



# MERCER ISLAND TRANSIT INTERCHANGE Operational and Configuration Study

Submitted by:

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# MERCER ISLAND TRANSIT INTERCHANGE

## Operational and Configuration Study

PREPARED FOR:  
SOUND TRANSIT

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# ACRONYMS

FEIS	Final Environmental Impact Statement
HOV	High occupancy vehicle
I-90	Interstate 90
KCM	King County Metro
P&R	Park and Ride
SEPA	State Environmental Policy Act
WSDOT	Washington State Department of Transportation

# INTRODUCTION/PROJECT OVERVIEW

## Overview of Tasks

David Evans and Associates, Inc. has been contracted by Sound Transit to provide an Operations and Configuration Study for transportation improvements on Mercer Island. This study is intended to provide the necessary analysis to identify a preferred alternative that addresses needs and goals of Sound Transit, the City of Mercer Island, and King County Metro (KCM or Metro). Below is a summary of the pertinent project information and team.

Name of Project:	Mercer Island Transit Interchange: Operational and Configuration Study
Project Sponsor:	Sound Transit
Analysis Consultant:	David Evans and Associates, Inc. 14432 SE Eastgate Way, Suite 400 Bellevue, WA 98007

## Project Location

The City of Mercer Island is located on an island, sharing the same name, between the urban western Washington cities of Seattle (to the west) and Bellevue (to the east). Mercer Island is bounded by Lake Washington and bisected at the northern end of the island by Interstate 90 (I-90). Although the island is primarily residential, there are many amenities including local and regional trails, commercial and retail areas, local and regional parks and beaches, and transit facilities. The areas adjacent to the I-90 corridor boast commercial and central business districts, parks, freeway lids, the Mercer Island Park and Ride (P&R), and future Mercer Island Link Light Rail station/system in between the eastbound and westbound I-90 travel lanes.

This analysis focuses on transit interchange integration within this I-90 corridor, and the adjacent amenities, Central Business District, and the Mercer Island Park and Ride (P&R). This project's scope focuses on the local roadways adjacent to I-90 including North Mercer Way, 77<sup>th</sup> Avenue SE, and 80<sup>th</sup> Avenue SE. A vicinity map of the project area is shown in **Figure 1**.

## Background/Purpose Statement

As part of the Settlement Agreement between the City of Mercer Island and Sound Transit for the East Link Project, both parties agreed to work jointly in implementing a modified 77<sup>th</sup> Avenue SE Configuration of the proposed bus/rail transit integration facility identified in the *2017 State Environmental Policy Act (SEPA) Addendum to the East Link Extension Final Environmental Impact Statement (FEIS)*. While the City of Mercer Island and Sound Transit are the sole signatories, the agreement states that the 77<sup>th</sup> Avenue SE Configuration cannot be implemented without Metro's concurrence.

KCM has raised concerns regarding the 77<sup>th</sup> Avenue SE Configuration modifications that would create significant tradeoffs and **negatively impact current and future Mercer Island residents and businesses**. The negative impacts include:

- Transfer times between bus and rail would be longer and more unpredictable because KCM would not be able to schedule buses to meet the trains.

- Reduction in connectivity for Mercer Island residents and employees to Link and inter-jurisdiction connections between Mercer Island, Eastgate/Factoria, Issaquah, Issaquah Highlands, Southeast Redmond, Sammamish, and North Bend. Public outreach to these communities would be required.
- Less ability to connect between bus and rail along the East Link line will result in more customers from the greater Eastside and I-90 corridor driving to Mercer Island to park, rather than taking bus service from their origin.
- Displaced layover and higher operational cost will require revising the METRO CONNECTS network, potentially calling into question assumptions for service on Mercer Island and the broader Eastside.

All three agencies—in consultation with the Washington State Department of Transportation (WSDOT)—have collaborated in an effort to study and identify bus/rail integration opportunities on Mercer Island. This study will identify the best approach for implementing a successful bus/rail transit interchange that will greatly support the City’s commitment to sustainability and livability by reducing Greenhouse Gas (GHG) emissions in the City and region (Goal 3 of the 2018-2019 Mercer Island City Council Goals).



**Figure 1: Vicinity Map**

## Project Goals and Objectives

Sound Transit, the City of Mercer Island, and KCM have agreed that potential configurations are to be evaluated on how each satisfies the following set of goals and objectives with the purpose of creating a multi-modal transit interchange that:

- Creates a seamless transfer experience for the customer that is intuitive, safe, barrier-free, weather-protected, and efficient;
- Minimize transfer walk distance and number of street crossings for bus/rail transfers;
- Ready for operation when the East Link light rail service begins in 2023;
- A cost-effective design that represents a transparent and appropriate use of public funds;
- Maximizes benefits to Mercer Island residents and local employers;
- Minimizes potential overall property impacts and local community access impacts and maintains through-vehicular traffic on the 80<sup>th</sup> Avenue SE bridge crossing;
- Provides excellent multi-modal access for customers while minimizing general pedestrian, bicycle, and vehicle mobility impacts near bus drop-off locations; and
- Limits diesel idling and limits regional bus circulation through the town center.

These goals and objectives were used to evaluate various potential refinements to the 77<sup>th</sup> Avenue SE Configuration, as discussed below.



# EXISTING CONDITIONS

The existing conditions present the current transit routing, service, infrastructure, facilities, and the connecting roadway network. These sections shall be used as a baseline for what services occur prior to any improvements, including East Link light rail service.

## Transit Service Area/Existing Transit Service

### Routes Currently Serving Mercer Island

Mercer Island is served by two separate transit authorities, Sound Transit and KCM. Each authority has a number of routes with a pair of stops along North Mercer Way adjacent to the future light rail station, with access points on both the north and south side of the street.

Sound Transit currently offers the following transit routes and services:

- Route 550 – Bellevue to Seattle [stops on both the north side and south side of North Mercer Way]
- Route 554 – Issaquah to Seattle [stops on both the north side and south side of North Mercer Way]

KCM currently offers the following transit routes and services:

- Route 201 – South Mercer Island to Mercer Island P&R [stops on both the north side and south side of North Mercer Way]
  - KCM has identified that this route will be deleted in March of 2019
- Route 204 – South Mercer Island to Mercer Island P&R [stops on both the north side and south side of North Mercer Way]
  - KCM has identified that starting in March 2019, Route 204 is being converted to the KCM Dial-A-Ride Transit (DART) service and is gaining Saturday services, which the existing route does not include.
- Route 216 – Bear Creek P&R to Issaquah to Downtown Seattle [stops on both the north side and south side of North Mercer Way]
- Route 630 (Community Shuttle) – Mercer Island to Downtown Seattle [stops on both the north side and south side of North Mercer Way]. Route 630 also offers variable routing service on a portion of Mercer Island on Monday through Friday, 6:00 AM – 8:15 AM and 4:45 PM to 7:15 PM.
- Route 892 – Mercer Island to Mercer Island High School [stops on the south side of North Mercer Way]
- Route 981 – Lakeside (Haller Lake) to Mercer Island P&R [stops on the north side of North Mercer Way]. This route only operates when Lakeside School is in session.
- Route 989 – Factoria to Lakeside (Haller Lake) to Evergreen School [stops on both the north side and south side of North Mercer Way]

Refer to **Appendix A** for route information for each of the routes currently served by Sound Transit and KCM.

