# Attachment A

# Transportation Technical Memorandum

This page intentionally left blank.

# MEMORANDUM

## Lynnwood Link Extension| Northgate Station to Lynnwood Transit Center

## Shoreline North/185th & Lynnwood City Center Stations, and 5th Avenue NE Closures – Traffic Analysis Update

**Date**: February 22, 2018

**To**: Steve Kennedy, Elma Borbe, Erik Finley, Jon Jordan, Brian Kemper – Sound Transit

**From:** C.J. Grove, Bill James – HNTB|Jacobs

**cc:** Jeff Schutt, Rich Johnson, Mike Coward, Sam Burch – HNTB|Jacobs

**Re:** Shoreline North/185th & Lynnwood City Center Stations, and 5th Avenue NE Closures - Traffic Analysis Update

### Introduction

Traffic analysis updates have been performed in support of design refinements at the Shoreline North/185th (formerly the NE 185th Street Station) and Lynnwood City Center (formerly the Lynnwood Transit Center) Stations. These stations are on Sound Transit's Lynnwood Link Extension. This memorandum compares traffic operations between the final design station configuration and the FEIS preferred alternative. Traffic analysis updates have also been performed in support of proposed closures of 5th Avenue NE between NE 125th and 145th Streets during construction of the aerial guideway structure.

Design refinements at the **Shoreline North/185th Station** include:

- Revising the location of the 500-stall parking garage from the west side of I-5 to the east side of I-5, north of NE 185th Street, with vehicular access from 8th Avenue NE, and
- Revising the design of the station to provide the bus transit center on the same grade level as NE 185th Street, located above the parking garage with bus access (entry and exit) at 5th Avenue NE. The bus transit center is forecast to serve a total of 32 King County Metro and Community Transit bus trips in the design year weekday peak hours, consistent with King County Metro's long-range plan. A total of 36 peak hour bus trips were estimated in the FEIS Transportation Technical Report.

The FEIS preferred alternative located the park-and-ride garage on the west side of I-5. The FEIS preferred alternative provided a one-way bus transit loop, with an entry from NE 185th Street west of 8th Avenue NE and an exit to NE 185th Street at 5th Avenue NE. The final design configuration is most

similar to Alternatives 3 and 7 in the FEIS, which evaluated a 500-stall parking garage on the east side of I-5, directly adjacent to the station.

Design refinements at the **Lynnwood City Center Station** include:

- A right-in, right-out parking garage driveway access point on 44th Avenue W, south of 200th Street SW,
- Elimination of the HOV-only parking garage driveway access point on 46th Avenue W,
- The addition of 202nd Street SW, between 46th Avenue W and 48th Avenue W, to facilitate site circulation and provide additional pick-up and drop-off areas, and
- The addition of 11 bus layover spaces, for a total of 20 spaces, to support additional Community Transit and Sound Transit Regional Express bus service that is forecast to increase design year weekday peak hour bus trips from 124 to 182 buses per hour within the bus loop.

The 46th Avenue W garage driveway in the FEIS preferred alternative was designated as HOV-only and was shown north of the bus transit center on 46th Avenue W, opposite the existing surface parking lot. The addition of 202nd Street SW on the station site will facilitate circulation of HOV traffic between the I-5 HOV direct access ramp on 46th Avenue W and the parking garage access on 48th Avenue W. The parking garage location and total station parking stall counts are consistent between the final design and FEIS preferred alternative configurations.

Construction method refinements for the light rail aerial guideway structure south of the Shoreline South/145th Station require closures of **5th Avenue NE** in the city of Seattle, between NE 125th Street and NE 145th Street, for a duration of approximately three-and-a-half years. Between NE 125th Street and NE 130th Street, 5th Avenue NE is proposed to be one-way northbound during the construction period. North of NE 130th Street to approximately NE 133rd Street, 5th Avenue NE will be open only for local access to adjacent properties. From NE 133rd Street to the I-5 northbound off-ramp at NE 145th Street, 5th Avenue NE will be closed to all traffic except construction and emergency vehicles.

The Synchro 9 software package was used in the preparation of design year (2035) intersection level-of-service (LOS) and delay estimates for the Shoreline North/185th Station analysis and construction year (2020) level of service and delay estimates for the 5th Avenue NE closure detour analysis. The Synchro networks prepared for the FEIS were used as the basis for these analyses. The VISSIM 8 software package was used in preparation of design year intersection level of service and delay estimates for the Lynnwood City Center Station. The 2035 VISSIM network prepared for the FEIS was used as the basis for this analysis, and was updated to reflect the final design station configuration.

Level of service categories for signalized and unsignalized intersections were determined in accordance with the 2010 *Highway Capacity Manual.* For unsignalized intersections, delay and level of service are reported for the poorest movement. The vehicle delay values associated with each level of service category are shown in Table 1.

**Table 1: Intersection Level-of-Service Criteria**

| Level of Service | Control Delay* (seconds per vehicle) | |
|---|---|---|
| | Signalized | Unsignalized |
| A | ≤10 | 0 to 10 |
| B | >10 to 20 | >10 to 15 |
| C | >20 to 35 | >15 to 25 |
| D | >35 to 55 | >25 to 35 |
| E | >55 to 80 | >35 to 50 |
| F | >80 | >50 |

Source: Transportation Research Board. Highway Capacity Manual 2010. Exhibit 18-4 and Exhibit 19-1.

* Control delay is time spent slowing, stopping, moving up in a queue, and accelerating back to desired speed.

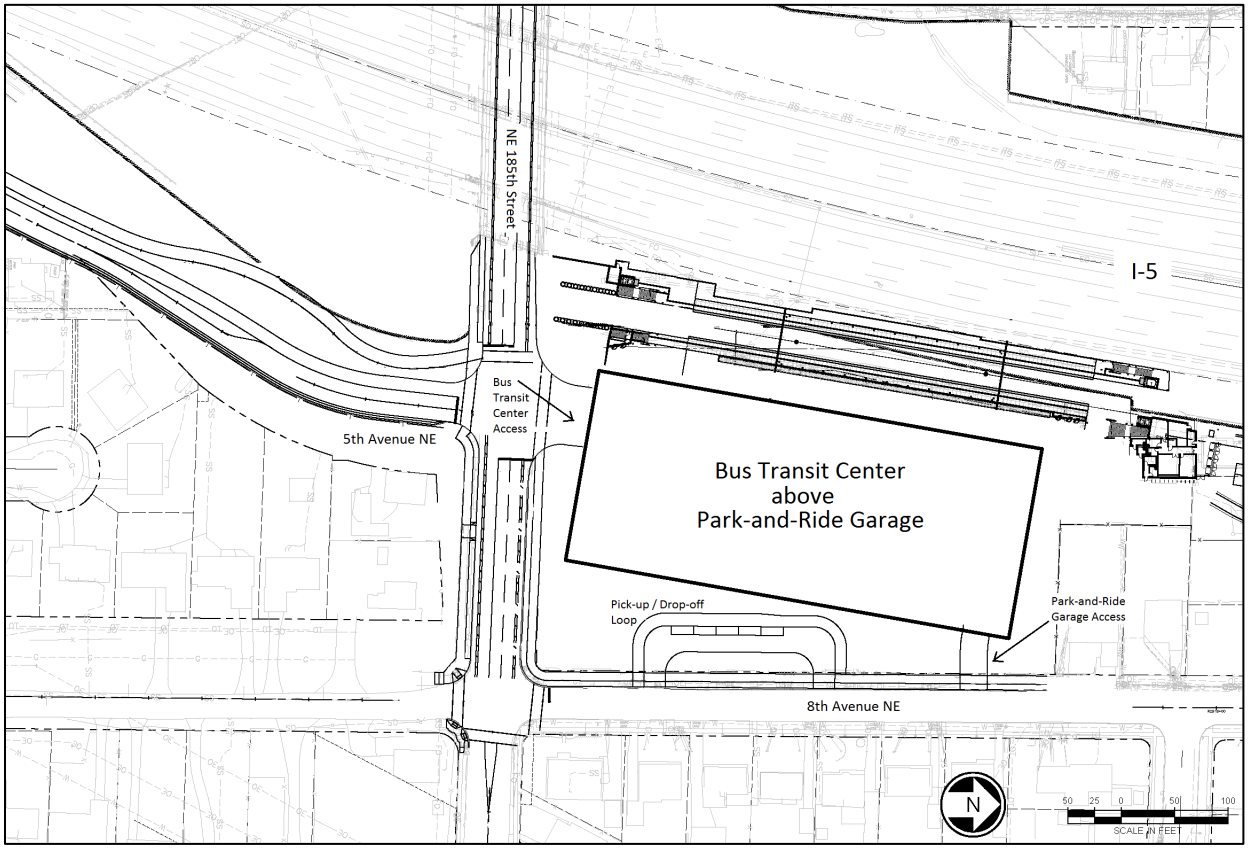
As described in the FEIS Transportation Technical Report (April 2015), Lynnwood Link Extension project-related traffic impacts are to be mitigated to meet local agency level of service standards. If an intersection exceeds the agency LOS standard without project related impacts, project mitigation is to maintain the no-build intersection average delay. Local agency LOS standards are shown in Table A-2a of the Transportation technical report. City of Shoreline standards are LOS D for signalized intersections and unsignalized intersecting arterials. City of Lynnwood standards are LOS E for City Center arterials, and LOS D for non-City Center arterials. WSDOT standards are LOS D for highways of statewide significance (HSS) and LOS E/mitigated for regionally significant state highways (non-HSS). The LOS E/mitigated standard means that mitigation measures should be enacted if delays exceed LOS E.

## Shoreline North/185th Station Traffic Analysis Update

### Site and Access Modifications

The final design configuration of the Shoreline North/185th Station (see Figure 1) includes bus transit center access at the NE 185th Street / 5th Avenue NE intersection east of I-5. Vehicular access to the park-and-ride garage and pick-up/drop-off loop will be on 8th Avenue NE north of NE 185th Street.

**Figure 1: Shoreline North/185th Station**
**Final Design Configuration**




- A three-lane basic cross-section is proposed for NE 185th Street, from east of 3rd Avenue NE to west of 9th Avenue NE. A center two-way-left-turn lane or left-turn pockets at intersections will be provided, with one lane in each direction for motorized traffic.
- Buffered bicycle lanes will be provided on NE 185th Street in both directions of travel.
- Widening of the segment of 5th Avenue NE west of I-5 would not be necessary with the parking garage on the east side of I-5. Bi-directional traffic volumes on 5th Avenue NE during the 2035 AM and PM peak hours would increase by 13% to 24% over no-build peak hour volumes but would remain under 300 vehicles per hour (vph). Revisions to the existing stop-sign control of 5th Avenue NE at its intersection with NE 185th Street west of I-5 would not be required, but the project will provide a two-way-left-turn lane at this intersection that can be used by motorists turning left from 5th Avenue NE to eastbound NE 185th Street.
- 5th Avenue NE east of I-5 will be realigned and reconstructed with a signalized intersection at NE 185th Street that will provide access to the bus transit center. Crosswalks will be provided on all four legs of the intersection.

- The existing two-lane cross-section on 8th Avenue NE will be retained to provide access to the park-and-ride garage and the pick-up/drop-off loop. A traffic signal or roundabout will replace the existing two-way stop control at the NE 185th Street / 8th Avenue NE intersection to meet the City of Shoreline level of service standard.

The FEIS preferred alternative included a park-and-ride garage on the west side of I-5, with access from 5th Avenue NE (west), and a shared bus transit / pick-up/drop-off loop at the NE 185th Street / 5th Avenue NE (east) intersection. The proposed traffic control was stop control on the north leg of 5th Avenue NE, west of I-5, and a traffic signal at the NE 185th Street / 5th Avenue NE intersection, east of I-5. The sidewalk on the north side of NE 185th Street on the bridge over I-5 was proposed to be widened to facilitate the movement of patrons between the park-and-ride garage and the light rail station.

## Traffic Analysis Update Results

Intersection delay and level of service values for the 2035 AM and PM peak hours are shown in Table 2. The five intersections included in this analysis are: NE 185th Street / 5th Avenue NE (west of I-5), Parking Garage Driveway / 5th Avenue NE (FEIS Preferred only), NE 185th Street / 5th Avenue NE (east of I-5), NE 185th Street / 8th Avenue NE, Pick-up/Drop-off Loop / 8th Avenue NE (final design only) and Park-and-Ride Garage Driveway / 8th Avenue NE (final design only). AM peak hour analysis was not performed for the FEIS preferred alternative at these intersections.

**Table 2: Shoreline North/185th Station**
**Comparison of FEIS and Final Design Station Configuration Intersection Levels of Service**

| Intersection | 2035 AM Peak Hour Intersection Delay (sec/veh) / Level of Service | | 2035 PM Peak Hour Intersection Delay (sec/veh) / Level of Service | |
|---|---|---|---|---|
| | FEIS Preferred Alt.[4] | Final Design Config. | FEIS Preferred Alt. | Final Design Config. |
| NE 185th St / 5th Ave NE (west)[1] | -- | 17 / C | 18 / C | 21 / C |
| Garage Driveway / 5th Avenue NE[1] | -- | -- | 12 / B | -- |
| NE 185th St / 5th Ave NE (east) / Bus Transit Center[2] | -- | 18 / B | 10 / A | 19 / B |
| NE 185th St / 8th Ave NE[1] | -- | 29 / D | 15 / C | 49 / E |
| Pick-up/Drop-off Loop / 8th Ave NE[1] | | 9 / A | -- | 10 / A |
| Park-and-Ride Garage Driveway / 8th Ave NE[1] | -- | 9 / A | -- | 9 / A |

Notes:
1) Unsignalized intersection control
2) Signalized intersection control
3) FEIS Preferred Alternative intersection LOS values reported from the Transportation Technical Report, Appendix C.
4) AM peak hour analysis was not performed for the FEIS preferred alternative at these intersections.

The analysis results in Table 2 show that all intersections in the Shoreline North/185th station area would meet the City of Shoreline level of service standard (LOS D or better) except the intersection of NE 185th Street / 8th Avenue NE. Under stop control in the 2035 PM peak hour, delays on the north

and south legs of this intersection would exceed the LOS D threshold for unsignalized arterial intersections. In the 2035 PM peak hour, average queues on the north leg of 8th Avenue NE would spillback to the pick-up/drop-off loop driveways, and 95th percentile queues would spillback to the park-and-ride garage driveway, affecting the operation of these facilities.

A traffic signal and a roundabout were evaluated at the NE 185th Street / 8th Avenue NE intersection. 2035 PM peak hour delays would be reduced with either a traffic signal or a roundabout, resulting in LOS B with a traffic signal, or LOS A with a roundabout.

Average speeds on NE 185th Street between 5th Avenue NE and 8th Avenue NE, from the SimTraffic arterial level of service report, show that in the 2035 PM peak hour:

- stop control on the north-south legs of 8th Avenue would result in 17 mph average speeds on NE 185th Street,
- traffic signal control at 8th Avenue NE would result in average speeds of 14 mph, and
- a roundabout at 8th Avenue NE would result in average speeds of 13 mph.

Average and 95th percentile queue lengths on 8th Avenue NE and on NE 185th Street, from the SimTraffic queuing and blocking report for the 2035 PM peak hour are shown in Table 3.

**Table 3: Shoreline North/185th Station**
**Comparison of 2035 PM Peak Hour Queue Lengths (ft) for 8th Avenue NE / NE 185th Street Intersection Control Options**

| | Stop Control | | Traffic Signal | | Roundabout | |
|---|---|---|---|---|---|---|
| **Intersection Movement** | **Avg** | **95th** | **Avg** | **95th** | **Avg** | **95th** |
| SB 8th Ave at 185th Street | 250[1] | 435[2] | 95 | 215[2] | 60 | 150[2] |
| EB 185th Street at 8th Ave | 45 | 125 | 95 | 215 | 95 | 185 |
| WB 185th Street at 5th Ave | 135 | 235 | 130 | 235 | 135 | 350[2] |

Note 1) average queue length exceeds available storage space, and average queue length from the upstream intersection is added
Note 2) 95th percentile queue length exceeds available storage space, and 95th percentile queue length from the upstream intersection is added.

The block length of 8th Avenue NE between NE 185th Street and the pick-up/drop-off loop would be 140 feet with stop control or traffic signal control, and 120 feet with a roundabout. The average and 95th percentile queue length on southbound 8th Avenue NE would exceed the block length with stop control during the PM peak hour. The 95th percentile queue length on southbound 8th Avenue NE would exceed the block length with traffic signal or roundabout control during the PM peak hour.

The block length of NE 185th Street between 5th Avenue NE and 8th Avenue NE would be 240 feet with stop control or traffic signal control, and 215 feet with a roundabout. The 95th percentile queue length on westbound NE 185th Street would exceed the block length with roundabout control during the PM peak hour.

A traffic signal or a roundabout would address the design year intersection level of service deficiency at the NE 185th Street / 8th Avenue NE intersection. The roundabout option would result in shorter queue lengths on the north leg of 8th Avenue NE, compared to a traffic signal. A traffic signal or roundabout would have similar average speeds on NE 185th Street between 5th Avenue NE and 8th Avenue NE.

Determination of the preferred intersection control at NE 185th Street / 8th Avenue NE will also include an evaluation of right-of-way and utility relocation impacts.

Intersection LOS at NE 185th Street / 5th Avenue NE (west of I-5) would be LOS C in the 2035 AM and PM peak hours with all station configurations. PM peak hour intersection delay is higher in the final design configuration because a single southbound lane is provided. A southbound right-turn lane was included in the FEIS preferred alternative to accommodate higher traffic volumes associated with the parking garage located on 5th Avenue NE just north of this intersection.

The NE 185th Street / 5th Avenue NE / Bus Transit Center intersection (east of I-5) would operate at LOS B in the final design configuration, during the design year weekday AM and PM peak hours. The FEIS preferred alternative reported LOS A.

## Lynnwood City Center Station Traffic Analysis Update

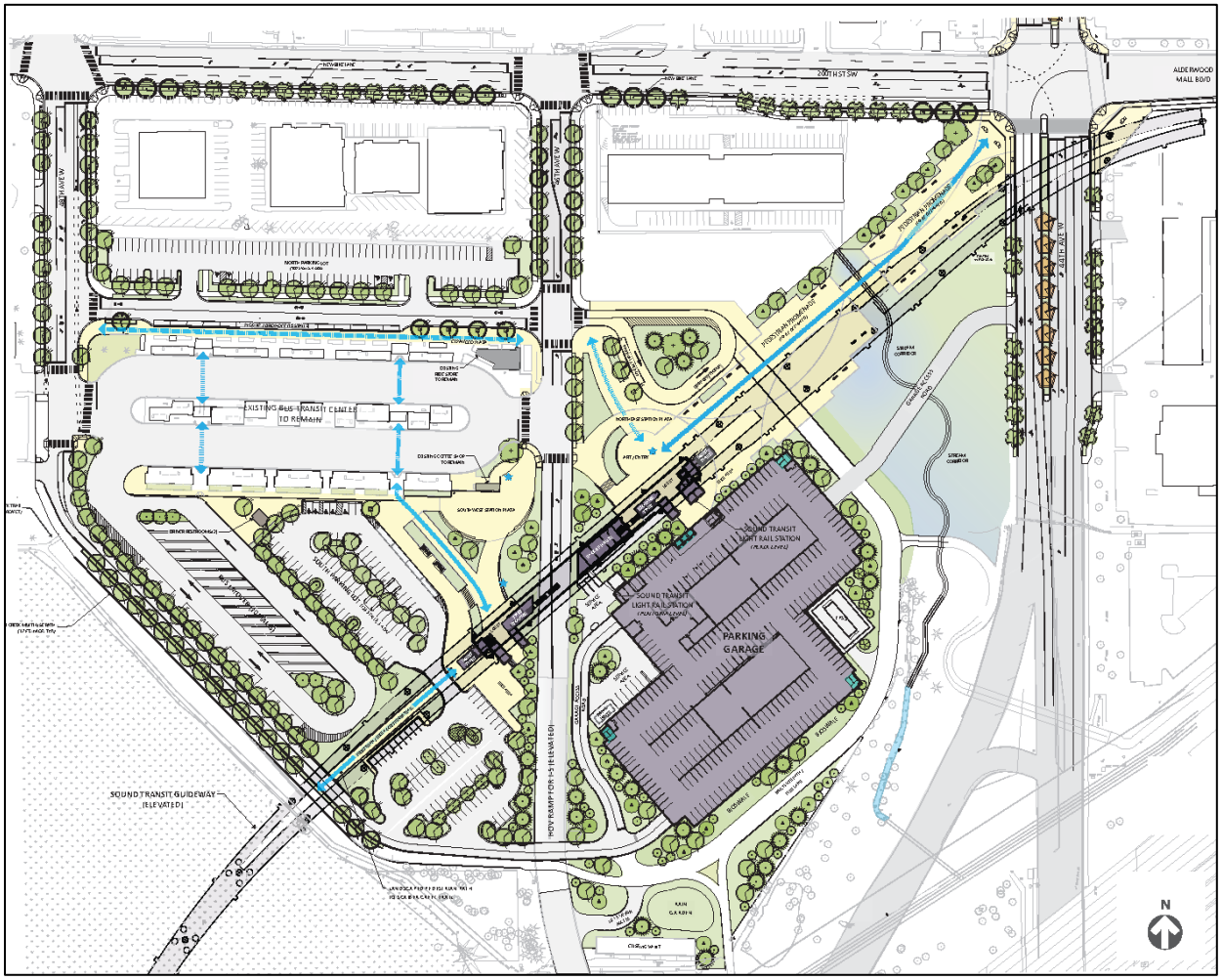
### Station Site Circulation and Access & Bus Service Revisions

The final design configuration of the Lynnwood City Center Station (see Figure 2) provides the following vehicular circulation and access provisions:

- Park-and-ride garage access from 200th Street SW via 48th Avenue W, and from 44th Avenue W via a right-in/right-out driveway south of 200th Street SW.
- Surface parking lot and pick-up/drop-off access from 200th Street SW via 46th and 48th Avenues W, and from 202nd Street SW.
- Bus transit center access from 200th Street SW via 46th Avenue W and 48th Avenue W, and from the I-5 HOV Direct Access Ramps that connect to 46th Avenue W.

