

## MEMORANDUM

**DATE:** August 8, 2016

**TO:** Adam Lundberg, Principal, AML Construction

**FROM:** Michael Read, PE, Principal, TENW

**SUBJECT:** 3803 NE 155<sup>th</sup> Street Mixed Use –Traffic Demand and Site Access Analysis (**Revised**)  
TENW Project No. 3418

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This memorandum summarizes the results of traffic demand and site access analysis associated with a proposed development known as the *3803 NE 155<sup>th</sup> Street Mixed Use* project near the intersection of NE 155 Street and Ballinger Way (SR 104) intersection in Lake Forest Park, WA. Upon completion, the project would remove an existing single family home and garage, and build a mixed use building with up to 14 residential apartments, 685 square-feet of office, and 28 parking stalls in structured parking (24 stalls on site), and 4 on-street parking stalls.

The *Southern Gateway Subarea EIS* prepared by the City of Lake Forest Park and adopted in 2013, reviews at a “project-level” traffic operational, safety, circulatory, and other transportation impacts associated with redevelopment of a mixed use subarea bounded by generally by NE 145<sup>th</sup> Street, Bothell Way (SR 522), NE 158<sup>th</sup> Street, and the Lake Washington shoreline. Along with the Southern Gateway Subarea Plan EIS, land use zoning, public infrastructure, code amendments, and development regulations were adopted by the City of Lake Forest Park which govern new development within this subarea.

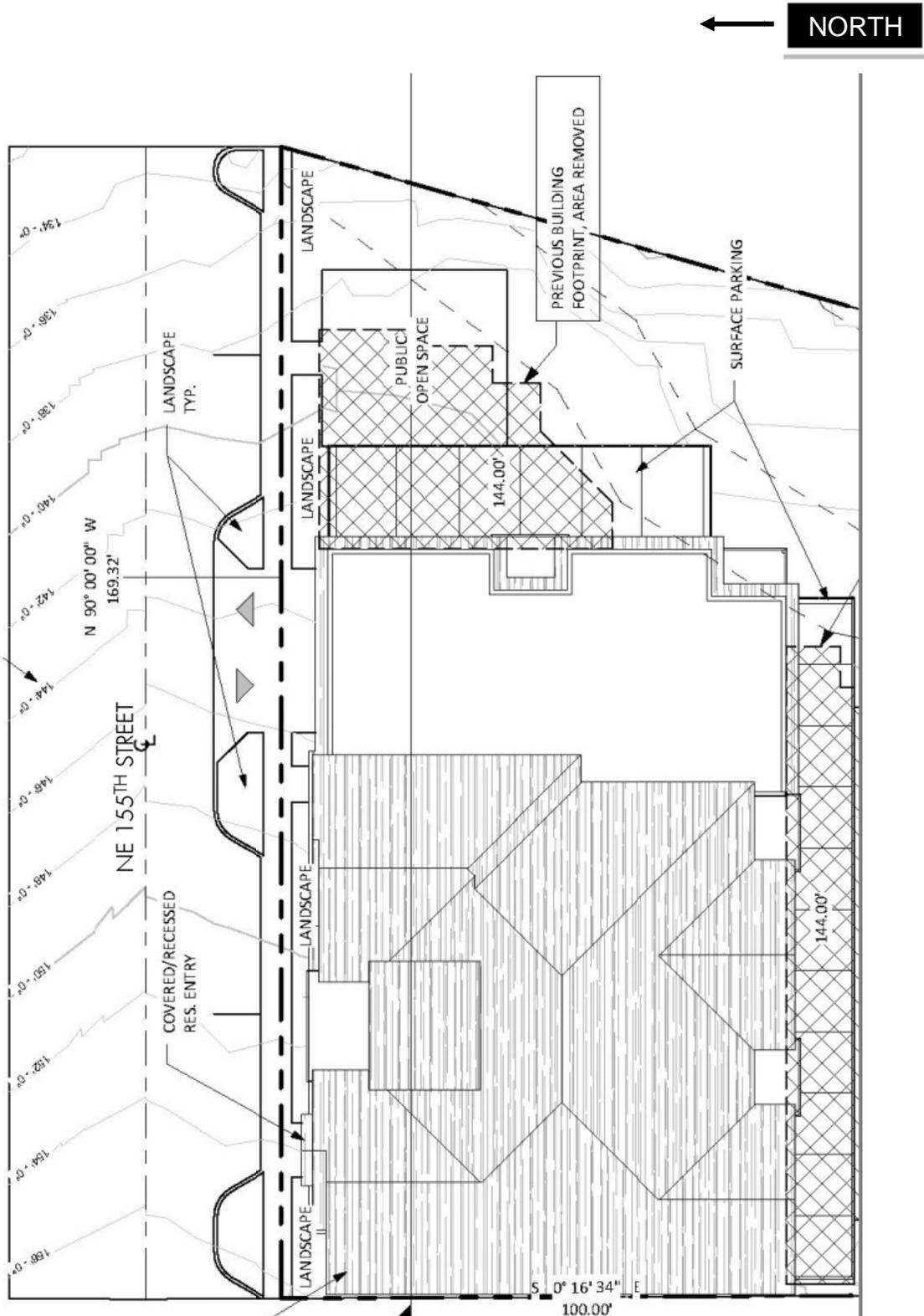
### Project Description

The proposed mixed use project is located at 3803 NE 155<sup>th</sup> Street (within the *Southern Gateway Subarea Plan*), adjacent to the Sheridan Market east of Ballinger Way (SR 104), is proposing up to 14 apartment units and 685 square-feet of office uses. Currently, the project is also proposing an on-site amenity space/common area for residents on the 2<sup>nd</sup> floor above the proposed ground-floor office.

