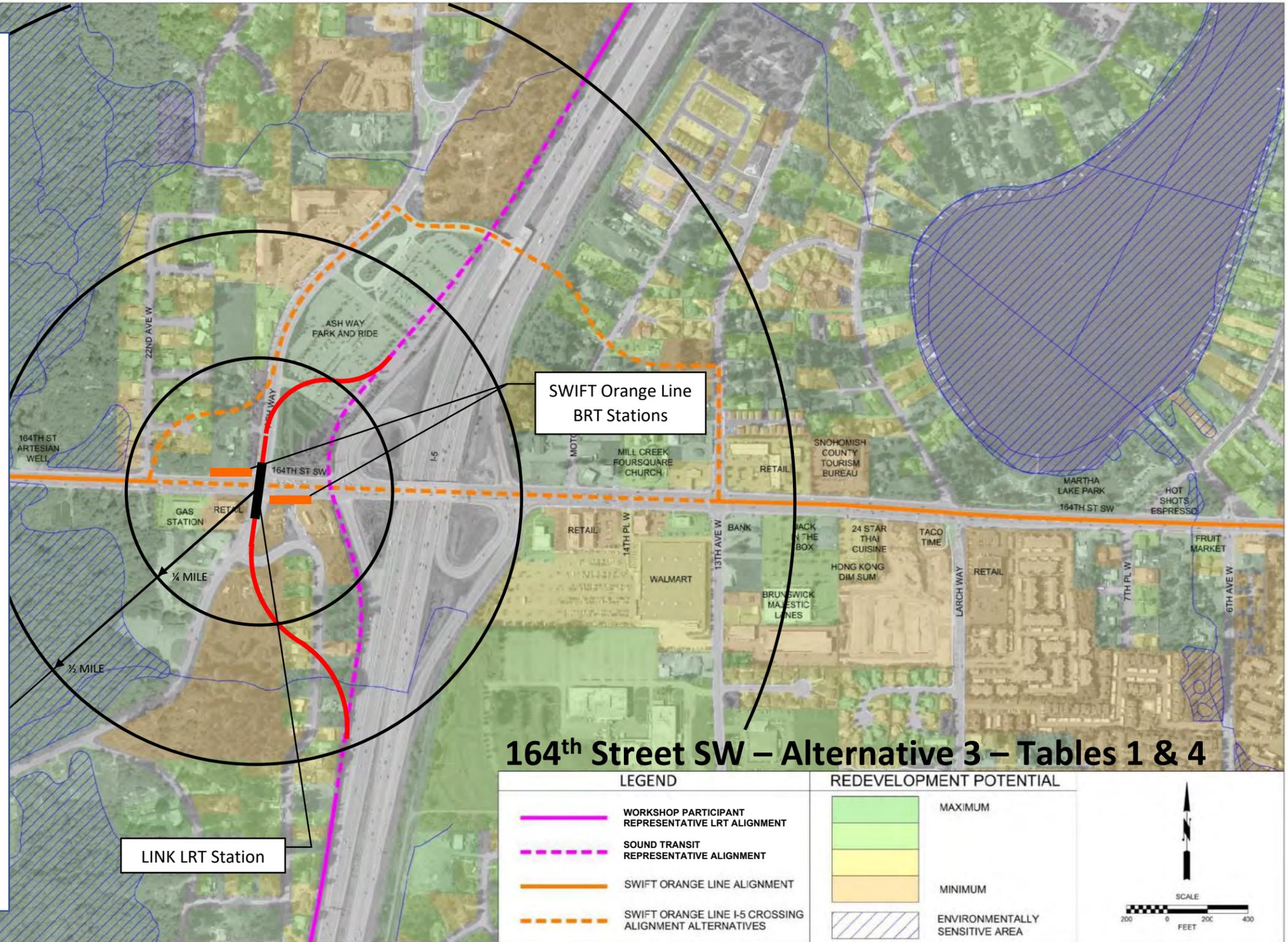
- Ash Way Park & Ride to remain with reconfiguration to move conventional bus transfer area closer to 164th Ave SW.

Related Non-Motorized Improvements:

- Construct elevated connections between LRT Station and each directional BRT Station to collect pedestrians on both north and south side of 164th Street SW, eliminate need for at-grade crossing of same.
- Consider a non-motorized connection across I-5 near the Texas T interchange (even if the bus/HOV access is not completed) to balance redevelopment and provide critical improvements for transit access.

Transit-Oriented Development Opportunities:

- LRT Station location would maximize redevelopment in the area west of I-5, with opportunities north and west of Ash Way and south of 164th Street SW.



LRT Station Location:

- Locate LRT Station parallel to west of 13th Avenue W, across 164th Street SW.
- LRT track directed away from ST's representative alignment using two high-speed 500'-radius curves to the south and 2-3 high-speed 500'-radius curves to the north.

BRT Station Location(s):

- SWIFT Orange Line stations on 164th Street SW at existing 13th Avenue W intersection; farside configuration in WB direction, nearside configuration in EB direction.

Parking Location(s):

- Alternative assumes redevelopment of Wal-Mart; time horizon of ST3 construction may likely coincide with Wal-Mart's redevelopment of site.
- Demolish existing Wal-Mart store; develop new Park & Ride facility using existing Wal-Mart parking lot and store footprint.

Related Non-Motorized Improvements:

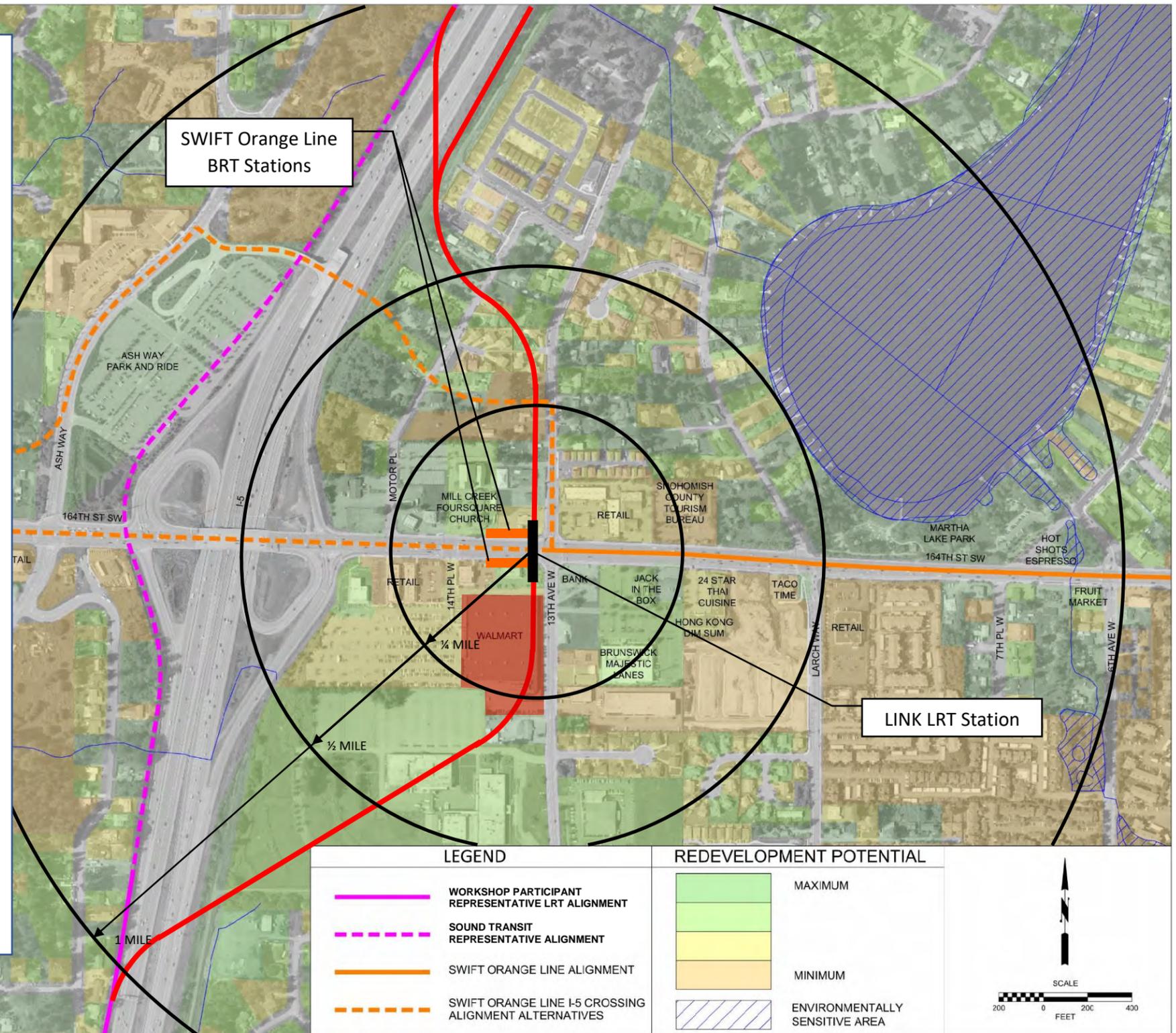
- Construct elevated connections between LRT Station and each directional BRT Station to collect pedestrians on both north and south side of 164th Street SW, eliminate need for at-grade crossing of same.
- Consider a non-motorized connection across I-5 near the Texas T interchange (even if the bus/HOV access is not completed) to balance redevelopment and provide critical improvements for transit access.

Additional Benefits to Transportation Infrastructure:

- Combination of moving LRT Station east and realigning Ash Way allows room to expand existing I-5 interchange, reduce congestion on short segment of 164th Street SW immediately west of interchange.

Transit-Oriented Development Opportunities:

- LRT Station location would maximize total redevelopment potential in the area by shifting LRT track to east side of I-5 where there are fewer environmentally sensitive areas. Note that nearly the entire ½-mile walkshed is now available.
- Realign Ash Way and redevelop Ash Way Park & Ride facility to TOD.



164th Street SW – Alternative 4 – Tables 2 & 3

Additional Improvements to Transportation Infrastructure:

- Construct new circumferential multimodal street making a northern loop around the interchange to relieve congestion on 164th Street SW and connect the sectors on either side of I-5.

Transit-Oriented Development Opportunities:

- Plenty of redevelopment potential inside northern loop road.

SWIFT Orange Line
BRT Stations

LRT Station Location:

- Locate LRT Station on existing Ash Way alignment, across existing 164th Street SW & Ash Way intersection.
- Alternative assumes that Ash Way south of 164th Street SW will be vacated and used for an at-grade LRT track which will be elevated as it approaches 164th Street SW from the south. LRT track will remain elevated through the study area.

BRT Station Location(s):

- SWIFT Orange Line stations on 164th Street SW at existing Ash Way intersection, farside configurations in both directions.

Parking Location(s):

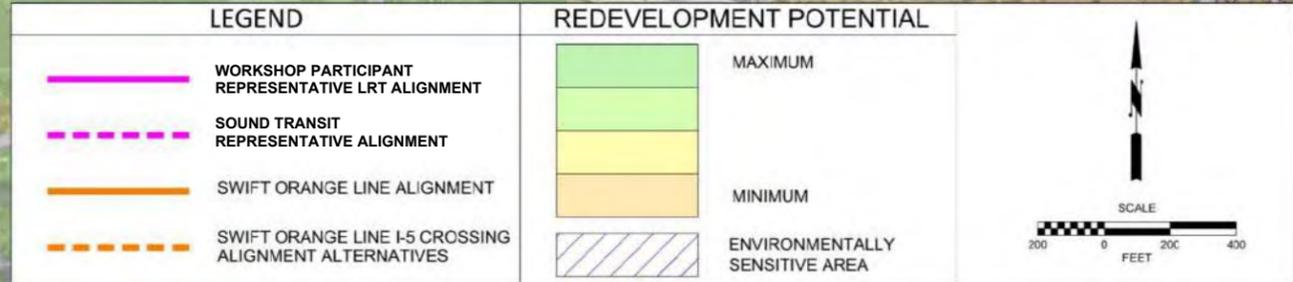
- Ash Way Park & Ride to remain with reconfiguration to move conventional bus transfer area closer to 164th Ave SW.

Related Non-Motorized Improvements:

- Construct elevated connections between LRT Station and each directional BRT Station to collect pedestrians on both north and south side of 164th Street SW, eliminate need for at-grade crossing of same.
- Consider a non-motorized connection across I-5 near the Texas T interchange (even if the bus/HOV access is not completed) to balance redevelopment and provide critical improvements for transit access.

LINK LRT Station

164th Street SW – Alternative 5 – Table 2



MEETING SUMMARY

505 5th Avenue S, Suite 300, Seattle, WA 98104 | P 206.436.0515

Client: Snohomish County
Project: 20180071.000 - East-West Corridor HCT Access Study – Station Area Planning
Time/Date: 3:00-4:30PM, August 17, 2018
Location: Mount Baker Conference Room, Snohomish County East Admin Bldg
Conf(O), AdmE , 6A02(025)
Subject: Station Area Planning Workshop #3

Attendees: Steve Thomsen, Snohomish County, Public Works
Steve Dickson, Snohomish County Public Works
Doug McCormick, Snohomish County Public Works
Jay Larson, Snohomish County Public Works, Agency Project Manager
Julie Highton, Snohomish County Public Works
David Killingstad, Snohomish County PDS
Eileen Canola, Snohomish County PDS
Stephen Toy, Snohomish County PDS
Frank Slusser, Snohomish County PDS
Felicia Medlen, Snohomish County Human Services
Yorik Stevens-Wajda, Snohomish County Council Staff
Vanessa Gutierrez, Snohomish County Executive's Office
Lacey Harper, Snohomish County Executive's Office
Tom Teigen, Snohomish County Parks
Peter De Boldt, Perteet, Consultant Project Manager
Marcus Elliott, Perteet
John Owen, Makers
Chris Wellander, WSP

Agenda:

1. Introductions/Workshop Overview – All/Peter(5 minutes)
2. Summary of Concepts from Workshop #2 – Peter (15 minutes)
3. Preliminary Decision Matrix Discussion - (40 minutes)
4. Conclusions/Next Steps
 - Alternatives to carry forward – Peter (10 minutes)
 - Closing – Steve T. (2 minutes)

MEETING SUMMARY

505 5th Avenue S, Suite 300, Seattle, WA 98104 | P 206.436.0515

Discussion:

1. Introductions/Workshop Overview

Peter facilitated introductions and led the group through the goals and objectives of previous Workshops #1 and #2, as well as those for the current Workshop #3.

2. Summary of Concepts from Workshop #2

Peter stepped the group through the five alternatives identified for the 164th Street SW corridor and the nine alternatives identified for the 128th Street SW corridor during Workshop #2. The presentation included descriptive maps for each alternative which showed the potential LRT station location and its relationship to Sound Transit's representative alignment, possible resulting configurations to Community Transit's SWIFT BRT zones, the deviations required from the representative alignment to serve the LRT station location, and the overall walksheds created for each LRT station location. (See the meeting summary for Workshop #2 for maps of each of these alternatives.)

3. Preliminary Decision Matrix Discussion

Peter led the group through the Consumer Reports-style "pie piece" evaluation matrix for each corridor, describing the evaluation criteria used to rank the alternatives:

- Geometric Constraints
 - The project team sourced both desired (500') and minimum (300') horizontal curve radii for the LRT track from Sound Transit's design manual and used them to establish how the ST's representative LRT alignment would need to be diverted in order to access the potential LRT station location. Many of the alternatives required minimum radii in order to work—resulting in trains running at slower speeds impacting future operations—and were downgraded accordingly in the decision matrix.
 - Most of the alternatives in both project corridors were explicitly suggested as aerial stations, with only a select few also allowing possible construction as at-grade stations. If both configurations were possible, the decision matrix provided evaluations of both.
- Accessibility to SWIFT BRT
 - Full points were awarded if a station could be built as a single structure to be built which incorporated the LRT station and BRT stations in both directions. This is possible wherever an aerial LRT station can be made to straddle a roadway in a manner that allows transit passengers to make a seamless transfer between modes, regardless of the direction of travel.
 - Fewer points were awarded if passengers transferring between modes in either direction were required to cross a street.
 - Even fewer points were awarded if the transfer between LRT and BRT stations included a significant distance to walk.
- Connections for Bikes and Pedestrians
 - Does the potential LRT station location lie on or near potential bicycle routes or walkable sidewalks that are reasonably safe? If not, can the existing roadway network be reconfigured to improve bicycle and/or pedestrian connections to the station location?

- How much of the 1/4-mile and 1/2-mile walksheds can access the potential LRT station location?
- Transit-Oriented Development Opportunities
 - The team shaded areas of the map according to redevelopment potential as detailed by Leland Consulting Group in their report to the County. Once a potential LRT station location was identified, the team superimposed the walkshed limits and made a subjective evaluation of how much the area might redevelop in response to better transit connections.

4. Conclusions/Next Steps

The group discussed the various alternatives for each corridor.

- 164th Street SW
 - Alternative 4 was both the highest-scoring alternative and the only alternative to locate the LRT station on the east side of I-5. Consequently, the group felt that it should advance to the next level of analysis.
 - Alternatives 1 and 2 both kept the LRT station at the Ash Way Park & Ride facility. Due to the level of previous investment at this location, the group felt that these alternatives should be combined into a single generic LRT station location independent of the LRT route ultimately selected and advanced to the next level of analysis.
 - Alternatives 3 and 5 both place the LRT station at the existing intersection of Ash Way & 164th Street SW, with some degree of repurposing the Ash Way right-of-way for use by the LRT alignment. The group felt that this location has merit, given its proximity to both the Park & Ride and the arterial corridor. The two alternatives will be combined into a single generic LRT station location independent of the LRT route ultimately selected and advanced to the next level of analysis.
- 128th Street SW
 - Alternative 4, located diagonally across the intersection of 128th Street SW & 4th Ave W, was the highest-scoring alternative. The group felt that it should advance to the next level of analysis. A suggestion was made that the horizontal curves on this alternatives should be flattened to the desired 500' radius in order to score higher.
 - Alternatives 1, 2, 8, and 9 all clustered the LRT station on 128th Street SW somewhere between 8th Ave W and 4th Ave W. The group felt that these alternatives should be combined into a single generic LRT station location and advanced to the next level of analysis. Since Alternative 4 is also advancing and is already located at 4th Ave W intersection, the County's direction was to create a second generic location at the 8th Ave W area.
 - Alternatives 5, 6, and 7 are all located in the "superblock" bounded by 128th Street SW, 4th Ave W, 132nd Street SW, and 8th Ave W. The group felt that these alternatives should be combined into a single generic LRT station location and advanced to the next level of analysis.
 - Alternative 3 locates the LRT station too far from any potential BRT station. It will be dropped from the analysis entirely.

EAST-WEST ACCESS STUDY – STATION AREA PLANNING

Workshop #3

August 17, 2018





Workshop #3 Agenda

1. Introductions/Workshop Overview
2. Evaluation Criteria
3. 164th Street SW
 - Preliminary Decision Matrix Discussion
 - Summary of Concepts from Workshop #2
4. 128th Street SW
 - Preliminary Decision Matrix Discussion
 - Summary of Concepts from Workshop #2
5. Conclusions/Next Steps
 - Alternatives to carry forward
 - Closing





Evaluation Criteria

Consumer Reports-style ratings based on “pie” pieces.

-  = Best
-  = Good
-  = Fair
-  = Bad

Corridor Alternative	Criteria 1	Criteria 2	Criteria 3	Criteria 4
1				





Evaluation Criteria

1. Geometric Constraints

- Does the LRT track's horizontal alignment contain any low-speed curves?
- Will the LRT station location work for at-grade LRT track, an elevated LRT track, or both?

Yes = - 

2. Accessibility to SWIFT

- Can a single transit center be built to serve LRT and BRT (EB and WB)?
- Does the transfer between LRT and BRT stations include a significant distance to walk?

No = - 

Yes = - 

3. Connections to Bikes/Peds

- Is the LRT station located so that it lies on or near potential bicycle routes?
- Are the potential bicycle routes to the LRT station safe?
- Is the LRT station location accessible to the majority of the 1/4-Mile walkshed?
- Is the LRT station location accessible to the majority of the 1/2-Mile walkshed?

Yes = + 

Yes = + 

Yes = + 

Yes = + 

4. TOD Opportunities

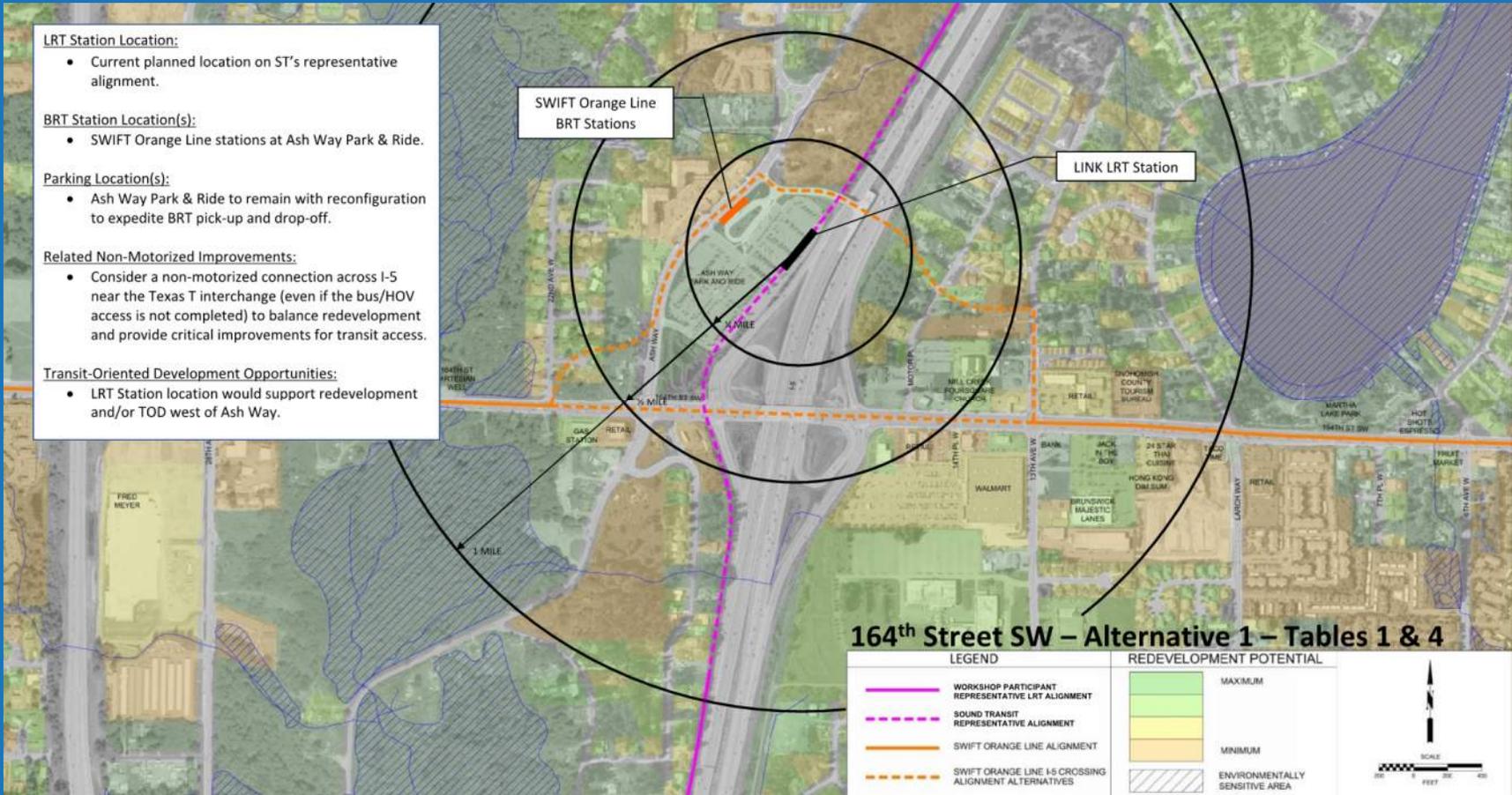
- Subjective measure of how much of the 1/2-Mile walkshed could be redeveloped.



Decision Matrix – 164th Street SW

Corridor Alternative	Geometric Constraints		Accessibility to SWIFT	Connections to Bike/Ped	TOD Opportunities
	At-Grade	Elevated			
1					
2					
3					
4					
5					

- LRT Station Location:**
- Current planned location on ST's representative alignment.
- BRT Station Location(s):**
- SWIFT Orange Line stations at Ash Way Park & Ride.
- Parking Location(s):**
- Ash Way Park & Ride to remain with reconfiguration to expedite BRT pick-up and drop-off.
- Related Non-Motorized Improvements:**
- Consider a non-motorized connection across I-5 near the Texas T interchange (even if the bus/HOV access is not completed) to balance redevelopment and provide critical improvements for transit access.
- Transit-Oriented Development Opportunities:**
- LRT Station location would support redevelopment and/or TOD west of Ash Way.



LRT Station Location:

- Locate LRT Station along Ash Way near southern end of Newberry Square development.
- LRT track directed away from ST's representative alignment using two high-speed 500'-radius curves to the south and two low-speed 300'-radius curves to the north.

BRT Station Location(s):

- SWIFT Orange Line stations at Ash Way Park & Ride.

Parking Location(s):

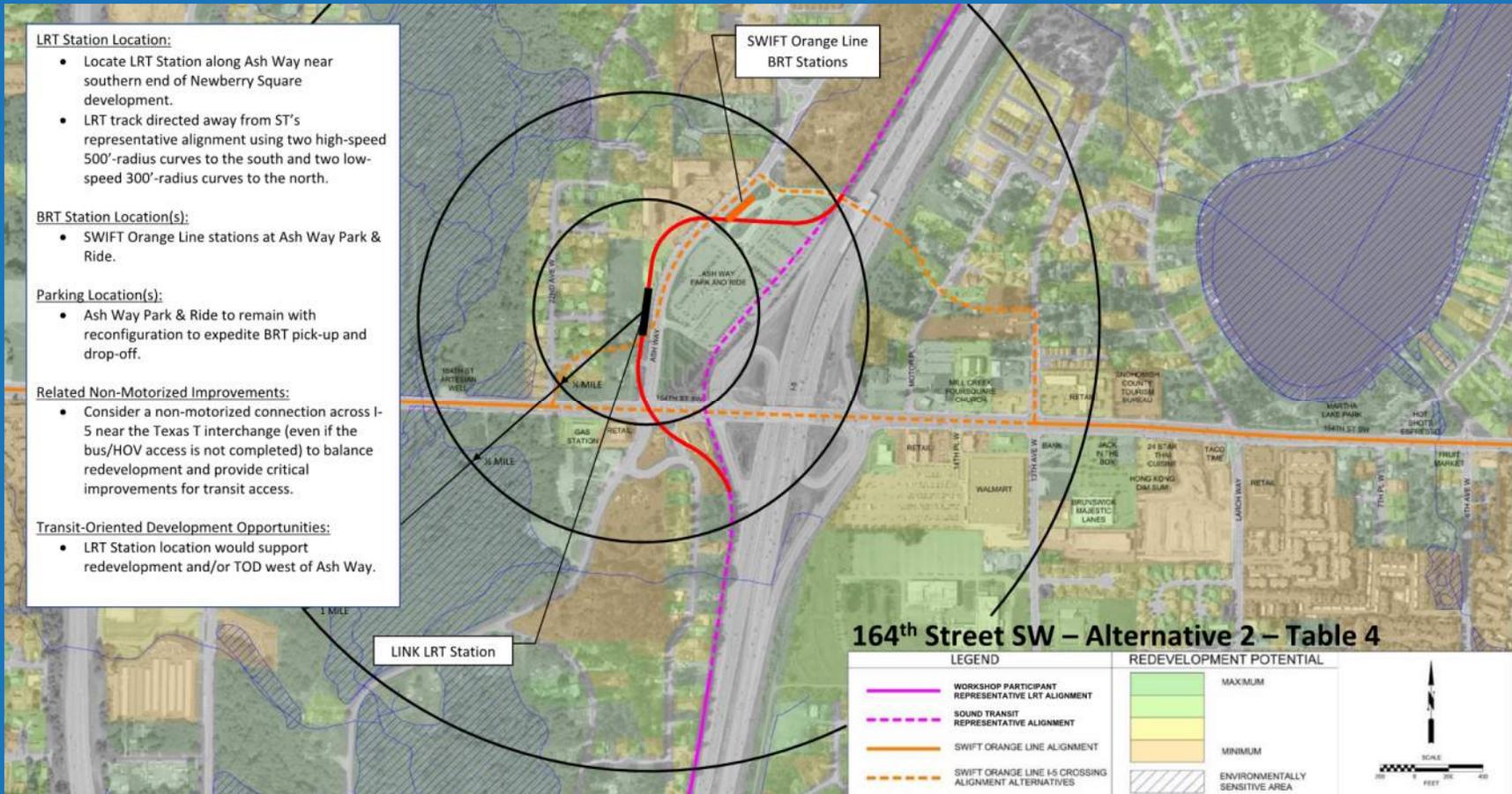
- Ash Way Park & Ride to remain with reconfiguration to expedite BRT pick-up and drop-off.

Related Non-Motorized Improvements:

- Consider a non-motorized connection across I-5 near the Texas T interchange (even if the bus/HOV access is not completed) to balance redevelopment and provide critical improvements for transit access.

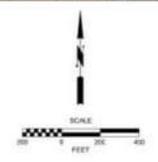
Transit-Oriented Development Opportunities:

- LRT Station location would support redevelopment and/or TOD west of Ash Way.



164th Street SW – Alternative 2 – Table 4

LEGEND		REDEVELOPMENT POTENTIAL	
	WORKSHOP PARTICIPANT REPRESENTATIVE LRT ALIGNMENT		MAXIMUM
	SOUND TRANSIT REPRESENTATIVE ALIGNMENT		MINIMUM
	SWIFT ORANGE LINE ALIGNMENT		ENVIRONMENTALLY SENSITIVE AREA
	SWIFT ORANGE LINE I-5 CROSSING ALIGNMENT ALTERNATIVES		



LRT Station Location:

- Locate LRT Station on existing Ash Way alignment, across existing 164th Street SW & Ash Way intersection.
- Alternative assumes realignment of Ash Way will be reconstructed.
- LRT track directed away from ST's representative alignment using two high-speed 500'-radius curves to the south and two low-speed 300'-radius curves to the north.

BRT Station Location(s):

- SWIFT Orange Line stations on 164th Street SW at existing Ash Way intersection, farside configurations in both directions.

Parking Location(s):

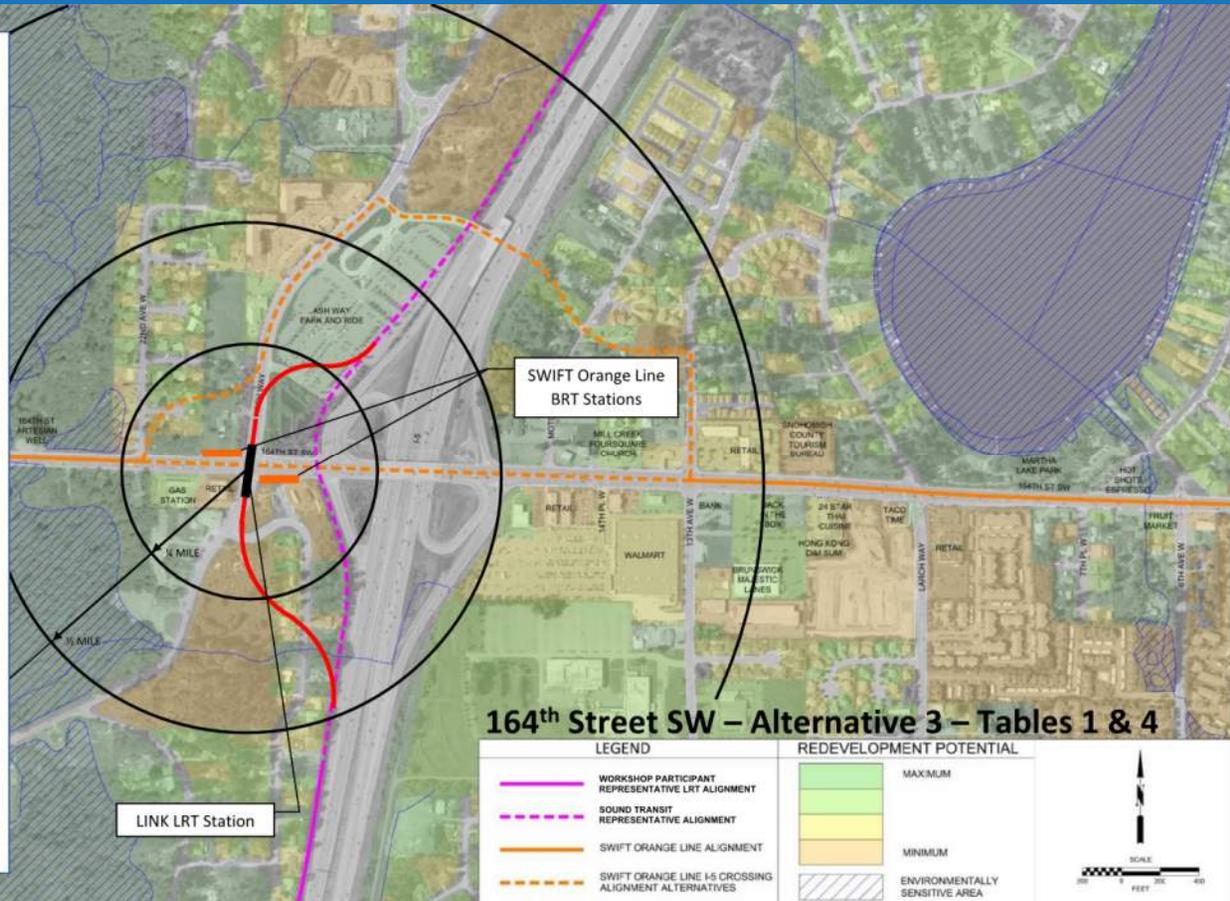
- Ash Way Park & Ride to remain with reconfiguration to move conventional bus transfer area closer to 164th Ave SW.

Related Non-Motorized Improvements:

- Construct elevated connections between LRT Station and each directional BRT Station to collect pedestrians on both north and south side of 164th Street SW, eliminate need for at-grade crossing of same.
- Consider a non-motorized connection across I-5 near the Texas T interchange (even if the bus/HOV access is not completed) to balance redevelopment and provide critical improvements for transit access.

Transit-Oriented Development Opportunities:

- LRT Station location would maximize redevelopment in the area west of I-5, with opportunities north and west of Ash Way and south of 164th Street SW.



LRT Station Location:

- Locate LRT Station parallel to west of 13th Avenue W, across 164th Street SW.
- LRT track directed away from ST's representative alignment using two high-speed 500'-radius curves to the south and 2-3 high-speed 500'-radius curves to the north.

BRT Station Location(s):

- SWIFT Orange Line stations on 164th Street SW at existing 13th Avenue W intersection; farside configuration in WB direction, nearside configuration in EB direction.

Parking Location(s):

- Alternative assumes redevelopment of Wal-Mart; time horizon of ST3 construction may likely coincide with Wal-Mart's redevelopment of site.
- Demolish existing Wal-Mart store; develop new Park & Ride facility using existing Wal-Mart parking lot and store footprint.

Related Non-Motorized Improvements:

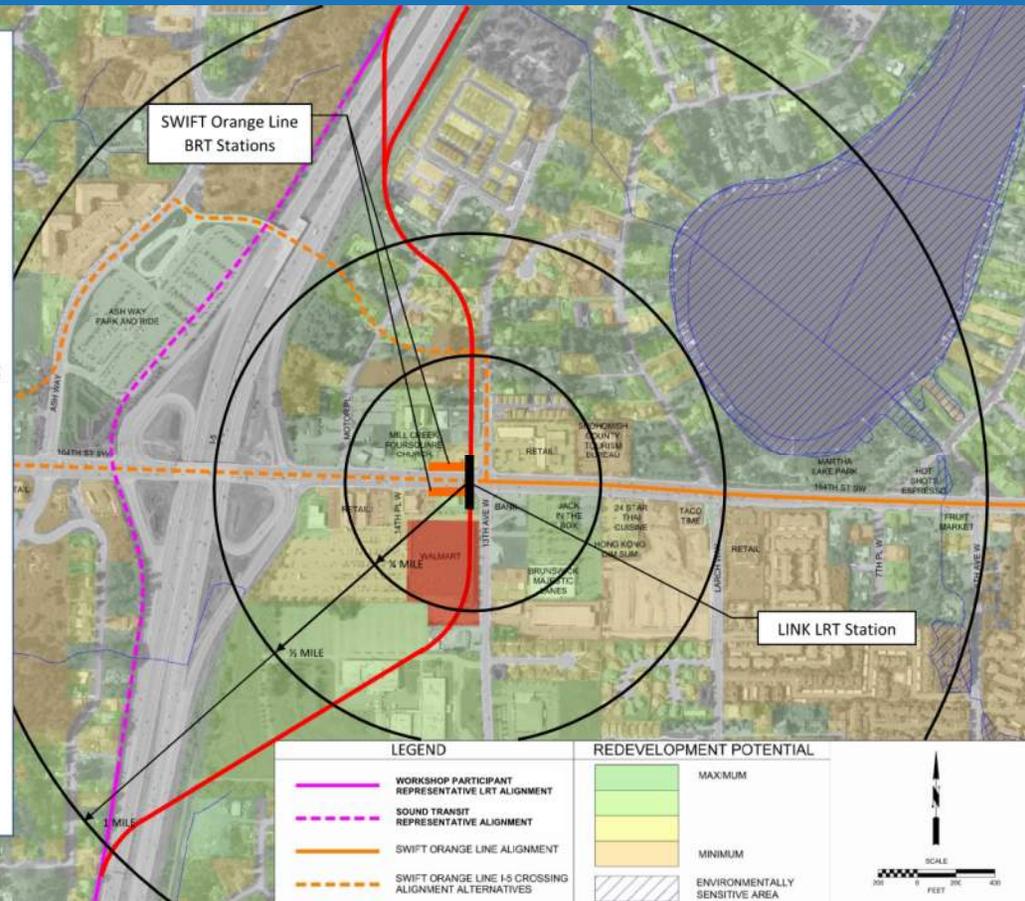
- Construct elevated connections between LRT Station and each directional BRT Station to collect pedestrians on both north and south side of 164th Street SW, eliminate need for at-grade crossing of same.
- Consider a non-motorized connection across I-5 near the Texas T interchange (even if the bus/HOV access is not completed) to balance redevelopment and provide critical improvements for transit access.

Additional Benefits to Transportation Infrastructure:

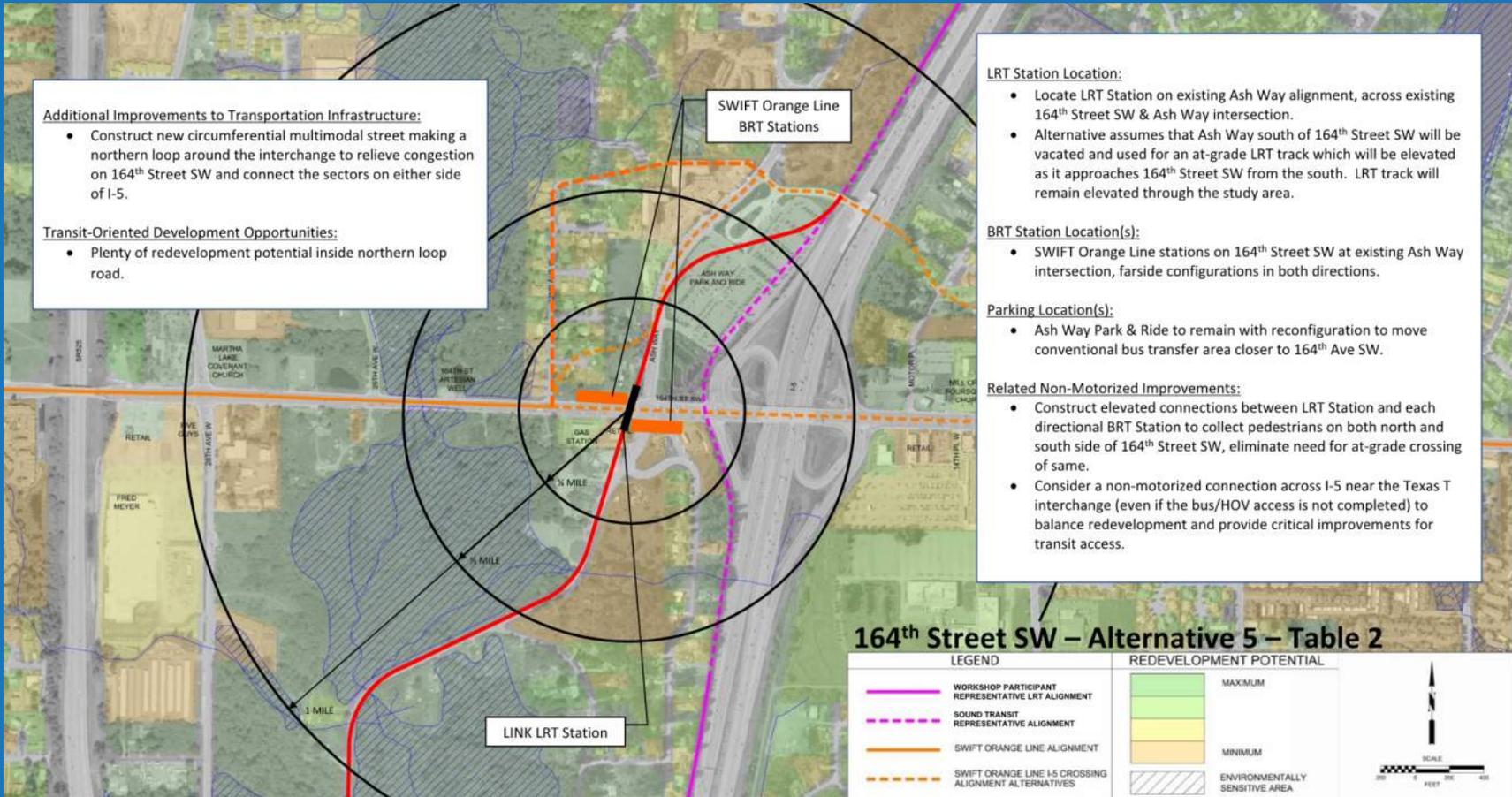
- Combination of moving LRT Station east and realigning Ash Way allows room to expand existing I-5 interchange, reduce congestion on short segment of 164th Street SW immediately west of interchange.

Transit-Oriented Development Opportunities:

- LRT Station location would maximize total redevelopment potential in the area by shifting LRT track to east side of I-5 where there are fewer environmentally sensitive areas. Note that nearly the entire ½-mile walkshed is now available.
- Realign Ash Way and redevelop Ash Way Park & Ride facility to TOD.