46th Avenue W will be open to all traffic between 200th Street SW and 202nd Street SW. It will be restricted to eligible HOV traffic (transit, vanpools, carpools, and motorcycles) between 202nd Street SW and the I-5 transit/HOV direct access ramp.

**Figure 2: Lynnwood City Center Station**
**Final Design Configuration**




Bus transit layover facilities will include 20 spaces in the final design configuration, accessible from the bus transit loop. The FEIS preferred alternative included 9 spaces. The Lynnwood City Center Station traffic analysis has been updated to reflect higher volumes of bus transit vehicles serving the station, and the increased layover space and revised layover access provisions in the final design configuration.

## Traffic Analysis Update Results

A comparison of design year traffic operations with the FEIS preferred alternative and final design station configurations is included in Table 4. The results of the intersection operations analysis for the final design configuration reflect increased transit bus service relative to the FEIS preferred alternative, and associated increases in bus volumes on streets providing access to the Lynnwood City Center Station and associated bus transit facilities.

The roadway modifications identified in the FEIS preferred alternative conceptual plans were selected for this comparison to facilitate a direct comparison of intersection operations. These roadway modifications, which are depicted on Figure 2, include:

- Adding a second northbound to westbound left turn lane at the intersection of 44th Avenue W and 200th Street SW
- Extending the length of an existing eastbound to southbound right turn pocket at the intersection of 44th Avenue W and 200th Street SW
- Adding a second eastbound lane on 200th Street SW between 48th and 46th Avenues W
- Adding an eastbound bicycle lane on 200th Street SW between 48th and 44th Avenues W
- Adding a northbound right turn lane on 48th Avenue W between 202nd Street SW and 200th Street SW

The roadway modifications depicted on Figure 2 also include frontage improvements consistent with the guidance contained in the City of Lynnwood's City Center Streetscape Plan.

**Table 4: Lynnwood City Center Station**
**Comparison of FEIS and Final Design Station Configuration Intersection Levels of Service**

| Intersection | 2035 AM Peak Hour Intersection Delay (sec/veh) / Level of Service | | 2035 PM Peak Hour Intersection Delay (sec/veh) / Level of Service | |
|---|---|---|---|---|
| | FEIS Preferred Alt. | Final Design Config. | FEIS Preferred Alt. | Final Design Config. |
| 44th Avenue W / 200th Street SW | 65 / E | 62 / E | 55 / D | 54 / D |
| 46th Avenue W / 200th Street SW | 42 / D | 39 / D | 25 / C | 50 / D |
| 48th Avenue W / 200th Street SW | 64 / E | 56 / E | 60 / E | 62 / E |
| 50th Avenue W / 200th Street SW | 124 / F[1] | 35 / C[1] | 51 / D | 61 / E[2] |

Note: FEIS Preferred Alternative intersection LOS values reported from the Transportation Technical Report, Appendix C.
1) FEIS preferred alternative analysis did not include the northbound right-turn overlap phase described in the ROD Mitigation Plan. Final design analysis did include the northbound right-turn overlap phase. City of Lynnwood has implemented the right-turn overlap phasing.
2) Intersection operations improve to LOS D with additional mitigation at the 48th Avenue W / 200th Street SW intersection. Mitigation is not proposed at the 50th Avenue W / 200th Street SW intersection.

AM peak hour intersection operations in the final design station configuration would be improved compared to the FEIS preferred alternative, due to the addition of the 44th Avenue W parking garage driveway. In the PM peak hour, the operational benefits of the 44th Avenue W driveway to traffic operations on 200th Street SW at 46th and 48th Avenues W would be offset by higher bus volumes. All four of the intersections would meet City of Lynnwood level of service standards in the design year AM peak hour.

The analysis results in Table 4 show that during the design year PM peak hour, three of the four intersections in the Lynnwood City Center station area would meet the City of Lynnwood level of service standards (LOS D or better at 50th Avenue W / 200th Street SW, LOS E or better at 48th, 46th and 44th

Avenues W). The 50th Avenue W / 200th Street SW intersection would not meet the LOS D standard in the PM peak hour. Additional mitigation measures at the 48th Avenue W / 200th Street SW would improve intersection operations at the 50th Avenue W intersection by reducing eastbound vehicle queuing on 200th Street SW that would otherwise interfere with traffic operations at the 50th Avenue W intersection. Potential mitigation measures include, but are not limited to, eastbound and/or southbound right-turn lanes at the 48th Avenue W / 200th Street SW intersection as identified in the Record of Decision (ROD), and/or an additional westbound travel lane on 200th Street SW between 46th and 48th Avenues W. These potential additional mitigation measures would impact properties on the north and south sides of 200th Street SW at 48th Avenue W.

Additional mitigation measures to meet the level of service standard at the 50th Avenue W / 200th Street SW intersection, and to support other operational objectives identified by Sound Transit, the City, and other stakeholders including transit service operators, will be implemented consistent with language in the ROD: "Sound Transit would provide these improvements or other improvements as agreed to by the local jurisdictions" (page B-2 of Table B-1- Mitigation Plan, Lynnwood Record of Decision, FTA, July 2015). Determination of the specific set of roadway modifications on 200th Street SW between 44th Avenue W and 48th Avenue W, and on 44th Avenue W between 200th Street SW and I-5, is being supported by a sensitivity analysis of roadway modification alternatives that is being performed by Sound Transit in collaboration with the City of Lynnwood.

## 5th Avenue NE Closure and Detour Traffic Analysis

The FEIS evaluated a temporary closure of 5th Avenue NE between NE 125th Street and NE 145th Street. It has since been determined that a full closure of portions of 5th Avenue NE for several years will be necessary for construction of the elevated guideway that will be located between I-5 and 5th Avenue NE. The difference in elevation and steep grades between I-5 and 5th Avenue NE do not readily allow for construction activities to be conducted from the I-5 right-of-way. In addition, utilizing 5th Avenue NE as the primary construction access will reduce construction impacts on regional traffic on I-5, which experiences northbound traffic volumes exceeding 100,000 vehicles per day.

Local access will be maintained on 5th Avenue NE between NE 125th Street and NE 130th Street, with traffic allowed one-way northbound. Between NE 130th Street and NE 133rd Street, two-way local traffic will be allowed only for access to adjacent properties on the east side of 5th Avenue NE. Between NE 133rd Street and the northbound I-5 off-ramp to NE 145th Street, 5th Avenue NE will be closed to all traffic except construction and emergency vehicles. 5th Avenue NE does not provide access to any adjacent properties between approximately NE 133rd Street and NE 145th Street. The South Jackson Park Park-and-Ride on 5th Avenue NE at approximately NE 135th Street will also be closed during construction. The northbound I-5 off-ramps at NE 130th Street and NE 145th Street will remain open during construction. Short-term closures of these ramps will be necessary, and will be coordinated to minimize travel disruptions.

The Jackson Park Trail along the east side of 5th Avenue NE could remain open during construction to minimize pedestrian and bicycle detours.

Peak hour and 24-hour traffic counts were collected on 5th Avenue NE and potential detour routes (15th Avenue NE, 1st Avenue NE, Roosevelt Way NE and NE 145th Street) in November 2016 to determine the feasibility of a long-duration full closure of 5th Avenue NE.

The highest weekday volumes on 5th Avenue NE between 130th Street NE and 145th Street NE are 500 vph in the northbound direction (PM peak) and 300 vph in the southbound direction (AM peak). Weekend volumes do not exceed 350 vph in either direction.

Hourly traffic volume forecasts for traffic detoured from 5th Avenue NE were added to the estimated year 2020 traffic volumes on each potential detour route street to determine if these streets could accommodate detour traffic during the proposed closure of 5th Avenue NE. Figure 3, Figure 4, and Figure 5 show average midweek (Tuesday through Thursday) hourly traffic volume forecasts for the 2020 construction year on 15th Avenue NE, NE 145th Street and Roosevelt Way NE, respectively. Figure 6, Figure 7, and Figure 8 show weekend (Friday evening through Monday morning) hourly traffic volume forecasts. A 1,500 vph threshold line is shown on these figures to represent the available vehicle capacity on these arterial streets where two travel lanes are available in each direction.

Figure 3 and Figure 6 show that 15th Avenue NE could approach capacity during weekday peak hours, if all 5th Avenue NE traffic were to shift to 15th Avenue NE. Weekend detour traffic from 5th Avenue NE could be accommodated. 15th Avenue NE intersections at NE 125th Street and NE 145th Street could experience traffic demands exceeding capacity during weekday peak hours if all detoured traffic utilized this segment of 15th Avenue NE during weekday peak periods.

Figure 4 and Figure 7 indicate that NE 145th Street operates near capacity in the midweek and weekend peak periods, due to the volume plateaus at 1,000 vph and 1,200 vph in the westbound and eastbound directions. The signalized intersections on NE 145th Street at 5th Avenue NE and 15th Avenue NE limit the capacity of NE 145th Street. Because of congestion at these signalized intersections, NE 145th Street between 5th Avenue NE and 15th Avenue NE could experience traffic demands exceeding the capacity of NE 145th Street if all detoured traffic utilized this segment during peak periods.

Figure 5 and Figure 8 indicate that Roosevelt Way NE operates near capacity in the midweek and weekend peak periods, due to the volume plateaus at 800 vph in the westbound and eastbound directions. This lower capacity value is due to the single-lane segment of Roosevelt Way NE between 10th Avenue NE and 15th Avenue NE. The single lane capacity constraint indicates that Roosevelt Way NE could experience traffic demands exceeding its capacity if all detoured 5th Avenue NE traffic utilized this segment of Roosevelt Way NE during peak periods.

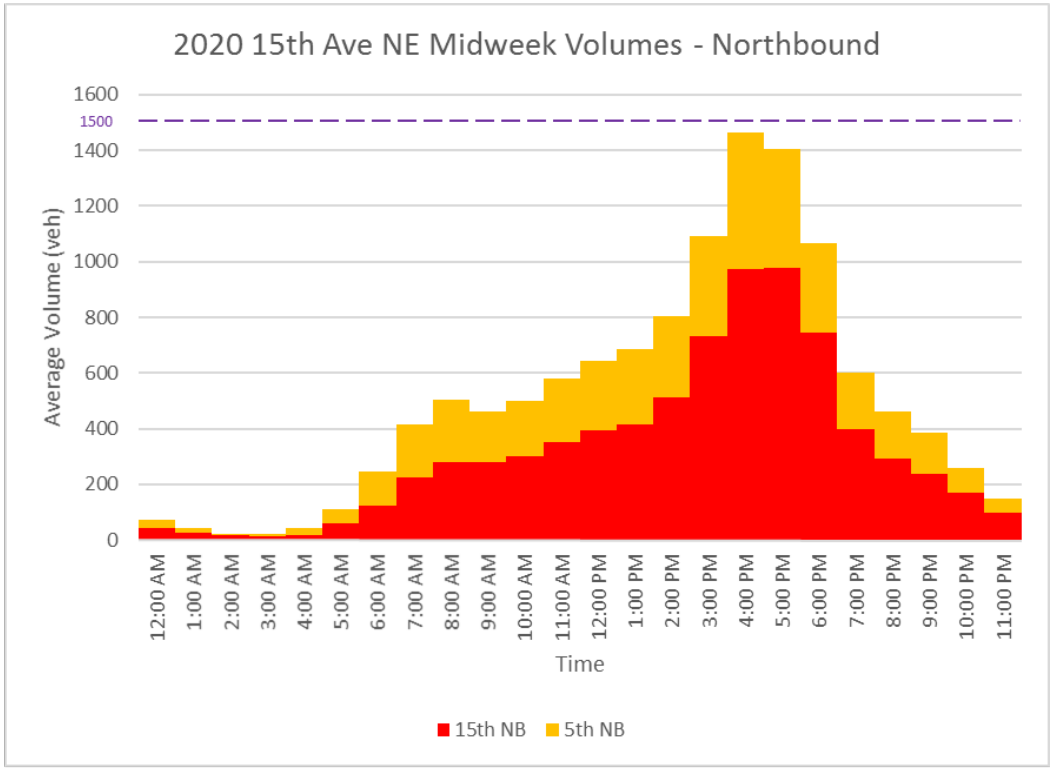
Because NE 145th Street and Roosevelt Way NE / NE 125th Street currently operate near capacity, and would not be likely to accommodate all of the motorists detouring from 5th Avenue, a public

information campaign will be needed to alert motorists to the closure of 5th Avenue and help motorists shift their travel route to 15th Avenue NE or 1st Avenue NE north of NE 145th Street and south of NE 125th Street.

The proposed alternative routes utilizing 15th Avenue NE and 1st Avenue NE would be able to accommodate motorists detouring from 5th Avenue NE. Travel patterns suggest that the majority of trips on 5th Avenue connect residences in Shoreline to Northgate or areas further south, so motorists would likely use east-west streets near their origin/destination to access 15th Avenue NE or 1st Avenue NE instead of traveling east-west on NE 145th Street and Roosevelt Way NE / NE 125th Street.

Synchro analysis of a wide-area shift in travel patterns from 5th Avenue NE to 15th Avenue NE is shown in Table 5.

**Figure 3: 15th Avenue NE Midweek Traffic Volumes**



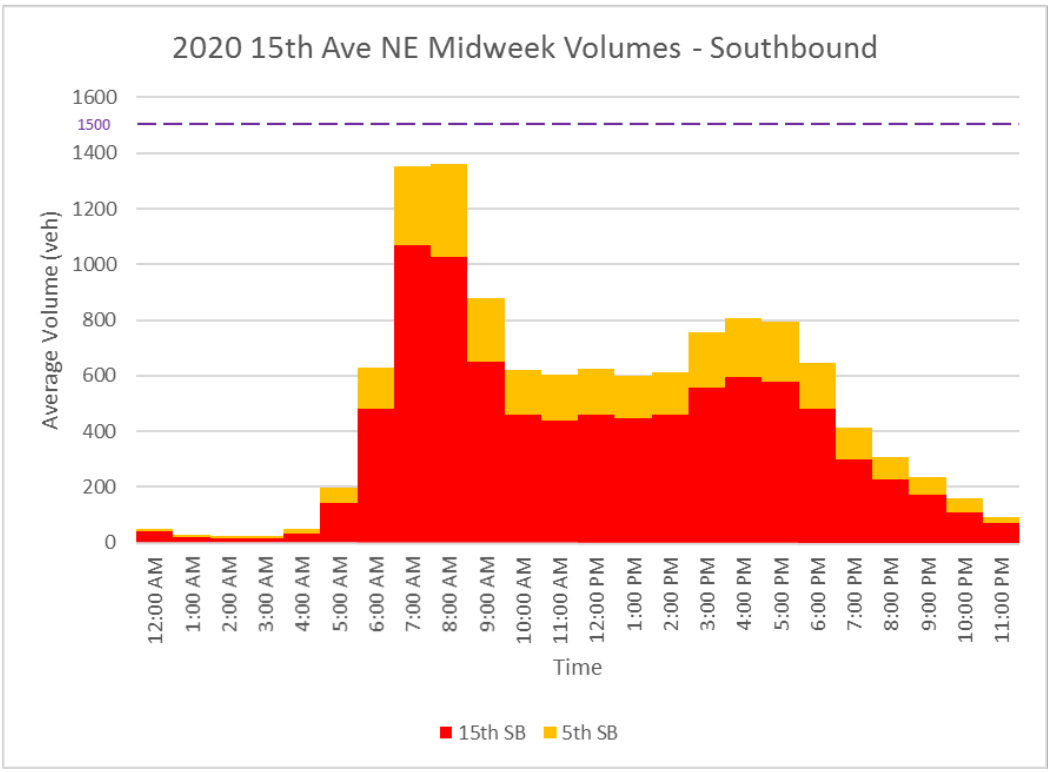
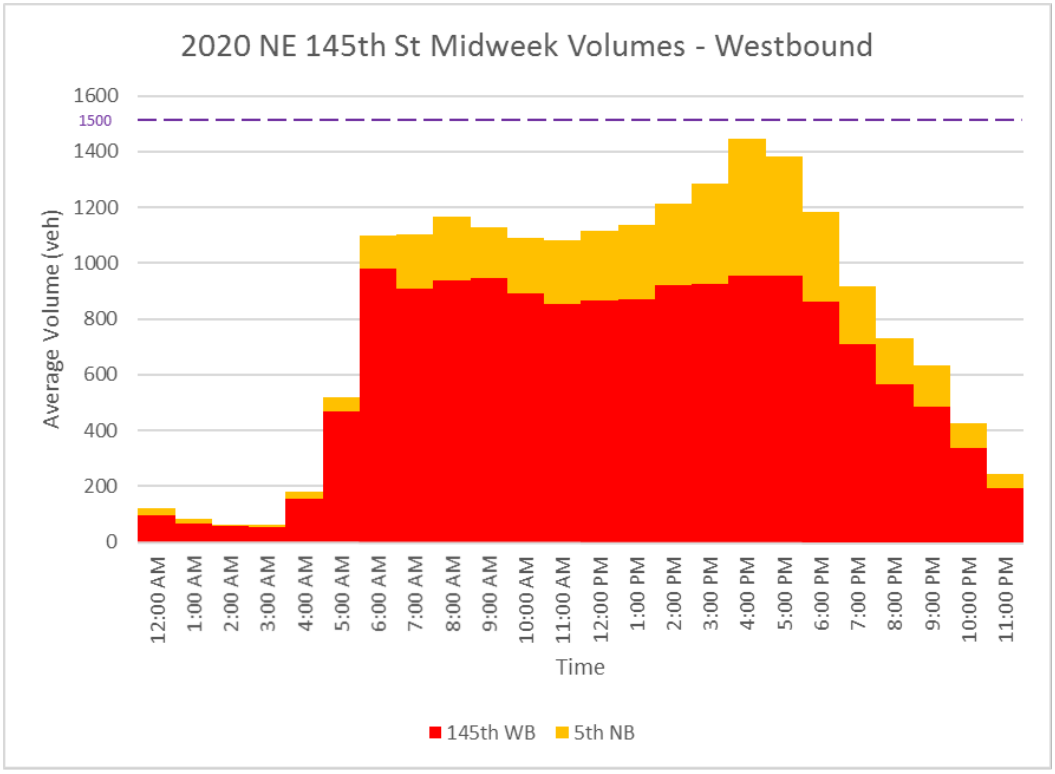



