William Popp Associates *Transportation Engineers/Planners*

(425) 401-1030
FAX (425) 401-2125
e-mail: info@wmpoppassoc.com

TRAFFIC IMPACT ANALYSIS

for

Lake Street Place
Mixed Use Development

Prepared for:
McLeod Development, Co.
112 Lake Street S, Suite 200
Kirkland, WA 98033

c/o:
Chesmore/Buck Architecture
27 100th Ave NE, #100
Bellevue, WA 98004

Prepared by:
William Popp Associates
14400 Bel-Red Rd, Suite 206
Bellevue, WA 98007

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I. Introduction

The following traffic study was prepared in accordance with the Traffic Impact Analysis Guidelines for proposed developments in the City of Kirkland. This study summarizes the project trip generation, concurrency results including project distribution and assignment, intersection impacts and level of service, site access issues, and mitigation issues.

According to the City's transportation guidelines, all commercial developments (non-residential) of more than 12,000 square feet with associated parking of 40 or more spaces are subject to environmental review under the State Environmental Policy Act (SEPA) and to road concurrency evaluation under the City's Concurrency Management Ordinance. The traffic impact analysis guidelines and subsequent analysis will assist in the determination of project compliance with transportation concurrency requirements, allow a thorough and complete review of potential traffic impacts, and ensure that review and mitigation of all proposals occur in a consistent and equitable manner.

A. Project Description

McLeod Development Co. is proposing redevelopment of the site located on the east side of Lake St south of Kirkland Ave and north of 2nd Ave in the City of Kirkland. A mix of office, restaurants, and retail currently occupy the site. A vicinity map is presented in Figure 1.

The existing site uses consists of office, retail, and various restaurant uses. The total floor area for the existing site (as it would have been within one year of today) is approximately 28,607 gsf. The proposed redevelopment of the site will also be a mix of office, retail, and restaurant uses. The total floor area increases to 110,421 gsf. The net increase in building area is 81,814 gsf. This net new floor area would include 83,786 gsf of proposed new floor area and a small portion of Hector's (1,972 gsf) to be removed.

Table 1a identifies the floor areas for existing and proposed redevelopment, and by the various land uses.

WILLIAM POPP ASSOCIATES
Bellevue, WA 98007
425.401.1030

VICINITY MAP

Figure 1

Lake Street Place
Office/Restaurant/Retail
Mixed Use Development

Table 1a
Project Specifications EXISITNG and FUTURE SITE Redevelopment [a]

Building	Retail (gsf)	Quality Restaurant (gsf)	High Turnover Restaurant (gsf)	Office (gsf)	Total (gsf)
EXISTING SITE BUIDING AREA SPECFIICATIONS [b]					
Hector's	0	4,670	0	2,528	7,198
Lakeside [b]	0	0	0	0	0
KWM [c]	2,163	6,503	1,626	11,117	21,409
Main St	0	0	0	0	0
Calabria [b]	0	0	0	0	0
All	2,163	11,173	1,626	13,645	28,607
PROPOSED FINAL PROJECT BUILDING AREA SPECIFCIATIONS (TOTAL AREA)					
Hector's	0	10,174	0	27,514	37,688
Lakeside [d]	0	0	0	0	0
KWM [c]	2163	8,592	1,626	24,894	37,275
Main St	15,349	0	0	20,109	35,458
Calabria [d]	0	0	0	0	0
All	17,512	18,766	1,626	72,517	110,421
NET NEW FLOOR AREA BY USE					
	+15,349	+7,593	0	+58,872	+81,814

[a] per Chesmore/Buck Architecture.
[b] Lakeside and Calabria currently demolished (in 2010). Floors areas are shown for trip mitigation fee and parking credit purposes only.
[c] KWM=Kirkland Waterfront Market.
[d] this building does not exist for future site.

As shown in Table 1a, the existing total gross floor area is 28,607 gsf, which does not include the Lakeside and Calabria buildings. These buildings were demolished in 2010. The proposed project's redevelopment gross floor area is proposed to be approximately 110,421 gsf. The largest land use increase in the project is in the office land use. The retail use increases significantly as well. There is a minor increase in the quality restaurant space, and the high turnover restaurant use declines slightly.

Future access to the site will be via an entrance from the alley to an above-grade parking garage. The parking garage entry/exit has been placed off the north alley per section 5.2 of the "Alley Easement Consideration Agreement" dated April 29, 2010 recorded between the property owner and the City of Kirkland. This agreement eliminates the possibility of locating an entry/exit to the property directly from Lake St or Main St.

The entrance will be operated with a gated ticket/card reader/scanner entrance and the exit will also be gated with a card reader/scanner and ticket payment with ticket booth operator. The parking garage is currently designed to accommodate 252 vehicles. The garage access will be approximately 30 feet (center to center) from the 101 Bank of America building garage entrance. This alley provides access to Lake St as well as to the Main St extension south of Kirkland Ave.

A site plan is presented in Figure 2.

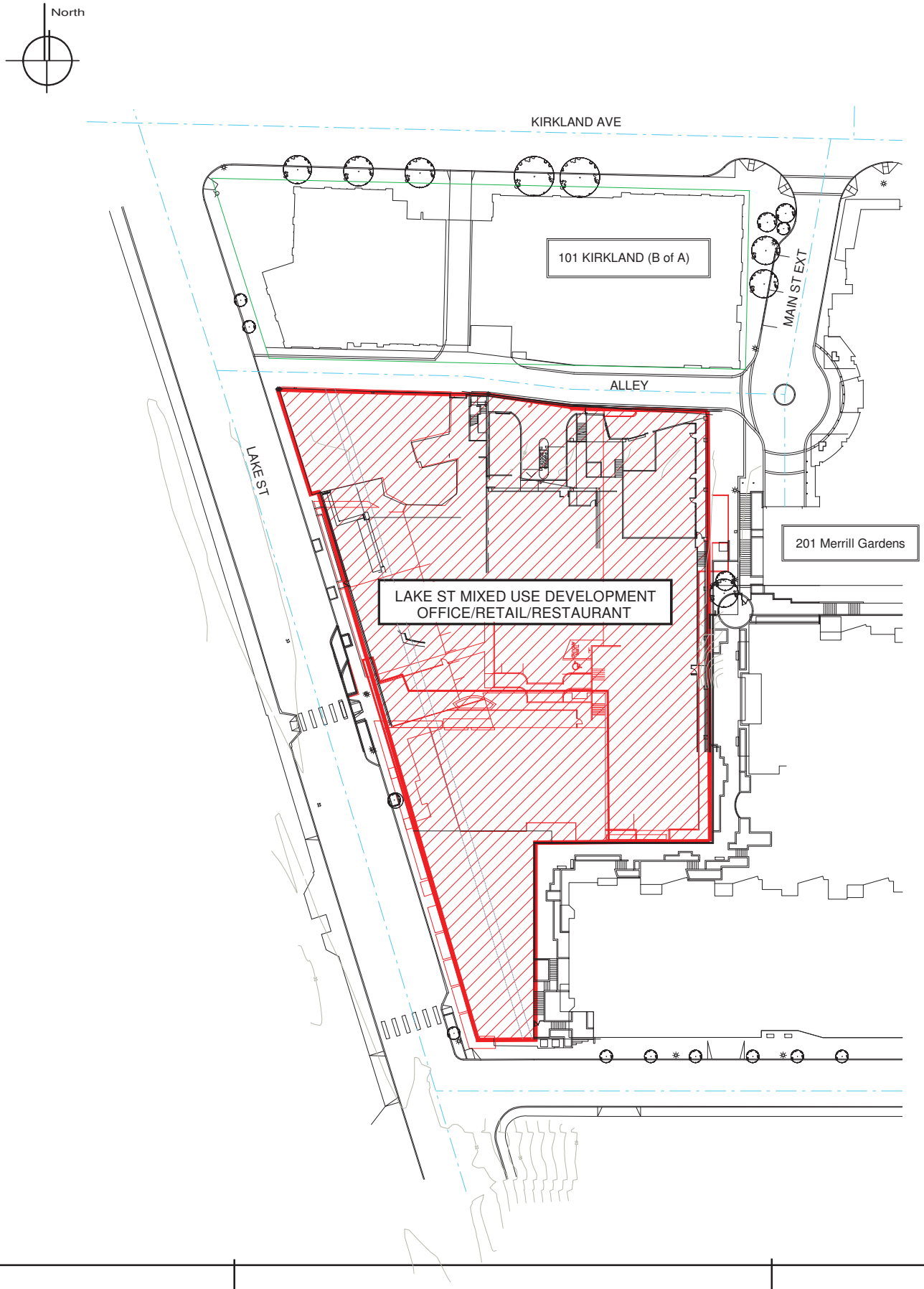
The site as it currently exists includes surface parking totaling 85 stalls with two access points to the alley. There is also on-street public 2-hour parking on Lake Street, Kirkland Ave, and 2nd Ave. It is important to note that the site has grandfathered parking in which 65 stalls must be maintained for the existing uses and 93 stalls are allowed as credit towards new uses from the relatively recent demolition of the Calabria and Lakeside buildings, as well as the proposed partial demolition of the Hector's building.

B. Phased Development

The development is proposed to be constructed in two stages, with the first stage referred to as Phase 1. Phase 1 will consist of an increase in building area to the KWM building with an increase in restaurant and office space. The total floor area of KWM building increases 16,183 gsf. Thus the total building area on the site increases from 28,607 gsf to 44,790 gsf with Phase 1 completion. This increase in floor area is shown in Table 1b. A supplemental traffic study identifying the traffic impacts associated with Phase 1 was prepared in March 2013 and is included in Appendix A.

The second stage, referred here as Phase 2, will consist of an increase in an additional area of 65,631 gsf to an ultimate building area of 110,421 gsf. The total building area increase from existing is a net new increase of 81,814 gsf. It should be noted that the project is essentially proposed as a single development but is proposed to be constructed in two stages, which included a sub-analysis for the Phase 1 development, as well as a full analysis for the entire project. The traffic analysis herein represent the full project proposal: a net increase of 81,814 gsf, from 28,607 gsf existing to a final project size of 110,421 gsf.

The building areas by phase are shown in Table 1b.



WILLIAM POPP ASSOCIATES
Bellevue, WA 98007
425.401.1030

SITE PLAN

Figure 2

Lake Street Place
Office/Restaurant/Retail
Mixed Use Development

Table 1b
Project Specifications, EXISTING, PHASE 1, and PHASE 2 Redevelopment [a]

Building	Retail (gsf)	Quality Restaurant (gsf)	High Turnover Restaurant (gsf)	Office (gsf)	Total (gsf)
EXISTING SITE BUIDING AREA SPECFIICATIONS [b]					
Hector's	0	4,670	0	2,528	7,198
Lakeside	0	0	0	0	0
KWM	2,163	6,503	1,626	11,117	21,409
Main St	0	0	0	0	0
Calabria	0	0	0	0	0
All	2,163	11,173	1,626	13,645	28,607
PROPOSED PHASE 1 REDEVELOPMENT OF KWM					
Hector's	0	4,670	0	2,528	7,198
Lakeside [d]	0	0	0	0	0
KWM	2,163	8,617	1,626	25,186	37,592
Main St	0	0	0	0	0
Calabria [d]	0	0	0	0	0
All	2,163	13,287	1,626	27,714	44,790
NET NEW FLOOR AREA BY USE AND BY PHASE SUMMARY					
PHASE 1	0	+2,114	0	+14,069	+16,183
PHASE 2	+15,349	+5,479	0	+44,803	+65,631
PHASE 1 & 2 [e]	+15,349	+7,593	0	+58,872	+81,814
FUTURE TOTAL	**17,512**	**18,766**	**1,626**	**72,517**	**110,421**

[a] per Chesmore/Buck Architecture, as of March 1, 2013.
[b] Lakeside and Calabria currently demolished, buildings shown for placeholder purpose.
[c] KWM=Kirkland Waterfront Market.
[d] this building does not exist for future site.
[e] the traffic analysis herein is based on this floor area increase.

As shown in Table 1b, the existing total gross floor area is 28,607 gsf. This floor area is the current floor area as of March 1, 2013. The Lakeside building and the Calabria building were previously demolished and are not included in these totals.

The proposed Phase 1 expansion of the KWM is proposed to be approximately +16,183 gsf. Thus, the new total building area for the site will be 44,790 gsf. The proposed Phase 2 expansion is proposed to be an additional +65,631 gsf. Thus, the new total building area for the site will be 110,421 gsf.

C. Previous Project Approval

It is important to note that the site is currently approved for a significantly larger development with similar access. The project is approved for 181,452 gsf total floor area with primarily office use with supplementary restaurant and retail use. The parking garage is designed to accommodate approximately 500 vehicles. As this relates to traffic, this approved project proposal is estimated to generate approximately 50% more trips than the currently scaled back proposal.

II. Existing Conditions

The existing conditions section identifies the roadway and channelization features, traffic volumes, transit, and site access sight distance.

A. Roadway Inventory

The primary existing road system utilized by project traffic would be Kirkland Avenue, Main Street, Lake Street, Central Way, 3rd Street, and State St. These streets are discussed below.

- Kirkland Avenue is a two lane Collector with connection between Lake Street to the west and ultimately to Central Way (NE 85th St) to the east. In the vicinity of the site, the roadway is approximately 40 feet wide (curb to curb) with some narrowing at intersections (curb bulbs) for shorter/safer pedestrian crossing and protection. There is curb, gutter and sidewalks on both sides. On-street parking (parallel) is also permitted on both sides of the street. Parking is limited to 2 hours between 9:00 AM and 7:30 PM. The speed limit is 25 mph.

- Lake Street is a two lane Principal Arterial extending south from Central Way and ultimately turning into Lake Washington Boulevard near Carillon Point. There are curb, gutters, and sidewalks on both sides as well as bike lanes and on-street parallel parking. Marked pedestrian crosswalks are located at all of the signalized intersections, as well as most non-signalized locations along this roadway. Parking is limited to 2 hours between 9:00 AM and 7:30 PM. The posted speed limit is 25 mph.

- Main Street is a local access street with connection between Kirkland Avenue and Central Way. There is curb, gutter, and sidewalks on both sides. On-street parking is permitted on the east side and is drive-in angle parking. The speed limit is 25 mph.

- Main Street south of Kirkland Ave is also a local access street with connection to the 201 Merrill Gardens garage and public parking, as well as connection to the alley

between the proposed project and the 101 Kirkland building. This roadway is approximately 30' wide with two 11' lanes and two on-street parking stalls on the west side, 8' x 40'. No parking is permitted on the east side except for a short zone marked for US Mail.

- 3rd Street is a two lane Collector with connection between Kirkland Avenue and Central Way. There is curb, gutter, and sidewalks on both sides. On-street parking is not permitted. The posted speed limit is 25 mph.

- Central Way is a five lane principal arterial connecting between downtown Kirkland and I-405. The roadway becomes NE 85th Street (a designated state route, SR 908) east of I-405 with ultimate connection to downtown Redmond. There are curb, gutters, and sidewalks on both sides. Marked pedestrian crosswalks are located at all of the signalized intersections along this roadway. Traffic control is predominated by signals. On-street parking is permitted on both sides of the street except along the Park Place frontage. The posted speed limit ranges between 30 mph and 35 mph.

- State Street is a two lane Collector with connection between Kirkland Avenue and NE 68th St. There is curb, gutter, and sidewalks on both sides. On-street parking is permitted on both sides. The posted speed limit is 25 mph north of 2nd Avenue S and 30 mph south.

- 6th St (aka 108th Ave NE) is a two to three lane minor arterial with connection between Central Way and Northup Way. In general, there is curb and gutter and sidewalks on both sides. The posted speed limit is 30 mph south of Kirkland Ave.

- NE 68th St is a three lane Minor Arterial connecting Houghton community with I-405 as well as easy connection to Lake Washington Boulevard via Lakeview Dr. There are curb, gutters, and sidewalks on both sides as well as bike lanes. Marked pedestrian crosswalks are located at all of the signalized intersections along this roadway. The posted speed limit is 25 mph in the vicinity of 6th St.

The near term future road system is expected to be similar as is today with some intersection improvement/modifications at selected intersections.

B. Traffic Volumes (Arterials)

Data regarding daily traffic volumes and historical trends on the selected study area links are available up through 2011 for the City. A brief discussion of selected links are noted as such:

- The 2011 Average Daily Traffic (ADT) volume on Kirkland Avenue east of Lake Street is approximately 6,600 vehicles per day (vpd) per City of Kirkland sources.

The 2012 PM peak hour volume is approximately 340 vehicles with 60% in the westbound direction.

- Lake Street: The 2011 ADT south of Central Way is 17,500 vpd and the 2012 PM peak hour volume is 980 with 63% northbound.

- The 2011 ADT on Main Street south of Central Way is approximately 4,150 vpd. The 2012 PM peak hour volume north of Kirkland Ave is approximately 190 vehicles with 60% southbound.

- Central Way: The 2011 ADT on this arterial west of Lake Street is 19,400 vpd and east of Lake Street it is 13,460 vpd. The 2012 PM peak hour volume is 1,460 vph west of Lake St and 1,050 vph east of Lake St. The peak direction is westbound at 65% approximately.

- 3rd Street between Central Way and State Street: The 2011 ADT on this link is 10,800 vpd. The PM peak hour volume north of Kirkland Ave is approximately 740 with 63% oriented in the northbound direction.

- State Street south of Kirkland Avenue: The 2011 ADT estimate on this collector is estimated to be approximately 8,150 vehicles per day (vpd), and the PM peak hour volume is approximately 860 vehicles with 65% oriented in the northbound direction.