164th Street SW – Alternative 4 – Tables 2 & 3

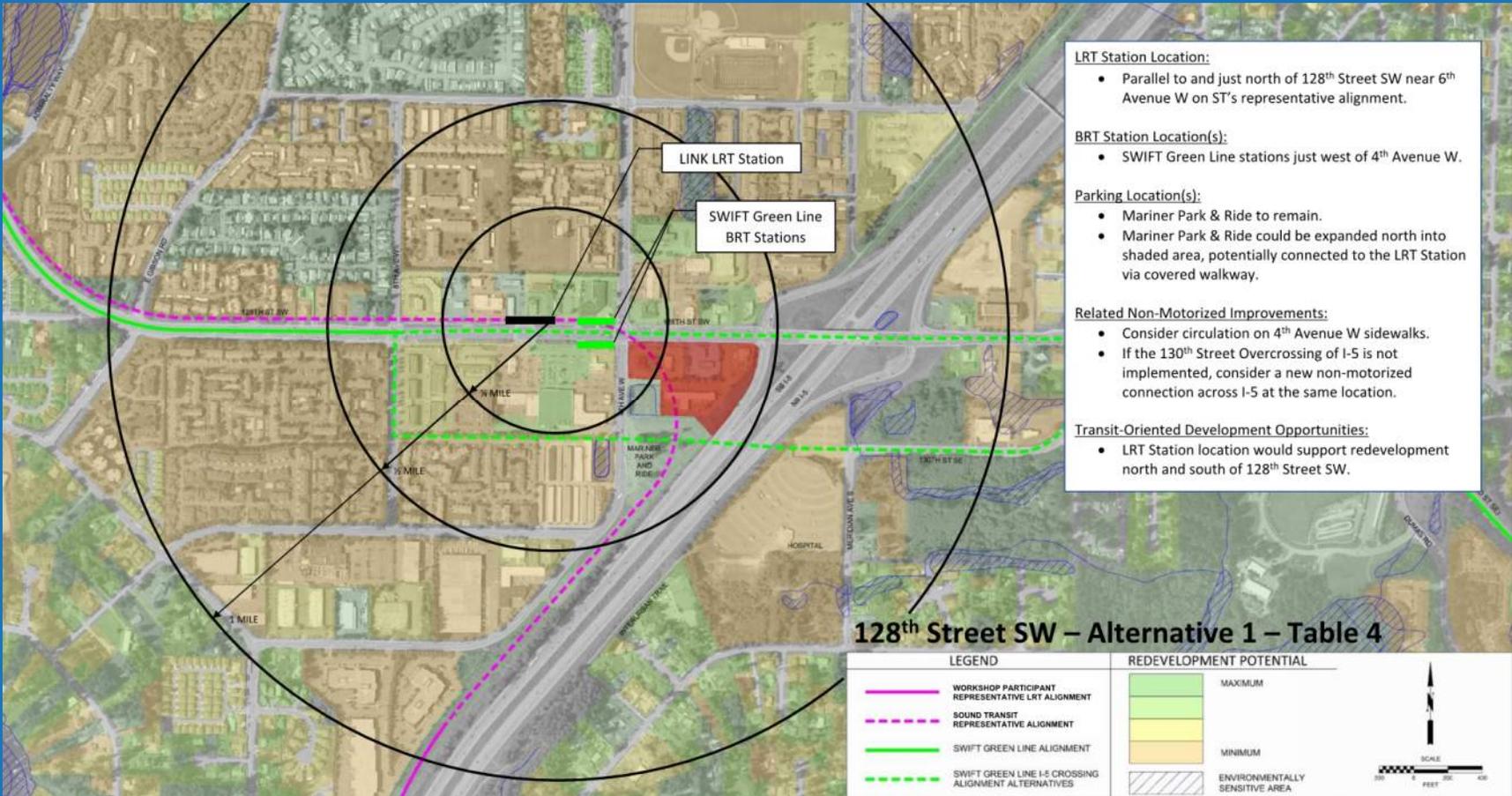


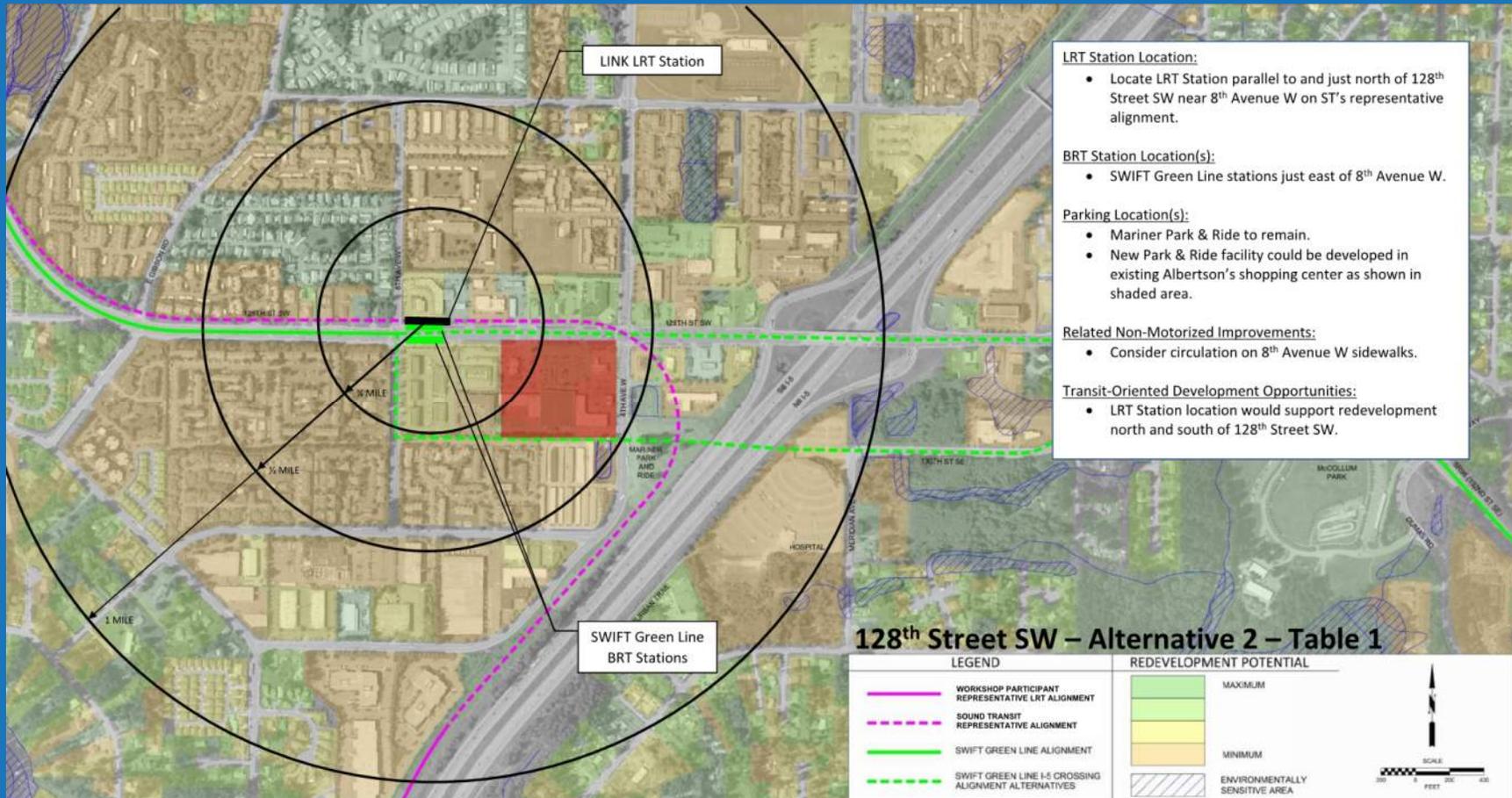
Decision Matrix – 164th Street SW

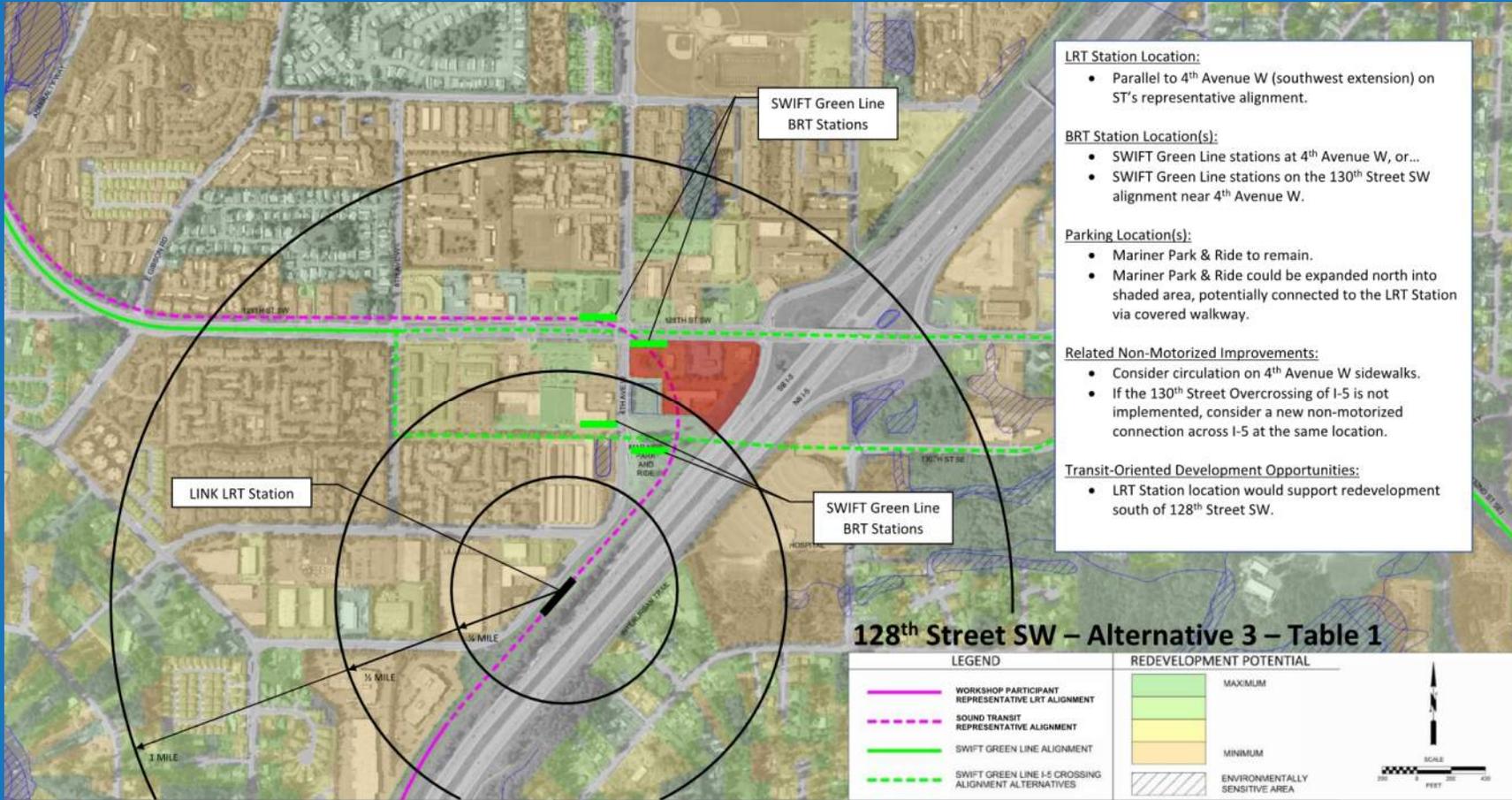
Corridor Alternative	Geometric Constraints		Accessibility to SWIFT	Connections to Bike/Ped	TOD Opportunities
	At-Grade	Elevated			
1					
2					
3					
4					
5					

Decision Matrix – 128th Street SW

Corridor Alternative	Geometric Constraints		Accessibility to SWIFT	Connections to Bike/Ped	TOD Opportunities
	At-Grade	Elevated			
1					
2					
3					
4					
5					
6					
7					
8					
9					







LRT Station Location:

- Parallel to 4th Avenue W (southwest extension) on ST's representative alignment.

BRT Station Location(s):

- SWIFT Green Line stations at 4th Avenue W, or...
- SWIFT Green Line stations on the 130th Street SW alignment near 4th Avenue W.

Parking Location(s):

- Mariner Park & Ride to remain.
- Mariner Park & Ride could be expanded north into shaded area, potentially connected to the LRT Station via covered walkway.

Related Non-Motorized Improvements:

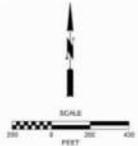
- Consider circulation on 4th Avenue W sidewalks.
- If the 130th Street Overcrossing of I-5 is not implemented, consider a new non-motorized connection across I-5 at the same location.

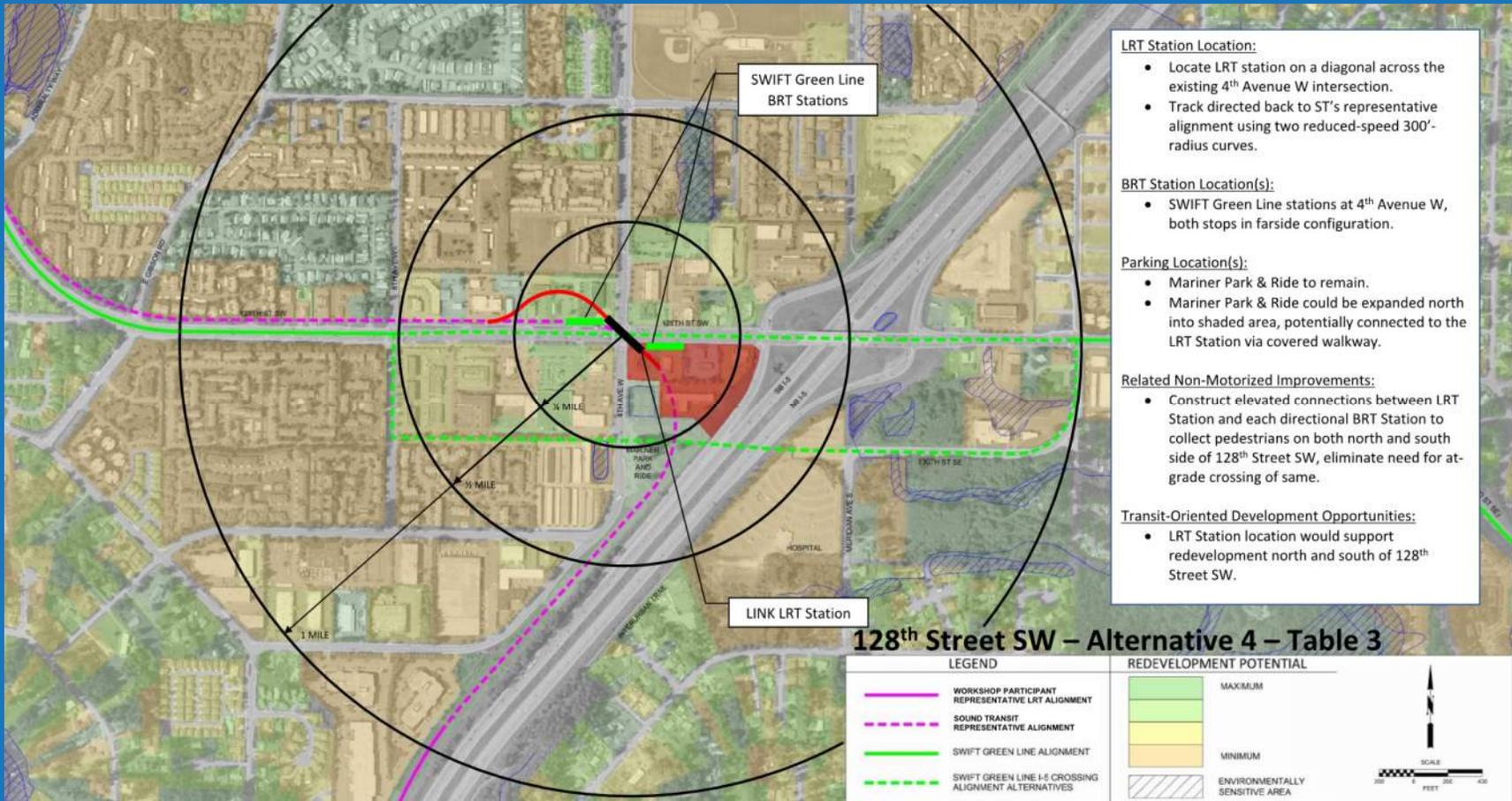
Transit-Oriented Development Opportunities:

- LRT Station location would support redevelopment south of 128th Street SW.

128th Street SW – Alternative 3 – Table 1

LEGEND		REDEVELOPMENT POTENTIAL	
	WORKSHOP PARTICIPANT REPRESENTATIVE LRT ALIGNMENT		MAXIMUM
	SOUND TRANSIT REPRESENTATIVE ALIGNMENT		MINIMUM
	SWIFT GREEN LINE ALIGNMENT		ENVIRONMENTALLY SENSITIVE AREA
	SWIFT GREEN LINE I-5 CROSSING ALIGNMENT ALTERNATIVES		





LRT Station Location:

- Locate LRT station on a diagonal across the existing 4th Avenue W intersection.
- Track directed back to ST's representative alignment using two reduced-speed 300'-radius curves.

BRT Station Location(s):

- SWIFT Green Line stations at 4th Avenue W, both stops in far-side configuration.

Parking Location(s):

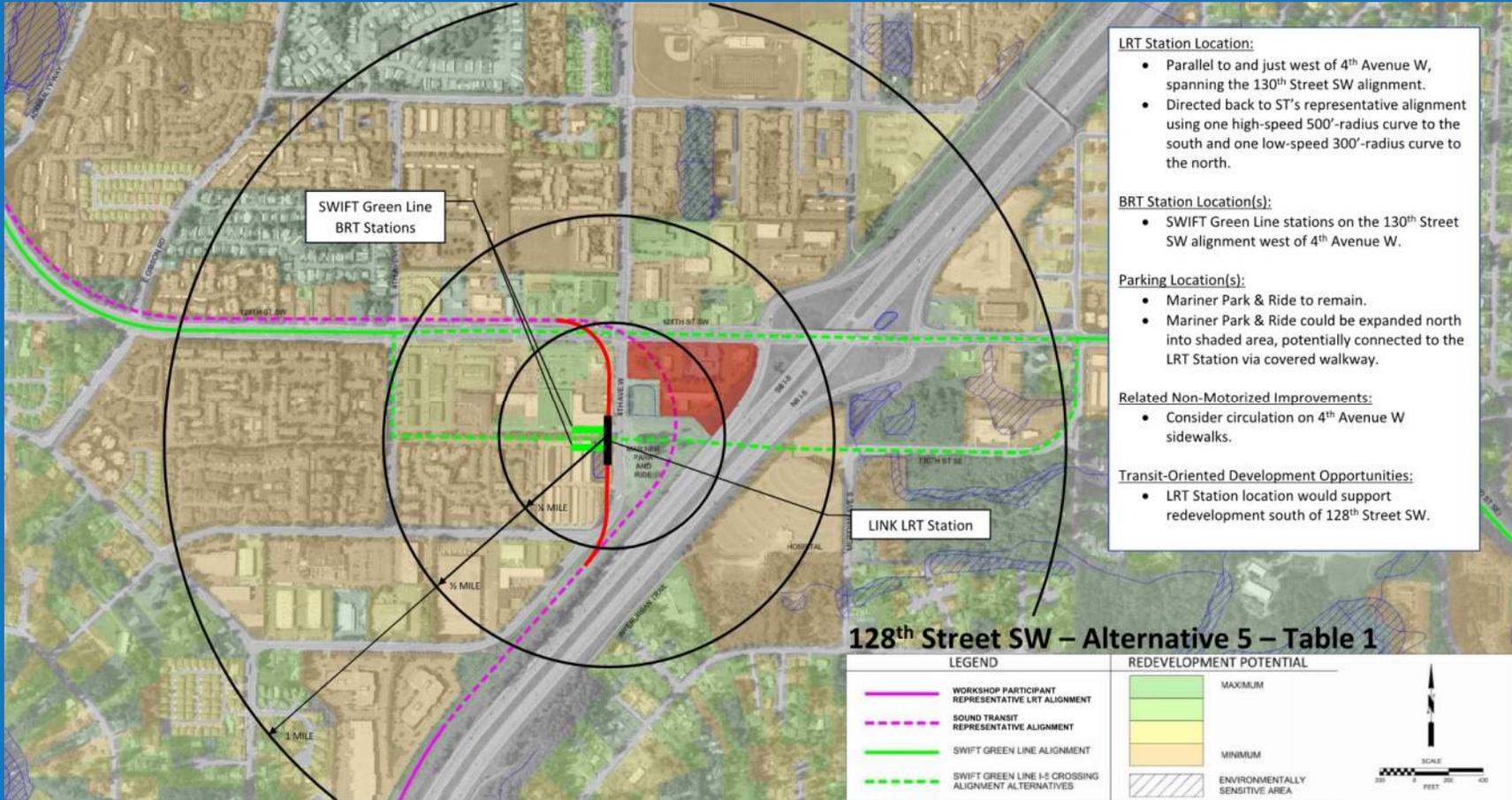
- Mariner Park & Ride to remain.
- Mariner Park & Ride could be expanded north into shaded area, potentially connected to the LRT Station via covered walkway.

Related Non-Motorized Improvements:

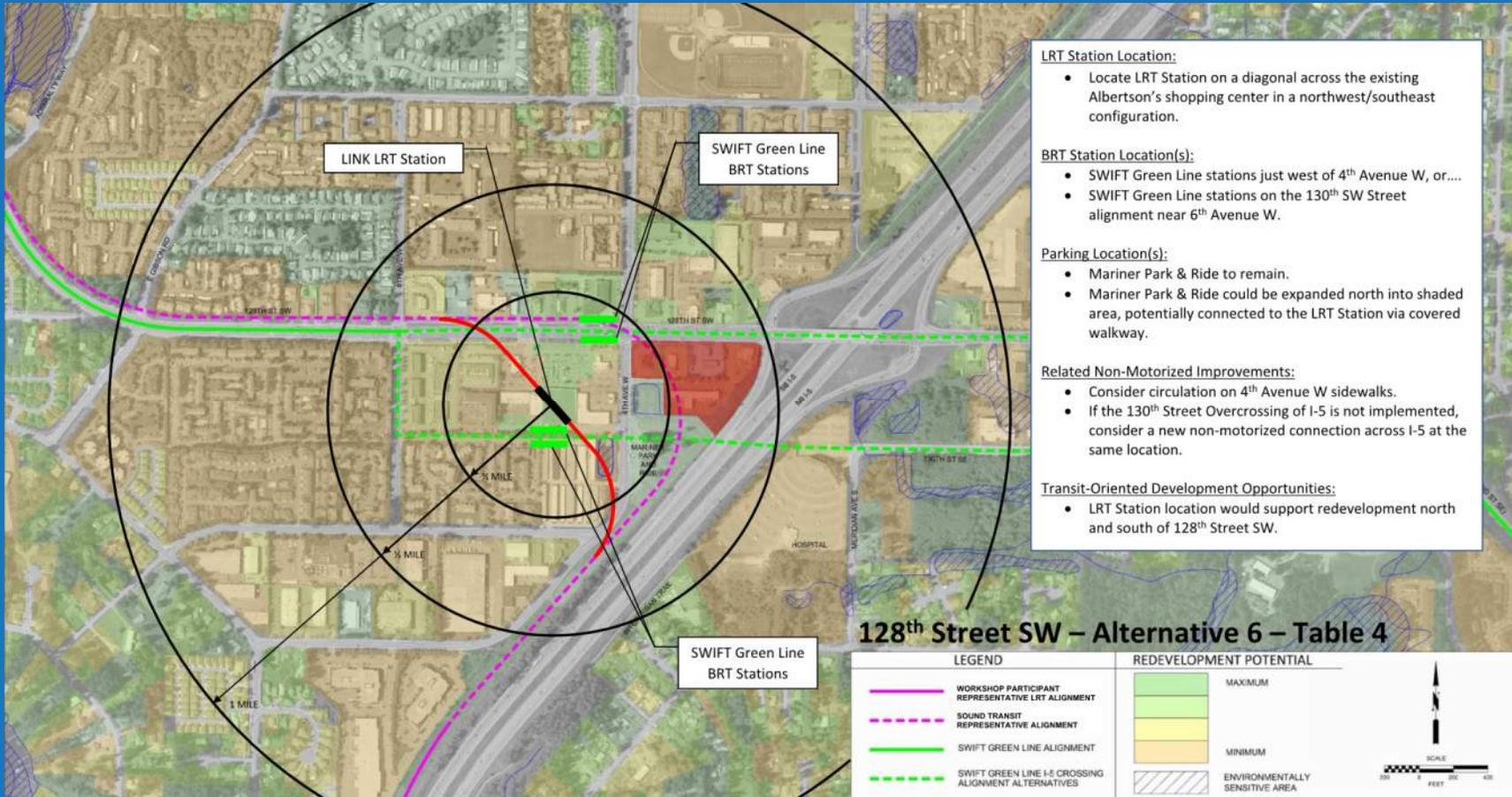
- Construct elevated connections between LRT Station and each directional BRT Station to collect pedestrians on both north and south side of 128th Street SW, eliminate need for at-grade crossing of same.

Transit-Oriented Development Opportunities:

- LRT Station location would support redevelopment north and south of 128th Street SW.



- LRT Station Location:**
- Parallel to and just west of 4th Avenue W, spanning the 130th Street SW alignment.
 - Directed back to ST's representative alignment using one high-speed 500'-radius curve to the south and one low-speed 300'-radius curve to the north.
- BRT Station Location(s):**
- SWIFT Green Line stations on the 130th Street SW alignment west of 4th Avenue W.
- Parking Location(s):**
- Mariner Park & Ride to remain.
 - Mariner Park & Ride could be expanded north into shaded area, potentially connected to the LRT Station via covered walkway.
- Related Non-Motorized Improvements:**
- Consider circulation on 4th Avenue W sidewalks.
- Transit-Oriented Development Opportunities:**
- LRT Station location would support redevelopment south of 128th Street SW.



LRT Station Location:

- Locate LRT Station on a diagonal across the existing Albertson's shopping center in a northwest/southeast configuration.

BRT Station Location(s):

- SWIFT Green Line stations just west of 4th Avenue W, or....
- SWIFT Green Line stations on the 130th SW Street alignment near 6th Avenue W.

Parking Location(s):

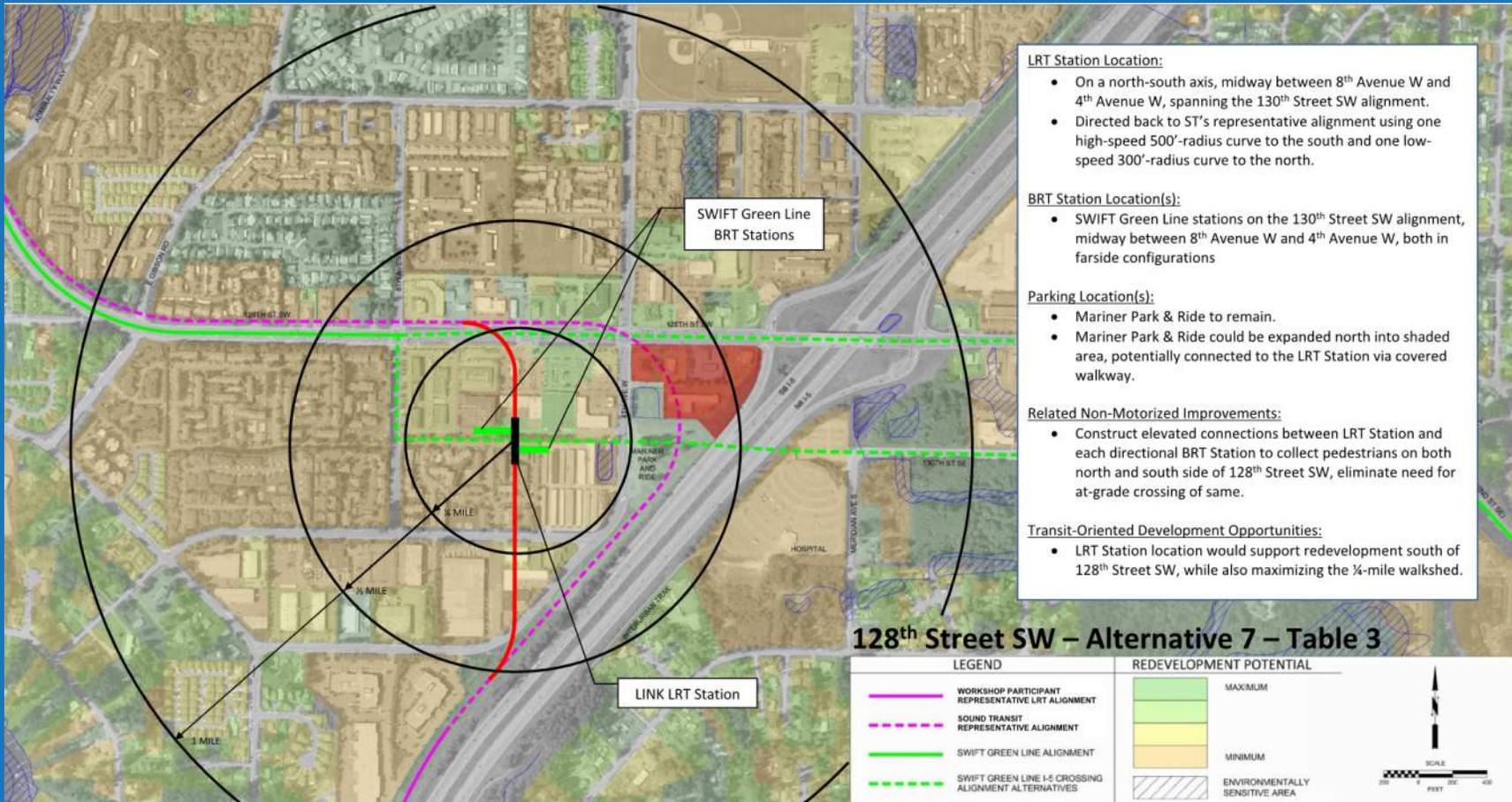
- Mariner Park & Ride to remain.
- Mariner Park & Ride could be expanded north into shaded area, potentially connected to the LRT Station via covered walkway.

Related Non-Motorized Improvements:

- Consider circulation on 4th Avenue W sidewalks.
- If the 130th Street Overcrossing of I-5 is not implemented, consider a new non-motorized connection across I-5 at the same location.

Transit-Oriented Development Opportunities:

- LRT Station location would support redevelopment north and south of 128th Street SW.



LRT Station Location:

- On a north-south axis, midway between 8th Avenue W and 4th Avenue W, spanning the 130th Street SW alignment.
- Directed back to ST's representative alignment using one high-speed 500'-radius curve to the south and one low-speed 300'-radius curve to the north.

BRT Station Location(s):

- SWIFT Green Line stations on the 130th Street SW alignment, midway between 8th Avenue W and 4th Avenue W, both in farside configurations

Parking Location(s):

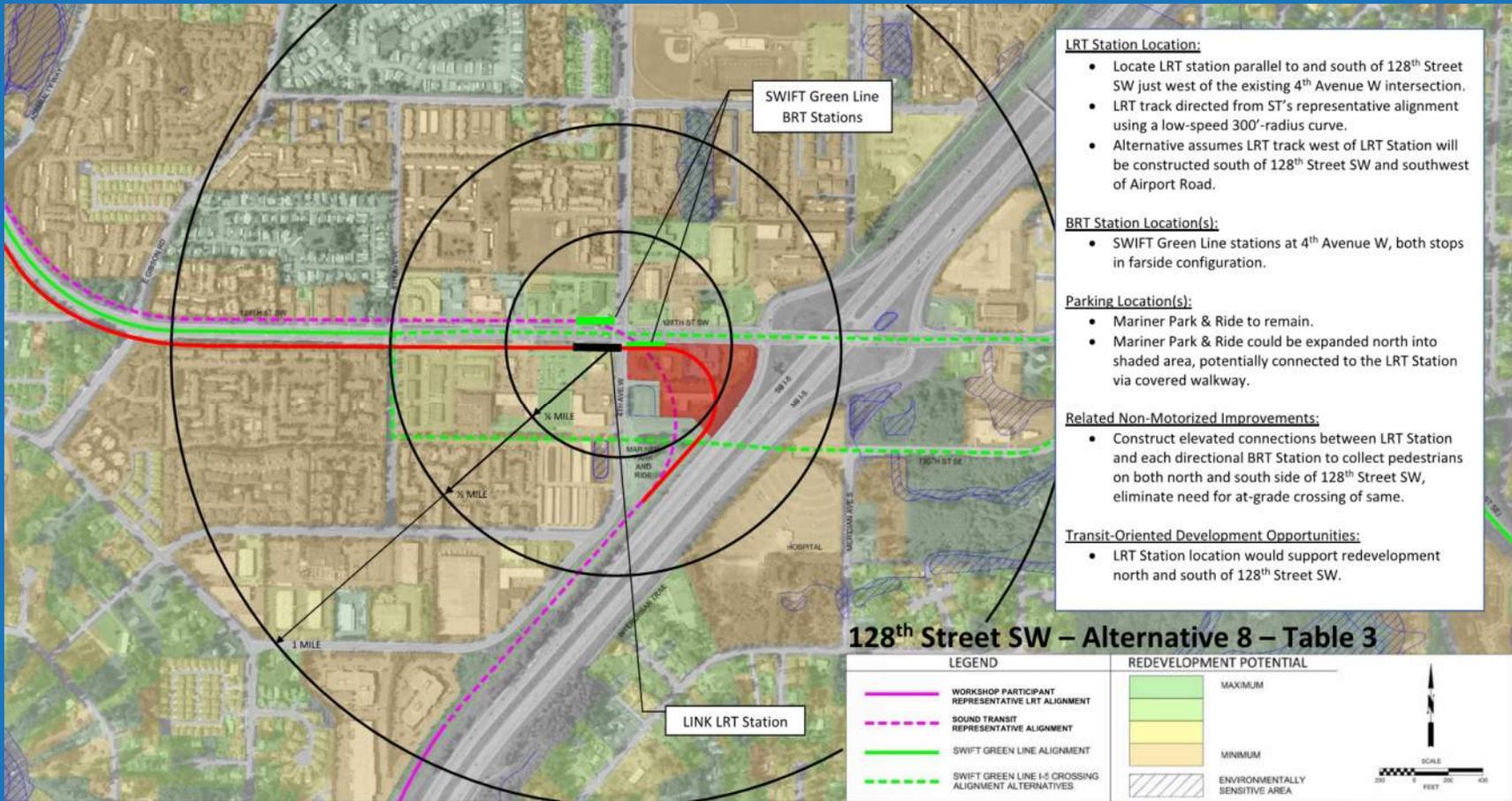
- Mariner Park & Ride to remain.
- Mariner Park & Ride could be expanded north into shaded area, potentially connected to the LRT Station via covered walkway.

Related Non-Motorized Improvements:

- Construct elevated connections between LRT Station and each directional BRT Station to collect pedestrians on both north and south side of 128th Street SW, eliminate need for at-grade crossing of same.

Transit-Oriented Development Opportunities:

- LRT Station location would support redevelopment south of 128th Street SW, while also maximizing the ¼-mile walkshed.



LRT Station Location:

- Locate LRT station parallel to and south of 128th Street SW just west of the existing 4th Avenue W intersection.
- LRT track directed from ST's representative alignment using a low-speed 300'-radius curve.
- Alternative assumes LRT track west of LRT Station will be constructed south of 128th Street SW and southwest of Airport Road.

BRT Station Location(s):

- SWIFT Green Line stations at 4th Avenue W, both stops in farside configuration.

Parking Location(s):

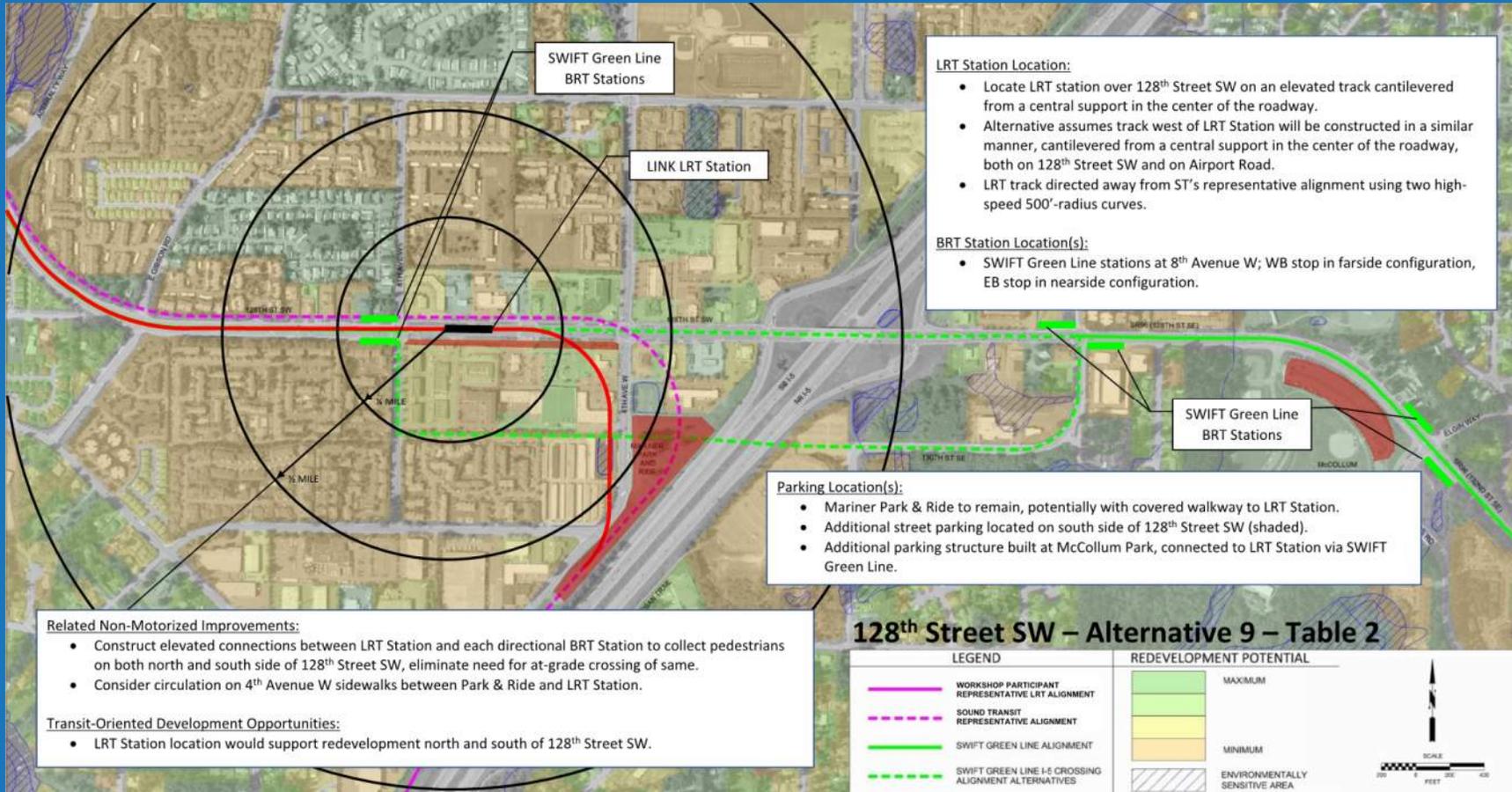
- Mariner Park & Ride to remain.
- Mariner Park & Ride could be expanded north into shaded area, potentially connected to the LRT Station via covered walkway.

Related Non-Motorized Improvements:

- Construct elevated connections between LRT Station and each directional BRT Station to collect pedestrians on both north and south side of 128th Street SW, eliminate need for at-grade crossing of same.

Transit-Oriented Development Opportunities:

- LRT Station location would support redevelopment north and south of 128th Street SW.



Decision Matrix – 128th Street SW

Corridor Alternative	Geometric Constraints		Accessibility to SWIFT	Connections to Bike/Ped	TOD Opportunities
	At-Grade	Elevated			
1					
2					
3					
4					
5					
6					
7					
8					
9					

MEETING MINUTES

2707 Colby Ave, Suite 300, Everett, WA 98201 | P 425.252.7700

Client: Snohomish County
Project: 20180071.000 - East-West Corridor HCT Access Study – Station Area Planning
Time/Date: 2:30 – 4:00, December 10, 2018
Location: Conf(O), AdmE,6A04(O25) Mount Pilchuck Conf Room
Subject: Project Coordination Meeting

Attendees: Jay Larson, Snohomish County Public Works, Project Manager
David Killingstad, Snohomish County PDS
Peter De Boldt, Perteet, Consultant Project Manager
Marcus Elliott, Perteet, Consultant Project Engineer
John Owen, Makers

Discussion:

1. Jay and David walked the group through the online open house comments. David wondered if the pros and cons the participants used to justify their opinions could each be assigned quantifiable dollar amounts to each alternative on a “component” basis.
2. Jay noted that in the months following the most recent workshop, there has been some discomfort among the Steering Committee members regarding which of the three alternatives at each light rail station location should be eliminated. He suggested that prior to developing station area concepts, the consultant team should focus their efforts on developing a decision matrix to assist the Steering Committee with this decision.

The group discussed this idea at length, as well as potential objective criteria for the decision matrix. The group agreed that transit performance would be important, but other than the travel times computed during the previous phase of work, no metrics seemed applicable. Marcus noted that transit reliability was governed primarily by how closely transit performance aligned with the real-time arrival information that ST and CT provided to transit users; consequently, this can't be estimated prior to the system launch. David suggested that development opportunities could be gathered from the County's Buildable Lands Report (2012) using a 1/2-mile walkshed. A further suggestion was made to somehow evaluate Park & Ride capacity vs. parking needs for individual users.

The group and settled on the following decision matrix objective criteria:

- Transit-Oriented Development
 - i. Areas of Developable Land with ½-mile walkshed
 1. Today
 2. As shown in the market analysis by Leland Consulting Group
 3. What might be built before LRT is extended to study area?
- Transit Performance
 - i. Ridership
 - ii. Speed
 - iii. Population served within ½-mile walkshed

MEETING MINUTES

2707 Colby Ave, Suite 300, Everett, WA 98201 | P 425.252.7700

- Cost
 - i. ST costs
 - ii. County costs
 - iii. “Component” costs for various ancillary improvements (Completion of Texas-T, etc.)

The decision matrix will be developed given the following assumptions:

- Parking will be located near the LRT station location (no transfer)
 - Boundaries of existing environmentally critical areas will be maintained.
 - Proposed LRT alignments will avoid the Snohomish County PUD substation location.
3. Jay asked if there was a way for the consultant team to begin conceptual work prior to reducing down to two alternatives at each station location.

MEETING MINUTES

2707 Colby Ave, Suite 300, Everett, WA 98201 | P 425.252.7700

Client: Snohomish County
Project: 20180071.000 - East-West Corridor HCT Access Study – Station Area Planning
Time/Date: 10:00 – 11:00, February 20, 2019
Location: Conf(R),AdmW,5A56(010)
Subject: Project Coordination Meeting

Attendees: Jay Larson, Snohomish County Public Works, Project Manager
David Killingstad, Snohomish County PDS
Stephen Toy, Snohomish County PDS
Peter De Boldt, Perteet, Consultant Project Manager
Marcus Elliott, Perteet, Consultant Project Engineer
John Owen, MAKERS
Chris Wellander, WSP

Agenda:

The focus of this meeting will be discussing and confirming the 128th and 164th areas station location concepts. The consultant team has developed some sketches of which these might look like for discussion (copies of which are attached). Elements that are included are; a footprint of the light rail station, a bus/light rail integration concept, pedestrian and bicycle connections, and the footprint of a parking facility. At the conclusion of the meeting, confirmation or needed changes to the concepts will be identified so the consultant team can prepare more detailed graphics for the steering committee meeting on February 27th.

Some of the highlights of each location are:

164th Station Area

- Station on east side of I-5: An important goal that impacted the location of the station was an LRT alignment that avoided the Snohomish County PUD station to the NE of the proposed new transit crossing of I-5. This pushed the LRT alignment closer to I-5. The other important goal impacting the LRT station location was the desire to have strong connections to the Swift Orange line.
- Station on west side of I-5: The LRT station location as shown is consistent with the concepts seen earlier, and closely replicates the representative alignment that Sound Transit developed for ST3.

128th Station Area

- Station on north side of 128th near 8th Avenue NW: The LRT station location as shown is consistent with the concepts seen earlier, and closely replicates the representative alignment that Sound Transit developed for ST3.
- Station at 130th between 4th Avenue NW and 8th Avenue NW. This location would take advantage of a realignment of the Swift Green line, and the existing Mariner Park and Ride.

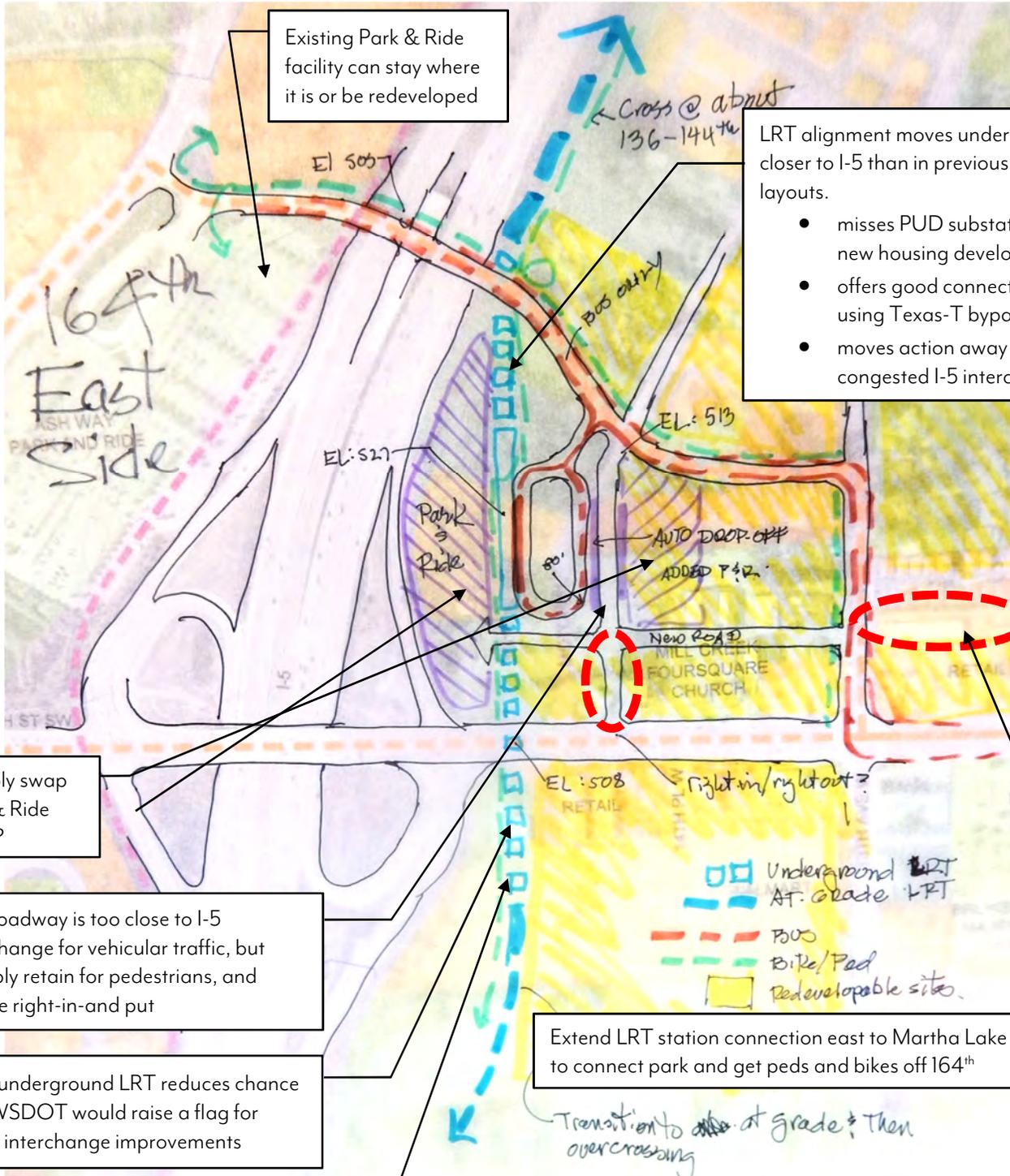
Discussion:

For each of the concept locations, there was a number of different elements which would benefit from additional refinement. Those are identified as notes on the attached sketches.

MEETING MINUTES

2707 Colby Ave, Suite 300, Everett, WA 98201 | P 425.252.7700

164th Street Station Area, East Side of I-5:



Existing Park & Ride facility can stay where it is or be redeveloped

LRT alignment moves underground and closer to I-5 than in previous alternative layouts.

- misses PUD substation and new housing development
- offers good connection to BRT using Texas-T bypass road
- moves action away from congested I-5 interchange

Possibly swap Park & Ride areas?