**Figure 4: NE 145th Street Midweek Traffic Volumes**



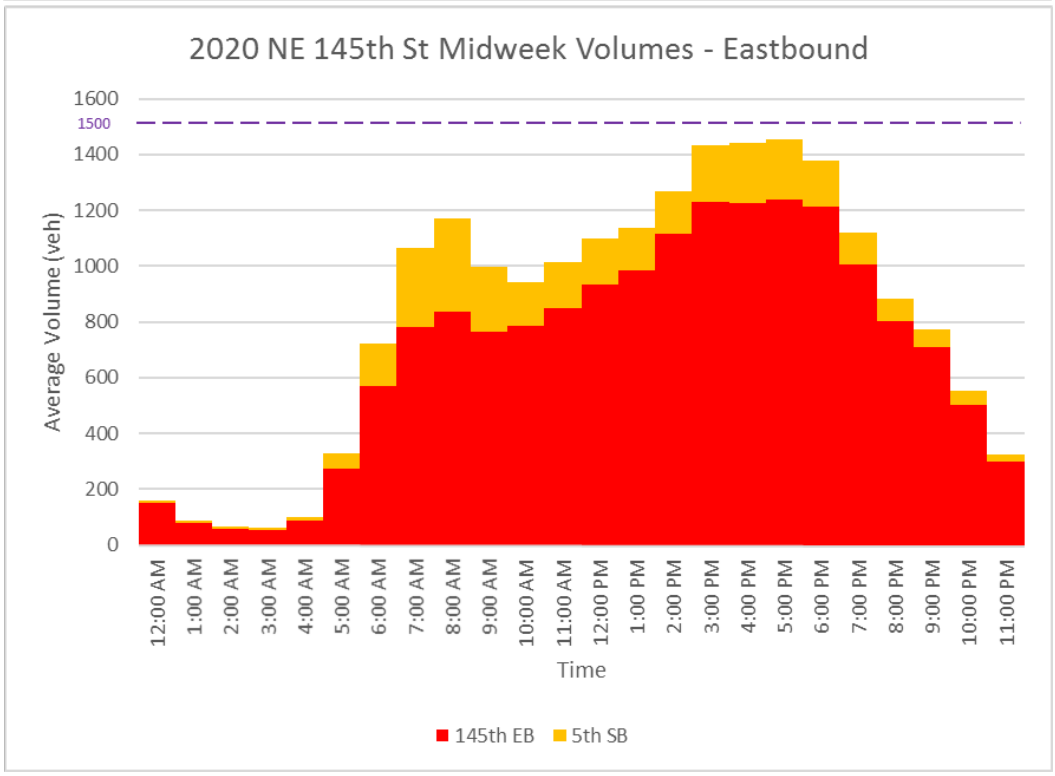
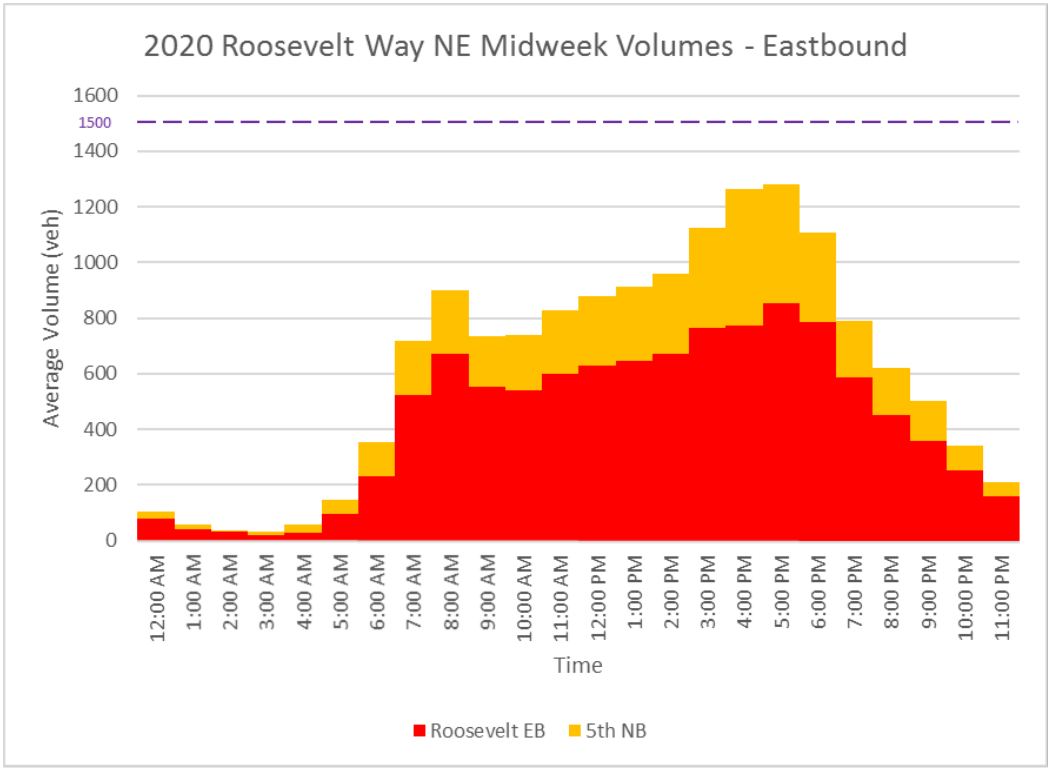



**Figure 5: Roosevelt Way NE Midweek Traffic Volumes**



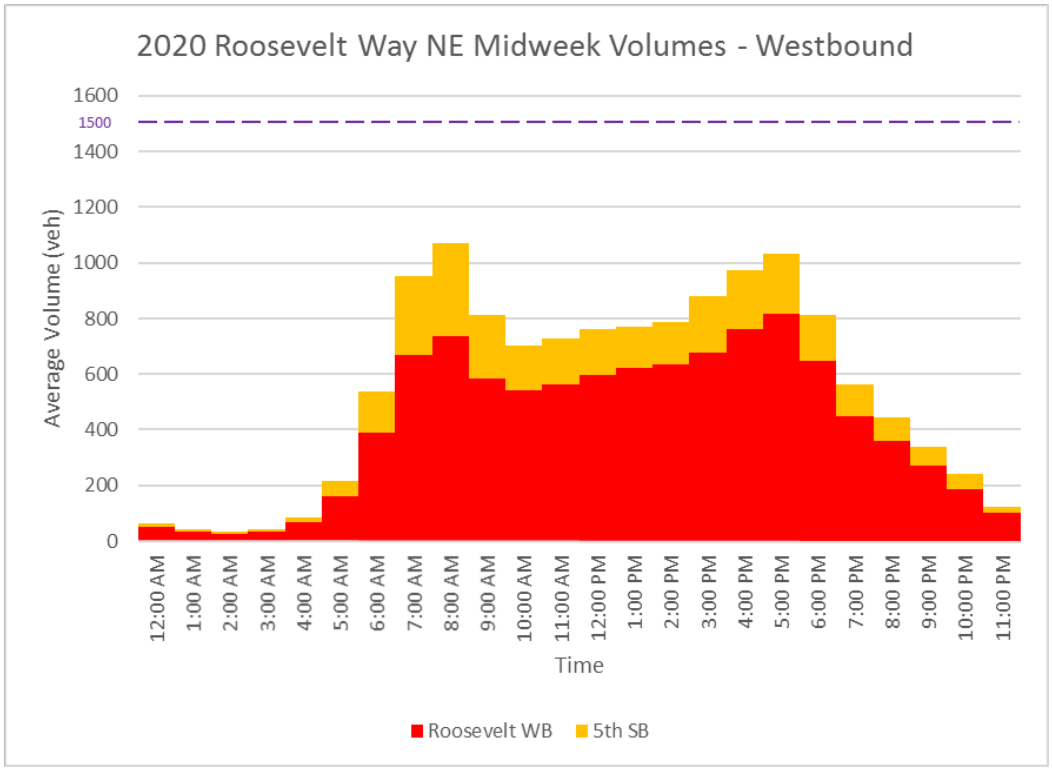
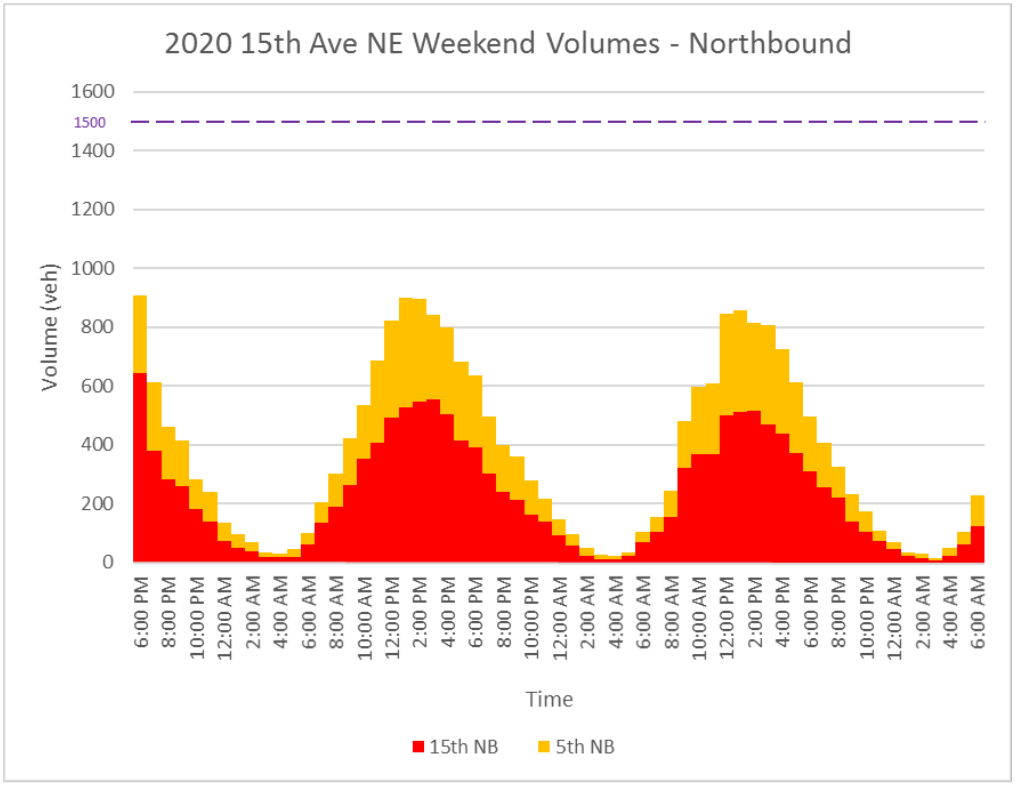



**Figure 6: 15th Avenue NE Weekend Traffic Volumes**



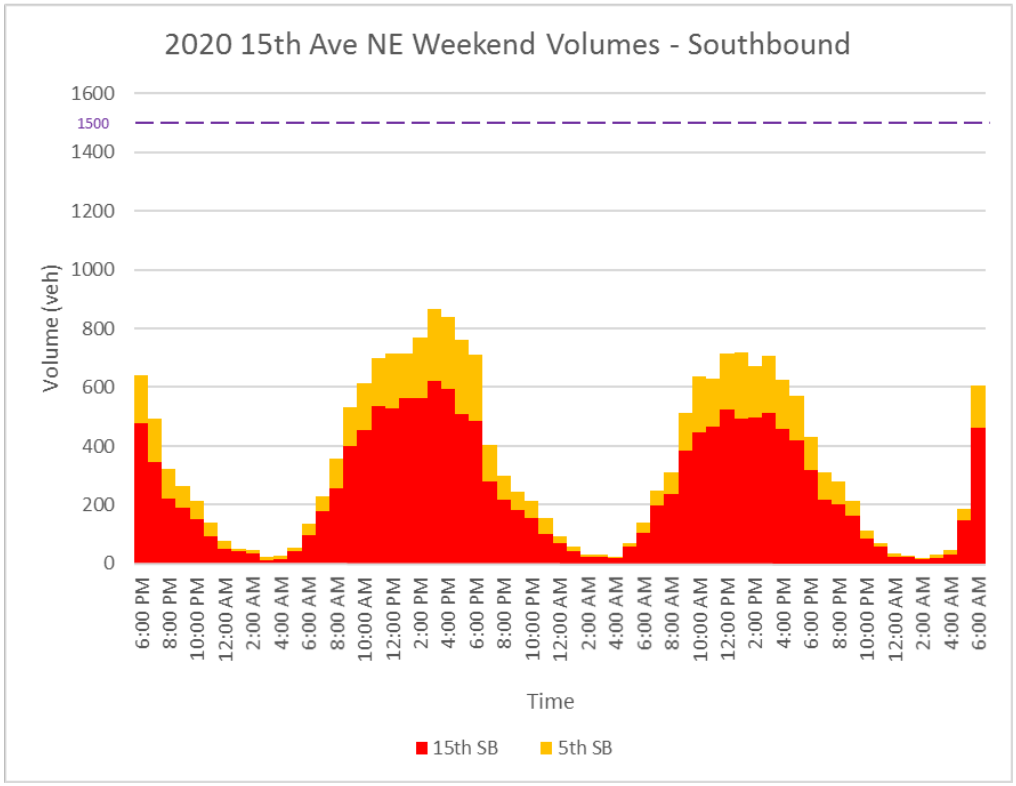



**Figure 7: NE 145th Street Weekend Traffic Volumes**

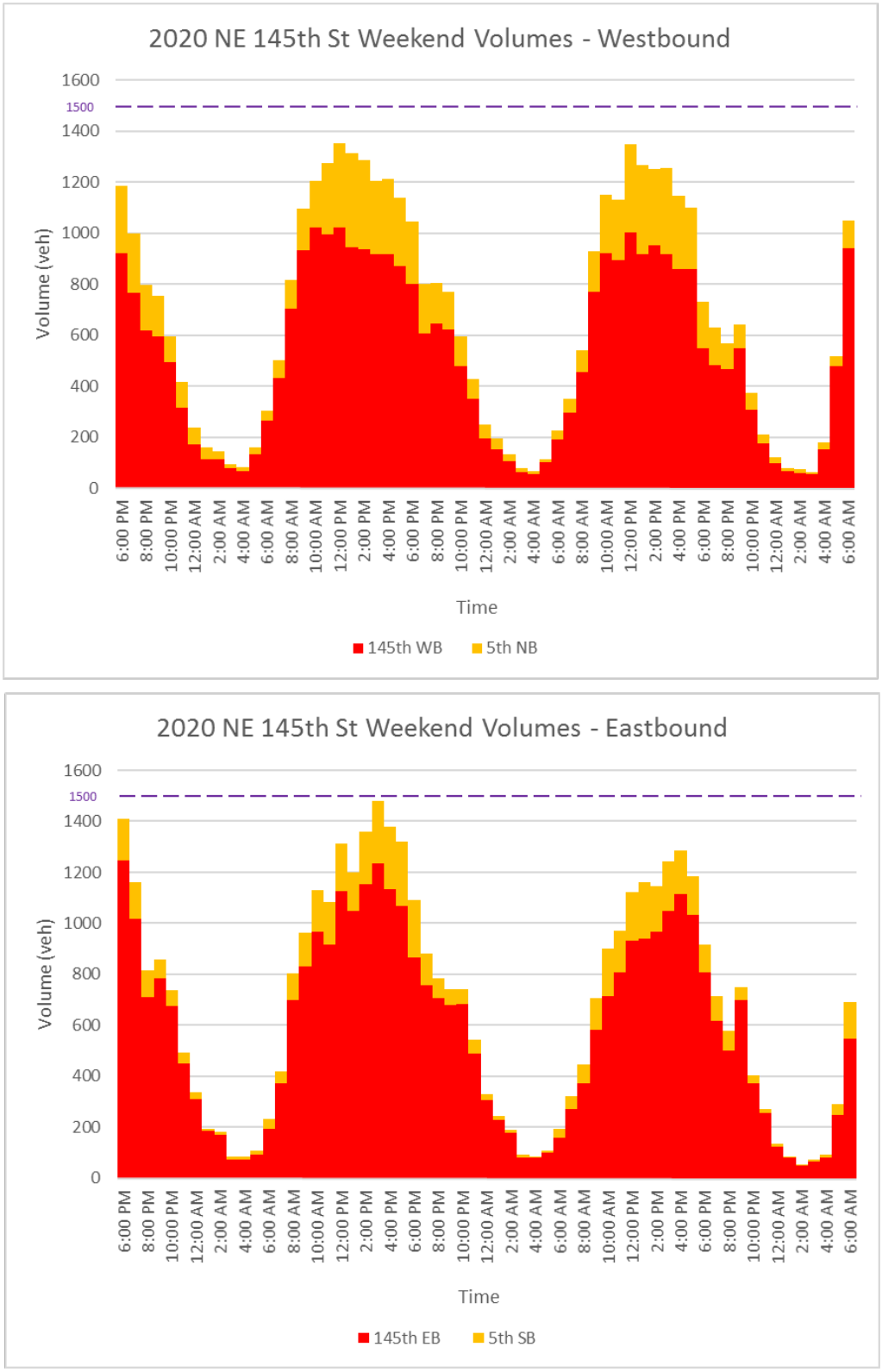
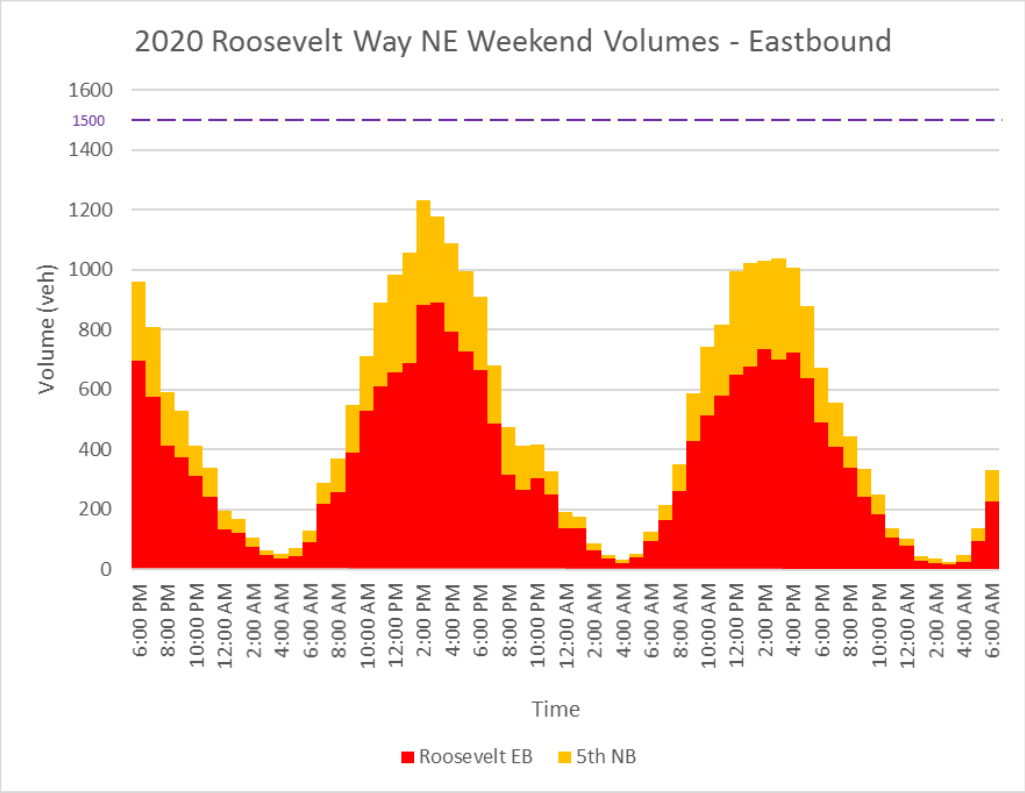
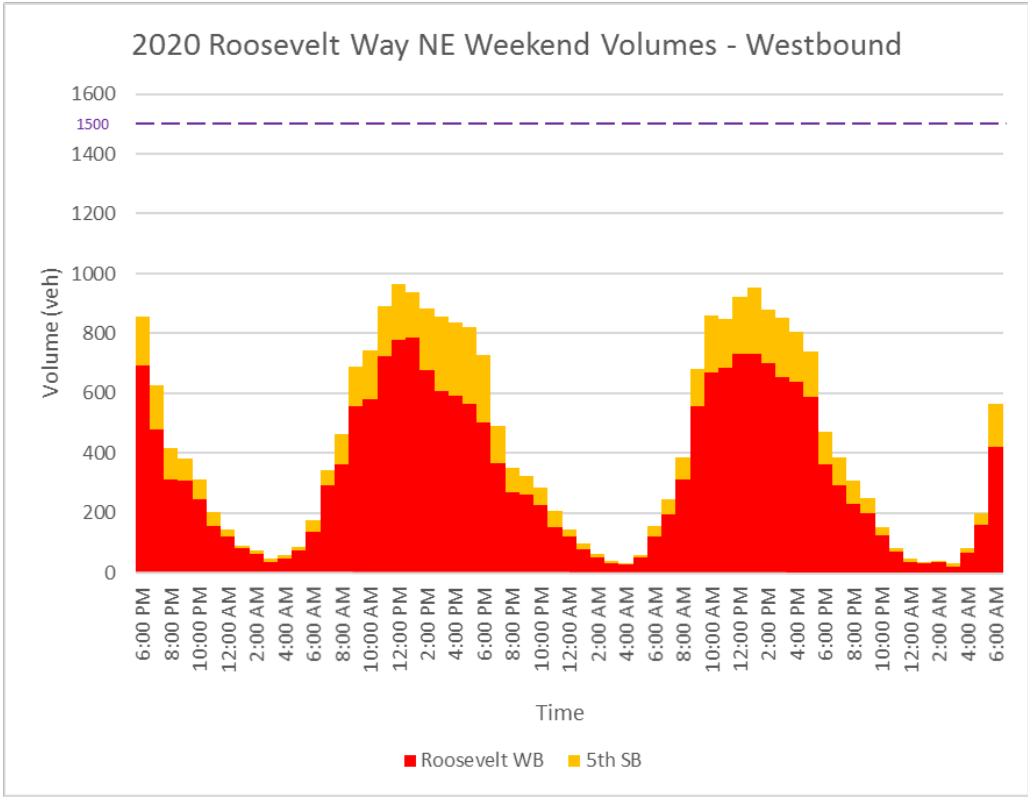


**Figure 8: Roosevelt Way NE Weekend Traffic Volumes**



With all 5th Avenue NE traffic shifting to 1st Avenue NE and 15th Avenue NE, via NE 125th Street/Roosevelt Way, NE 145th Street and other east-west streets in Seattle and Shoreline, intersection operations would be characterized as LOS E or better during construction in the area bounded by 1st Avenue NE, 15th Avenue NE, NE 145th Street and NE 125th Street. Baseline conditions would be characterized as LOS D or better.