Twenty-four on-site parking stalls would be constructed, with 4 new on-street parking stalls. No on-street parking is available in the immediate site vicinity. A single access driveway into the parking garage would be constructed.

A site design of the overall building is provided in **Figure 1**.

Figure 1: Project Site Plan



## Traffic Demand Analysis

Published trip rate equations compiled by the Institute of Transportation Engineers (ITE) *Trip Generation, 9<sup>th</sup> Edition*, 2012, were used to estimate daily, a.m. and p.m. peak hour traffic that would be generated by the proposed development assuming new Mid-Rise Apartments (ITE Land Use Code 223) and Office (ITE Land Use Code 710) uses and removal of the Single-Family Home (ITE Lane Use Code 210).

As shown in **Table 1**, an estimated net increase of approximately 67 daily, 4 a.m. peak hour (2 entering and 2 exiting), and 5 p.m. peak hour vehicular trips (2 entering and 3 exiting) would be generated at full build-out of the project. This level of increased trip generation warrants no formal evaluation of traffic operational impacts.

A detailed summary of trip generation calculations is provided in **Attachment A**.

**Table 1**  
**3803 NE 155<sup>th</sup> Street Mixed Use Generation Summary**

Time Period	In	Out	Total
<i>(14 Apartments, 685 SF Office)</i>			
Weekday AM Peak Hour	2	2	4
Weekday PM Peak Hour	2	3	5
Weekday Daily	33	34	67

Source: Trip Generation Manual, 9<sup>th</sup> Edition, ITE, 2012.

## Traffic Operational Impacts

Peak hour traffic volumes represent the highest hourly volume of vehicles passing through an intersection during a typical 7-9 a.m. and 4-6 p.m. weekday peak period. Hourly traffic counts were conducted on NE 155<sup>th</sup> Street immediately east of Bothell Way (SR 522) over a 48-hour period during typical weekdays. These local directional volumes were used to evaluate available gaps in traffic and delay given the restricted access nature of NE 155<sup>th</sup> Street onto Bothell Way (SR 522) during the peak traffic flow periods of the afternoon peak commute period. **Attachment B** provides the hourly volume data collected on NE 155<sup>th</sup> Street as well as recent peak hour counts north of the site on Bothell Way (SR 522). As shown, hourly traffic volumes on NE 155<sup>th</sup> Street are very limited (given the dead-end nature of this roadway), with peak volumes during the typical commute period of 13 total vehicles in the a.m. peak hour and 18 in the p.m. peak hour.

## Intersection Level of Service (LOS) Impacts

LOS refers to the degree of congestion on a roadway or intersection. It is a measure of vehicle operating speed, travel time, travel delays, and driving comfort. A letter scale from A to F generally describes LOS. At signalized intersections, LOS A represents free-flow conditions-motorists experience little or no delays, and LOS F represents forced-flow conditions-motorists experience an average delay in excess of 80 seconds per vehicle. The LOS reported for

signalized intersections represents the average control delay for all vehicles entering the intersection. The LOS reported at stop-controlled intersections is also based on the average control delay (sec/veh), but is reported for stop controlled and yield movements only. **Table 2** outlines the LOS criteria for signalized and unsignalized intersections based on these methodologies. The SR 522 corridor (i.e., Bothell Way) is a Tier 1 Significant Highway managed by WSDOT, with an LOS E standard as designated by the Puget Sound Regional Council and its local member jurisdictions.

**Table 2: Level of Service Criteria for Intersections**

Level of Service	Signalized Intersection	Unsignalized Intersection
	Average Delay Range (sec)	Delay Range (sec)
A	≤ 10	≤ 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: "Highway Capacity Manual", Special Report 209, Transportation Research Board, 2010.

Estimated project intersection LOS impacts during the p.m. peak hour in 2017 are summarized in **Table 3**. As shown, the stop controlled approach of NE 155<sup>th</sup> Street onto Bothell Way (SR 522) would operate at LOS D with or without the project, with averages of approximately 30 seconds per vehicle experienced on the NE 155<sup>th</sup> Street stop-controlled approach onto Bothell Way (SR 522). Detailed LOS summary worksheets and queuing estimates at the stop controlled study intersection are included in **Attachment C**.

**Table 3: PM Peak Hour Intersection Level of Service Impacts**

Study Intersection	PM Peak Hour Without Project			PM Peak Hour With Project		
	LOS	Delay (sec)	V/C Ratio	LOS	Delay (sec)	V/C Ratio
<i>Stop Controlled Intersections</i>						
NE 155 <sup>th</sup> Street at Bothell Way (SR 522) – WB Stop	D	29.3	0.06	D	29.9	0.09

Source: TENW using Synchro 6.0.

## Site Access Analysis

The proposed *3803 NE 155<sup>th</sup> Street Mixed Use* project vehicular access is proposed via NE 155<sup>th</sup> Street east of Bothell Way (SR 522). This street is a "dead-end" roadway with no other outlet except directly onto Bothell Way (SR 522). The intersection of NE 155<sup>th</sup> Street onto Bothell Way is restricted to right-in, right-out movements only, with U-turn opportunities within 250 feet to the north (exiting traffic) and 550 feet to the south (entering traffic) that provide full access. Given the net increase in traffic volumes estimated to be generated by the project, a new trip entering or leaving the site approximately every 12 minutes or more would be added to the intersection.

