

## MEMORANDUM

**DATE:** August 25, 2015

**TO:** Andy Chow, P.E.  
City of Redmond

**FROM:** Jeff Schramm  
TENW

**SUBJECT:** UPDATED Traffic Assessment for the proposed  
Duke's Landing Residential – City of Redmond  
TENW Project No. 5020

This memorandum summarizes the updated traffic assessment conducted for the proposed Duke's Landing residential development which includes a project description, trip generation estimate, traffic volumes on adjacent streets, LOS at adjacent intersections, and a conclusion.

### Project Description

The proposed Duke's Landing site is located west of West Lake Sammamish Parkway NE between NE 46<sup>th</sup> Street and NE 48<sup>th</sup> Street as shown in the Attachment A site plan. The project proposal includes the development of up to 17 single-family detached dwelling units and one duplex on a site that includes one single-family home and barn that will be removed.

Vehicular access to the site would be provided onto NE 48<sup>th</sup> Street via a new residential road that currently exists as a road stub. As a result of this development, and prior agreements provided by the City, the existing 15 homes that currently access NE 47<sup>th</sup> Street from W Lake Sammamish Parkway NE would be required to re-route through the site and no longer have direct access to W Lake Sammamish Parkway NE. The anticipated year of occupancy is 2017.

### Trip Generation

The weekday daily, AM and PM peak hour trip generation estimates for the proposed Duke's Landing residential development were based on trip equations published in the Institute of Transportation Engineers (ITE) *Trip Generation* manual, 9<sup>th</sup> edition. The resulting weekday daily, AM and PM peak hour trips are summarized in Table 1. A detailed trip generation estimate is included in Attachment B.

**Table 1**  
**Duke's Landing – Trip Generation Summary**

Time Period	Net Trips Generated		
	In	Out	Total
Weekday Daily	102	101	203
Weekday AM Peak Hour	3	10	13
Weekday PM Peak Hour	13	7	20

As shown in Table 1, the Duke’s Landing residential development is estimated to generate 203 weekday daily trips with 13 trips occurring during the weekday AM peak hour (3 in, 10 out) and 20 trips during the weekday PM peak hour (13 in, 7 out).

## Traffic Volumes

To estimate future traffic volumes in the vicinity of the proposed Duke’s Landing project, weekday PM peak period counts were collected at the following two intersections on May 19, 2015:

- W Lake Sammamish Parkway NE / NE 48<sup>th</sup> Street
- 164<sup>th</sup> Place NE / NE 46<sup>th</sup> Street

With the Duke’s Landing project, vehicle access to W Lake Sammamish Parkway NE from NE 47<sup>th</sup> Street would be eliminated based on a prior development approval. As a result, the 15 existing single family homes would be re-routed west on NE 47<sup>th</sup> Street to a new road connection through the Duke’s Landing project. For purposes of estimating future traffic, the existing trips at the W Lake Sammamish Parkway NE & NE 47<sup>th</sup> Street intersection were re-routed through Duke’s Landing to utilize NE 48<sup>th</sup> Street and NE 46<sup>th</sup> Street. Duke’s Landing project trips and the re-route of NE 47<sup>th</sup> Street existing traffic were added to the existing traffic volumes to estimate future 2017 traffic volumes with the Duke’s Landing project. Existing volumes, Duke’s Landing project trips, re-routed existing NE 47<sup>th</sup> Street traffic, and future 2017 with-project volumes are summarized in Attachment C. The resulting future traffic volume estimates in the vicinity of the Duke’s Landing project are summarized below in Table 2.

**Table 2**  
**Duke’s Landing – Volume Summary**

Location	Existing Volume <sup>1</sup>	Duke’s Landing Project Traffic	Re-Routed Traffic <sup>2</sup>	Total Traffic	% Change
W Lk Sammamish Pkwy NE n/o NE 48 <sup>th</sup> Street	2,197	11	0	2,208	< 1%
W Lk Sammamish Pkwy NE s/o NE 48 <sup>th</sup> Street	2,171	1	-13	2,159	< -1%
NE 48 <sup>th</sup> Street w/o W Lk Sammamish Pkwy NE	44	12	15	71	61%
NE 46 <sup>th</sup> Street w/o 164 <sup>th</sup> Place NE	45	7	0	52	16%
NE 46 <sup>th</sup> Street e/o 164 <sup>th</sup> Place NE	23	1	4	28	22%

1. Based on counts collected on 5/19/15.

2. As a result of removal of NE 47<sup>th</sup> Street access to W Lake Sammamish Parkway NE.

The existing 19 PM peak hour trips associated with the shift from NE 47<sup>th</sup> Street through the site to SE 48<sup>th</sup> Street would not be considered significant since SE 48<sup>th</sup> Street is a local access street that currently carries 30–40 trips during the PM peak hour.