**Figure 2** is a representation of existing bus routing in the immediate vicinity of the future light rail station.



**Figure 2: Existing Transit Routing**

### Frequency of Service and Scheduling

Frequency of service and timing is dependent on each of the routes servicing the Mercer Island P&R and the associated stops along North Mercer Way. Basic scheduling and stops for each of the existing services, based on arrival/departure times, but not including any special scheduling or missed/adjusted routes and stops, are illustrated in **Table 1**. All counts and times are based on the arrival/departure at the respective Mercer Island P&R stop.

**Table 1: Existing Transit Service Serving Mercer Island P&R**

Route No.	Direction	First Departure	Last Departure	Weekday AM Peak/ Total AM Trips*	Weekday PM Peak/ Total PM Trips*	Total Route Daily Trips
ST Route 550	EB	5:16 AM	12:14 AM	5/29	12/62	179
	WB	5:12 AM	12:33 AM	12/44	6/44	
ST Route 554	EB	5:40 AM	12:21 AM	3/15	5/28	87
	WB	4:43 AM	11:17 PM	4/23	3/21	
KCM Route 201	NB	7:20 AM	7:59 AM	2/2	-	3
	SB	6:26 PM	6:26 PM	-	1/1	
KCM Route 204	EB	6:23 AM	7:03 PM	2/8	2/9	35
	WB	6:08 AM	6:43 PM	2/9	2/9	

Route No.	Direction	First Departure	Last Departure	Weekday AM Peak/ Total AM Trips*	Weekday PM Peak/ Total PM Trips*	Total Route Daily Trips
KCM Route 216	WB	6:28 AM	9:07 AM	2/6	-	14
	EB	3:38 PM	6:35 PM	-	3/8	
KCM Route 630 (Community Shuttle)	WB	6:18 AM	8:22 AM	2/5	-	10
	EB	4:40 PM	7:10 PM	-	2/5	
KCM Route 892	SB	7:27 AM	7:27 AM	1/1	-	2
	NB	3:36 PM	3:36 PM	-	1/1	
KCM Route 981	SB	7:22 PM	7:22 PM	-	1/1	1
KCM Route 989	NB	7:07 AM	7:07 AM	1/1	-	2
	SB	4:18 PM	4:18 PM	-	1/1	
<b>Totals</b>				<b>36/143</b>	<b>39/190</b>	<b>333</b>

\* Total AM and PM Trips represent the number of trips during the peak (1) hour during each peak period.

Currently, ST Express Bus Routes (550 and 554) comprise approximately half of bus service on Mercer Island during the AM and PM peak periods. Per **Table 1** above, ST Routes account for 18 AM and 17 PM peak hour bus trips, approximately 50 and 44 percent of total peak hour bus trips in each AM and PM peak hour, respectively. By comparison, the seven (7) KCM Bus Routes account for 18 and 22 bus trips in the AM and PM peak hours, respectively. In the AM peak, westbound (to Seattle) trips outnumber eastbound (to other Eastside communities) approximately 2 to 1; during the PM peak, the reverse is true. During the AM peak, the bus stops on the north side of North Mercer Way are busiest, with buses exiting on the westbound I-90 HOV off-ramp at 80<sup>th</sup> Avenue SE and traveling west on North Mercer Way before returning to westbound I-90 at 76<sup>th</sup> Avenue SE. Based on the current schedule, approximately one bus (ST or KCM) arrives to North Mercer Way every 2 minutes during both the AM and PM, and although it is not uncommon for two buses to arrive at the same time, it is rare for more than 3 buses to be operating at bus stops on both sides of North Mercer Way simultaneously.

Starting in March 2019, Route 201 is being deleted, and Route 204 is being converted to Dial-A-Ride Transit (DART) and gaining Saturday service. DART is a fixed-route transit service that typically operates in suburban communities via smaller transit vehicles. In addition to operating on a fixed route according to a regular schedule, DART offers the flexibility to make minor route variations to pick-up and drop-off passengers within a defined service area during non-peak hours. As a result of this change, Mercer Island can expect to see fewer 40-foot coaches and more of the smaller shuttles, similar to the existing Route 630 vehicles.

## Existing Transit Infrastructure

Existing transit infrastructure accommodates current local and regional transit services, primarily to serve Mercer Island commuters who park at the Mercer Island Park & Ride (P&R) at North Mercer Way and 80<sup>th</sup> Avenue SE and board ST and KCM buses at bus stops on both sides of North Mercer Way. **Figure 3** below shows the existing Mercer Island P&R and pick-up/drop-off facilities, along with the local roadway network.



**Figure 3: Existing Transit Facilities**

### Park and Ride and Pick-Up/Drop-Off Areas

Sound Transit owns and operates the Mercer Island P&R located at 8000 North Mercer Way on the north side of North Mercer Way at 80<sup>th</sup> Avenue SE, conveniently located between I-90 access points at 76<sup>th</sup> Avenue SE (westbound) and Island Crest Way (eastbound) and a short distance from the Mercer Island Town Center. The facility is a two-level parking garage structure with 447 parking stalls, 16 bicycle lockers, plus surface racks. The Mercer Island P&R is lighted and has emergency phone stations.

The site is accessed by two separate driveways along North Mercer Way—the main entrance at the intersection of North Mercer Way and 80<sup>th</sup> Avenue SE, and the secondary entrance is about 360 feet northwest. The main entrance provides a direct connection to the upper level of parking structure while the secondary access goes to the lower level.

Along North Mercer Way (both the north side and south side; west of the main entrance intersection) are the transit center’s roadside bus bays along with concrete sidewalks, curb access to transit, shelters, illumination, trash receptacles, wayfinding and transit route signage, and a signalized pedestrian crossing at 80<sup>th</sup> Avenue SE. There is roughly 225 feet of bus bay pick-up and drop-off space on both sides of North Mercer Way. There are no separate layover areas in the existing condition, as bus layover operations occur within the existing pick-up and drop-off areas.

### Adjacent Street Network

North Mercer Way is a three-lane Urban Major Collector with curb, gutter, sidewalk, planter areas, and I-90 trail amenities. The speed limit in the project vicinity varies from 25 to 30 miles per hour. There are traffic signals along North Mercer Way, in particular at 77<sup>th</sup> Avenue SE, 80<sup>th</sup> Avenue SE and Island Crest Way. Outside of the areas adjacent to the Mercer Island P&R, only intermittent street lighting is provided.

# ANALYSIS OF THE MODIFIED 77<sup>TH</sup> AVENUE SE CONFIGURATION

Per the November 2017 Settlement Agreement, both Sound Transit and the City of Mercer Island agreed to collaborate on bus-rail integration design that would improve transit integration between the existing Mercer Island P&R and the future East Link light rail station—to be located at grade within the I-90 freeway elevation between the 77<sup>th</sup> Avenue SE and 80<sup>th</sup> Avenue SE overpasses—and will include a new roundabout at the intersection of 77<sup>th</sup> Avenue SE and North Mercer Way (see **Appendix B**). This future transit interchange will become important for future commuters, Mercer Island residents, and Mercer Island employers, as it will become a key transfer point for Metro buses to/from Eastside communities not immediately served by East Link (East Link will serve both Bellevue and Redmond). It is anticipated that ST Express Bus routes currently serving Mercer Island will either be eliminated (ST Route 550) or terminate/truncate at South Bellevue (ST Route 554). This is a critical connection for the following reasons:

- Current and future Mercer Island residents, employees, and businesses will rely on connections that will not be served by East Link.
- Mercer Island is already a key destination with 150 to 175 daily trips originating or ending at Mercer Island to/from areas that will not be served by East Link.
- Mercer Island is the fastest, most logical, intuitive, and attractive location to connect to Link for transit customers traveling along the I-90 corridor to/from points east of Mercer Island.
- Terminating routes at Mercer Island East Link light rail station is the most efficient use of Metro resources (buses and operational hours) and offers the best opportunity to allow expansions of local connections.