## Conclusions

The proposed *3803 NE 155<sup>th</sup> Street Mixed Use* development was evaluated for peak traffic demands and site access. A net increase of approximately 67 new daily, 4 new a.m. peak hour trips, and 5 new p.m. peak hour vehicular trips are estimated. As demonstrated in the analysis of traffic operational/delay impacts, with the limited net increase in traffic that would be generated by the redevelopment no measurable impacts to vehicle delay, queuing, or other traffic impacts would occur as a result of the project.

If you have any questions regarding the information presented in this memo, please call me at (206) 361-7333 x 101 or [mikeread@tenw.com](mailto:mikeread@tenw.com).

Attachment A  
Trip Generation Demand Estimates

ITE Trip Generation, 9th Edition, 2012  
 3801 NE 155th Street Mixed Use

Proposed	X	LU Code	AM Peak			PM Peak			Daily			
			Enter	Exit	Trips	Enter	Exit	Trips	Trips	Daily Rate	AM Rate	PM Rate
<b>Scenario 1</b>												
Mid-Rise Apartment	14	223	1	3	4	3	2	5	70	4.97	0.30	0.39
Office	685	710	<u>1</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>1</u>	<u>1</u>	<u>8</u>	11.03	1.56	1.49
			2	3	5	3	3	6	77			
<b>Removed</b>												
Single-Family Home	-1	210	<u>0</u>	<u>-1</u>	<u>-1</u>	<u>-1</u>	<u>0</u>	<u>-1</u>	<u>-10</u>	9.52	0.75	1.00
			0	-1	-1	-1	0	-1	-10			
<b>Net Trips without Mode Split Adjustments - Scenario 1</b>			<b>2</b>	<b>2</b>	<b>4</b>	<b>2</b>	<b>3</b>	<b>5</b>	<b>67</b>			

Attachment B  
Traffic Counts on NE 155<sup>th</sup> Street and SR 522

Location: NE 155TH ST E/O SR 522  
 Date Range: 8/3/2016 - 8/9/2016  
 Site Code: 01

Time	Wednesday			Thursday			Friday			Saturday			Sunday			Monday			Tuesday			Mid-Week Average					
	8/3/2016			8/4/2016			8/5/2016			8/6/2016			8/7/2016			8/8/2016			8/9/2016								
	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total
12:00 AM	1	0	1	2	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	2
1:00 AM	0	0	0	1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1
2:00 AM	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
3:00 AM	1	0	1	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0	1
4:00 AM	0	1	1	1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2
5:00 AM	0	4	4	2	4	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	4	5
6:00 AM	0	5	5	0	6	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	6	6
7:00 AM	3	8	11	3	3	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	6	9
8:00 AM	5	14	19	1	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	10	13
9:00 AM	2	11	13	6	11	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	11	15
10:00 AM	11	5	16	3	5	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	5	12
11:00 AM	6	9	15	12	11	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9	10	19
12:00 PM	10	7	17	3	1	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	4	11
1:00 PM	8	10	18	10	11	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9	11	20
2:00 PM	9	8	17	10	5	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	7	16
3:00 PM	6	8	14	4	5	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	7	12
4:00 PM	10	5	15	9	11	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	8	18
5:00 PM	9	5	14	8	5	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9	5	14
6:00 PM	7	4	11	9	5	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	5	13
7:00 PM	5	1	6	6	5	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	3	9
8:00 PM	9	5	14	5	4	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	5	12
9:00 PM	3	3	6	4	3	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	3	7
10:00 PM	7	4	11	8	1	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	3	10
11:00 PM	0	1	1	1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2
<b>Total</b>	<b>112</b>	<b>118</b>	<b>230</b>	<b>108</b>	<b>105</b>	<b>213</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<b>110</b>	<b>112</b>	<b>222</b>
<b>Percent</b>	<b>49%</b>	<b>51%</b>	-	<b>51%</b>	<b>49%</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<b>50%</b>	<b>50%</b>	-