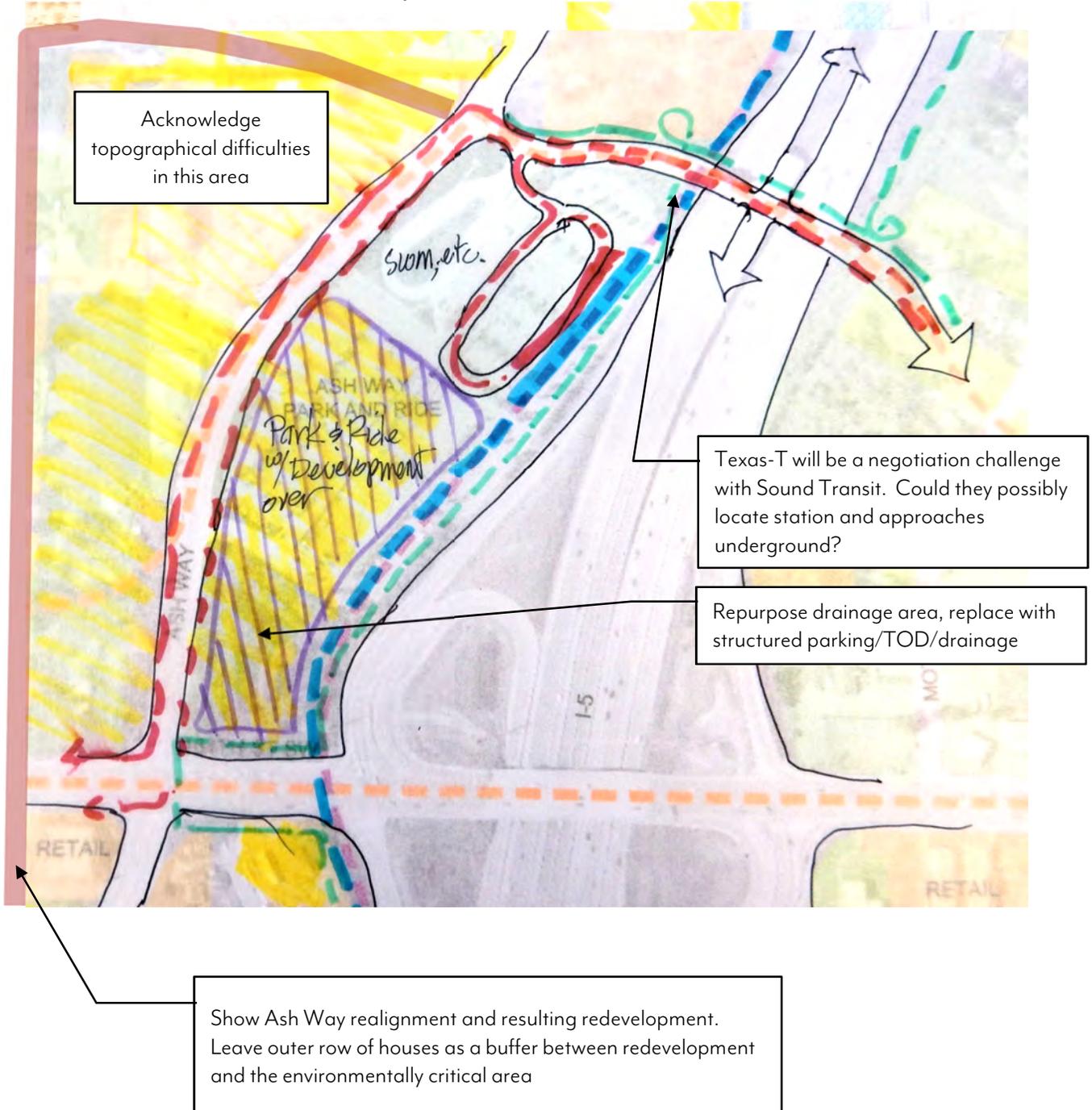
This roadway is too close to I-5 interchange for vehicular traffic, but possibly retain for pedestrians, and maybe right-in-and put

Does underground LRT reduce chance that WSDOT would raise a flag for future interchange improvements

Wrap in underground crossing of interurban trail with LRT?

Extend LRT station connection east to Martha Lake to connect park and get peds and bikes off 164th

Transition to at grade then overcrossing

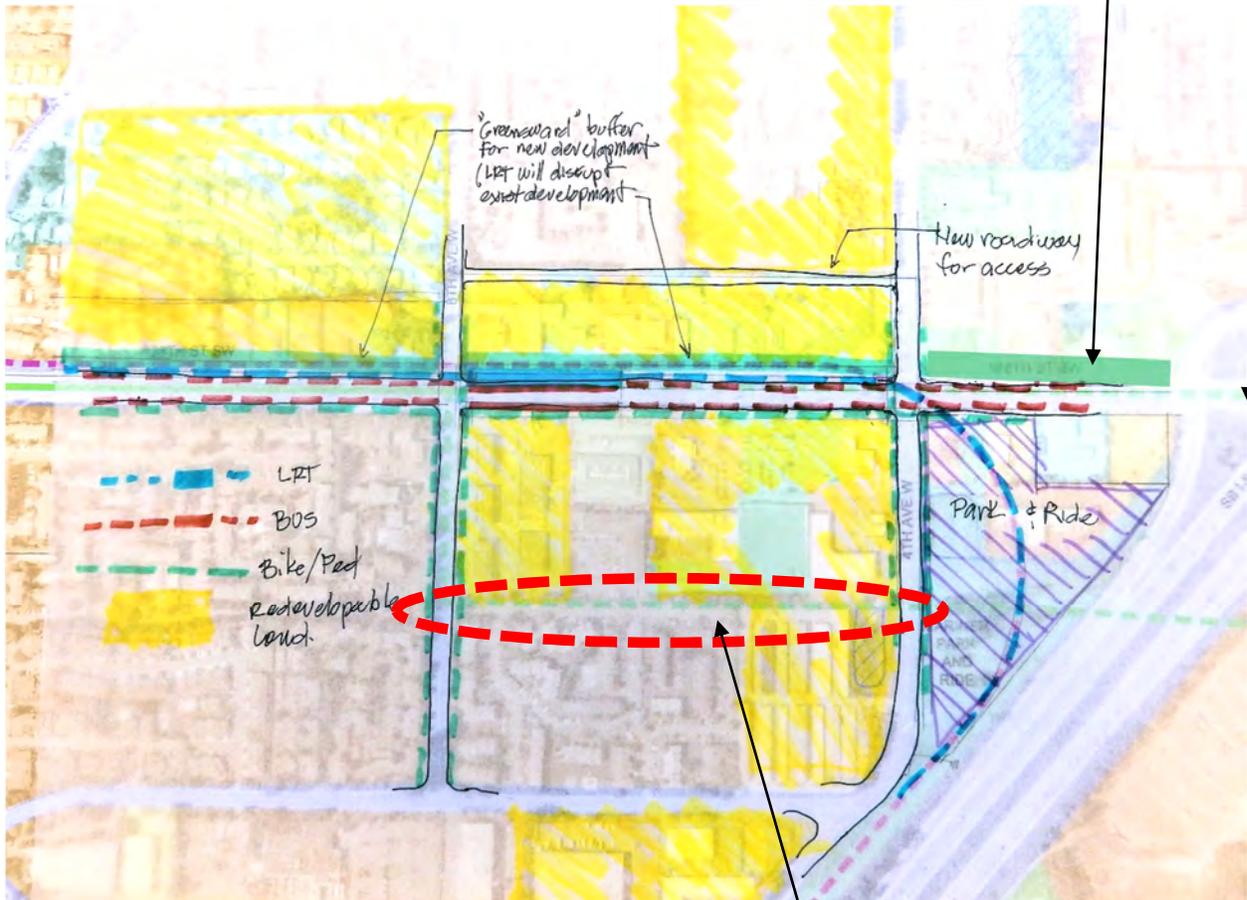
164th Street Station Area, Ash Way Park & Ride:

128th Street Station Area, 8th Ave:

Community Transit says this alternative putting BRT through the existing interchange will only serve their needs for another 10 years. After this, the interchange will need to be redesigned and rebuilt.

- Jay wants this added to alternative's costs; Peter to check budget.
- Chris: Maybe add infield loop ramps to eliminate left turns through interchange to improve operations and extend life for CT.

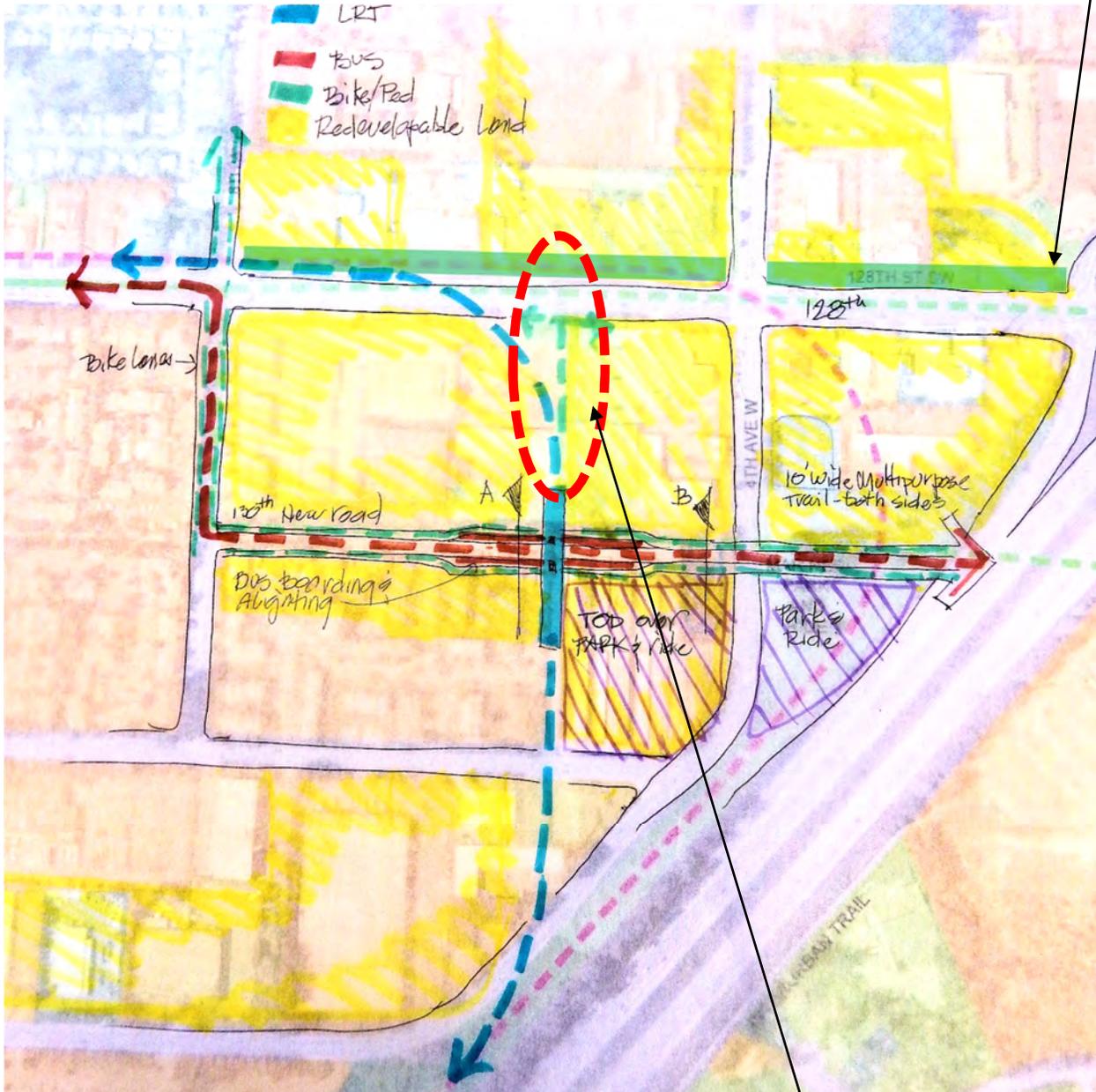
Extend "greensword" to interchange to connect bikes and peds using relic segment of Interurban Trail.



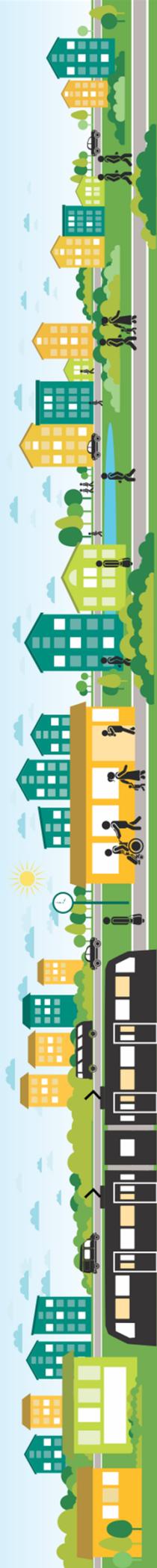
Consider adding a segment of 130th St between 8th & 4th?

128th Street Station Area, 130th Street Overcrossing of I-5:

Create “greensword” north of 128th St to connect bikes and peds using relic segment of Interurban Trail, similar to 128th St Station Area, 8th Ave alternative.



Extend LRT platform north to cross over 128th St with touchdown in the “green sword” to connect bikes and peds.



AST Presentation

September 26, 2019



Agenda and Explanation of Exercise

Agenda

1. Introductions
2. Summary of work and activities to-date
3. What we will do today
4. Slide presentation on comparisons of the options
5. Group exercise on scoring the options using a matrix

Concepts:

Mariner 130th St Option





Transit Operations: Mariner Options

	8 th Ave Option	130 th St Option
Bus Ridership	4,800 daily riders	4,600 daily riders
Transit Travel Time	12 min WB 9 min EB	11 min WB 8 min EB
Impact on Transit Operations During Construction	Greater Disruption	Less Disruption

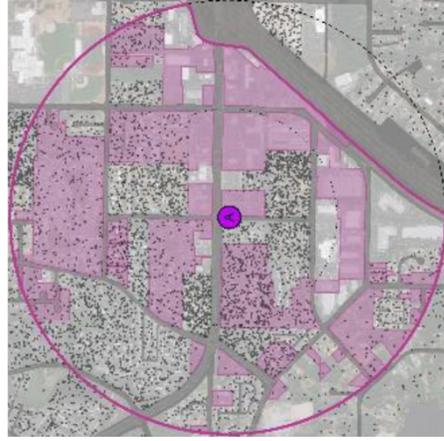


Non-motorized: Mariner Options

	8 th Ave Option	130 th St Option
Walk Score (out of 100)	55	62
Distance to Interurban Trail	.4 miles	.3 miles

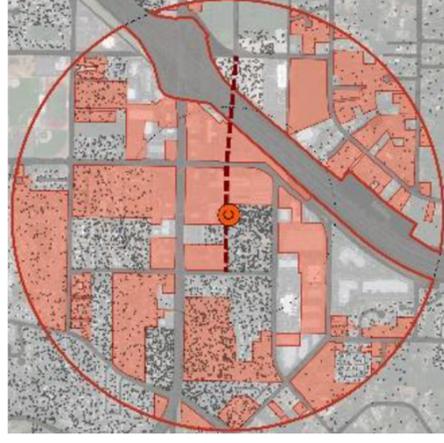


TOD Opportunities: Mariner Options



8th Ave

Existing dwelling units (DU)	4,167
Redevelopable acres	178
Potential New units	17,793
Total Potential DU	20,817



130th St

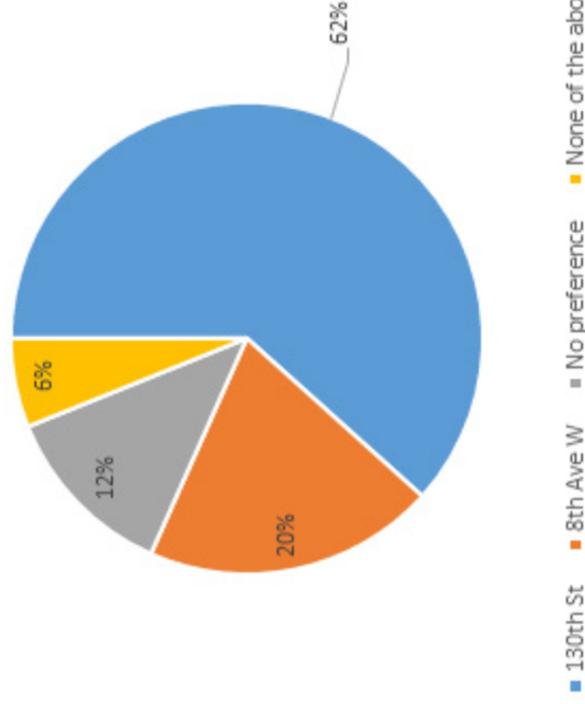
Existing dwelling units (DU)	3,653
Redevelopable acres	189
Potential New units	18,886
Total Potential DU	21,393



Public Preference: Mariner Options

Why do you prefer this location?

Which Station Area do you prefer?



8th Ave:

- Convenient
- Less noisy
- Least disruptive

130th Street:

- Additional I-5 overpass
- Better bike, pedestrian and bus connections
- More TOD opportunities
- Less disruptive
- Least traffic impact
- Closer to parking
- Better rail alignment



Rating the Mariner Options

Category	Category Weighting	8 th Ave		130 th St	
		Category Rating	Composite Score	Category Rating	Composite Score
Transit Performance	5	3	15	4	20
Non-motorized	4	3	12	3	12
TOD Opportunities	5	4	20	4	20
Costs	2	3	6	3	6
Public Opinion	3	3	9	4	12
		Total Score	62	Total Score	70

Concepts: Ash Way East of I-5 Option





Transit Operations: Ash Way Options

	Ash Way Park and Ride Option	East of I-5 Option
Bus Ridership	4,800 daily riders with Texas T	4,800 daily riders with Texas T
Transit Travel Time	With Texas T: 10 min WB 5 min EB Without Texas T: 17 min WB 10 min EB	With Texas T: 9 min WB 6 min EB Without Texas T: 15 min WB 12 min EB
Impact on Transit Operations During Construction	Greater Disruption	Less Disruption

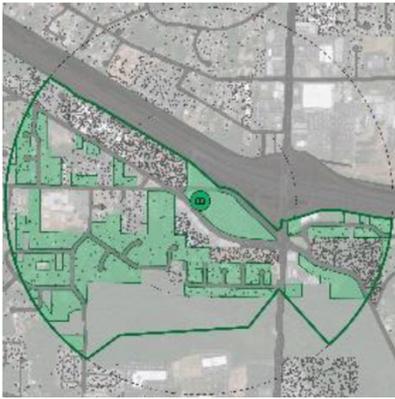
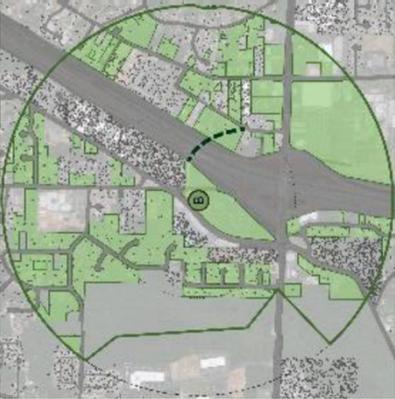


Non-motorized: Ash Way Options

Walk Score (out of 100)	Ash Way P&R 38	Ash Way P&R With "Texas T Completed"	62	East of I-5 62	East of I-5 With "Texas T Completed"	62
Distance to Interurban Trail	0.7 (across the interchange)	0.3 miles	0 miles	0 miles	0 miles	0 miles



TOD Opportunities: Ash Way Options

				
	Ash Way P&R	Ash Way P&R With "Texas T Completed"	East of I-5	East of I-5 With "Texas T Completed"
Existing DU	1,970	2,355	1,253	2,378
Redevelopable acres	88	165	137	161
Potential New units	8,808	16,451	13,729	16,075
Total Potential DU	10,564	18,502	14,788	18,222



ST Costs for East Side vs. West Side Alignment

West Side Alignment

- Total cost: Similar ~ 5% lower
- Requires higher Track costs:
 - A higher % of aerial construction results in a higher cost per linear foot
- A longer alignment due to large turn at 128th

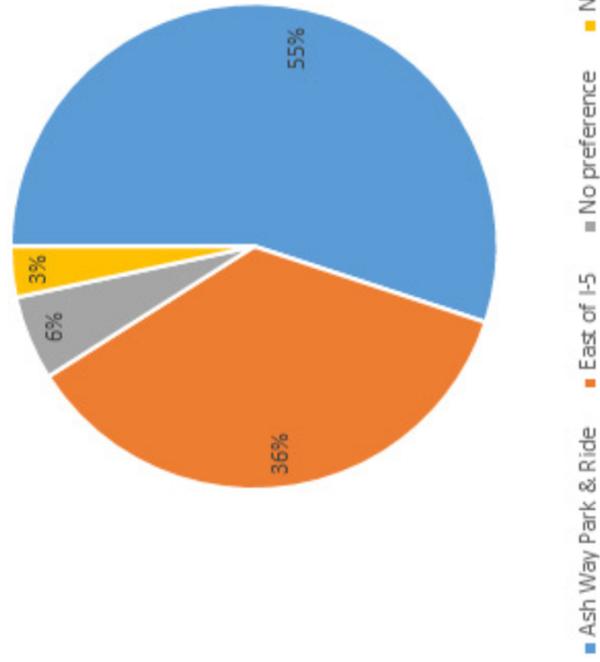
East Side Alignment

- Total cost: Similar ~ 5% higher
- Requires higher ROW, earthwork, and Structures cost including:
 - Additional crossings of I-5
 - Cut and cover construction at 164th
 - A larger percentage of lower-cost at-grade construction
 - Shorter alignment because 128th curve is unnecessary



Public Preference: Ash Way Options

Which Station Area do you prefer?



Why do you prefer this location?

Ash Way Park & Ride:

- Infrastructure and land already available
- Costs less
- Prefers bus and light rail at same location
- Eases congestion
- More convenient for that person
- More parking

East of I-5:

- Better bike and pedestrian connections via Interurban Trail
- Eases congestion
- Prefers a below-grade station
- East of I-5 needs access to light rail
- Closer to amenities and other businesses



Rating the Ash Way Options

Category	Category Weighting	Ash Way Park and Ride (with Texas T)		East Side of I-5 (with Texas T)	
		Category Rating	Composite Score	Category Rating	Composite Score
Transit Performance	5	3	15	3	15
Non-motorized	4	2	8	3	12
TOD Opportunities	5	3	15	3	15
Costs	2	3	6	2	4
Public Opinion	3	4	12	3	9
		Total Score	56	Total Score	55

MEETING MINUTES

2707 Colby Ave, Suite 300, Everett, WA 98201 | P 425.252.7700

Client: Snohomish County
Project: 20180071.000 - East-West Corridor HCT Access Study – Station Area Planning
Time/Date: 10:00 – 12:00, September 26, 2019
Location: Conf(R), AdmW, 5A56(010)
Subject: AST Meeting

Attendees: Jay Larson, Snohomish County Public Works
David Killingstad, Snohomish County PDS
Stephen Toy, Snohomish County PDS
Barb Mack, Snohomish County PDS
Eileen Canola, Snohomish County PDS
Frank Slusser, Snohomish County PDS
Hillary McGowan, Snohomish County PDS
Jacob Lambert, Snohomish County PDS
Doug McCormick, Snohomish County Public Works
Steve Dickson, Snohomish County Public Works
Max Phan, Snohomish County Public Works
Phillip Harris, WSDOT
Cathy George, WSDOT
Tom Rogers, City of Mill Creek
Karl Almgren, City of Lynnwood
Allan Giffen, City of Everett
Sabina Araya, Everett Transit
June DeVoll, Community Transit
Noah Tunicle, Community Transit
Kamuron Gurol, Sound Transit
Peter De Boldt, Perteet
Brent Powell, Perteet

Discussion:

The agenda for this meeting was prepared in Microsoft PowerPoint, which Peter presented to the group.

After overviewing the prior stages of the East-West study that led up to this meeting, Peter began reviewing four categories of information for the Mariner station area:

- Transit Performance
- Non-motorized
- TOD Opportunities
- Public Opinion

After discussing the various metrics that had been developed as part of the multiple stages of this East-West project for the above categories, Peter displayed an evaluation/scoring matrix with filled-out values to reflect the scores that the consultant and project management team (Peter, Brent, Jay, and David) had developed for the

MEETING MINUTES

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station area. The matrix included one additional category for evaluation: costs. This item was not covered by any of the presentation slides.

The matrix included three main columns of data, all on a scale of 1 to 5. First, each category had a “weighting” score, with a weight of 5 equaling maximum importance and 1 equaling least importance. Second, the 8th Avenue station area scores were filled in. These scores used the same 1 to 5 scale, but with a 1 meaning least performance in the category and a 5 meaning highest performance in the category. Third, the 130th Street station area scores were filled in. At the bottom of the slides were total values for each station area, calculated as the summation of all the weights multiplied by the category scores.

At this point, Peter paused the presentation and returned to his seat. All attendees were then asked to fill out their own version of the scoring matrix for the Mariner station area. Each person completed the three columns of data (and, optionally, the multiplication and addition to determine the total summary score for the sites) like had been done in the presentation. The raw data is attached. Figure 1 through 3, below, show the average, median (middle), and mode (most common value), respectively, for the full data set of all attendees at the Mariner stations.

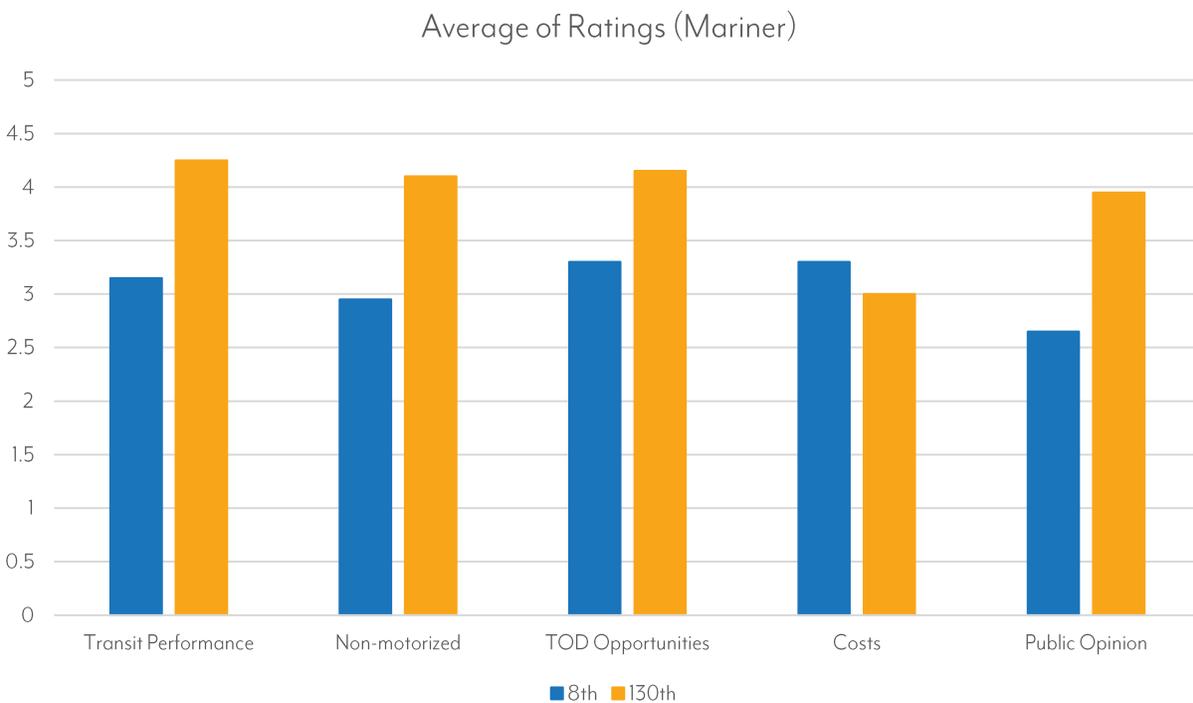


Figure 1. Average value for each category at Mariner.

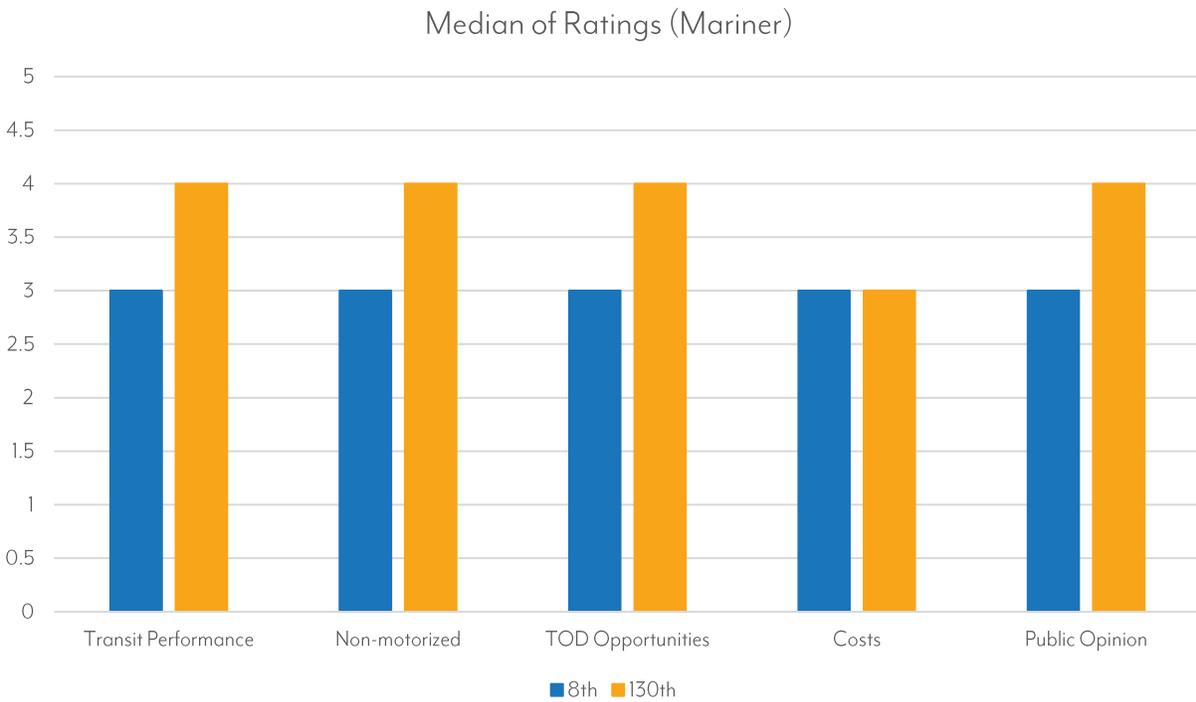


Figure 2. Median (middle) ratings within the dataset for Mariner.

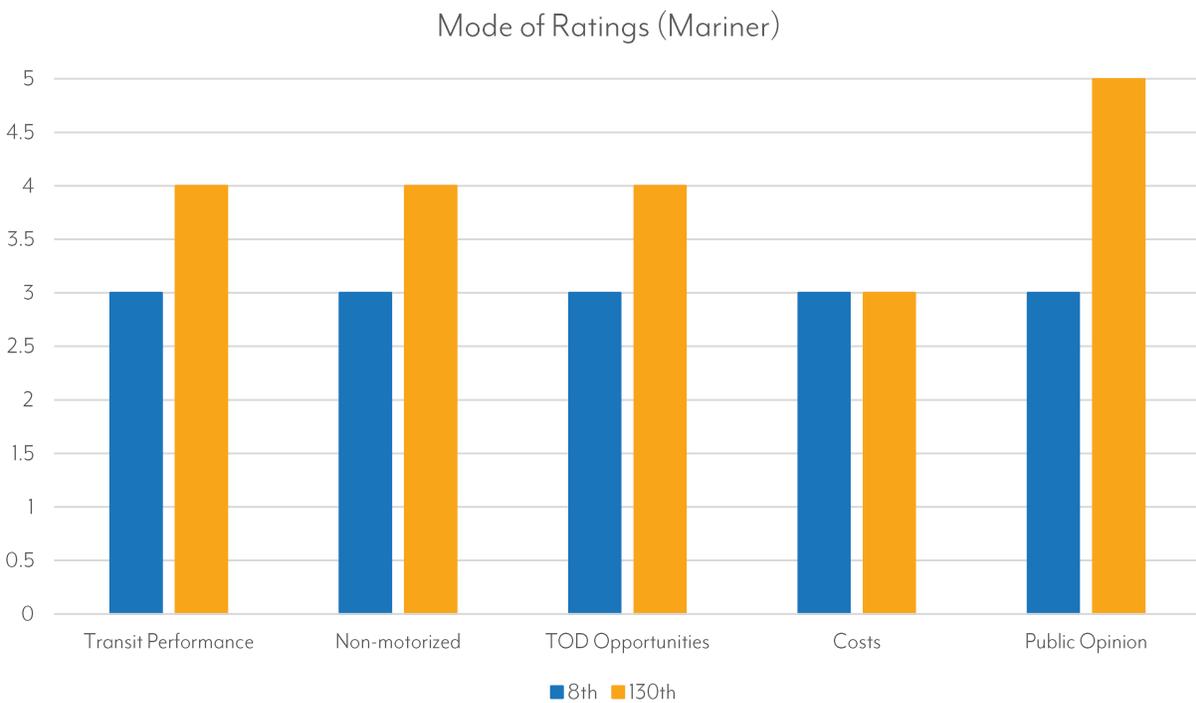


Figure 3. Mode (most common) of the dataset for Mariner.

Figure 1 shows that the 130th Street station has better results in all categories except perceived costs. Respondents expressed that there would be improved transit and non-motorized access via the 130th Street overcrossing. That same overcrossing was seen as the difference maker in costs, exceeding the costs associated with improving the existing 128th Street interchange.

Figure 2 and 3 show similar results, with all but the cost category having higher median and mode values for 130th street. The cost comparison shown in Figure 2 and 3 reveals that while the raw average slightly favors 8th Avenue, the responses scored the two sites the same in this metric.

On average, the weighted overall scores for each site favored 130th Street on every single attendee matrix. The difference ranged from 5 to 27, with all but one in the double digits.

Peter resumed the presentation to do the same discussion for the Ash Way options. This time he did note the cost differences that Perteet had evaluated for the west and east-side alignments. The group discussed if the proposed east side alignment would be compatible with both of the Mariner station locations and with the planning work that Lynnwood is engaged in south of this study area.

After breaking back into groups, attendees went through the same exercise of evaluating weighting factors and then scores for each alternative. Figures 4 through 6 show the average, median, and mode statistics for the Ash Way dataset.

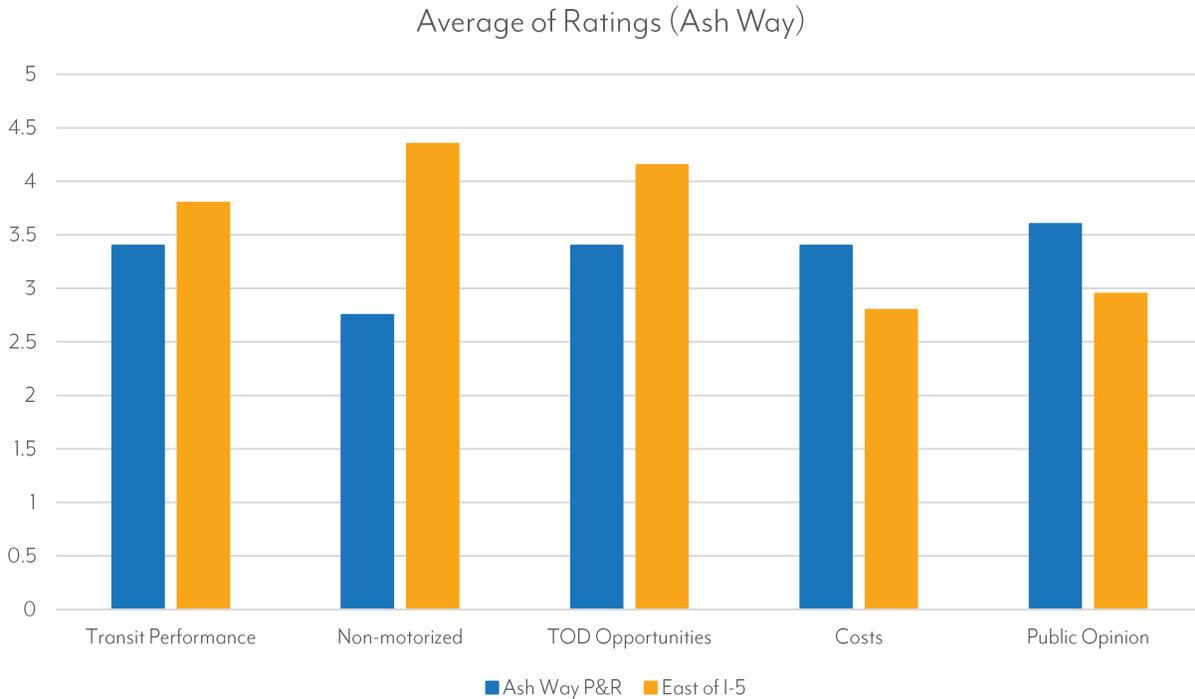


Figure 4. Average value for each category at Ash Way.

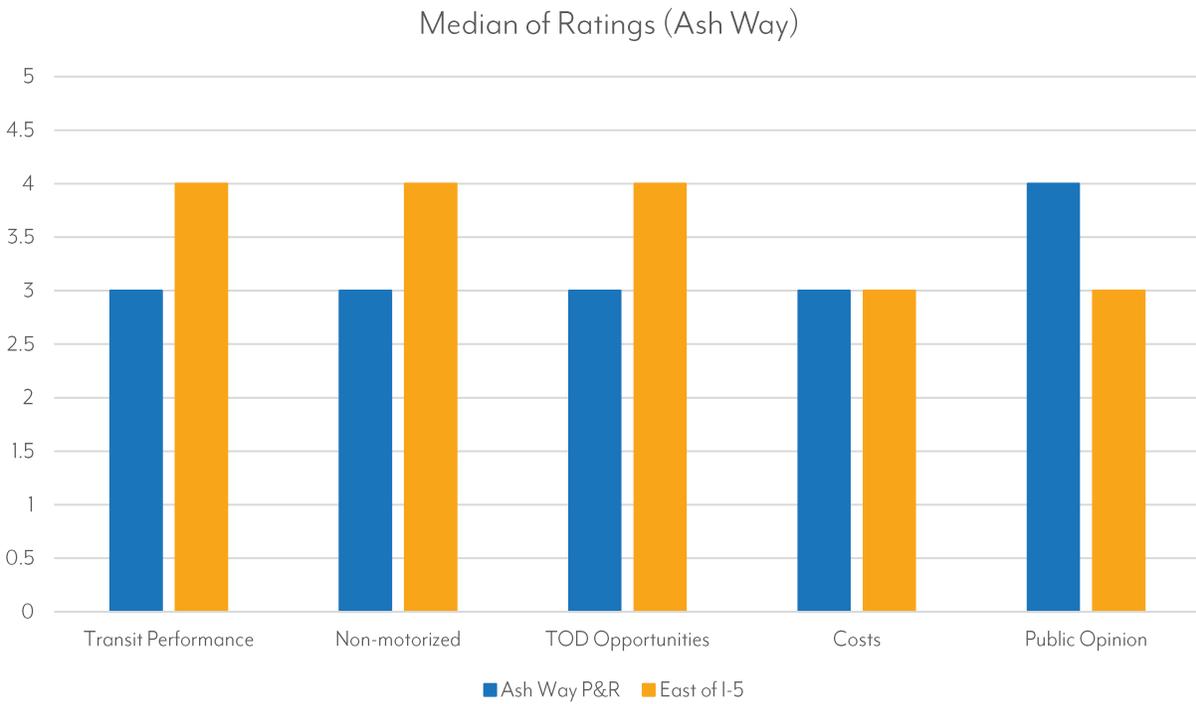


Figure 5. Median ratings within the dataset for Ash Way.

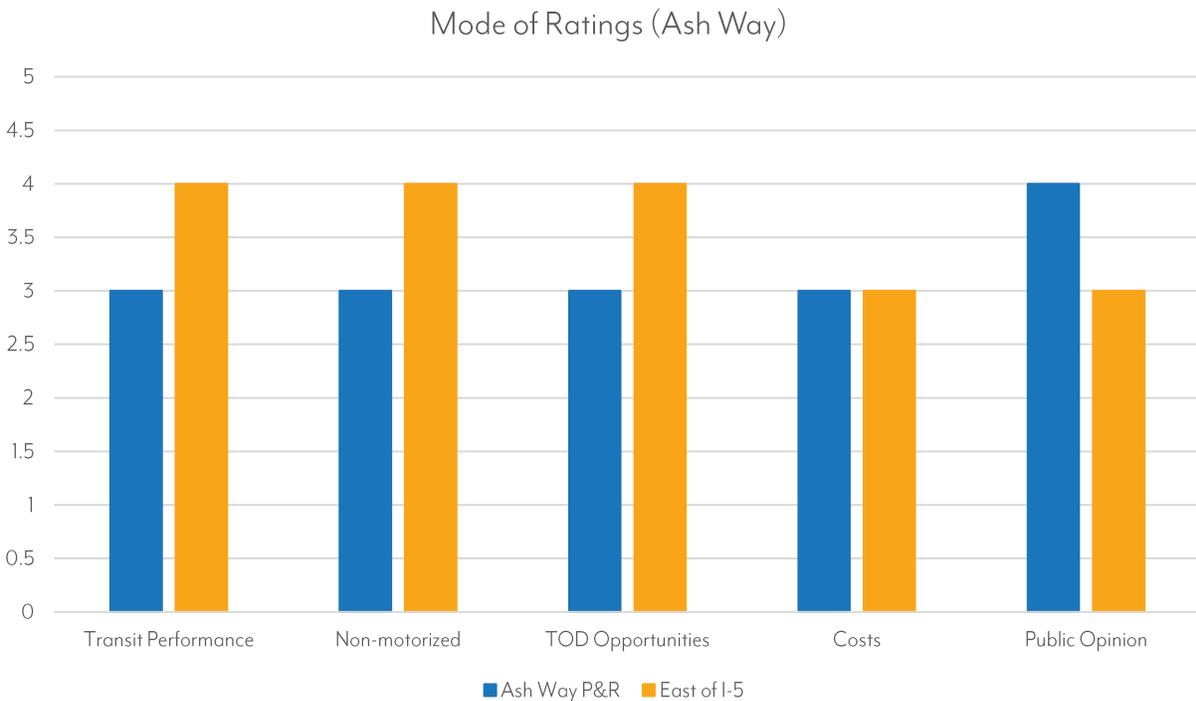


Figure 6. Mode of the dataset at Ash Way.

MEETING MINUTES

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The group identified that the Ash Way Park and Ride alternative will generally have lower costs and is more favorable to the public, in part because it is a familiar transit location. However, the east of I-5 alternative received higher average scores for transit performance, non-motorized factors, and TOD opportunities, as shown in Figure 1. The non-motorized factors were heavily influenced by the incorporation of the Interurban Trail into the station location that Peter highlighted would be part of the plan at the east of I-5 site.

The median and mode correlate similarly to the averages, with the first three categories favoring the east of I-5 option and the public opinion favoring the Ash Way Park and Ride. As with the Mariner station area, the costs had the same median and mode (3), even though there is a clear difference in the average values.

On average, the weighted overall scores for each site were closer at Ash Way than at Mariner. Three of the 20 attendees scored the Ash Way Park and Ride better (all by 5 points or fewer), while nine scored east of I-5 higher by 10 points or fewer, and the remaining eight ballots had a score difference of over 10 points.

In general, the attendees did not change their category weights between the Mariner and Ash Way evaluations. However, there were some modifications between the locations. Figure 7, on the following page, shows the count of each weighting option for each metric, as well as which weightings changed between sites.

Transit performance and TOD opportunities generally saw the highest weightings, though cost and non-motorized also had some rankings of 5. Across the board, the group valued transit performance; that weighting was never below 4 at either station location. Non-motorized was also deemed important, with all scores at 3 or above. In general, public opinion was the least valued category with most weights coming in at 2 or 3 and zero at 5. Cost were valued slightly more, with a typical weight of 3, but some in the 4 or 5 range.

APPENDIX C

Online Open House Summaries



⇄⇄ Snohomish County

Light Rail Communities

Results from Online Open House #1 | June 22 - July 23, 2018

INTRO

Snohomish County presented its Light Rail Communities project to the public and stakeholders through an online open house, as well as a mailed postcard. The feedback that was received will help to inform Snohomish County’s planning efforts in advance of the arrival of light rail.

Below is a summary of the feedback received for both the survey questions and the interactive map that respondents could place a pin on the map and provide comments or suggestions.

RECAP

51 survey responses	114 map comments	1,466 unique visitors to online open house	454 emails submitted for future communication
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- ⇒ 30 percent of visitors went to three or more pages.
- ⇒ Visitors spent 3:11 minutes at the online open house.

Q1

What do you like about the station areas’ neighborhoods?

These were some of the themes we heard:



Q2 | What is your vision for the station areas' neighborhoods in the future?

- Plenty of affordable housing that doesn't displace current residents.
- Consider access to the station areas as well as mobility across I-5.
- Improve walkability; increase ADA, cyclist and pedestrian facilities as well as building connections to existing trails.
- Increase density and build tall buildings (40 stories) to encourage transit oriented development.
- Keep crime at bay and create economic stability.
- Some respondents said they wanted more parking while others said they wanted less to encourage people to utilize public transit and reduce congestion.

Q3 | How could light rail benefit or impact achieving your vision for these neighborhoods in the future?

BENEFITS:

- Reduce urban sprawl by increasing density and creating actual neighborhoods.
- Bring more amenities to these areas.
- Reduce traffic and increase connectivity to other areas of the region.
- Improve quality of life.

IMPACTS:

- At-grade crossings could increase traffic.
- Gentrification, displacement of people and affordable housing due to a rise in property values.
- Increase pollution due to more people driving to the stations.
- Increase crime.
- Noise might become a problem due to denser living.
- Reduce habitat for birds and other animals.