The remainder of this report identifies key modifications to the 77<sup>th</sup> Avenue SE Configuration that limit KCM’s ability to provide the best level of service for current and future Mercer Island residents, employees, and businesses. The report will analyze outcomes of three alternatives using the Project Goals and Objectives as a guide. The estimated service levels indicated under each of the following scenarios are based on the modified 77<sup>th</sup> Avenue SE Configuration and initial assumptions that may vary based on further planning and design refinements. Each option’s estimated future service levels are below KCM’s preferred service levels and below existing service levels. **Figure 4** shows the anticipated routing of transit services once East Link light rail service becomes operational in 2023.

**Most importantly, each of the configurations discussed below serve to implement the Settlement Agreement and will not result in a need to change or amend this agreement.**



**Figure 4: Anticipated Future Bus Routing on Mercer Island**

## Documentation Review

### Previous Analytical Studies

The following analytical and reference documents/studies relating to transit connections on Mercer Island were reviewed prior to conducting this study:

- *East Link FEIS*, July 2011
- *East Link Extension – 2017 SEPA Addendum*, April 2017
- *Sound Transit East Link: Bus/LRT System Integration Study*, July 2014
- *Summary of Metro’s Needs at Mercer Island Transit Hub Memorandum*, June 2018
  - As part of the memo, review of the *Mercer Island Transit Center – 77th Ave Transit Facility Review*, May 2017
- Estimated inbound/outbound data provided by KCM, September 2018
- *City of Mercer Island Pedestrian and Bicycle Facilities Plan*, June 2010

It should be noted that the scope of several of the documents reviewed above are systemic in nature, where Mercer Island was discussed in a more regional context. It should also be noted that many of these previous

analytical studies covered a number of local transit interchange options, including baseline configurations at 77<sup>th</sup> Avenue SE and 80<sup>th</sup> Avenue SE (included in the *East Link FEIS*).

## Environmental Review and Compliance

As noted above, both the *East Link FEIS* and the *SEPA Addendum* analyzed the potential environmental impacts of a number of local transit interchange options, including configurations focusing bus traffic along North Mercer Way to 77<sup>th</sup> Avenue SE or along 80<sup>th</sup> Avenue SE. Potential environmental impacts as a result of any of the options evaluated in this study were previously discussed and accounted for in previous environmental analyses and no additional environmental review is required.

## Refinements to the Modified 77<sup>th</sup> Avenue SE Configuration

### Limited Service Configuration

In addition to the FEIS Configuration, two configurations from the *2017 SEPA Addendum* were considered for transit integration when East Link service is in operation:

- 77<sup>th</sup> Avenue SE Configuration, and
- 80<sup>th</sup> Avenue SE Configuration.

As part of the Settlement Agreement, the Parties (Sound Transit and Mercer Island) agreed to implement the 77<sup>th</sup> Avenue SE Configuration, where buses would be routed in a counterclockwise direction along North Mercer Way and turn around at a new roundabout at North Mercer Way and 77<sup>th</sup> Avenue SE. The roundabout would allow for buses to make a full U-turn along North Mercer Way and eliminate any need for regional (I-90) buses to travel through the Town Center. It is anticipated that buses would connect through the transit interchange by departing I-90 from the westbound 80<sup>th</sup> Avenue SE high-occupancy vehicle (HOV) off-ramp and reconnecting on the eastbound 80<sup>th</sup> Avenue SE HOV on-ramp (as shown on **Figure 4**).

The Settlement Agreement included several modifications to the 77<sup>th</sup> Avenue SE Configuration, as originally depicted in the *2017 SEPA Addendum*, but allowed that “the Parties agree that the 77<sup>th</sup> Avenue SE Configuration cannot be implemented without King County Metro’s agreement” and “[t]he Parties will work collaboratively with King County Metro to obtain its concurrence where necessary and document such concurrence as appropriate.”

Metro has identified a number of operational modifications to the 77<sup>th</sup> Avenue SE Configuration that would result in negative impacts for current and future Mercer Island residents, employees, and businesses and the regional transit network, specifically:

*Section 4.3(b) – Bus layover times are limited to no more than 15 minutes, and then only during the afternoon peak period (3:30 PM to 7:00 PM).*

The opening of East Link service will necessitate a significant restructure of Metro’s bus service, including the ability for buses to layover and sync with Link service on Mercer Island. Mercer Island will become an important location for customers, including many Mercer Island residents and employees, to transfer between rail and bus service and connect to/from communities not served by East Link.

Layover limits have the most severe impact and could prohibit any level of service on Mercer Island, including local Mercer Island service. KCM cannot legally limit bus layover durations that conflict with labor contract requirements mandating operator rest periods. However, typical layover times are approximately 15 minutes,

so the majority of layovers would meet the intent of this layover limit. It is in KCM's interest to minimize the length of layover to the extent feasible in order to maximize its resources and provide the best level of service possible for the communities it serves.

Additionally, Metro would not be able to provide peak service to Mercer Island, or all-day on-island service, if layovers are limited to the afternoon peak period. Limiting bus layover times to fifteen (15) minutes, and only during the afternoon peak period, would eliminate the opportunity to provide coordinated bus-rail transfers on Mercer Island, including services for the on-island Mercer Island routes. In addition, KCM does not idle its buses during layover. KCM is also aggressively pursuing a zero-emissions fleet that should further mitigate any future concern regarding emissions during bus layovers.

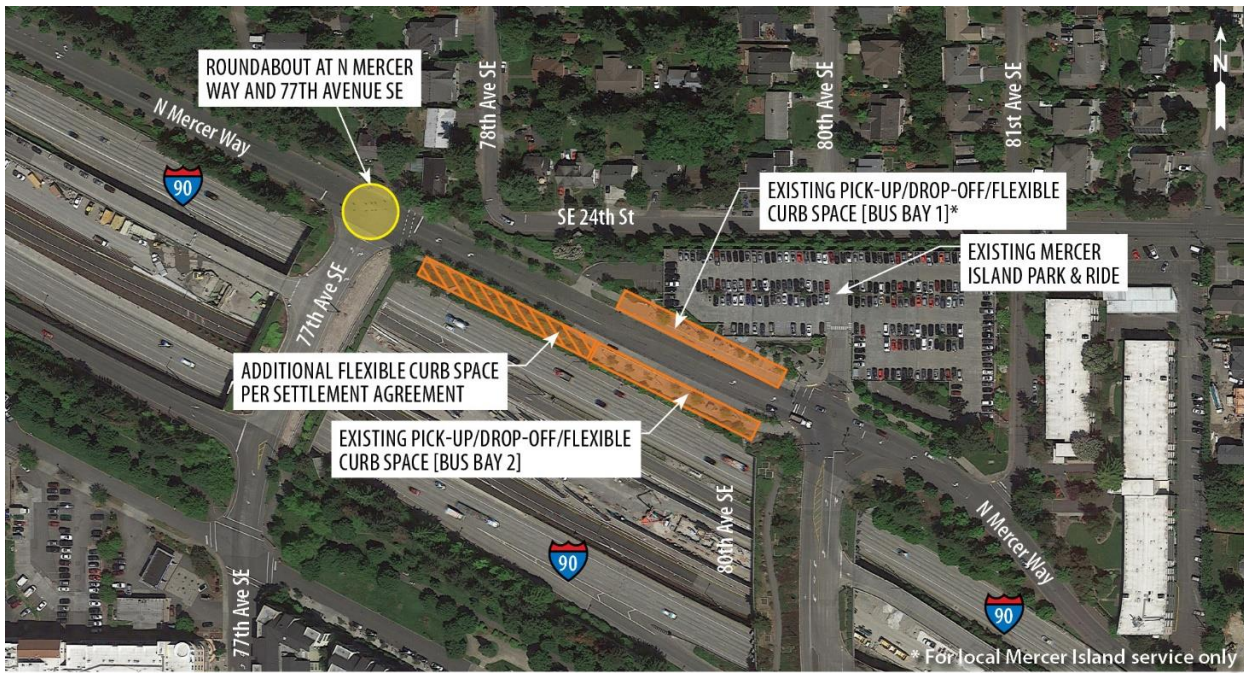
*Sections 4.2(a)/4.3(a) – All bus drop-off/pick-up, and layover areas – other than for local Mercer Island buses, as indicated in 4.2(1) – will be located on the south side of North Mercer Way.*