**Table 5: 5th Avenue NE Closure Traffic Operations during Construction**

| Intersection | AM Peak Hour Delay / LOS | | PM Peak Hour Delay / LOS | |
|---|---|---|---|---|
| | Baseline | With 5th Ave Closure | Baseline | With 5th Ave Closure |
| 5th Avenue NE / NE 130th Street | 31 / C | 28 / C | 40 / D | 28 / C |
| 5th Avenue NE / NE 145th Street | 50 / D | 40 / D | 48 / D | 48 / D |
| 1st Avenue NE / NE 130th Street | 30 / C | 36 / D | 39 / D | 47 / D |
| 1st Avenue NE / NE 145th Street | 29 / C | 33 / C | 33 / C | 43 / D |
| 15th Avenue NE / NE 125th Street | 45 / D | 44 / D | 48 / D | 51 / D |
| 15th Avenue NE / NE 145th Street | 40 / D | 64 / E | 49 / D | 69 / E |

The intersection of 15th Avenue NE / NE 145th Street would see the most change in operations during the closure of 5th Avenue NE. This intersection would operate at LOS E in the AM and PM peak hours, compared to LOS D with 5th Avenue NE open to vehicle traffic. LOS E would be acceptable during the peak hours, per WSDOT level of service standards.

Traffic signal timing optimization would likely mitigate the higher traffic volumes on 15th Avenue NE and 1st Avenue NE during the closure of 5th Avenue NE. Other mitigation measures would include monitoring of traffic patterns during the closure to identify other intersections in the project vicinity in need of signal timing optimization, and a robust public information campaign to encourage motorists to use alternate routes.

## Summary

Traffic analysis updates for the Lynnwood Link Extension project have been performed in support of design refinements at the Shoreline North/185th Station and Lynnwood City Center Station, and in support of construction method refinements along 5th Avenue NE between NE 125th Street and NE 145th Street in Seattle.

The analysis results show that four of the five intersections in the Shoreline North/185th Station area would meet the City of Shoreline level of service standard. The NE 185th Street / 8th Avenue NE intersection would not meet the City of Shoreline level of service standard in the 2035 PM peak hour

with stop control. Additional mitigation measures at this intersection would consist of a traffic signal or a roundabout. Selection of a traffic signal or roundabout will be performed in consultation with the City of Shoreline and will be implemented by Sound Transit, consistent with language in the Record of Decision (ROD): "Sound Transit would provide these improvements or other improvements as agreed to by the local jurisdictions" (page B-2 of Table B-1- Mitigation Plan, Lynnwood Record of Decision, FTA, July 2015).

The analysis results show that three of the four intersections in the Lynnwood City Center station area would meet the City of Lynnwood level of service standards. The 50th Avenue W / 200th Street SW intersection would not meet the City's LOS D standard in the PM peak hour. Additional mitigation measures at the 48th Avenue W / 200th Street SW would improve operations at the 50th Avenue W intersection to meet the City level of service standard. Additional mitigation measures will be identified in consultation with the City of Lynnwood and will be implemented by Sound Transit, consistent with language in the ROD: "Sound Transit would provide these improvements or other improvements as agreed to by the local jurisdictions" (page B-2 of Table B-1- Mitigation Plan, Lynnwood Record of Decision, FTA, July 2015).

The analysis results show acceptable intersection operations during the full closure of 5th Avenue NE, with intersections along potential detour routes operating at LOS E or better during peak hours meeting WSDOT's level of service standard on NE 145th Street and SDOT's level of service goal at signalized intersections south of NE 145th Street. Mitigation measures associated with the closure of 5th Avenue NE would consist of traffic signal timing optimization along potential detour routes, monitoring of traffic patterns during the closure to identify other intersections in the project vicinity in need of signal timing optimization, and a robust public information campaign to encourage motorists to use alternate routes.

## Appendices

- Shoreline North/ 185th Station Final Design Configuration – Synchro Reports
- Lynnwood City Center Station Final Design Configuration – VISSIM Output
- 5th Avenue NE Closure Analysis – Synchro Reports

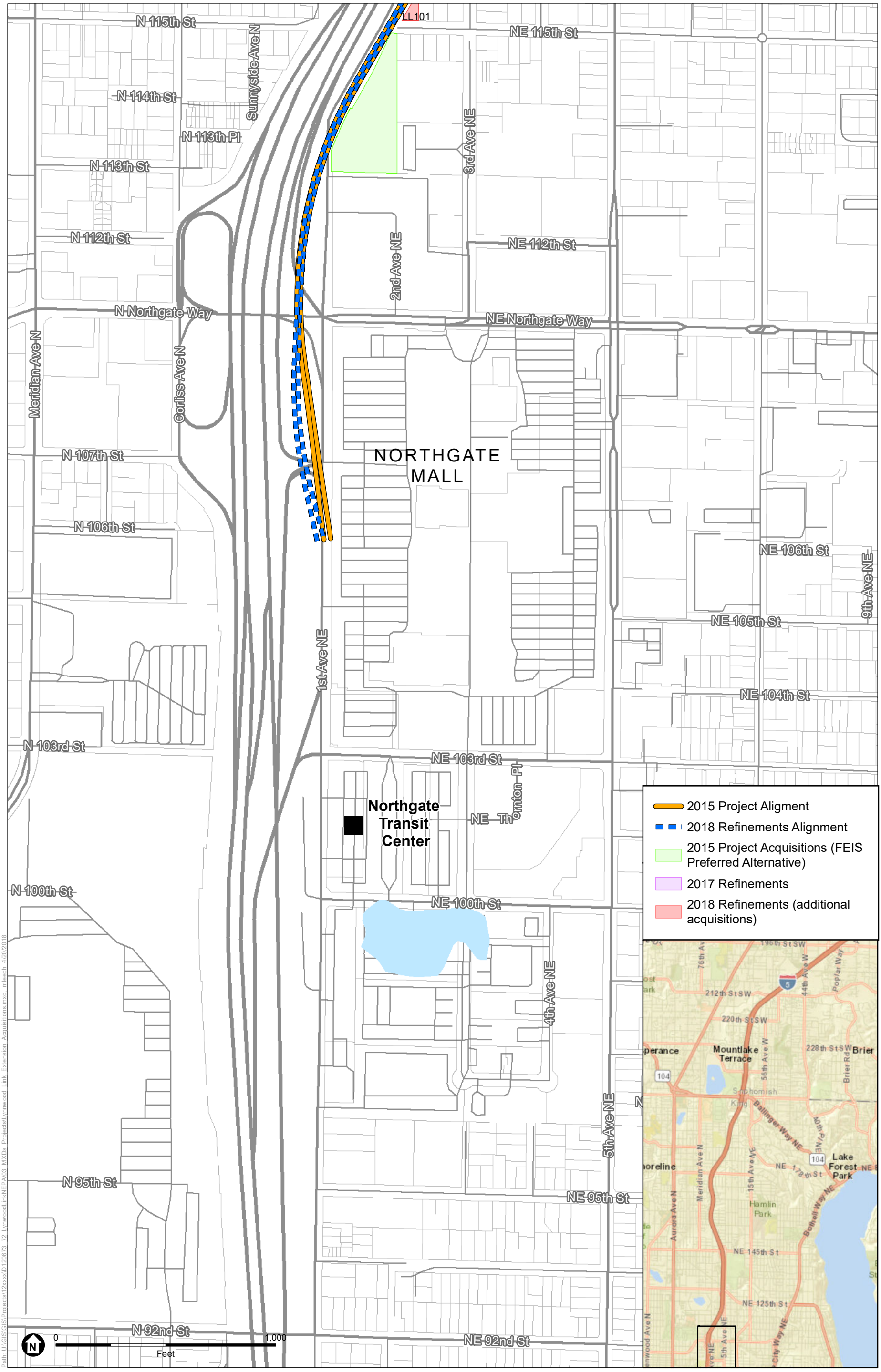
# Attachment B

# List of Additional Potential Acquisitions

This page intentionally left blank.

| ST ROW # | Taxlot ID | Owner | Site Address | City |
|---|---|---|---|---|
| LL-101 | 6411600161 | SCHARNIKOW DEBORAH | 136 NE 115TH ST | Seattle |
| LL-102 | 7810300035 | NIEDERMEYER DARCY M | 147 NE 116TH ST | Seattle |
| LL-146 | 1787600090 | NORTH SEATTLE CHURCH OF | 13126 5th Ave NE | Seattle |
| LL-180.1 | 2111600040 | PYPER J BRUCE+TERESA K | 114 NE 161ST ST | Shoreline |
| LL-180.2 | 2111600035 | PEW DAVID A+KAITLYN A | 122 NE 161ST ST | Shoreline |
| LL-221.4 | 1115100112 | COLELLO DOUGLAS F | 333 NE 180TH ST | Shoreline |
| LL-222.1 | 1115100110 | HEADINGS ALICE E | 331 NE 180TH ST | Shoreline |
| LL-247.1 | 3235100270 | LAMA NYIMA C+DOLKAR TSERING | 18504 8TH AVE NE | Shoreline |
| LL-259.1 | 0526049025 | PRANGER STEPHEN W+CATHERINE | 18547 8TH AVE NE | Shoreline |
| LL-268.4 | 3971700551 | KING COUNTY-PROPERTY SVCS | NA | Shoreline |
| LL-268.7 | 3971700540 | LYNCH LESLIE K | NA | Shoreline |
| LL-272 | 00524100001500 | FLEMING FAMILY LOVING TRUST | 23506 59TH PL W | Mountlake Terrace |
| LL-272.1 | 00524100001400 | TAYLOR JAMES L | 23504 59TH PL W | Mountlake Terrace |
| LL-272.2 | 00524100001300 | BELAIR RONALD H & SHANNON L | 23502 59TH PL W | Mountlake Terrace |
| LL-272.4 | 00524100001200 | VIERRA KANOE C | 23501 59TH PL W | Mountlake Terrace |
| LL-272.5 | 00524100001100 | TURNER DAVID | 23503 59TH PL W | Mountlake Terrace |
| LL-272.6 | 00524100001000 | KOCH KARL / SYMON JESSIE | 23505 59TH PL W | Mountlake Terrace |
| LL-272.7 | 00524100000900 | GRAND LOUANNE C | 23507 59TH PL W | Mountlake Terrace |
| LL-272.8 | 00524100000800 | MERCADO SOLEDAD & FRANCISCO | 23509 59TH PL W | Mountlake Terrace |
| LL-273.7 | 00522000302300 | DAVIES ALLEN L & KRYSTYNA | 23112 61ST AVE W | Mountlake Terrace |
| LL-274 | 00524000000500 | DRAAYER DAPHNE & VANESSA | 6101 227TH ST SW | Mountlake Terrace |
| LL-275.1 | 00524000004900 | MACKAY JOHN | 22305 62ND AVE W | Mountlake Terrace |
| LL-275.2 | 00524000005000 | MACKAY ANELIA A & JOHN C | NA | Mountlake Terrace |
| LL-289 | 27042800202100 | SNOHOMISH CO PROP MGMT | NA | Mountlake Terrace |
| LL-291 | 00462601501000 | SURFACE NICOLE STACIA | NA | Lynnwood |
| LL-292 | 00462601500700 | SURFACE NICOLE STACIA | 21031 54TH AVE W | Lynnwood |
| LL-300.1 | 00462600400100 | FORD, ETHAN & HAYLE | 20406 52ND AVE W | Lynnwood |
| LL-300.2 | 00412000000400 | GRAHAM, ELIZABETH A & KELLY | 5207 204th St SW | Lynnwood |
| LL-312 | 00682500000000 | Cedar Creek Condominium | 4920 200th St SW | Lynnwood |
| LL-314.1 | 00608400200401 | LYNNWOOD BEAVER CREEK LLC | 4807 200TH ST SW | Lynnwood |
| LL-315.1 | 00372600600600 | 4711 200TH STREET LLC | 4727 200TH ST SW | Lynnwood |
| LL-316.1 | 00372600601405 | MSB PROPERTIES | 4601 200TH ST SW | Lynnwood |
| LL-317 | 00372600601404 | YOURIST HARRY R & ROSALIE H | 19930 44TH AVE W | Lynnwood |
| LL-318 | 00372600601403 | WSDOT | NA | Lynnwood |
| LL-319 | 00372600702001 | FUETTE VALERIE | 19929 44TH AVE W | Lynnwood |

This page intentionally left blank.



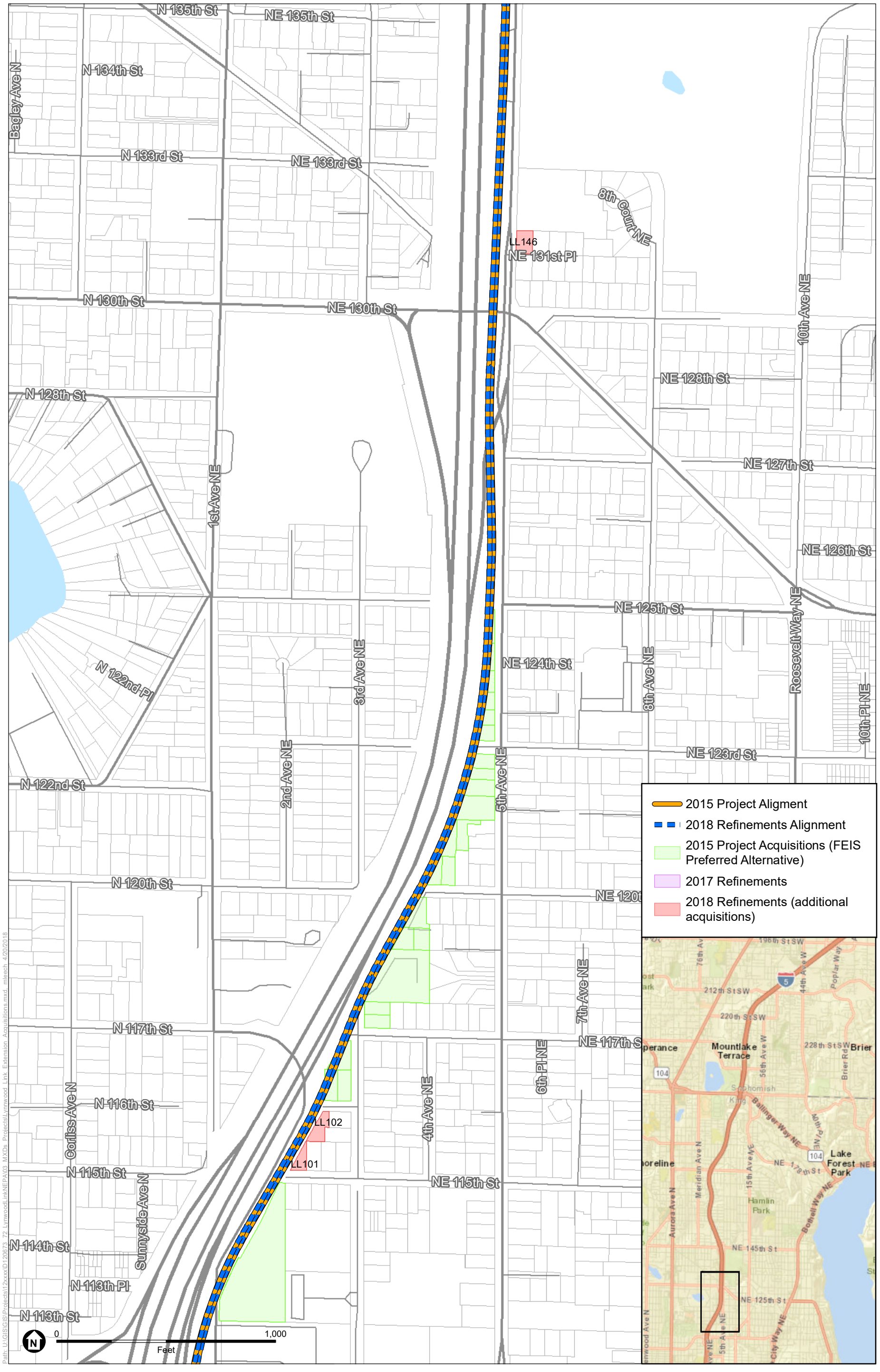

SOURCE: Open Street Map, 2016; King Co, 2016; ESA, 2018

This map does not indicate whether affected properties are a full or partial property acquisition.

D120673.Lynwood Link NEPA

**Figure 1 - Pg. 1**
Lynnwood Link Extension Acquisitions

ESA



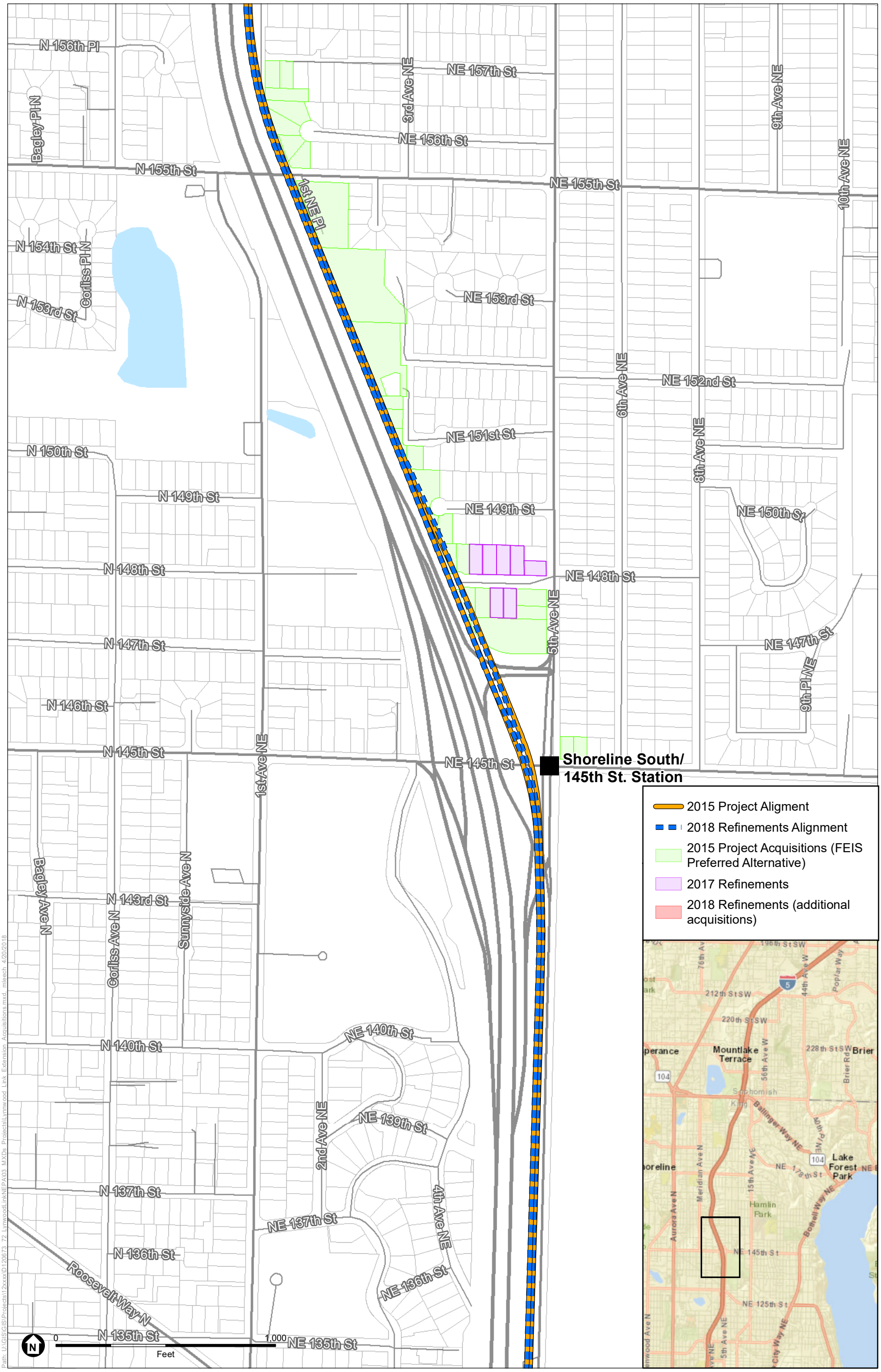

SOURCE: Open Street Map, 2016; King Co, 2016; ESA, 2018

This map does not indicate whether affected properties are a full or partial property acquisition.