1. Mid-week average includes data between Tuesday and Thursday.

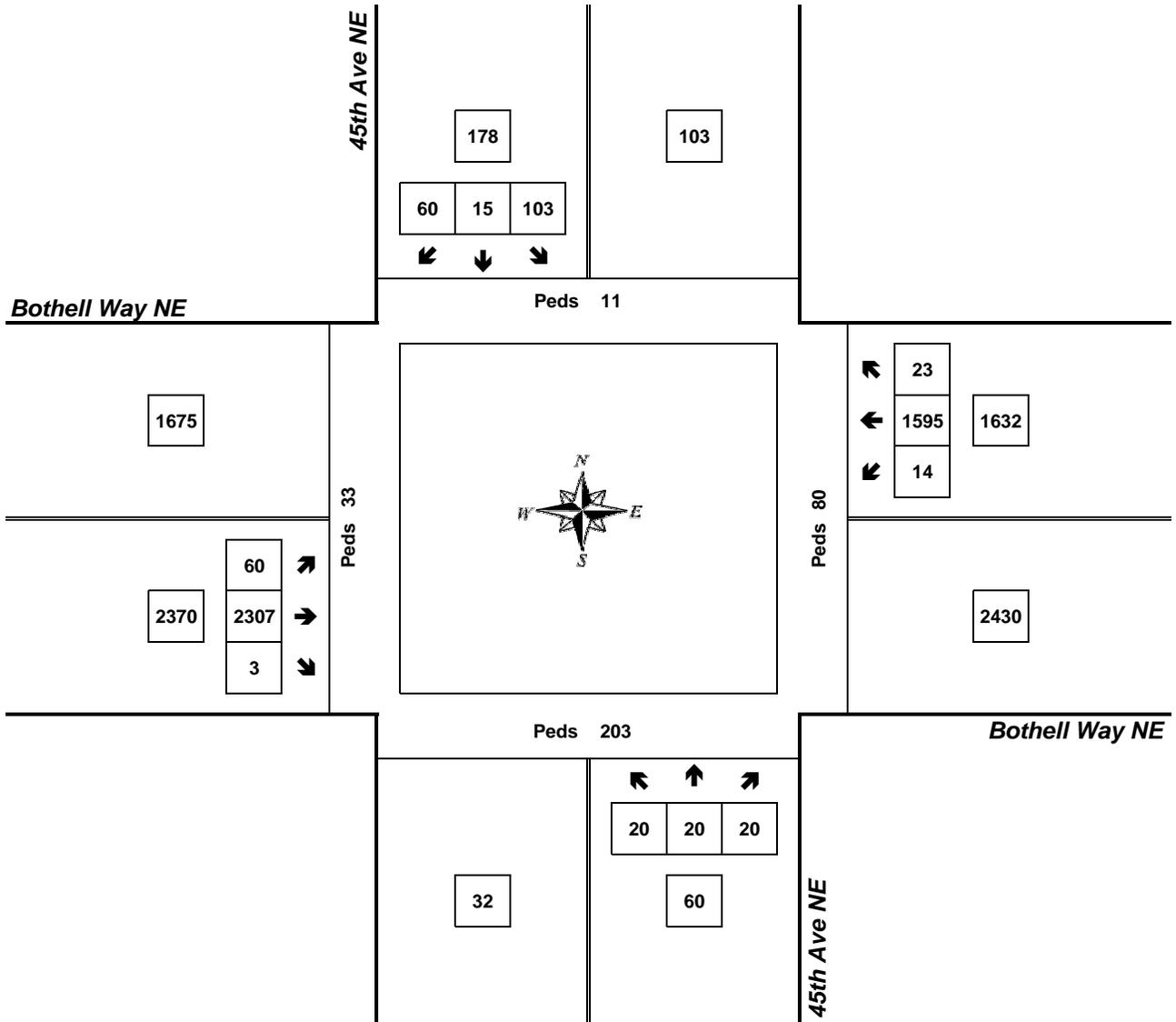
# Peak Hour Summary



Mark Skaggs  
(206) 251-0300

## 45th Ave NE & Bothell Way NE

5:00 PM to 6:00 PM  
Thursday, June 06, 2013



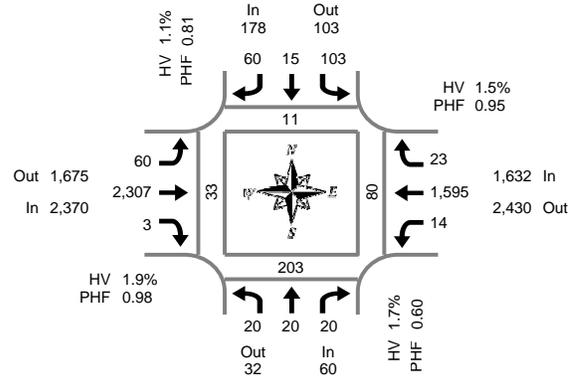
Approach	PHF	HV%	Volume
EB	0.98	1.9%	2,370
WB	0.95	1.5%	1,632
NB	0.60	1.7%	60
SB	0.81	1.1%	178
<b>Intersection</b>	<b>0.98</b>	<b>1.7%</b>	<b>4,240</b>

Count Period: 4:00 PM to 6:00 PM

# Total Vehicle Summary



Mark Skaggs  
(206) 251-0300



## 45th Ave NE & Bothell Way NE

Thursday, June 06, 2013  
4:00 PM to 6:00 PM

### 15-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound 45th Ave NE				Southbound 45th Ave NE				Eastbound Bothell Way NE				Westbound Bothell Way NE				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
4:00 PM	0	0	5	0	27	3	13	0	8	528	4	9	2	335	9	9	934	2	39	22	5
4:15 PM	1	1	2	0	14	2	14	0	14	567	2	7	4	367	8	9	996	1	34	16	9
4:30 PM	1	2	1	0	15	4	15	1	5	580	2	17	5	382	6	9	1,018	1	39	17	5
4:45 PM	2	0	4	2	24	2	12	0	17	551	0	15	4	423	6	3	1,045	0	45	15	6
5:00 PM	7	10	8	0	22	5	12	1	12	577	1	8	6	370	2	8	1,032	3	58	15	7
5:15 PM	5	3	6	1	32	2	21	0	12	585	1	11	1	403	6	6	1,077	7	47	32	16
5:30 PM	3	3	3	0	15	4	13	0	18	587	1	11	2	405	7	5	1,061	1	47	12	8
5:45 PM	5	4	3	0	34	4	14	1	18	558	0	14	5	417	8	6	1,070	0	51	21	2
Total Survey	24	23	32	3	183	26	114	3	104	4,533	11	92	29	3,102	52	55	8,233	15	360	150	58