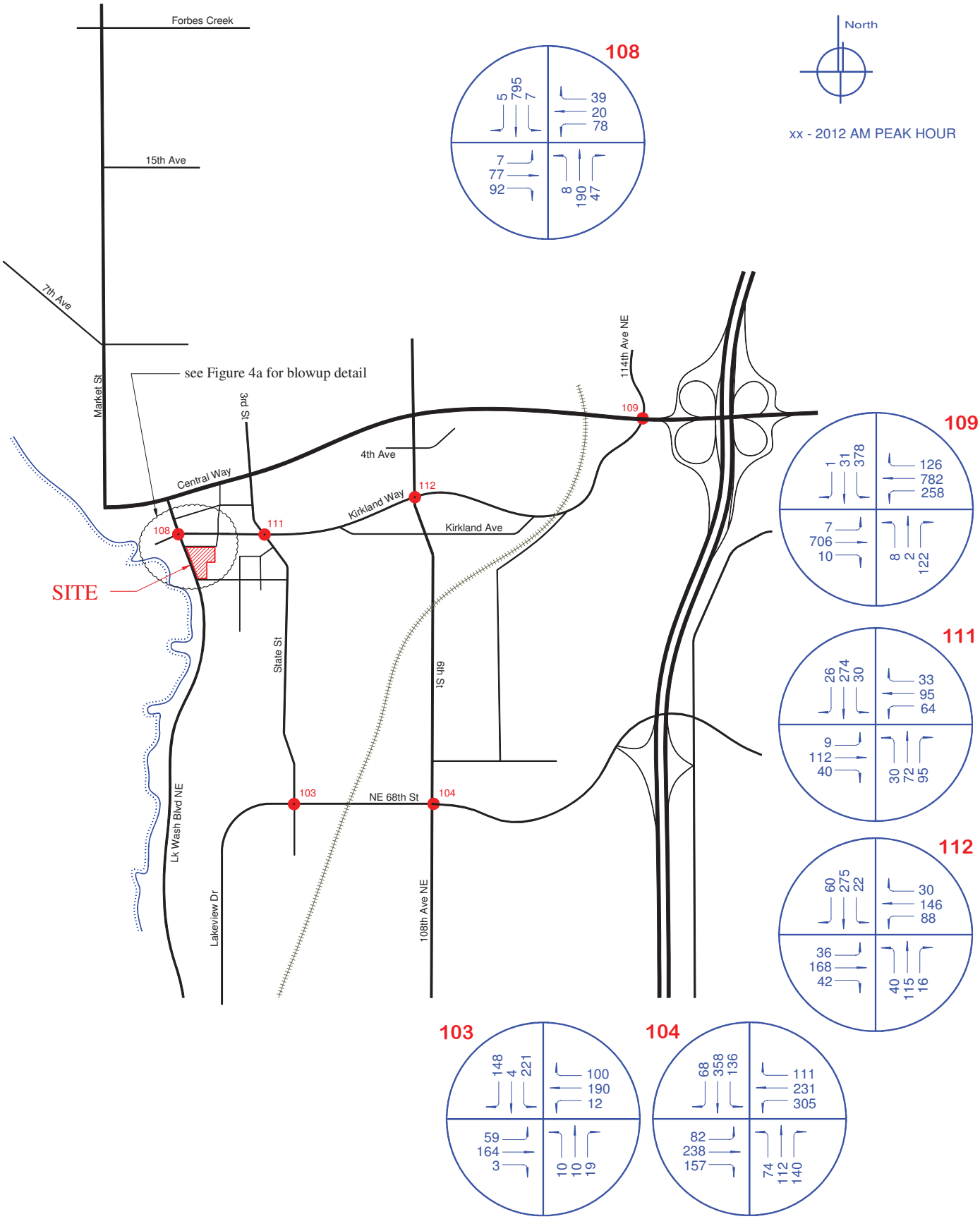
- 6th St north of NE 68th St: The 2011 ADT on this arterial is estimated to be approximately 10,860 vpd, and the PM peak hour volume is approximately 970 vehicles with 60% northbound.

- NE 68th St east and west of 6th St: The 2011 ADT on this arterial is estimated to be approximately 17,020 vpd east of, and 12,150 vpd west of 6th St. The PM peak hour volume is approximately 1,170 vph east leg, and 1,030 vph west leg. The peak direction is nearly evenly split east and west.

The ADT counts are attached in Appendix B. The existing AM and PM peak hour turning movement volumes at selected key intersection are shown in Figure 3a and 3b respectively. The intersections shown in these two figures were selected for further study based on the City's proportionate share worksheet calculations, which is discussed later.

C. Local Area Inventory and Traffic Volumes

The Kirkland Ave/Main St intersection is a non-signalized intersection with stop sign control on both the north and south approaches. The intersection has pedestrian crosswalk marking on all legs: thermoplastic piano bar crosswalk bars on the north, east, and west legs, and a red brick paver pattern on the south leg. As part of the 201 Merrill Gardens development, this intersection was reconstructed to provide enhanced traffic



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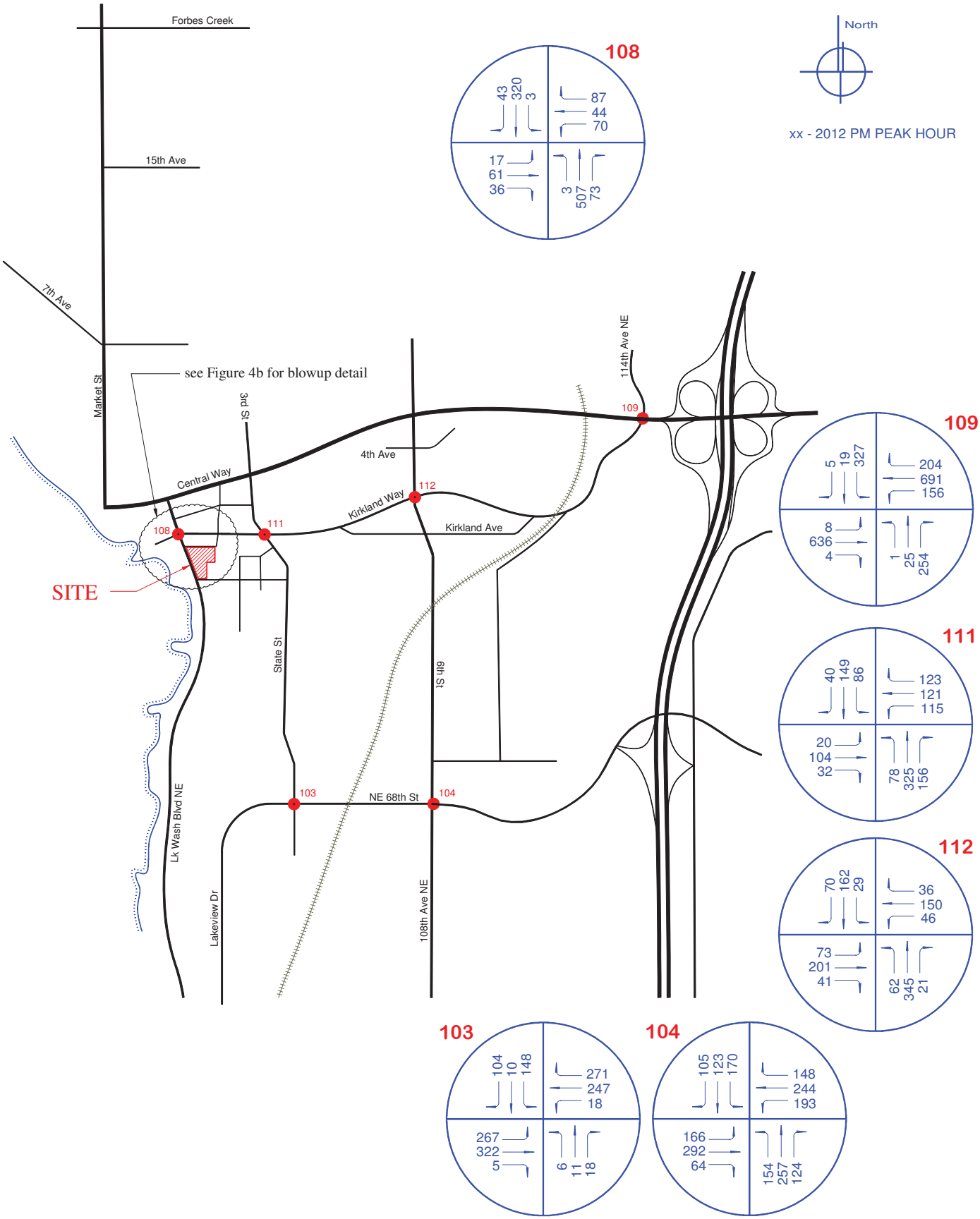
Bellevue, WA 98007
425.401.1030

EXISTING AM PEAK HOUR VOLUMES

Figure 3a

Lake Street Place
Office/Restaurant/Retail
Mixed Use Development



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Bellevue, WA 98007
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EXISTING PM PEAK HOUR VOLUMES

Figure 3b

Lake Street Place
Office/Restaurant/Retail
Mixed Use Development

calming to the intersection that included curb-bulbs on all approaches in order to minimize the pedestrian crossing distances all legs as well as to provide more visibility to pedestrians out in front of on-street parking thus making for a safer crossing environment. Parallel parking is permitted on both sides of Kirkland Ave east and west of the intersection.

Main St south of the Kirkland Ave is approximately 23 feet wide at the intersection and widens to 30 feet just south to include parallel parking stalls on the west side (two). The east side is marked as no parking (red curb) except for a short section for US Mail only (white curb). About 115 feet south of Kirkland Ave (measured from back of crosswalk) there is a small traffic circle/turn around area (50' diameter +/-) that adjoins: 1) 201 Merrill Gardens main pedestrian entrance to the building (east side of the circle), 2) the 201 Merrill Gardens parking garage south of the circle (with some shared public parking), and 3) the alley between the proposed project and 101 Kirkland to Lake St There are large sidewalks on both sides of Main St between Kirkland Ave and the alley.

The alley connects between Lake St and the Main St extension. The roadway width is approximately 17 feet wide throughout. There is 1-foot rolled curb/gutter on the north side at the west end and on both sides at the east end. In addition, there is a 4-foot concrete sidewalk on the north side continuous between Lake St and Main St extension. The overall alley width including rolled curb and sidewalk near the east end is approximately 23 feet, and 22 feet at the west end.

Traffic counts were conducted at the Kirkland Ave/Main St intersection and Lake St/alley driveway Wednesday February 27, 2013 4:00 pm to 6:00 pm and Thursday April 25, 2013 7:15 am to 9:00 am. In addition, alley counts were conducted Wednesday May 16, 2012 for the PM peak period and Wednesday 5/1/13 for the AM peak period. Some minor volume balancing was performed on the alley counts to match the intersection endpoint counts.

A summary of these counts are shown in Table 2.

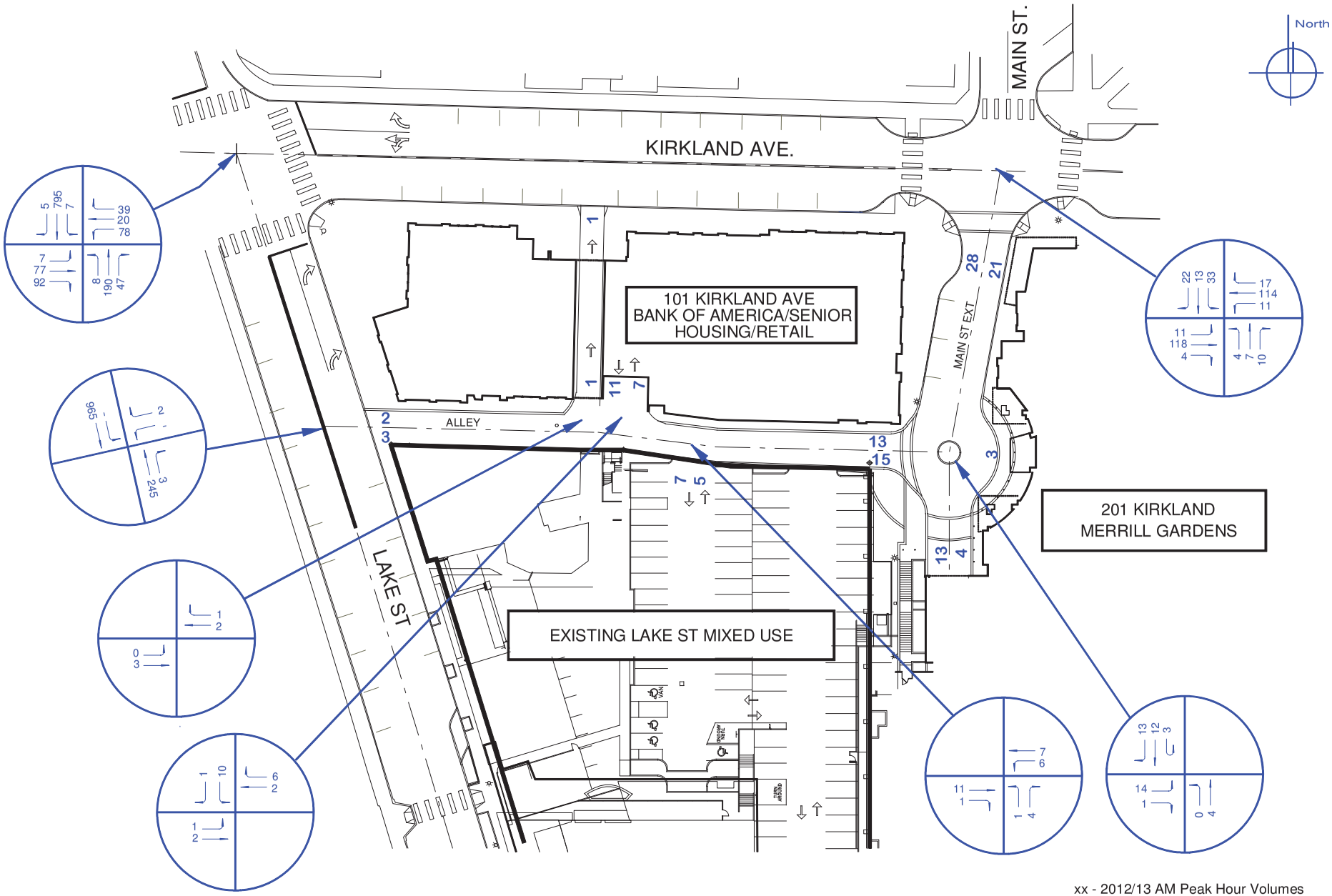
Table 2
Existing Site Area Traffic Volumes (Main St Extension and Alley)

Land Use		AM Peak Total	AM Peak In	AM Peak Out	PM Peak Total	PM Peak In	PM Peak Out
201 Merrill Gardens	Count [a]	17	13	4	34	20	14
U-turns at 201 MG		6	3	3	18	9	9
101 Kirkland Ave	Count [a]	18	7	11	33	20	13
Bank Drive-Thru		2	1	1	18	9	9
Hectors/KWM	Count [a]	12	7	5	51	34	17
All Existing Uses	Count [a]	55	31	24	154	92	62
Kirkland Ave/Main St (south leg)	Count [b]	49	28	21	136	86	50
Kirkland Ave/Bank Drive-Thru Exit	Count [a]	1	0	1	10	0	10
Lake St/Alley	Count [b]	5	3	2	8	6	2
All Trips (end points)	Count [c]	55	31	24	154	92	62

a counts conducted at the driveways for AM Wed 5/1/13 and for PM Wed 5/16/12 and Thur 5/30/13; minor volume balancing was conducted to match counts at Kirkland Ave/Main St and Lake St/Alley
b AM count conducted Thursday 4/25/13, and PM count conducted Wednesday 2/27/13
c A summation of all entrance and exit points for the subject area.

As shown here, the count volumes indicate that there were 55 and 154 vehicle trips in and out of the subject area for the AM and PM street peak hours respectively. The primary vehicle use for the area is to and from the Kirkland Ave/Main St intersection.

Figures 4a and 4b show the existing AM and PM peak hour traffic volumes, respectively, around the site including the alley driveways and Main St.



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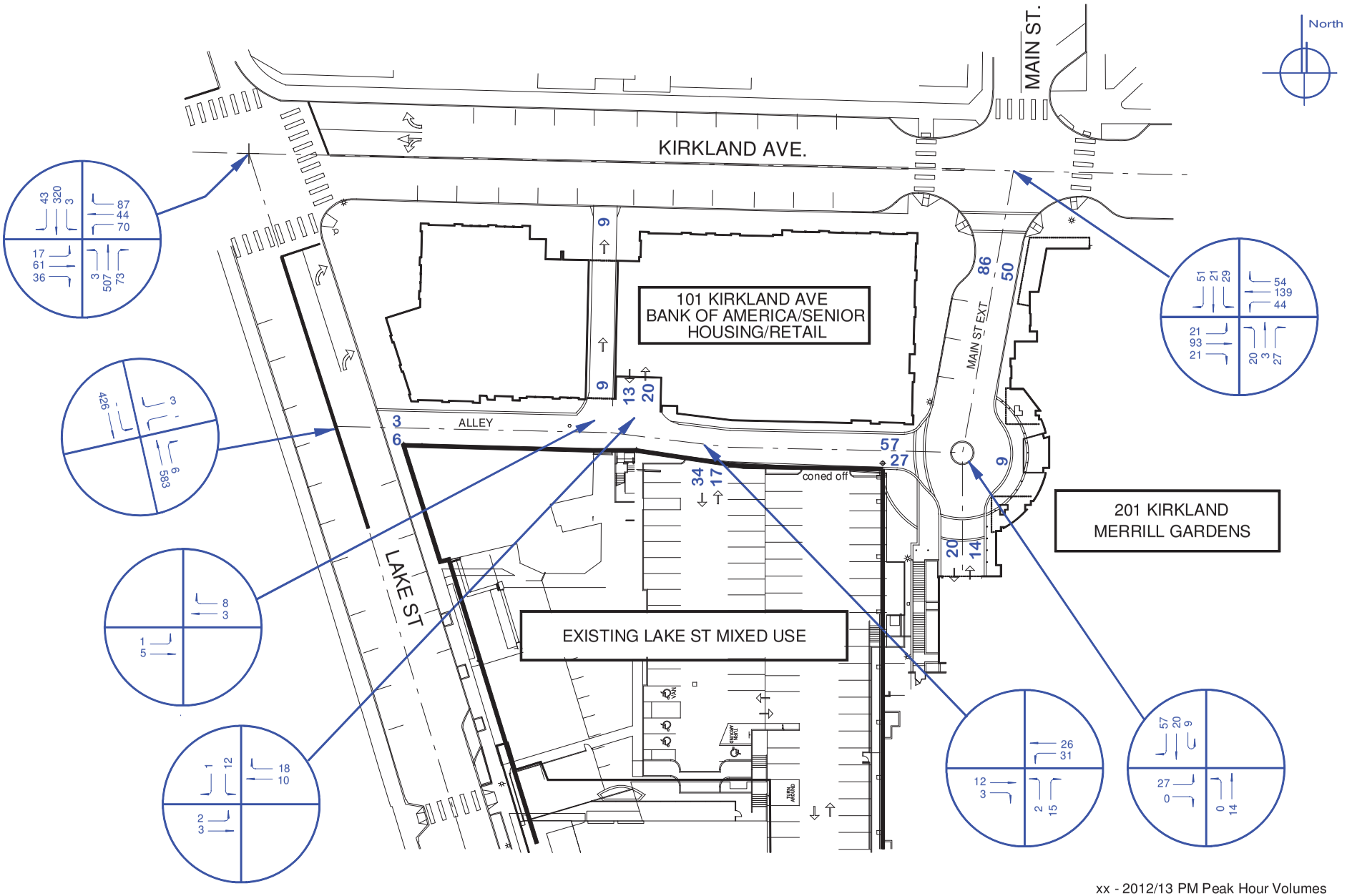
EXISTING AM PEAK HOUR VOLUMES

Figure 4a

Lake Street Place
Office/Restaurant/Retail
Mixed Use Development

ATTACHMENT 8
SEP13-00959
APPLICANT TIA



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EXISTING PM PEAK HOUR VOLUMES

Figure 4b

Lake Street Place
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Mixed Use Development

ATTACHMENT 8
SEP13-00959
APPLICANT TIA

D. Transit Service

King County Metro provides several bus routes near the site that stop at the Kirkland Transit Center on 3rd St just north of Kirkland Ave. There are no routes that run adjacent to the project. The Kirkland Transit Center serves 8 routes including Routes 234, 235, 236, 238, 245, 248, 255, and Sound Transit Route 540. This transit center is a relatively new facility (Apr 2005) that accommodates at least 8 buses (four 40' and four 60' long) in at least 4 bus bays. The transit center was developed with shelters and weather protection for riders, improved signage, information, and other amenities to support riders transferring between services or arriving by vehicle. Operator restrooms, passenger boarding areas, bike facilities, accessible design accommodations, and pedestrian/bike connections to the surrounding community have been included in the project. These routes at this transit center are discussed below:

Route 234 – This route runs north and south along Market St, 3rd St, State St, and Lakeview Dr. It runs between Kenmore and the Bellevue Transit Center.