D120673.Lynwood Link NEPA

**Figure 1 - Pg. 2**
Lynnwood Link Extension Acquisitions

ESA



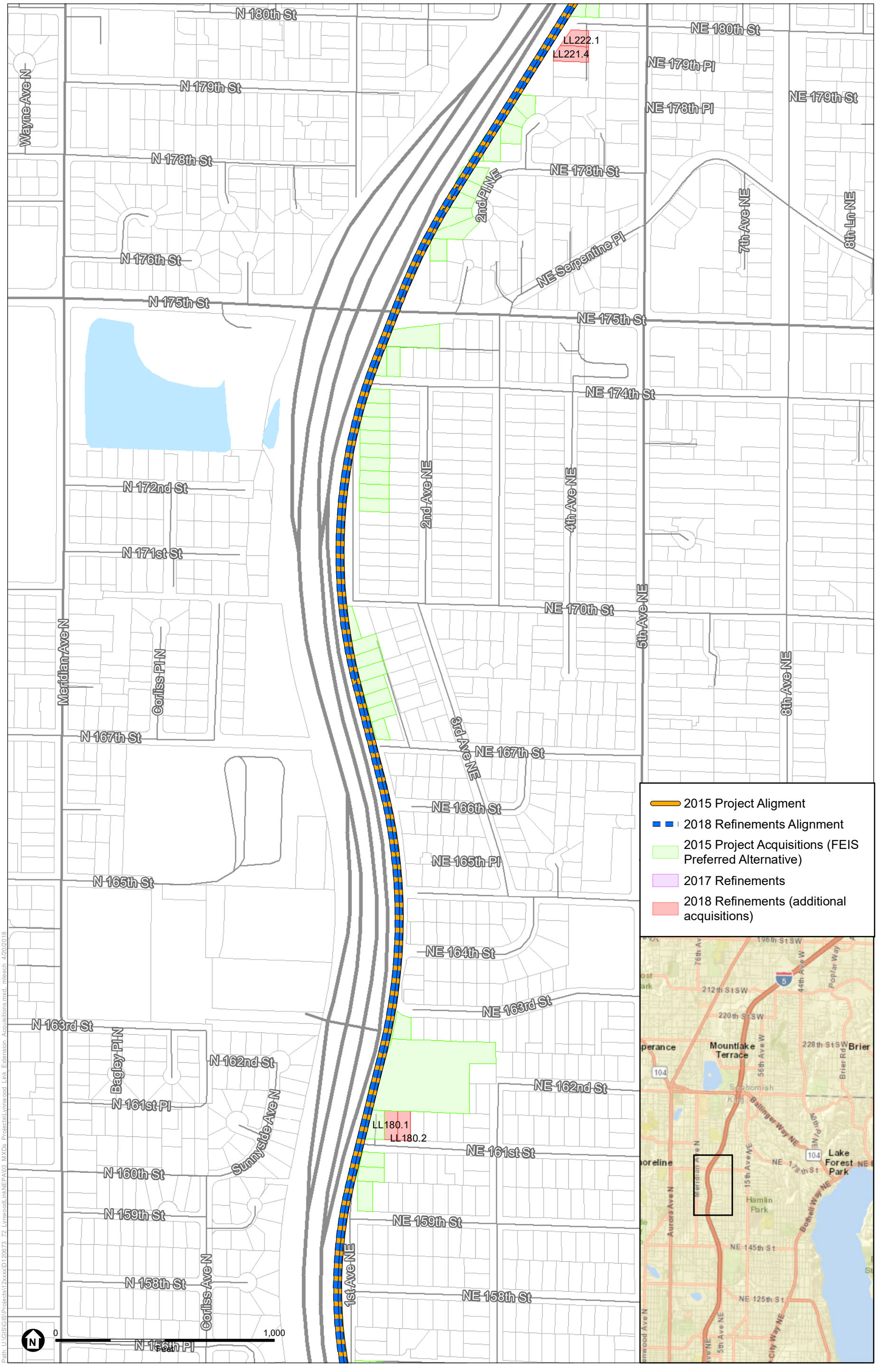

SOURCE: Open Street Map, 2016; King Co, 2016; ESA, 2018

This map does not indicate whether affected properties are a full or partial property acquisition.

D120673.Lynwood Link NEPA

**Figure 1 - Pg. 3**
Lynnwood Link Extension Acquisitions

ESA



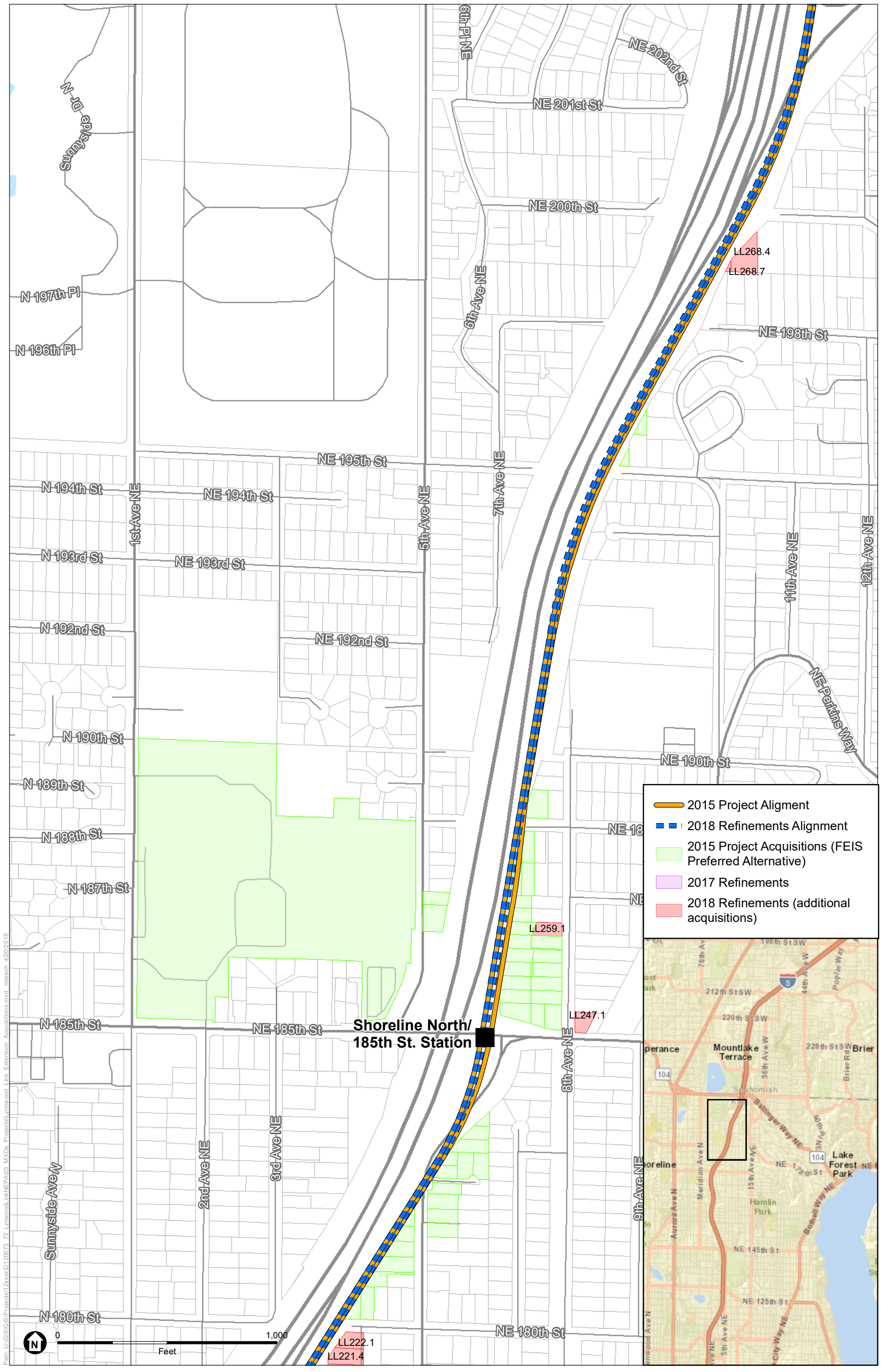

SOURCE: Open Street Map, 2016; King Co, 2016; ESA, 2018

This map does not indicate whether affected properties are a full or partial property acquisition.

D120673.Lynwood Link NEPA

**Figure 1 - Pg. 4**
Lynnwood Link Extension Acquisitions

ESA



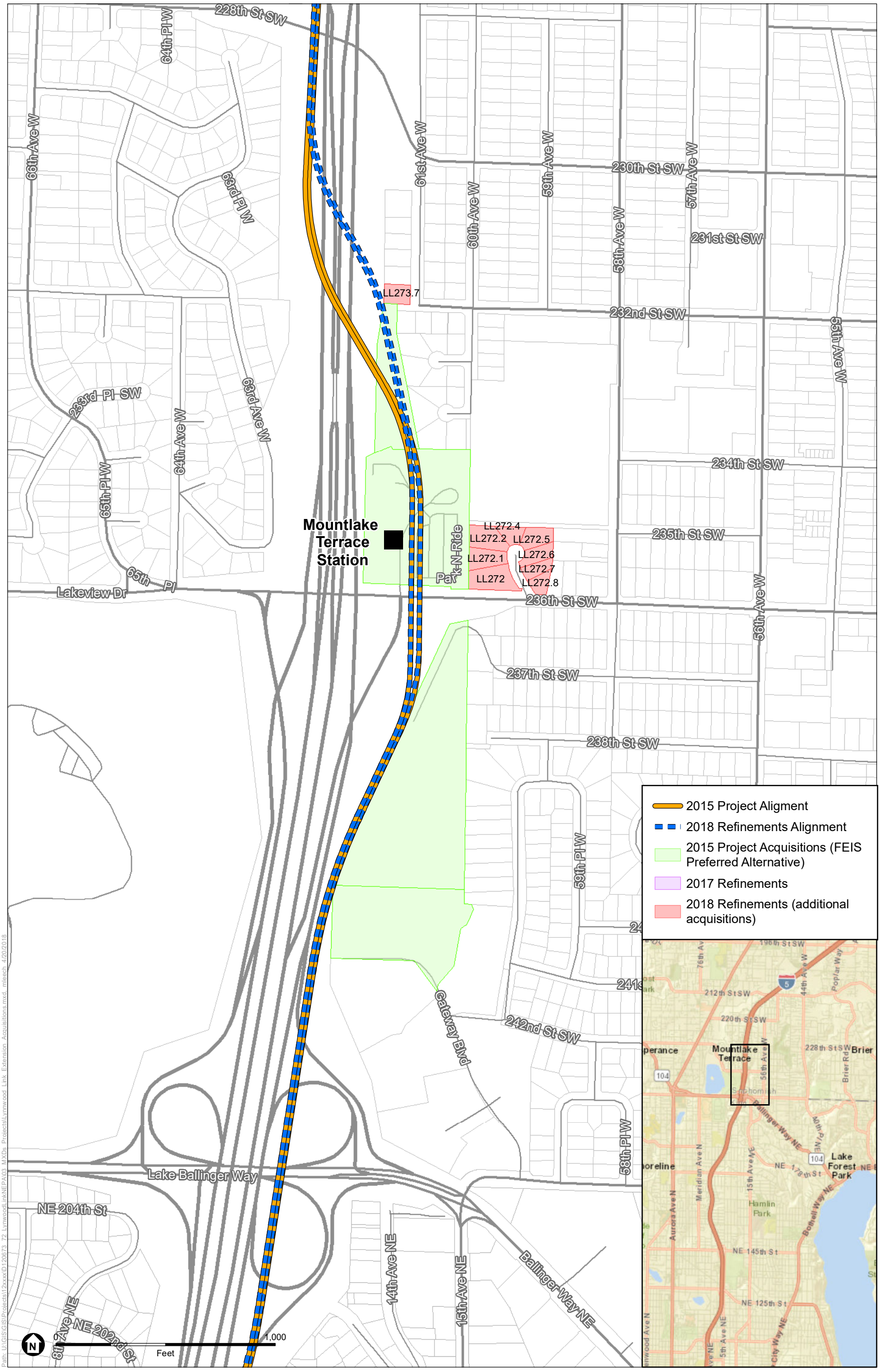

SOURCE: Open Street Map, 2016; King Co, 2016; ESA, 2018

This map does not indicate whether affected properties are a full or partial property acquisition.

D120673.Lynwood Link NEPA

**Figure 1 - Pg. 5**
Lynnwood Link Extension Acquisitions

ESA



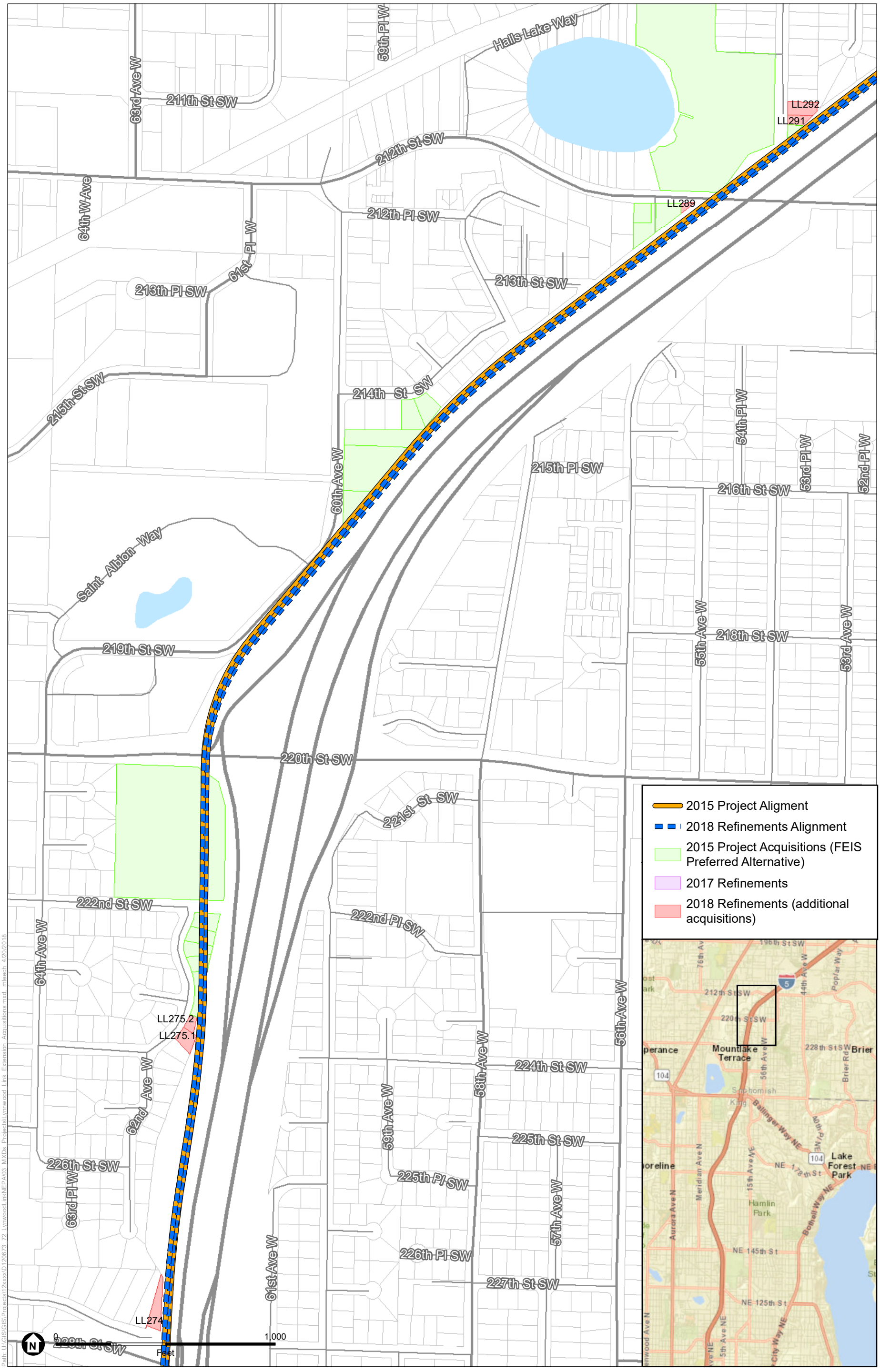

SOURCE: Open Street Map, 2016; King Co, 2016; ESA, 2018

This map does not indicate whether affected properties are a full or partial property acquisition.

D120673.Lynwood Link NEPA

**Figure 1 - Pg. 6**
Lynnwood Link Extension Acquisitions

ESA



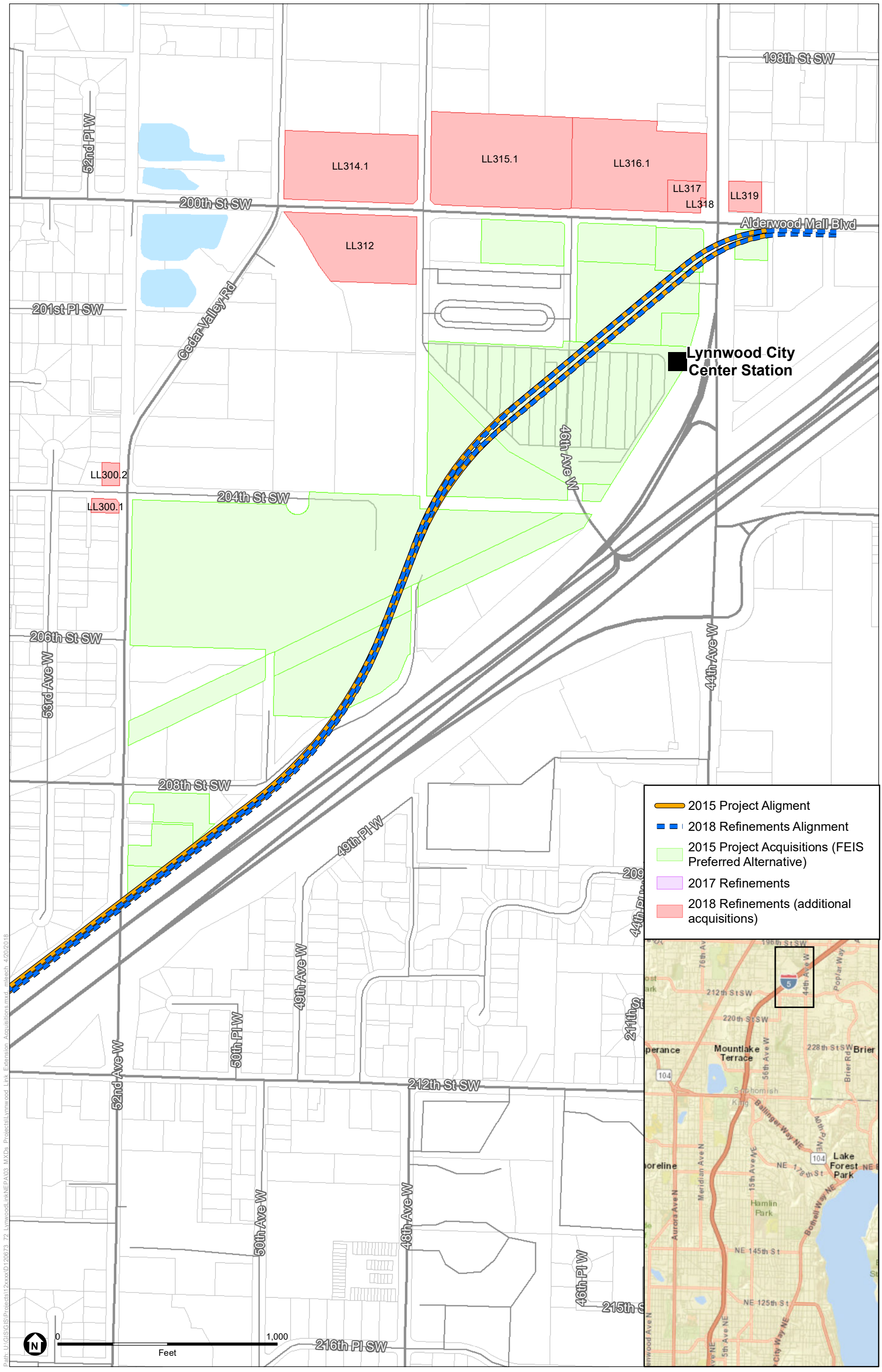

SOURCE: Open Street Map, 2016; King Co, 2016; ESA, 2018

This map does not indicate whether affected properties are a full or partial property acquisition.

D120673.Lynwood Link NEPA

**Figure 1 - Pg. 7**
Lynnwood Link Extension Acquisitions

ESA




SOURCE: Open Street Map, 2016; King Co, 2016; ESA, 2018

This map does not indicate whether affected properties are a full or partial property acquisition.

D120673.Lynwood Link NEPA

**Figure 1 - Pg. 8**
Lynnwood Link Extension Acquisitions

ESA

# Attachment C

# Noise Technical Memorandum

This page intentionally left blank.

# MEMORANDUM

Lynnwood Link Extension| Northgate Station to Lynnwood Transit Center

## Noise and Vibration Impact Analyses for Final Design Project Refinements

Date: March 8, 2018

To: Steve Kennedy, Elma Borbe, Erik Finley

From: Thom Bergen, Taylor Hays

CC: Shankar Rajaram, Jerry Dorn, Jeff Schutt, Rich Johnson, Jim Schettler

Re: Revised Noise and Vibration Impact Analyses for Project Refinements, including 185th Station and Lynnwood Transit Center Station

Noise and vibration impact analyses have been updated for Sound Transit's Lynnwood Link Extension (LLE) project related to refinements to the project as part of final design and cost savings effort. This memo summarizes the results from analyzing the project refinements and compares them to the results disclosed in the Final Environmental Impact Statement (FEIS). For the Preferred Alternative (PA) Plus Project Refinements, which include the project refinements evaluated in this memo, all noise and vibration impacts will be mitigated, and there will be no residual impacts.

Future impacts for the park-and-ride facilities were calculated using the methods outlined in the Federal Transit Administration guidance manual (FTA 2006). The Lynnwood City Center (LCC) Station also includes roadway improvement modifications, which were addressed with additional modeling in the Traffic Noise Model (TNM). Results for the analyses were compared to the FTA impact criteria and the Washington Administrative Code (WAC) noise limit. The WAC is applied to stationary facilities where state and local ordinances are applicable.