## Level of Service Analysis

Future PM peak hour LOS analyses were conducted at the intersection of W Lake Sammamish Parkway NE and NE 48<sup>th</sup> Street for the anticipated year of opening (2017). The roadway network assumed in the future year 2017 LOS analyses is based on existing intersection geometry since there are no planned improvements at the intersection by 2017. The 2017 weekday PM peak hour LOS results at the study intersection are summarized in Table 3. The detailed LOS worksheets are included in Attachment D.

**Table 3  
Year 2017 PM Peak Hour LOS Summary**

Study Intersection	2017 Without-Project		2017 With-Project	
	LOS <sup>1</sup>	Delay	LOS	Delay
W Lake Sammamish Parkway NE / NE 48 <sup>th</sup> St				
Eastbound Shared Left-Right	D	31.1	D	33.1
Northbound Left-Turn	B	10.4	B	10.5
W Lake Sammamish Parkway NE / NE 47 <sup>th</sup> St				
Eastbound Shared Left-Right	D	29.1	closed	
Northbound Left-Turn	B	10.6	closed	

1. Based on HCM 2010 methodologies.

As shown in Table 3, the side-street turns at the intersection of W Lake Sammamish Parkway NE and NE 48<sup>th</sup> Street are anticipated to operate at LOS D in 2017 with or without the Duke’s Landing project.

## Conclusion

With the Duke’s Landing project, vehicle access to W Lake Sammamish Parkway NE from NE 47<sup>th</sup> Street would be eliminated based on a prior development approval. As a result, the traffic generated by the 15 existing single family homes would be re-routed west on NE 47<sup>th</sup> Street to a new road connection through the Duke’s Landing project at 164<sup>th</sup> Court NE onto NE 48<sup>th</sup> Street. The 20 new PM peak hour project trips generated by Duke’s Landing, and the re-route of the 19 PM peak hour trips from the closure of NE 47<sup>th</sup> Street, would result in an addition of 39 PM peak hour trips to the existing traffic on SE 48<sup>th</sup> Street. This additional traffic is not expected to create a significant impact since the resulting total traffic on NE 48<sup>th</sup> Street is expected to be between 50–75 vehicles during the PM peak hour west of W Lake Sammamish Parkway NE, which is consistent with the existing local access designation; and turn movements at the intersection of W Lake Sammamish Parkway NE and NE 48<sup>th</sup> Street are anticipated to operate at LOS D in 2017 with or without the Duke’s Landing project.

If you have any questions, please feel free to contact me at (425) 250-0581 or schramm@tenw.com.