Route 235 – This route runs between Totem Lake via Central Way and the Bellevue Transit Center via State St and Lakeview Dr.

Route 236 and 238 – This route runs a circuitous route through Bothell, Finn Hill, Juanita, Kingsgate, and Rose Hill. The route runs north-south on 3rd St and east-west on Kirkland Ave in the Transit Center vicinity.

Route 245 – This route runs between the Kirkland Transit Center and the Eastgate Park & Ride passing through Overlake area of Bellevue/Redmond through the Overlake Transit Center.

Route 248 – This route connects between the Kirkland Transit Center and east to and from the Avondale area of Redmond.

Route 255 – This route between the Brickyard Park & Ride near Bothell (NE 160th St I/C with I-405), across SR 520 and into Downtown Seattle.

Route 540 – This route is a Sound Transit route that connects between the Kirkland Transit Center and the University of Washington area.

Figure 5 shows the bus route map for the area surrounding the project.

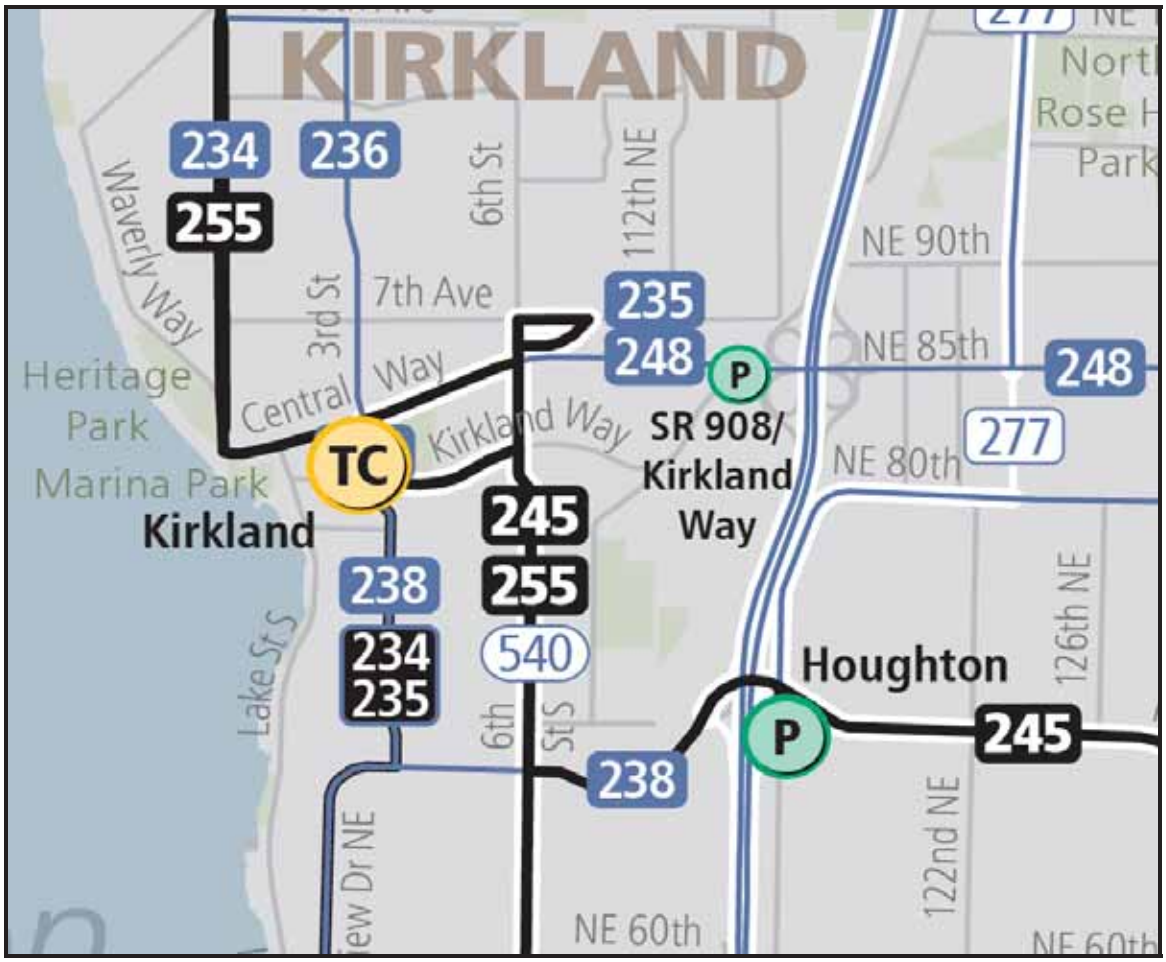


Figure 5

The walking distance between the Lake Street Place project and the Kirkland Transit Center is approximately 900 feet, along safe pedestrian sidewalks.

E. Intersection Sight Distance

Intersection sight distance (ISD) requirements are the design parameters set forth in order to provide sufficient sight distance for entering vehicles such that they do not impede the mainline traffic speed and in-turn do not reduce the capacity of the roadway. The City road standards require a minimum sight distance of 280 feet for a speed of 25 mph and 335 feet for a speed of 30 mph for a typical stop sign controlled intersection (minor street stop)(Case B). The City standard for driveways where the exiting driveway volume is less than 50 PM peak hour trips and the ADT on the major street is less than 15,000 is 150 feet for a 25 mph facility (Case E1 or E2). The sight distance requirement increases to 280 feet with an ADT exceeding 6,000 (Case E2).

Intersection sight distance evaluation was conducted in the field at the proposed site access points. Measurements were based on criteria of 3.5 feet for entering driver eye

height and an approaching vehicle height of 3.5 feet. Typically, the "driver's eye" for the entering vehicle is located 14 feet back from edge of traveled way. The edge of traveled way is exclusive of bike lanes or on-street parking.

The available sight distance from the alley looking south on Lake St is restricted by the adjacent on-street parking. If the parking were not occupied, the ISD extends in excess of 300 feet south. The ISD to the north extends through the Kirkland Ave signalized intersection, however, this measurement is not relevant given that the only permitted movement at the alley is right in and right out. There are two on-street parking stalls to the south where parking is restricted between 4:00 PM and 7:00 PM. When the parking stalls are occupied, the available sight distance from the alley looking south on Lake St varies between 37 feet and 44 feet depending on the setback assumption of 10 feet or 14 feet. These sight line measurements assume a sight line that crosses the front of the vehicle, presumably a van or similar vehicle without a front-end low profile. The available ISD without the two parking stalls occupied varies between 122 feet and 152 feet depending on the two noted setback assumptions. The shorter setback assumption yields a longer sight distance.

The available sight distance from the Main Street extension looking east on Kirkland Avenue is available up to the 3rd Street intersection, however, it can be restricted somewhat by on-street parking. The available sight distance from the site access looking west on Kirkland Avenue is available up to Lake St. The distance from the site access to each of these intersections is in excess of the 150-foot minimum distance. Thus, the available sight distance would be adequate for a 25 mph speed limit assumption.

F. Vehicle Collision History

A 3-year reported vehicle collision history 2009 through 2011 at the study area intersections was provided by WSDOT Olympia Headquarters to WPA. The study area intersections noted in this table were determined based on the City's Concurrency analysis and the Significant Intersection impact analysis, as well as local area intersections surrounding the project. The concurrency process is discussed later in this report. The "target threshold" intersection collision rate (aka accident rate) set at the city is 1.0 acc/mev.

The collision rates for the years 2009 and 2011 were computed based on estimates of total daily volume entering the intersection. Intersection daily volumes (total entering) were estimated based on PM peak hour intersection volumes divided by K factors from historical City data sources. The K factor reflects the ratio of PM volume to daily volume, where in this case represent total entering intersection volumes. The PM peak hour volumes used are 2012 thus the resultant daily volumes were adjusted down 1% per year to reflect the collision data set years 2011, 2010 and 2009.

The number of collisions, the daily volume basis, and the subsequent annual collision rates are shown in Table 3.

Table 3
Intersection Collision History [a]

Intersection	2011 # of Acc[b]	2011 Entering Volume[c]	2011 Acc Rate[d]	2010 # of Acc[b]	2010 Entering Volume[c]	2010 Acc Rate[d]	2009 # of Acc[b]	2009 Entering Volume[c]	2009 Acc Rate[d]
Signalized Intersections									
State St/NE 68th St	1	16,620	0.16	0	16,450	0.00	0	16,290	0.00
108th Ave NE/NE 68th St	4	22,440	0.49	4	22,220	0.49	1	22,000	0.12
Lake St/Kirkland Ave	6	17,880	0.92	2	17,700	0.31	2	17,520	0.31
NE 85th St/114th Ave NE	12	25,630	1.28	4	25,370	0.43	12	25,120	1.31
Kirkland Ave/3rd St	1	17,810	0.15	1	17,630	0.16	3	17,450	0.47
Non-Signalized Intersection (all-way stop)									
Kirkland Way/6th St S	2	15,300	0.36	2	15,150	0.36	1	15,000	0.18
Kirkland Ave/Main St	1	7,420	0.37	0	7,350	0.00	0	7,280	0.00
Main St south of Kirkland Ave	no accidents identified/reported								
Alley between Lake St and Main St	no accidents identified/reported								

[a] Data summary provided by WSDOT Olympia HQ.
[b] Annual accidents/collisions; intersection related.
[c] Total vehicles per day entering the intersection.
[d] Annual Accident Rate = [(# of Acc)(1,000,000)]/[(ADT)(365)]

A summary of each intersection is discussed below.

At the State St/NE 68th St intersection, over the course of the 3-year period shown, this intersection had only 1 collision over the 3-year period analyzed, resulting in an annual average of 0.33 collisions per year. The 3-year average collision rate was estimated to be 0.05 collisions per million vehicles entering; with annual rates ranging between 0.00 and 0.16. This intersection is signalized. The K-factor was estimated to be 8.5%.

At the 108th Ave NE/NE 68th St intersection, for the 3-year period shown, has had 9 intersection related collisions over the 3-year period analyzed, thus averaging 3.00 collisions per year. The average collision rate was estimated to be 0.37 collisions per million vehicles entering; annual rates ranged between 0.12 and 0.49. This intersection is signalized. The K factor (PM to daily ratio for total entering) was assumed to be 9.0%. A review of the collision summary indicates that of the 9 intersection related collisions, 2 were rear-end, 3 were side-swipe, 2 were entering at angle (failure to yield), 1 improper turn hit pedestrian, and 1 was a large truck hitting signal pole (east to north right turn).

At the Lake St/Kirkland Ave intersection, over the course of the 3-year period shown, this intersection had 10 collisions over the 3-year period analyzed, resulting in an annual average of 3.33 collisions per year. The average collision rate was estimated to be 0.51 collisions per million vehicles entering; annual rates ranged between 0.31 and 0.92. This intersection is signalized. The K factor (PM to daily ratio for total entering) was estimated to be 7.0%. A review of the collision summary indicates that of the 10 intersection related collisions, 6 were rear-end, 2 were left turn (failure to yield), and 2 were on-street parking related.

At the NE 85th St/114th Ave NE intersection, over the course of the 3-year period shown, this intersection had 28 collisions, resulting in an annual average of 9.33 collisions per year. The average collision rate was estimated to be 1.00 collisions per million vehicles entering; annual rates ranged between 0.43 and 1.31. The majority of the collisions, 14 of 28, were rear end related with most being in the west to east direction (eastbound). There were 11 left-turn related collisions; where the left turn failed to yield right of way to the thru movement. Most of these left-turn related collisions, 9 of the 11, were the westbound left-turn. This intersection is signalized. The K factor was estimated to be 9.0%.

At the Kirkland Ave/3rd St intersection, over the course of the 3-year period shown, this intersection had 5 collisions over the 3-year period analyzed, resulting in an annual average of 1.67 collisions per year. The average collision rate was estimated to be 0.26 collisions per million vehicles entering; annual rates ranged between 0.15 and 0.47. This intersection is signalized. The K factor was estimated to be 7.5%.

At the Kirkland Way/6th St intersection, this intersection had 5 collisions over the 3-year period analyzed, resulting in an annual average of 1.67 collisions per year. The collision types consisted of 1 rear end, 1 left turn, and 3 entering at angle (failure to grant right of way). The average collision rate was estimated to be 0.30 collisions per million vehicles entering; annual rates ranged between 0.18 and 0.36. This intersection is controlled by stop signs for all approaches (all-way stop). The K factor was estimated to be 8.0%.

At the Kirkland Way/Main St intersection, over the course of the 3-year period shown, this intersection had 1 collision, resulting in an annual average of 0.33 collisions per year. The collision report identified this collision as improper backing (same direction). The average collision rate was estimated to be 0.12 collisions per million vehicles entering; annual rates ranged between 0.00 and 0.37. This intersection is non-signalized (nb/sb side street stop). The K factor was estimated to be 7.5%.

There were no collisions reported in the 3-year history for Main St south of Kirkland Ave as well as on the alley between Lake St and Main St.

G. City Programmed Improvements

According to the City of Kirkland's Capital Facilities Plan, there are several proposed roadway projects that will have an improved ultimate affect on the roadway infrastructure utilized by the project. They would include:

Traffic Signal Enhancements (Global) – Intelligent Transportation System (ITS). ITS involves the systematic implementation of advanced technology to improve traffic flow. It has several components including advanced traffic signal controllers, traffic surveillance cameras, video detection, and accessible pedestrian signals to name a few. A Traffic Management Center (TMC) is used to remotely manage all of the field devices with central traffic systems, allowing monitoring and adjustments to signal timing in a real-time environment. This project will be completed in two phases:

Phase I: Install traffic signal upgrades on designated ITS corridors including traffic surveillance cameras. Set up the TMC and connect fiber optic communication to link corridors to TMC.

1. Central Way from 6th Street to Lake Street
2. Lake Washington Blvd from NE 38th Street to Central Way
3. Market Street/100th Avenue NE from Central Way to NE 132nd Street

Between Phase I and Phase II, the **Citywide Safety & Traffic Flow Improvement** project will provide enhanced signal interconnection and communication to the City's new TMC.

Phase II: Install ITS upgrades at 15 intersections formerly on King County's network (six of which are located in the newly annexed area) to integrate them into Kirkland's Phase I ITS. Includes system engineering analysis, design, plans and specifications for the procurement and construction/installation of ITS devices such as controllers, cabinets, detection, traffic surveillance cameras and other related devices, as well as the fiber optic communication system that will allow devices to communicate to Kirkland's TMC presently under design.

1. NE 132nd Street
2. 120th Avenue/124th Avenue NE in Totem Lake
3. 100th Avenue NE/Juanita Woodinville Way

Project Timeline: Phase 1: Traffic Management Center 2013, Procurement and Testing 2013, Installations 2013. Phase 2: Procurement and Testing 2014, Installations 2014.

- Park Lane Pedestrian Enhancement. The intent of the project is to develop visual connections along Park Lane (consistent with the long term goal of connecting the

Park to the Lake Washington waterfront) with enhanced Park Lane as a regional destination, encourage economic vibrancy and diversity, ensure equitable access for all, and create high performance greenscapes.

- Cross Kirkland Corridor (Regional Trail). The Cross Kirkland Corridor is a 5.75-mile segment of the 44-mile Eastside Rail Corridor. The Eastside Rail Corridor runs from Renton, WA to Snohomish, WA. The City purchased the Cross Kirkland Corridor from the Port of Seattle in April 2012. One of the many unique features about the Cross Kirkland Corridor is its connection to two transportation hubs. Plans are underway to develop the South Kirkland Park & Ride, which rests at the south end of the Corridor, as transit-oriented housing and retail In the near term, the City has plans to construct an interim gravel trail.