These sections would significantly limit the capacity of future off-island service for Mercer Island residents, employees, and businesses connecting to/from East Link and other destinations on Mercer Island likely resulting in more single-occupant vehicle trips and greater traffic levels on Mercer Island. Moreover, less ability to connect between bus and rail along East Link will result in more customers from the greater Eastside and I-90 corridor driving to Mercer Island to park. This would also increase travel time for inbound customers as buses would route through the planned 77<sup>th</sup> Avenue SE roundabout before arriving at the pick-up/drop-off location.

*Sections 4.2(a)/4.3(a)* effectively limit bus operations to approximately 450 feet along the south side of North Mercer Way. While exact utilization of this space has not been determined, it would allow for a maximum of three layover bays along the south side of North Mercer Way and a single active bay that could accommodate up to two buses at once. For purposes of this analysis, KCM has assumed an average layover of 15 minutes for each bus. Under this assumption, this layout allows for a maximum of only 12 buses per hour serving the Link station, as shown in **Table 2** below. This level of service is much less than half of existing service levels and less than half of Metro's proposed 2025 service levels as outlined in METRO CONNECTS, equating to one bus every five minutes and a maximum of three buses laying over at any given time.

This configuration—which complies with all other conditions in the Settlement Agreement—is identified as the **Limited Service Configuration** and illustrated in **Figure 5**.





**Figure 5: Limited Service Configuration**

**Table 2: Existing and Proposed Curb Space Configurations**

Location	Pick-Up/Drop-Off Bays	Flexible/Layover Bays	Estimated Peak Hour Service
<b>Existing Conditions and Existing Transit Service (Baseline Condition)</b>			
N. Mercer Way (WB)	1 [See Note A.]	See below.*	
N. Mercer Way (EB)	1 [See Note A.]	See below.*	
80th Avenue SE (SB)	0	0	
<b>Service Characteristics</b>	<b>*Sound Transit and KCM buses utilize bus bays on both sides of N. Mercer Way. KCM bus layover operations occur within this area.</b>		<b>36 AM and 39 PM peak hour trips, or one bus every 2 minutes</b>
<b>Limited Service Configuration</b>			
N. Mercer Way (WB)	1 [local service only]	0	
N. Mercer Way (EB)	1 [same as existing]	Up to 3	
80th Avenue SE (SB)	0	0	
<b>Service Characteristics</b>	<b>50+% reduction in bus volumes relative to existing condition.</b>		<b>12 AM and 12 PM, or one bus every 5 minutes</b>
<b>Improved Service Configuration</b>			
N. Mercer Way (WB)	1 [same as existing]	1	
N. Mercer Way (EB)	1 [same as existing]	Up to 3	
80th Avenue SE (SB)	0	0	
<b>Service Characteristics</b>	<b>50% reduction in bus volumes relative to existing condition.</b>		<b>16 AM and 16 PM, or one bus every 4 minutes</b>

Optimal Service Configuration			
N. Mercer Way (WB)	1 [same as existing]	1	
N. Mercer Way (EB)	1 [same as existing]	Up to 3	
80th Avenue SE (SB)	1**	0	
<b>Service Characteristics</b>	<b>50% reduction in bus volumes relative to existing condition.</b> <b>**80<sup>th</sup> Avenue SE pick-up/drop-off transit for local Mercer Island bus service only if requested by the City.</b>		<b>Up to 20 AM and up to 20 PM, or one bus every 3 minutes</b>

**NOTE**

- A. Existing curb space along North Mercer Way is labeled as Bus Bay 1 (WB, north side) and Bus Bay 2 (EB, south side); however, each of these bays are approximately 225 feet in length and can accommodate up to 3 buses at once.

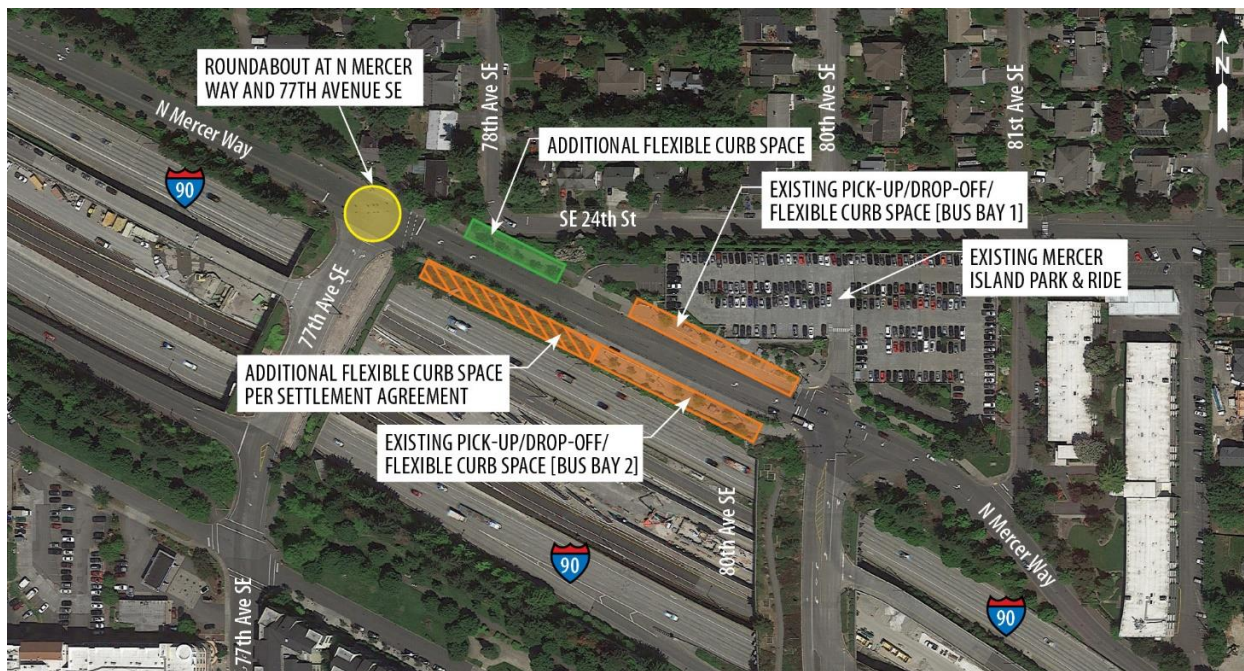
### Improved Service Configuration

As part of the pre-analysis period, KCM provided a table (see **Appendix C**) outlining service challenges of several modifications to the 77<sup>th</sup> Avenue SE Configuration that need further refinement to provide adequate service for the community of Mercer Island and to meet Metro’s current and future operational needs. These include: (1) bus layover periods only in the afternoon peak period (3:30 PM – 7:00 PM); (2) limiting pick-up/drop-off areas on the south side of North Mercer Way; and (3) limiting specific bus layover times.