cc: Jeff Haynie, P.E. Principal TENW

Attachments

# ATTACHMENT A

## Site Plan Concept



Attachment A: Site Plan Concept



## ATTACHMENT B

### Trip Generation Calculations

## Duke's Landing - Redmond Trip Generation

<b>DAILY</b>									
Land Use	Units		ITE LUC <sup>1</sup>	Directional Split		Trip Rate Total	Trips Generated		
				In	Out		In	Out	Total
<b>Proposed Use</b>									
Single-Family	17	Dwelling Units	210	50%	50%	Equation	103	103	206
Multi-Family	1	Dwelling Units	230	50%	50%	Equation	6	6	12
<b>Existing Use</b>									
Single-Family	1	Dwelling Units	210	50%	50%	Equation	-7	-8	-15
<b>Net New Weekday Daily Trips Generated =</b>							<b>102</b>	<b>101</b>	<b>203</b>
<b>AM PEAK HOUR</b>									
Land Use	Units		ITE LUC <sup>1</sup>	Directional Split		Trip Rate Total	Trips Generated		
				In	Out		In	Out	Total
<b>Proposed Use</b>									
Single-Family	17	Dwelling Units	210	25%	75%	Equation	5	17	22
Multi-Family	1	Dwelling Units	230	17%	83%	Equation	0	1	1
<b>Existing Use</b>									
Single-Family	1	Dwelling Units	210	25%	75%	Equation	-2	-8	-10
<b>Net New AM Peak Hour Trips Generated =</b>							<b>3</b>	<b>10</b>	<b>13</b>
<b>PM PEAK HOUR</b>									
Land Use	Units		ITE LUC <sup>1</sup>	Directional Split		Trip Rate Total	Trips Generated		
				In	Out		In	Out	Total
<b>Proposed Use</b>									
Single-Family	17	Dwelling Units	210	63%	37%	Equation	13	8	21
Multi-Family	1	Dwelling Units	230	67%	33%	Equation	1	0	1
<b>Existing Use</b>									
Single-Family	1	Dwelling Units	210	63%	37%	Equation	-1	-1	-2
<b>Net New PM Peak Hour Trips Generated =</b>							<b>13</b>	<b>7</b>	<b>20</b>

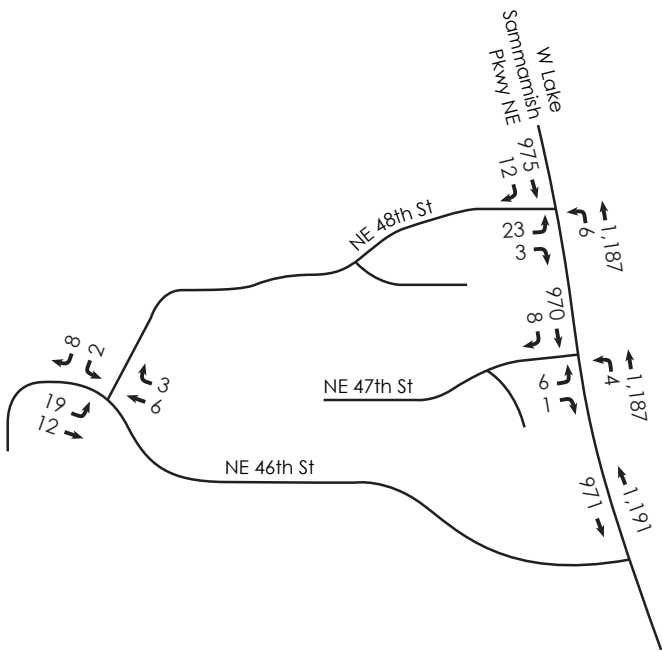
**Notes:**

<sup>1</sup> Institute of Transportation Engineers, *Trip Generation* Manual, 9th Edition, 2012 Land Use Codes.