- South Kirkland Park and Ride - Transit Oriented Development (TOD). Construction of the new Park & Ride parking garage and Transit Oriented Development in the northeast corner of the South Kirkland Park and Ride is underway. The project is currently under construction. The TOD development proposal includes two buildings for 239 residential units and a 295-stall parking garage. The King County METRO portion of the project includes 530 stall parking stalls, and redesign of the surface parking lot and transit loading area. At completion, the park and ride facility will increase the number of parking stalls from the existing 603 stalls to approximately 850 stalls.

- I-405 – NE 6th St to I-5 Widening and Express Toll Lanes. The NE 6th Street to I-5 Widening and Express Toll Lanes project will complement the widening between NE 85th Street and NE 124th Street (Kirkland Nickel Stage 1 project) by providing one continuous northbound and southbound lane between NE 6th Street in Bellevue and SR 522 in Bothell. This new lane when combined with the existing carpool lane will operate as a dual express toll lane system from downtown Bellevue to Bothell/ Woodinville. Additionally, the existing carpool lane from SR 522 to I-5 will be converted to a single express toll lane or high-occupancy vehicle toll (HOT) lane.

  The new express toll lane system will provide 17 miles of additional congestion relief to Bellevue, Kirkland, and Bothell. To further enhance traffic operations in the Bothell area, a northbound "braided" ramp system will be built between the NE 160th Street and SR 522 interchanges. The NE 160th Street to I-405 northbound traffic and the I-405 to SR 522 traffic will be separated from each other to provide more efficient access to I-405 and SR 522. To aid congestion on southbound I-405 in the Bothell area, WSDOT will build wider shoulders between SR 522 and NE 160th Street and between SR 527 and NE 195th Street, allowing buses to use the shoulders during peak periods.

- SR 520 – Medina/Hunts Point to SR 202: Eastside Transit and HOV Project. The Eastside Transit and HOV Project will complete and improve the 8.8-mile HOV

system from Evergreen Point Road to the SR 202 interchange. The improved six-lane corridor will include two general-purpose lanes and one transit/HOV lane in each direction. The Eastside Transit and HOV Project will provide transit service and mobility improvements along with environmental and community enhancements including: 1) Regional bicycle and pedestrian path, 2) Direct-access ramp to 108th Avenue NE for carpools and transit, 3) Wider, safer shoulders , 4) Inside transit/HOV lane through the entire Eastside corridor, 5) Improvement of the Evergreen Point Road Park and Ride, and 6) Median transit stops at Evergreen Point Road and 92nd Avenue NE.

- NE 85th St/114th Ave NE Intersection Improvements. Recent improvements have been made including widening of the north leg to include dual southbound left turn lanes. Future improvements are likely to include HOV Queue Bypass lanes east and west directions. However, these additional improvements are unfunded and are not included in the horizon year of this study (2017).

- NE 68th St/108th Ave NE Intersection Improvements -- addition of a westbound right turn lane, along with new curb, gutter and 10' sidewalk around the northeast corner of the intersection. This project was recently constructed. The benefits of this improvement are: 1) it allows the westbound through movement to travel through the intersection unimpeded by the slower turning westbound right turn movement, and 2) if there are any pedestrian crossings of the north leg, the delay to the right turn movement waiting for the pedestrian(s) to cross is removed from the westbound through movement.

- 6th St/Kirkland Way Traffic Signal (unfunded). This intersection is on the unfunded transportation list for signalization, which would involve changing the intersection control from all-way stop to a traffic signal. The project was taken off the road impact fee project list when the City had to reduce the CIP project list.

III. Trip Generation

A. Project Trip Generation

Trip generation estimates daily, AM and PM peak hours for the proposed project were calculated using trip generation rates obtained from the Eighth Edition of the ITE *Trip Generation Report*, 2008 as well as supplemented with information presented in the ITE Trip Generation Handbook. This would include estimates for internal site trip making characteristics as well as pass-by assumptions for the restaurant uses. The retail use is expected to also have some pass-by related trips, however; there is no information within ITE to support a pass-by rate for non-specified retail use. It is likely the pass-by rate for

retail could range between 25% and 50% of all external retail trips, nevertheless, no adjustment was made in this analysis.

Trip generation estimates for the existing uses were computed with the same trip making assumptions noted for the future site.

The trip generation estimate for the existing conditions for Daily, AM, and PM street peak hours are shown in Table 4 below. The supporting trip capture assumptions used for the existing site uses are the same as for the future site uses.

It should be noted that the summary of trip generation for the City's concurrency run effort summarize only the external non-pass-by trips for each of the respective conditions. The external trips reflect those trips that have either an origin or destination trip end associated with the project. Due to the fact this is a mixed-use project, it is anticipated some of the trips will remain on-site for trips between land uses. In addition, this analysis summarizes only the non-pass-by trips since the pass-by trips are trips that would already be on the surrounding street system beyond the perimeter of the site.

Table 4
Trip Generation – EXISTING Site Uses

Land Use	AWDT	AM Peak Total	AM Peak In	AM Peak Out	PM Peak Total	PM Peak In	PM Peak Out
Office (13,645 gsf)							
LUC 710 Rate	11.01	1.55	0.88	0.12	1.49	0.17	0.83
All Trips	150	21	19	2	20	3	17
Internal Capture[1]	38	1	1	0	3	1	2
External[2]	112	20	18	2	17	2	15
Quality Restaurant (11,173 gsf)							
LUC 931 Rate	89.95	0.81	n/a	n/a	7.49	0.67	0.33
All Trips	1,005	9	7	2	84	56	28
Internal Capture[1]	56	1	0	1	4	2	2
External[2]	949	8	7	1	80	54	26
pass-by[3]	420	4	3	1	21	14	7
non-pass-by[4]	529	4	4	0	59	40	19
High Turnover Restaurant (1,626 gsf)							
LUC 931 Rate	89.95	0.81	n/a	n/a	7.49	0.67	0.33
All Trips	207	19	10	9	18	11	7
Internal Capture[1]	35	0	0	0	1	1	0
External[2]	172	19	10	9	17	10	7
pass-by[3]	73	8	4	4	6	3	3
non-pass-by[4]	99	11	6	5	11	7	4
Retail (2,163 gsf)							
LUC 814 Rate	44.32	1.09	0.66	0.34	2.71	0.44	0.56
All Trips	96	2	1	1	6	3	3
Internal Capture[1]	59	1	0	1	2	1	1
External [2]	37	1	1	0	4	2	2
TOTALS							
All Trips	1,458	51	37	14	128	73	55
Capture	188	3	1	2	10	5	5
External	1,270	48	36	12	118	68	50
pass-by	493	12	7	5	27	17	10
non-pass-by	777	36	29	7	91	51	40

1 See Attachment 1, 2, and 3 for estimated internal trip capture for AM, PM, and Daily respectively.
2 External vehicle trips entering or exiting the site
3 Pass-by for Quality Restaurant: 26% for PM Peak, and 44% for AM and daily. Pass-by for high turnover restaurant is 43% for all cases. These are for trips entering or existing the site (excludes all internal trips).
4 Non-pass-by trips are new and/or diverted trips entering or exiting the site (excludes all internal trips.

As shown in Table 4, the existing site is estimated to generate 777 daily, 36 AM, and 91 PM peak hour trips to the surrounding street system (non-pass-by trips only). Within the immediate area of the site including the alley and Main St, pass-by trips are included in the volume estimates: 1,270 daily trips, 48 AM, and 118 PM peak hour trips.

Table 5
Trip Generation – FUTURE Site Uses

Land Use	AWDT	AM Peak Total	AM Peak In	AM Peak Out	PM Peak Total	PM Peak In	PM Peak Out
Office (72,517 gsf)							
LUC 710 Rate	11.01	1.55	0.88	0.12	1.49	0.17	0.83
All Trips	798	112	99	13	108	18	90
Internal Capture[1]	93	1	1	0	5	2	3
External[2]	705	111	98	13	103	16	87
Quality Restaurant (18,766 gsf)							
LUC 931 Rate	89.95	0.81	n/a	n/a	7.49	0.67	0.33
All Trips	1,688	15	11	3	141	94	47
Internal Capture[1]	284	3	1	1	13	7	6
External[2]	1,404	12	10	2	128	87	41
pass-by[3]	621	6	4	2	33	22	11
non-pass-by[4]	783	6	6	0	95	65	30
High Turnover Restaurant (1,626 gsf)							
LUC 931 Rate	89.95	0.81	n/a	n/a	7.49	0.67	0.33
All Trips	207	19	10	9	18	10	8
Internal Capture[1]	67	2	1	1	4	2	2
External[2]	140	17	9	8	14	8	6
pass-by[3]	59	7	4	3	5	3	2
non-pass-by[4]	81	10	5	5	9	5	4
Retail (17,512 gsf)							
LUC 814 Rate	44.32	1.09	0.66	0.34	2.71	0.44	0.56
All Trips	776	19	13	6	47	22	25
Internal Capture[1]	312	4	2	2	14	7	7
External[2]	464	15	11	4	33	15	18
TOTALS							
All Trips	3,469	165	134	31	314	144	170
Capture	757	10	6	4	36	18	18
External	2,712	155	128	27	278	126	152
pass-by	680	12	8	4	38	25	13
non-pass-by	2,032	143	120	23	240	101	139

1 See Attachment 1, 2, and 3 for estimated internal trip capture for AM, PM, and Daily respectively.
2 External vehicle trips entering or exiting the site
3 Pass-by for Quality Restaurant: 26% for PM Peak, and 44% for AM and daily. Pass-by for high turnover restaurant is 43% for all cases. These are for trips entering or existing the site (excludes all internal trips).
4 Non-pass-by trips are new and/or diverted trips entering or exiting the site (excludes all internal trips.

As shown in Table 5, the proposed site redevelopment is estimated to generate 2,032 daily, 143 AM and 240 PM peak hour non-pass-by trips to the surrounding street network. It is important to note that all these trips noted above represent average

weekday conditions and reflect the external non-pass-by trips only. Within the immediate area of the site including the alley and Main St, pass-by trips are included in the volume estimates: 2,712 daily trips, 155 AM, and 278 PM peak hour trips.

Table 6 below identifies the change in trip generation "net new" conditions as a result of the land use and floor area adjustments for all of the four land use types.

Table 6
NET NEW Trip Generation

		AM Peak			PM Peak		
Land Use	AWDT	Total	In	Out	Total	In	Out
External Trips (without pass-by) [2]							
EXISTING SITE	777	36	29	7	91	51	40
FUTURE SITE	2,032	143	120	23	240	101	139
NET NEW	1,255	107	91	16	149	50	99
External Trips (with pass-by) [3]							
EXISTING SITE	1,270	48	36	12	118	68	50
FUTURE SITE	2,712	155	128	27	278	126	152
NET NEW	1,442	107	92	15	160	58	102

1 Net New is Future Trips minus Existing Trips. All trip estimates are per ITE rates.
2 Non-pass-by external-trips-only; see Table 4 for existing trip generation details, and Table 5 for future trip generation details. Totals do not include internal trips (trip capture for mixed use) and pass-by trips. Trip estimates are applicable to areas outside the immediate vicinity of the site.
3 All trips entering and exiting the site; see Table 4 for existing trip generation details, and Table 5 for future trip generation details. Totals do not include internal trips (trip capture for mixed use). Trip estimates are applicable to only the immediate area of the site.

As shown in Table 6, per ITE trip generation rates, the net new trip generation totals show that the site redevelopment's net new vehicular trip impact on the surrounding street system (non-pass-by trips only) will result in an increase of 1,255 daily trips, 107 AM peak hour trips and 149 PM peak hour trips. These net new trips were used for the City's concurrency analysis for all off-site key intersection evaluation. The City concurrency results are included in Appendix C as well as the trip generation report.

For the immediate area of the site, the analysis includes all of the net new pass-by trips as well as the non-pass-by trips. The net new volume estimate (future minus existing) with inclusion of pass-by trips is 1,442 daily trips, 107 AM, and 160 PM peak hour trips. These trip estimates reflect the project's net increase in floor area and use.

The total trips estimated for the full development (to and from the site) were computed by adding the actual counts for the existing site to the estimated net new trips for the expansion. For the typical AM and PM street peak hours, it is therefore estimated that the total trips to/from the site would be 119 (12 existing + 107 new) AM peak hour trips, and

211 (51 existing + 160 new) PM peak hour trips. The existing counts are shown back in Table 2.

B. Weekday Traffic Fluctuations

An estimate of hourly volumes, totals by land use type, for each hour of an average weekday condition was prepared. The off peak hour estimates were based on several factors including the known peak hour volumes (per trip generation tables above), the estimated daily volume as a control total (per trip generation tables above), hourly parking accumulation patterns (based on ITE Parking Generation data as well as Urban Land Institute (ULI) for shared parking), professional traffic engineering judgment, as well as information provided by the client regarding quality restaurant use peak activity.

Figure 6 shows the average weekday hourly distribution by land use type and total as well as an estimate for the existing site. The volumes in this figure represent the project trips with pass-by trips included for the entire site, ie., the net new with pass-by 1,442 daily, 107 AM and 160 PM trips added to the existing counts 550 daily (estimate), 12 AM and 51 PM trips. The site's peak is estimated to be 211 hourly trips occurring during the street PM peak hour. The AM street peak volume is estimated to be 119 vehicles.

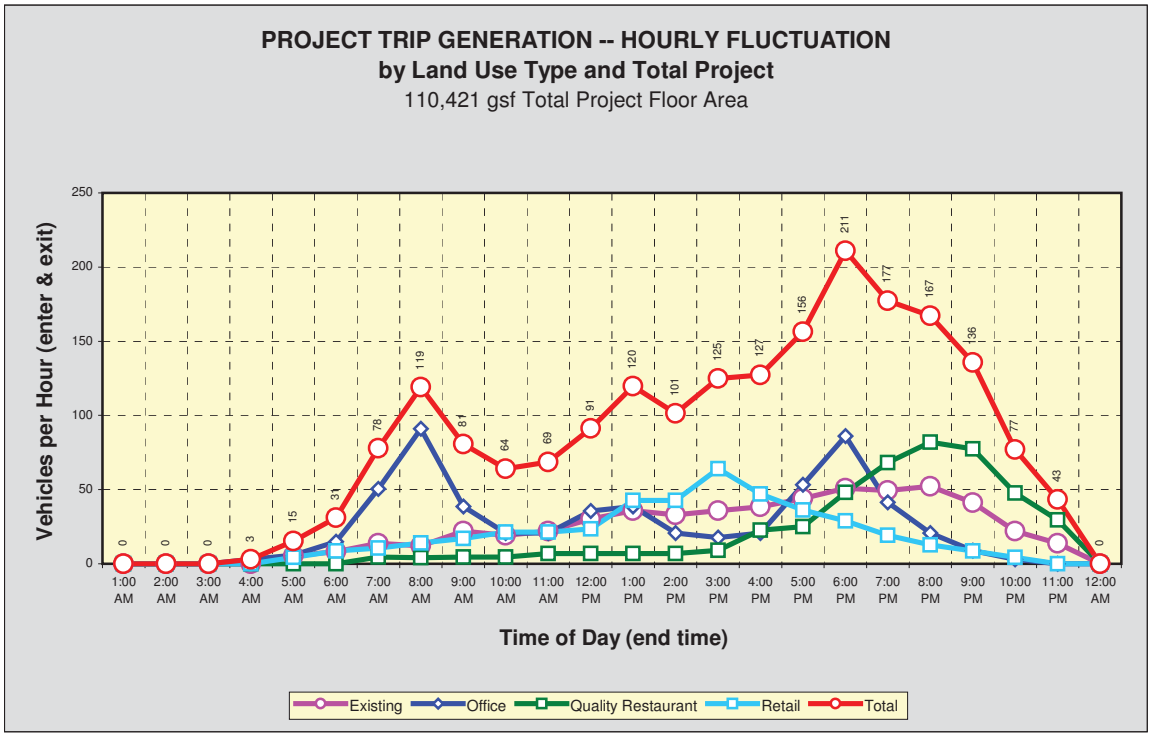


Figure 6

A second figure, Figure 7, represents the inbound and outbound total trips along with the total trips as shown above in Figure 6 (red line). This figure is intended to show the entering and exiting volume magnitude compared against the total volume.

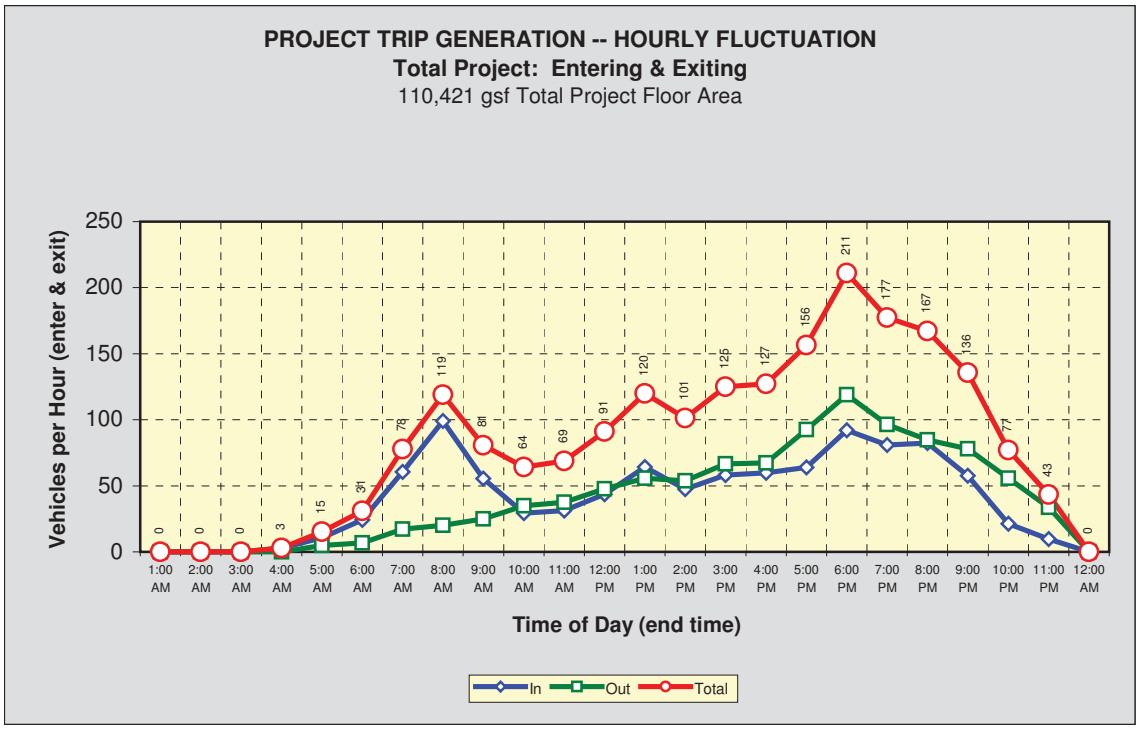


Figure 7

The peak entering volume ("In"; blue line) for the site peak is 99 vph, and 119 vph exiting ("Out"; green line). The peak inbound volume occurs around 8:00 am and the peak exiting volume occurs around 6:00 pm. The peak two way volume is 211 vph which also occurs around 6:00 pm

It is important to note that the volume estimates for the expansion part of the project (+81,814 gsf) could be considered somewhat conservative. Factors such as good transit exposure for office tenants (project in close proximity to transit center), as well as retail and restaurant trip capture from areas beyond the site within the CBD area, are predicted to result in lower trip estimates than as calculated per ITE. Nevertheless, it should be noted that the analysis herein does not account for this potential trip reduction for the project expansion element.

