



**KING COUNTY**  
**Signature Report**

1200 King County Courthouse  
516 Third Avenue  
Seattle, WA 98104

**February 9, 2016**

**Motion 14563**

**Proposed No. 2016-0089.2**

**Sponsors Dembowski**

1           A MOTION relating to public transportation, approving a  
2           report assessing potential traffic impacts of a new bus stop  
3           on Montlake Boulevard NE and NE Pacific Place, as  
4           directed by Ordinance 18133, Section 5.

5           WHEREAS, in October 2015, Ordinance 18133 approved the March 2016  
6           University Link bus integration service changes, and

7           WHEREAS, Ordinance 18133, Section 5, requires that the council pass a motion  
8           approving a traffic impacts analysis report before the installation of a bus stop on  
9           Montlake Boulevard NE at NE Pacific Place, and

10          WHEREAS, Ordinance 18133, Section 5, requires the report to summarize the  
11          results of a traffic impact analysis of a new bus stop on Montlake Boulevard NE near Hec  
12          Edmundson Pavilion with an assessment of the impact of that proposed stop on general  
13          purpose traffic travel time on Montlake Boulevard NE from Boyer Avenue East to NE  
14          45th Street and impact on the level of service and performance of intersections at  
15          Montlake Boulevard NE with NE Pacific Street and NE Pacific Place, and

16          WHEREAS, Metro has commissioned the required traffic study and the executive  
17          has transmitted to the council the report summarizing the results of the traffic study as set  
18          forth as Attachment A to this motion, and

19 WHEREAS, the Seattle Department of Transportation has authority to approve  
20 new bus stops within the city of Seattle, has reviewed the results of the traffic impact  
21 study, and concurs with its conclusions;

22 NOW, THEREFORE, BE IT MOVED by the Council of King County:

23 The King County Council hereby approves the King County Metro Transit  
24 Montlake Triangle New Bus Zone Traffic Analysis report, Attachment A to this motion.

25

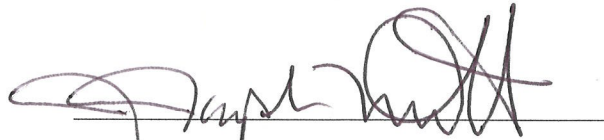
Motion 14563 was introduced on 2/1/2016 and passed by the Metropolitan King  
County Council on 2/8/2016, by the following vote:

Yes: 9 - Mr. von Reichbauer, Mr. Gossett, Ms. Lambert, Mr. Dunn,  
Mr. McDermott, Mr. Dembowski, Mr. Upthegrove, Ms. Kohl-Welles  
and Ms. Balducci

No: 0

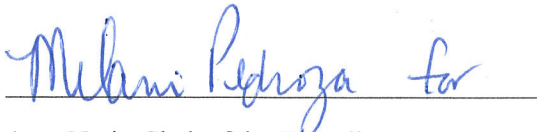
Excused: 0

KING COUNTY COUNCIL  
KING COUNTY, WASHINGTON



J. Joseph McDermott, Chair

ATTEST:



Anne Noris, Clerk of the Council

**Attachments:** A. King County Metro Transit - Montlake Triangle New Bus Zone Traffic Analysis ,  
Updated February 2, 2016

February 2, 2016

# King County Metro Transit

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## Montlake Triangle New Bus Zone Traffic Analysis

December 9, 2015

*Prepared for:*  
King County Council

*Prepared by:*



Department of Transportation  
Metro Transit Division  
Service Development Section  
King Street Center, KSC-TR-0415  
201 S Jackson St.  
Seattle, WA 98104  
[www.kingcounty.gov/metro](http://www.kingcounty.gov/metro)

Alternative Formats Available  
206-477-3832 TTY Relay: 711



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## Analysis Purpose

DKS was tasked with performing an operational analysis of the Montlake Triangle area to estimate the impacts of adding a new northbound bus stop near Alaska Airlines Arena at “Hec” Edmundson Pavilion on northbound general purpose traffic on Montlake Boulevard NE. Figure 1 shows the proposed bus stop location. The concern was whether northbound buses stopping in-lane would create queuing problems and travel time delay northbound on Montlake Boulevard NE.

The traffic analysis was completed using an existing Vissim microsimulation model (Vissim is described in Appendix B), which was recently calibrated to traffic conditions around the Montlake Triangle for the PM peak hour. The proposed new stop would serve routes 65 and 78 and have capacity to accommodate two 60-foot buses. The model included eight buses per hour split between routes 65 and 78 at the new stop.