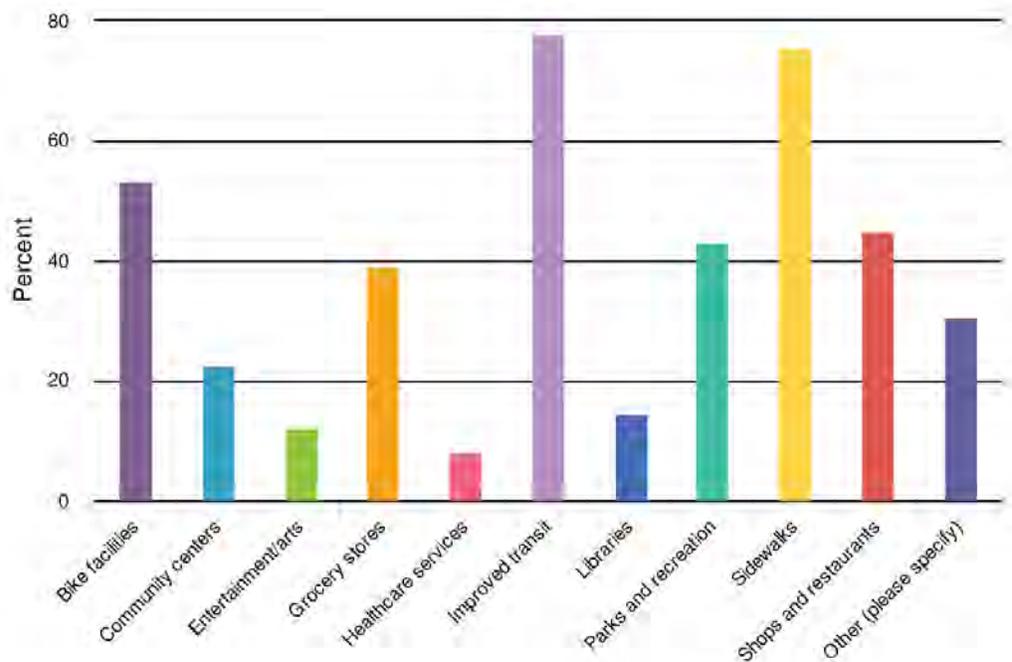
Q4

What should Snohomish County consider during the station area and subarea planning phases?

- **Affordable Housing:**
Ensure there is plenty of affordable housing and decrease the potential for residents to be displaced.
- **Station Accessibility:**
Consider how people can get to and from the station areas. Road improvements, additional bus and bike routes, more sidewalks, pedestrian sky bridges, and access to Paine Field were all noted by respondents. Some respondents are interested in more parking while others think less parking and more density will increase people's dependence on public transit and ease congestion on roads.
- **Encourage density:**
Density should be increased near stations to reduce potential sprawl and encourage residents to use transit by living near it.
- **Amenities:**
Consider maintaining green spaces, increasing community spaces and encouraging retail within the stations.

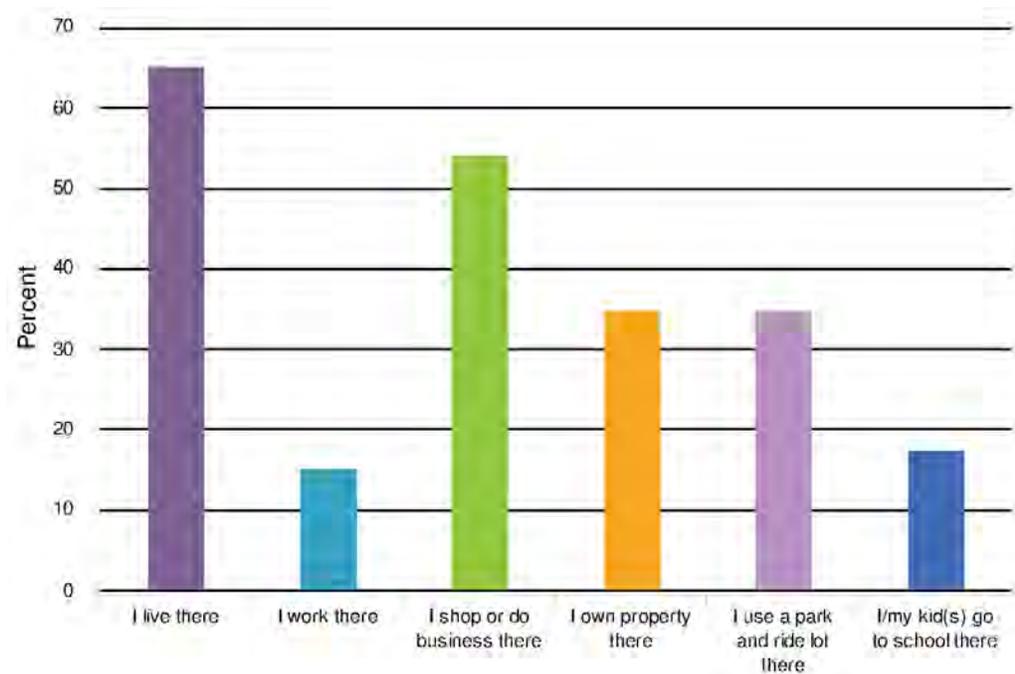
Q5

Which amenities would you like to see in the future station areas? (Select up to 5)



Q6

How do you currently interact with the station area(s) or broader subarea? (Please check all that apply.)



Interactive Map

Respondents were asked to place a pin on a digital map and leave a comment. This is a summary of the comments that were received.

- Ensure there is plenty of affordable housing near the stations.
- Minimize at-grade crossings to improve safety and decrease congestion.
- Respondents want a plethora of amenities such as retail, public plazas, grocery stores, a library, restaurants and cafes.
- Build bike lanes and sidewalks on arterials that feed into the station areas.
- Build an alternate route over I-5 to help move cars, buses, cyclists and pedestrians in and out of the station area.
- Some respondents are interested in more parking while others think less parking and more density will increase people's dependence on public transit and ease congestion on roads.
- Focus on pedestrian-friendly development to improve livability of the neighborhoods, including trees, planter strips and covered walkways.
- Realign and expand some roads and intersections to ease congestion and optimize traffic flow.



⇄⇄ Snohomish County

Light Rail Communities

Results from Online Open House #2 | October 31 - November 30, 2018

INTRO

After meeting with stakeholders, utilities, local municipalities, transit agencies, reviewing public comments and considering the project’s guiding principles, Snohomish County presented three possible station locations for each station area.

Below is a summary of the feedback received for both multiple choice and fill-in-the-blank questions.

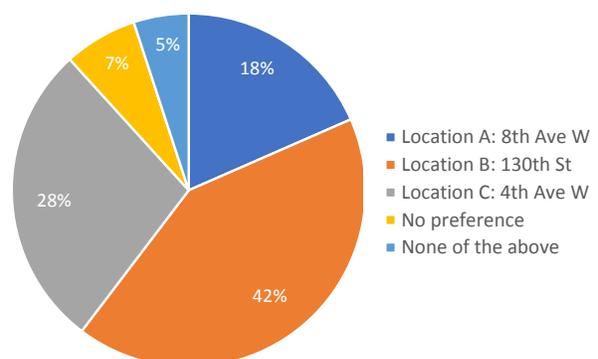
RECAP



Mariner Station

Q1

Which potential Mariner station location do you prefer?



Q2

Why did you choose that station location?

This is a summary of the comments that were received.

► 8th Ave W Option

Reasons Supporting Location	Reasons Against Location
Redevelopment opportunities	Too far away from the Interurban Trail
Centrally located to serve north and south of 128th Street	Too much traffic on 128th St
Farther away from I-5	Too far from the existing park and ride

► 130th St Option

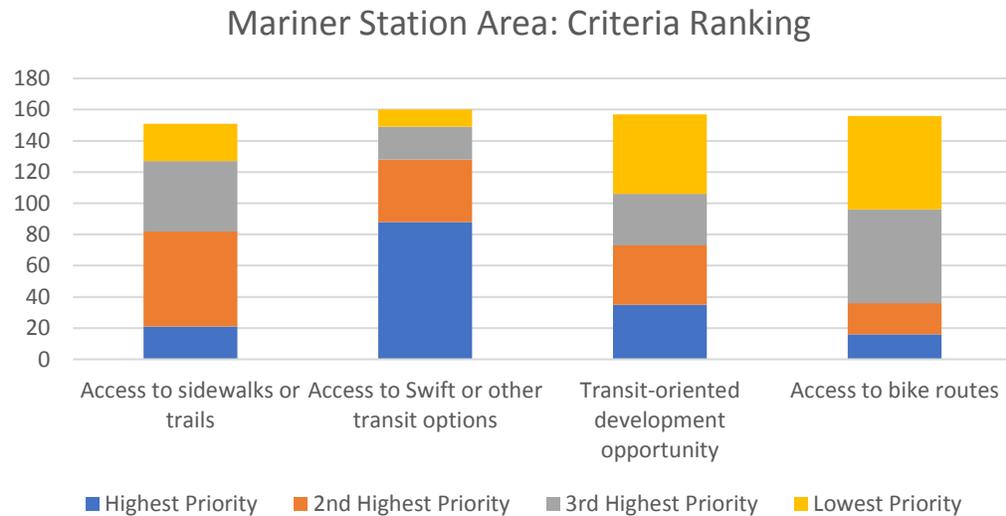
Reasons Supporting Location	Reasons Against Location
Takes advantage of existing infrastructure (i.e. Park and Ride)	Takes out the only grocery store in the area
Further away from the traffic at 4th Ave W and 8th Ave W	Requires re-routing of SWIFT
Redevelopment opportunities	Challenging access to Interurban Trail

► 4th Ave W Option

Reasons Supporting Location	Reasons Against Location
Closest for students at Mariner High School	Right on top of one of the busiest intersections in the county
Access to I-5	Too close to I-5
Opportunity to double up with an existing SWIFT stop	Displacement of businesses

Q3

Rank the following criteria based on what you think is most important to consider when evaluating the potential Mariner station locations; 1 being the highest priority and 4 being the lowest.



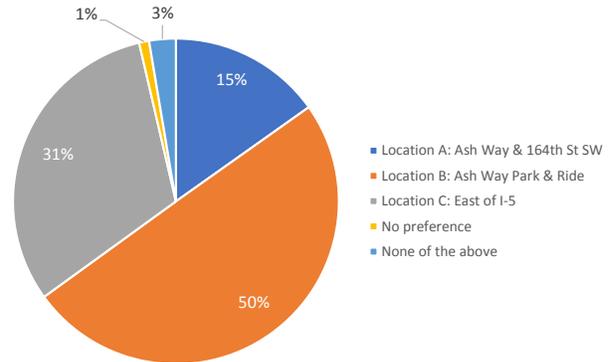
Q4

What would make accessing the station area easier?

This is a summary of the comments that were received:

- Sidewalks, pedestrian overpasses and lighted walking paths
- Ample supply of parking
- A physical connection to the Interurban Trail and an over/under-pass that allowed bicyclists and pedestrians on the Interurban Trail to easily cross the major intersections and I-5
- Easy access to station area despite current traffic levels
- HOV on/off ramps to I-5

Q1 Which potential Ash Way station location do you prefer?



Q2 Why did you choose that station location?

This is a summary of the comments that were received.

► Ash Way & 164th St SW Option

Reasons Supporting Location	Reasons Against Location
Allows the future Orange Swift to avoid branching off up to the P&R and then back again	Too close to environmentally sensitive areas
Close enough to the park and ride for access but not so close that it is negatively impacted by loss of the space	Traffic on 164th is already challenging
Ease of accessibility to SWIFT with shared light rail and SWIFT stations	Hill adds walkability challenges

► Ash Way Park and Ride Option

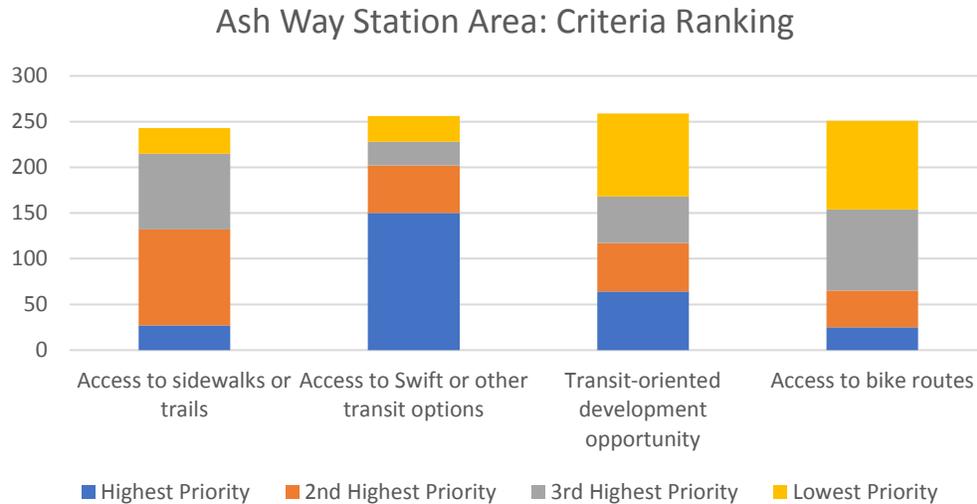
Reasons Supporting Location	Reasons Against Location
Capitalizes on existing parking and pedestrian access	Too close to environmentally sensitive areas
Existing residential development	High volume of traffic on 164th
Easier transfer from Swift line bus riders	Requires diversion of SWIFT

► East of I-5 Option

Reasons Supporting Location	Reasons Against Location
Having the light rail on the east side could reduce the traffic congestion for getting back across I5	Requires crossing I-5 twice which will be more expensive
Provides access for Mill Creek and Bothell	Traffic already problematic and adding a station would make it worse
Higher level of retail/commercial/residential density	Limited area for parking

Q3

Rank the following criteria based on what you think is most important to consider when evaluating the potential Mariner station locations; 1 being the highest priority and 4 being the lowest.



Q4

What would make accessing the station area easier?

This is a summary of the comments that were received:

- Ample parking
- Easy access to station area despite current traffic levels
- Access to bus connections including direct HOV/bus I-5 on/off ramps
- Sidewalks
- Dedicated pedestrian and bike I-5 overpass

Welcome!

We invite you to:

- Sign in
- Pick up a fact sheet and comment sheet
- Visit the project stations and talk with staff

Brief remarks to be made at 5:15 p.m.

Mariner Station

- 8th Ave W
- 130th St

Ash Way Station

- Park & Ride
- East of I-5

- Weigh in on which station locations you prefer; leave your comments at the comment table

*Please enjoy the
complementary refreshments*



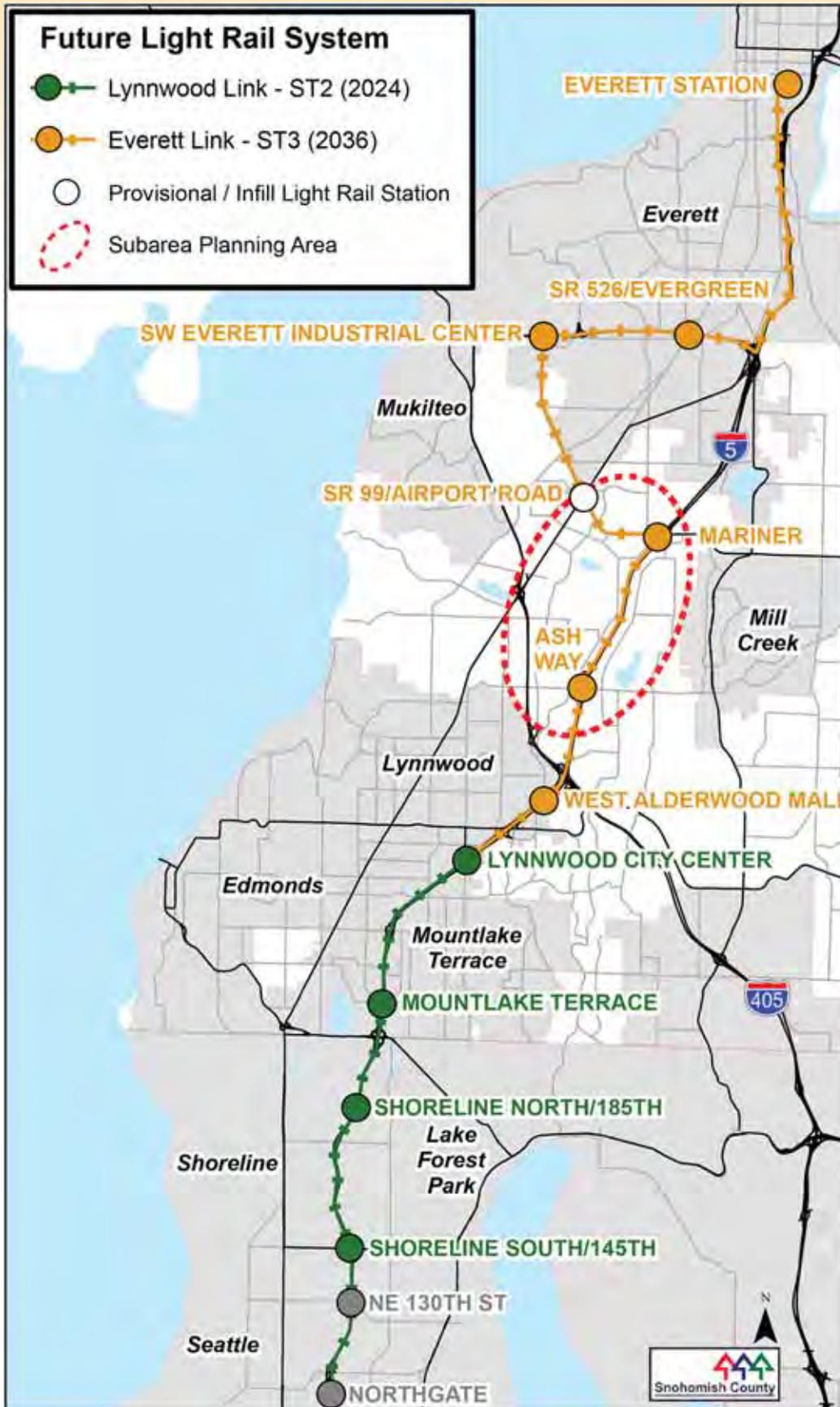
Background

Two light rail stations are planned for the mid-2030s in unincorporated Snohomish County at 128th St (Mariner Station) and 164th St (Ash Way Station), near I-5. We would like your input on two potential location options for each station.

Final decisions on the actual station location and alignment will be made by Sound Transit.

Guiding principles:

- Preserve neighborhood character
- Create a walkable environment
- Cultivate economic development
- Promote sustainability
- Support affordable housing
- Strive for social equity
- Maintain healthy communities



What We'll Do With Your Feedback

- Publish a summary of feedback on the project web page.
- Share input with stakeholder groups.
- Make recommendations of the “locally favored” option(s) for each station area to be incorporated into subarea planning.

Thank You!

Thank you for participating in the final open house for the station area planning portion of Snohomish County's Light Rail Communities project.

We hope that you stay engaged with this project as it moves into subarea planning.

Timeline



Subarea Planning by Snohomish County Includes:

NOW: Station Area Planning

Conceptual plans for the two station areas include:

- Potential station locations
- Transit, vehicle, pedestrian and bicycle connections
- Public open spaces
- Station area parking

MID 2019: Subarea Plan

A subarea plan will focus on:

- Land use, zoning, regulations
- Broader transportation connections
- Housing
- Park, public service and utility needs
- Economic development

Final decisions on the actual station location and alignment will be made by Sound Transit.

What is Transit-Oriented Development (TOD)?



0 to 1/8 mile from station

- 10+ story buildings
- 50% residential uses
- 50% non-residential uses (retail/office)
- Many buildings with ground floor commercial uses
- Centrally located plaza or open space to provide a community focal point

1/8 to 1/4 mile from station

- 5-10 story buildings
- 75% residential uses
- 25% non-residential uses (retail/office)
- Some buildings with ground floor commercial uses

1/4 to 1/2 mile from station

- 3-6 story buildings
- 75% residential uses
- 25% non-residential uses (retail/office)

Features of TOD can include:

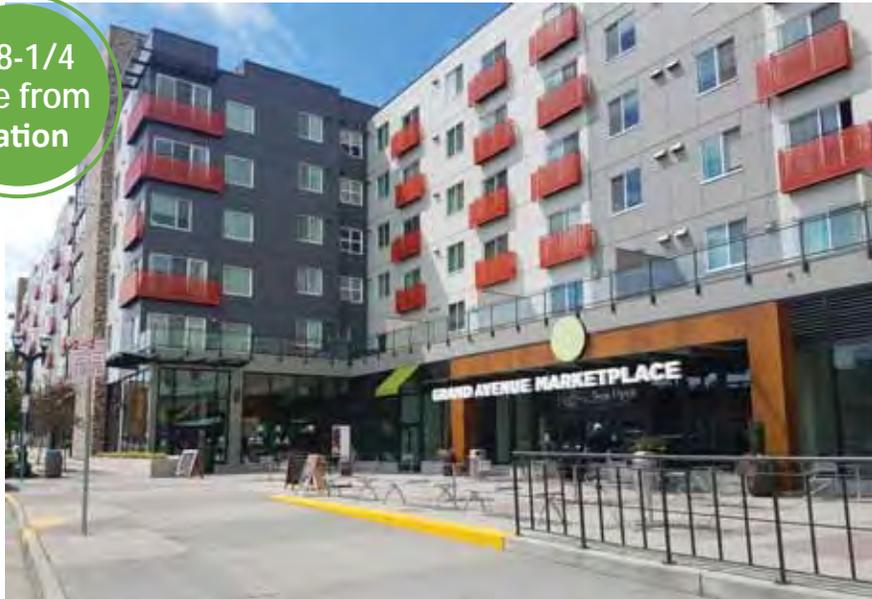
- A mix of uses including buildings with street level retail and other uses on floors above.
- A range of densities and building heights with the highest, closest to the station or corridor, tapering down to existing neighborhoods.
- Reduced parking or enclosed in parking garages.
- Improved mobility options including access to pedestrian and bike facilities.
- Parks, open space, cultural features and urban tree canopy.

TOD Examples

0-1/8
mile from
station



1/8-1/4
mile from
station



1/4-1/2
mile from
station



Mariner Station

Potential Station Locations



Key Features:

- Redevelopment and existing structures
- New roads
- Open spaces
- Location of parking
- Light rail track

Key Features for 8th Ave W

This concept is representative of one possible future outcome; it does not intend to indicate what the actual key features of this area will be in the future.

Station Location

This concept reflects an elevated station along 128th St at 8th Ave W. The blue shadowing on the station area map represents an area the station could be located in.

New 130th St

A new road would be built at 130th St to provide improved vehicle circulation and pedestrian access from the park and ride to bus rapid transit and light rail.

Pedestrian Overcrossing

To provide a safer pedestrian crossing on 128th St, a pedestrian overcrossing would be built.

128th St

Turning movements off and onto 128th St would be limited between 4th Ave W and 8th Ave W.

Greensward

Limited turning on 128th St would allow for a greensward (a landscaped pedestrian and bicycle space) between the light rail structure and private development.

New 127th St

A new road at 127th St would provide access to development north of 128th St.

Expanded Park & Ride

Sound Transit will be adding an additional 500 parking spaces to the existing ~700 spaces as part of ST3.

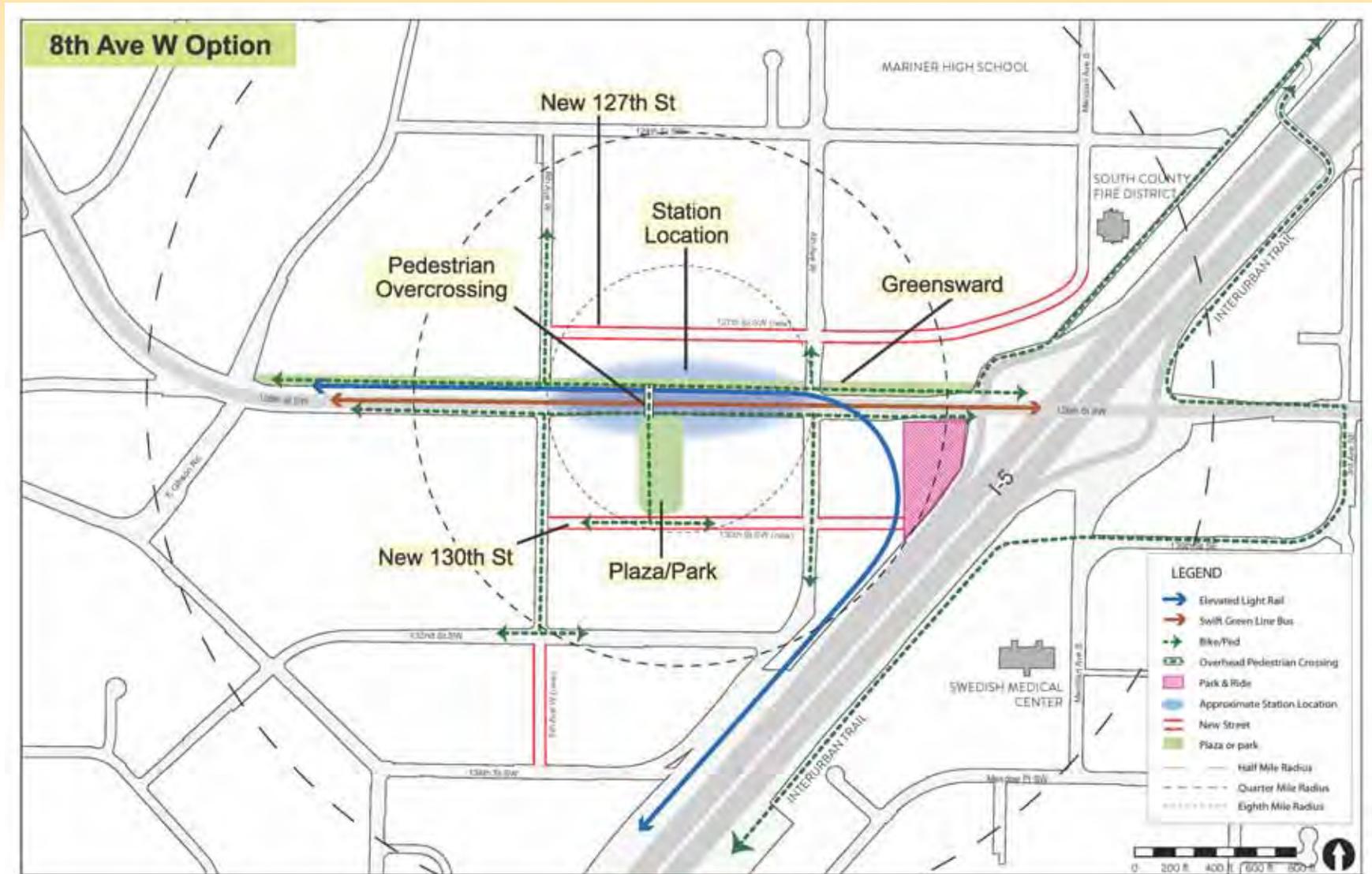
128th St & I-5 Interchange

For Swift to operate efficiently, replacement of the existing interchange will be needed in the next 10 years.

Plaza/Park

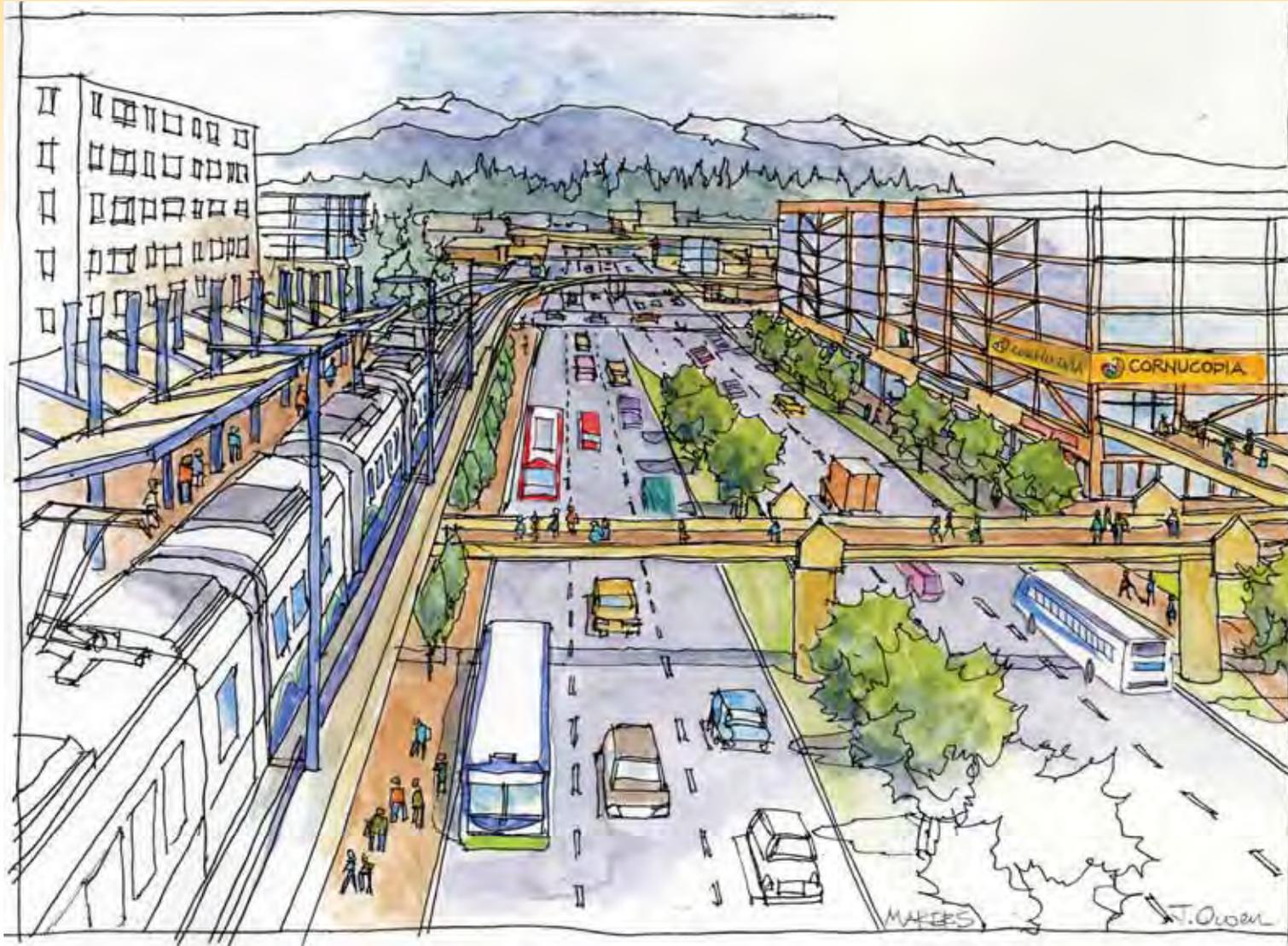
A centrally located plaza/park would adjoin the station to provide a focal point for the community.

Station Area Concept: 8th Ave W



This concept is representative of one possible future outcome; it does not intend to indicate what the actual key features of this area will be in the future.

Street View: Looking East at 8th Ave W



This concept is representative of one possible future outcome; it does not intend to indicate what the actual key features of this area will be in the future.

Aerial Representation: 8th Ave W

The aerial representation of the station area shows key features or infrastructure needed to make this concept possible.

This concept is representative of one possible future outcome; it does not intend to indicate what the actual key features of this area will be in the future.



Key Features for 130th St

This concept is representative of one possible future outcome; it does not intend to indicate what the actual key features of this area will be in the future.

Station Location

This concept reflects an elevated station perpendicular to 130th St between 4th Ave SW and 8th Ave SW. The blue shadowing on the station area map represents an area the station could be located in.

130th St Overcrossing

New 130th St overpass would be built for bus, HOV or vehicle and pedestrian/bike access to the Interurban Trail.

Pedestrian Overcrossing

The light rail platform would be extended to provide a pedestrian overcrossing over 128th St to provide a safer pedestrian crossing.

Expanded Park & Ride

Sound Transit will be adding an additional 500 parking spaces to the existing ~700 spaces as part of ST3.

Plaza/Park

A centrally located plaza/park would adjoin the station to provide a focal point for the community.

Street View: Looking East at 8th Ave

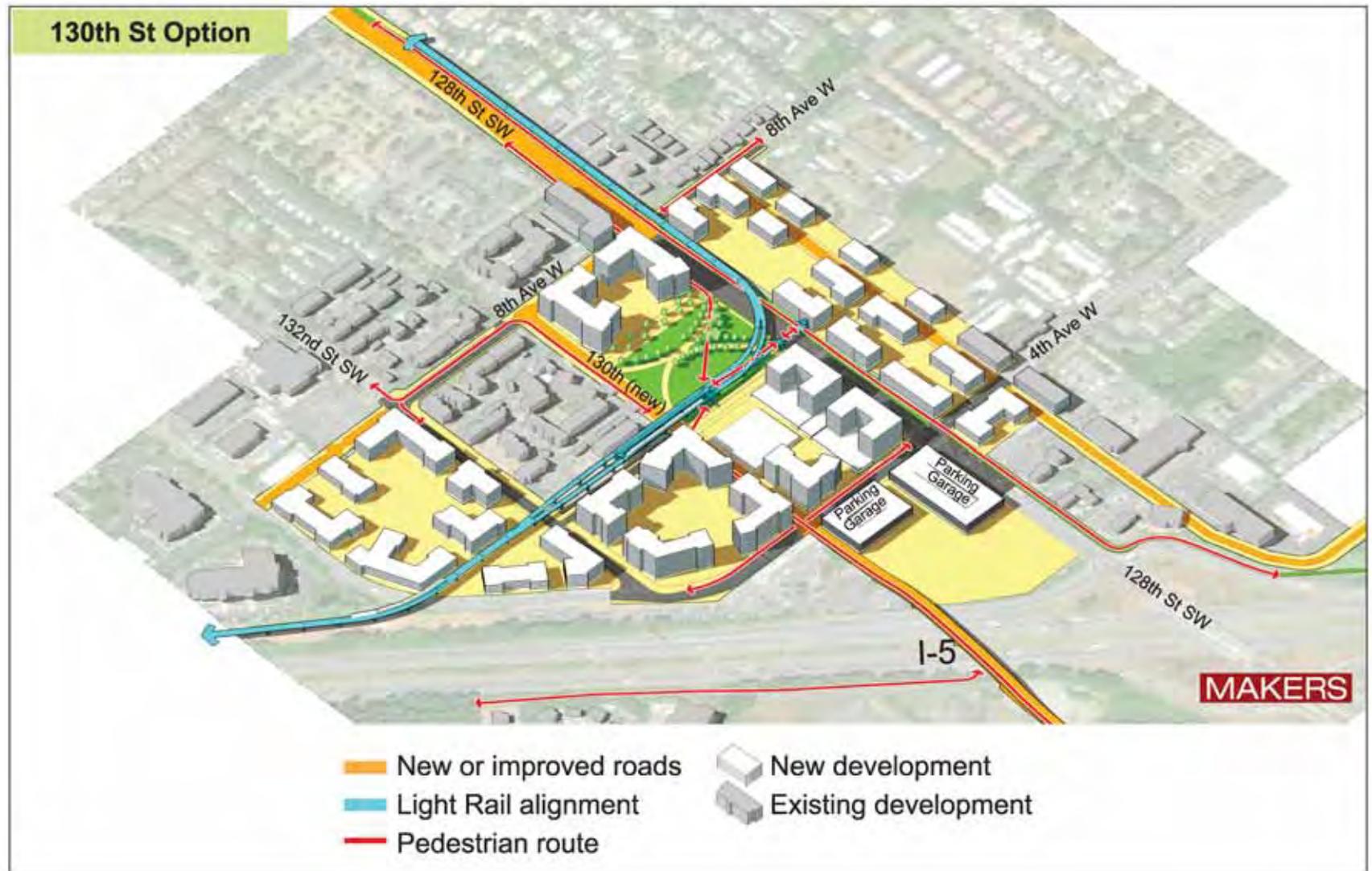


This concept is representative of one possible future outcome; it does not intend to indicate what the actual key features of this area will be in the future.

Aerial Representation: 130th St

The aerial representation of the station area shows key features or infrastructure needed to make this concept possible.

This concept is representative of one possible future outcome; it does not intend to indicate what the actual key features of this area will be in the future.



Ash Way Station

Potential Station Locations



Key Features:

- Redevelopment and existing structures
- New roads
- Open spaces
- Location of parking
- Light rail track

Key Features for Ash Way Park & Ride

This concept is representative of one possible future outcome; it does not intend to indicate what the actual key features of this area will be in the future.

Station Location

This concept reflects an elevated or at-grade station located within the existing Ash Way Park & Ride. The blue shadowing on the station area map represents an area the station could be located in.

Direct Access Ramp

The current HOV direct access from southbound I-5 would be extended to both sides of I-5 creating an overcrossing to provide bus, bike and pedestrian connection over I-5.

Ash Way Realignment

The section of Ash Way from the Park & Ride entrance to 164th St would be removed and realign to 162nd Pl SW. This would reduce congestion on 164th St by eliminating turn movements so close to the I-5 intersection.

Ash Way Park & Ride

The park and ride would be redeveloped into structured parking with development above.

Plaza/Park

A centrally located plaza/park would adjoin the station to provide a focal point for the community.

Station Area Concept: Ash Way Park & Ride



This concept is representative of one possible future outcome; it does not intend to indicate what the actual key features of this area will be in the future.

Street View: Looking East on 22nd Ave W

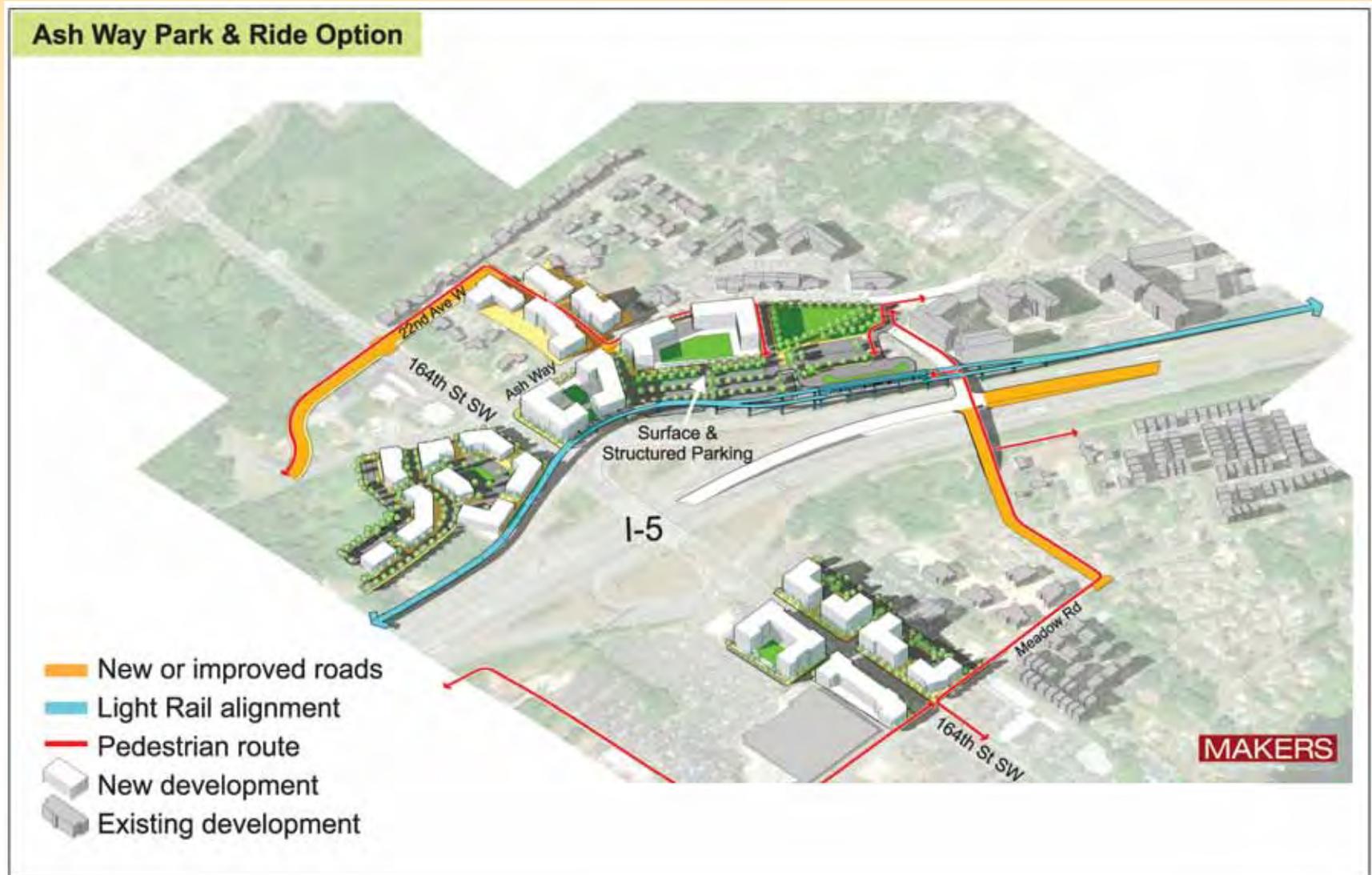


This concept is representative of one possible future outcome; it does not intend to indicate what the actual key features of this area will be in the future.

Aerial Representation: Ash Way Park & Ride

The aerial representation of the station area shows key features or infrastructure needed to make this concept possible.

This concept is representative of one possible future outcome; it does not intend to indicate what the actual key features of this area will be in the future.



Key Features for East of I-5

This concept is representative of one possible future outcome; it does not intend to indicate what the actual key features of this area will be in the future.

Station Location

This concept reflects an underground station located east of I-5. The blue shadowing on the station area map represents an area the station could be located in.

Interurban Trail Crossing

A potential Interurban Trail crossing would be built below 164th St.

Direct Access Ramp

The current HOV direct access from southbound I-5 would be extended to both sides of I-5 creating an overcrossing to provide bus, bike and pedestrian connection over I-5.

New Road - 162nd St

This road would provide a secondary connection between Larch Way and the light rail station and provide additional local circulation and pedestrian connections.

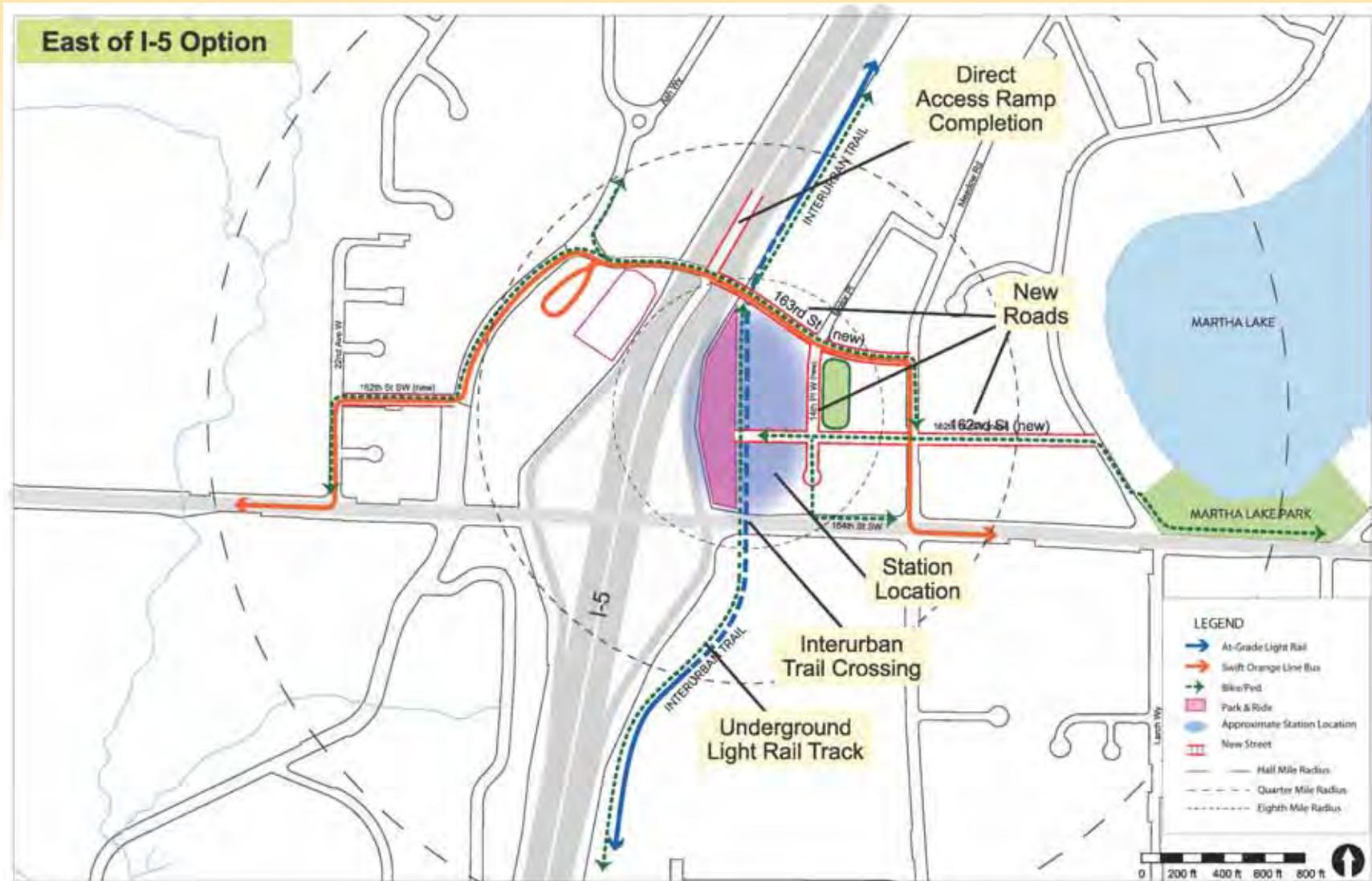
New Road - 14th Pl W & 163rd St

By breaking up the blocks on the east side of I-5, pedestrians will have better connectivity. Turns in/out of 164th St from 14th Pl W would be limited to right only.