C. Traffic Count Comparison with Existing Development

There are two adjacent developments that share use of the alley and Main St Extension. These include 201 Merrill Gardens (Assisted Living/Retail) and 101 Kirkland Ave (Independent Senior Housing/Bank/Retail). In addition of course, Hectors and the Kirkland Waterfront Market (KWM) currently take sole access to the alley from the internal surface parking lot. A brief description of each project is discussed below:

- 201 Merrill Gardens. This development is located adjacent east of this project and also fronts to Kirkland Ave. This project is an assisted living retirement community consisting of 120 beds and 7,800 gsf of specialty retail. This project takes access to the Main St extension via a parking garage situated south of the east-west alley to Lake St. Vehicle access can be either to/from Lake St via the alley or to/from Kirkland Ave via the new connection to the Kirkland Ave/Main St intersection.

- 101 Kirkland Ave. This development is located adjacent north of this project and also fronts to Kirkland Ave and Lake St. This project is a luxury is a luxury apartment building consisting of 66 units as well as 6,545 gsf of specialty retail and a new 5,500 gsf Bank of America. This project will have sole access to the southside alley via a parking garage with driveway access closer to Lake St. Vehicle access can be either to/from Lake St via the alley or to/from Kirkland Ave via the new connection to the Kirkland Ave/Main St intersection.

- The existing total gross floor area for Hectors and Kirkland Waterfront Market is 28,607 gsf. The uses consist of a mix of restaurant (quality and high turnover), office, and retail uses. The estimated trip generation was noted in back in Table 4.

Traffic counts were conducted at the Kirkland Ave/Main St intersection and Lake St/alley driveway Wednesday February 27, 2013 4:00 pm to 6:00 pm and Thursday April 25, 2013 7:15 am to 9:00 am, respectively. The counts were adjusted to match the east and west leg volume counts provided by the City for Lake St/Kirkland Ave and Kirkland Ave/3rd St.

In addition, alley counts were conducted Wednesday May 16, 2012 and Thursday May 30, 2013 for the PM peak period and Wednesday 5/1/13 for the AM peak period.

Trip generation estimates for each of these projects are shown in Table 7 below.

Table 7
Trip Generation – Existing Site and Adjacent Development

Land Use	Source	AM Peak Total	AM Peak In	AM Peak Out	PM Peak Total	PM Peak In	PM Peak Out
201 Merrill Gardens	ITE [a]	26	17	9	47	20	27
	Count [d]	23	16	7	52	29	23
101 Kirkland Ave	ITE [b]	36	21	15	164	82	82
	Count [d]	20	8	12	51	29	22
Hectors/KWM	ITE [c]	48	36	12	118	68	50
	Count [d]	12	7	5	51	34	17
All Existing Uses	ITE [e]	110	74	36	329	170	159
	Count [d]	55	31	24	154	92	62

a per Table 1 of the 201 Merrill Gardens TIA 11/22/06; total trips (no pass-by trips assumed)
b per Table 1 of the 101 Kirkland Ave TIA 1/25/08; total trips (includes pass-by trips)
c per Table 4 of this TIA; total trips (includes pass-by element for AM and PM)
d counts conducted at the driveways for AM Wed 5/1/13 and for PM Wed 5/16/12, Thur 5/30/13; minor volume balancing was conducted to match counts at Kirkland Ave/Main St and Lake St/Alley. The count volumes reflect those trips in and out of each of the respective site's parking areas only.
e total trip estimate for all uses based on ITE rates.

As shown in Table 7, the recorded trips from these existing uses are noticeably less than what is estimated per ITE rates. The counts reflect those trips in and out of each of the respective site's parking areas (garage or surface lot). There is potential that some trips to and from each of the three site's may use on-street parking or park elsewhere and thus are not recorded in these counts. However, it is important to note that the parking lot or garage for each of the site's noted above all had ample parking available supply such that vehicles would not be deterred to parking elsewhere.

The counts indicate a total volume entering and exiting the alley and Main St extension at 55 AM peak hour trips and 154 PM peak hour trips. By comparison, the ITE estimate was 110 AM trips and 329 PM trips.

Per ITE rates for AM and PM for all three projects, the AM peak hour volumes are estimated to be about one-third of PM volumes. Actual traffic counts for entering and exiting the alley area indicate AM volumes during the street peak hour indicate a similar relationship to PM volumes. The volume counts generated to/from the three properties parking lot/garage are about half of what was estimated per ITE rates.

Based on this information, it is assumed that there are several factors that would lead to the results observed. These would include: 1) some of the existing restaurant and retail trips likely to utilize on-street parking, 2) given the location of the developments in the

Kirkland CBD vicinity, there are more walk trips versus vehicle trips, 3) on-line banking has likely continued to increase thus decreasing vehicle trips to the bank, 4) restaurant and retail likely to have a higher customer walkup percentage given the location, and 5) more trip linking (trip capture to a large extent beyond the bounds of the project) with all the other retail/restaurant/residential in the area.

As note earlier, the future traffic forecasts are based on traffic counts for the existing uses plus the net new project traffic estimates for the project expansion.

IV. Trip Distribution and Assignment

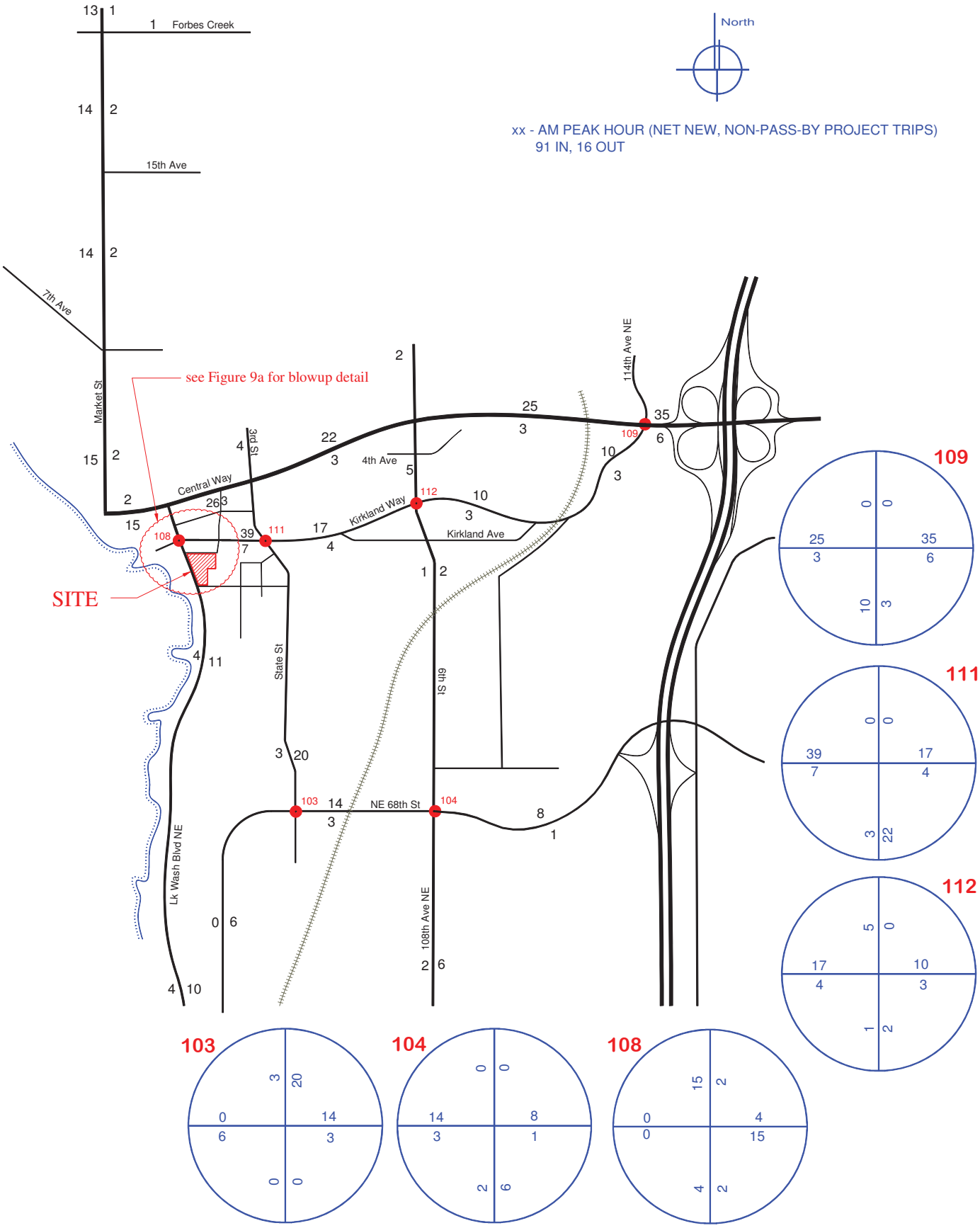
The distribution and assignment of project PM peak hour trips was performed by the City using the City's traffic model as part of the transportation concurrency test. The results suggest the majority of the project trips (70% +/-) will enter and exit to/from the east via Kirkland Ave and Central Way. Below is a detail of the PM trip assignment.

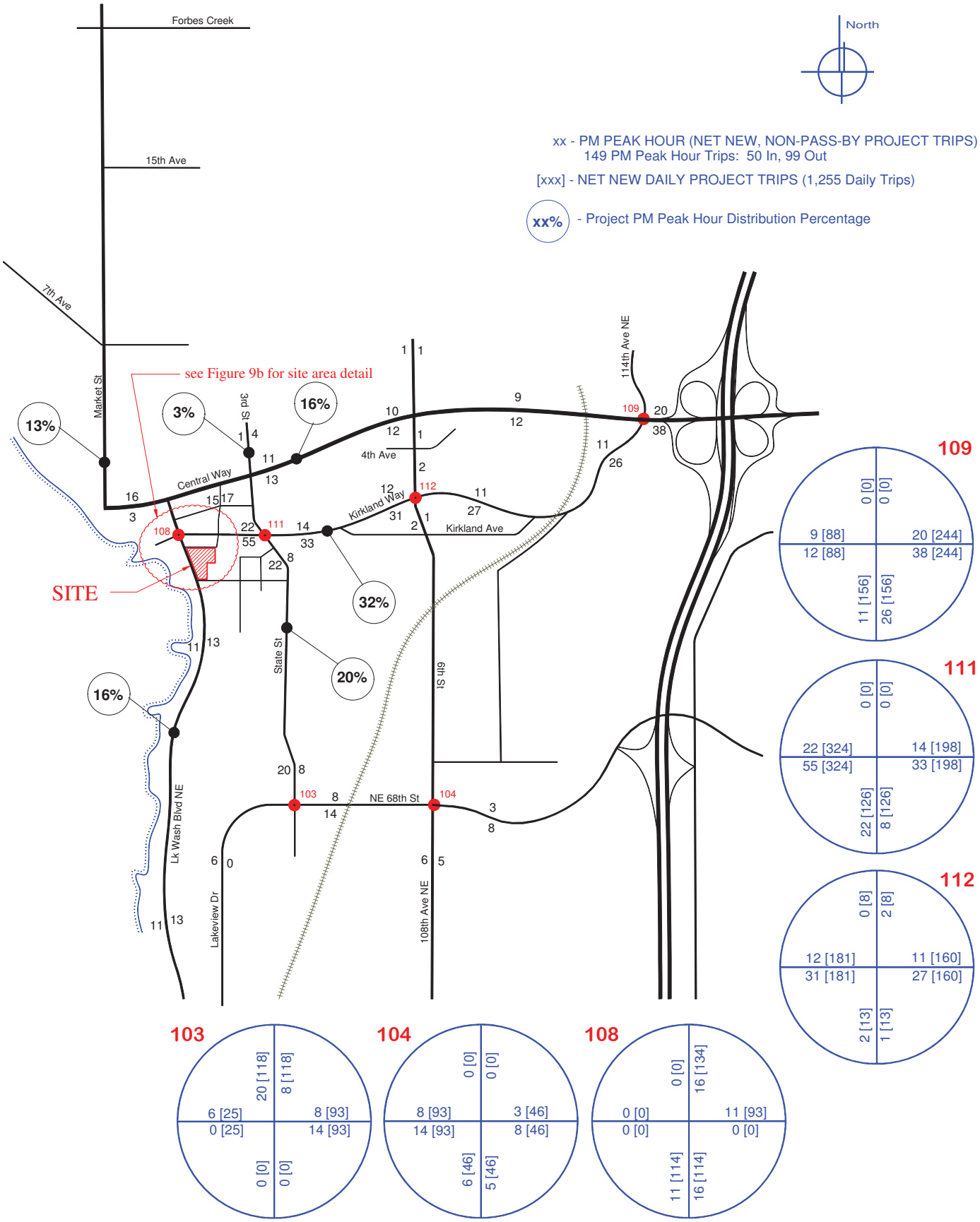
- 32% on Kirkland Ave east of State St.
- 20% on State St south of Kirkland Ave.
- 16% on Central Way east of 3rd St.
- 3% on 3rd St north of Central Way.
- 16% on Lake St south of the alley (south of 2nd Ave).
- 13% on Market St north of Central Way.

The distribution of the AM trips is typically not provided by the City. In this instance, the AM project trips were estimated based on a general reverse orientation of the PM distribution with an adjustment factor for the trip generation AM-PM ratios. There was some adjustment for the inbound trips from the south on Lake Washington Boulevard, where in this case all of the trips were assumed to enter the site from Lake St to Kirkland Ave, whereas in the PM, the southbound left turn movement at this intersection is not permitted, thus these trips were diverted to Main St and entered the site from the north.

The AM project trip assignment is shown in Figure 8a. The assignment of project weekday PM peak hour trips along with daily volumes is shown in Figure 8b. It is important to note that these two figures represent the net new non-pass-by trips from the site as a result of redevelopment. The AM and PM peak hour volumes are shown by turning movement at all the intersections defined as significant. The full assignment in tabular form can be found in Appendix C as part of the City's concurrency run.

The AM and PM peak hour project turning movement volumes in the vicinity of the site are shown in Figures 9a and 9b respectively. These two figures represent the net new trips to and from the site, including pass-by trips.


North
xx - AM PEAK HOUR (NET NEW, NON-PASS-BY PROJECT TRIPS)
91 IN, 16 OUT
Forbes Creek
15th Ave
7th Ave
Market St
see Figure 9a for blowup detail
SITE
Central Way
3rd St
4th Ave
Kirkland Way
Kirkland Ave
114th Ave NE
State St
6th St
NE 68th St
Lk Wash Blvd NE
108th Ave NE
108
109
111
112
103
104

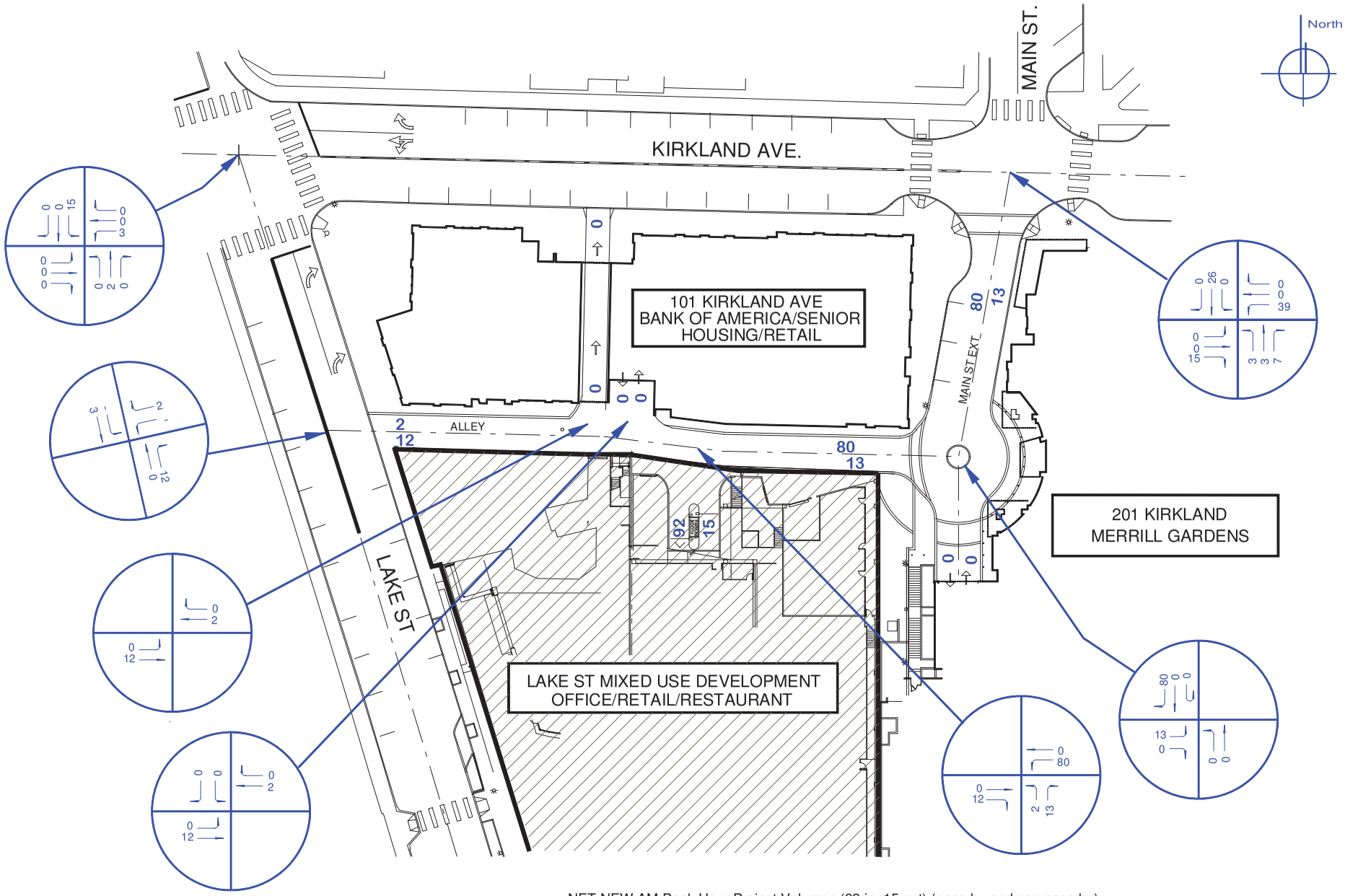


WILLIAM POPP ASSOCIATES
Bellevue, WA 98007
425.401.1030

PROJECT PM PEAK HOUR TRIPS [plus Daily]
Net New non Pass-By

Figure 8b

Lake Street Place
Office/Restaurant/Retail
Mixed Use Development



xx - NET NEW AM Peak Hour Project Volumes (92 in, 15 out) (pass-by and non pass-by)