### Peak Hour Summary 5:00 PM to 6:00 PM

By Approach	Northbound 45th Ave NE				Southbound 45th Ave NE				Eastbound Bothell Way NE				Westbound Bothell Way NE				Total	Pedestrians Crosswalk			
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV		North	South	East	West
Volume	60	32	92	1	178	103	281	2	2,370	1,675	4,045	44	1,632	2,430	4,062	25	4,240	11	203	80	33
%HV	1.7%				1.1%				1.9%				1.5%				1.7%				
PHF	0.60				0.81				0.98				0.95				0.98				

By Movement	Northbound 45th Ave NE				Southbound 45th Ave NE				Eastbound Bothell Way NE				Westbound Bothell Way NE				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	20	20	20	60	103	15	60	178	60	2,307	3	2,370	14	1,595	23	1,632	4,240
PHF	0.71	0.50	0.63	0.60	0.76	0.75	0.71	0.81	0.83	0.98	0.75	0.98	0.58	0.96	0.72	0.95	0.98

### Rolling Hour Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound 45th Ave NE				Southbound 45th Ave NE				Eastbound Bothell Way NE				Westbound Bothell Way NE				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
4:00 PM	4	3	12	2	80	11	54	1	44	2,226	8	48	15	1,507	29	30	3,993	4	157	70	25
4:15 PM	11	13	15	2	75	13	53	2	48	2,275	5	47	19	1,542	22	29	4,091	5	176	63	27
4:30 PM	15	15	19	3	93	13	60	2	46	2,293	4	51	16	1,578	20	26	4,172	11	189	79	34
4:45 PM	17	16	21	3	93	13	58	1	59	2,300	3	45	13	1,601	21	22	4,215	11	197	74	37
5:00 PM	20	20	20	1	103	15	60	2	60	2,307	3	44	14	1,595	23	25	4,240	11	203	80	33