Design changes potentially affecting environmental noise and vibration impacts in the L200 segment include (a) Shoreline North Station and Garage relocation, and (b) curve radii changes at stations.

Design changes in the L300 segment include (a) LCC Station Roadway Improvement and Park & Ride Traffic Analysis, and (b) the shifting the alignment to the east and north of the Mountlake Terrace Station, which results in a more northerly crossing of I-5 from the east side to the west side.

Noise and vibration impacts from project refinements are lower compared to the Preferred Alternative. The reduction in impacts is due to changes in the track alignment shifting the tracks away from receptors, and modeling refinements resulting from additional field measurements and observations,

and refined train speed profile. In addition, properties that were originally impacted for noise and vibration in the FEIS are no longer affected because they have been acquired for the project.

All impact counts reported herein are for individual dwelling units. Table 1 below compares the changes in noise and vibration impacts and mitigation with the FEIS Preferred Alternative. Mitigation measures, which include noise walls, track-level vibration mitigation (ballast mat and floating slab), and residential sound insulation where noise walls are not feasible, will address all impacts and no residual impacts are anticipated.

**Table 1 – Number of Properties with Projected Noise and Vibration Impacts (Before/After Mitigation)**

| Alternative | LRV Noise Impacts | Park & Ride Noise Impacts (1) | Total Noise Impacts | Vibration and Groundborne Noise Impacts |
|---|---|---|---|---|
| FEIS Preferred Alternative (PA) | 540/0 | 98/0 | 638/0 | 30/0 |
| PA plus Project Refinements | 446/0 | 100/0 | 546/0 (2) | 25/0 |

(1) Two new impacts identified near LCC

(2) 115 impacts will be mitigated by offering residential sound insulation, primarily near park-and-ride facilities

Analysis of noise and vibration impacts as a result of the approximately 400 foot shift to the north in location of the 145th St Station in the City of Shoreline was covered in a separate NEPA Reevaluation for the 145th St. station refinements, approved by FTA in January 2017 (Memorandum, *NE 145th St Station Relocation – FTA Noise Impact Analysis*, 14 December 2016). That analysis resulted in 17 noise impacts, 7 of which could be mitigated with a noise wall along the north side of the bus loop, and the remaining 10 with sound insulation.

# Relocation of Shoreline North Station and Garage

Design refinements at the Shoreline North Station include:

- Revising the location of the 500-stall parking garage from the west side of Interstate 5 (I-5) to the east side of I-5, north of NE 185th Street, with vehicular access from 8th Avenue NE; and

- Revising the design of the station to provide the bus transit center on the roof level of the parking garage with bus access (entry and exit) from NE 185th Street.

The 185th Station & Park-and-Ride Garage was to be located on the west side of I-5 for the Preferred Alternative, but for cost savings will be relocated adjacent to the station on the east side of I-5, similar to Alternatives 3 and 7 in the FEIS. The FEIS Preferred Alternative identified 13 impacts associated with the 185th Station park-and-ride on the west side of I-5, and 9 noise impacts were identified for Alternatives 3 and 7.

The 2035 bus schedule was utilized for analysis of the project refinements with impact assessed against the WAC nighttime noise limit (6 am to 7 am) of 47 dBA $L_{eq}$. During the morning peak hour, a total of 32 bus trips are expected for the PA Plus Project Refinements, in comparison to 36 bus trips identified in the FEIS traffic analysis.

As part of the project refinements, the same number of 13 single family residences were calculated to equal or exceed the WAC noise limit, with all impacts related to buses entering and exiting, and moving within the park-and-ride. Table 2 summarizes the number of impacts from the FEIS Noise and Vibration Technical Report, and the project refinements analysis. Impacts resulting from buses in the park-and-ride can be fully mitigated in the form of a parapet noise wall, 9 feet in height above the parking garage driving surface, on three sides of the park-and-ride (as shown in Figure 1). If such a wall is deemed to have an unacceptable visual impact, sound insulation for the 13 impacted residences can be considered to remove all impacts.

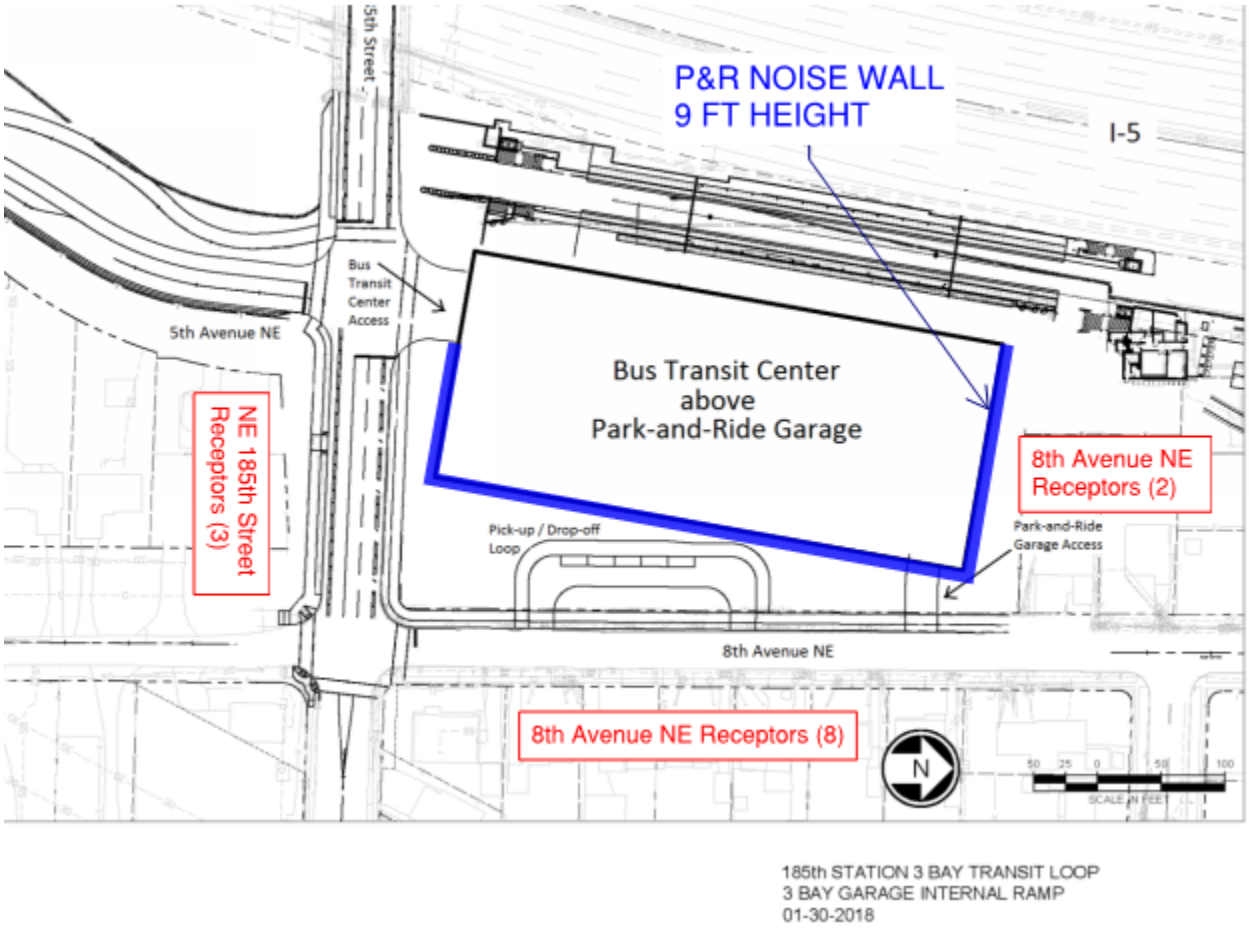



**Figure 1 – Preferred Alternative Plus Project Refinements for Shoreline North Station and Garage**

**Table 2 – Summary of Noise Impacts and Mitigation at Shoreline North Station and Garage**

| Alternative | Noise Impacts Before Mitigation | Noise Impacts After Mitigation | Mitigation |
|---|---|---|---|
| FEIS Preferred Alternative with NE 185th Station | 13 | 0 | Approximately 530 feet of noise walls |
| FEIS Alternative A3 | 9 | 0 | Insulation offered to 9 receptors |
| FEIS Alternative A7 | 9 | 0 | Insulation offered to 9 receptors |
| PA plus Project Refinements | 13 | 0 | Approximately 700 feet of new noise wall |

# Lynnwood City Center Station

## Park-and-Ride

The existing bus loop will remain in place (see Figure 2). Design refinements at the Lynnwood City Center Station include:

- The addition of 11 bus layover spaces, for a total of 20 spaces, to support additional Community Transit and Sound Transit Regional Express bus service that is forecast to increase weekday peak hour bus trips from 124 to 182 buses per hour within the bus loop. Noise modeling of this increase indicated 58 noise impacts consistent with the FEIS.

- Bus routing will either send all buses down 46th Avenue W, or will distribute the buses between 46th Avenue W and 48th Avenue W based on route origin and destination. Regardless of routing, all buses will pass through the western edge of the bus loop closest to the Cedar Creek Condominiums and Park Five Apartments. All expected impacts are related to noise from buses at this location.

Using the 2035 bus schedule and applying the WAC noise criteria, a total of 58 impacts at Cedar Creek and Park Five receptors was predicted for both the FEIS Preferred Alternative and the PA Plus Project Refinements (see Table 3). The increase in bus trips corresponds to a roughly 1.5 dBA increase in the total facility noise, but would not change the number of impacts. Because of the elevation of the multifamily units, all noise impacts would be mitigated with sound insulation.

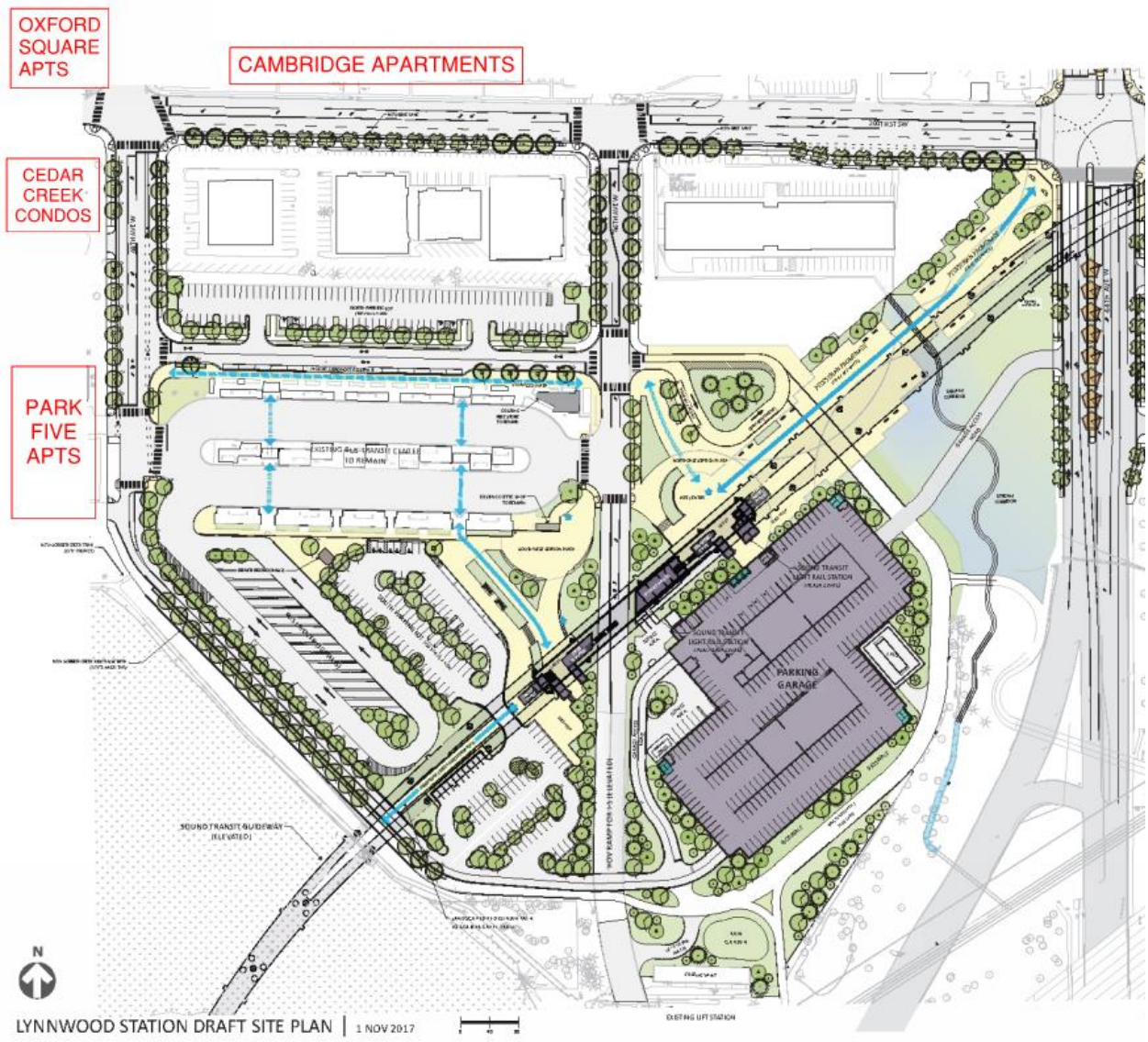



**Figure 2 – PA Plus Projects Refinements Layout for Lynnwood City Center**

**Table 3 – Summary of Noise Impacts and Mitigation at LCC Park and Ride**

| Alternative | Noise Impacts Before Mitigation | Noise Impacts After Mitigation | Mitigation |
|---|---|---|---|
| FEIS Preferred Alternative | 58 | 0 | Insulation offered to 58 receptors (apartment/condo units) |
| PA plus Project Refinements | 58 | 0 | Insulation offered to 58 receptors (apartment/condo units) |

## Roadway Improvement Traffic Analysis

This analysis refers to the refinements outlined in the HNTB|Jacobs Memorandum, *Shoreline North/185th & Lynnwood City Center Stations, and 5th Avenue NE Closures – Traffic Analysis Update*, December 14, 2017.

Design refinements at the Lynnwood City Center Station include:

- A right-in, right-out parking garage driveway access point on 44th Avenue W, south of 200th Street SW,
- Elimination of the HOV-only parking garage driveway access point on 46th Avenue W,
- The addition of 202nd Street SW, between 46th Avenue W and 48th Avenue W, to facilitate site circulation and provide additional pick-up and drop-off areas, and
- Park-and-ride garage access from 200th Street SW via 48th Avenue W, and from 44th Avenue W via a right-in/right-out driveway south of 200th Street SW.
- Surface parking lot and pick-up/drop-off access from 200th Street SW via 46th and 48th Avenues W, and from 202nd Street SW

Modeling of the proposed changes identified 20 impacted receptors during the AM peak, and an additional five residences that would be impacted during the PM peak (Table 4). Mitigation options for the impacted residences are listed in Table 5.

Two residential receptors in the Oxford Square Apartments were identified as potentially noise impacted in the current analysis. These residences were not identified as impacts in the FEIS. As part of the FEIS Preferred Alternative, total of 16 residences at the Cambridge Apartments are impacted prior to mitigation and a total of seven residences at the Cedar Creek Condominiums are predicted to be impacted by noise prior to mitigation (23 total).

**Table 4 – Number of Properties with Noise Impacts due to LCC Roadway Improvements**

| **FEIS Preferred Alternative Noise Impacts** | PA Plus Project Refinements **Impacted Residences during AM Peak** | PA Plus Project Refinements **Impacted Residences during PM Peak** | PA Plus Project Refinements **Impacted Residences After Mitigation** |
|---|---|---|---|
| 23 | 20 | 25 | 0 |

An additional refinement under consideration is to add an additional westbound traffic lane on the north side of 200th Street SW. This scenario was modeled in the TNM, and found to result in no additional noise impacts, and a minimal increase in noise level.

**Table 5 – Summary of Mitigation Measures for Noise Impacts due to LCC Roadway Improvements**

| Alternative | Mitigation (1) |
|---|---|
| FEIS Preferred Alternative | Approximately 1,275 feet of noise walls or insulation offered to 23 residential units |
| PA Plus Project Refinements | Approximately 1,275 feet of noise walls or insulation offered to 25 residential units |

(1) If noise walls, up to 15 feet in height, are determined to be infeasible, or unacceptable to the City of Lynnwood, sound insulation will be offered

# Curve Radii Reduction at Stations

Proposed change included tightening up curves at the 145th and Mountlake Terrace Stations to reduce the amount of split aerial structure entering and leaving stations. The Sound Transit Design Criteria Manual specifies that curves with radii of curvature less than 600 feet are required to include track lubricators, and curves with radii between 600 feet and 1250 feet are to be made "lubricator ready".

This design change would reduce curve radii slightly, but none to less than 600 feet. South of Mountlake Terrace Station, one curve would be reduced from 760 feet to 610 feet radius. Provisions for track lubrication were included in the 60% design recommendation for this curve, and others in the 600 to 1250 foot range. No changes in expected noise impacts or curving noise control recommendations are anticipated for this design change.

# I-5 Crossing Realignment – Mountlake Terrace

At the I-5 crossing in Mountlake Terrace, the track alignment was altered as a project refinement. North of the Mountlake Terrace Station, the guideway was moved to the east, cutting into the hillside before transitioning to aerial structure across the freeway. A summary of impacts in the vicinity of the I-5 Crossing is provided in Table 6. This change moved the tracks closer to receptors on the east side of the freeway, but the retaining wall provides shielding from train noise, reducing the number of impacts from 12 to 8 (relative to the FEIS). This change also moved the tracks away from receptors on the west side of the freeway reducing the number of impacts from 12 to 6 due to the increased distance. No vibration impacts were predicted for this area for either the FEIS Preferred Alternative or the PA Plus Project Refinements. Although the tracks cut into the hillside in a retained cut section, they are more than 40 feet lower in elevation than the receptor foundations providing adequate offset to avoid vibration impact.

**Table 6 – Summary of Noise and Vibration Impacts and Mitigation Near the I-5 Crossing in Mountlake Terrace**

| Alternative | Noise Impacts Before Mitigation | Noise Impacts After Mitigation | Vibration Impacts Before Mitigation | Vibration Impacts After Mitigation |
|---|---|---|---|---|
| FEIS Preferred Alternative | 24 (1) | 0 | 0 | 0 |
| PA plus Project Refinements | 14 (2) | 0 | 0 | 0 |

(1) Includes 2 impacts potentially requiring sound insulation
(2) Includes 1 impact potentially requiring sound insulation

# Conclusion

For the Preferred Alternative Plus Project Refinements compared with the FEIS Preferred Alternative:

- The total number of noise impacts decreased by 92 (difference in Total Noise Impacts shown in Table 1)
- After noise mitigation, including residential sound insulation, there will be no residual noise impacts
- The total number of vibration and groundborne noise impacts requiring mitigation decreased by five

# Attachment D

# Project Status Update for Endangered Species Act Compliance

This page intentionally left blank.

MEMO

SOUNDTRANSIT

January 24, 2018

TO: Mark Assam, Federal Transit Administration

FROM: Karin Ertl, Sound Transit

SUBJECT: Lynnwood Link Extension
Project Status Update for Endangered Species Act Compliance

---

## 1. INTRODUCTION & SUMMARY OF CONCLUSIONS

The Sound Transit Lynnwood Link Extension (LLE) will extend the Link light rail system 8.5 miles from Seattle to Shoreline, Mountlake Terrace, and Lynnwood in King and Snohomish counties, Washington. It will provide reliable, rapid, and efficient peak and off-peak two-way transit service, create an alternative to travel on congested roadways, and improve regional multimodal transportation connections. The Federal Transit Administration (FTA) is the lead agency for the project under the National Environmental Policy Act (NEPA).

The LLE Biological Assessment (BA) was completed by Sound Transit in December 2014. FTA submitted the BA to the National Marine Fisheries Service (NMFS) in January 2015. In January 2015, NMFS concurred with the BA's findings which are shown in Table 1. Based on the BA, FTA determined that the project would have No Effect on U.S. Fish and Wildlife (USFWS) species; therefore, consultation with USFWS was not conducted.

**Table 1.** LLE BA Effects Determinations for ESA-Listed Species and Critical Habitat

| Species | Effects Determination |
|---|---|
| Chinook salmon, Puget Sound ESU | Not likely to adversely affect |
| Chinook salmon critical habitat | No effect |
| Steelhead, Puget Sound DPS | Not likely to adversely affect |
| Steelhead critical habitat | No effect |

NMFS also directed that reinitiation of consultation is required if:

- New information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered;
- The identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the January 2015 NMFS concurrence letter; or
- A new species is listed or critical habitat designate that may be affected by the action.

The purpose of the memo is to determine if FTA and Sound Transit need to reinitiate consultation with NMFS and the USFWS under Section 7 of the Endangered Species Act (ESA). It evaluates the following changes since the BA:

1. Listing status for ESA-regulated species and critical habitat,
2. Resources in the LLE action area identified through additional field work, and
3. Changes to the LLE design and construction elements and their associated impacts.