WILLIAM POPP ASSOCIATES

Bellevue, WA 98007
425.401.1030

FUTURE AM PEAK HOUR PROJECT VOLUMES

Figure 9a

Lake Street Place
Office/Restaurant/Retail
Mixed Use Development

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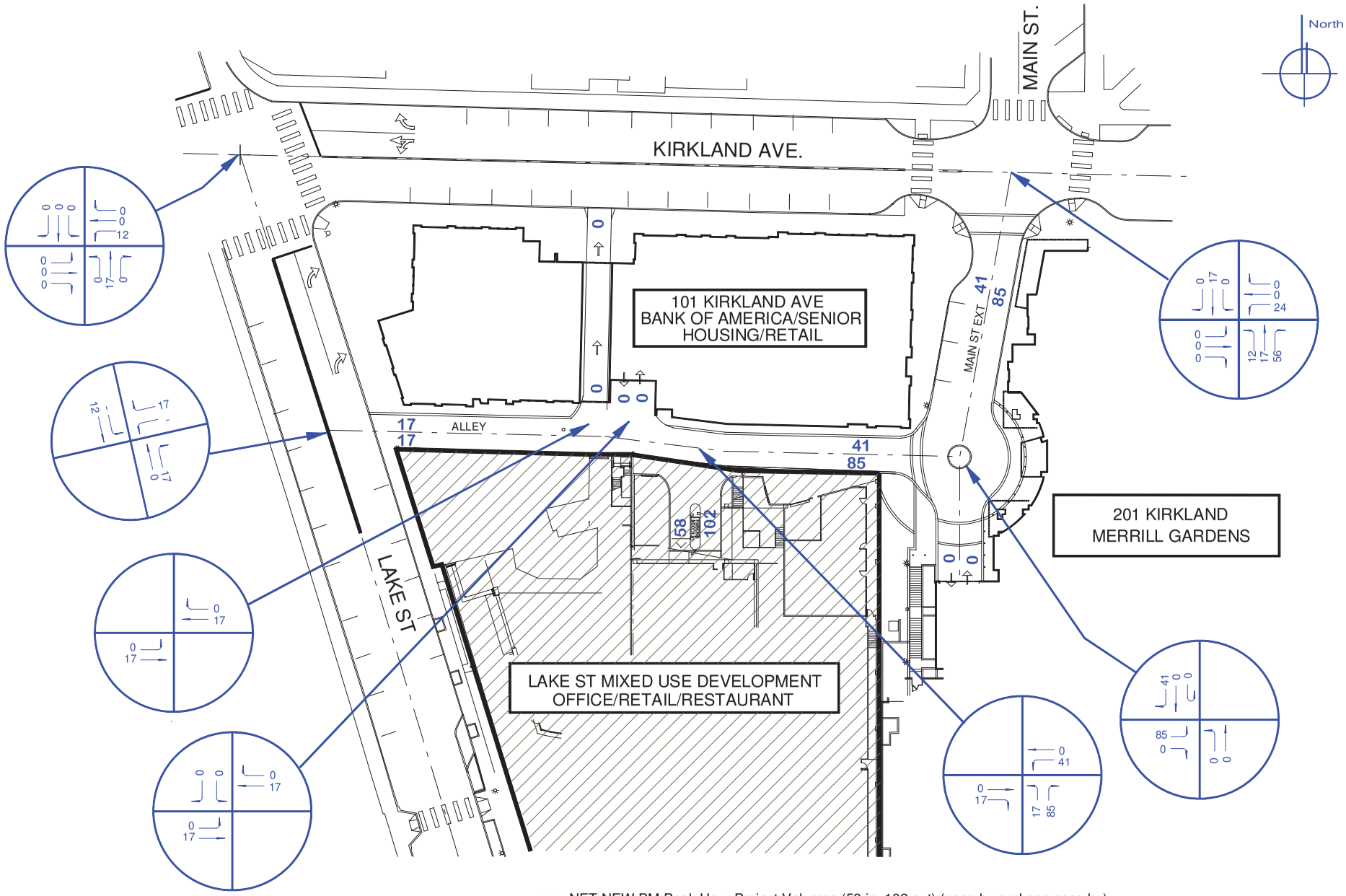

xx - NET NEW PM Peak Hour Project Volumes (58 in, 102 out) (pass-by and non pass-by)

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Bellevue, WA 98007
425.401.1030

FUTURE PM PEAK HOUR PROJECT VOLUMES

Figure 9b

Lake Street Place
Office/Restaurant/Retail
Mixed Use Development

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V. Transportation Concurrency

The City of Kirkland conducted a traffic concurrency test for this project and provided the results in a memo to the Planning Department dated April 4, 2013. The memo and concurrency results are attached. The project passed concurrency. The concurrency test notice shall expire and a new concurrency test application is required unless:

1. A complete SEPA checklist, traffic impact analysis and all require documentation are submitted to the City within 90 calendar days of the concurrency test notice
2. A Certificate of Concurrency is issued or an extension is requested and granted by the Public Works Department within one year of issuance of the concurrency test notice. A Certificate of Concurrency is issued at the same time a development permit or building permit is issued if the applicant holds a valid concurrency test notice.

Please refer to the memo for additional details including expiration dates.

VI. Significant Traffic Impact

The City's analysis guidelines require analysis of all intersections where the project's proportional share is greater than 1%. These intersections are defined as significant intersections.

Direct traffic mitigation improvements are required at intersections where the intersection level of service is E with project and the intersection proportional share is greater than 15%, or when the level of service is F with project and the intersection proportional share is greater than 5%.

Based on project trip distribution and assignment, there are six intersections that are identified as significant. All intersections reviewed and those determined to result in a proportionate share impact of 0.5% or greater are shown in Table 8 below. The intersections reviewed included all intersections identified in the concurrency run. It is important to note that the proportional share calculations utilize the net new daily trip estimates as shown in Table 6, which recognizes the existing estimated trips as existing trips already on the street system.

Table 8
Significant Intersection Check

	Intersection	Project AWDT[a]	Proportional Share[b]	Significant?[c]
102	Lake Wash/Lakeview Dr	269	0.9%	No
103	**State St/NE 68th St**	**235**	**1.4%**	**Yes**
104	**108th Ave NE/NE 68th St**	**185**	**1.5%**	**Yes**
105	Central Way/6th St	193	0.5%	No
106	Central Way/3rd St	219	0.6%	No
107	Central Way/Lake St	160	0.8%	No
108	**Lake St/Kirkland Ave**	**227**	**1.4%**	**Yes**
109	**NE 85th St/114th Ave NE**	**488**	**2.1%**	**Yes**
111	**Kirkland Ave/3rd St**	**648**	**5.5%**	**Yes**
112	**Kirkland Way/6th St**	**362**	**3.4%**	**Yes**
201	98th Ave NE/Juanita Dr	143	0.5%	No
205	Market St/Forbes Creek	168	0.5%	No
403	NE 85th St/ 120th Ave NE	202	0.5%	No
504	Juanita-Woodinville Wy/100th Ave NE	76	0.5%	No

a Project daily trips entering intersection (net new).
b Based on the City of Kirkland Proportional Share Impact Worksheet.
c A significant intersections defined as any intersection where the proportional share is equal to or exceeds 1.0%.

According to the results shown in Table 8, there are 6 intersections that meet the criteria to be defined as a significant intersection, ie., greater than 1%. It is important to note that at one intersection the proportionate share project impact exceeds 5%. The remaining intersections are determined not to be significant. The proportionate share worksheets can be found in Appendix D.

Thus, the six intersections that require additional analysis for AM and PM street peak period analysis are:

103 State St/NE 68th St
104 108th Ave NE/NE 68th St
108 Lake St/Kirkland Ave
109 NE 85th St/114th Ave NE
111 Kirkland Ave/3rd St
112 Kirkland Way/6th St

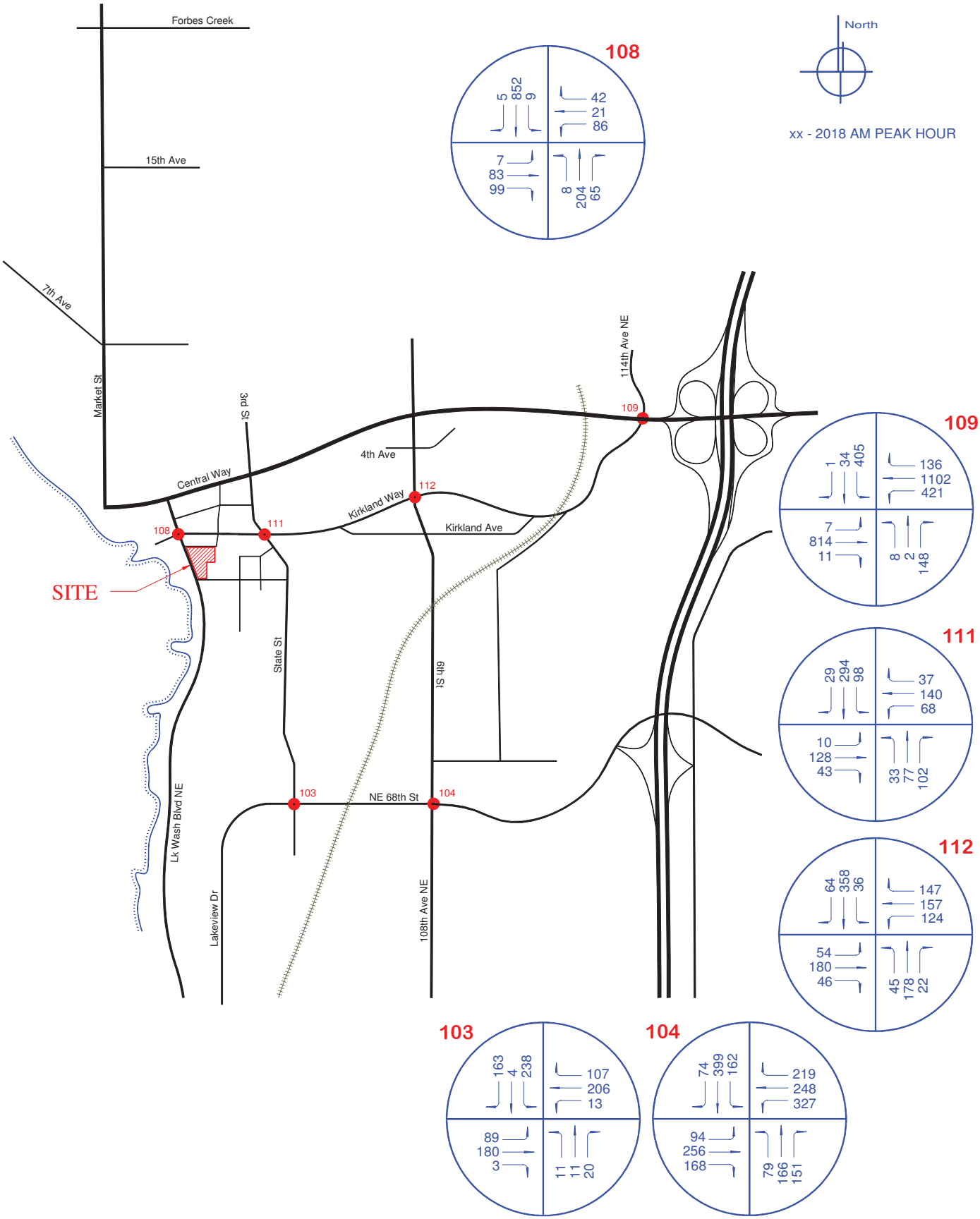
An AM and PM street peak hour analysis was also conducted at all of the site vicinity intersections including Kirkland Ave/Main St, Lake St/Alley, and the three intersections in the alley.

VII. Future Year (Year 2018) Traffic Volume Estimates

The horizon year of this project is estimated to be 2 to 4 years from today, however, the traffic study assumes a 2018 horizon year to coincide with the concurrency forecasts. The City provided PM peak hour traffic volume forecasts for the year 2018 that included traffic growth from all pipeline projects. WPA prepared estimates for future volume conditions for the AM condition. The horizon year volumes at the analysis intersections without the project are shown in Figure 10a and 10b for the AM and PM peak hours respectively.

The horizon year turning movement volumes at the analysis intersections with the project are shown in Figure 11a and 11b, for AM and PM peak hours respectively. It should be noted that the volumes in these figures reflect the net new non-pass-by project traffic.

The AM and PM peak hour project turning movement volumes in the vicinity of the site are shown in Figures 12a and 12b respectively. These two figures represent the total trips to and from the site, including pass-by trips.