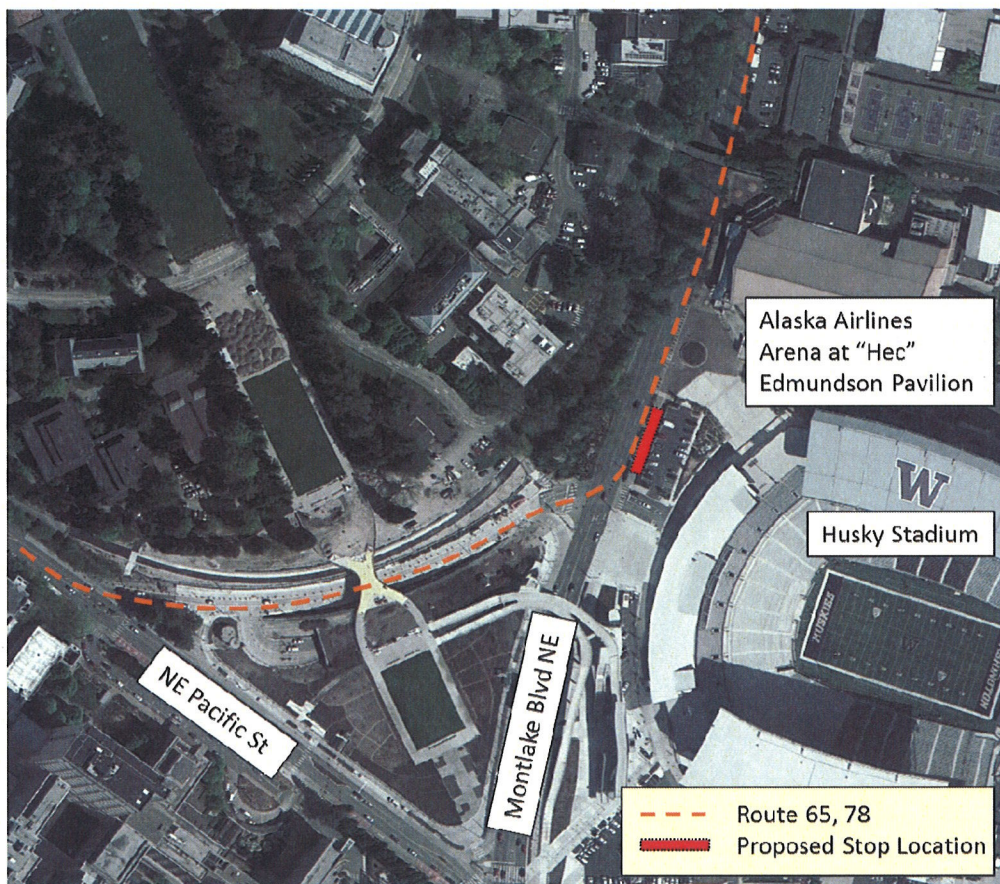


Figure 1: Proposed Stop Location



## Results and Conclusion

Travel times were measured from the intersection of Boyer Avenue E/24<sup>th</sup> Avenue E to the intersection of Montlake Boulevard NE/NE 45<sup>th</sup> Street as shown in Figure 2.