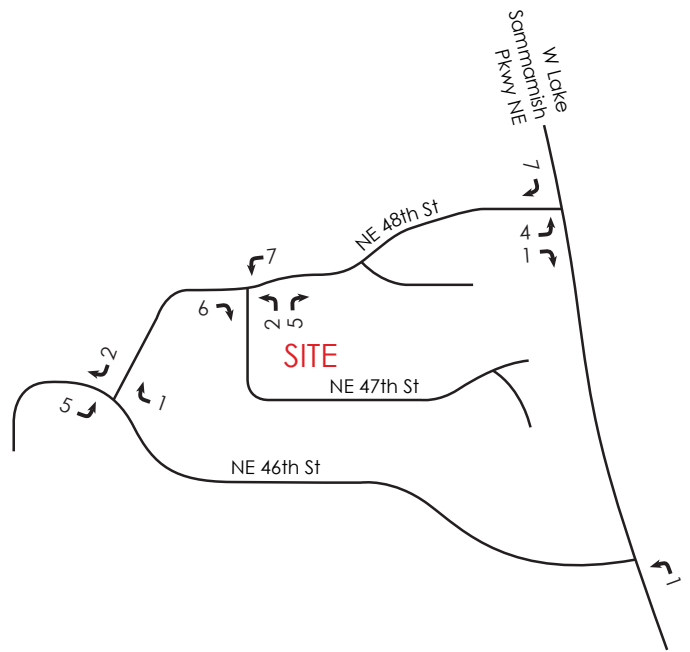
## ATTACHMENT C

### PM Peak Hour Traffic Volumes

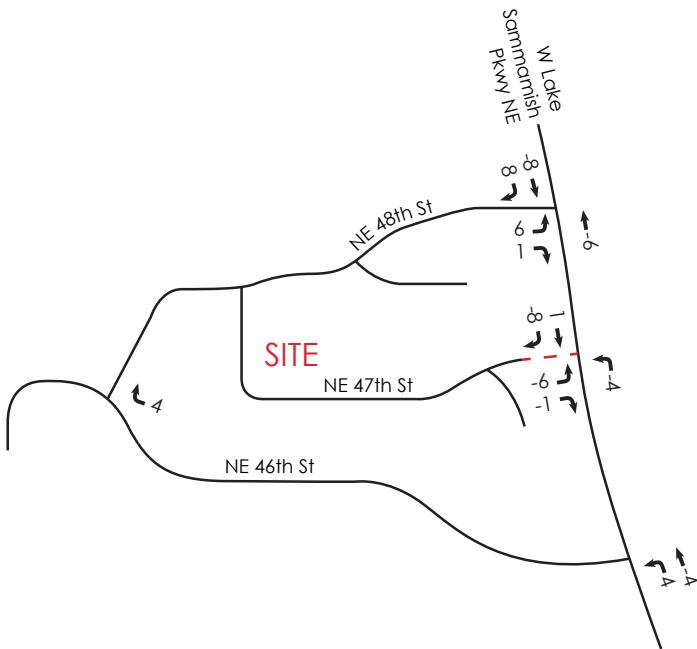




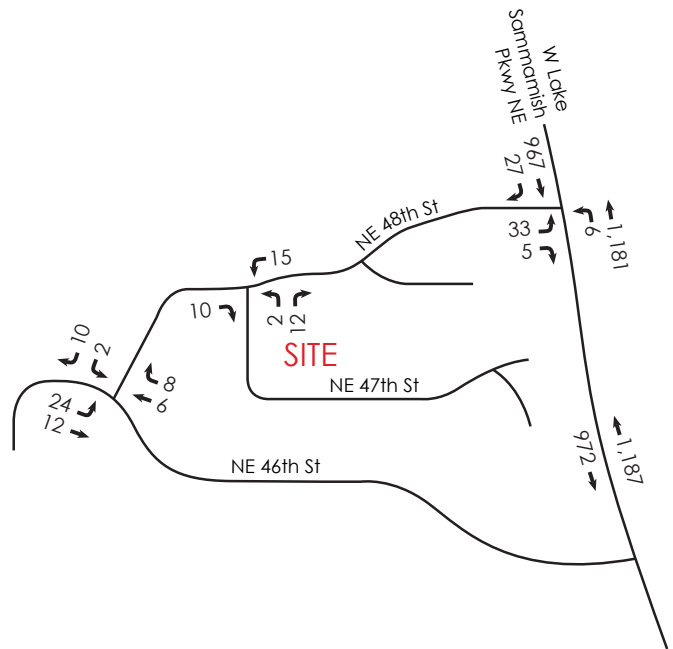
2015 Existing



Duke's Landing Project Trip Assignment



NE 47th Street Traffic Re-Route  
(removal of access to W Lake Sammamish Parkway)



Total Volumes  
2017 With-Project














# ATTACHMENT D

## LOS Calculations

Lanes, Volumes, Timings  
 1: W Lake Sammamish Parkway NE & NE 48th St

6/2/2015

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	23	3	6	1187	975	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	50			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Link Speed (mph)	25			35	35	
Link Distance (ft)	1474			335	355	
Travel Time (s)	40.2			6.5	6.9	
Confl. Peds. (#/hr)	10	10	10			10
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	1%	1%	1%	1%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

**Intersection**

Int Delay, s/veh 0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	23	3	6	1187	975	12
Conflicting Peds, #/hr	10	10	10	0	0	10
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	50	-	-	-
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	1	1	1	1
Mvmt Flow	24	3	6	1236	1016	12