KCM has stated that permitting bus bays along both the north and south sides of North Mercer Way—a refinement of *Sections 4.2(a)/4.3(a)*—would enable better transit service to Mercer Island. This configuration—identified as the **Improved Service Configuration**—would include a footprint of approximately 370 feet along the north side of North Mercer Way, in addition to the 450 feet along the south side of North Mercer Way, building upon the Limited Service Configuration. This configuration would preserve the existing active bay space along the north side of North Mercer Way and provide additional flexible curb space, allowing for a moderate increase in service levels when compared to the previous scenario. Assuming an average layover time of 15 minutes, approximately 16 buses per hour could serve this transit interchange under this configuration, or approximately one bus roughly every 4 minutes (see **Table 2**). For reference, this volume of activity is still less than half of today’s frequency. A maximum of 4 buses could layover at any given time.

Additionally, outside the AM and PM peak periods, the newly-designated flexible curb space may also supplement the planned drop-off area to support the existing and future needs of innovative mobility options (such as commuter rideshare) that will serve to enhance access to and from this transit hub.

In summary, the **Improved Service Configuration** would maintain the existing pick-up/drop-off bays, provide room for no more than 3 layover spaces along the south side of North Mercer Way, and provide one additional layover space along the north side of North Mercer Way (see **Figure 6**). Bus routing and access—including the proposed roundabout at North Mercer Way and 77<sup>th</sup> Avenue SE—are identical to these attributes in the Limited Service Configuration.



**Figure 6: Improved Service Configuration**

### Optimal Service Configuration

The **Optimal Service Configuration** builds upon the Improved Service Configuration by adding a preferred pick-up/drop-off stop for local bus service along southbound 80<sup>th</sup> Avenue SE approximately 100 feet south of the Mercer Island light rail station’s east entrance. This stop would provide additional capacity and flexibility for Metro operations at this transit hub, and an ideal location for quick, convenient transfers for passengers between light rail and local bus service, and would only be included if requested by the City. This configuration would require a refinement of the first section of *Section 4.2(a)*, which states “[t]here will be no bus drop-off/pick-up or layover area on 80<sup>th</sup> Avenue SE”; this refinement is recommended to meet Metro’s current and future operational needs.

In summary, this configuration would allow for an additional bus stop for local bus service along southbound 80<sup>th</sup> Avenue SE and may provide room for one additional layover space along the south side of North Mercer Way, assuming some active bay capacity could be transferred to 80<sup>th</sup> Avenue SE (see **Figure 7**). Bus routing is essentially the same as the previous two configurations. Again, assuming an average of 15 minute layovers, up to 20 buses per hour could serve the new Link station under this configuration—still lower than existing bus frequency (see **Table 2**).

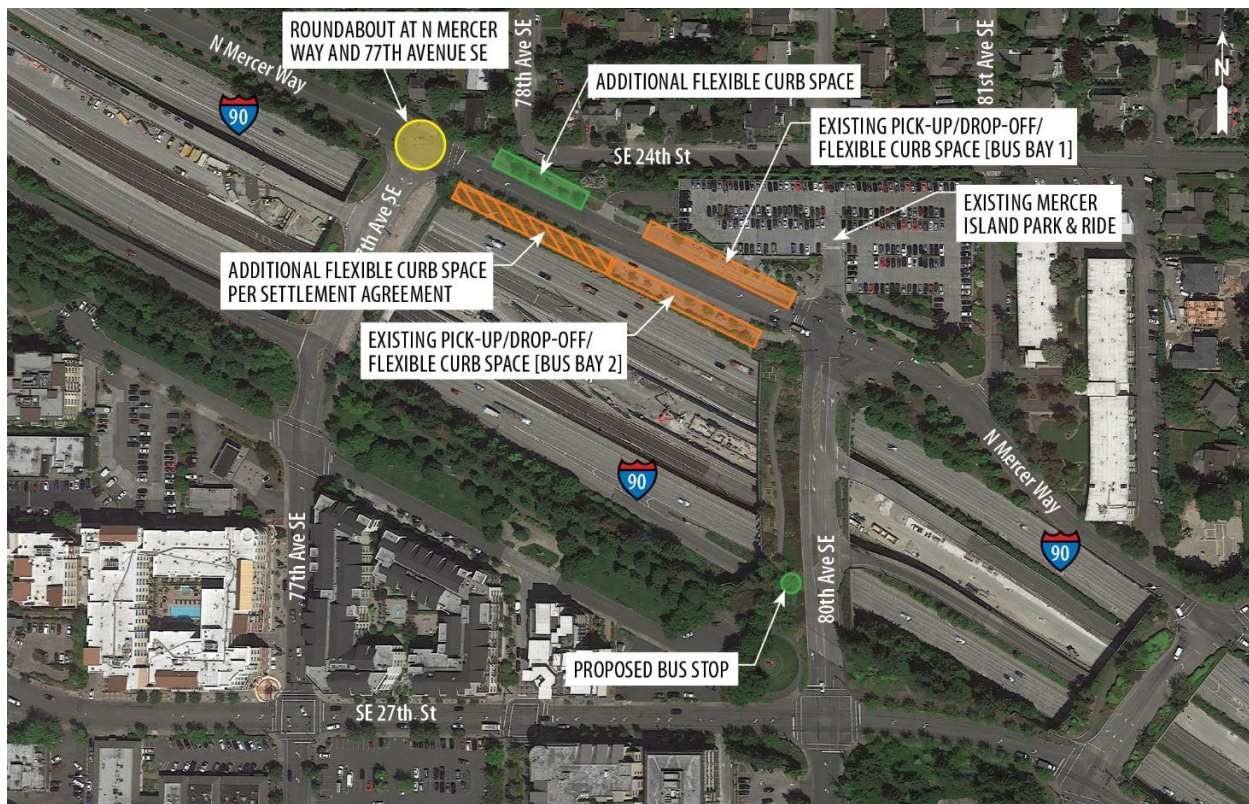


Figure 7: Optimal Service Configuration

## Points of Analyses and Evaluation

### Methodology

Sound Transit, Mercer Island, and KCM developed eight goals/objectives to establish the framework for determining which transit configuration best serves Mercer Island residents and other transit users. A description of the contributing factors—reflecting a wide range of considerations and influences—employed to evaluate the performance of each configuration as it pertains to the identified goals and objectives are discussed in detail below.