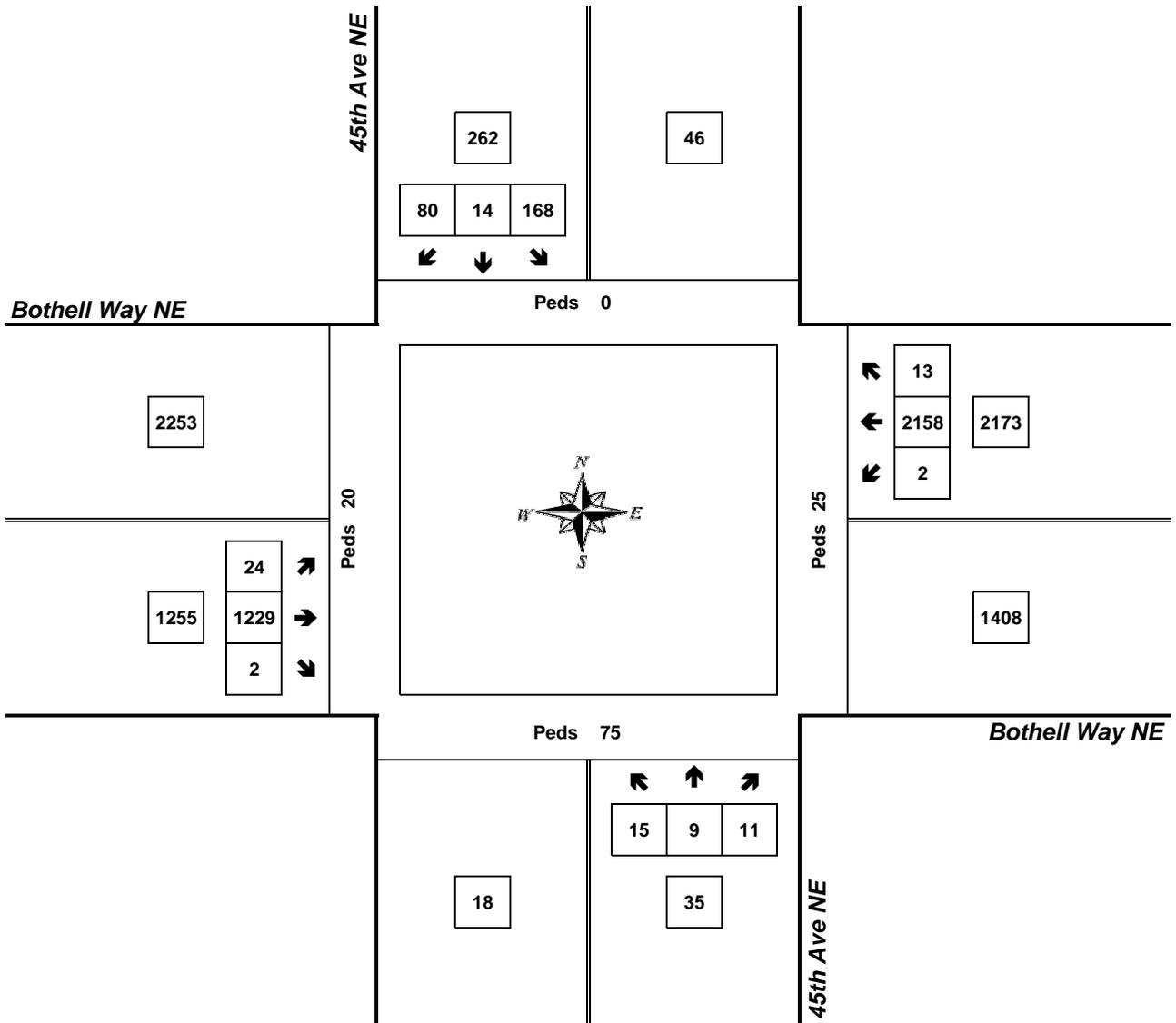
# Peak Hour Summary



Mark Skaggs  
(206) 251-0300

## 45th Ave NE & Bothell Way NE

7:00 AM to 8:00 AM  
Thursday, June 06, 2013



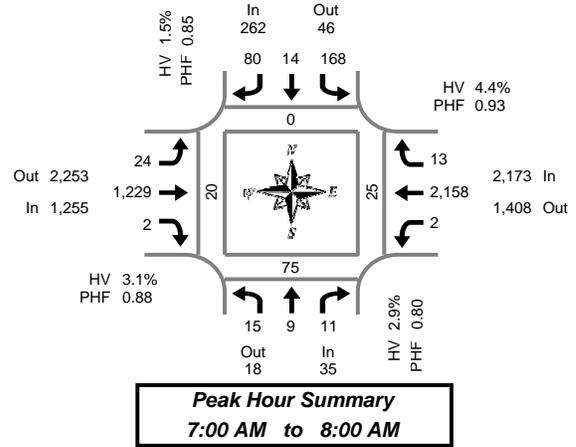
Approach	PHF	HV%	Volume
EB	0.88	3.1%	1,255
WB	0.93	4.4%	2,173
NB	0.80	2.9%	35
SB	0.85	1.5%	262
<b>Intersection</b>	<b>0.96</b>	<b>3.7%</b>	<b>3,725</b>

Count Period: 7:00 AM to 9:00 AM

# Total Vehicle Summary



Mark Skaggs  
(206) 251-0300



## 45th Ave NE & Bothell Way NE

Thursday, June 06, 2013  
7:00 AM to 9:00 AM

### 15-Minute Interval Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound 45th Ave NE				Southbound 45th Ave NE				Eastbound Bothell Way NE				Westbound Bothell Way NE				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
7:00 AM	0	2	1	0	25	1	29	1	1	245	1	8	1	583	3	16	892	0	16	7	3
7:15 AM	4	3	4	1	47	7	13	1	4	301	0	11	0	550	3	28	936	0	20	6	7
7:30 AM	8	2	1	0	54	3	20	2	11	334	0	10	0	534	2	23	969	0	13	3	6
7:45 AM	3	2	5	0	42	3	18	0	8	349	1	10	1	491	5	28	928	0	26	9	4
8:00 AM	0	3	2	1	26	0	17	0	7	314	1	9	1	461	8	17	840	2	15	8	4
8:15 AM	0	0	3	0	36	1	16	0	4	296	1	9	5	451	6	19	819	1	15	4	2
8:30 AM	3	1	4	0	15	5	8	1	6	316	0	5	3	489	6	23	856	0	13	4	2
8:45 AM	3	2	5	1	23	1	19	1	6	250	1	14	4	479	7	17	800	0	13	5	1
Total Survey	21	15	25	3	268	21	140	6	47	2,405	5	76	15	4,038	40	171	7,040	3	131	46	29

### Peak Hour Summary 7:00 AM to 8:00 AM

By Approach	Northbound 45th Ave NE				Southbound 45th Ave NE				Eastbound Bothell Way NE				Westbound Bothell Way NE				Total	Pedestrians Crosswalk			
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV		North	South	East	West
Volume	35	18	53	1	262	46	308	4	1,255	2,253	3,508	39	2,173	1,408	3,581	95	3,725	0	75	25	20
%HV	2.9%				1.5%				3.1%				4.4%				3.7%				
PHF	0.80				0.85				0.88				0.93				0.96				

By Movement	Northbound 45th Ave NE				Southbound 45th Ave NE				Eastbound Bothell Way NE				Westbound Bothell Way NE				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	15	9	11	35	168	14	80	262	24	1,229	2	1,255	2	2,158	13	2,173	3,725
PHF	0.47	0.75	0.55	0.80	0.78	0.50	0.69	0.85	0.55	0.88	0.50	0.88	0.50	0.93	0.65	0.93	0.96

### Rolling Hour Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound 45th Ave NE				Southbound 45th Ave NE				Eastbound Bothell Way NE				Westbound Bothell Way NE				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
7:00 AM	15	9	11	1	168	14	80	4	24	1,229	2	39	2	2,158	13	95	3,725	0	75	25	20
7:15 AM	15	10	12	2	169	13	68	3	30	1,298	2	40	2	2,036	18	96	3,673	2	74	26	21
7:30 AM	11	7	11	1	158	7	71	2	30	1,293	3	38	7	1,937	21	87	3,556	3	69	24	16
7:45 AM	6	6	14	1	119	9	59	1	25	1,275	3	33	10	1,892	25	87	3,443	3	69	25	12
8:00 AM	6	6	14	2	100	7	60	2	23	1,176	3	37	13	1,880	27	76	3,315	3	56	21	9