Light Rail Track

The at-grade light rail track would transition to underground (cut and cover) south of 164th St and switch to elevated north of the station area prior to crossing I-5 between approximately 136th St and 144th St.

Station Area Concept: East of I-5



This concept is representative of one possible future outcome; it does not intend to indicate what the actual key features of this area will be in the future.

Street View: Looking West on New 162nd St

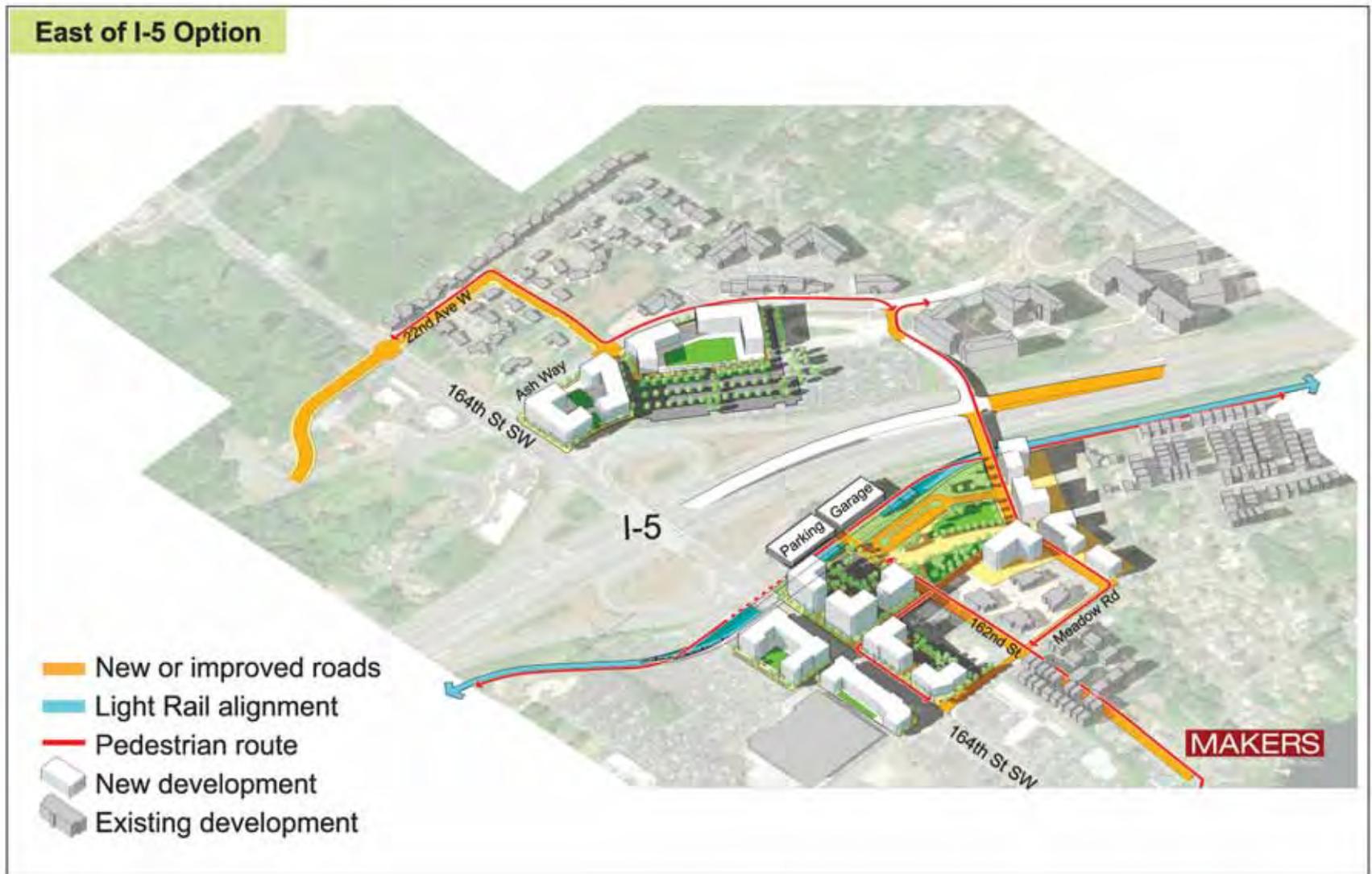


This concept is representative of one possible future outcome; it does not intend to indicate what the actual key features of this area will be in the future.

Aerial Representation: East of I-5

The aerial representation of the station area shows key features or infrastructure needed to make this concept possible.

This concept is representative of one possible future outcome; it does not intend to indicate what the actual key features of this area will be in the future.





☘☘☘ Snohomish County

Light Rail Communities

Results from Public Outreach | July 1 - July 31, 2019

INTRO

After meeting with stakeholders, utilities, local municipalities, transit agencies, reviewing public comments and considering the project’s guiding principles, Snohomish County narrowed down the possible station locations for each station area to two.

Below is a summary of the feedback received for both multiple choice and fill-in-the-blank questions from the in-person public meetings and the online open house.

RECAP



Mariner Station

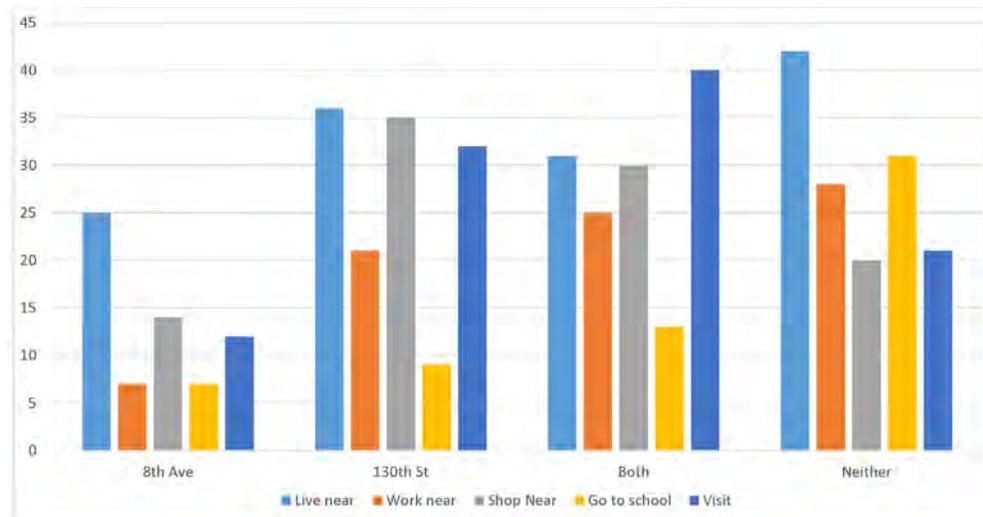
Q1

Rank each station location.



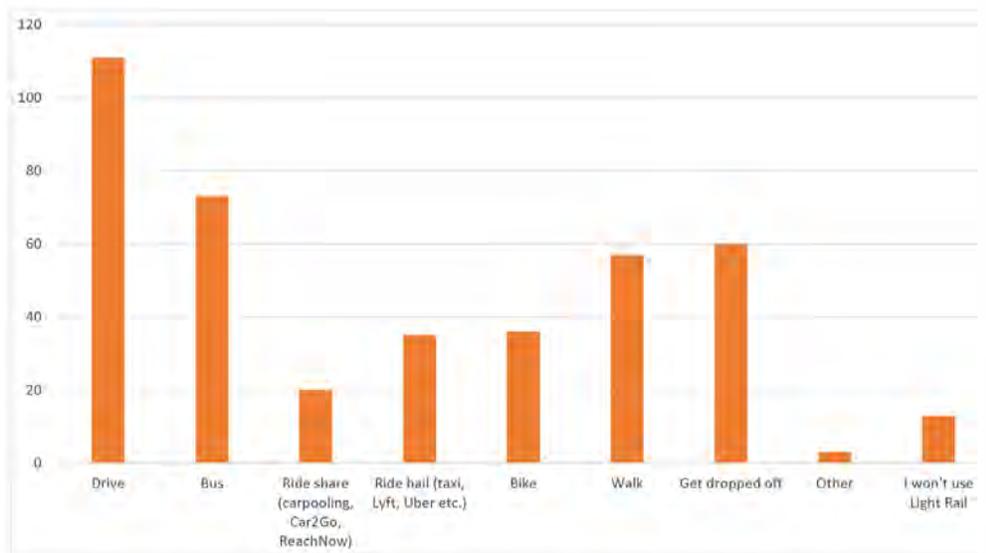
Q2

Based on what this online open house has shown you, does one of the station areas make you or your family more inclined to want to live, shop, go to school, visit or work near?



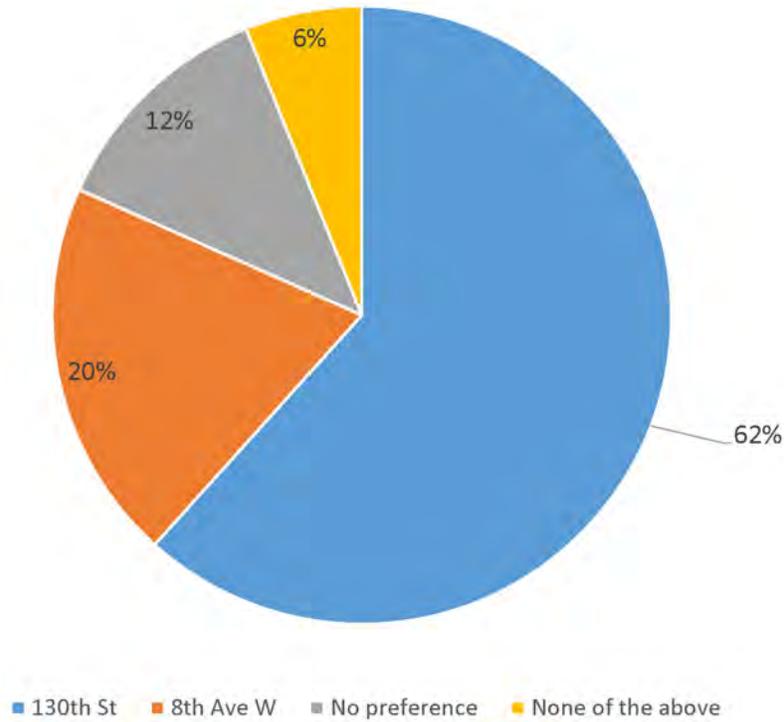
Q3

How do you think you will get to the light rail stations?



Q4

Which potential Mariner Station location do you prefer?



Q5

Why did you choose that station location?

8th Ave:

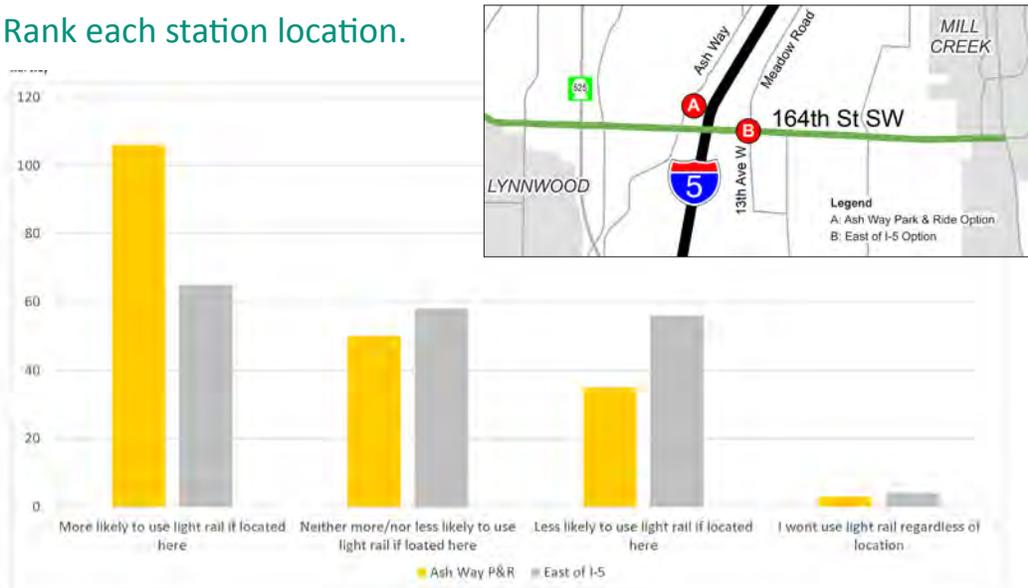
- Convenient
- Less noisy
- Less disruptive

130th Street:

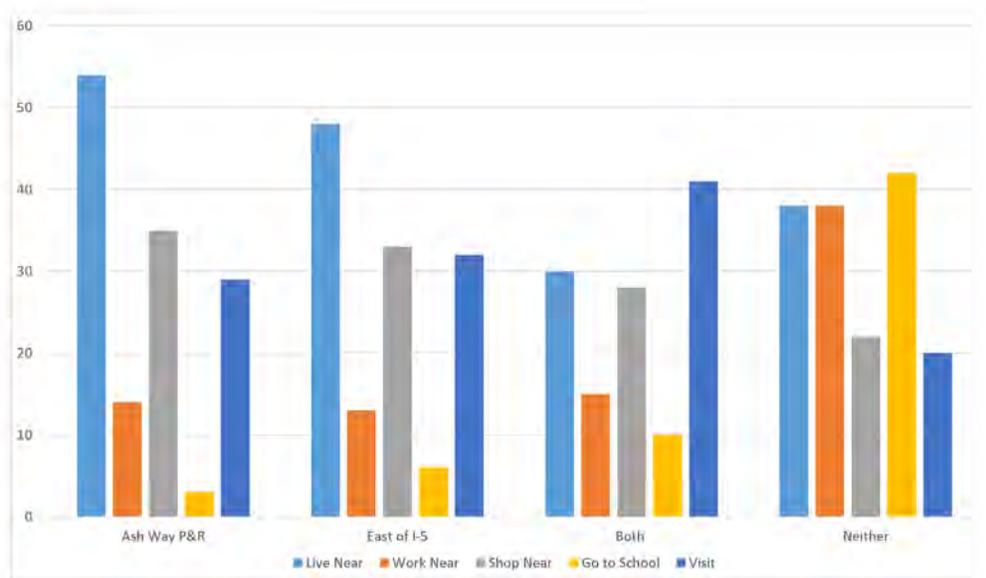
- Additional I-5 overpass
- Better bike, pedestrian and bus connections
- More TOD opportunities
- Less disruptive
- Least traffic impact
- Closer to parking
- Better rail alignment

Ash Way Station

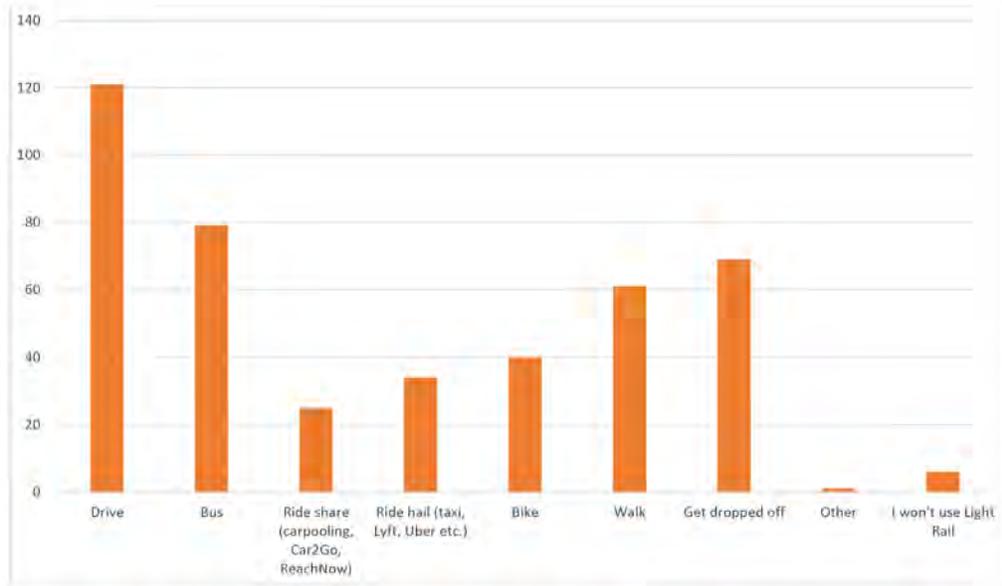
Q1 Rank each station location.



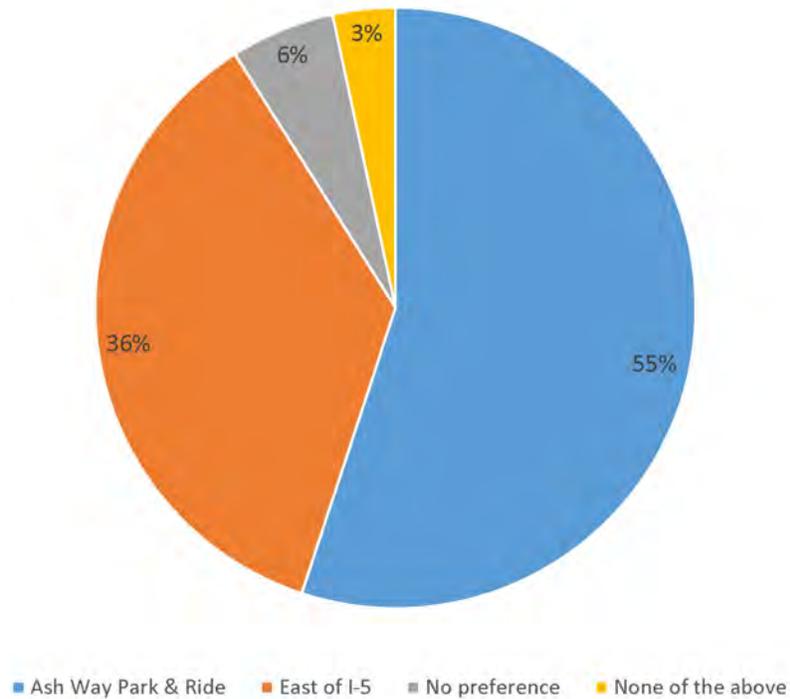
Q2 Based on what this online open house has shown you, does one of the station areas make you or your family more inclined to want to live, shop, go to school, visit or work near?



Q3 How do you think you will get to the light rail stations?



Q4 Which potential Ash Way Station location do you prefer?



Q5

Why did you choose that station location?

Ash Way Park & Ride:

- Infrastructure and land already available
- Costs less
- Prefers bus and light rail to be located at same location
- Eases congestion
- More convenient for that person
- More parking

East of I-5:

- Better bike and pedestrian connections via Interurban Trail
- Eases congestion
- Prefers an underground station
- East of I-5 needs access to light rail
- Closer to amenities and other businesses

APPENDIX D

Preliminary Station Locations Comparison Matrix Memorandum

MEMORANDUM

2707 Colby Avenue, Suite 900, Everett, WA 98201 | P 425.252.7700

To: Jay Larson
 From: Peter De Boldt
 Marcus Elliott
 Date: January 29, 2019
 Re: East-West Corridors Analysis: 164th and 128th Station Area Alternatives Matrices

Below are the two station area alternatives matrices for the 164th Street and 128th Street interchange areas. Each table contains more than three comparison options because the implementation of other projects—the completion of the Texas-T at 164th Street and the construction of the 130th Street overpass at 128th Street—have impacts on the project metrics. Backup information is attached to this memorandum.

Table 1. 164th Street SW Station Area Alternatives Matrix.

Metric	164th Street SW at Ash Way	Ash Way Park & Ride	Ash Way Park & Ride with full Texas-T	East of I-5	East of I-5 with full Texas-T
Transit-Oriented Development¹					
Existing dwelling units	1,586	1,970	2,355	1,253	2,378
Re-developable acres	78	88	165	137	161
Potential new units ²	7,801	8,808	16,451	13,729	16,075
Existing units on re-developable parcels	149	214	304	194	231
Total potential dwelling units	9,238	10,564	18,502	14,788	18,222
Transit Performance³					
Ridership ⁴	4,600 Bus 38,000 LRT	4,600 Bus 38,000 LRT	4,800 Bus 39,000 LRT	4,600 Bus 38,000 LRT	4,800 Bus 39,000 LRT
Travel Time to LRT Station (Alderwood Mall Pkwy to SR 527)	10 min WB 3 min EB	13 min WB 5 min EB	10 min WB 5 min EB	4 min WB 8 min EB	4 min WB 10 min EB
Cost Relative to Baseline					
Sound Transit (2017 \$) ⁵	+\$7.5M	\$0	\$0	+\$107.5M	+\$107.5M
Snohomish County (2030 \$) ⁶	\$224.9M ⁷	\$224.9M ⁷	\$350.8M ^{8,9}	\$224.9M ⁷	\$350.8M ^{8,9}
Total Costs	\$232.4M	\$224.9M	\$350.8M	\$332.4M	\$458.3M

Notes: ¹ Limited to a ½-mile walkshed.
² Potential dwelling units calculated assuming 100 dwelling units per re-developable acre.
³ Assumes BAT lanes added along 164th Street SW through the study area.
⁴ Ridership was modeled for a general light rail station location; specific station locations were not modeled and there may be ridership differences between the three candidate sites.
⁵ Costs are planning-level, relative to Sound Transit’s “Representative Alignment”. Costs are limited to design and construction of additional light rail track and/or parking; right-of-way costs are not included.
⁶ Costs are concept-level and include right-of-way negotiation and acquisition, design, and construction.
⁷ Includes the installation of BAT lanes on 164th Street SW from 36th Ave W to SR 527
⁸ Includes the installation of BAT lanes on 164th Street SW from 36th Ave W to Ash Way and from Meadow Road/13th Ave W to SR 527
⁹ Includes the realignment of Ash Way and Meadow Road, completion of the “Texas T” interchange, and the raising of the existing bridge over SB I-5 by 5’ to avoid clearance issues across NB I-5

Table 2. 128th Street SW Station Area Alternatives Matrix.

	8th Avenue W	4th Avenue W	130th Street SW with 2-Lane Overpass
Metric			
Transit-Oriented Development¹			
Existing dwelling units	4,167	3,050	3,653
Re-developable acres	178	144	189
Potential new units ²	17,793	14,438	18,886
Existing units on re-developable parcels	1,143	960	1,146
Total potential dwelling units	20,817	16,528	21,393
Transit Performance³			
Ridership ⁴	4,800 Bus 37,000 LRT	4,800 Bus 37,000 LRT	4,600 Bus 37,000 LRT ⁴
Travel Time to LRT Station (SR 99 to 16 th Ave SE)	12 min WB 9 min EB	12 min WB 9 min EB	11 min WB 8 min EB ⁴
Cost Relative to Baseline			
Sound Transit (2017 \$) ⁵	\$0	\$0	\$0
Snohomish County (2030 \$) ⁶	\$135.2M ⁷	\$135.2M ⁷	+ \$183.8M ^{8,9}

Notes: ¹ Limited to a 1/2-mile walkshed.
² Potential dwelling units calculated assuming 100 dwelling units per re-developable acre.
³ Assumes BAT lanes are installed along 128th Street SW/SE the study area.
⁴ Ridership was modeled for a general light rail station location; specific station locations were not modeled and there may be ridership differences between the three candidate sites.
⁵ Costs are planning-level, relative to Sound Transit's "Representative Alignment". Costs are limited to design and construction of additional light rail track and/or parking; right-of-way costs are not included.
⁶ Costs concept-level and include right-of-way negotiation and acquisition, design, and construction.
⁷ Includes the installation of BAT lanes on 128th Street SW/SE from 36th Ave W to SR 527.
⁸ Includes the installation of BAT lanes on 128th Street SW/SE from 36th Ave W to 8th Ave W and from 3rd Ave SE to SR 527.
⁹ Includes the construction of a three-lane segment of 130th Street SW/SE between 8th Ave W and 3rd Ave SE with a two-lane overcrossing of I-5 for transit/HOV.

APPENDIX A

Transit-Oriented Development and Walkshed Limits

Link Light Rail Station Location Comparison

1/17/18

General Characteristics: 128th St & 164th St

- Significant development of multifamily housing has occurred in recent years especially along I-5
- Mix of large lot commercial, apartments/condos, and single-family homes
- Lakes and wetlands limit buildable land
- I-5 presents a major barrier to walkability

Methodology

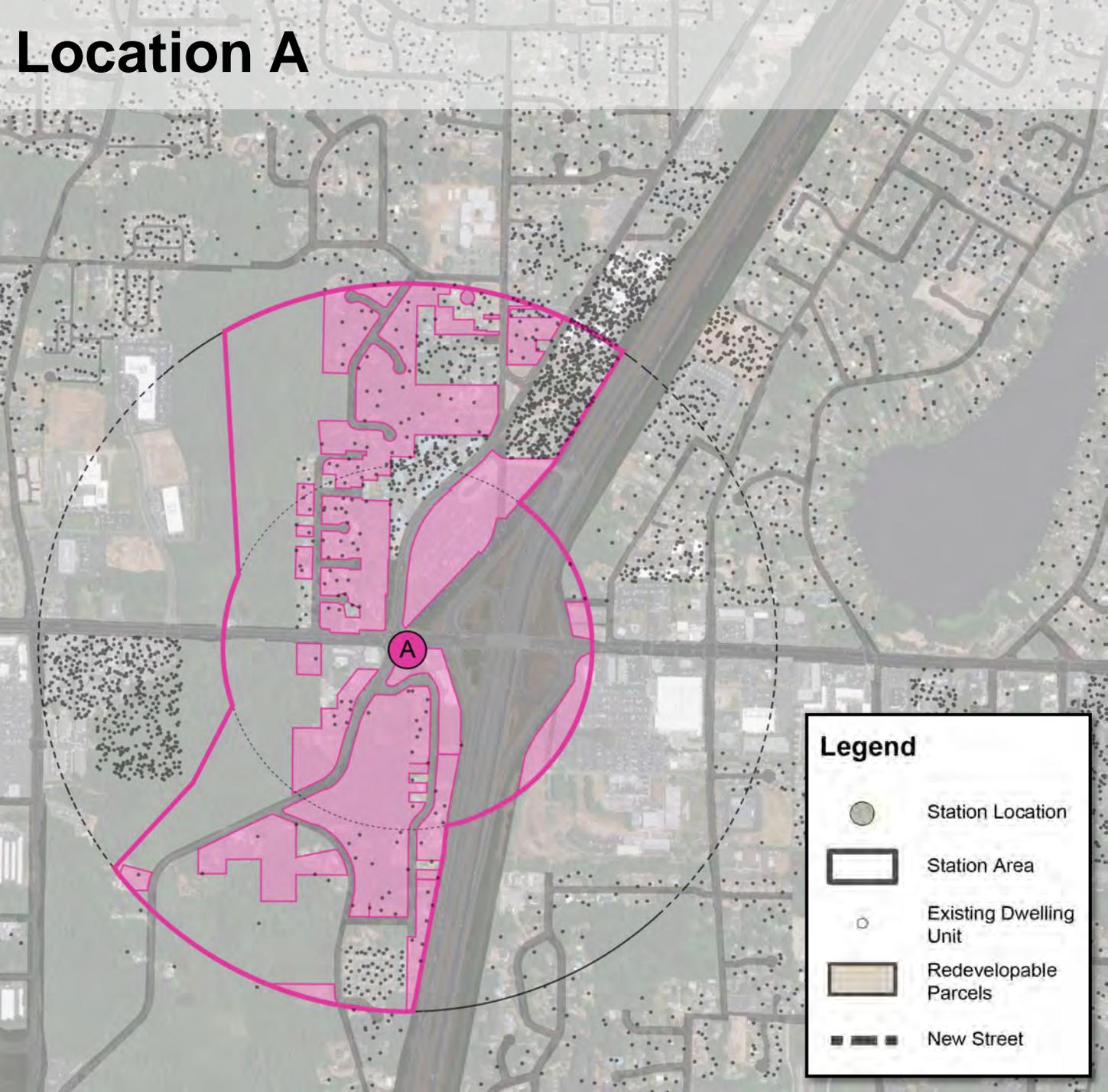
- Redevelopable parcels are identified as all parcels developed before 1980 and all parcels where the ratio of improvements to land value is less than 1.
- Potential dwelling units are calculated at 100 per acre on redevelopable parcels.
- Total potential units is the sum of existing units and potential units, with the subtraction of existing units located on redevelopable parcels.
- Dwelling unit data source is Snohomish County Assessor with revisions based on major new construction.
- Area within a half mile radius of station location is considered within the station area unless a significant barrier, such as I-5 impedes pedestrian movement. Where pedestrians would be required to cross I-5 or travel along 164th St the station area is limited to a quarter mile radius.

164th Street/Ash Way P&R



- 800-2000 existing units in station area depending on location
- Major multi-family residential development in recent years adjacent to Park & Ride station
- Locations west of I-5 offer limited capacity to develop mixed-use district
- 164th Street presents unpleasant pedestrian environment, limiting potential walkshed to the west
- Commercial buildings east of I-5 will be due for redevelopment when light rail service begins

Location A

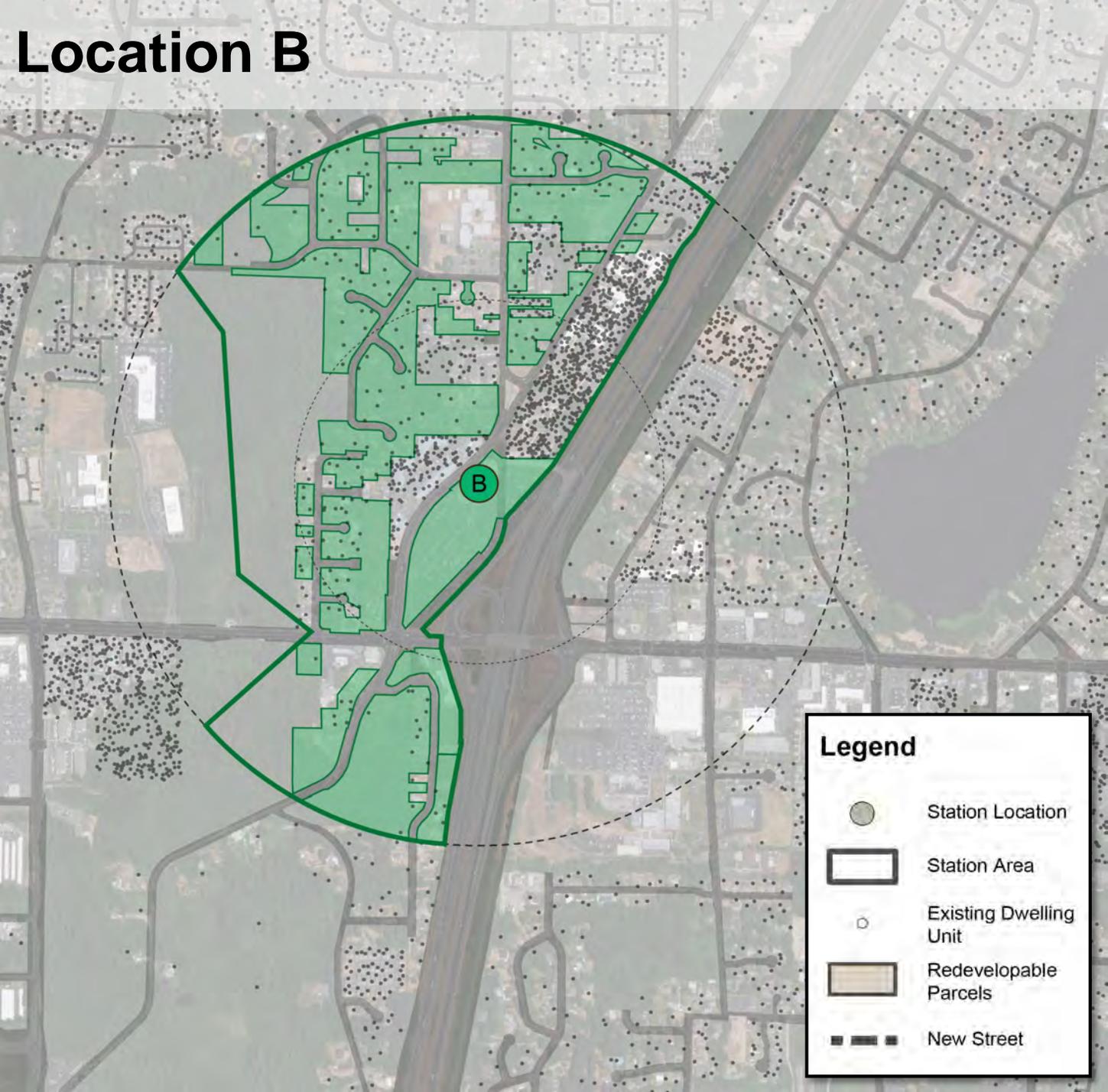


Legend

- Station Location
- Station Area
- Existing Dwelling Unit
- Redevelopable Parcels
- New Street

Existing DU:	905
Redevelopable Acres:	98
Potential Units at 100 DU/Acre	9,811
Existing Units on Redevelopable parcels	136
Total Potential Units	10,921

Location B



Existing DU
1,297

Redevelopable
Acres
110

Potential Units at
100 DU/Acre
11,047

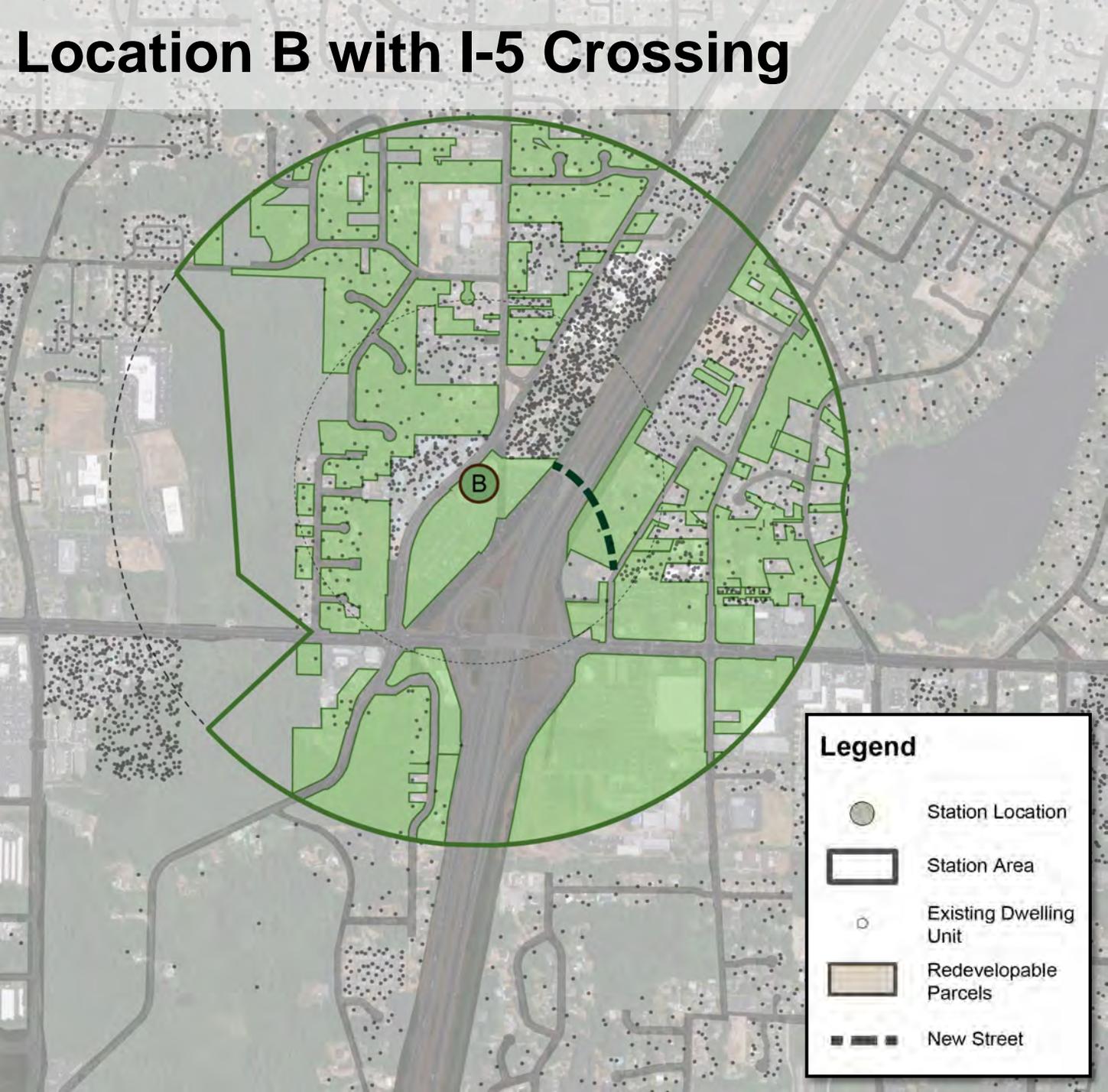
Existing Units on
Redevelopable
parcels
200

Total Potential
Units
12,144

Legend

- Station Location
- Station Area
- Existing Dwelling Unit
- Redevelopable Parcels
- New Street

Location B with I-5 Crossing



Existing DU:
1,726

Redevelopable
Acres:
197

Potential DU at
100 DU/acre:
19,725

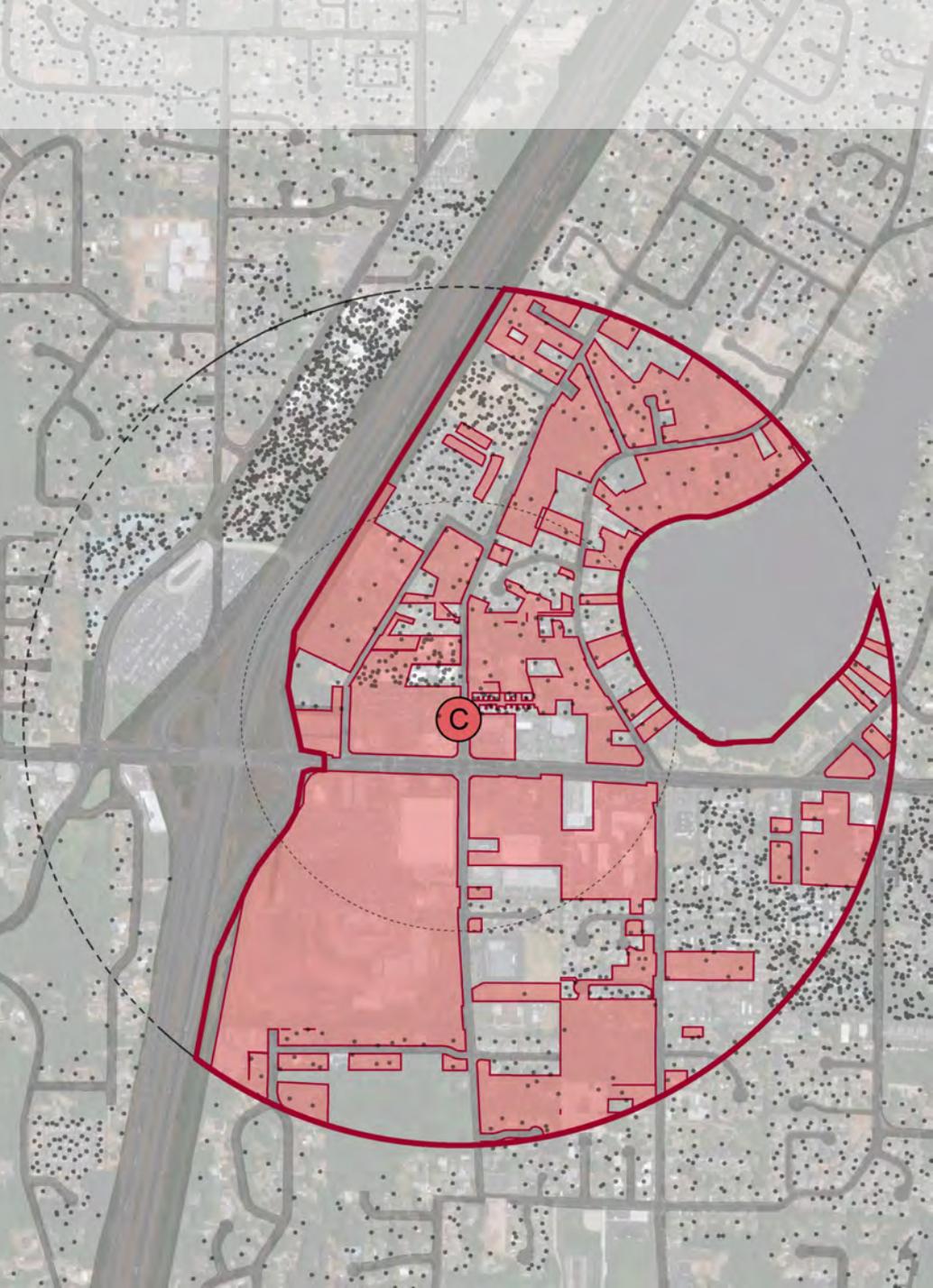
Existing Units on
Redevelopable
parcels
314

Total Potential
Units:
21,137

Location C

Legend

- Station Location
- Station Area
- Existing Dwelling Unit
- Redevelopable Parcels
- New Street



Existing DU:
1,028

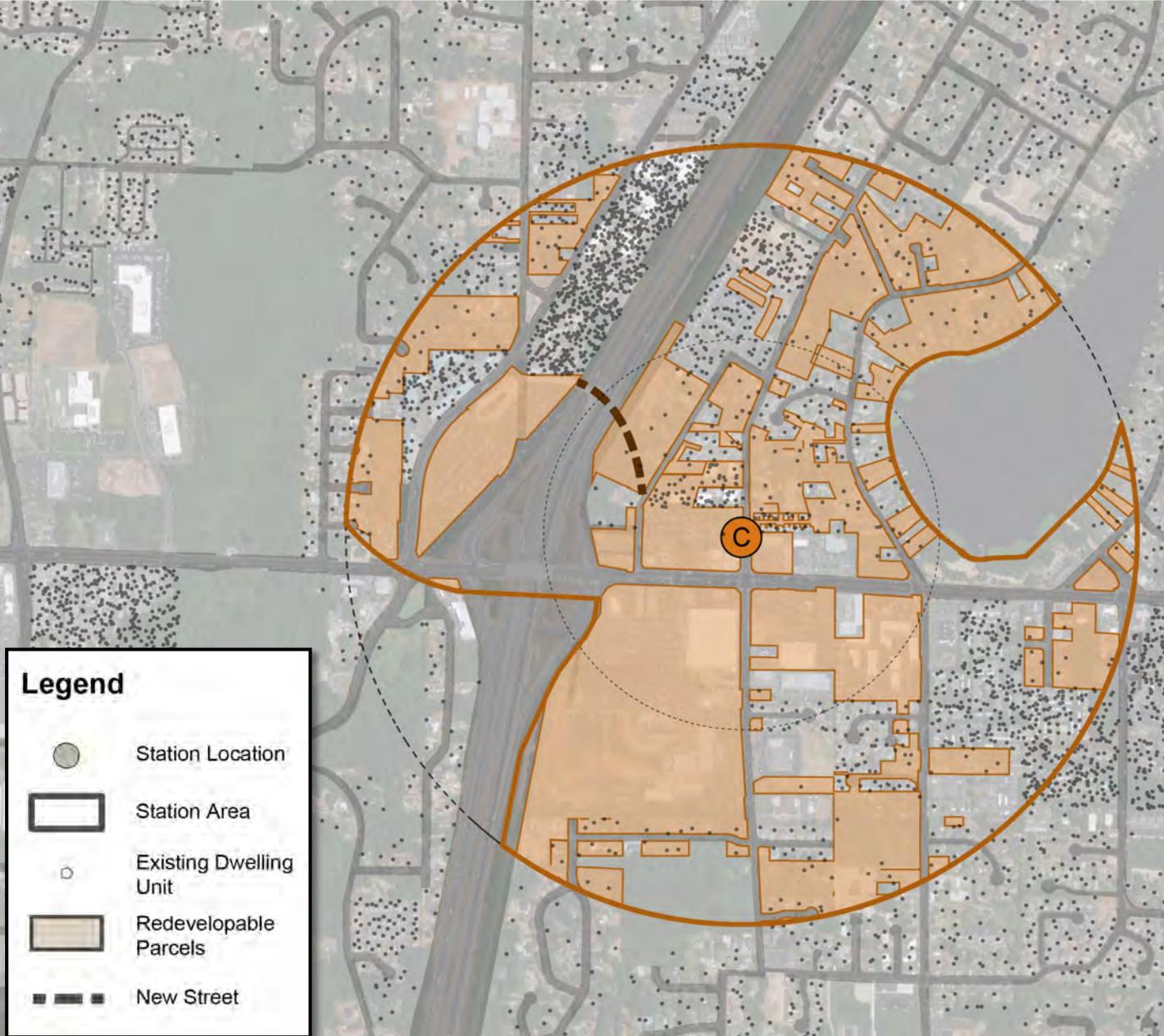
Redevelopable
Acres:
168

Potential Units at
100 DU/Acre
16,796

Existing Units on
Redevelopable
parcels
223

Total Potential
Units
17,601

Location C with I-5 Crossing

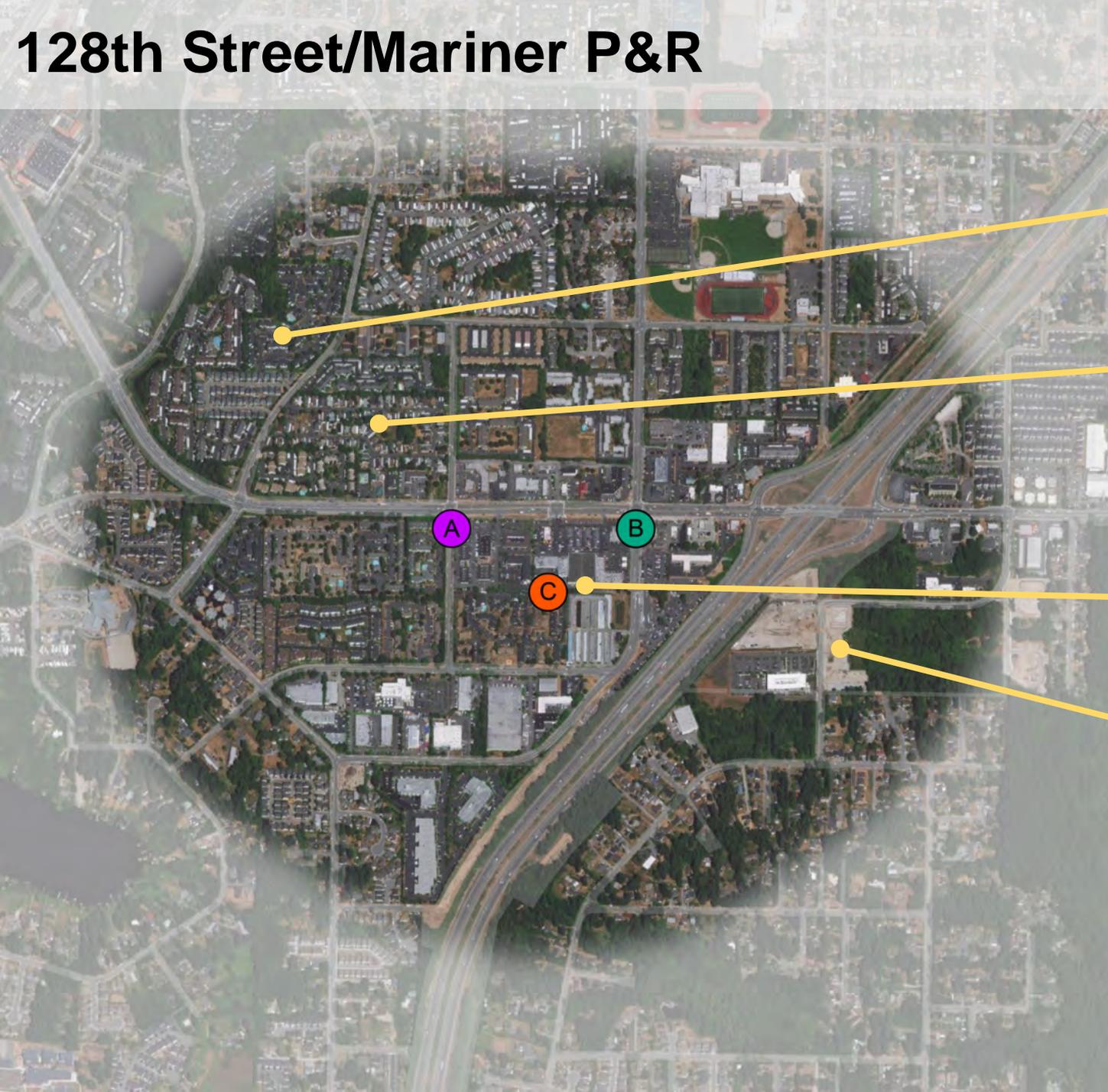


Legend

- Station Location
- Station Area
- Existing Dwelling Unit
- Redevelopable Parcels
- New Street