### Identified Goals and Objectives

The eight identified goals and objectives (and their respective defining factors) developed to objectively evaluate each of the three design configurations are as follows:

**Goal/Objective 1: *Create a seamless transfer experience for the customer that is intuitive, safe, barrier-free, weather-protected, and efficient.***

A seamless transfer experience for a bus-rail transfer patron should be effortless, direct, and quick. This effortless transfer experience starts with the distance proximity to/from pick-up and drop-off areas for both means of travel in which a patron must walk to. Bus stops located on the north side of North Mercer Way are the least seamless, as this requires transfer patrons to wait for traffic prior to crossing to the south side of the street towards the future Mercer Island light rail station, resulting in a less efficient transfer. Additionally, since the crossing is not covered, these patrons are exposed to the weather.

In addition to a direct and effortless link, rail/bus transfers must be plentiful to meet the user's needs. The transit services are configured based on the usage of transit routes and its ridership. If transfers are not readily available to necessary Eastside destinations (e.g., Bellevue, Issaquah, etc.), this lack of service further reduces transit demand to/from these areas, resulting in a less seamless transfer experience. This also directly impacts the service scheduling and reliability of buses, and corresponding rail schedules. Reduced levels of transfer scheduling means less service for the Mercer Island residents and employers. However, if greater levels of services are planned and more transit opportunities are provided, there is less queuing and waiting in weather-protected areas for passengers during the transfer.

Switching between light rail trains, buses, local shuttles, and future connection methods can be confusing and non-inviting to riders. Greater transfer distances requires additional amenities to facilitate that efficient transfer, such as signage, localized illumination, and easily accessible transit route information/materials. Wayfinding signage facilitates a general understanding of where each transit mode is located and how to most directly get to that location; the importance of wayfinding signage increases with the difficulty and/or distance between transfer points.

***Goal/Objective 2: Create a transit interchange that minimizes transfer walk distance and number of street crossings for bus/rail transfers.***

Greater distances between transfer points substantially reduce the effectiveness of transit interchange operations. Conversely, shorter distances between transfer points and transit nodes—in this case, future light rail service connections with local and regional bus service—allow for better-coordinated transit scheduling and an improved customer experience, including benefits for disabled passengers. As the location of the Mercer Island light rail station is fixed, the differences between the three configurations are the proposed bus stop locations, which would be located along the north (passenger drop-off) and south (passenger pick-up) sides of North Mercer Way and, if requested by the City, along 80<sup>th</sup> Avenue SE approximately 100 feet south of the light rail station's east entrance. A bus stop along 80<sup>th</sup> Avenue SE (approximately 100 feet) and on the south side of North Mercer Way (approximately 300 feet) provide the shortest transfer walk distance between modes. Bus stops on the north side of North Mercer Way (up to 600 feet) are the farthest distance from the light rail station; in addition, access to these bus stops would require a street crossing at the North Mercer Way/80<sup>th</sup> Street SE signalized intersection.

***Goal/Objective 3: Create a transit interchange that is ready for operation when the East Link light rail service begins in 2023.***

Sound Transit, the City of Mercer Island, and KCM have agreed that the transit interchange project should be constructed and in operation prior to the commencement of East Link light rail service. This will ensure proper coordination with both local and regional services at this location. It is anticipated that each of the proposed configurations satisfy this goal/objective to the same degree. However, this assumes that decisions are made in the first quarter of 2019 on the transit interchange so that the necessary property acquisition, final design, and construction can be completed by system opening.

***Goal/Objective 4: Develop a cost-effective design that represents a transparent and appropriate use of public funds.***

Each of the three design configurations are expected to have minimal impact to the local roadway system, while also providing increased usability for transit routing and connectivity to the future light rail station. In this manner, all options represent a transparent and appropriate use of public funds.

However, there are a number of factors with the potential to impact costs for each configuration, including:

- **Right-of-Way:** This is the cost associated with purchasing either private parcels (such as the two residential parcels north of the proposed roundabout at 77<sup>th</sup> Avenue SE) or using public property which is generally directly adjacent to North Mercer Way.
- **Structures:** This is the cost associated with constructing roadway features over the 80<sup>th</sup> Avenue SE lidded structures. These costs may include drainage structures, physical components such as curb and gutter, and pavement for the construction of the pick-up area on the 80<sup>th</sup> Avenue SE lid.
- **Civil/Roadway:** Costs associated with Civil/Roadway would include general construction of bus pick-up, drop-off, and layover areas on both the north and south sides of North Mercer Way.
- **Use of Previous Improvements:** Sound Transit has recently invested to provide updates to the Mercer Island P&R. These improvements include intersection updates at North Mercer Way and 80<sup>th</sup> Avenue SE and non-motorized bike and pedestrian improvements such as striping. These are previously allocated tax dollars and any option that uses the pick-up/drop-off areas on the north side of North Mercer Way make use of this public investment.

All of these financial factors make up the total project construction costs. The combination of each factor can change by each of the three configurations. Total project costs are not only the hard costs associated with construction, but also should incorporate the ease and efficiency for overall facility operation. As such, options such as the Improved Service and Optimal Service Configurations offer cost-effective solutions for increasing transit interchange users.

Separate from costs associated with physical improvements, there is an Airspace Corridor above the I-90 freeway lids. An airspace corridor is a three-dimensional corridor of a specific length and width between two elevations. Airspace corridors are generally used where the highway (i.e., I-90) runs beneath structures, such as the 80<sup>th</sup> Avenue SE overpass. The property above I-90 can be used for other purposes, as long as there are no negative effects on the associated highway. While WSDOT owns the 80<sup>th</sup> Avenue SE overpass, an Operations and Maintenance Agreement between WSDOT and the City of Mercer Island states that the City is to be responsible for all street and landscape maintenance and operations while WSDOT is responsible for the overpass structure and structural maintenance. WSDOT and KCM (with the assistance of Sound Transit and the City of Mercer Island) need to confirm there are not any airspace corridor lease costs for transit stops with these configurations.

**Goal/Objective 5: Maximize benefits to Mercer Island residents and local employers.**

The Mercer Island Transit Interchange will provide a hub, allowing residents, employers/employees, visitors, and commuters connections to local areas of Mercer Island, but also to other regional hubs such as Seattle, Bellevue, and Issaquah. By providing these transit services on Mercer Island, the benefit for Mercer Islanders is maximized. Based on Metro historical data, approximately 150 to 175 passenger trips per day are made between Mercer Island and Eastside communities that will not be served by East Link light rail when it opens in 2024. Any option that reduces services to/from Mercer Island will result in a negative impact for its current and future residents, employees, and employers.

Transit routes will not utilize the Mercer Island Town Center for “looping” back to the Mercer Island P&R. This means that buses once utilizing Town Center streets for connections will be removed, leaving only buses providing direct service to local Mercer Island locations.

In the Improved Service and Optimal Service Configurations, the additional layover/flexible space can be used to support the existing and future needs of innovative mobility options—such as commuter rideshare—that will serve to enhance access to and from this transit hub, but also adds capacity for transit use, reducing queuing and wait times for both transit users and motorists on the adjacent street network.

**Goal/Objective 6: Minimize potential overall property impacts and local community access impacts and maintain through-vehicular traffic on the 80<sup>th</sup> Avenue SE bridge crossing.**

Each of the proposed configurations include a traffic roundabout at North Mercer Way and 77<sup>th</sup> Avenue SE. Due to the physical constraints of the 77<sup>th</sup> Avenue SE I-90 lid and the requirement for both the Metro 40-foot buses and 60-foot articulated buses to circulate through the roundabout while not driving on the truck apron for the routing on North Mercer Way, the roundabout size and location have few other options for placement. Based on preliminary concept designs for the roundabout and safety measures for the I-90 trail, the roundabout and non-motorized components will encroach onto two separate parcels, just north of the proposed roundabout. In addition, taking into account the need for private property acquisition, implementation of the 77<sup>th</sup> Avenue Configuration would result in a much higher cost to the public than the 80<sup>th</sup> Avenue SE Configuration from the 2017 SEPA Addendum.