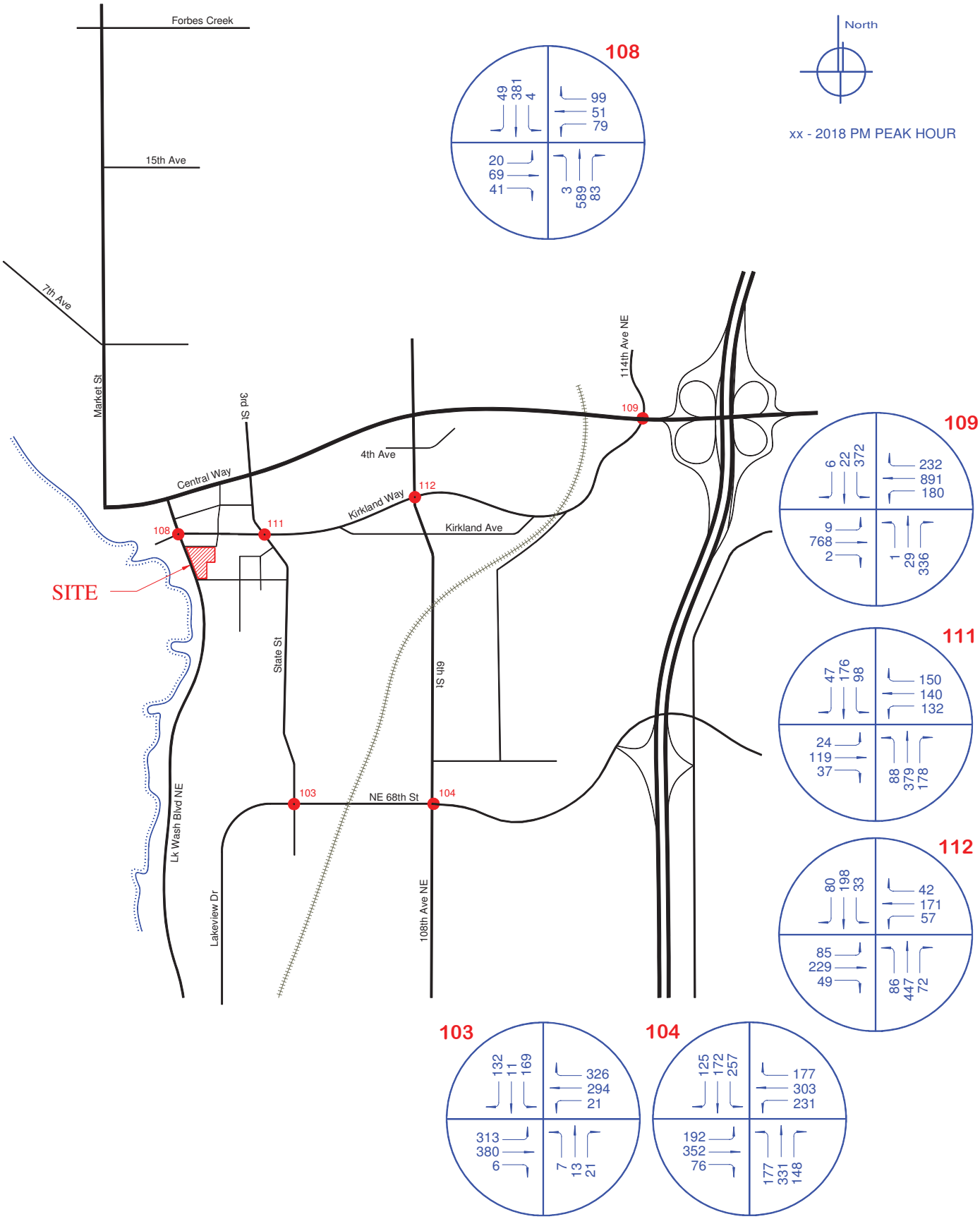
WILLIAM POPP ASSOCIATES

Bellevue, WA 98007
425.401.1030

BACKGROUND AM PEAK HOUR VOLUMES

Figure 10a

Lake Street Place
Office/Restaurant/Retail
Mixed Use Development



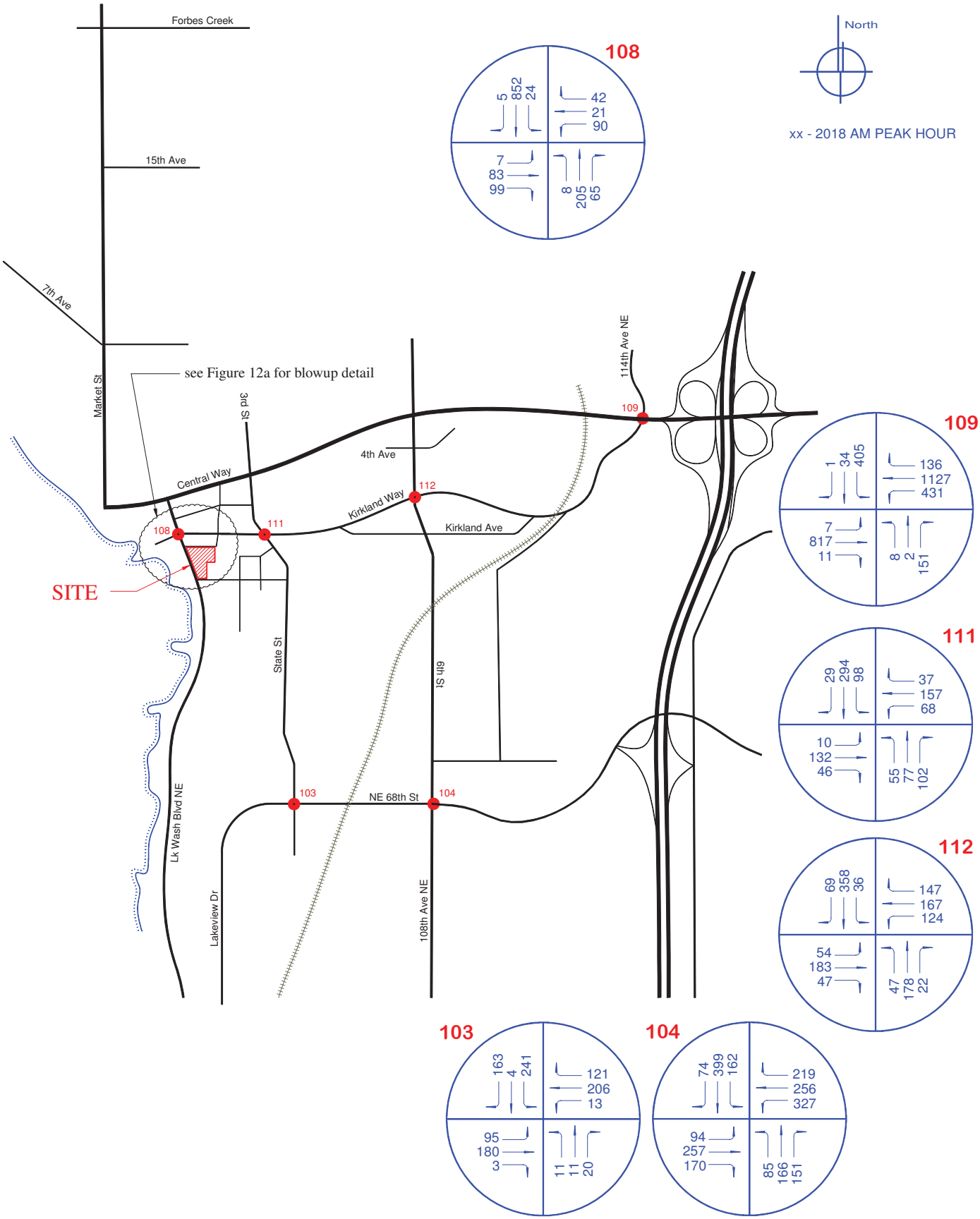
WILLIAM POPP ASSOCIATES

Bellevue, WA 98007
425.401.1030

FUTURE BACKGROUND PM VOLUMES

Figure 10b

Lake Street Place
Office/Restaurant/Retail
Mixed Use Development



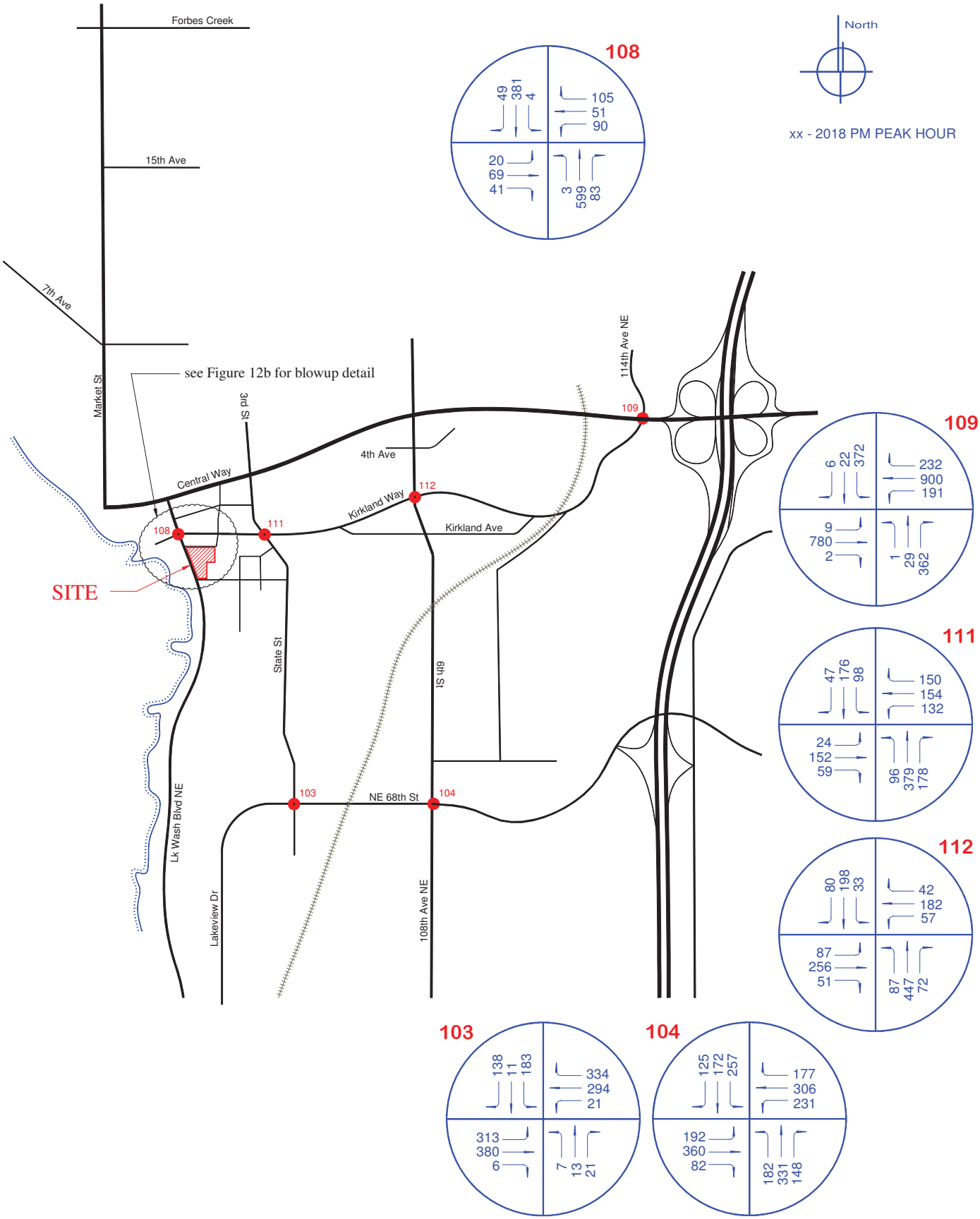
WILLIAM POPP ASSOCIATES

Bellevue, WA 98007
425.401.1030

BACKGROUND PLUS PROJECT
AM PEAK HOUR VOLUMES

Figure 11a

Lake Street Place
Office/Restaurant/Retail
Mixed Use Development



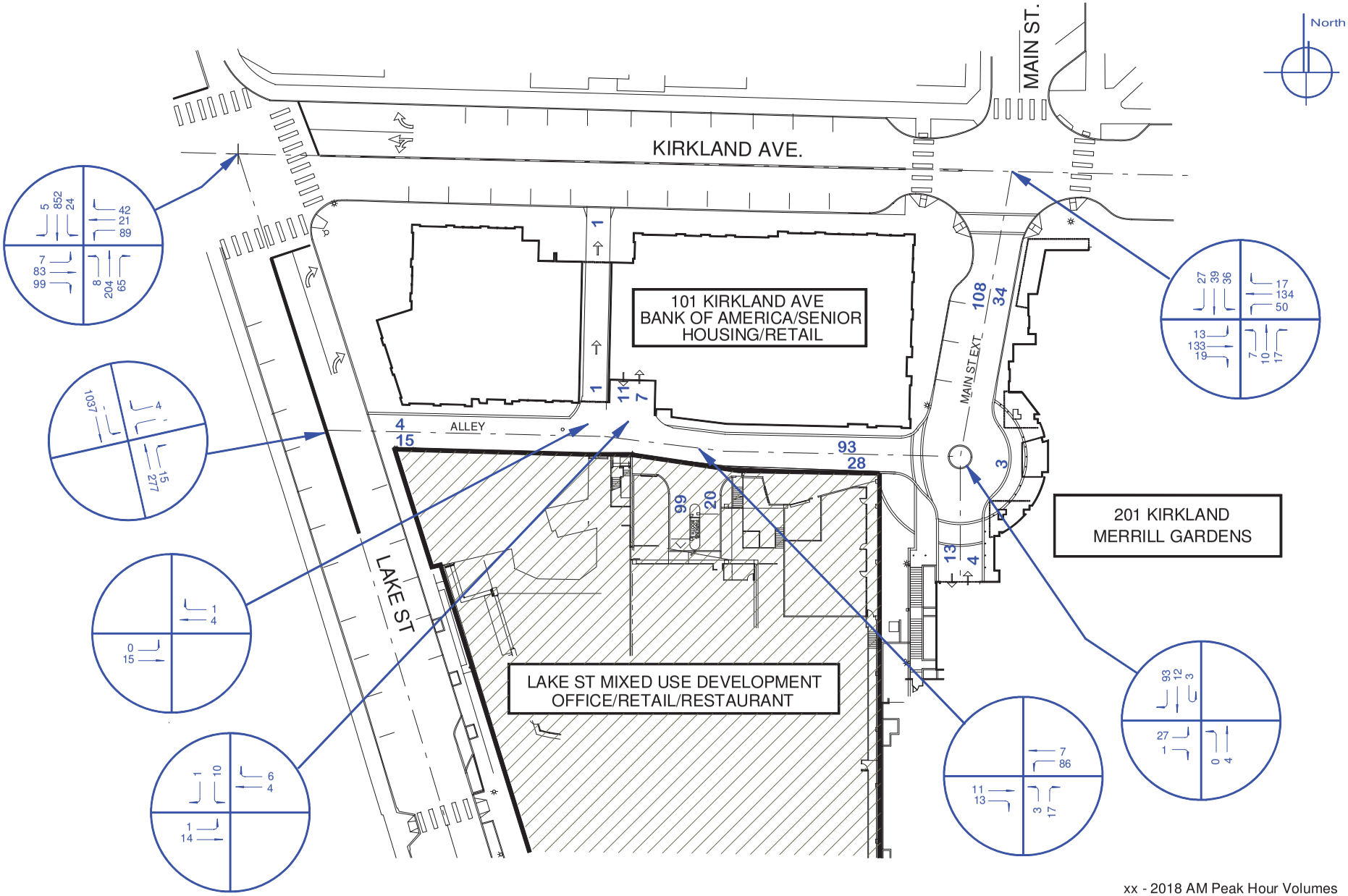
WILLIAM POPP ASSOCIATES

Bellevue, WA 98007
425.401.1030

FUTURE WITH PROJECT PM VOLUMES

Figure 11b

Lake Street Place
Office/Restaurant/Retail
Mixed Use Development



WILLIAM POPP ASSOCIATES

Bellevue, WA 98007
425.401.1030

FUTURE AM PEAK HOUR VOLUMES

Figure 12a

Lake Street Place
Office/Restaurant/Retail
Mixed Use Development

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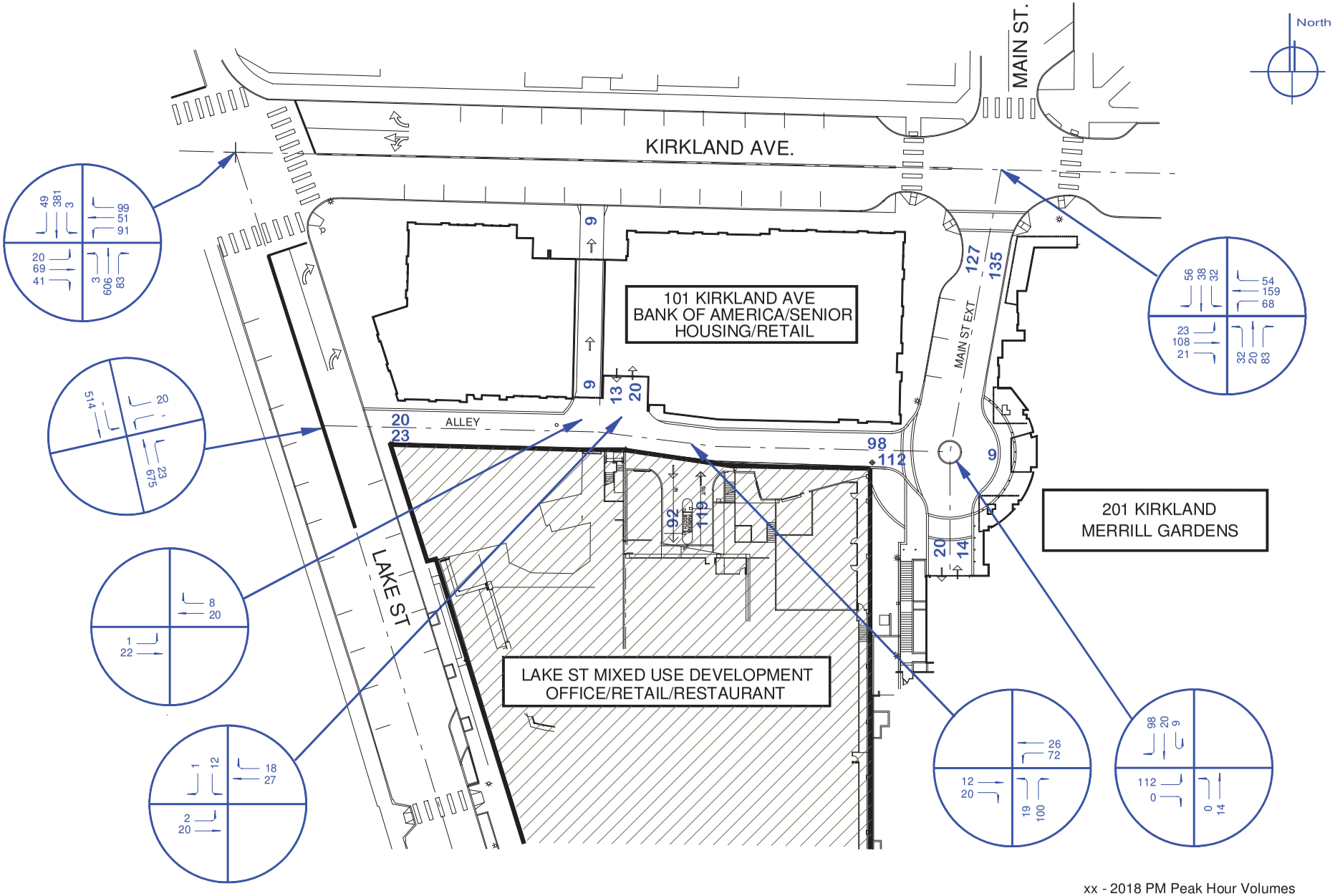

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Bellevue, WA 98007
425.401.1030

FUTURE PM PEAK HOUR VOLUMES

Figure 12b

Lake Street Place
Office/Restaurant/Retail
Mixed Use Development

ATTACHMENT 8
SEP13-00959
APPLICANT TIA

VIII. Level of Service Analysis

Level-of-service for the existing condition, as well as future conditions, were calculated using the Trafficware Synchro intersection analysis software. It should be noted that both software packages and summary results are per the HCM signalized and unsignalized methodology. The delay as shown represents average delay per vehicle for all approaches at signalized and all-way stop controlled intersections. Note the delay presented for side street stop controlled intersections represents the delay for the critical approach or movement and not the overall intersection.

A. Key Intersections – Off-Site Locations (Years 2012/13 & 2018)

As defined in Section VI., there are six key intersections that require a level of service evaluation of existing and future conditions with and without the project, for both the AM and PM peak hours.

Level of service was calculated at the study area's key intersections for existing 2012/13, as well as 2018 with and without project conditions. The results are shown in Table 9a.

Table 9a
AM & PM Peak Hour Level of Service – Key Intersections per Concurrency Results

Int #	Intersection [b]	Approach/ Movement	2012/13 Existing LOS (Delay) [a]		2018 without project LOS (Delay) [a]		2018 with project LOS (Delay) [a]	
AM PEAK HOUR								
103	State St/NE 68th St	overall	C	33.9	D	36.2	D	37.5
104	108th Ave NE/NE 68th St	overall	D	35.4	D	38.9	D	38.4
108	Lake St/Kirkland Ave [c]	overall	C	23	D	36	D	42
109	NE 85th St/114th Ave NE	overall	C	27.2	D	40.4	D	41.5
111	Kirkland Ave/3rd St	overall	C	26.0	C	32.3	C	33.9
112	Kirkland Way/6th St	overall	C	16.8	F	63.1	F	68.0
			-	-	-	-	B	11.3 [d]
PM PEAK HOUR								
103	State St/NE 68th St	overall	C	29.9	C	34.8	D	35.4
104	108th Ave NE/NE 68th St	overall	C	33.9	D	42.2	D	42.9
108	Lake St/Kirkland Ave [c]	overall	D	36	F	137	F	152
109	NE 85th St/114th Ave NE	overall	C	21.9	C	25.9	C	28.3
111	Kirkland Ave/3rd St	overall	C	33.5	C	34.7	D	35.8
112	Kirkland Way/6th St	overall	D	33.7	F	127	F	144
			-	-	-	-	B	11.5 [d]

a Delay is represented in seconds per vehicle. All results modeled using Synchro with HCM results methodology.
b Intersections 103, 104, 108, 109, and 111 are signalized. Intersection 112 is all-way stop.
c no left turns permitted northbound-southbound during the PM peak period, except for transit. The LOS and Delay shown are based on a simulation modeling effort (SimTraffic) to account for downstream queue spill back from Central Way/Lake St.
d City unfunded project – install signal, and add left turn lane on the south leg.