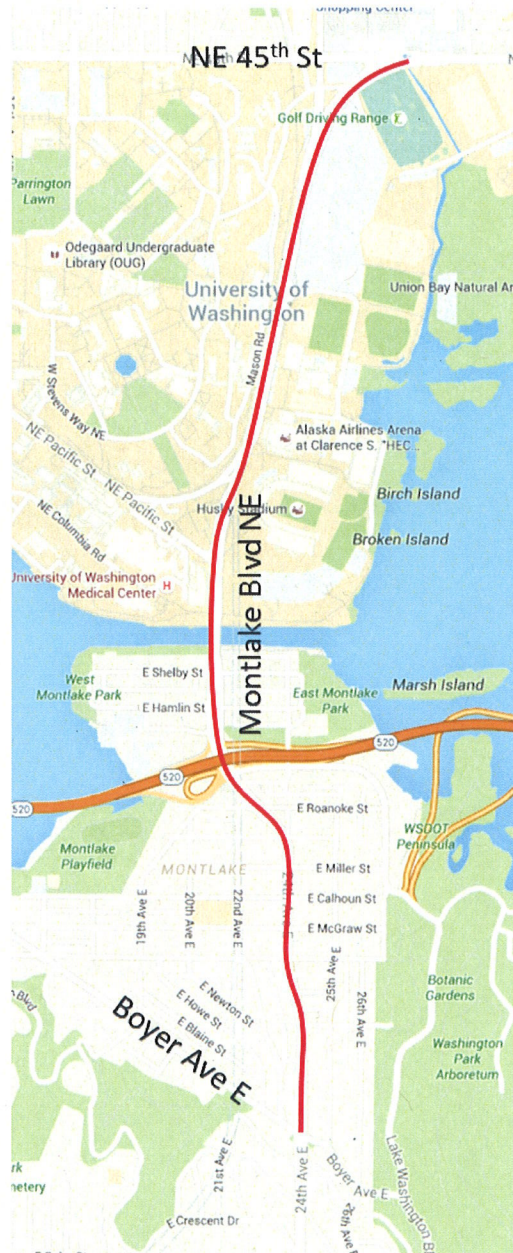


Figure 2: Travel Time Segment

The analysis showed negligible impact to northbound transit travel times as shown in Table 1. The 30-second increase in transit travel time can be attributed to the loading/unloading delay in the new stop. Table 2 shows the overall intersection delay and level of service (LOS) at the intersections of Montlake Blvd NE/NE Pacific St



and Montlake Blvd NE/NE Pacific PI (level of service is further defined in Appendix A). Intersection delay values changed very little with no change in level of service. The three-second decrease in intersection delay at Montlake Blvd NE/NE Pacific PI from the No-Build scenario to the Build scenario can be attributed to variations in the model runs.

Even with the addition of the new bus stop, there was no increase in travel time for general purpose traffic. Queuing for northbound traffic on the south side of the intersection of Montlake Blvd NE/NE Pacific PI exists, but is not excessive. This provides opportunity for vehicles to merge into the left lane if a bus is serving the stop on the north side of the intersection. General purpose traffic will have some increased friction traveling through the intersection when a bus is present at the stop with some vehicles queuing behind the bus while waiting to merge left to pass the bus. Even with the increased friction through the intersection, the model shows that installing the new transit stop would have very little to no impact on traffic operations at the Montlake Triangle.

*Table 1: Northbound Travel Times*

Travel Mode	No-Build Travel Time (minutes)	Build Travel Time (minutes)
General Purpose	9.0	9.0
Transit	12.1	12.6

*Table 2: Intersection LOS/Average Delay per Vehicle*

Intersection	No-Build LOS/Delay (seconds)	Build LOS/Delay (seconds)
Montlake Blvd NE/NE Pacific St	D/52	D/52
Montlake Blvd NE/NE Pacific PI	F/119	F/116



## Appendix A: Level of Service

As used in this study, level of service (LOS) is a measurement of average vehicle delay in seconds per vehicle for a signalized intersection, based on the Highway Capacity Manual published by the Transportation Research Board. LOS is separated into several letter grades depending on the expected delay at the intersection. Table 3 shows the breakdown of the delay values. LOS is a useful measure of effectiveness for intersections as it can describe the overall delay that can be expected at an intersection or identify specific movements or approaches that experience high amounts of delay.

*Table 3: Level of Service Values*

LOS	Intersection Delay (seconds/vehicle)
A	≤ 10
B	10 - 20
C	20 – 35
D	35 – 55
E	55 – 80
F	≥ 80





## Appendix B: Vissim Microsimulation Software

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Vissim is a microsimulation software used to model multimodal facilities. Vissim models individual vehicles and their interactions with one another within a predefined study area. Since Vissim models individual vehicles, it captures the effects of small changes in lane geometry, intersection layouts, or intersection timing.

Typically, an existing conditions model is created based on existing lane geometry and signal timing. The existing conditions model is calibrated to field conditions like transit and general purpose travel times through a study area. The model is also calibrated to match existing turning movement counts. This calibration is completed so the model matches as closely as possible how drivers behave in that specific corridor. Once the existing conditions model is calibrated, future No-build and Build models are created. The future No-Build model serves as a baseline for comparison to the future Build model.

Each model is run several times (20 runs per model in this study during the PM peak hour) and average measures of effectiveness are collected and documented for the multiple model runs. Each model run uses the same turning movement volumes at each intersection, but each run feeds the vehicles into the system differently. This gives some variability between runs for congestion levels not unlike variations in congestion day-to-day. Since the same model is run several times, travel times and delays are averaged across all runs to give statistically significant results. The measures of effectiveness generated from Vissim for this study included general purpose travel time, transit travel time, and intersection delay.