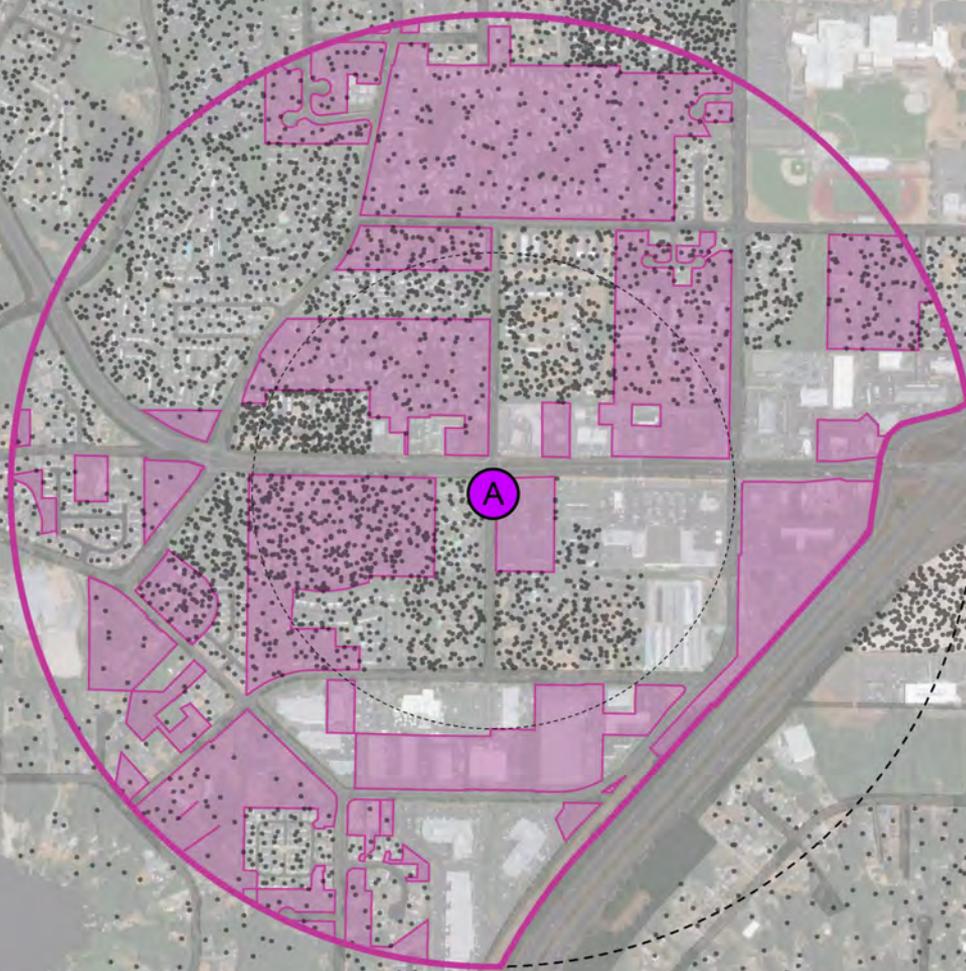
Existing DU:	2,033
Redevelopable Acres:	198
Potential Units at 100 DU/Acre	19,767
Existing Units on Redevelopable parcels	257
Total Potential Units	21,543

128th Street/Mariner P&R



- 2,700-3,900 existing units in station area depending on location
- Relatively new building stock limits redevelopment potential
- Redevelopment of mobile home parks and older attached housing implies displacement of existing residents
- Location C requires new right-of-way acquisition
- Significant development in recent years east of I-5 near potential 130th Street overpass

Location A



Legend

- Station Location
- Station Area
- Existing Dwelling Unit
- Redevelopable Parcels
- New Street

Existing DU: **3,881**

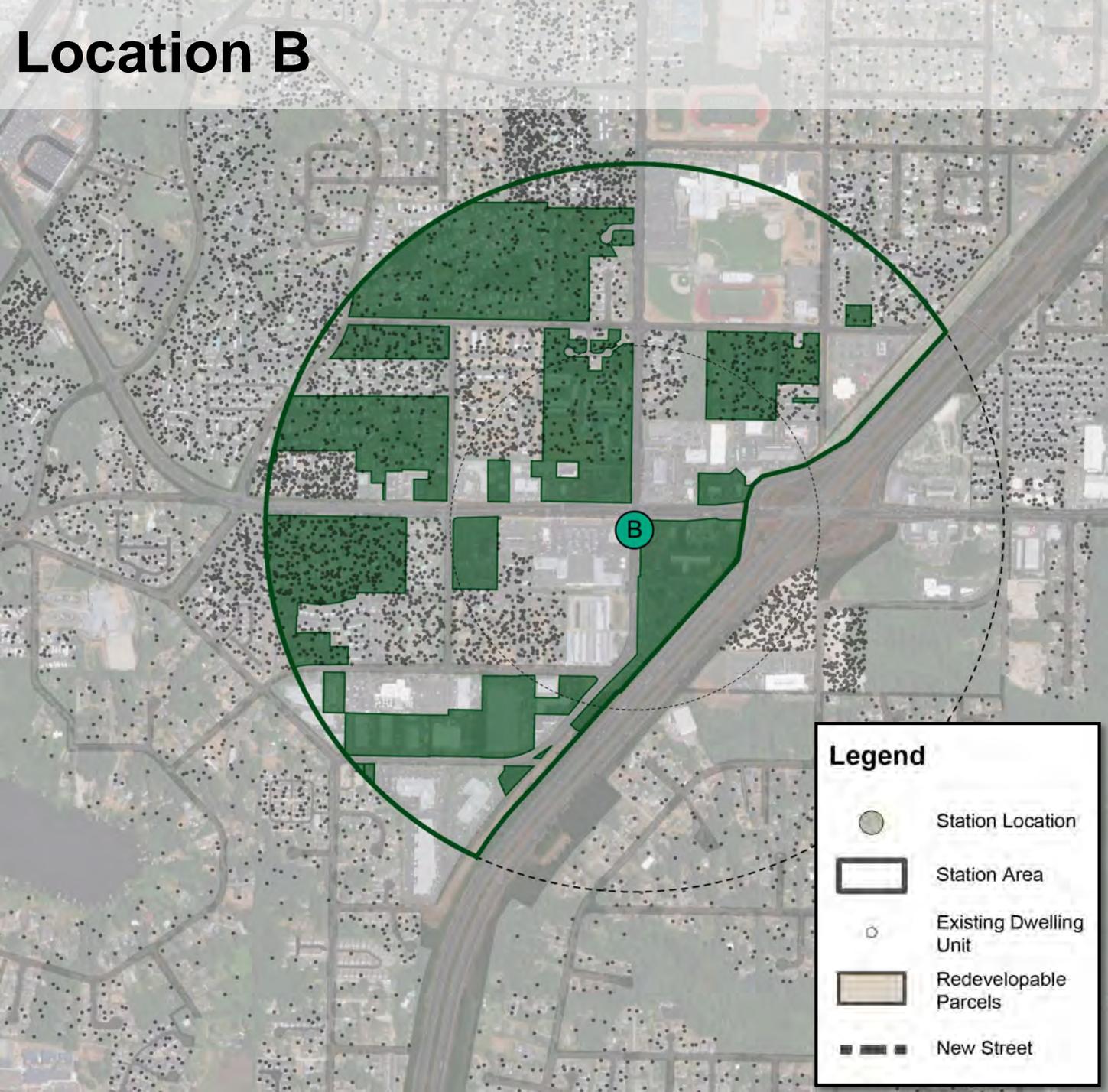
Redevelopable Acres: **171**

Potential Units at 100 DU/Acre **17,063**

Existing Units on Redevelopable parcels **1,123**

Total Potential Units **19,321**

Location B



Existing DU:
2,771

Redevelopable
Acres:
126

Potential Units at
100 DU/Acre
12,566

Existing Units on
Redevelopable
parcels
935

Total Potential
Units
14,410

Legend

- Station Location
- Station Area
- Existing Dwelling Unit
- Redevelopable Parcels
- New Street

Location C



Legend

- Station Location
- ▭ Station Area
- Existing Dwelling Unit
- ▭ Redevelopable Parcels
- New Street

Existing DU:
2,983

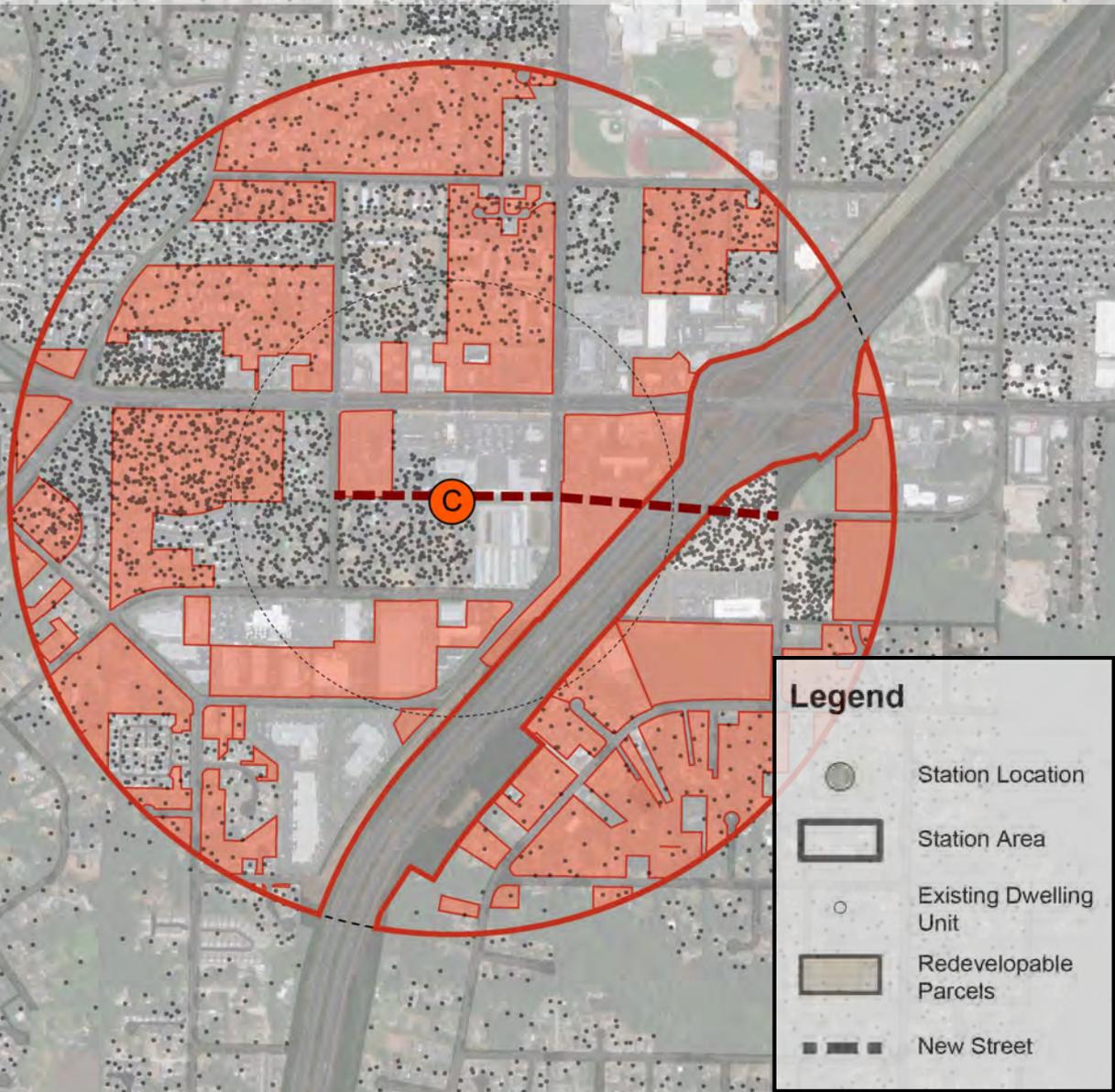
Redevelopable
Acres:
145

Potential Units at
100 DU/Acre
14,485

Existing Units on
Redevelopable
parcels
1,028

Total Potential
Units
16,440

Location C with 130th Street Overpass



Existing DU:
3,589

Redevelopable
Acres:
192

Potential Units at
100 DU/Acre
19,167

Existing Units on
Redevelopable
parcels
1,125

Total Potential
Units
21,631

APPENDIX B

Traffic Data Summary (from Phase II of Study)

Scenario	Description of Improvements	Total ADT Volumes (Range)	Preliminary Transit Ridership	Corridor-Wide Travel Time (min)		Intermediate Travel Time to Proposed LRT Station (min)			Total Person-Trips Crossing I-5 ⁵
				GP Traffic ¹	Transit ¹	Transit ²	Walking ³	Total	
Scenario 1 (128th)	Future Baseline- BRT with no improvements	128th: 20-41k 164th: 37-44k	128th: 4,050 164th: 3,550 LRT: 36,000 Total: 43,600	Eastbound: 17	Eastbound: 15	Eastbound: 7	Eastbound: 4	Eastbound: 11	73-105k
Scenario 1 (164th)				Westbound: 15	Westbound: 16	Westbound: 8	Westbound: 6	Westbound: 14	
Scenario 2	Widen 128th Street to add a BAT lane in each direction.	128th: 21-42k 164th: 37-44k	128th: 4,800 164th: 3,550 LRT: 37,000 Total: 45,350	Eastbound: 17 Westbound: 13	Eastbound: 10 Westbound: 10	Eastbound: 5 Westbound: 6	Eastbound: 4 Westbound: 6	Eastbound: 9 Westbound: 12	75-107k
Scenario 3	Widen 164th Street to add a BAT lane in each direction.	128th: 20-41k 164th: 38-46k	128th: 4,050 164th: 4,600 LRT: 38,000 Total: 46,650	Eastbound: 13 Westbound: 18	Eastbound: 8 Westbound: 13	Eastbound: 2 Westbound: 9	Eastbound: 8 Westbound: 8	Eastbound: 10 Westbound: 17	75-109k
Scenario 4	Widen 128th Street to add a BAT lane in each direction. Construct an alternate 2-lane crossing of I-5 at approximately 130th Street that would be reserved for Transit and HOV.	128th: 22-43k 164th: 37-44k 130 th : 12k	128th: 4,600 164th: 3,550 LRT: 37,000 Total: 45,150	Eastbound: 19 Westbound: 16	Eastbound: 13 Westbound: 15	Eastbound: 7 Westbound: 10	Eastbound: 1 Westbound: 1	Eastbound: 8 Westbound: 11	101-133k
Scenario 5	Widen 128th Street to add a BAT lane in each direction Construct an alternate 4-lane crossing of I-5 at approximately 130th Street that with an HOV and GP lane in each direction.	128th: 22-47k 164th: 37-44k 130 th : 25k	128th: 4,800 164th: 3,550 LRT: 37,000 Total: 45,350	Eastbound: 22 Westbound: 16	Eastbound: 11 Westbound: 14	Eastbound: 6 Westbound: 9	Eastbound: 1 Westbound: 1	Eastbound: 7 Westbound: 10	105-142k
Scenario 6	Widen 164th Street to add a BAT lane in each direction. Construct an alternate crossing of I-5 at the "Texas T" reserved for transit and HOV.	128th: 20-41k 164th: 38-45k Texas T: 5-8k	128th: 4,050 164th: 4,800 LRT: 39,000 Total: 48,300	Eastbound: 14 Westbound: 21	Eastbound: 11 Westbound: 16	Eastbound: 4 Westbound: 9	Eastbound: 1 Westbound: 1	Eastbound: 5 Westbound: 10	85-124k
Scenario 7 (128th) ⁴	Repurpose the outer lanes on both 128th Street and 164th Street as BAT lanes in each direction.	128th: 26-27k 148th: 37-41k 164th: 27-28k	128th: 4,700 164th: 4,600 LRT: 39,000 Total: 48,300	Eastbound: 22	Eastbound: 12	Eastbound: 5	Eastbound: 4	Eastbound: 9	113-120k
Scenario 7 (164th) ⁴				Westbound: 17	Westbound: 9	Westbound: 6	Westbound: 6	Westbound: 12	
Scenario 8	Construct a new corridor at the 148th Street / 146th Street alignment.	128th: 20-41k 164th: 35-42k	128th: 4,050 164th: 4,900 LRT: 39,000 Total: 46,950	Eastbound: 25 Westbound: 37	Eastbound: 8 Westbound: 7	Eastbound: 2 Westbound: 5	Eastbound: 8 Westbound: 8	Eastbound: 10 Westbound: 13	72-104k

1. Travel time is between SR99 and SR527 (unless otherwise noted).
2. Transit component of the Intermediate Travel Time is from SR99 or SR527 to the Mariner Park & Ride Proposed LRT Stations (128th Street) or the Ash Way Park & Ride Proposed LRT Station (164th Street).
3. Walking component of the Intermediate Travel Time is from an on-street bus stop to the Proposed LRT Station in question.
4. Scenario 7 results in reasonable travel times along 128th and SR 527. However, significant delay is anticipated along SR 99, SR 527, and the I-5 ramps at intersections with 128th and 164th as a result of reduced capacity along these corridors that impacts intersecting roads.
5. Assumes average vehicle occupancy of 1.15 for GP traffic and 2.05 for HOV.

APPENDIX C

Sound Transit Costs, Relative to Representative Alignment

164th Alignment Cost Comparisons

Representative Length = 14700

12/10/2018

Item	Ash Way & 164th Street SW Alternative	Ash Way Park & Ride Alternative	East of I-5 Alternative
Light Rail Track			
Length	15197 LF	15019 LF	15468 LF
Length Increase Compared to Representative Alignment	497 LF	319 LF	768 LF
Standard Segment Length	497 LF	319 LF	168
Long-Span Segment Length	0	0	600
Standard Segment Unit Cost per LF	\$15,100	\$15,100	\$15,100
Long-Span Segment Unit Cost per LF	\$25,500	\$25,500	\$25,500
Straddle Bents	0 EA	0 EA	6 EA
Straddle Bent Unit Cost per EA	\$1,710,000	\$1,710,000	\$1,710,000
LRT Cost Increase Compared to Representative Alignment (2017 \$)	\$7,500,000	\$4,800,000	\$28,100,000
Parking			
New Parking Stalls	0 EA	0 EA	1019 EA
Parking Stall Unit Cost per EA	\$77,900	\$77,900	\$77,900
Parking Cost Increase Compared to Representative Alignment (2017 \$)	\$0	\$0	\$79,400,000
Total			
Total Cost Increase Compared to Representative Alignment (2017 \$)	\$7,500,000	\$4,800,000	\$107,500,000

Note: All costs are in 2017 \$.

APPENDIX D
Snohomish County Costs

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description: East-West Corridor HCT Access Study - Phase II	Client: Snohomish County
Corridor Section: 128th St Corridor	Date: April-15
Location: Segment 3 - South Alternative	Date of Cost Index: 2015
Diversion from 8th Ave W to 3rd Ave SE	Calculated By/Entered By: BMP
	Checked By: JJH
	6-Apr 2-Sep

ESTIMATE TEMPLATE COSTS - UPDATED DECEMBER 2014

		ITEM	UNIT	ESTIMATED UNIT COST	QTY	COST
I.		RIGHT OF WAY				
		RIGHT OF WAY (PARTIAL ACQUISITION)	LS	\$5,438,000	1	\$5,438,000
		RIGHT OF WAY (FULL ACQUISITION)	LS	\$7,686,000	1	\$7,686,000
		CONSTRUCTION EASEMENTS	SF	\$5	27,700	\$138,500
		RIGHT OF WAY TOTAL				\$13,262,500
II.		CONSTRUCTION				
1		PREPARATION/GRADING/DRAINAGE				
	1.1	PREPARATION				
		CLEAR & GRUB, DEMO	ACRE	\$6,000	3.5	\$21,000
		REMOVING EXISTING PAVEMENT	SY	\$10	-	\$0
		REMOVAL STRUCTURES & OBSTRUCTIONS	LS	\$0	1	\$0
	1.2	EARTHWORK				
		ROADWAY EXCAVATION INCL. HAUL	CY	\$20	26,700	\$534,000
		STRUCTURE EX. CL. A INCL. HAUL	CY	\$25	-	\$0
		BORROW INCL. HAUL	TON	\$18	60,700	\$1,092,600
		EMBANKMENT COMPACTION	CY	\$2	32,800	\$65,600
	1.3	STORMWATER MITIGATION				
		DETENTION AND TREATMENT	SF	\$10	296,300	\$2,963,000
	1.4	STORM SEWER				
		CATCH BASIN TYPE 1	EA	\$1,000	71	\$71,000
		CATCH BASIN TYPE 2	EA	\$2,200	36	\$79,200
		PLAIN CONC. STORM SEWER PIPE 12 IN. DIAM.	LF	\$35	1,410	\$49,350
		PLAIN CONC. STORM SEWER PIPE 18 IN. DIAM.	LF	\$45	5,940	\$267,300
		STRUCTURE EXCAVATION CL. B	CY	\$15	5,200	\$78,000
2		STRUCTURE				
		CONCRETE BRIDGES	SF	\$250	23,100	\$5,775,000
		CONCRETE BRIDGES WIDENING	SF	\$350	-	\$0
		APPROACH SLAB	SY	\$140	400	\$56,000
		BRIDGE EMBANKMENT	CY	\$50	5,300	\$265,000
		MODULAR BLOCK WALL (CUT)	SF	\$35	1,100	\$38,500
		SOLDIER PILE WALL W/ CONCRETE FACING (CUT)	SF	\$125	-	\$0
		SOLDIER PILE WALL W/ CONCRETE FACING (CUT)	SF	\$150	-	\$0
		MECHANICALLY STABILIZED EARTH WALL (FILL)	SF	\$45	2,000	\$90,000
		SOLDIER PILE WALL W/ CONCRETE FACING (FILL)	SF	\$125	3,200	\$400,000
		SOLDIER PILE WALL W/ CONCRETE FACING (FILL)	SF	\$150	12,900	\$1,935,000
		BRIDGE REMOVAL	SF	\$40	-	\$0
		CULVERT	LF	\$1,750	80	\$140,000
		NOISE WALLS	SF	\$40	-	\$0
3		SURFACING				
		PORTLAND CEMENT CONCRETE	SF	\$12	-	\$0
		HOT MIX ASPHALT	TON	\$85	12,400	\$1,054,000
		CRUSHED SURFACING	TON	\$25	9,300	\$232,500
4		ROADSIDE DEVELOPMENT				
		FENCING	LF	\$15	-	\$0
		SEEDING, MULCHING & FERTILIZING	LS	\$37,000	1	\$37,000
		WETLAND MITIGATION	LS	\$624,000	1	\$624,000
		ENVIRONMENTAL PERMITS	LS	\$0	1	\$0
		TEMPORARY WATER POLLUTION & EROSION CONTROL	LS	\$360,300	1	\$360,300
		LANDSCAPING	LS	\$418,000	1	\$418,000
5		TRAFFIC				
		GUARD RAIL	LF	\$18	-	\$0
		CONCRETE BARRIER	LF	\$65	1,700	\$110,500
		SIGNAL SYSTEMS	LS	\$800,000	1	\$800,000
		ILLUMINATION	LS	\$314,200	1	\$314,200
		SIGNING	LS	\$29,000	1	\$29,000
		CURBS	LF	\$15	10,800	\$162,000
		CURB RAMPS	EA	\$1,500	24	\$36,000
		SIDEWALKS	SY	\$25	6,100	\$152,500
		DRIVEWAYS	SY	\$75	800	\$60,000

PLANNING LEVEL OPINION OF COST SUMMARY						
Project Description:		East-West Corridor HCT Access Study - Phase II			Client: Snohomish County	
Corridor Section:		128th St Corridor			Date: April-15	
Location:		Segment 3 - South Alternative			Date of Cost Index: 2015	
		Diversion from 8th Ave W to 3rd Ave SE			Calculated By/Entered By: BMP	
					Checked By: JJH	
					6-Apr	
					2-Sep	
ESTIMATE TEMPLATE COSTS - UPDATED DECEMBER 2014						
		ITEM	UNIT	ESTIMATED UNIT COST	QTY	COST
		SC&DI (ITS)	LS	\$60,000	1	\$60,000
		TRAFFIC CONTROL	LS	\$918,600	1	\$918,600
	5a.	OTHER ITEMS				
		SURVEYING	LS	\$289,400	1	\$289,400
		SPECIAL ITEMS	EST	\$0	1	\$0
		UTILITY RELOCATIONS	EST	\$0	1	\$0
6		MISCELLANEOUS (10%)	LS	\$1,958,000	1	\$1,958,000
7		CONSTRUCTION SUBTOTAL (ITEMS 1 THRU 6)				\$21,536,550
8		MOBILIZATION				
		10.00% OF ITEM 7	EST	\$2,154,000	1	\$2,154,000
9		SUBTOTAL (ITEMS 7 & 8)				\$23,690,550
10		SALES TAX				
		0.0% OF (% OF ITEM 9)	EST	\$0	1	\$0
11		AGREEMENTS (Utilities, WSP, etc.)				
			EST	\$0	1	\$0
12		SUBTOTAL (ITEMS 9 THRU 11)				\$23,690,550
13		CONSTRUCTION				
		ENGINEERING (15% OF ITEM 12)	EST	\$3,554,000	1	\$3,554,000
		CONTINGENCIES (30% OF ITEM 12)	EST	\$7,108,000	1	\$7,108,000
14		CONSTRUCTION TOTAL (ITEMS 12 & 13)				\$34,352,550
III.		PRELIMINARY ENGINEERING				
		(15% OF ITEM 14)	EST	\$5,153,000	1	\$5,153,000
IV.		TOTAL ESTIMATED COST				
		(ITEMS I, 14 & III)				\$52,770,000
V.		FUTURE ESTIMATED COST				
			Inflation	Const. Year	Cost Index	Future Cost
		FUTURE COST BASED ON INFLATION RATE	0.04	2030	2015	\$95,040,000

The above opinion of cost is a planning level estimate only. It is based on best available information and scope at the time, not on the results of a detailed engineering study, and is supplied as a budgeting guide only. Pertee, Inc. does not guarantee or warrant the accuracy of this planning level estimate.

Relative Cost Calculation: Subtracted from 130th Overpass Cost

PLANNING LEVEL OPINION OF COST SUMMARY						
Project Description: Snohomish County HCT Access Study - Phase 1			Client: Snohomish County			
Corridor Section: 128th St Corridor			Date: January-15			
Location: Segment 3 - 8th Ave W to 3rd Ave SE			Date of Cost Index: 2015			
			Calculated By/Entered By: JJH			
			Checked By: BMP			
ESTIMATE TEMPLATE COSTS - UPDATED JANUARY 2016						
		ITEM	UNIT	ESTIMATED UNIT COST	QTY	COST
I.		RIGHT OF WAY				
		RIGHT OF WAY (PARTIAL)	LS	\$1,524,000	1	\$1,524,000
		RIGHT OF WAY (FULL ACQUISITION)	LS	\$1,745,000	1	\$1,745,000
		CONSTRUCTION EASEMENTS	SF	\$5	19,800	\$99,000
		RIGHT OF WAY TOTAL				\$3,368,000
II.		CONSTRUCTION				
1		PREPARATION/GRADING/DRAINAGE				
	1.1	PREPARATION				
		CLEAR & GRUB, DEMO	ACRE	\$25,000	3.6	\$90,000
		REMOVING EXISTING PAVEMENT	SY	\$10	-	\$0
		REMOVAL STRUCTURES & OBSTRUCTIONS	LS	\$0	1	\$0
	1.2	EARTHWORK				
		ROADWAY EXCAVATION INCL. HAUL	CY	\$30	15,700	\$471,000
		STRUCTURE EX. CL. A INCL. HAUL	CY	\$25	-	\$0
		BORROW INCL. HAUL	TON	\$23	12,100	\$278,300
		EMBANKMENT COMPACTION	CY	\$8	6,500	\$52,000
	1.3	STORMWATER MITIGATION				
		DETENTION AND TREATMENT	SF	\$10	131,400	\$1,314,000
	1.4	STORM SEWER				
		CATCH BASIN TYPE 1	EA	\$1,200	49	\$58,800
		CATCH BASIN TYPE 2	EA	\$2,200	25	\$55,000
		PLAIN CONC. STORM SEWER PIPE 12 IN. DIAM.	LF	\$55	2,180	\$119,900
		PLAIN CONC. STORM SEWER PIPE 18 IN. DIAM.	LF	\$45	4,380	\$197,100
		STRUCTURE EXCAVATION CL. B	CY	\$20	2,400	\$48,000
2		STRUCTURE				
		CONCRETE BRIDGES	SF	\$250	-	\$0
		CONCRETE BRIDGES WIDENING	SF	\$350	12,800	\$4,480,000
		MODULAR BLOCK WALL (CUT)	SF	\$35	-	\$0
		SOLDIER PILE WALL W/ CONCRETE FACING (CUT)	SF	\$100	-	\$0
		MECHANICALLY STABILIZED EARTH WALL (FILL)	SF	\$45	-	\$0
		SOLDIER PILE WALL W/ CONCRETE FACING (FILL)	SF	\$125	-	\$0
		BRIDGE REMOVAL	SF	\$30	-	\$0
		CULVERT	LF	\$1,750	-	\$0
		NOISE WALLS	SF	\$40	-	\$0
3		SURFACING				
		PORTLAND CEMENT CONCRETE	SF	\$12	-	\$0
		HOT MIX ASPHALT	TON	\$85	8,500	\$722,500
		CRUSHED SURFACING	TON	\$31	4,500	\$139,500
4		ROADSIDE DEVELOPMENT				
		FENCING	LF	\$15	110	\$1,650
		SEEDING, MULCHING & FERTILIZING	LS	\$44,100	1	\$44,100
		WETLAND MITIGATION	LS	\$77,000	1	\$77,000
		ENVIRONMENTAL PERMITS	LS	\$0	-	\$0
		TEMPORARY WATER POLLUTION & EROSION CONTROL	LS	\$217,000	1	\$217,000
		LANDSCAPING	LS	\$366,000	1	\$366,000
5		TRAFFIC				
		GUARD RAIL	LF	\$18	-	\$0
		CONCRETE BARRIER	LF	\$80	-	\$0
		SIGNAL SYSTEMS	LS	\$1,500,000	1	\$1,500,000
		ILLUMINATION	LS	\$280,900	1	\$280,900
		SIGNING	LS	\$49,000	1	\$49,000
		CURBS	LF	\$15	7,900	\$118,500
		CURB RAMPS	EA	\$1,500	42	\$63,000
		SIDEWALKS	SY	\$25	4,100	\$102,500
		DRIVEWAYS	SY	\$120	1,000	\$120,000
		SC&DI (ITS)	LS	\$100,000	1	\$100,000
		TRAFFIC CONTROL	LS	\$553,300	1	\$553,300
	5a.	OTHER ITEMS				
		SURVEYING	LS	\$174,300	1	\$174,300
		SPECIAL ITEMS	EST	\$0	-	\$0
		UTILITY RELOCATIONS	EST	\$0	-	\$0
6		MISCELLANEOUS (10%)	LS	\$1,180,000	1	\$1,180,000
7		CONSTRUCTION SUBTOTAL (ITEMS 1 THRU 6)				\$12,973,350
8		MOBILIZATION				
		10.00% OF ITEM 7	EST	\$1,298,000	1	\$1,298,000

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description: Snohomish County HCT Access Study - Phase 1	Client: Snohomish County
Corridor Section: 128th St Corridor	Date: January-15
Location: Segment 3 - 8th Ave W to 3rd Ave SE	Date of Cost Index: 2015
	Calculated By/Entered By: JJH
	Checked By: BMP

ESTIMATE TEMPLATE COSTS - UPDATED JANUARY 2016

ITEM	UNIT	ESTIMATED UNIT COST	QTY	COST
9	SUBTOTAL (ITEMS 7 & 8)			\$14,271,350
10	SALES TAX			
	0.0% OF (% OF ITEM 9)	EST \$0	1	\$0
11	AGREEMENTS (Utilities, WSP, etc.)			
		EST \$0	1	\$0
12	SUBTOTAL (ITEMS 9 THRU 11)			\$14,271,350
13	CONSTRUCTION			
	ENGINEERING (15% OF ITEM 12)	EST \$2,141,000	1	\$2,141,000
	CONTINGENCIES (30% OF ITEM 12)	EST \$4,282,000	1	\$4,282,000
14	CONSTRUCTION TOTAL (ITEMS 12 & 13)			\$20,694,350
III.	PRELIMINARY ENGINEERING			
	(15% OF ITEM 14)	EST \$3,105,000	1	\$3,105,000
IV.	TOTAL ESTIMATED COST			
	(ITEMS I, 14 & III)			\$27,170,000
V.	FUTURE ESTIMATED COST			
		Inflation	Const. Year	Cost Index
	FUTURE COST BASED ON INFLATION RATE	0.04	2030	2015
				\$48,940,000

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PLANNING LEVEL OPINION OF COST SUMMARY

Project Description: East-West Corridor HCT Access Study - Phase II	Client: Snohomish County	Date: April-15
Corridor Section: 164th St Corridor	Date of Cost Index: 2015	Calculated By/Entered By: BMP
Location: Segment III: Meadow Rd, Imp. E of I-5 and N of 164th	Checked By: JJH	6-Apr 2-Sep

ESTIMATE TEMPLATE COSTS - UPDATED DECEMBER 2014

		ITEM	UNIT	ESTIMATED UNIT COST	QTY	COST
I.		RIGHT OF WAY				
		RIGHT OF WAY (PARTIAL ACQUISITION)	LS	\$1,208,700	1	\$1,208,700
		RIGHT OF WAY (FULL ACQUISITION)	LS	\$1,686,300	1	\$1,686,300
		CONSTRUCTION EASEMENTS	SF	\$5	5,700	\$28,500
		RIGHT OF WAY TOTAL				\$2,923,500
II.		CONSTRUCTION				
1		PREPARATION/GRADING/DRAINAGE				
	1.1	PREPARATION				
		CLEAR & GRUB, DEMO	ACRE	\$6,000	2.5	\$15,000
		REMOVING EXISTING PAVEMENT	SY	\$10	-	\$0
		REMOVAL STRUCTURES & OBSTRUCTIONS	LS	\$0	1	\$0
	1.2	EARTHWORK				
		ROADWAY EXCAVATION INCL. HAUL	CY	\$20	7,600	\$152,000
		STRUCTURE EX. CL. A INCL. HAUL	CY	\$25	-	\$0
		BORROW INCL. HAUL	TON	\$18	5,900	\$106,200
		EMBANKMENT COMPACTION	CY	\$2	3,200	\$6,400
	1.3	STORMWATER MITIGATION				
		DETENTION AND TREATMENT	SF	\$10	89,900	\$899,000
	1.4	STORM SEWER				
		CATCH BASIN TYPE 1	EA	\$1,000	20	\$20,000
		CATCH BASIN TYPE 2	EA	\$2,200	10	\$22,000
		PLAIN CONC. STORM SEWER PIPE 12 IN. DIAM.	LF	\$35	440	\$15,400
		PLAIN CONC. STORM SEWER PIPE 18 IN. DIAM.	LF	\$45	1,860	\$83,700
		STRUCTURE EXCAVATION CL. B	CY	\$15	1,700	\$25,500
2		STRUCTURE				
		CONCRETE BRIDGES	SF	\$250	12,400	\$3,100,000
		CONCRETE BRIDGES WIDENING	SF	\$350	-	\$0
		APPROACH SLAB	SY	\$140	200	\$28,000
		BRIDGE EMBANKMENT	CY	\$50	1,800	\$90,000
		MODULAR BLOCK WALL (CUT)	SF	\$35	-	\$0
		SOLDIER PILE WALL W/ CONCRETE FACING (CUT)	SF	\$125	-	\$0
		SOLDIER PILE WALL W/ CONCRETE FACING (CUT)	SF	\$150	-	\$0
		MECHANICALLY STABILIZED EARTH WALL (FILL)	SF	\$45	-	\$0
		SOLDIER PILE WALL W/ CONCRETE FACING (FILL)	SF	\$125	-	\$0
		SOLDIER PILE WALL W/ CONCRETE FACING (FILL)	SF	\$150	-	\$0
		BRIDGE REMOVAL	SF	\$40	-	\$0
		CULVERT	LF	\$1,750	-	\$0
		NOISE WALLS	SF	\$40	-	\$0
3		SURFACING				
		PORTLAND CEMENT CONCRETE	SF	\$12	-	\$0
		HOT MIX ASPHALT	TON	\$85	4,200	\$357,000
		CRUSHED SURFACING	TON	\$25	2,800	\$70,000
4		ROADSIDE DEVELOPMENT				
		FENCING	LF	\$15	-	\$0
		SEEDING, MULCHING & FERTILIZING	LS	\$17,000	1	\$17,000
		WETLAND MITIGATION	LS	\$0	1	\$0
		ENVIRONMENTAL PERMITS	LS	\$0	1	\$0
		TEMPORARY WATER POLLUTION & EROSION CONTROL	LS	\$112,000	1	\$112,000
		LANDSCAPING	LS	\$92,000	1	\$92,000
5		TRAFFIC				
		GUARD RAIL	LF	\$18	-	\$0
		CONCRETE BARRIER	LF	\$65	-	\$0
		SIGNAL SYSTEMS	LS	\$200,000	1	\$200,000
		ILLUMINATION	LS	\$111,700	1	\$111,700
		SIGNING	LS	\$14,000	1	\$14,000
		CURBS	LF	\$15	3,800	\$57,000
		CURB RAMPS	EA	\$1,500	14	\$21,000
		SIDEWALKS	SY	\$25	1,500	\$37,500
		DRIVEWAYS	SY	\$75	500	\$37,500

PLANNING LEVEL OPINION OF COST SUMMARY						
Project Description:		East-West Corridor HCT Access Study - Phase II			Client: Snohomish County	
Corridor Section:		164th St Corridor			Date: April-15	
Location:		Segment III: Meadow Rd, Imp. E of I-5 and N of 164th			Date of Cost Index: 2015	
				Calculated By/Entered By: BMP		6-Apr
				Checked By: JJH		2-Sep
ESTIMATE TEMPLATE COSTS - UPDATED DECEMBER 2014						
		ITEM	UNIT	ESTIMATED UNIT COST	QTY	COST
		SC&DI (ITS)	LS	\$20,000	1	\$20,000
		TRAFFIC CONTROL	LS	\$285,500	1	\$285,500
	5a.	OTHER ITEMS				
		SURVEYING	LS	\$90,000	1	\$90,000
		SPECIAL ITEMS	EST	\$0	1	\$0
		UTILITY RELOCATIONS	EST	\$0	1	\$0
6		MISCELLANEOUS (10%)	LS	\$609,000	1	\$609,000
7		CONSTRUCTION SUBTOTAL (ITEMS 1 THRU 6)				\$6,694,400
8		MOBILIZATION				
		10.00% OF ITEM 7	EST	\$670,000	1	\$670,000
9		SUBTOTAL (ITEMS 7 & 8)				\$7,364,400
10		SALES TAX				
		0.0% OF (% OF ITEM 9)	EST	\$0	1	\$0
11		AGREEMENTS (Utilities, WSP, etc.)				
			EST	\$0	1	\$0
12		SUBTOTAL (ITEMS 9 THRU 11)				\$7,364,400
13		CONSTRUCTION				
		ENGINEERING (15% OF ITEM 12)	EST	\$1,105,000	1	\$1,105,000
		CONTINGENCIES (30% OF ITEM 12)	EST	\$2,210,000	1	\$2,210,000
14		CONSTRUCTION TOTAL (ITEMS 12 & 13)				\$10,679,400
III.		PRELIMINARY ENGINEERING				
		(15% OF ITEM 14)	EST	\$1,602,000	1	\$1,602,000
IV.		TOTAL ESTIMATED COST				
		(ITEMS I, 14 & III)				\$15,210,000
V.		FUTURE ESTIMATED COST				
		FUTURE COST BASED ON INFLATION RATE	Inflation	Const. Year	Cost Index	Future Cost
			0.04	2030	2015	\$27,400,000

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PLANNING LEVEL OPINION OF COST SUMMARY

Project Description: East-West Corridor HCT Access Study - Phase II	Client: Snohomish County	Date: April-15
Corridor Section: 164th St Corridor	Date of Cost Index: 2015	Calculated By/Entered By: BMP
Location: Segment V: I-5 Interchange (Texas T) North Leg	Checked By: JJH	7-Apr 8-Apr

ESTIMATE TEMPLATE COSTS - UPDATED DECEMBER 2014

		ITEM	UNIT	ESTIMATED UNIT COST	QTY	COST
I.		RIGHT OF WAY				
		RIGHT OF WAY (PARTIAL ACQUISITION)	LS	\$0	1	\$0
		RIGHT OF WAY (FULL ACQUISITION)	LS	\$0	1	\$0
		CONSTRUCTION EASEMENTS	SF	\$5	-	\$0
		RIGHT OF WAY TOTAL				\$0
II.		CONSTRUCTION				
1		PREPARATION/GRADING/DRAINAGE				
	1.1	PREPARATION				
		CLEAR & GRUB, DEMO	ACRE	\$6,000	2.5	\$15,000
		REMOVING EXISTING PAVEMENT	SY	\$10	-	\$0
		REMOVAL STRUCTURES & OBSTRUCTIONS	LS	\$0	1	\$0
	1.2	EARTHWORK				
		ROADWAY EXCAVATION INCL. HAUL	CY	\$20	7,200	\$144,000
		STRUCTURE EX. CL. A INCL. HAUL	CY	\$25	-	\$0
		BORROW INCL. HAUL	TON	\$18	26,000	\$468,000
		EMBANKMENT COMPACTION	CY	\$2	14,000	\$28,000
	1.3	STORMWATER MITIGATION				
		DETENTION AND TREATMENT	SF	\$10	88,000	\$880,000
	1.4	STORM SEWER				
		CATCH BASIN TYPE 1	EA	\$1,000	-	\$0
		CATCH BASIN TYPE 2	EA	\$2,200	20	\$44,000
		PLAIN CONC. STORM SEWER PIPE 12 IN. DIAM.	LF	\$35	-	\$0
		PLAIN CONC. STORM SEWER PIPE 18 IN. DIAM.	LF	\$45	3,960	\$178,200
		STRUCTURE EXCAVATION CL. B	CY	\$15	2,800	\$42,000
2		STRUCTURE				
		CONCRETE BRIDGES	SF	\$250	-	\$0
		CONCRETE BRIDGES WIDENING	SF	\$350	-	\$0
		APPROACH SLAB	SY	\$140	-	\$0
		BRIDGE EMBANKMENT	CY	\$50	-	\$0
		MODULAR BLOCK WALL (CUT)	SF	\$35	-	\$0
		SOLDIER PILE WALL W/ CONCRETE FACING (CUT)	SF	\$125	-	\$0
		SOLDIER PILE WALL W/ CONCRETE FACING (CUT)	SF	\$150	-	\$0
		MECHANICALLY STABILIZED EARTH WALL (FILL)	SF	\$45	-	\$0
		SOLDIER PILE WALL W/ CONCRETE FACING (FILL)	SF	\$125	6,100	\$762,500
		SOLDIER PILE WALL W/ CONCRETE FACING (FILL)	SF	\$150	13,900	\$2,085,000
		BRIDGE REMOVAL	SF	\$40	-	\$0
		CULVERT	LF	\$1,750	-	\$0
		NOISE WALLS	SF	\$40	-	\$0
3		SURFACING				
		PORTLAND CEMENT CONCRETE	SF	\$12	-	\$0
		HOT MIX ASPHALT	TON	\$85	6,800	\$578,000
		CRUSHED SURFACING	TON	\$25	3,400	\$85,000
4		ROADSIDE DEVELOPMENT				
		FENCING	LF	\$15	-	\$0
		SEEDING, MULCHING & FERTILIZING	LS	\$0	1	\$0
		WETLAND MITIGATION	LS	\$0	1	\$0
		ENVIRONMENTAL PERMITS	LS	\$0	1	\$0
		TEMPORARY WATER POLLUTION & EROSION CONTROL	LS	\$122,600	1	\$122,600
		LANDSCAPING	LS	\$0	1	\$0
5		TRAFFIC				
		GUARD RAIL	LF	\$18	-	\$0
		CONCRETE BARRIER	LF	\$65	6,200	\$403,000
		SIGNAL SYSTEMS	LS	\$300,000	1	\$300,000
		ILLUMINATION	LS	\$107,300	1	\$107,300
		SIGNING	LS	\$9,000	1	\$9,000
		CURBS	LF	\$15	-	\$0
		CURB RAMPS	EA	\$1,500	-	\$0
		SIDEWALKS	SY	\$25	-	\$0
		DRIVEWAYS	SY	\$75	-	\$0

PLANNING LEVEL OPINION OF COST SUMMARY						
Project Description:		East-West Corridor HCT Access Study - Phase II			Client: Snohomish County	
Corridor Section:		164th St Corridor			Date: April-15	
Location:		Segment V: I-5 Interchange (Texas T) North Leg			Date of Cost Index: 2015	
				Calculated By/Entered By: BMP		7-Apr
				Checked By: JJH		8-Apr
ESTIMATE TEMPLATE COSTS - UPDATED DECEMBER 2014						
		ITEM	UNIT	ESTIMATED UNIT COST	QTY	COST
		SC&DI (ITS)	LS	\$0	1	\$0
		TRAFFIC CONTROL	LS	\$312,600	1	\$312,600
	5a.	OTHER ITEMS				
		SURVEYING	LS	\$98,500	1	\$98,500
		SPECIAL ITEMS	EST	\$0	1	\$0
		UTILITY RELOCATIONS	EST	\$0	1	\$0
6		MISCELLANEOUS (10%)	LS	\$667,000	1	\$667,000
7		CONSTRUCTION SUBTOTAL (ITEMS 1 THRU 6)				\$7,329,700
8		MOBILIZATION				
		10.00% OF ITEM 7	EST	\$733,000	1	\$733,000
9		SUBTOTAL (ITEMS 7 & 8)				\$8,062,700
10		SALES TAX				
		0.0% OF (% OF ITEM 9)	EST	\$0	1	\$0
11		AGREEMENTS (Utilities, WSP, etc.)				
			EST	\$0	1	\$0
12		SUBTOTAL (ITEMS 9 THRU 11)				\$8,062,700
13		CONSTRUCTION				
		ENGINEERING (15% OF ITEM 12)	EST	\$1,210,000	1	\$1,210,000
		CONTINGENCIES (30% OF ITEM 12)	EST	\$2,419,000	1	\$2,419,000
14		CONSTRUCTION TOTAL (ITEMS 12 & 13)				\$11,691,700
III.		PRELIMINARY ENGINEERING				
		(15% OF ITEM 14)	EST	\$1,754,000	1	\$1,754,000
IV.		TOTAL ESTIMATED COST (ITEMS I, 14 & III)				\$13,450,000
V.		FUTURE ESTIMATED COST				
		FUTURE COST BASED ON INFLATION RATE	Inflation	Const. Year	Cost Index	Future Cost
			0.04	2030	2015	\$24,230,000

The above opinion of cost is a planning level estimate only. It is based on best available information and scope at the time, not on the results of a detailed engineering study, and is supplied as a budgeting guide only. Pertee, Inc. does not guarantee or warrant the accuracy of this planning level estimate.