Attachment C  
Detailed Intersection Level of Service Summary Sheets

# HCM Unsignalized Intersection Capacity Analysis

## 4: NE 155th Street & Bothell Way (SR 522)

8/8/2016



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕↗			↕↗
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	8	2345	10	0	1685
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	9	2549	11	0	1832
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	3470	1280			2560	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3470	1280			2560	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	94			100	
cM capacity (veh/h)	5	157			170	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>	<b>SB 2</b>	
Volume Total	9	1699	861	916	916	
Volume Left	0	0	0	0	0	
Volume Right	9	0	11	0	0	
cSH	157	1700	1700	1700	1700	
Volume to Capacity	0.06	1.00	0.51	0.54	0.54	
Queue Length 95th (ft)	4	0	0	0	0	
Control Delay (s)	29.3	0.0	0.0	0.0	0.0	
Lane LOS	D					
Approach Delay (s)	29.3	0.0		0.0		
Approach LOS	D					
<b>Intersection Summary</b>						
Average Delay			0.1			
Intersection Capacity Utilization			75.1%		ICU Level of Service	D
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis  
 4: NE 155th Street & Bothell Way (SR 522)

8/8/2016



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕↗			↕↖
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	11	2345	12	0	1685
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	12	2549	13	0	1832
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	3471	1281			2562	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3471	1281			2562	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	92			100	
cM capacity (veh/h)	5	156			170	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	12	1699	863	916	916	
Volume Left	0	0	0	0	0	
Volume Right	12	0	13	0	0	
cSH	156	1700	1700	1700	1700	
Volume to Capacity	0.08	1.00	0.51	0.54	0.54	
Queue Length 95th (ft)	6	0	0	0	0	
Control Delay (s)	29.9	0.0	0.0	0.0	0.0	
Lane LOS	D					
Approach Delay (s)	29.9	0.0		0.0		
Approach LOS	D					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			75.2%		ICU Level of Service	D
Analysis Period (min)			15			

## MEMORANDUM

**DATE:** June 22, 2014

**TO:** Adam Lundberg, Principal, AML Construction

**FROM:** Michael Read, PE, Principal, TENW

**SUBJECT:** 3803 NE 155<sup>th</sup> Street Mixed Use –Parking Impact Analysis  
TENW Project No. 3418

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This memorandum summarizes the results of parking demand analysis associated with a proposed development known as the *3803 NE 155<sup>th</sup> Street Mixed Use* project near the intersection of NE 155 Street and Ballinger Way (SR 104) intersection in Lake Forest Park, WA. Upon completion, the project would remove an existing single family home and garage, and build a mixed use building with up to 34 residential apartments, 1,340 square-feet of office, and 32 parking stalls in structured parking. An evaluation of City code, parking demand estimates based on national/local parking generation rates, and the potential for shared parking at the site is included in the evaluation of on-site parking demand. *Parking Generation, 4th Edition*, Institute of Transportation Engineers, and *Shared Parking, 2nd Edition*, Urban Land Institute to estimate peak on-site demand for parking by use and hourly utilization profiles for a typical weekday.

### Project Description

The proposed mixed use project is located at 3803 NE 155<sup>th</sup> Street, adjacent to the Sheridan Market east of Ballinger Way (SR 104), is proposing up to 34 apartment units and 1,340 square-feet of office uses. No on-street parking is available in the immediate site vicinity. A conceptual site design in **Figure 1**.

### Parking Analysis

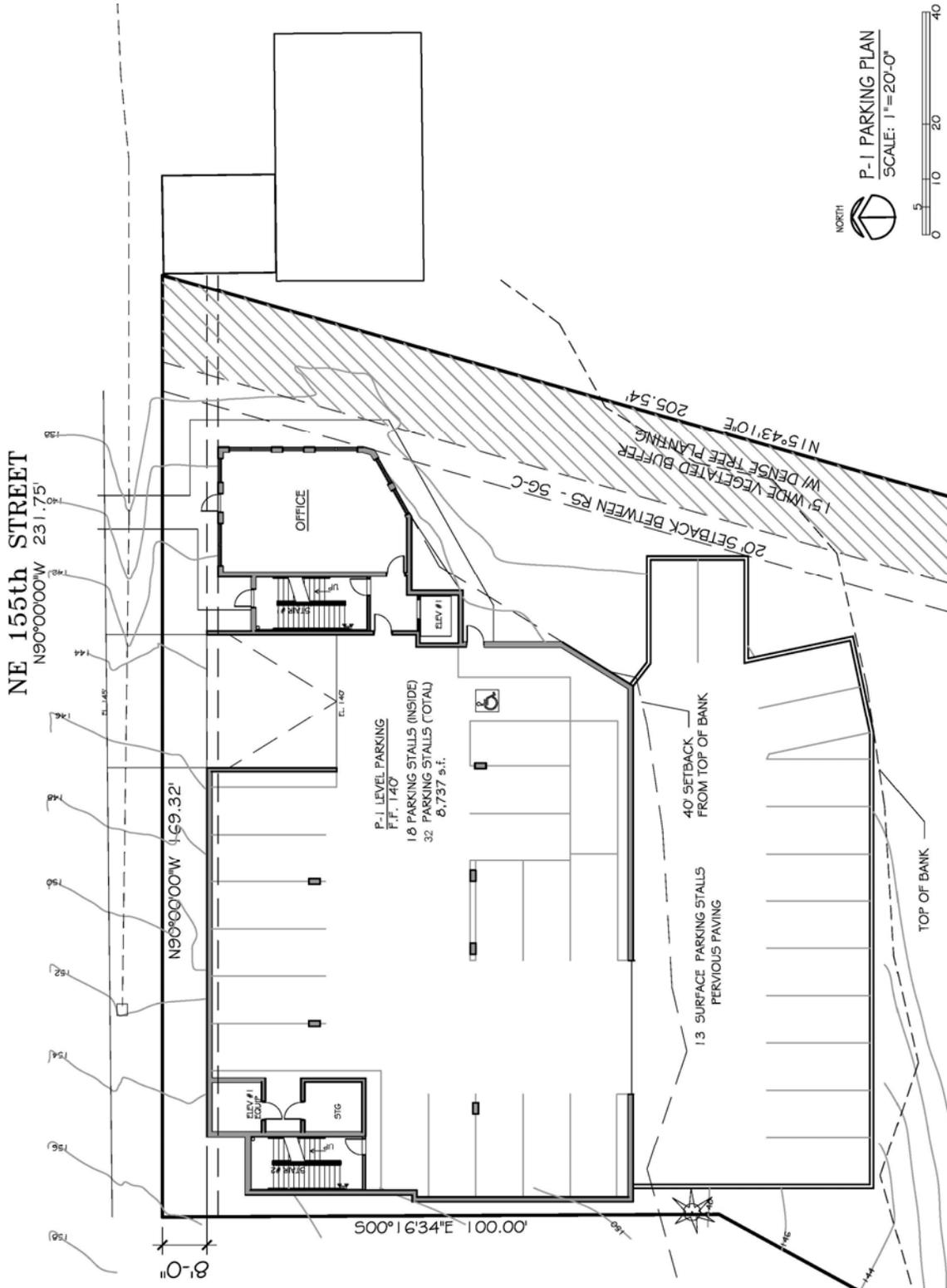
A parking analysis was conducted to project parking impacts. The analysis included:

- City of Lake Forest Park parking requirements.
- Proposed on-site parking supply.
- Estimated parking demand and utilization of proposed mixed use development.
- Mitigation measures.

### City of Lake Forest Park Parking Requirements

Based upon City of Lake Forest Park off-street parking standards (Municipal Code 18.58.030 and 18.47.110), **Table 1** summarizes minimum off-street parking stalls required. As this project is within the Southern Gateway Subarea, separate code provisions apply. As shown, the City of

FIGURE 1 – CONCEPTUAL SITE PLAN



Lake Forest Park would normally require 49 off-street parking stalls for the proposed residential and non-residential uses.

**Table 1**  
**3803 NE 155<sup>th</sup> Street Off Street Parking Requirements**

Parking Component	Minimum Off-Street Parking Requirements	Size	Total
Residential Uses	1.25 stalls per Multifamily Dwelling	34 units	43 stalls
Office Uses	1 stall per 250 Square-Feet	1,340 SF	6 stalls
<b>Total Minimum Off-Street Parking Supply</b>			<b>49 stalls</b>

1 - Per City of Lake Forest Park Municipal Code, 18.47.110.

## Project Parking Demand and Proposed Supply

The Institute of Transportation Engineers *Parking Generation, Fourth Edition*, 2010, was used to estimate potential parking demand for the proposed *3803 NE 155<sup>th</sup> Street Mixed Use* development. Land Use Code 221 for Low/Mid-Rise Apartments and Land Use Code 710 for Office were used to estimate parking demand (see **Attachment A**). Without considering shared use, total peak demand for parking is estimated at up to 35 stalls, which assumes both proposed land uses peak simultaneously.

However, as this is a predominately residential project, the peak demand for parking would occur during evening hours when residential demand is at its peak. During peak evening hours (after 9:00 p.m.), peak demand for on-site parking is estimated at 31 stalls, while during typical weekday daytime hours during normal business hours, peak on-site parking demand is estimated at 26 stalls when residential demand is reduced and office uses are at their peak. Hourly parking profiles by land use published in *Shared Parking, 2<sup>nd</sup> Edition*, Urban Land Institute, were used to evaluate shared parking scenario.

## Conclusions

The proposed *3803 NE 155<sup>th</sup> Street Mixed Use* development was evaluated for peak parking demands. City code would normally require 49 on-site parking stalls to be provided. Peak parking demand was estimated using published ITE parking rates and evaluated for peak daytime and evening demands. To accommodate the proposed project of up to 34 apartments and 1,340 square-feet of office, an additional 7 on-site stalls are recommended. To maximize density of the site, up to 35 apartment units with 1,340 square-feet of office could be developed and accommodated within the 32 stalls available of the proposed parking garage.

If you have any questions regarding the information presented in this memo, please call me at (206) 361-7333 x 101 or [mikeread@tenw.com](mailto:mikeread@tenw.com).

Attachment A  
Parking Demand Estimates

**3803 NE 155th Street Mixed Use - Parking Demand Analysis**

ITE Parking Generation - 4th Edition

			<b>Demand Time</b>	<b>Demand Rate</b>		<b>Unit</b>		<b>ITE Demand</b>
Low-Rise/Mid-Rise Apts	221	Peak Period Parking Demand	11:00 p.m. - 6:00 a.m.	0.92	stalls per dwelling unit	34	dwelling units	31
Office Use	701	Peak Period Parking Demand	9:00 a.m. - 4:00 p.m.	2.84	stalls per 1,000 square feet	1.34	square feet	4
<b>Total</b>								<b>35</b>
Peak Evening Demand (Residential Only)								31
On-Site Stalls								32
Daytime Peak Parking Demand								
Residential (70% of peak evening rate)								22
Office								<u>4</u>
Total								26
On-Site Stalls								32