Each of the proposed configurations would continue to allow and maintain through-vehicular traffic on the 80<sup>th</sup> Avenue SE bridge crossing. The Optimal Service Configuration includes the option—if exercised by the City of Mercer Island—for a bus stop reserved for local bus service along 80<sup>th</sup> Avenue SE south of the of I-90 EB HOV on-ramp; this bus stop is currently envisioned as an in-lane bus stop with the potential to affect southbound traffic along 80<sup>th</sup> Avenue SE. Under this scenario, KCM anticipates a local bus would stop once every 15 minutes with an estimated dwell time of approximately 30 seconds or less. Traffic analyses at intersections along 80<sup>th</sup> Avenue SE in the 2017 SEPA Addendum to the East Link Final EIS—which included higher bus volumes and bus stops along 80<sup>th</sup> Avenue SE in front of the future light rail station entrance—anticipate these locations to continue to perform at acceptable levels. As such, it is anticipated that an in-lane bus stop at this location would result in minimal impacts to through-vehicular traffic on the 80<sup>th</sup> Avenue SE bridge crossing.

**Goal/Objective 7: Provide excellent multi-modal access for customers while minimizing general pedestrian, bicycle, and vehicle mobility impacts near bus drop-off locations.**

Multi-modal access to the current Mercer Island P&R and the East Link light rail station will be crucial for quick and efficient access to transit facilities. Multi-modal facilities and access increase transit usability; provide connectivity to local Mercer Island parks, schools, businesses, and regional destinations; reduce local vehicular traffic; and provide access to community facilities for those unable to drive a car. This is critical upon entering and exiting either the 77<sup>th</sup> Avenue SE or 80<sup>th</sup> Avenue SE link light rail station entrances. The Mercer Island East Link light rail facilities will provide a kiss-and-ride drop-off and bike parking at the 77<sup>th</sup> Avenue SE entrance to the station. This will provide additional bus/rail transfer integration, particularly when connecting to other local areas reachable by different modes of transportation.

While the potential for pedestrian, bicycle, and vehicle mobility interactions are increased with the increase of additional transit pick-up, drop-off, and layover areas, these new multi-modal interaction zones provide opportunities for additional connections for users of the I-90 trail, the Mercer Island P&R, and the future light rail station.

Any final roundabout design will include a direct multi-modal connection point to the I-90 trail. Additionally, the I-90 trail has recently been repaved in some areas, while other connection and ADA compliance improvements have been made recently. The City of Mercer Island has requested that a 14-foot-wide I-90 multi-modal trail be included in the roundabout conceptual design, providing a bolstered non-motorized trail with cross-street access to both the 77<sup>th</sup> Avenue SE and 80<sup>th</sup> Avenue SE light rail entrances.

**Goal/Objective 8: *Limit diesel idling and limit regional bus circulation through the Town Center.***

The City of Mercer Island has expressed the desire to limit the idling of diesel buses on Mercer Island and limit non-local bus routes to North Mercer Way and 77<sup>th</sup> Avenue SE via the I-90 HOV on- and off-ramps at 80<sup>th</sup> Avenue SE. Each of the proposed configurations include a traffic roundabout at North Mercer Way and 77<sup>th</sup> Avenue SE—thus resulting in similar bus routing patterns. KCM has stated that its buses do not idle during layovers, and over the coming years, KCM is shifting to an all-electric fleet of buses, which do not idle.

It is anticipated that each of the proposed configurations satisfy this goal/objective to the same degree.

**Goals and Objectives Evaluation**













**Table 3** provides a detailed evaluation on how each of the proposed refinements satisfy the identified goals and objectives; higher scores reflect an anticipated more favorable outcome.



**Table 3: Project Goals and Objectives Evaluation**



Project Goals and Objectives	Limited Service Configuration	Improved Service Configuration	Optimal Service Configuration
<b>Goal/Objective 1</b>			
<i>Creates a seamless transfer experience for the customer that is intuitive, safe, barrier-free, weather-protected, and efficient</i>	<p>Quick, safe, and intuitive transfers between bus and rail. Limited bus/flexible transit curbspace would reduce local and system-wide transfer opportunities, resulting in increased wait times and a less seamless transfer experience.</p>	<p>Additional bus/flexible transit curbspace would provide adequate local and system-wide transfers. May require street crossing for connections to light rail station, which is less intuitive, and longer connections are not weather-protected.</p>	<p>Provides greatest amount of bus/flexible transit curbspace, allowing for greater transfer opportunities with shortest wait times. Potential bus stop along 80<sup>th</sup> Avenue SE would provide quick and convenient transfers to local bus service.</p>
<b>Goal/Objective 2</b>			
<i>Minimize transfer walk distance and number of street crossings for bus/rail transfers</i>	<p>Short transfer distance as bus pick-up/drop-off points are along North Mercer Way closest to 80<sup>th</sup> Avenue SE. Potential street crossing for transfers to local and regional bus service.</p>	<p>Short transfer distance as bus pick-up/drop-off points are along North Mercer Way closest to 80<sup>th</sup> Avenue SE. Potential street crossing for transfers to local and regional bus service.</p>	<p>Short transfer distance as bus pick-up/drop-off points are along North Mercer Way closest to 80<sup>th</sup> Avenue SE. Potential street crossing for transfers to local and regional bus service. Potential bus stop along 80<sup>th</sup> Avenue SE would provide better access to local bus service.</p>
<b>Goal/Objective 3</b>			
<i>Ready for operation when the East Link light rail service begins in 2023</i>	<p>Construction of this option will be complete prior to commencement of East Link light rail service, provided decision made in Q1 2019.</p>	<p>Construction of this option will be complete prior to commencement of East Link light rail service, provided decision made in Q1 2019.</p>	<p>Construction of this option will be complete prior to commencement of East Link light rail service, provided decision made in Q1 2019.</p>
<b>Goal/Objective 4</b>			
<i>A cost-effective design that represents a transparent and appropriate use of public funds</i>	<p>Lowest overall construction costs, but limits the amount of bus transit service and flexibility for future innovative mobility options through the transit interchange.</p>	<p>Construction costs are balanced compared to the level of transit service provided by the additional bus/flexible transit curbspace.</p>	<p>Construction costs are balanced compared to the level of transit service provided by the additional bus/flexible transit curbspace. Most cost-effective design based on the additional transit service capacities.</p>