Relative Cost Calculation: Subtracted from Texas-T Cost

PLANNING LEVEL OPINION OF COST SUMMARY						
Project Description: Snohomish County HCT Access Study - Phase 1		Client: Snohomish County				
Corridor Section: 164th St		Date: January-15				
Location: Segment I: 35th Ave W to Cascadian Way		Date of Cost Index: 2015				
				Calculated By/Entered By: BMP		2/2/2015
				Checked By: JJH		1/30/2015
ESTIMATE TEMPLATE COSTS - UPDATED JANUARY 2016						
		ITEM	UNIT	ESTIMATED UNIT COST	QTY	COST
I. RIGHT OF WAY						
		RIGHT OF WAY (PARTIAL ACQUISITION)	LS	\$9,085,000	1	\$9,085,000
		RIGHT OF WAY (FULL ACQUISITION)	LS	\$4,292,000	1	\$4,292,000
		CONSTRUCTION EASEMENTS	SF	\$5	66,700.0	\$333,500
		RIGHT OF WAY TOTAL				\$13,710,500
II. CONSTRUCTION						
1 PREPARATION/GRADING/DRAINAGE						
	1.1	PREPARATION				
		CLEAR & GRUB, DEMO	ACRE	\$25,000	13.0	\$325,000
		REMOVING EXISTING PAVEMENT	SY	\$10	-	\$0
		REMOVAL STRUCTURES & OBSTRUCTIONS	LS	\$0	1	\$0
	1.2	EARTHWORK				
		ROADWAY EXCAVATION INCL. HAUL	CY	\$30	52,000	\$1,560,000
		STRUCTURE EX. CL. A INCL. HAUL	CY	\$25	-	\$0
		BORROW INCL. HAUL	TON	\$23	44,900	\$1,032,700
		EMBANKMENT COMPACTION	CY	\$8	24,300	\$194,400
	1.3	STORMWATER MITIGATION				
		DETENTION AND TREATMENT	SF	\$10	485,200	\$4,852,000
	1.4	STORM SEWER				
		CATCH BASIN TYPE 1	EA	\$1,200	132	\$158,400
		CATCH BASIN TYPE 2	EA	\$2,200	66	\$145,200
		PLAIN CONC. STORM SEWER PIPE 12 IN. DIAM.	LF	\$55	6,810	\$374,550
		PLAIN CONC. STORM SEWER PIPE 18 IN. DIAM.	LF	\$45	12,010	\$540,450
		STRUCTURE EXCAVATION CL. B	CY	\$20	13,400	\$268,000
2 STRUCTURE						
		CONCRETE BRIDGES	SF	\$250	-	\$0
		CONCRETE BRIDGES WIDENING	SF	\$350	64,200	\$22,470,000
		MODULAR BLOCK WALL (CUT)	SF	\$35	1,100	\$38,500
		SOLDIER PILE WALL W/ CONCRETE FACING (CUT)	SF	\$100	-	\$0
		MECHANICALLY STABILIZED EARTH WALL (FILL)	SF	\$45	2,200	\$99,000
		SOLDIER PILE WALL W/ CONCRETE FACING (FILL)	SF	\$125	1,500	\$187,500
		BRIDGE REMOVAL	SF	\$30	-	\$0
		CULVERT	LF	\$1,750	130	\$227,500
		NOISE WALLS	SF	\$40	-	\$0
3 SURFACING						
		PORTLAND CEMENT CONCRETE	SF	\$12	-	\$0
		HOT MIX ASPHALT	TON	\$85	30,000	\$2,550,000
		CRUSHED SURFACING	TON	\$31	14,500	\$449,500
4 ROADSIDE DEVELOPMENT						
		FENCING	LF	\$15	-	\$0
		SEEDING, MULCHING & FERTILIZING	LS	\$197,000	1	\$197,000
		WETLAND MITIGATION	LS	\$3,463,000	1	\$3,463,000
		ENVIRONMENTAL PERMITS	LS	\$0	1	\$0
		TEMPORARY WATER POLLUTION & EROSION CONTROL	LS	\$919,800	1	\$919,800
		LANDSCAPING	LS	\$1,253,000	1	\$1,253,000
5 TRAFFIC						
		GUARD RAIL	LF	\$18	-	\$0
		CONCRETE BARRIER	LF	\$80	900	\$72,000
		SIGNAL SYSTEMS	LS	\$3,200,000	1	\$3,200,000
		ILLUMINATION	LS	\$851,500	1	\$851,500
		SIGNING	LS	\$68,000	1	\$68,000
		CURBS	LF	\$15	23,700	\$355,500
		CURB RAMPS	EA	\$1,500	98	\$147,000
		SIDEWALKS	SY	\$25	13,700	\$342,500
		DRIVEWAYS	SY	\$120	2,700	\$324,000
		SC&DI (ITS)	LS	\$240,000	1	\$240,000
		TRAFFIC CONTROL	LS	\$2,345,300	1	\$2,345,300
	5a.	OTHER ITEMS				
		SURVEYING	LS	\$738,800	1	\$738,800
		SPECIAL ITEMS	EST	\$0	1	\$0
		UTILITY RELOCATIONS	EST	\$0	1	\$0
6 MISCELLANEOUS (10%)						
			LS	\$5,000,000	1	\$5,000,000
7 CONSTRUCTION SUBTOTAL (ITEMS 1 THRU 6)						
						\$54,990,100
8 MOBILIZATION						
		10.00% OF ITEM 7	EST	\$5,500,000	1	\$5,500,000
9 SUBTOTAL (ITEMS 7 & 8)						
						\$60,490,100
10 SALES TAX						
		0.0% OF (% OF ITEM 9)	EST	\$0	1	\$0
11 AGREEMENTS (Utilities, WSP, etc.)						
			EST	\$0	1	\$0

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description: Snohomish County HCT Access Study - Phase 1	Client: Snohomish County
Corridor Section: 164th St	Date: January-15
Location: Segment I: 35th Ave W to Cascadian Way	Date of Cost Index: 2015
	Calculated By/Entered By: BMP
	Checked By: JJH
	2/2/2015
	1/30/2015

ESTIMATE TEMPLATE COSTS - UPDATED JANUARY 2016

	ITEM	UNIT	ESTIMATED UNIT COST	QTY	COST
12	SUBTOTAL (ITEMS 9 THRU 11)				\$60,490,100
13	CONSTRUCTION				
	ENGINEERING (15% OF ITEM 12)	EST	\$9,074,000	1	\$9,074,000
	CONTINGENCIES (30% OF ITEM 12)	EST	\$18,148,000	1	\$18,148,000
14	CONSTRUCTION TOTAL (ITEMS 12 & 13)				\$87,712,100
III.	PRELIMINARY ENGINEERING				
	(15% OF ITEM 14)	EST	\$13,157,000	1	\$13,157,000
IV.	TOTAL ESTIMATED COST				
	(ITEMS I, 14 & III)				\$114,580,000
V.	FUTURE ESTIMATED COST				
		Inflation	Const. Year	Cost Index	Future Cost
	FUTURE COST BASED ON INFLATION RATE	0.04	2030	2015	\$206,360,000

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Relative Cost Calculation: Added to Texas-T Cost (final line only)

PLANNING LEVEL OPINION OF COST SUMMARY						
Project Description: Snohomish County HCT Access Study - Phase 1		Client: Snohomish County				
Corridor Section: 164th St		Date: January-15				
Location: Segment I: 35th Ave W to Cascadian Way		Date of Cost Index: 2015				
					Calculated By/Entered By: BMP	2/2/2015
					Checked By: JJH	1/30/2015
ESTIMATE TEMPLATE COSTS - UPDATED JANUARY 2016						
		ITEM	UNIT	ESTIMATED UNIT COST	QTY	COST
I.		RIGHT OF WAY				
		RIGHT OF WAY (PARTIAL ACQUISITION)	LS	\$9,085,000	1	\$9,085,000
		RIGHT OF WAY (FULL ACQUISITION)	LS	\$4,292,000	1	\$4,292,000
		CONSTRUCTION EASEMENTS	SF	\$5	66,700.0	\$333,500
		RIGHT OF WAY TOTAL				\$13,710,500
II.		CONSTRUCTION				
1		PREPARATION/GRADING/DRAINAGE				
	1.1	PREPARATION				
		CLEAR & GRUB, DEMO	ACRE	\$25,000	13.0	\$325,000
		REMOVING EXISTING PAVEMENT	SY	\$10	-	\$0
		REMOVAL STRUCTURES & OBSTRUCTIONS	LS	\$0	1	\$0
	1.2	EARTHWORK				
		ROADWAY EXCAVATION INCL. HAUL	CY	\$30	51,900	\$1,557,000
		STRUCTURE EX. CL. A INCL. HAUL	CY	\$25	-	\$0
		BORROW INCL. HAUL	TON	\$23	44,900	\$1,032,700
		EMBANKMENT COMPACTION	CY	\$8	24,200	\$193,600
	1.3	STORMWATER MITIGATION				
		DETENTION AND TREATMENT	SF	\$10	475,100	\$4,751,000
	1.4	STORM SEWER				
		CATCH BASIN TYPE 1	EA	\$1,200	132	\$158,400
		CATCH BASIN TYPE 2	EA	\$2,200	66	\$145,200
		PLAIN CONC. STORM SEWER PIPE 12 IN. DIAM.	LF	\$55	6,810	\$374,550
		PLAIN CONC. STORM SEWER PIPE 18 IN. DIAM.	LF	\$45	12,000	\$540,000
		STRUCTURE EXCAVATION CL. B	CY	\$20	13,300	\$266,000
2		STRUCTURE				
		CONCRETE BRIDGES	SF	\$250	-	\$0
		CONCRETE BRIDGES WIDENING	SF	\$350	48,300	\$16,905,000
		APPROACH SLAB	SY	\$140	800	\$112,000
		BRIDGE EMBANKMENT	CY	\$50	5,800	\$290,000
		MODULAR BLOCK WALL (CUT)	SF	\$35	1,100	\$38,500
		SOLDIER PILE WALL W/ CONCRETE FACING (CUT)	SF	\$125	-	\$0
		SOLDIER PILE WALL W/ CONCRETE FACING (CUT)	SF	\$150	-	\$0
		MECHANICALLY STABILIZED EARTH WALL (FILL)	SF	\$45	2,200	\$99,000
		SOLDIER PILE WALL W/ CONCRETE FACING (FILL)	SF	\$125	700	\$87,500
		SOLDIER PILE WALL W/ CONCRETE FACING (FILL)	SF	\$150	900	\$135,000
		BRIDGE REMOVAL	SF	\$40	-	\$0
		CULVERT	LF	\$1,750	130	\$227,500
		NOISE WALLS	SF	\$40	-	\$0
3		SURFACING				
		PORTLAND CEMENT CONCRETE	SF	\$12	-	\$0
		HOT MIX ASPHALT	TON	\$85	30,000	\$2,550,000
		CRUSHED SURFACING	TON	\$31	14,500	\$449,500
4		ROADSIDE DEVELOPMENT				
		FENCING	LF	\$15	-	\$0
		SEEDING, MULCHING & FERTILIZING	LS	\$197,000	1	\$197,000
		WETLAND MITIGATION	LS	\$3,463,000	1	\$3,463,000
		ENVIRONMENTAL PERMITS	LS	\$0	1	\$0
		TEMPORARY WATER POLLUTION & EROSION CONTROL	LS	\$815,400	1	\$815,400
		LANDSCAPING	LS	\$1,251,000	1	\$1,251,000
5		TRAFFIC				
		GUARD RAIL	LF	\$18	-	\$0
		CONCRETE BARRIER	LF	\$80	900	\$72,000
		SIGNAL SYSTEMS	LS	\$3,200,000	1	\$3,200,000
		ILLUMINATION	LS	\$851,400	1	\$851,400
		SIGNING	LS	\$61,000	1	\$61,000
		CURBS	LF	\$15	24,800	\$372,000
		CURB RAMPS	EA	\$1,500	96	\$144,000
		SIDEWALKS	SY	\$25	14,200	\$355,000
		DRIVEWAYS	SY	\$120	2,700	\$324,000
		SC&DI (ITS)	LS	\$240,000	1	\$240,000
		TRAFFIC CONTROL	LS	\$2,079,200	1	\$2,079,200
	5a.	OTHER ITEMS				
		SURVEYING	LS	\$655,000	1	\$655,000
		SPECIAL ITEMS	EST	\$0	1	\$0
		UTILITY RELOCATIONS	EST	\$0	1	\$0
6		MISCELLANEOUS (10%)	LS	\$4,432,000	1	\$4,432,000
7		CONSTRUCTION SUBTOTAL (ITEMS 1 THRU 6)				\$48,749,450
8		MOBILIZATION				
		10.00% OF ITEM 7	EST	\$4,875,000	1	\$4,875,000
9		SUBTOTAL (ITEMS 7 & 8)				\$53,624,450
10		SALES TAX				

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description: Snohomish County HCT Access Study - Phase 1	Client: Snohomish County
Corridor Section: 164th St	Date: January-15
Location: Segment I: 35th Ave W to Cascadian Way	Date of Cost Index: 2015
	Calculated By/Entered By: BMP
	Checked By: JJH
	2/2/2015
	1/30/2015

ESTIMATE TEMPLATE COSTS - UPDATED JANUARY 2016

	ITEM	UNIT	ESTIMATED UNIT COST	QTY	COST
	0.0% OF (% OF ITEM 9)	EST	\$0	1	\$0
11	AGREEMENTS (Utilities, WSP, etc.)	EST	\$0	1	\$0
12	SUBTOTAL (ITEMS 9 THRU 11)				\$53,624,450
13	CONSTRUCTION				
	ENGINEERING (15% OF ITEM 12)	EST	\$8,044,000	1	\$8,044,000
	CONTINGENCIES (30% OF ITEM 12)	EST	\$16,088,000	1	\$16,088,000
14	CONSTRUCTION TOTAL (ITEMS 12 & 13)				\$77,756,450
III.	PRELIMINARY ENGINEERING				
	(15% OF ITEM 14)	EST	\$11,664,000	1	\$11,664,000
IV.	TOTAL ESTIMATED COST				
	(ITEMS I, 14 & III)				\$103,140,000
V.	FUTURE ESTIMATED COST				
		Inflation	Const. Year	Cost Index	Future Cost
	FUTURE COST BASED ON INFLATION RATE	0.04	2030	2015	\$185,750,000
	Length of Phase 1 Segment				12280 LF
	Length of Revised Segment				10460 LF
	REVISED FUTURE COST				\$158,230,000

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PLANNING LEVEL OPINION OF COST SUMMARY

Project Description: East-West Corridor HCT Access Study - Phase II	Client: Snohomish County
Corridor Section: 164th St Corridor	Date: 5/30/17
Location: Raise Ash Way Direct Access Structure 5-feet to gain clearance for NB I5.	Date of Cost Index: 2015
	Calculated By/Entered By: PGD
	Checked By: 5/30/2017

ESTIMATE TEMPLATE COSTS - UPDATED JANUARY 2016

		ITEM	UNIT	ESTIMATED UNIT COST	QTY	COST
I.		RIGHT OF WAY				
		RIGHT OF WAY (PARTIAL ACQUISITION)	LS	\$0	1	\$0
		RIGHT OF WAY (FULL ACQUISITION)	LS	\$0	1	\$0
		CONSTRUCTION EASEMENTS	SF	\$5	-	\$0
		RIGHT OF WAY TOTAL				\$0
II.		CONSTRUCTION				
1		PREPARATION/GRADING/DRAINAGE				
	1.1	PREPARATION				
		CLEAR & GRUB, DEMO	ACRE	\$25,000	-	\$0
		REMOVING EXISTING PAVEMENT	SY	\$10	16,100	\$161,000
		REMOVAL STRUCTURES & OBSTRUCTIONS	LS	\$33,000	1	\$33,000
	1.2	EARTHWORK				
		ROADWAY EXCAVATION INCL. HAUL	CY	\$60	-	\$0
		STRUCTURE EX. CL. A INCL. HAUL	CY	\$25	-	\$0
		BORROW INCL. HAUL	TON	\$23	29,400	\$676,200
		EMBANKMENT COMPACTION	CY	\$8	15,900	\$127,200
	1.3	STORMWATER MITIGATION				
		DETENTION AND TREATMENT	SF	\$10	84,500	\$845,000
	1.4	STORM SEWER				
		CATCH BASIN TYPE 1	EA	\$1,200	-	\$0
		CATCH BASIN TYPE 2	EA	\$2,200	-	\$0
		PLAIN CONC. STORM SEWER PIPE 12 IN. DIAM.	LF	\$55	-	\$0
		PLAIN CONC. STORM SEWER PIPE 18 IN. DIAM.	LF	\$45	-	\$0
		STRUCTURE EXCAVATION CL. B	CY	\$20	-	\$0
2		STRUCTURE				
		CONCRETE BRIDGES	SF	\$250	12,400	\$3,100,000
		CONCRETE BRIDGES WIDENING	SF	\$350	-	\$0
		APPROACH SLAB	SY	\$140	200	\$28,000
		BRIDGE EMBANKMENT	CY	\$50	-	\$0
		MODULAR BLOCK WALL (CUT)	SF	\$35	-	\$0
		SOLDIER PILE WALL W/ CONCRETE FACING (CUT)	SF	\$125	-	\$0
		SOLDIER PILE WALL W/ CONCRETE FACING (CUT)	SF	\$150	-	\$0
		MECHANICALLY STABILIZED EARTH WALL (FILL)	SF	\$45	-	\$0
		SOLDIER PILE WALL W/ CONCRETE FACING (FILL)	SF	\$125	6,600	\$825,000
		SOLDIER PILE WALL W/ CONCRETE FACING (FILL)	SF	\$150	-	\$0
		BRIDGE REMOVAL	SF	\$40	6,400	\$256,000
		CULVERT	LF	\$1,750	-	\$0
		NOISE WALLS	SF	\$40	-	\$0
3		SURFACING				
		PORTLAND CEMENT CONCRETE	SF	\$12	-	\$0
		HOT MIX ASPHALT	TON	\$85	7,000	\$595,000
		CRUSHED SURFACING	TON	\$31	3,200	\$99,200
4		ROADSIDE DEVELOPMENT				
		FENCING	LF	\$15	-	\$0
		SEEDING, MULCHING & FERTILIZING	LS	\$0	1	\$0
		WETLAND MITIGATION	LS	\$0	1	\$0
		ENVIRONMENTAL PERMITS	LS	\$0	1	\$0
		TEMPORARY WATER POLLUTION & EROSION CONTROL	LS	\$142,300	1	\$142,300
		LANDSCAPING	LS	\$0	1	\$0
5		TRAFFIC				
		GUARD RAIL	LF	\$18	-	\$0
		CONCRETE BARRIER	LF	\$80	2,700	\$216,000
		SIGNAL SYSTEMS	LS	\$0	1	\$0
		ILLUMINATION	LS	\$121,900	1	\$121,900
		SIGNING	LS	\$13,000	1	\$13,000
		CURBS	LF	\$15	1,200	\$18,000
		CURB RAMPS	EA	\$1,500	-	\$0
		SIDEWALKS	SY	\$25	-	\$0
		DRIVEWAYS	SY	\$120	-	\$0
		SC&DI (ITS)	LS	\$0	1	\$0
		TRAFFIC CONTROL	LS	\$362,900	1	\$362,900
	5a.	OTHER ITEMS				
		SURVEYING	LS	\$114,300	1	\$114,300
		SPECIAL ITEMS	EST	\$0	1	\$0
		UTILITY RELOCATIONS	EST	\$0	1	\$0
6		MISCELLANEOUS (10%)	LS	\$774,000	1	\$774,000
7		CONSTRUCTION SUBTOTAL (ITEMS 1 THRU 6)				\$8,508,000
8		MOBILIZATION				
		10.00% OF ITEM 7	EST	\$851,000	1	\$851,000

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description:	East-West Corridor HCT Access Study - Phase II	Client:	Snohomish County
Corridor Section:	164th St Corridor	Date:	5/30/17
Location:	Raise Ash Way Direct Access Structure 5-feet to gain clearance for NB I5.	Date of Cost Index:	2015
		Calculated By/Entered By:	PGD
		Checked By:	5/30/2017

ESTIMATE TEMPLATE COSTS - UPDATED JANUARY 2016

	ITEM	UNIT	ESTIMATED UNIT COST	QTY	COST
9	SUBTOTAL (ITEMS 7 & 8)				\$9,359,000
10	SALES TAX				
	0.0% OF (% OF ITEM 9)	EST	\$0	1	\$0
11	AGREEMENTS (Utilities, WSP, etc.)				
		EST	\$0	1	\$0
12	SUBTOTAL (ITEMS 9 THRU 11)				\$9,359,000
13	CONSTRUCTION				
	ENGINEERING (15% OF ITEM 12)	EST	\$1,404,000	1	\$1,404,000
	CONTINGENCIES (40% OF ITEM 12)	EST	\$3,744,000	1	\$3,744,000
14	CONSTRUCTION TOTAL (ITEMS 12 & 13)				\$14,507,000
III.	PRELIMINARY ENGINEERING				
	(15% OF ITEM 14)	EST	\$2,177,000	1	\$2,177,000
IV.	TOTAL ESTIMATED COST				
	(ITEMS I, 14 & III)				\$16,690,000
V.	FUTURE ESTIMATED COST				
		Inflation	Const. Year	Cost Index	Future Cost
	FUTURE COST BASED ON INFLATION RATE	0.04	2030	2015	\$30,060,000

The above opinion of cost is a planning level estimate only. It is based on best available information and scope at the time, not on the results of a detailed engineering study, and is supplied as a budgeting guide only. Perteet, Inc. does not guarantee or warrant the accuracy of this planning level estimate.

APPENDIX E

Alternative Alignments Comparison Memorandum

MEMORANDUM

2707 Colby Avenue, Suite 900, Everett, WA 98201 | P 425.252.7700

To: Jay Larson, AICP

From: Peter De Boldt, PE
Brent Powell, PE

Date: September 2, 2019

Re: East-West Corridor High Capacity Transit – Alternative Alignments Comparison

INTRODUCTION

Snohomish County hired Perteet Inc. and a team of subconsultants (MAKERS and WSP) to assist with station area planning in south Snohomish County for the future Sound Transit 3 (ST3) light rail expansion to Everett. While the ST3 Everett Link extension is scheduled to open in 2036, the County is currently interested in understanding the potential station location areas that could be part of the Everett Link to better plan for land use developments and potential infrastructure improvements in those vicinities.

As part of the ST3 voter initiative, Sound Transit developed a “representative alignment” for the Everett Link, which is a candidate project that was used for baseline cost estimating by Sound Transit. The station locations that were identified as part of ST3 at the southern end of Everett Link are at the Ash Way Park and Ride near the 164th Street and I-5 interchange and the Mariner Park and Ride at the 128th Street and I-5 interchange. The representative alignment that connects these stations runs along the west side of I-5 and continues south to the Alderwood Mall vicinity and north along 128th Street toward Boeing’s Everett plant and Paine Field.

Using the representative alignment and station locations as a starting point, the Snohomish County project team evaluated alternative station locations along the representative alignment and within the vicinity of the interchanges that had already been selected for light rail stations. That process included online open houses that narrowed the station locations down to two alternatives at each interchange. At 164th Street, in addition to the ST3 representative station location at the Ash Way Park and Ride (“Ash Way Park and Ride” alternative), an alternative was developed for a station location at the northeast quadrant of the interchange that would include a cut-and-cover station (“East of I-5” alternative). This location is shown in Figure 1 on the following page. At 128th Street, two alternatives were advanced between 4th Avenue W and 8th Avenue W that are each at a different location than the ST3 representative station that is at the Mariner Park and Ride. The first alternative would have the station along the 128th Street corridor on the north side of the roadway (“128th Street” alternative). The second alternative would move the station south to be in above a planned new roadway called 130th Street, which would be constructed as part of the project by Snohomish County to provide better connections to Community Transit’s Green Bus Rapid Transit (BRT) line (“130th Street” alternative). The 130th Street station is shown in Figure 2 on the following page.

These alternatives were advanced to this stage for various reasons, including connections to bus transit, transit-oriented development (TOD) potential; pedestrian and bicycle connectivity to the stations; and online open house feedback. Project cost differences have been noted qualitatively for each station alternative, but differences have not been evaluated in detail until this point.

MEMORANDUM

This memorandum documents Perteet’s effort to provide a high-level, relative cost comparison between the representative alignment (including stations at the Ash Way Park and Ride and 128th Street) and the east-side alternative alignment that is necessary to connect the East of I-5 station to the light rail spine. The east-side alternative alignment includes the 130th Street station for the purposes of this analysis, though the anticipated costs of a 128th Street station and a 130th Street station are similar.

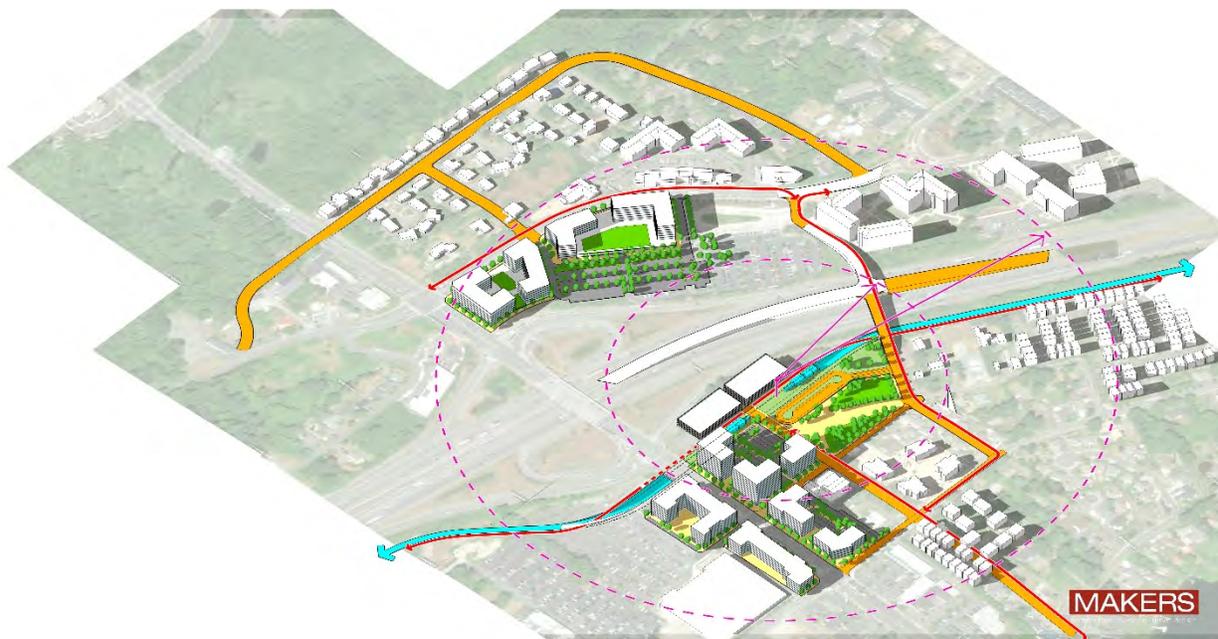


Figure 1. East of I-5 Alternative Station Location (Preliminary Graphic).



Figure 2. 130th Street Alternative Station Location (Preliminary Graphic).

The cost evaluations included in this document are not intended to be interpreted as full project costs for this portion of the light rail spine and the stations along it in south Snohomish County. Perteet focused on the

MEMORANDUM

apparent “big-ticket” cost items, such as track structures, stations, walls, and earthwork when developing these cost estimates. The goal of the exercise is to evaluate if costs between the two alternative alignments are similar or significantly different.

METHODOLOGY

Perteet had access to the following files and data during this process:

1. Aerial imagery of the study area;
2. GIS linework for right-of-way, parcel, and critical area linework;
3. Detailed contours of the study area;
4. The representative alignment and profile that was developed for ST3 and shared with Perteet in 2015;
5. Sound Transit’s Design Criteria Manual (Version 4, March 2016); and
6. Sound Transit’s Design Criteria Manual (Version 5, June 2018).

Perteet began its process by generating an existing ground (EG) surface model based on the contour dataset.

The representative alignment that Perteet received included a proposed center-of-tracks profile and an EG profile. Perteet compared those existing ground elevations in the representative alignment profile to the contours that Perteet used to generate a detailed surface model. In general, the existing surface from the profile did not match the contour surface model, nor was one surface uniformly above or below the other. It was unclear which set of EG data was more accurate, but it was clear that the surface model generated from the contours by Perteet has a higher level of detail than the profile surface shows. This is understandable given that the representative ST3 alignment was developed at a conceptual level for the entire Everett Link alignment, while the section we are currently focused on is only a small portion where the more detailed EG surface model is a little easier to work with.

After establishing an existing ground surface model, and with the knowledge of the East of I-5 alternative station location, Perteet produced a horizontal east-side alternative light rail centerline (that models the center of the pair of tracks) between and beyond the 164th Street and 128th Street stations. Perteet then developed a proposed track profile along that alternative alignment.

Perteet relied on the design requirements listed in Sound Transit’s Design Criteria Manual (Version 5). The design criteria that Perteet used to build the east-side alternative alignment is included in Appendix A. In general, design values for this stage do not go down to the Sound Transit minimums, to retain flexibility as the final design progresses and various design issues are encountered.

The representative alignment centerline and profile are shown in Appendix B. The east-side alternative centerline and profile are shown in Appendix C.

East-Side Alternative Alignment Characteristics

The representative alignment includes an aerial track at the southern end of the study area. From there, with the east-side alternative alignment, a curve will be introduced to transition into long-span aerial structure across I-5 south of the 164th Street overpass. Once on the east side of I-5, the track will begin to descend into a cut-and-cover situation south and the through the 164th Street right-of-way. The station location will be north of 164th Street. North of the station location, the track will rejoin the existing elevations to provide at-grade track within the Snohomish County Public Utility District (PUD) right-of-way until reaching the next crossing of I-5, which is just

MEMORANDUM

south of the 128th Street interchange, approximately where I-5 bends to the northeast. This crossing of I-5 will again be long-span aerial, but with straight structures instead of curved. The track continues into the commercial area surrounding 128th Street to the west of I-5, connecting to the proposed station location (either alternative station location would be compatible) and then continuing to the west along 128th Street toward Boeing and Paine Field. The entire length within the 128th Street commercial zone would be aerial track.

Cost Estimating

The final stage of Perteet’s effort for this analysis was preparing planning-level opinions of cost for the major components of the two light rail alignments. Minor items were not considered in the opinion of cost analysis, because the goal of this work was to determine if costs between the two alternatives were significantly different.

Because the estimating effort is planning-level, many assumptions are necessary to provide consistent opinions of cost between the two alternatives. Appendix D lists the opinion of cost assumptions for establishing quantities and unit costs.

Appendix E and Appendix F show the opinion of cost summaries for the representative alignment and east-side alternative alignment, respectively.

Costs were generated in 2019 dollars and include right-of-way (and easement) acquisition, demolition activities, earthwork volumes, track structures, stations, engineering, contingencies, mobilization, and surveying costs. Traffic control is not included in either opinion of cost, as it is assumed to be roughly equal between alternatives.

COST COMPARISON

Table 1 compares the costs for the major cost categories for both alternatives.

Table 1. Planning-level opinion of cost comparison.

Cost Category	Representative Alignment	East-Side Alternative Alignment
Right of Way	\$ 14,792,000	\$ 68,991,500
Preparation	\$ 640,000	\$ 1,213,000
Earthwork	\$ 2,080,00	\$ 3,660,000
Structure	\$ 7,197,500	\$ 27,584,300
Light Rail Transit (LRT)	\$ 341,950,000	\$ 320,047,000
Surveying (6%)	\$ 21,112,100	\$ 21,150,300
Miscellaneous (10%)	\$ 37,297,960	\$ 37,365,460
Construction Subtotal	\$ 410,277,560	\$ 411,020,060
Mobilization (10%)	\$ 41,027,756	\$ 41,102,006
Contingency (40%)	\$ 180,522,126	\$ 180,848,826
Sales Tax (10.5%)	\$ 66,341,881	\$ 66,461,944
Construction Management/Changes	\$ 214,821,330	\$ 215,210,103
Construction Total	\$ 912,990,654	\$ 914,642,940
Design/Engineering (30%)	\$ 273,897,196	\$ 274,392,882
Total	\$ 1,201,679,851	\$ 1,258,027,321

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As noted previously, the “Total” value in Table 1 should not be construed as a total design and construction price for the Everett Link project between 164th Street and 128th Street. This total value should only be used for comparison purposes to evaluate if the two alternatives have similar or significantly different costs.

Despite the two crossings of I-5, the east-side alternative alignment has a similar cost (within 5%) compared to the representative alignment, based on the information presented in Table 1. While the east-side alternative alignment requires higher right-of-way, earthwork, and structure (including straddle bents for crossing I-5 and a 164th Street overpass structure above the cut and cover construction) costs, those increases are offset by the difference in LRT track costs, which are over \$20,000,000 higher for the representative alignment.

The representative alignment has higher LRT costs due to two primary factors. First, it is a longer alignment because it has a large turn near the 128th Street interchange, whereas the east-side alternative alignment runs straighter through that area. Second, a larger percentage of the route is on aerial track as compared to the east-side alternative alignment. A cost estimate value from 2014 from Sound Transit showed ballasted at-grade dual track at \$550 per linear foot (LF), which, when inflated at 5% annually since 2014, is approximately \$700 per LF. Aerial track, including the structure cost, is estimated at \$8,810 per LF, primarily due to the structure costs. (Note that the traction power systems are excluded from both unit costs and are assumed to be equivalent regardless of track/structure type.)

OTHER FINDINGS

Through this alignment and cost estimate development process, Perteet noticed the following about the representative alignment.

First, the representative alignment generally closely follows the western limit of WSDOT right-of-way between the 164th Street and 128th Street interchanges. In some locations, the representative alignment—which is the centerline between the two parallel light rail tracks—is as little as 16 feet away from the edge of WSDOT right-of-way. Per the Sound Transit Design Criteria Manual, 14 feet of separation is required between the two track centerlines (so 7 feet on either side of the representative alignment) with 9 feet beyond those track centerlines for clearances and an emergency walkway. That configuration results in a 32-foot wide track structure, which is centered on the representative alignment. As such, the edge of track structure often falls on or immediately adjacent to the WSDOT right-of-way line for portions of the corridor, meaning that right-of-way acquisition or permanent easements are required for any wall installations. The alignment could be shifted to the east to reduce right-of-way and permanent easement acquisition needs, but this could minimize WSDOT’s options for future widening of I-5 (such as for creation of a HOT lane).

Second, Perteet found that the proposed center of tracks profile for the representative alignment does not adjust for the existing Ash Way Park and Ride direct access ramp over the I-5 southbound travel lanes. The representative alignment profile appears to cross under the direct access ramp, however, an overcrossing of that ramp may be required based on the height of that existing structure and the aerial Ash Way Park and Ride station concept.

Additionally, Perteet noted a few areas of interest with the east-side alternative alignment.

First, shifting the 164th Street station to the east of I-5 opens up a connection opportunity between the Interurban Trail and the station. Currently, the Trail generally runs the east side of I-5 in Snohomish County PUD right-of-way. But, at the 164th Street crossing, the Trail deviates to 13th Avenue W / Meadow Road to the east of I-5. This

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current configuration adds travel time and introduces an at-grade crossing of 164th Street. With the east-side alternative alignment, the cut-and-cover zone could be expanded to include additional width for the Interurban Trail (this cost was included in our analysis). The Trail could run at the grade of the tracks, or higher, as desired. The East of I-5 station location is assumed to include a center platform serving both directions, like all other station locations in this analysis. There are multiple options for connecting that platform to the Interurban Trail. The first option would be to run the Trail outside of the tracks but along the alignment of the tracks, with a connection to the platform zone via elevators to the surface station access points, a tunnel below the adjacent light rail tracks, or a permission for trail users to cross the light rail tracks directly (likely with necessary devices to ensure safety). A second option would be to cross the trail above or below the light rail tracks north and south of the cut-and-cover zone so that the trail then runs through or possibly with grade-separation at the platform zone. This second option could require undercrossing or overcrossing structures for the Interurban Trail.

Second, the crossings of I-5 will likely be designed to provide the shortest possible crossing distance, meaning that the spans will be as perpendicular as feasible to the I-5 travel lanes. Perteet found that the crossing south of 164th Street has curvature within the long-span aerial distance on the west side of I-5, unless adjacent properties are acquired to bulb out the alignment before crossing the freeway. As noted above, Perteet used curve radii greater than the minimum design criteria where possible, but this curve was reduced to 500 feet to minimize span lengths. A refined design for this location may result in a shorter long-span aerial length if more extreme design criteria are used.

CONCLUSIONS

The planning-level cost comparison shows that the representative alignment and the east-side alternative alignment have costs of a similar magnitude—within 5%—despite the additional crossings of the Interstate for the East of I-5 station location.

ATTACHMENTS

- Appendix A Design Criteria Memorandum
- Appendix B Representative Alignment and Profile
- Appendix C East-Side Alternative Alignment and Profile
- Appendix D Opinion of Cost Assumptions
- Appendix E Representative Alignment Opinion of Cost Summary
- Appendix F East-Side Alternative Alignment Opinion of Cost Summary

APPENDIX A

Design Criteria Memorandum

MEMORANDUM

2707 Colby Avenue, Suite 900, Everett, WA 98201 | P 425.252.7700

To: Jay Larson, AICP

From: Peter De Boldt, PE

Date: August 28, 2019

Re: East-West Corridor High Capacity Transit – Station Area Plan Design Criteria

The following information in Table 1 documents the design criteria values Perteet Inc. has used in establishing a conceptual alternative east-side alignment for Sound Transit 3 light rail between the 128th Street and 164th Street corridors in south Snohomish County. References to the Sound Transit Design Criteria Manual are from the June 2018 revision (version 5).

This document is intended to be a “living” record of design elements employed during the conceptual layout process. Additional criteria may be identified and added to the table later on, or design values may change as alternatives are considered. Table 1 will be updated as necessary to reflect those changes.

Table 1. Conceptual Alternative East-Side Alignment Design Criteria.

Design Element	Design Value	Local Standard	Reference
General			
Maximum design speed	55 MPH	55 MPH	Sound Transit Design Criteria Manual 4.4.1
Segments considered “cut and cover”	Track more than 3’ below existing grade on east side Note: Cut-and-cover will only be applicable at the 164th Street undercrossing.	NA	NA
Segments considered “aerial”	Track more than 10’ above existing grade	NA	NA
Segments considered “at-grade”	All other track	NA	NA
Aerial span lengths	275 FT, typical maximum 390 FT at western curve for south I-5 crossing Note: Span lengths for 128th Street overpass across I-5 are approximately 250 FT.	NA	NA
Platform Length	380 FT	380 FT, minimum	Sound Transit Design Criteria Manual 9.4.3
Cross Section			
Aerial easement width	32 FT, minimum	NA	NA
Permanent Right of Way Limits	32 FT, minimum	NA	NA
Minimum Track Width	32 FT, minimum Note: Based on 14-foot centerline track spacing and 9-foot distance from track centerline to edge of walkway / face of wall.	NA	NA

MEMORANDUM

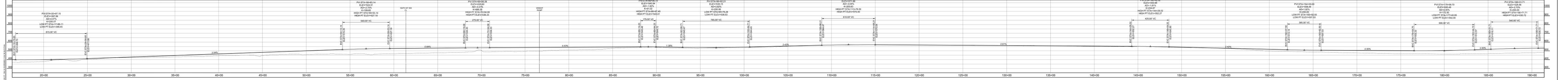
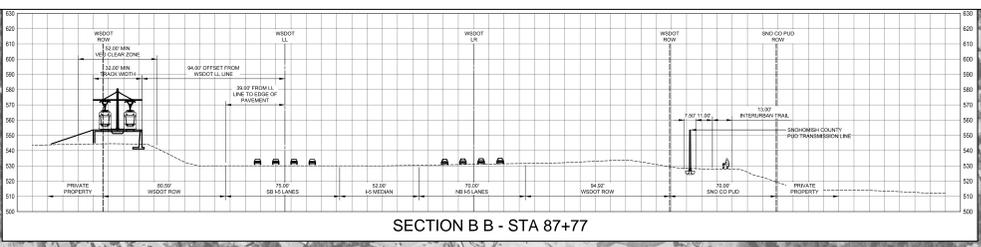
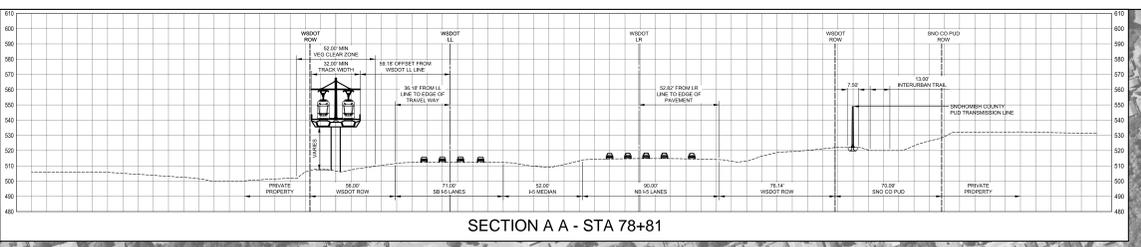
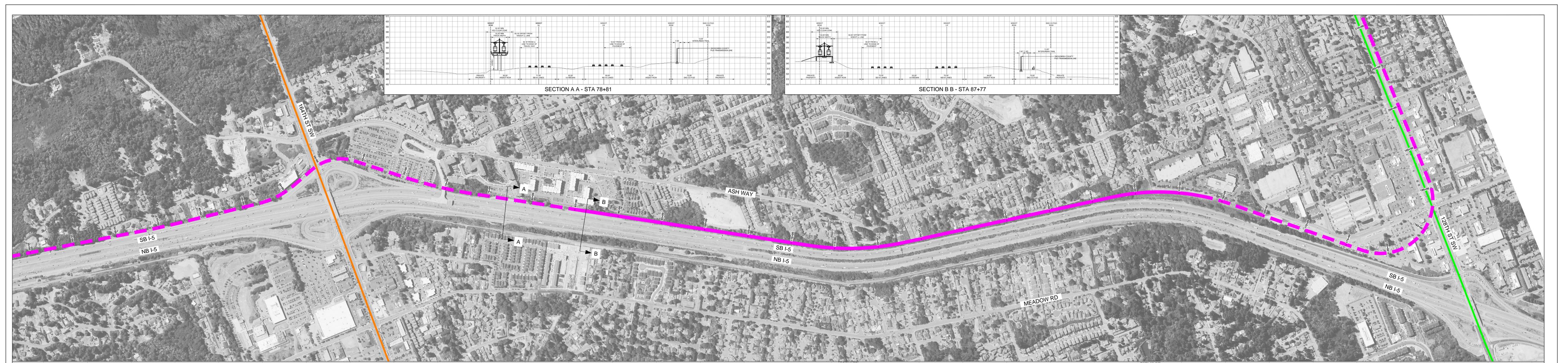
Design Element	Design Value	Local Standard	Reference
Aerial top of track to bottom of structure dimension	5 FT	NA	NA
Track spacing centerline to centerline	14 FT	14 FT, minimum	Sound Transit Design Criteria Manual 4.4.7
	Assumption: Track configuration is double track with OCS poles between tracks.		
Separation from track centerline to railing or wall	9 FT, minimum	Minimum distance required to clear the clearance envelope plus walkway width requirements	Sound Transit Design Criteria Manual 4.4.6.C.2
	Note: Sound Transit Design Criteria Manual version 4 (March 2016) listed 9 FT as a minimum distance from track centerline to railing or wall in Section 4.2.6.		
Cut and fill slope	3:1, minimum	NA	NA
Vertical clearance to overhead structures	21.5 FT, minimum	NA	NA
	Note: Sound Transit Design Criteria Manual version 4 (March 2016) listed 21.5 FT as a minimum clearance above tracks in Table 4-14.		
Clear zone from edge of WSDOT travel way	45 FT, minimum	45 FT (fill), minimum 24 FT (cut), minimum	WSDOT Design Manual Chapter 1600
	Note: Based on 60 MPH posted speed limit, assuming side slopes no steeper than 4H:1V.		
Horizontal Geometry			
Minimum horizontal radius	1000 FT, typical minimum 500 FT at western curve for south I-5 crossing	500 FT (aerial), minimum 300 FT (at grade) minimum 250 FT (subway) minimum 100 FT (in street) minimum	Sound Transit Design Criteria Manual Table 4-2
Tangent length between horizontal curves	200 FT, minimum	200 FT, desirable minimum 100 FT or 3 x Design Speed (in MPH), minimum	Sound Transit Design Criteria Manual Table 4-1
Tangent length beyond station	50 FT, minimum	50 FT, minimum 45 FT, absolute minimum	Sound Transit Design Criteria Manual 4.4.3
Vertical Geometry			
Sustained grade	0.5%, minimum 4.0%, maximum	0.5%, minimum 4%, maximum	Sound Transit Design Criteria Manual Table 4-4
Grade at stations	0.5%, minimum 1.0%, maximum	0.5%, desirable minimum 1.0%, maximum	Sound Transit Design Criteria Manual Table 4-5
Tangent length between vertical curves	165 FT, minimum	100 FT or 3x design speed, whichever is greater, minimum	Sound Transit Design Criteria Manual Table 4-7
	Note: 55 MPH design speed makes the minimum desirable tangent length 165 FT .		