In summary, none of the project changes or new information since the BA creates new effects to listed species or critical habitat in a manner or extent not previously considered. Several of the design changes would increase the amount and duration of in-water work, but would help protect water quality during construction and would have the same effects on ESA-listed species as described in the BA. Changes in species and critical habitat listing status since the BA include designation of Steelhead critical habitat and the listing and designation of critical habitat for the streaked horned lark and yellow-billed cuckoo. The action area does not include designated critical habitat for any of these species. Additionally, streaked horned lark and yellow-billed cuckoo are not expected to occur in the action. More detailed information regarding this conclusion is presented below.

## 2. ESA SPECIES AND CRITICAL HABITAT LISTING STATUS

### *Species under NMFS Jurisdiction*

The 2014 BA analyzed two species under NMFS jurisdiction, the Puget Sound Evolutionarily Significant Unit (ESU) of Chinook salmon (*Oncorhynchus tshawytscha*) and the Puget Sound DPS of Steelhead (*O. Mykiss*). It also analyzed impacts to critical habitat for both species. As shown in Table 2, there have been no changes in the listing status for NMFS species or Chinook salmon critical habitat since 2014. On March 25, 2016, NMFS designated Steelhead critical habitat; however, none of the water bodies in the LLE action areas are included in the designation.

**Table 2.** NMFS Jurisdiction ESA-Listed Species and Critical Habitats

| Species | Status 2014 | Status 2018 |
|---|---|---|
| Chinook salmon, Puget Sound ESU | Threatened | Threatened |
| Chinook salmon critical habitat | Designated | Designated |
| Steelhead, Puget Sound DPS | Threatened | Threatened |
| Steelhead critical habitat | Proposed | Designated |

### *Species under USFWS Jurisdiction*

The 2014 BA concluded that no species under USFWS jurisdiction are expected to occur within the action area. Since the BA, the yellow-billed cuckoo (*Coccyzus americanus*) and streaked horned lark (*Eremophila alpestris strigata*) have been listed as Threatened.

The yellow-billed cuckoo was a candidate species at the time of the BA. The BA concluded that it is not expected to occur in the action area because of lack of suitable nesting habitat and the absence of documented sightings within 5-miles other than a single observation in 2000. In 2014, critical habitat was proposed in Arizona, California, Colorado, Idaho, New Mexico, Nevada, Texas, Utah, and Wyoming. None of the proposed critical habitat is in the action area. Due to the lack of designated critical habitat and no additional recorded observations, the yellow-billed cuckoo is still not expected to occur in the action area.

The streaked horned lark was listed in 2013 along with critical habitat in Grays Harbor, Pacific, and Wahkiakum counties in Washington. There is no designated critical habitat in the action area. In Washington, the streaked horned lark nests on grasslands and sparsely vegetated areas at

airports, sandy islands, and coastal spits[1]. Although typical habitat patches for streaked horned lark are considered to be 300 or more acres, they have been known to occupy smaller areas less than 100 acres[2]. There is no potential suitable streaked horned lark habitat in the project corridor; therefore, they are not expected to occur in the action area.

Since the yellow-billed cuckoo and streaked horned lark are not expected to occur in the action area and no critical habitat is designated or proposed in the actions area for these species, the project is expected to have No Effect on both species.

## 3. ENVIRONMENTAL BASELINE UPDATE

This section summarizes changes to sensitive areas in the action area. After the BA was submitted, Sound Transit's Final Design team verified boundaries of previously delineated wetlands and streams and also delineated jurisdictional ditches. Boundaries were updated as necessary. In addition, a field review was conducted in August 2015 with the U.S. Army Corps of Engineers (the Corps), the Washington State Department of Ecology (Ecology), and Washington Department of Fish and Wildlife (WDFW) to confirm the jurisdictional status and boundaries of regulated sensitive areas in the action area.

### 3.1 Streams

#### *Stream SMT2*

Property access to Wetland WMT7 was briefly granted in 2017. During field survey of the property, biologists identified Stream SMT2 which appeared to be a tributary to Hall Creek that originates from the northwest corner of Wetland WMT7. The open channel, located on private property outside of WSDOT right of way, is approximately 50 feet long. It exits via a 12-inch culvert and appears to cross 60th Avenue W before entering a ravine. The stream is not mapped by WDFW or by the City of Mountlake Terrace. Based on a steep gradient of greater than 15 percent in downstream reaches and the absence of documented anadromous fish use, Stream SMT2 is not known or expected to support fish.

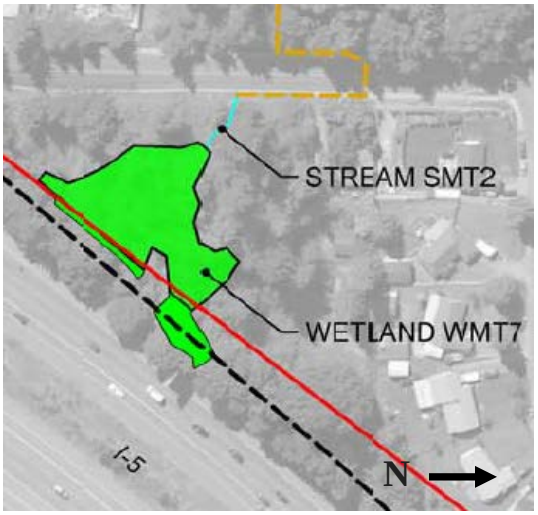



**Figure 1**. Stream SMT2

#### *Streams SSH5 and SSH6*

During final design, Sound Transit and the City of Shoreline agreed to develop a compensatory wetland mitigation site at Ronald Bog Park in Shoreline which is described further in Section 4.3 (see Appendix A). Two streams (streams SSH5 and SSH6) flow through the park. Stream SSH5 enters through the northeast corner of the park in a 42-inch-diameter culvert. It then flows in a channelized open watercourse along the west side of I-5 and discharges into Ronald Bog pond

[1] Anderson, H.E., and S.F. Pearson. 2015. Streaked Horned Lark Habitat Characteristics. Center for Natural Lands Management and Washington Department of Fish and Wildlife.

[2] Anderson and Pearson, 2015

(Wetland WSH6). Stream SSH6 is limited to a stormwater pipe that collects water along Meridian Avenue North and discharges into Ronald Bog pond from the northwest. Both streams are identified as reaches of Thornton Creek by the City of Shoreline 2004 Stream and Wetland Inventory and Assessment.

Based on public fishing reports online, fish are present in Ronald Bog pond and therefore also likely present in Stream SSH5. Fish in these water bodies are likely limited to carp, bluegills, and potentially smallmouth bass and/or cutthroat trout. One steelhead was observed at Twin Ponds Park (downstream of Ronald Bog Park) in 2004. However, it appears to be an anomaly, and no salmon have been documented upstream of the Twin Ponds Park location. Fish use of Stream SSH6 is unknown, but unlikely since the entire length of the stream appears to be enclosed in an underground culvert along Meridian Avenue North.

**Figure 2**. Ronald Bog Park

### 3.2 Wetlands

As a result of the coordination efforts noted above, one Wetland WSH1 identified in the BA was determined to be non-jurisdictional by the Corps. Sound Transit also brought wetland classifications under the Washington State Wetland Rating System up to date using the most current 2014 forms. This resulted in the Scriber Creek wetland (Wetland WLY4) changing from a Category II wetland to a Category I wetland. Additionally, one new wetland (Wetland WSE9) was identified in the project corridor and two new wetlands (WSH6 and WSH7) were identified at the Ronald Bog mitigation site.

#### *WSE 9*

Wetland WSE9 is approximately 0.03 acres and is east of I-5 and west of 5$^{th}$ Avenue Northeast in Seattle. It is classified as palustrine scrub-shrub under the U.S. Fish and Wildlife Service (USFWS) system and depressional under the hydrogeomorphic (HGM) system. It is rated as a Category II wetland by the City of Seattle using the 2004 Ecology rating system.

**Figure 3**. Wetland WSE9

#### *WSH6 and WSH7*

Wetlands WSH6 and WSH7 are in Ronald Bog Park (see Appendix A). Wetland WSH6, a Category III wetland, is primarily a large, open water pond with palustrine fringe. Approximately 77 percent of the wetland is open water. Wetland WSH6 drains through a 30-inch-diameter culvert to the south and is the headwaters of the North Branch of Thornton Creek. Wetland WSH7 is a small, palustrine scrub-shrub wetland in a depression northeast of Wetland WSH6. It is rated a Category II wetland.

## 4. REVISED PROJECT ELEMENTS & IMPACTS

Since the BA, Sound Transit has advanced project design, completed various value engineering (VE) exercises, conducted additional stakeholder coordination, and received input from the project general contractor/construction manager (GCCM) regarding construction. These efforts have resulted in some changes to the LLE design and construction methods. It has also resulted in the identification of a new compensatory wetland mitigation site not previously evaluated. This section summarizes the changes since the 2014 BA.

### 4.1 Revised Design and Construction Elements Affecting Streams

Table 3 compares impacts to streams from the BA to the current design. Potential changes are also described in more detail below. Construction activities at Stream SSE1, Scriber Creek, and Stream SLY1 would increase the amount and duration of in-water work. However, no listed species are present in these areas and the effects would be similar to those described in the BA. Additionally, in-water work at SLY1 to daylight a portion of the stream would provide a long term benefit to fish if downstream barriers are removed in the future.

**Table 3**. Comparison of Impacts to Streams between the 2014 BA and 2018 Design

| Stream | 2014 BA Impacts | 2018 Design/Construction Change |
|---|---|---|
| North Branch of Thornton Creek | **Temporary**: loss/disturbance of riparian vegetation; potential release of turbid water or pollutants<br>**Permanent**: loss of riparian vegetation; shading from the guideway; reduction in large woody debris (LWD) delivery | **Temporary**: a temporary work trestle to be built over stream to protect water quality during construction; additional shading impact from trestle<br>**Permanent**: no change |
| SSE1 | **Temporary**: loss of riparian vegetation; potential release of turbid water or pollutants<br>**Permanent**: loss of riparian vegetation; shading from the guideway; reduction in LWD delivery | **Temporary**: 100 feet temporarily piped during construction to protect water quality<br>**Permanent**: no change |
| McAleer Creek | **Temporary**: loss of riparian vegetation; potential release of turbid water or pollutants<br>**Permanent**: loss of riparian vegetation; shading from the guideway; reduction in LWD delivery | **Temporary**: no change<br>**Permanent**: no change |
| SSH2 | **Temporary**: none<br>**Permanent**: none | **Temporary**: no change<br>**Permanent**: no change |
| SSH4 | **Temporary**: loss of riparian vegetation; potential release of turbid water or pollutants<br>**Permanent**: loss of riparian vegetation; shading from the guideway; reduction in LWD delivery | **Temporary**: no change<br>**Permanent**: no change |
| SMT1 | **Temporary**: work below ordinary high watermark (OHWM) to construct guideway; temporary loss of riparian vegetation; potential release of turbid water or pollutants<br>**Permanent**: portion of a guideway column within the OHWM; loss of riparian vegetation; shading from the guideway; reduction in LWD delivery; potential for guideway support columns to interfere with possible future habitat restoration projects | **Temporary**: temporarily pipe approximately 185 linear feet of stream during construction to protect water quality<br>**Permanent**: A portion of the stream permanently realigned around guideway columns after construction; no column within the OHWM after realignment |
| SMT2 | **Temporary:** not identified in BA<br>**Permanent:** not identified in BA | **Temporary:** approximately 0.011 acre temporary loss of stream buffer for construction access. Temporary loss of riparian vegetation; potential release of turbid water or pollutants<br>**Permanent:** Approximately 0.057 acres of permanent impact to the stream buffer for a new stormwater pond and construction access |
| Scriber Creek | **Temporary**: 12,600 square foot temporary work trestle with 88 piles; work below OHWM to construct guideway and temporary work trestle; loss of riparian vegetation; potential release of turbid water or pollutants<br>**Permanent**: 6 columns within the OHWM; loss of riparian vegetation; shading from the guideway, reduction in LWD delivery | **Temporary**: approximately 24,0000 square foot temporary work trestle with up to 94 piles<br>**Permanent**: 4 columns within the OHWM for guideway bents. |
| SLY1 | **Temporary**: none<br>**Permanent**: potential for stormwater discharge | **Temporary**: temporarily pipe 140 linear feet of open channel during construction to protect water quality; temporary disturbance and in-water work to reroute and daylight the stream<br>**Permanent**: Reroute and daylight stream in station area and make fish passable |

***Segment A – North Branch of the Thornton Creek***

The North Branch of Thornton Creek flows into the action area from under I-5 in the City of Seattle. It daylights for approximately 100 feet between I-5 and 5th Avenue Northeast before entering a culvert under 5th Avenue Northeast and to an open channel between Jackson Park Golf Course and 5th Avenue Northeast. According to WDFW, steelhead are present in the North Branch of Thornton Creek as far upstream as the Jackson Park Golf Course, approximately 1,600 feet downstream of the action area. However, based on an observation of an adult steelhead near Twin Ponds upstream of the action area, it is possible that steelhead may use stream habitats in the action area.

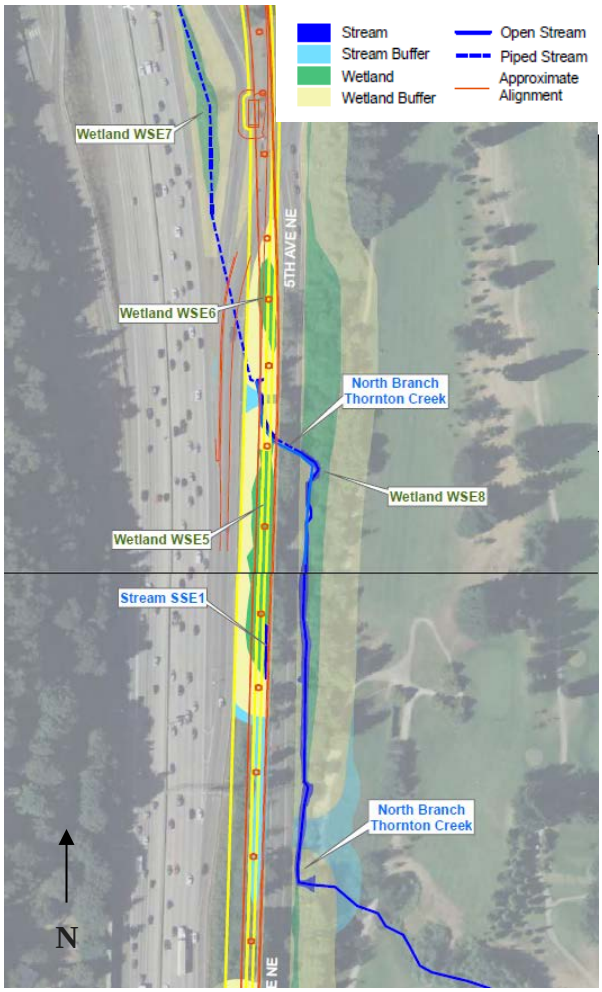



**Figure 4**. North Branch of Thornton Creek and Stream SSE1

The LLE would cross over the North Branch of Thornton Creek on an elevated guideway. The BA states that there would be temporary disturbance to the stream during construction from removal of vegetation. Since the BA, with input from WDFW, the GCCM evaluated options for minimizing temporary impacts to the stream. At this location, they determined that building a temporary work trestle over the stream and utilizing other BMPs will best minimize impacts while constructing the guideway over the stream. The contractor plans to build an approximately 130 foot by 40 foot temporary work trestle over the stream segment between I-5 and 5th Avenue Northeast for construction. The contractor would install the work trestle outside of the ordinary high watermark, therefore there would still be no in-water work in the North Branch of Thornton Creek. While the work trestle would have temporary shading impacts to the stream, it would help protect water quality during construction by providing a physical barrier between the overhead construction and the open water channel. Other BMPs will be used along the stream to further reduce impacts from sedimentation.

***Segment A - Stream SSE 1***

Approximately 300 feet south of the North Branch of Thornton Creek's crossing under 5th Avenue Northeast, Stream SSE1 emerges from a culvert in the I-5 right-of-way. It flows southward in a ditch on the west side of 5th Avenue Northeast for approximately 100 feet and then drains to Thornton Creek via a culvert under 5th Avenue Northeast. No fish are known or expected to use Stream SSE1.

The LLE would cross over SSE1 on an elevated guideway. The BA states that there could be temporary disturbance to it during construction from construction-related sedimentation and

turbidity, but no in-water work. Subsequently, the GCCM determined that temporarily piping the stream will be an effective way to minimize temporary impacts while constructing the guideway over this short section of stream. They would temporarily pipe approximately 100 feet of the open channel portion of Stream SSE1 between I-5 and 5th Avenue Northeast for approximately one to two years in accordance with the Hydraulic Project Approval (HPA) that WDFW is expected to issue and the Clean Water Act (CWA) Section 404 permit the Corps is expected to issue. While piping the stream would have temporary impacts and increase the amount of in-water work, it would protect water quality during construction and reduce the construction-related sedimentation and turbidity.

***Segment B – Stream SMT1***

Stream SMT1 is a tributary to McAleer Creek. During site visits, flowing water was observed only during or immediately after rainfall. The downstream portion of ill-defined channel enters a culvert that extends from the edge of the action area into the adjacent property. WDFW has identified this culvert as a total barrier to fish passage. On the adjacent property (the Gateway Development), the stream is in open channel again. Based on the presence of human-created barriers to fish passage, no fish are known or expected to use Stream SMT1 in the action area.

The LLE would cross over Stream SMT1 on an elevated guideway. The BA states that a portion of a guideway column would be within the ordinary high water mark (OHWM) of the stream requiring in-water work. To protect water quality during construction, the contractor will temporarily place approximately 185 linear feet of the stream in a pipe. After construction, to avoid permanently placing a guideway column within the OHWM, Sound Transit has modified the design to permanently reroute the stream around the column. Sound Transit would conduct all work in the stream in accordance with the HPA and Section 404 permits.

***Segment B – SMT2***

As described in Section 3.1, Stream SMT2 is a tributary to Hall Creek that originates from Wetland WMT7 (see Figure 1). Based on a steep gradient of more than 15 percent in downstream reaches and the absence of documented anadromous fish use, Stream SMT2 is not known or expected to support fish.

The LLE guideway would be east of the stream and a stormwater pond would be north of it. The stream was not identified at the time of the BA; therefore, impacts to it were not assessed. During construction, there would be potential temporary sedimentation and turbidity impacts because of the proximity of LLE construction activities. These impacts would be the same as the temporary construction impacts described in Section 6.1 of the BA. No in-water work would be required. Stormwater from the guideway (which is a non-pollution generating impervious surface) may be dispersed into the adjacent Wetland WMT7 that feeds into the stream. This would be similar to current conditions as rain and surface water from the same area enters the stream; however, the dispersion would be at an increased rate.

There would be some permanent impacts to the stream buffer for a stormwater pond (approximately 0.057 acres) as well as temporary impacts to the buffer for construction access (approximately 0.011 acres). These impacts would be mitigated through onsite restoration and enhancement.

***Segment C – Scriber Creek***

Approximately 2,000 feet of Scriber Creek flows through the action area. For most of its length in the action area, the stream channel is braided and indistinct as it flows through Wetland WLY4 and the OHWM is coincident with the wetland boundary. Chinook salmon have been documented in Scriber Creek approximately 3,100 feet downstream of the action area. Steelhead are not currently known or expected to use habitats in Scriber Creek, although winter-run steelhead have been observed in Swamp Creek, to which Scriber Creek is a tributary to. WDFW classified the culverts under I-5 immediately downstream of the action area as partial barriers to fish passage, and identified a total barrier another 2,900 feet downstream.

The LLE would cross through Scriber Creek on an elevated guideway. The design at the time of the BA included three pairs of guideway columns (six columns total) within the OHWM and that the contractor would use a temporary work trestle to construct the guideway. The temporary work trestle was estimated to be 30-feet wide with one 100-foot-long trestle from the west, one 200-foot-long trestle from the east, and three 40-foot-long transverse trestles (12,600 square feet total). It was also estimated to have 88 piles.

The number of permanent guideway columns within the stream OHWM has since been reduced to four columns. Sound Transit's GCCM has also developed additional detail on the temporary work trestle and anticipates that it would need to be approximately 24,000 square feet with up to 94 piles. It would include one continuous trestle plus four transverse trestles. To minimize temporary shading impacts to the wetlands below the trestle, the bottom of the continuous girder would be a minimum five feet above the OHWM. The GCCM would install the work trestle at the beginning of the 2019 fish window (July 2019) and would fully remove it by the end of the fish window in 2021 (September 2021).

The work trestle would affect a greater area (approximately 11,400 square feet) of Scriber Creek. Due to the increased size, there could also be an increase in duration to install the trestle. However, installation is expected to be similar to what the BA evaluated. Consistent with the BA, the affected reach of Scriber Creek is still approximately 2,900 feet upstream of a barrier that prevents access to the action area by ESA-listed fish species. Additionally, any work areas where surface water is present would be isolated from other surface waters with a cofferdam or similar system to prevent suspended sediment or pollutants from leaving the work area. While more temporary piles would be driven within the OHWM of Scriber Creek, potential noise impacts are expected to be the same as the BA. Sound energy from any in-water pile driving would not extend more than a few hundred feet upstream or downstream and would be blocked by the bends in the stream before it reaches the culvert under I-5 immediately downstream of the action area. The LLE would remain compliant with the in-water work window and employ best management practices similar to those described in the BA to protect water quality and avoid impacts to species and their habitat.