Project Goals and Objectives	Limited Service Configuration	Improved Service Configuration	Optimal Service Configuration
<b>Goal/Objective 5</b>			
<i>Maximizes benefits to Mercer Island residents and local employers</i>	 Providing pick-up/drop-off only on the south side of North Mercer Way limits overall ridership benefits to current and future Mercer Island residents and local employers. Major portion of 150 to 175 passenger transit service trips eliminated.	 Provides pick-up and drop-off areas on both the north and south sides of North Mercer Way, providing transit service flexibility and limited service benefits to current and future Mercer Island residents and local employers.	 Provides pick-up and drop-off areas on both the north and south sides of North Mercer Way and in front of light rail station, providing the most transit service flexibility and benefits to current and future Mercer Island residents and local employers.
<b>Goal/Objective 6</b>			
<i>Minimizes potential overall property impacts and local community access impacts and maintain through-vehicular traffic on the 80th Avenue SE bridge crossing</i>	 Roundabout at North Mercer Way and 77 <sup>th</sup> Avenue SE substantially impacts two residential parcels. Through vehicular traffic on 80 <sup>th</sup> Avenue SE will remain.	 Roundabout at North Mercer Way and 77 <sup>th</sup> Avenue SE substantially impacts two residential parcels. Through vehicular traffic on 80 <sup>th</sup> Avenue SE will remain.	 Roundabout at North Mercer Way and 77 <sup>th</sup> Avenue SE substantially impacts two residential parcels. This configuration include the potential for an in-lane bus stop along 80 <sup>th</sup> Avenue SE south of the I-90 EB HOV on-ramp, which may result in minimal impacts to southbound traffic at this location.
<b>Goal/Objective 7</b>			
<i>Provides excellent multi-modal access for customers while minimizing general pedestrian, bicycle, and vehicle mobility impacts near bus drop-off locations</i>	 Fewer pick-up/drop-off and layover bays reduce potential mobility interaction points but also reduces potential multi-modal access opportunities.	 Proposed bus/flexible transit curb space provides opportunities for increased multi-modal accessibility and for future innovative mobility options. Expected activity on the north side of North Mercer Way would result in additional pedestrian, bicycle, and vehicle interaction points.	 Proposed bus/flexible transit curb space in this configuration provides the greatest opportunity for multi-modal access and future innovative mobility options. Expected activity on the north side of North Mercer Way would result in additional pedestrian, bicycle, and vehicle interaction points.
<b>Goal/Objective 8</b>			
<i>Limits diesel idling and limits regional bus circulation through the Town Center</i>	 KCM buses do not idle during layover. Future buses will be all electric. Roundabout eliminates regional bus circulation through the Town Center.	 KCM buses do not idle during layover. Future buses will be all electric. Roundabout eliminates regional bus circulation through the Town Center.	 KCM buses do not idle during layover. Future buses will be all electric. Roundabout eliminates regional bus circulation through the Town Center.
<b>Total Score (Higher Is Better)</b>	<b>24</b>	<b>28</b>	<b>33</b>

# CONCLUSION AND RECOMMENDATION

## Analyses Results

All three of these configurations were developed with the intent of providing a bus/rail interchange that satisfies the Settlement Agreement. Importantly, each configuration will result in lower bus volumes than the numbers operating today, an acknowledgement of the City's stated desire to limit regional transit service on Mercer Island. Each configuration will include a new roundabout at North Mercer Way and 77<sup>th</sup> Avenue SE, resulting in the need for property acquisition and at least some refinement of the Settlement Agreement. Bus stops and layover areas only vary in their number, and anticipated bus circulation patterns are identical.

The differences are most pronounced in terms of the quality of bus transit service that KCM is capable of providing to current and future Mercer Island residents, employees, and businesses, and the entire region. This is a critical transit interchange for the following reasons:

- Current and future Mercer Island residents, employees, and businesses will rely on connections that will not be served by Link.
- Mercer Island is already a key destination with 150 to 175 daily trips originating or ending at Mercer Island to/from areas that will not be served by East Link.
- Mercer Island is the fastest, most logical, intuitive, and attractive location to connect to Link for transit customers traveling along the I-90 corridor to/from points east of Mercer Island.
- Terminating routes at Mercer Island is the most efficient use of Metro resources (buses and operational hours) offers the best opportunity to allow expansions of local connections on Mercer Island and between Mercer Island and destinations that will not be served by East Link.

## Limited Service Configuration

The **Limited Service Configuration**, which allows up to 450 feet of bus curbspace on the south side of North Mercer Way and limits curbspace on the north side of North Mercer Way to local bus traffic only received the lowest score. This configuration has the smallest footprint and would signify the greatest change when compared to the activity at the current Mercer Island P&R facility. Instead of facilitating connections—which is the primary purpose of a transit interchange—this configuration actually limits such connections and would ultimately result in the least pleasant transfer experience, with the few bus stops and minimal layover space resulting in longer wait times. This would significantly limit the amount of future off-island service for Mercer Island residents, employees, and businesses connecting to/from Link and other destinations on Mercer Island and result in greater levels of car dependency on Mercer Island. Additionally, less ability to connect between bus and rail along the East Link will result in more customers from the greater Eastside and I-90 corridor driving to Mercer Island to park.

The **Limited Service Configuration** scored the lowest on three of the six differentiated goals and objectives (each configuration assumed identical scores for Goal/Objective 3 [project completion date] and Goal/Objective 8 [bus idling and circulation]). The instances where higher scores were achieved related to transfer distance (Goal/Objective 2) and lack of conflict points (Goal/Objective 7), both of which are at least partially the result of limited transfer and service opportunities. It is important to note that KCM would not be able to provide adequate local Mercer Island bus service with this configuration, including the current 150 to 175 daily bus passenger trips between Mercer Island and Eastside communities.

## Improved Service Configuration

The **Improved Service Configuration** received the intermediate overall score, obtaining lower rankings for Goal/Objective 2 (transfer distance) and Goal/Objective 7 (excellent multi-modal access). The lower scores for this configuration are predominantly the result of some bus stops located along the north side of North Mercer Way, requiring some transfer passengers to travel farther to reach these bus stops, including the need to cross a signalized intersection (North Mercer Way) to get there.

The layout of these spaces are most similar to the current condition, effectively creating active spaces between the Mercer Island P&R, bus transfer points along North Mercer Way, and the future light rail station. This configuration would include a greater amount of pick-up/drop-off and layover space as compared with the Limited Service Configuration, comparatively ranking higher for goals and objectives relating to seamless transfer experience, cost-effective design, and maximum benefit to current and future Mercer Island residents and employers.

## Optimal Service Configuration

As noted in earlier sections, the **Optimal Service Configuration** builds upon the Improved Service Configuration by adding bus/transit curb space approximately 100 feet south of the future east entrance to the Mercer Island Link light rail station along 80<sup>th</sup> Avenue SE. This additional bus bay allows for the potential for seamless transfers for local bus service, shorter transfer distance, reduced walking distances to the Town Center, reduced impacts to vehicles accessing the I-90 HOV lanes, and maximizes benefits to the Mercer Island community by providing space for future service changes and opportunities for innovative mobility options. In sum, the **Optimal Service Configuration** provides the best transit benefits in the following areas:

- Flexibility for future mobility options;
- Immediacy of transfer experience; and
- Transfer reliability.

This configuration scored the highest ranking in each of the six differentiated goals and objectives.

## Recommendation

Based on the point total results presented in **Table 3**, the configuration with the highest score is the **Optimal Service Configuration**. Therefore, the **Optimal Service Configuration** is the recommended path forward in implementing refinements to the Settlement Agreement as this configuration satisfies the joint goals and objectives to the highest degree and best serves the interests of Mercer Island and the region. While this configuration will require the most refinements to the modified 77<sup>th</sup> Avenue SE Configuration (each configuration requires refinement), this configuration represents the best design in fulfilling the bus/rail integration section of the Settlement Agreement while best meeting Sound Transit's and Metro's current and future operational needs.