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	2281	1042	1038 0
Stage 1	1032	-	- -
Stage 2	1249	-	- -
Critical Hdwy	6.4	6.2	4.11 -
Critical Hdwy Stg 1	5.4	-	- -
Critical Hdwy Stg 2	5.4	-	- -
Follow-up Hdwy	3.5	3.3	2.209 -
Pot Cap-1 Maneuver	44	281	674 -
Stage 1	347	-	- -
Stage 2	273	-	- -
Platoon blocked, %			- -
Mov Cap-1 Maneuver	43	276	668 -
Mov Cap-2 Maneuver	157	-	- -
Stage 1	344	-	- -
Stage 2	268	-	- -

Approach	EB	NB	SB
HCM Control Delay, s	31.1	0.1	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	668	-	165	-	-
HCM Lane V/C Ratio	0.009	-	0.164	-	-
HCM Control Delay (s)	10.4	-	31.1	-	-
HCM Lane LOS	B	-	D	-	-
HCM 95th %tile Q(veh)	0	-	0.6	-	-

Lanes, Volumes, Timings  
 2: W Lake Sammamish Parkway NE & NE 47th Street

6/2/2015



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	6	1	4	1187	970	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	50			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Link Speed (mph)	25			35	35	
Link Distance (ft)	377			696	335	
Travel Time (s)	10.3			13.6	6.5	
Confl. Peds. (#/hr)	10	10	10			10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

**Intersection**

Int Delay, s/veh 0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	6	1	4	1187	970	8
Conflicting Peds, #/hr	10	10	10	0	0	10
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	50	-	-	-
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	1	4	1290	1054	9












Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	2368	1079	1073 0
Stage 1	1069	-	- -
Stage 2	1299	-	- -
Critical Hdwy	6.42	6.22	4.12 -
Critical Hdwy Stg 1	5.42	-	- -
Critical Hdwy Stg 2	5.42	-	- -
Follow-up Hdwy	3.518	3.318	2.218 -
Pot Cap-1 Maneuver	39	265	650 -
Stage 1	330	-	- -
Stage 2	256	-	- -
Platoon blocked, %			- -
Mov Cap-1 Maneuver	38	261	645 -
Mov Cap-2 Maneuver	147	-	- -
Stage 1	327	-	- -
Stage 2	252	-	- -

Approach	EB	NB	SB
HCM Control Delay, s	29.1	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	645	-	157	-	-
HCM Lane V/C Ratio	0.007	-	0.048	-	-
HCM Control Delay (s)	10.6	-	29.1	-	-
HCM Lane LOS	B	-	D	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Lanes, Volumes, Timings  
 1: W Lake Sammamish Parkway NE & NE 48th St

6/2/2015

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	33	5	6	1181	967	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	50			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Link Speed (mph)	25			35	35	
Link Distance (ft)	1474			335	355	
Travel Time (s)	40.2			6.5	6.9	
Confl. Peds. (#/hr)	10	10	10			10
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	1%	1%	1%	1%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

**Intersection**

Int Delay, s/veh 0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	33	5	6	1181	967	27
Conflicting Peds, #/hr	10	10	10	0	0	10
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	50	-	-	-
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	1	1	1	1
Mvmt Flow	34	5	6	1230	1007	28

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	2274	1041	1045 0
Stage 1	1031	-	- -
Stage 2	1243	-	- -
Critical Hdwy	6.4	6.2	4.11 -
Critical Hdwy Stg 1	5.4	-	- -
Critical Hdwy Stg 2	5.4	-	- -
Follow-up Hdwy	3.5	3.3	2.209 -
Pot Cap-1 Maneuver	45	282	670 -
Stage 1	347	-	- -
Stage 2	275	-	- -
Platoon blocked, %			- -
Mov Cap-1 Maneuver	44	277	664 -
Mov Cap-2 Maneuver	158	-	- -
Stage 1	344	-	- -
Stage 2	270	-	- -

Approach	EB	NB	SB
HCM Control Delay, s	33.1	0.1	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	664	-	167	-	-
HCM Lane V/C Ratio	0.009	-	0.237	-	-
HCM Control Delay (s)	10.5	-	33.1	-	-
HCM Lane LOS	B	-	D	-	-
HCM 95th %tile Q(veh)	0	-	0.9	-	-