***Segment C –Stream SLY1***

Stream SLY1 is an intermittent tributary of Scriber Creek that flows southward along the eastern edge of the Lynnwood Transit Center. Its primary source of flow is urban runoff. Stream SLY1 is in a culvert for most of the action area except for a small portion (approximately 140 linear

feet) east of the transit center where it flows through a patch of forested vegetation. It is not known or expected to support listed fish and it is separated from known fish-bearing waters by culverts under I-5 and the I-5 on and off ramps.

Within the action area, the piped portion of Stream SLY1 is under the Lynnwood station area. The BA states that all construction activities within 200 feet of the stream would occur in currently paved portions of the transit center and therefore would have no potential to affect the stream or its riparian buffer.

Subsequent to the BA, the City of Lynnwood required that Sound Transit replace the portion of the pipe in the station area. Since Stream SLY1 has the potential to support fish in the future if downstream barriers are removed, instead of replacing the pipe, Sound Transit will reroute the portion of the stream in the project area and make it fish passable. Sound Transit is coordinating with the Muckleshoot Indian Tribe and WDFW on the stream design (see Figure 4).

During construction of the LLE, the contractor will temporarily pipe the 140 linear feet of open channel for up to five years. The contractor would then reroute and daylight the stream in the project area to make it fish passible. Rerouting Stream SLY1 would increase in-water work related to the project and would temporarily increase sedimentation and turbidity. Similar to other in-water activities, Sound Transit would conduct the work using BMPs and in compliance with the WDFW HPA and Corps Section 404 permit. Overall, the change would have a net benefit to the stream by improving the riparian environment. Additionally, making the stream fish passable would allow for future fish use if downstream barriers are removed.

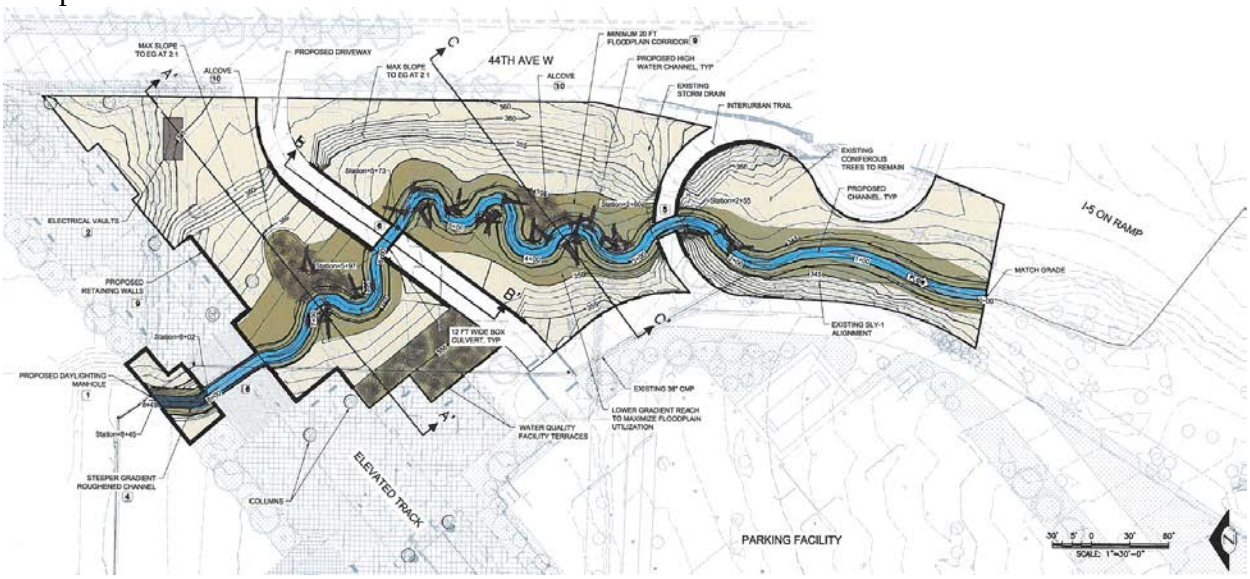



**Figure 5**. Draft Conceptual Design for Stream SLY1

### 4.2 Revised Design and Construction Elements Affecting Wetlands

Design refinements throughout the corridor and fieldwork have changed the amount of impacts to wetlands. Table 4 compares wetland impacts in the BA to the current design. The current design reduces permanent wetland impacts and increases temporary impacts.

**Table 4**. Comparison of Wetlands between the BA and the Current Design

| Impact | Final Environmental Impact Statement Impacts (acres) | 2018 Design Impacts (acres) | Net Change (acres) |
|---|---|---|---|
| Temporary | 0.5 | 3 | +2.5 |
| Permanent | 2.4 | 0.6 | -1.8 |

### 4.3 Project Mitigation Sites

During final design, Sound Transit has worked with the local jurisdictions, Ecology, and the Corps to identify mitigation for unavoidable permanent wetland impacts. For the City of Lynnwood, a small area of wetland and wetland buffer will be re-established along the edge of the Scriber Creek wetland complex, which is within the previously evaluated action area. In Shoreline, Sound Transit plans to develop a compensatory wetland mitigation site at Ronald Bog Park. This mitigation site, described in more detail below, was not included in the 2014 BA.

***Ronald Bog Park Mitigation Site***

Ronald Bog Park is on the west side of I-5, just south of NE 175th Street in Shoreline (2301 N 175th St, Shoreline). The area is a passive park with trails, open areas, and a pond. This area was originally a large peat wetland system. The peat was mined in the 1940s to mid-1960s, and a large pond formed as a result of the excavation. In the mid-1960s, the north and east portions of the pond were filled with construction debris.

The vast majority of permanent wetland impacts for the LLE are within the City of Shoreline. To satisfy local, state and federal permitting requirements for impacts within the City of Shoreline, Sound Transit plans to reestablish approximately one acre of wetlands in the park as well as enhance existing wetlands and wetland buffers as shown in Appendix A. Sound Transit would achieve this by excavating fill material, grading, soil decompaction, soil amendments, and invasive species removal. Wetland reestablishment areas would be designed to include lower elevation areas that can accommodate occasional or seasonal inundation to provide flood storage capacity and habitat complexity while inhibiting the potential for fish stranding.

An undisturbed one-foot-wide zone between the open water pond of Wetland WSH6 and grading operations would protect the pond from sedimentation during construction. This would be capped by compost socks made from natural plant fibers to further protect Ronald Bog from soil-disturbing activities. At the end of the first summer, once plants are fully rooted, the undisturbed areas at the mouth of the emergent areas would be hand excavated to just above the water level to allow water into the site during the next high water period.

## 5. EFFECTS DETERMINITATION

### 5.1 Chinook salmon

Within the action area, Chinook salmon have been documented in the lower reaches of Thornton, McAleer, and Scriber creeks. In Thornton and Scriber creeks, the reaches where Chinook salmon have been observed are separated from the action area by total fish passage barriers. None of the

tributaries to Thornton, McAleer, Scriber, and Hall creeks in the action area are known or expected to support fish use because of barriers to fish passage.

There are no changes to project elements that could affect McAleer Creek. Stream SMT1, a tributary to McAleer Creek, would be temporarily piped during construction then rereouted to avoid permanent impacts from placing a column within the OHWM. Temporarily piping the stream during construction is expected to reduce construction related impacts such as sedimentation and turbidity.

Stream SSE1, a tributary to Thornton Creek, would be temporarily piped for 1-2 years during construction, increasing in-water work by approximately 100 linear feet, but reducing construction impacts related to sedimentation and turbidity. The temporary work trestle over the North Branch of Thornton Creek would be constructed outside of the OHWM and would help protect the stream from construction related impacts.

The amount of in-water work at Scriber Creek would increase from the 2014 BA due to a larger temporary work trestle. Temporary impacts for installation and removal of the trestle would be similar to those described in the BA; however, the area and duration of the impacts may slightly increase. This increase is not expected to be substantial and would still be approximately 2,900 feet upstream of a barrier that prevents access to the action area by ESA-listed fish species. Making Stream SLY1, a tributary to Scriber Creek, fish passable would also increase temporary construction impacts from in-water work, but would have long term benefits.

With the current design and construction approach for the LLE, direct and indirect effects and interrelated and interdependent actions on Chinook salmon and their critical habitat would be similar to those evaluated in the BA. Revised construction elements would increase the amount and duration of temporary impacts, but are not in areas used by Chinook salmon or designated as critical habitat; therefore, do not warrant additional analysis of impacts on Chinook salmon or their critical habitat. The LLE effect determinations for Chinook salmon and Chinook critical habitat remain as follows:

- Construction and operation of the LLE may affect, but is not likely to adversely affect, the Puget Sound population of Chinook salmon.
- The LLE will have no effect on designated critical habitat for Puget Sound Chinook salmon.

### 5.2 Steelhead

Within the action area, steelhead have been documented in Thornton and McAleer creeks. Steelhead are not currently known or expected to use habitats in Scriber Creek. None of the tributaries to McAleer, Scriber, and Hall creeks in the action are known or expected to support steelhead use. As described in Section 6.2, there are no changes to project elements that could affect McAleer Creek or its tributaries. In Thornton Creek, steelhead are present in the North Branch approximately 1,600 feet downstream of the action area; however, it is possible that they might use the portion of the stream in the action area. The proposed use of a temporary work trestle for construction of the elevated guideway over the North Branch of Thornton Creek would reduce construction related impacts described in the BA.

With the current design and construction approach for the LLE, direct and indirect effects and interrelated and interdependent actions on steelhead would be the same as those described and evaluated in the BA. Revised construction elements would increase the amount and duration of temporary impacts, but are not in areas used by steelhead or designated as critical habitat; therefore, do not warrant additional analysis of the LLE impacts on steelhead. The LLE effect determination for steelhead remain as follows:

- Construction and operation of the LLE may affect, but is not likely to adversely affect, Puget Sound steelhead.
- The LLE will have no effect on designated critical habitat for Puget Sound steelhead.

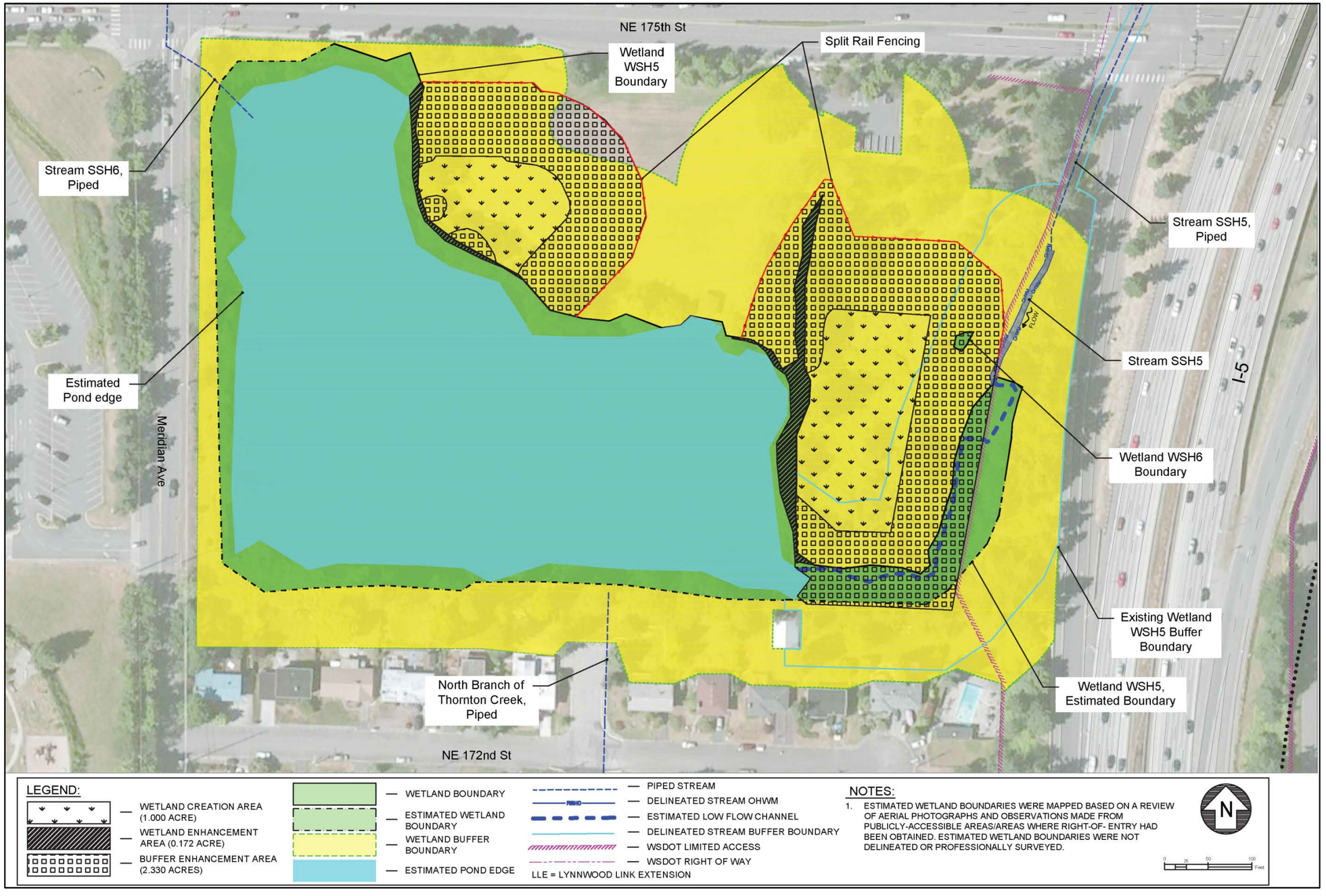
This page intentionally left blank.

# APPENDIX A

## RONALD BOG STREAMS, WETLANDS, AND MITIGATION CONCEPTUAL DESIGN

This page intentionally left blank.

## Ronald Bog Mitigation Overview Map



**From:** Scott Anderson - NOAA Federal [mailto:scott.anderson@noaa.gov]
**Sent:** Tuesday, January 30, 2018 2:30 PM
**To:** Ziegler, Ellie <ellie.ziegler@soundtransit.org>
**Cc:** Jennifer Quan - NOAA Federal <jennifer.quan@noaa.gov>; Ertl, Karin <karin.ertl@soundtransit.org>; Assam, Mark (FTA) <Mark.Assam@dot.gov>; Green, Erin <erin.green@soundtransit.org>
**Subject:** Re: Lynwood Link Extension Project - ESA update

Ellie:
NMFS has reviewed the project changes for the Sound Transit Lynwood Link Extension Project (NWR-2015-1898) (described above). The project changes include decreases in construction related impacts, including temporarily isolating streams (through pipes) during construction, reduction in permanent features below the OHWL, and construction of a stormwater pond within a riparian area. There is no designated critical habitat for salmonids within the action area.

From our review, it appears none of these changes will cause permanent or temporary effects beyond what was described in the original letter of concurrence (NWR-2015-1898).
As such, effects determinations in the original LOC remain valid, and reinitiation is not required at this time.

If more project changes are required that could further effect fish or habitat, please contact NMFS prior to construction.

Thanks
Scott

On Tue, Jan 30, 2018 at 10:43 AM, Ziegler, Ellie <ellie.ziegler@soundtransit.org> wrote:

> Hi Scott,
>
> The information below and attached is related to Sound Transit's Lynwood Link Extension Project. The Lynnwood Link Extension project extends light rail from Northgate to the Lynnwood Transit Center. Sound Transit and the Federal Transit Administration (FTA) completed Section 7 consultation under ESA with NMFS for the project in 2015. NMFS concurred with a determination of "may effect, but not likely to adversely affect" for the threatened Puget Sound Steelhead DPS and the Puget Sound Chinook salmon ESU on January 27, 2015 (see attached). Subsequent to the concurrence by NMFS, Sound Transit advanced the project design and conducted additional stakeholder coordination resulting in some changes in the project design, construction methods, and offsite compensatory mitigation. If possible, we would like your input on if reinitiation of Section 7 consultation is needed.

The changes are summarized in the bullets below and identified in the attached map from the BA with yellow text boxes. With the exception of work near Stream SMT2, the work is within the same areas identified in the original consultation: wetlands and tributaries to Thornton, McAleer, and Scriber creeks. Proposed changes at the North Branch of Thornton Creek, where steelhead may be present, would reduce construction related impacts. None of the other changes will be in areas where steelhead or chinook are present. While some of the changes increase the amount and duration of construction related impacts, the effects of the actions are the same as those described in the BA. Additionally, some of the changes, such as daylighting Stream SLY1 and the Ronald Bog Park Mitigation site, will result in long term benefits.

- **North Branch of Thornton Creek**: The BA included overwater work at the North Branch of Thornton Creek to construct the elevated guideway. As suggested by WDFW, ST will construct temporary work trestle over the stream to protect water quality while constructing the elevated guideway above the stream. This will decrease potential construction related impacts identified in the BA. Steelhead occur approximately 1,600 feet downstream of the action area. However, based on an observation of an adult steelhead near Twin Ponds upstream of the action area, it is possible that steelhead may us stream habitats in the action area.

- **Stream SSE1** (tributary to Thornton Creek):The BA identified turbidity and sedimentation impacts due to construction. To protect water quality during construction, ST has changed the construction approach to temporarily pipe approximately 100 feet. No fish are known or expected to use Stream SSE1.

- **Stream SMT1** (tributary McAleer Creek): The BA assumed temporary turbidity and sedimentation impacts from construction and in-water work for the permanent placement of a column within the OHWM. To protect water quality during construction, ST now plans to temporarily pipe the stream. To avoid permanent impacts of a column within the OHWM, ST also plans to realign the stream after construction. No fish are known or expected to use SMT1 in the action area because of human-created barriers to fish passage.

- **Stream SMT2** (tributary to Hall Creek): Stream SMT2 was identified subsequent to the BA. No in-water work is proposed, but temporary (0.011 acre) and permanent (0.057) impacts to stream buffer for construction access and a new stormwater pond. No fish are known or expected to use Stream SMT2.

- **Scriber Creek**: The BA assumed temporary impacts from construction of a 12,600 foot temporary work trestle with 88 temporary piles. It also assumed permanent impacts of 6 columns within the OHWM for the guideway. ST has since identified the need for a larger temporary work trestle (24,000) with additional piles (up to 94). ST has also modified the design of the permanent structure to reduce the number of permanent columns from six to four. Chinook have been documented in Scriber Creek approximately 3,100 feet downstream; however, a total fish barrier is located approximately 2,900 feet downstream of the action area. Steelhead are not known or expected to use the habitats in Scriber Creek.

- **Stream SLY1** (tributary to Scriber Creek): The majority of Stream SLY1 is piped in the action area, with the exception of approximately 140 feet. The BA assumed no impacts to the stream. Through coordination with the City of Lynnwood, WDFW, and the Muckleshoot Tribe, ST has changed the design to temporarily pipe 140 linear feet during

construction (4-5 years). After construction ST will reroute and daylight approximately 500 linear feet of the stream in action area to make it fish passable. Chinook are not expected to use Stream SLY1 because of complete fish barriers over 2,900 feet downstream of the action area. Steelhead are not known or expected to use the habitats of Scriber Creek.

- **Ronald Bog Park Mitigation Site**: Through coordination with the City of Shoreline and the Corps of Engineers ST identified offsite compensatory mitigation at Ronald Bog Park. Mitigation includes reestablishing about 1 acre of wetland in the park adjacent to Ronald Bog Pond. Two tributaries of Scriber Creek (SSH5 and SSH6) flow into Ronald Bog Pond. Stream SSH5 enters through the northeast corner of the park in a 42-inch-diameter culvert. It then flows in a channelized open watercourse along the west side of I-5 and discharges into the pond. Stream SSH6 is limited to a stormwater pipe that collects water along Meridian Avenue North and discharges into Ronald Bog pond from the northwest. Based on public fishing reports online, fish are present in Ronald Bog pond and therefore also likely present in Stream SSH5. Fish in these water bodies are likely limited to carp, bluegills, and potentially smallmouth bass and/or cutthroat trout. One steelhead was observed at Twin Ponds Park (downstream of Ronald Bog Park) in 2004. However, it appears to be an anomaly, and no salmon have been documented upstream of the Twin Ponds Park location. Fish use of Stream SSH6 is unknown, but unlikely since the entire length of the stream appears to be enclosed in an underground culvert along Meridian Avenue North.

Please let me know if you think any of the changes warrant reinitiating consultation. If not, we will document the changes in a “no need to reinitiate” letter for review and approval by FTA.

Thank you for your help,

**Ellie Ziegler**
Senior Environmental Planner
Office of Environmental Affairs & Sustainability
Sound Transit
W (206) 398-5135
C (206) 954-0828
Connect with us
facebook.com/SoundTransit
twitter.com/SoundTransit


--
Scott E. Anderson
Lower Columbia/SW Washington Branch
National Marine Fisheries Service
360.753.5828