MEMORANDUM

Design Element	Design Value	Local Standard	Reference
Aerial structure clearance over roadway surface	20 FT, minimum	NA	NA
	Note: Allowing additional clearance above roadway for formwork during structure construction. Sound Transit Design Criteria Manual version 4 (March 2016) listed 16.5 FT as a minimum clearance over roadway surface in Table 4-14.		
Vertical curve length (crest and sag)	Equal to 200A, minimum	Equal to 200A, desirable minimum Equal to 100A (sag curves), minimum Equal to 150A (crest curves), minimum	Sound Transit Design Criteria Manual Table 4-8
	Note: $A = G2 - G1$; A is the algebraic difference in gradients connected by the vertical curve, in percent.		

APPENDIX E-B

Representative Alignment and Profile



WEST-SIDE ALIGNMENT			
ST1 REPRESENTATIVE ALIGNMENT	AT-GRADE	SWIFT ORANGE LINE	
	AREAL	SWIFT GREEN LINE	

APPENDIX E-C

East-Side Alternative Alignment and Profile

APPENDIX E-D

Opinion of Cost Assumptions

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description:	East-West Corridor HCT - Station Area Plan	Client:	Snohomish County
Corridor Section:	East-Side Alternative Alignment	Date:	8/27/2019
Location:	South Snohomish County	Date of Cost Index:	2019
		Calculated By/Entered By:	RLO
		Checked By:	JCB

20180071 East-West Corridor HCT - Station Area Plan
DESIGN ASSUMPTIONS
Proposed cross section

Track structure width: 32'
 All Stations are center platform. Station platform between tracks: 20' wide
 To accommodate four-car light rail, platform length is assumed a minimum of 380 ft.
 Vegetative clear zone 10' outside of edge of track structure. This zone used for estimation of easement area.

ESTIMATING ASSUMPTIONS
I. RIGHT OF WAY

Assume permanent ROW acquisition for track width + buffer based on Sound Transit Design Manual, temporary easement for crossings and vegetative clear zone. Assume acquisition of full property when more than half of property is taken by track or track separates more than half of the property from the other half. Also acquisition of full property when development is blocked from roadway access by either track or station. Partial acquisition of property when track does not require relocation of development and does not restrict access. Assume use of WSDOT and Sno Co PUD ROW without acquisition. ROW considers developed and undeveloped urban land. Assume easement area of required vegetative clear zone (10' outside of edge of track). Relocation of houses and commercial buildings based on parcel acquisition.

II. RETAINING WALLS

Assume all wall footings outside of Sound Transit permanent ROW fall within 10' vegetative clear zone and thus included in the estimated easement zone.

Assume all concrete cantilever retaining walls are cast in place.

Unit cost based on WSDOT Bridge Design Manual M 23-50.19 (Appendix 12.3-A1) for reinforced soldier pile walls and reinforced concrete retaining walls.

Soldier pile walls used for cut and cover sections. Cantilever walls used for at grade sections.

PREPARATION AND REMOVAL OF STRUCTURES AND OBSTRUCTIONS.

Approximated unit cost 2x clearing and grubbing, using aerial images and required vegetative clear zones for quantity.

Cut and Fill estimated using offset profiles and design profile:

Neat line estimated using average depth across track width based on proposed CL elevation compared to existing elevation

1H:1V excavation slope behind cantilever walls

No excavation slope for soldier pile walls

All cut and fill slopes are 3H:1V except for fill slopes between track structure and I-5 which are 4H:1V

Single-unit developments priced as houses, anything larger assumed as commercial buildings.

LRT TRACK AND ALIGNMENT

Assumed track height over 10' above existing surface = Aerial Guideway, track height under 10' above existing surface and above 5' below existing surface = At Grade, and track height under 5' below existing surface = Cut and Cover (only applicable at 164th undercrossing)

Assume 94' offset from WSDOT NB (LR) CL for edge of east alignment track structure

Assume long span aerial goes from 100' offset from WSDOT NB and SB lane CLs on either side of I-5 for I-5 crossings. Cost provided by Chris Wellander 12/6/2018

Aerial unit cost/LF provided by Chris Wellander 12/6/2018

At grade unit cost/LF calculated by using the Revised Draft Report for the Expert Review Panel for the Assessment of Cost Estimating Methodology and Sample Cost Estimates for Sound Transit ST3 Projects (\$550 / LF) with applied 5% annual inflation.

https://wsdot.wa.gov/partners/erp/background/ValueMgmtConsulting_rpt_cost_est_methodology.pdf

Assumed cut and cover track costs the same as at grade track, additional costs come from earthwork, wall, and structure estimates

Assume 5 straddle bents at each I-5 crossing, 1 in I-5 median and 2 on either side of I-5 crossing. Cost provided by Christ Wellander 12/6/2018

LRT STATIONS

Aerial station unit price based off Federal Way link, at \$110 M. Assumed cut and cover station unit price at \$75 M, due to less required structure.

Federal Way link can be referenced at: <https://www.soundtransit.org/sites/default/files/documents/november-2018-link-progress-report.pdf>. Cost of At-Grade rail assumed from 2014 cost of \$550 RF with 5% annual inflation rate.

STRUCTURE

Concrete overpass SF is the square footage of the entire new bridge. Assume center platform 20' wide at station just north of 164th requiring a wider cut through 164th. However, along the station length, the cut width will be 30' from east edge of track structure to account for the Interurban trail / platform mixing zone. Unit cost based on WSDOT Bridge Design Manual M 23-50.19 (Appendix 12.3-A1) for reinforced concrete slabs. Used for cut and cover and when cut or fill exceeds 5'.

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description:	East-West Corridor HCT - Station Area Plan	Client:	Snohomish County
Corridor Section:	East-Side Alternative Alignment	Date:	8/27/2019
Location:	South Snohomish County	Date of Cost Index:	2019
		Calculated By/Entered By:	RLO
		Checked By:	JCB

20180071 East-West Corridor HCT - Station Area Plan
SURFACING

Rigid pavements are estimated by the cubic yard assuming a 12" PCC pavement section based off UBA for 2012-2019.

ADDED COSTS

Assumed 40% overall contingency cost.
 30% design assumed from ST3.

UNCERTAINTY FACTOR

The Uncertainty Factor is to take into account any uncertainty in the quantity of the item that it is being applied to. The Uncertainty Factor takes into account variability due to limited information available, preliminary or incomplete design, very preliminary review of site conditions, etc. and utilizes a scale from 1 to 2. Applying these factors involves the use of Engineering Judgment. The following is a summary of factors (see more detailed information regarding Uncertainty Factor values, attached sheet).

General values to use are as follows:

- 1 = The quantity is fairly accurate for preliminary design and the calculated quantity is unlikely to change within 10% if the design remains the same.
- 1.2 = The calculated quantity could vary due to actual site conditions at the time of construction and due to details of actual design, and there is some variability due to information available.
- 1.4 = There is a good deal of uncertainty in the calculated quantity and there is a likeliness that the quantity will change.
- 2.0 = It is very uncertain as to the calculated quantity and it is very likely that the number will be higher, however it is difficult to calculate this number in preliminary design stages.

SIGNIFICANT DIGITS AND ROUNDING

Special attention needs to be given to the significant digits used and when rounding is applied to numbers used within this spreadsheet. This is a planning level opinion of cost. Thus the accuracy of the numbers used within this cost estimate are usually not to the nearest dollar. A good rule of thumb is as follows:

- Round individual entries (Roadway Ex., Gravel Borrow, etc.) to a decent round number that represents the level of accuracy, and should be done within the individual quantity sheets. For example, round 387 CY to 400 CY, or round 526,345 CY to 526,400 CY
- Round up the final total of the estimate. Round the final number to two or three significant digits, or use half of the numbers left of the decimal point as significant digits.
- Rounding at intermediate totals and summaries within the spreadsheet should be avoided as these will just introduce compounding error. The only numbers that should be rounded are the values input into the summary spreadsheet and the final cost number.

APPENDIX E-E

Representative Alignment Opinion of Cost Summary

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description:	East-West Corridor HCT - Station Area Plan	Client:	Snohomish County
Corridor Section:	Representative Alignment	Date:	8/27/2019
Location:	South Snohomish County	Date of Cost Index:	2019
		Calculated By/Entered By:	RLO
		Checked By:	JCB

20180071 East-West Corridor HCT - Station Area Plan

	ITEM	UNIT	ESTIMATED UNIT COST	QTY	COST
I.	RIGHT OF WAY				
	RIGHT OF WAY	SF	\$35	343,500	\$12,022,500
	EASEMENT	SF	\$15	77,300	\$1,159,500
	RELOCATIONS: BUSINESSES	EA	\$65,000	10	\$650,000
	RELOCATIONS: RESIDENCES	EA	\$65,000	4	\$260,000
	CONDEMNATION PROCEDURE	EA	\$50,000	14	\$700,000
	RIGHT OF WAY TOTAL				\$14,792,000
II.	CONSTRUCTION				
1	1.1 PREPARATION				
	TREE REMOVAL	ACRE	\$20,000	14.0	\$280,000
	REMOVING EXISTING PAVEMENT	SY	\$10	-	\$0
	REMOVAL STRUCTURES & OBSTRUCTIONS (HOUSE)	EA	\$15,000	4	\$60,000
	REMOVAL STRUCTURES & OBSTRUCTIONS (COMMERCIAL)	EA	\$30,000	10	\$300,000
	1.2 EARTHWORK				
	TOTAL CUT VOLUME	CY	\$25	29,200	\$730,000
	TOTAL FILL VOLUME	TON	\$25	54,000	\$1,350,000
2	2.1 STRUCTURE				
	STRADDLE BENT	EA	\$1,000,000	-	\$0
	164TH ST OVERPASS	LS	\$2,345,800		\$0
	REINFORCED CONCRETE RETAINING WALL	SF	\$55	68,500	\$3,767,500
	SOLDIER PILE WALL	SF	\$100	34,300	\$3,430,000
	2.2 LRT				
	REGULAR AERIAL GUIDEWAY	LF	\$8,810	13,000	\$114,530,000
	LONG SPAN AERIAL GUIDEWAY	LF	\$14,090	-	\$0
	AT-GRADE	LF	\$700	10,600	\$7,420,000
	CUT AND COVER TRACK	LF	\$700	-	\$0
	STATIONS (AERIAL)	EA	\$110,000,000	2	\$220,000,000
	STATIONS (CUT AND COVER)	EA	\$75,000,000	-	\$0
3	OTHER ITEMS				
	SURVEYING	LS	\$21,112,100	1	\$21,112,100
4	MISCELLANEOUS (10%)	LS	\$37,297,960	1	\$37,297,960
5	SUBTOTAL (ITEMS 1 THRU 4)				\$410,277,560
6	MOBILIZATON (10% OF ITEM 5)	EST	\$41,027,756	1	\$41,027,756
7	SUBTOTAL (ITEMS 5 AND 6)				\$451,305,316
8	CONTINGENCY (40%)	EST	\$180,522,126	1	\$180,522,126
9	SUBTOTAL (ITEMS 7 AND 8)				\$631,827,442.40
10	SALES TAX (10.5%)	EST	\$66,341,881	1	\$66,341,881

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description:	East-West Corridor HCT - Station Area Plan	Client:	Snohomish County
Corridor Section:	Representative Alignment	Date:	8/27/2019
Location:	South Snohomish County	Date of Cost Index:	2019
		Calculated By/Entered By:	RLO
		Checked By:	JCB

20180071 East-West Corridor HCT - Station Area Plan

	ITEM	UNIT	ESTIMATED UNIT COST	QTY	COST
11	CONSTRUCTION				
	CONSTRUCTION MANAGEMENT	EST	\$56,864,470	1	\$56,864,470
	CHANGE ORDERS	EST	\$94,774,116	1	\$94,774,116
	DSDC	EST	\$63,182,744	1	\$63,182,744
12	CONSTRUCTION TOTAL (ITEMS 9 THRU 11)				\$912,990,654
III.	PRELIMINARY WORK				
	DESIGN (30% OF ITEM 12)	EST	\$273,897,196	1	\$273,897,196
IV.	TOTAL ESTIMATED COST				
	(ITEMS I, 12, & III)				\$1,201,679,851

The above opinion of cost is a planning level estimate only. It is based on best available information and scope at the time, not on the results of a detailed engineering study, and is supplied as a budgeting guide only. Perteeet Inc. does not guarantee or warrant the accuracy of this planning level estimate.

APPENDIX E-F

East-Side Alternative Alignment Opinion of Cost Summary

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description:	East-West Corridor HCT - Station Area Plan	Client:	Snohomish County
Corridor Section:	East-Side Alternative Alignment	Date:	8/27/2019
Location:	South Snohomish County	Date of Cost Index:	2019
		Calculated By/Entered By:	RLO
		Checked By:	JCB

20180071 East-West Corridor HCT - Station Area Plan

	ITEM	UNIT	ESTIMATED UNIT COST	QTY	COST
I.	RIGHT OF WAY				
	RIGHT OF WAY	SF	\$35	1,810,500	\$63,367,500
	EASEMENT	SF	\$15	37,600	\$564,000
	RELOCATIONS: BUSINESSES	EA	\$65,000	26	\$1,690,000
	RELOCATIONS: RESIDENCES	EA	\$65,000	18	\$1,170,000
	CONDEMNATION PROCEDURE	EA	\$50,000	44	\$2,200,000
	RIGHT OF WAY TOTAL				\$68,991,500
II.	CONSTRUCTION				
1	1.1 PREPARATION				
	TREE REMOVAL	ACRE	\$20,000	15.3	\$306,000
	REMOVING EXISTING PAVEMENT	SY	\$10	700	\$7,000
	REMOVAL STRUCTURES & OBSTRUCTIONS (HOUSE)	EA	\$15,000	12	\$180,000
	REMOVAL STRUCTURES & OBSTRUCTIONS (COMMERCIAL)	EA	\$30,000	24	\$720,000
	1.2 EARTHWORK				
	TOTAL CUT VOLUME	CY	\$25	51,400	\$1,285,000
	TOTAL FILL VOLUME	TON	\$25	95,000	\$2,375,000
2	2.1 STRUCTURE				
	STRADDLE BENT	EA	\$1,000,000	10	\$10,000,000
	164TH ST OVERPASS	LS	\$2,345,800	1	\$2,345,800
	REINFORCED CONCRETE RETAINING WALL	SF	\$55	70,700	\$3,888,500
	SOLDIER PILE WALL	SF	\$100	113,500	\$11,350,000
	1.3 LRT				
	REGULAR AERIAL GUIDEWAY	LF	\$8,810	8,100	\$71,361,000
	LONG SPAN AERIAL GUIDEWAY	LF	\$14,090	1,400	\$19,726,000
	AT-GRADE TRACK	LF	\$700	9,700	\$6,790,000
	CUT AND COVER TRACK	LF	\$700	3,100	\$2,170,000
	STATIONS (AERIAL)	EA	\$110,000,000	1	\$110,000,000
	STATIONS (CUT AND COVER)	EA	\$110,000,000	1	\$110,000,000
3	OTHER ITEMS				
	SURVEYING	LS	\$21,150,300	1	\$21,150,300
4	MISCELLANEOUS (10% OF ITEMS 1 THRU 3)	LS	\$37,365,460	1	\$37,365,460
5	SUBTOTAL (ITEMS 1 THRU 4)				\$411,020,060
6	MOBILIZATON (10% OF ITEM 5)	EST	\$41,102,006	1	\$41,102,006
7	SUBTOTAL (ITEMS 5 AND 6)				\$452,122,066
8	CONTINGENCY (40% OF ITEM 7)	EST	\$180,848,826	1	\$180,848,826
9	SUBTOTAL (ITEMS 7 AND 8)				\$632,970,892.40
10	SALES TAX (10.5% OF ITEM 9)	EST	\$66,461,944	1	\$66,461,944

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description:	East-West Corridor HCT - Station Area Plan	Client:	Snohomish County
Corridor Section:	East-Side Alternative Alignment	Date:	8/27/2019
Location:	South Snohomish County	Date of Cost Index:	2019
		Calculated By/Entered By:	RLO
		Checked By:	JCB

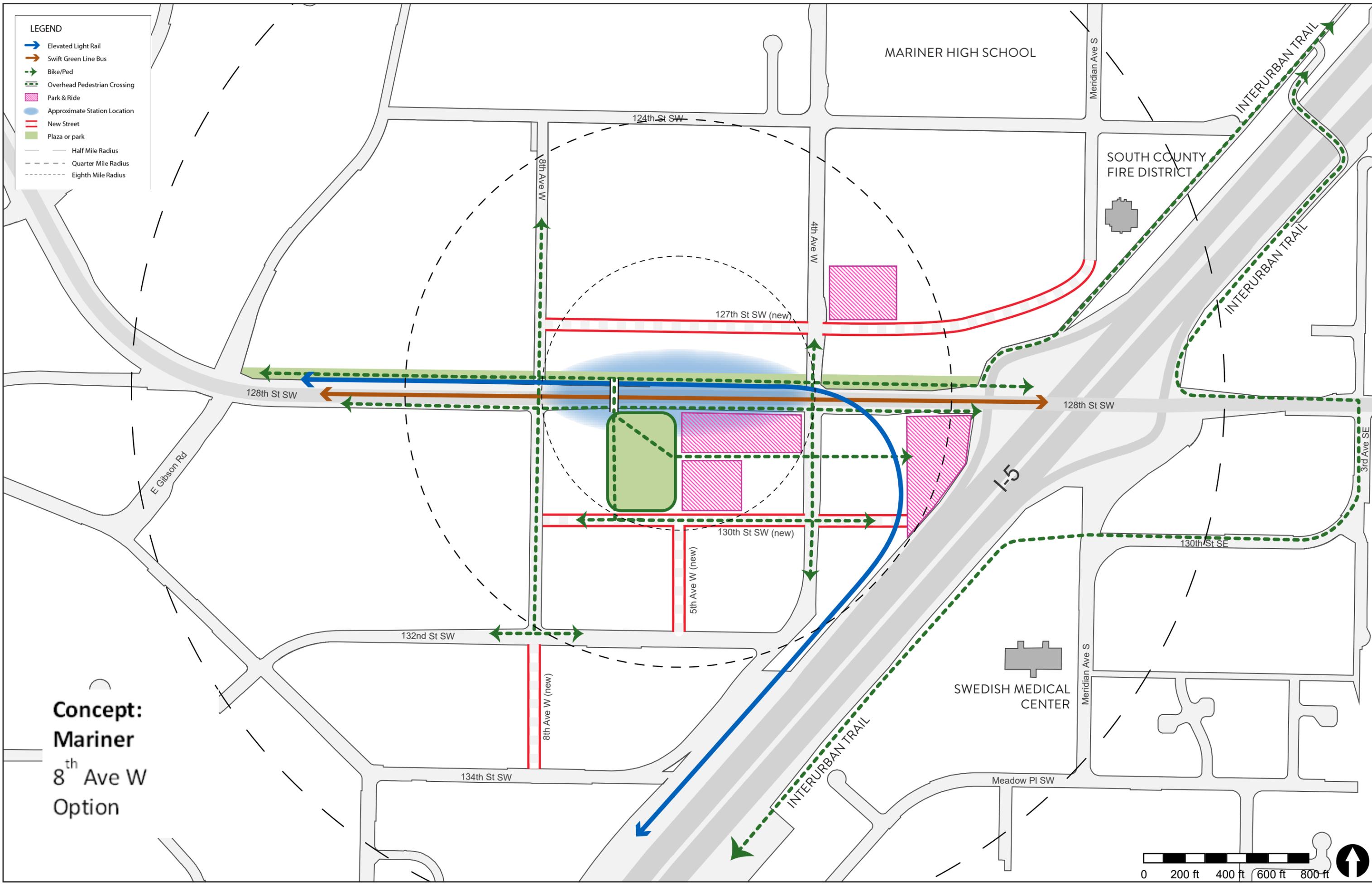
20180071 East-West Corridor HCT - Station Area Plan					
ITEM		UNIT	ESTIMATED UNIT COST	QTY	COST
11	CONSTRUCTION				
	CONSTRUCTION MANAGEMENT	EST	\$56,967,380	1	\$56,967,380
	CHANGE ORDERS	EST	\$94,945,634	1	\$94,945,634
	DSDC	EST	\$63,297,089	1	\$63,297,089
12	CONSTRUCTION TOTAL (ITEMS 9 THRU 11)				\$914,642,940
III.	PRELIMINARY WORK				
	DESIGN (30% OF ITEM 12)	EST	\$274,392,882	1	\$274,392,882
IV.	TOTAL ESTIMATED COST				
	(ITEMS I, 12, & III)				\$1,258,027,321

The above opinion of cost is a planning level estimate only. It is based on best available information and scope at the time, not on the results of a detailed engineering study, and is supplied as a budgeting guide only. Perteet Inc. does not guarantee or warrant the accuracy of this planning level estimate.

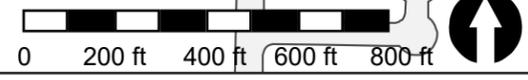
APPENDIX F

Station Area Renderings

- LEGEND**
- Elevated Light Rail
 - Swift Green Line Bus
 - Bike/Ped
 - Overhead Pedestrian Crossing
 - Park & Ride
 - Approximate Station Location
 - New Street
 - Plaza or park
 - Half Mile Radius
 - Quarter Mile Radius
 - Eighth Mile Radius



Concept:
Mariner
 8th Ave W
 Option



Concept:
Mariner
8th Ave W
Option

LEGEND

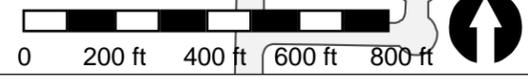
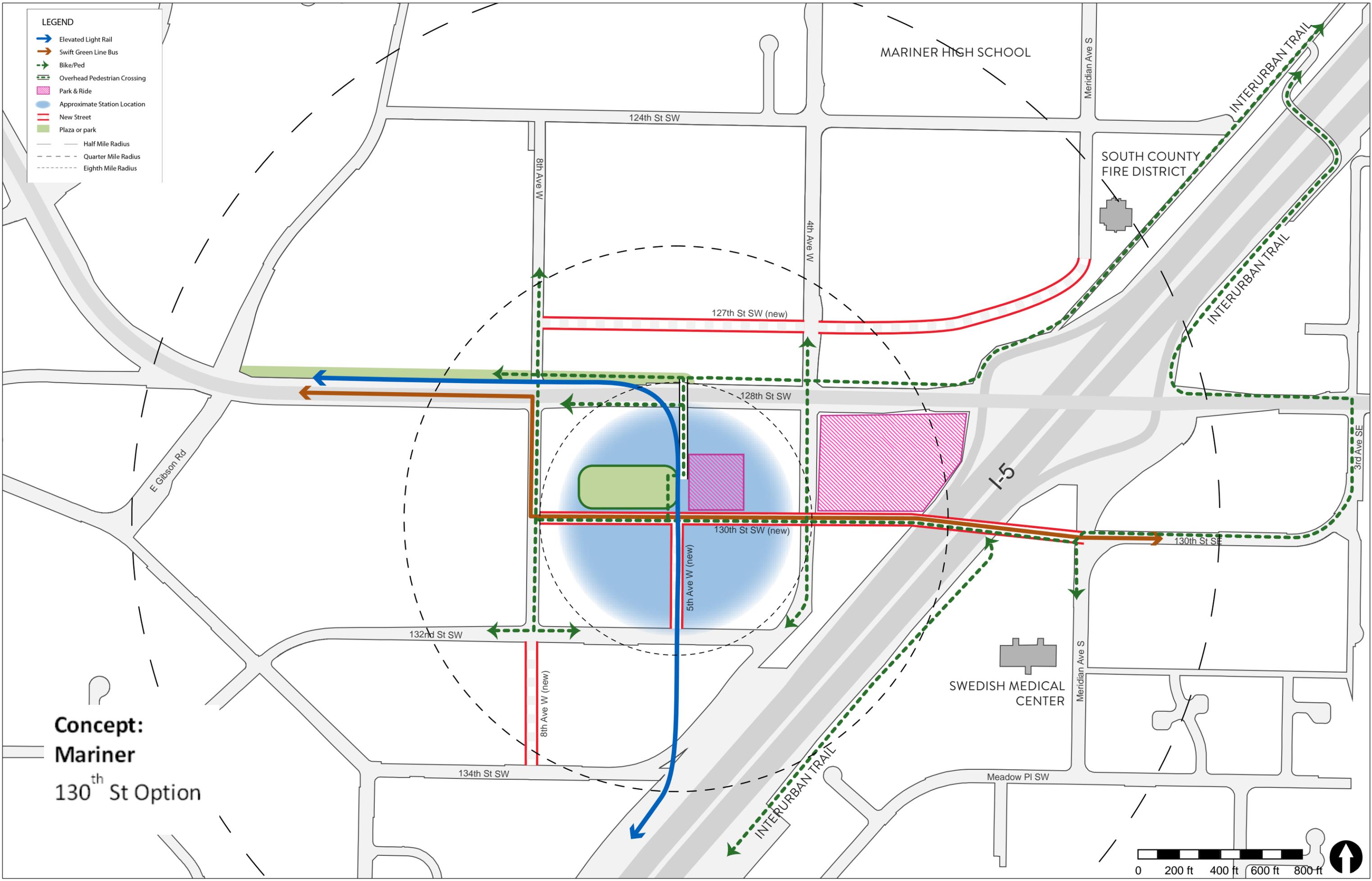
-  LIGHT RAIL LINE
-  BIKE/PED NETWORK
-  NEW TOD STREET NETWORK
-  TOD AREAS
-  STRUCTURED PARKING
-  PARK/AMENITY



LEGEND

- Elevated Light Rail
- Swift Green Line Bus
- Bike/Ped
- Overhead Pedestrian Crossing
- Park & Ride
- Approximate Station Location
- New Street
- Plaza or park
- Half Mile Radius
- Quarter Mile Radius
- Eighth Mile Radius

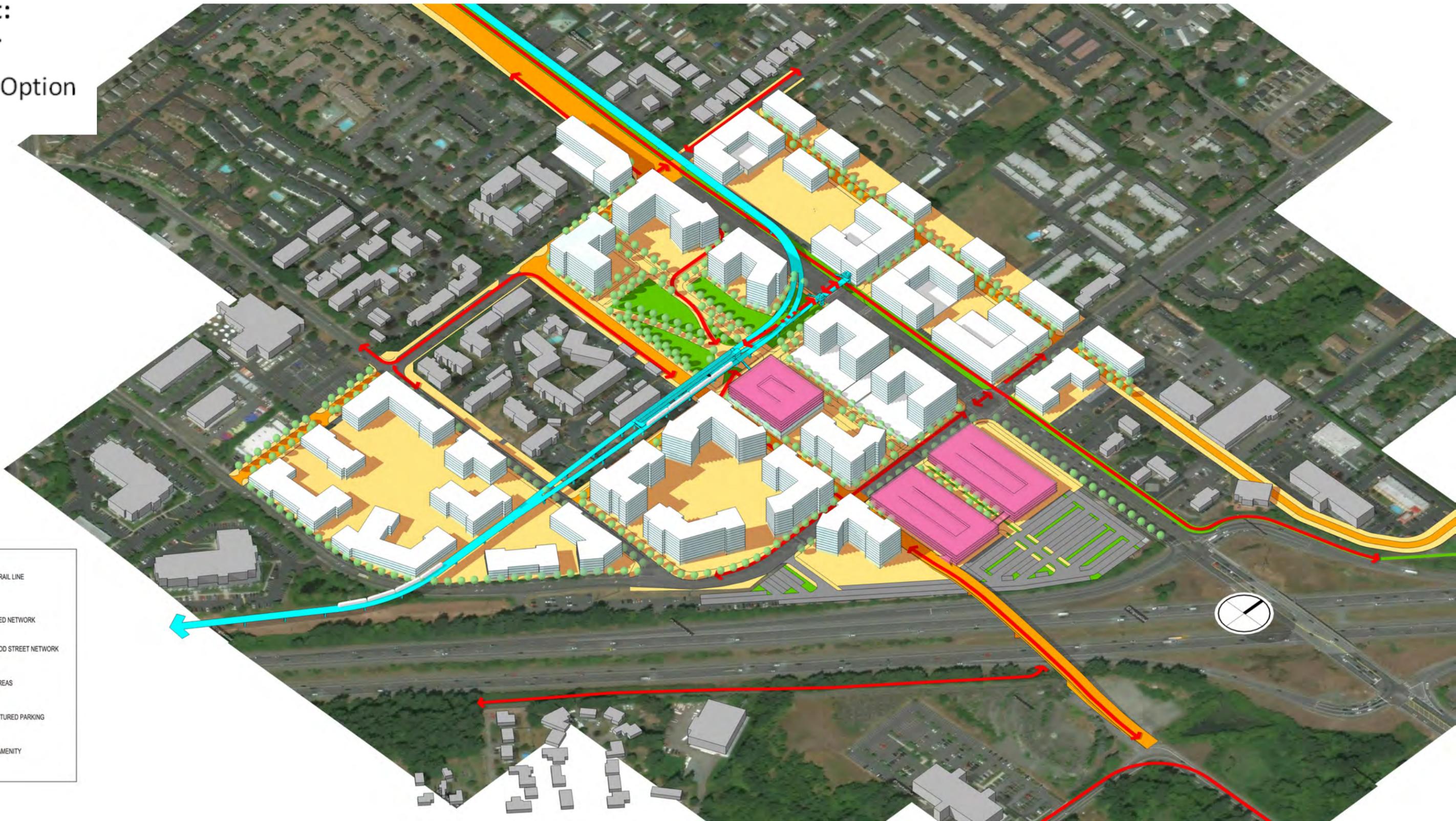
Concept:
Mariner
130th St Option



Concept:
Mariner
130th St Option

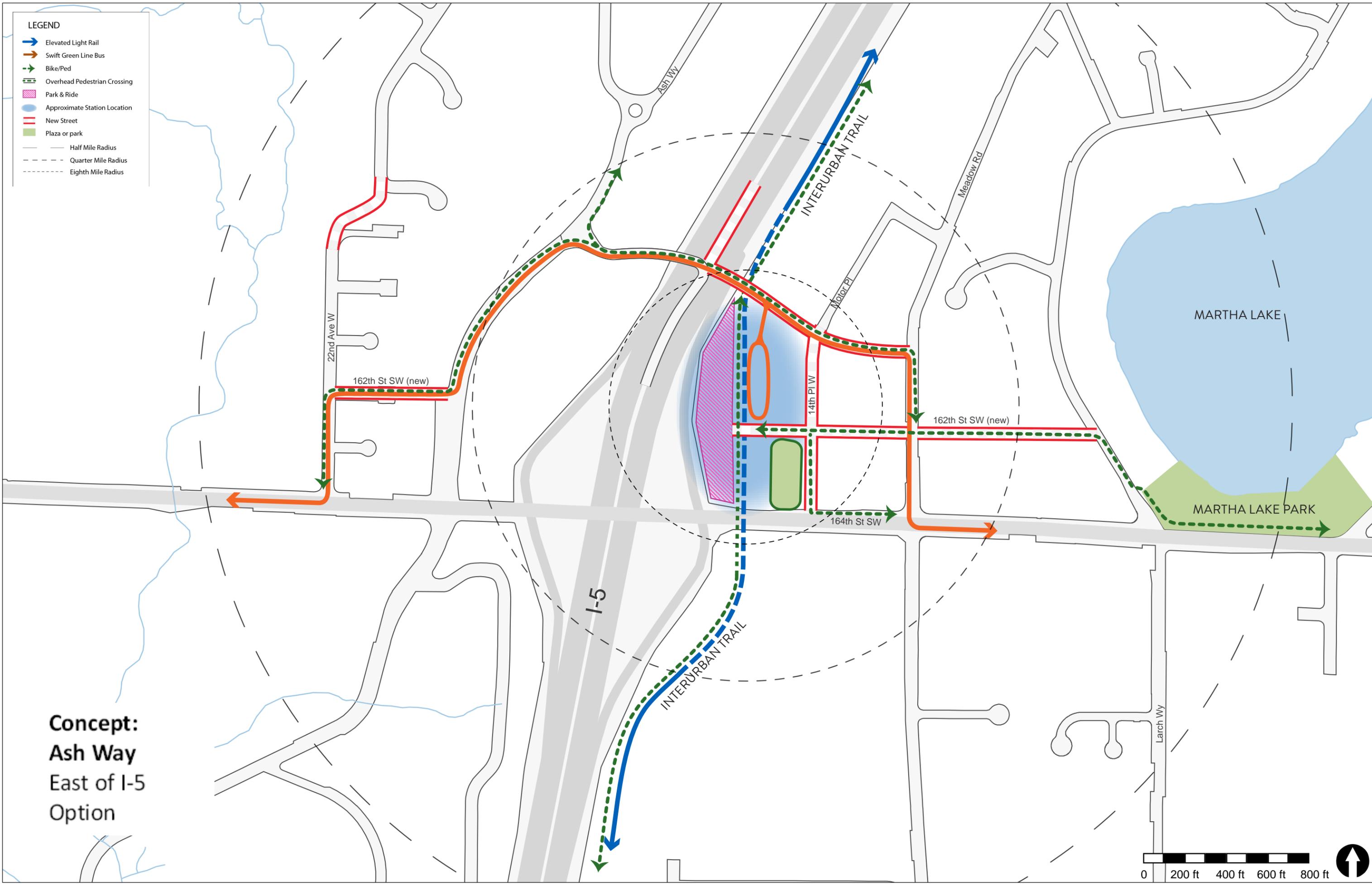
LEGEND

-  LIGHT RAIL LINE
-  BIKE/PED NETWORK
-  NEW TOD STREET NETWORK
-  TOD AREAS
-  STRUCTURED PARKING
-  PARK/AMENITY

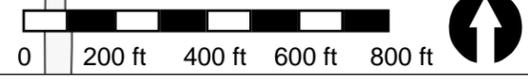


LEGEND

- Elevated Light Rail
- Swift Green Line Bus
- Bike/Ped
- Overhead Pedestrian Crossing
- Park & Ride
- Approximate Station Location
- New Street
- Plaza or park
- Half Mile Radius
- Quarter Mile Radius
- Eighth Mile Radius



Concept:
Ash Way
East of I-5
Option



Concept:
Ash Way
East of I-5
Option

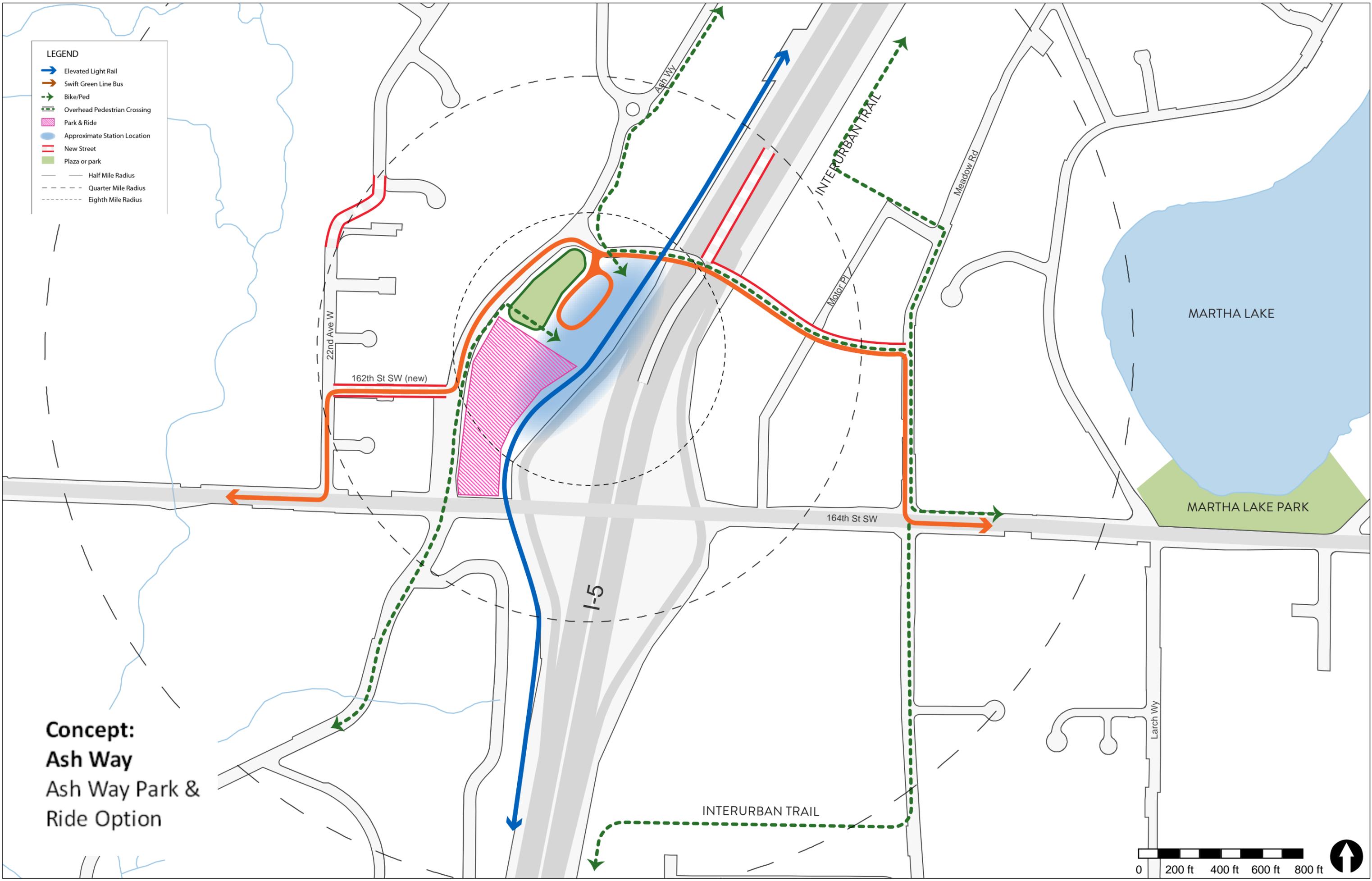


LEGEND

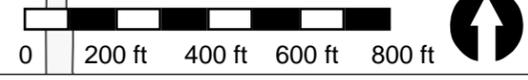
-  LIGHT RAIL LINE
-  BIKE/PED NETWORK
-  NEW TOD STREET NETWORK
-  TOD AREAS
-  STRUCTURED PARKING
-  PARK/AMENITY

LEGEND

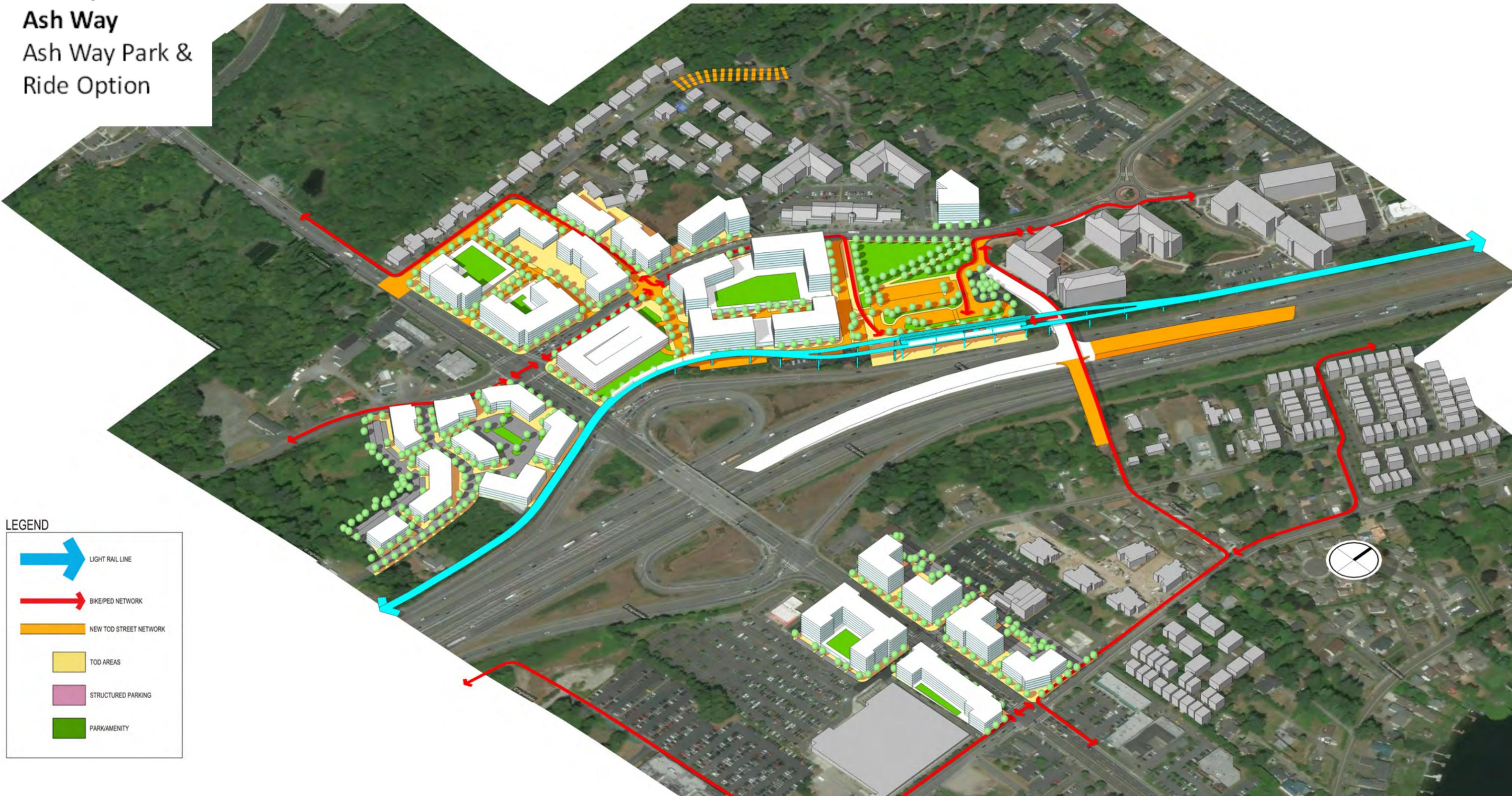
-  Elevated Light Rail
-  Swift Green Line Bus
-  Bike/Ped
-  Overhead Pedestrian Crossing
-  Park & Ride
-  Approximate Station Location
-  New Street
-  Plaza or park
-  Half Mile Radius
-  Quarter Mile Radius
-  Eighth Mile Radius



Concept:
Ash Way
 Ash Way Park &
 Ride Option



Concept:
Ash Way
Ash Way Park &
Ride Option



LEGEND

-  LIGHT RAIL LINE
-  BIKE/PED NETWORK
-  NEW TOD STREET NETWORK
-  TOD AREAS
-  STRUCTURED PARKING
-  PARK/AMENITY