A summary of the level of service results at each intersection are discussed below.

- #103, Sate St/NE 68th St. This intersection is currently signalized, and is estimated to operate at LOS C for current conditions and LOS C or D for future conditions with or without the project, either peak period. The overall delay increase at this intersection with impact from net project traffic is 1.3 seconds per vehicle (s/v) for AM and 0.6 s/v for PM. The project's proportional share is 1.4%.

- #104, 108th Ave NE (aka 6th St)/NE 68th St. This intersection is currently signalized, and is estimated to operate at LOS D & C for current AM and PM conditions respectively. It is estimated to operate at LOS D for future conditions with or without the project for either peak period. The overall delay increase at this intersection with

impact from net project traffic is essentially 0 for the AM peak hour and 0.7 s/v for the PM peak hour. The project's proportional share is 1.5%.

- #108, Lake St/Kirkland Ave. This intersection is signalized and is estimated to operate at LOS C/D for AM conditions. For the PM peak hour, there is excessive queue spillback from the Central Ave/Lake St intersection resulting in significant congestion for northbound traffic. A simulation modeling test using SimTraffic is more effective in estimating delays at certain intersections that are impacted by upstream or downstream ones. The simulation test estimated a future (2018) with or without project average delay of between 140 and 150 seconds per vehicle, which falls in the LOS F range. The primary congestion is the northbound movement, all of the other movements at this intersection are estimated to operate at LOS D or better. The project's proportional share is 1.4%.

- #109, NE 85th St/114th Ave NE. This intersection, signalized, is estimated to operate at LOS C for current AM and PM conditions. In the future with our without the project, this intersection is estimated to operate at LOS D and C for AM and PM peak hours respectively. The overall delay increase with impact from net project traffic is 1.1 seconds per vehicle for the AM condition and 2.4 s/v for the PM condition. The project's proportional share is 2.1%.

- #111, Kirkland Ave/3rd St. This intersection is currently signalized and includes left turn pockets all approaches and protected left turn signal phasing all approaches. It is estimated to operate at LOS C for current conditions for both the AM and PM peak hour. For future AM conditions, the intersection is estimated to operate also at LOS C. For PM conditions, the intersection is estimated to operate at the LOS C/D threshold. The overall delay increase with impact from net project traffic is 1.6 seconds per vehicle for the AM condition and 1.1 s/v for the PM condition. The project's proportional share is 5.5%.

- #112, Kirkland Way/6th St. This intersection is currently an all-way stop. It is estimated to operate at LOS C and D for current conditions AM and PM peak hours respectively. For future conditions with or without the project, this intersection is estimated to operate at LOS F for both peak hours. The project's proportional share is 3.4%. Improvements would be required at this intersection if the project's proportional share is greater than 15% for LOS E conditions, and greater than 5% for LOS F conditions. Thus, no direct mitigation should be required. The intersection is planned for signal, however the project is currently unfunded. With construction of a signal, as well as adding a northbound left turn pocket (channelization modifications), the intersection is estimated to operate at LOS B.

All of the level of service results can be found in Appendix E.

B. Site Area Intersections (Years 2012/13 & 2018)

This analysis focuses on the immediate area intersections in the alley and on Main St south from Kirkland Ave. The intersections include: Kirkland Ave/Main St, Main St/Alley/201 Merrill Gardens garage access, Alley/Project Site Access, Alley/101 Kirkland Garage, and the Lake St/Alley intersection. The analysis also includes Kirkland Ave/Lake St and Central Way/Lake St to replicate congestion on Lake St.

The analysis for all of the alley intersections including Lake St/Alley and Main St/Alley assume a very low saturation flow rate of 1,000 vph (default typical is 1,800 vph), 9' lanes (lowest possible), 5 mph turning speeds, and heavy pedestrian traffic at the endpoints.

Traffic counts were conducted by William Popp Associates (WPA) and video surveillance data was conducted by 201 Merrill Gardens (MG). A quantitative summary of the video data was not available from the MG source but a qualitative summary provided by 201 MG indicated truck percentages of 35% in the AM and 10% in the PM peak in the vicinity of the Main St/Alley intersection. Truck percentages based on WPA counts for the south leg at the Kirkland Ave/Main St intersection indicate approximately truck percentages of 7% for the AM and 2% for the PM. Given the low volumes on Main St south of Kirkland Ave, truck percentages could vary significantly day to day. Thus, for this analysis, the analysis assumes 20% trucks on Main St south of Kirkland Avenue for the AM and 10% trucks for the PM peak hour. The analysis also includes U-turns at the Main St/Alley intersection: 10% and 7% for the AM and PM peak hours respectively, based on traffic counts.

Main St south of Kirkland Avenue and the alley between Lake St and Main St currently have a fair amount of friction/congestion due to things such as loading and unloading truck activity, garbage pickup, emergency vehicles, passenger pickup/drop off, shuttle van pickup/drop off, and passenger vehicle encroachment into oncoming lanes in the alley when making turning movements. With the inclusion of the project and the resultant increase in traffic, mitigation recommendations (discussed later) are focused on managing the aforementioned elements such that the future analyses assume significantly reduced blockage associated with those activities. The only element difficult to model for movement delay is the vehicle encroachment into the alley from turning vehicles exiting the site or 101 Kirkland. The delay for those vehicles exiting each of these sites will likely be slightly lower than reported, although still in the LOS A/B range, and since the LOS is still quite high, no operational problems are anticipated. The future volumes for both the AM and PM peak hour are still relatively light and should not significantly tax the available capacity of the alley and Main St.

The results are shown in Table 9b. It should be noted that an analysis of future conditions <u>without</u> the project are assumed to be the same as or similar to the existing 2012 conditions, and thus are not shown specifically in Table 9b.

Table 9b
AM and PM Peak Hour Level of Service – Site Vicinity Intersections

Peak Hour	Intersection	Approach/ Movement	2012/13 Existing Volume	LOS	(Delay) [a]	2018 with project Volume	LOS	(Delay) [a]
AM PEAK HOUR								
	Lake St/Alley Access [b1]	WB	2	B	10	4	B	10
	Kirkland Ave/Main St [c]	NB	21	B	11	34	B	13
		SB	76	B	12	102	B	15
		EB	150	A	1	165	A	1
		WB	162	A	1	201	A	2
	Main St/Alley/201 MG Garage [d]	EB	15	A	9	28	A	9
		NB	4	A	0	4	A	0
		SB	28	A	0	108	A	0
	Alley/Lake Street Place Access [e]	NB	5	A	8	20	A	9
		EB	15	A	0	24	A	0
		WB	13	A	3	93	A	7
	Alley/101 Kirkland Access [f]	SB	11	A	9	11	A	9
		EB	3	A	2	15	A	1
		WB	8	A	0	10	A	0
PM PEAK HOUR								
	Lake St/Alley Access [b1]	WB	3	B	13	20	C	15
				F	137 [b2]		F	279 [b2]
	Kirkland Ave/Main St [c]	NB	50	B	13	135	C	16
		SB	101	B	13	126	C	17
		EB	135	A	1	152	A	1
		WB	237	A	2	281	A	2
	Main St/Alley/201 MG Garage [d]	EB	27	A	9	112	A	10
		NB	14	A	0	14	A	0
		SB	86	A	0	127	A	0
	Alley/Lake Street Place Access [e]	NB	17	A	9	119	A	9
		EB	15	A	0	32	A	0
		WB	57	A	4	98	A	6
	Alley/101 Kirkland Access [f]	SB	13	A	9	13	A	9
		EB	5	A	3	22	A	1
		WB	28	A	0	45	A	0

a Delay is represented in seconds per vehicle (rounded to whole number). All results are Synchro/HCM based unless otherwise noted.
b1 Right-in, right-out only. Westbound exiting right turn generally blocked by northbound queue in PM. Computer modeling likely not accurate given human behavior. See discussion.
b2 Estimated delay for the westbound right turn out per a simulation test using SimTraffic, with stopped approach assumption. Delay is close to zero with yield assumption.
c Northbound and southbound are the stopped approaches. All single lane approaches.
d The eastbound approach is the only stopped approach. The intersection is a widened circle. Analysis includes southbound u-turn movements.
e Proposed site access is the northbound approach. This approach is metered in and out with parking gates.
f The 101 Kirkland garage access just west of the proposed site access. Southbound approach to the alley. The bank drive-thru is exit only northbound from the alley.

A summary of the level of service results at each intersection are discussed below.

- Lake St/Alley Access. The alley access to Lake Street is restricted to right-in and right-out only. For the AM period, it is estimated that vehicles could exit to Lake St with relative ease since the northbound volume is light and the predominant flow of traffic is southbound: the right turn out is estimated to be LOS B. For the PM peak period, there is heavy congestion for the northbound movement through the Kirkland Ave intersection up to Central Way. The queue spill back stems from the Central Way/Lake St intersection. The northbound right turn movement at Kirkland Ave/Lake St is light with minimal queues. Observations of current activity indicate traffic from the alley merges into the northbound through movement with gaps created by signal startup lost time and/or courtesy "wave-in" from northbound motorists. The Synchro model reports a delay of around 13 to 15 seconds per vehicle, which is in the LOS B/C range, however it does not take into account the queue spillback and stop-and-go traffic from the downstream intersection. The delay when modeled through simulation (SimTraffic) with stop sign control for the right turn exiting from the alley results in very high congestion, LOS F operations. However, the modeling cannot and does not allow for motorist courtesy wave-in. If vehicles can exit the alley into the northbound right turn lane and are comfortable merging into the northbound flow via that merge movement, then when modeled as a merge rather than a stop, the estimated delay is significantly better. In general, without computer modeling, it is estimated that the delay incurred by the westbound right turn movement exiting the alley would be approximately 1 vehicle per signal cycle (a 60 second signal cycle at the Kirkland Ave/Lake St intersection), thus 60 seconds per vehicle, assuming the motorist heads north through the signal. The delay could be less if the exiting motorist turns right into the northbound right turn pocket to ultimately head east on Kirkland Ave, since there is no queue estimated for that movement. The estimated right turn movement for future conditions with the project from the alley to Lake St is 20 vph in the PM peak and only 4 vph in the AM peak.

  It is estimated that 20 trips would make this movement (19 from the project site). That would equate to about 1 vehicle every 3 minutes. Therefore, contrary to the delay estimates from the computer simulation, it is estimated that traffic from the alley should be able to adequately exit to Lake St with likely no more than 60 seconds/vehicle delay, and there shouldn't be any significant queue in the alley.

- Kirkland Ave/Main St. The stopped approaches at this intersection are the north and south ones. The LOS for these approaches is estimated to be LOS B for AM conditions with project, and LOS C for PM conditions with project. The existing LOS for both AM and PM peak hours is LO S B. The project is estimated to add 126 vehicles per hour (PM peak hour) through this intersection.

- Main St/Alley Circle. Presently, there are many friction factor events occurring at this intersection, in particular during the AM peak hour. These would include heavy truck

activity with unload and loading, passenger pickup and drop off, some emergency vehicle activity, southbound u-turns with some stopping in front of 201 Merrill Gardens and some not stopping at all, and pedestrians crossing through the traffic circle. Regardless of all the friction, the vehicular traffic is very light such that it is estimated there are no capacity/LOS issues. The current level of service is estimated to be LOS A for either peak period.

The project is estimated to add 93 vehicles during the AM peak hour (80 in and 13 out), and 126 vehicles during the PM peak hour (85 out, 41 in).

- Alley/Site Driveway. The intersection is estimated to operate at LOS A for either peak hour. The driveway will be gated, thus the volume entering and exiting will be metered.

- Alley/101 Kirkland Driveway. The intersection is estimated to operate at LOS A for either peak hour.

C. One-Way Alley Westbound Option (Year 2018)

The City requested a review of future conditions with project with a conversion of the alley to one-way westbound. It is assumed that the loading dock would remain as currently designed facing east and that the one-way concept would begin west of the loading dock. The Lake St and 101 Kirkland Ave garage driveways would be signed as left out only and right out only respectively.

For the PM peak hour scenario (which is the worst case alley volume scenario), the one-way concept would result in 132 vehicles exiting to Lake St with approximately 112 turning northbound right at the Lake St/Kirkland Ave intersection. In addition, there would be 23 trips that would normally turn right into the alley from Lake St that would be required to divert around the block on to Kirkland Ave then enter the alley from the east end via Main St. It is estimated there would be an additional 135 trips using the northbound right turn pocket at Kirkland Ave/Lake St added to the future forecast of 65 vehicles, for a total of 200 right turning vehicles. At the Kirkland Ave/Main St intersection, the eastbound thru volume would increase by 112 and the eastbound right turn movement would increase 23 vph. Of course the northbound movements would all decrease. The estimated level of service at Kirkland Ave/Main St is estimated to be the same for all approaches; however, the southbound approach delay is estimated to increase very slightly, from 17 to 18 sec/veh. The delay for the northbound approach is estimated to remain at 16 sec/veh, as shown in Table 10 above for the alley two-way concept. The net decrease in traffic on Main St south of Kirkland Ave would be 89 trips (add an extra 23 southbound less 112 northbound equals a decrease of 89 vph for two-way volume).

A simulation modeling analysis of future PM peak hour conditions with the project for a one-way alley concept was prepared. The results indicate similar conclusions as the two-

way concept at the Lake St/Alley intersection: if the alley is modeled as a stop sign then a significant queue backs up through the alley and up into Main St, if the alley is modeled as a yield/merge movement, then traffic exits the alley with minimal queue spill back. It is assumed that some of the motorists will be conservative drivers, thus the queue spill back depends on how successful motorists are able to enter into the stop-and-go queue on Lake St. Using the previous 1 vehicle per cycle rule of thumb equates to 60 vehicles entering, however, there are 132 vehicles predicted to enter. Nonetheless, the majority of these vehicles exiting the alley in this one-way concept will be turning into the northbound right turn pocket which is estimated to have a minimal queue, hence it is likely a few more cars than 1 per cycle could turn out of the alley.

D. Key Intersections – Off-Site Locations (Year 2016)

A level of service analysis was also conducted for an expedited construction schedule for the entire project with an anticipated horizon year buildout at year 2016. The 2016 intersection volumes were provided by the City for PM peak hour. The AM volumes for 2016 were developed using a 2% per year growth rate applied to existing counts.

Table 10a identifies the level of service at the study area's key intersections for 2018 with project (from Table 9a above) as well as for a 2016 horizon year with project.

Table 10a
AM & PM Peak Hour Level of Service – Key Intersections per Concurrency Results
2016 Horizon Year Analysis (with project only)

Int #	Intersection [b]	Approach/ Movement	2018 with project [e] LOS (Delay) [a]		2016 with project LOS (Delay) [a]	
AM PEAK HOUR						
103	State St/NE 68th St	overall	D	37.5	D	36.8
104	108th Ave NE/NE 68th St	overall	D	38.4	D	38.0
108	Lake St/Kirkland Ave	overall	D	42	D	42
109	NE 85th St/114th Ave NE	overall	D	41.5	C	29.3
111	Kirkland Ave/3rd St	overall	C	33.9	C	24.5
112	Kirkland Way/6th St	overall	F B	68.0 11.3 [d]	F A	58.2 10.0 [d]
PM PEAK HOUR						
103	State St/NE 68th St	overall	D	35.4	C	33.7
104	108th Ave NE/NE 68th St	overall	D	42.9	D	40.2
108	Lake St/Kirkland Ave [c]	overall	F	153	F	132
109	NE 85th St/114th Ave NE	overall	C	28.3	C	26.7
111	Kirkland Ave/3rd St	overall	D	35.8	C	33.4
112	Kirkland Way/6th St	overall	F B	144 11.5 [d]	F B	122 10.5

a Delay is represented in seconds per vehicle. All results modeled using Synchro with HCM results methodology.
b Intersections 103, 104, 108, 109, and 111 are signalized. Intersection 112 is all-way stop.
c no left turns permitted northbound-southbound during the PM peak period, except for transit. The LOS and Delay shown for PM are based on a simulation modeling effort (SimTraffic) to account for downstream queue spill back from Central Way/Lake St.
d City unfunded project – install signal, and add left turn lane on the south leg.
e 2018 with project results shown for comparison purposes. Obtained from Table 9a.

A summary of the level of service results at each intersection are discussed below.

- #103, Sate St/NE 68th St. This intersection is estimated to operate at LOS D for AM and LOS C for PM peak hours for the 2016 with project condition.

- #104, 108th Ave NE (aka 6th St)/NE 68th St. This intersection is estimated to operate at LOS D for both the AM and PM peak hours for 2016 with project conditions.

- #108, Lake St/Kirkland Ave. This intersection is estimated to operate at LOS D for AM conditions and LOS F for the PM peak hour, for 2016 with project. For the PM peak hour, there is excessive queue spillback from the Central Ave/Lake St

intersection resulting in significant congestion for northbound traffic, thus the LOS F results.

- #109, NE 85th St/114th Ave NE. This intersection, signalized, is estimated to operate at LOS C for both the AM and PM conditions in 2016 with project.

- #111, Kirkland Ave/3rd St. This intersection is estimated to operate at LOS C for both the AM and PM peak hour for 2016 with project.

- #112, Kirkland Way/6th St. This intersection is currently an all-way stop. It is estimated to operate at LOS F for 2016 with project for both AM and PM peak hours. As noted in the 2018 discussion, the intersection is planned for signal, however the project is currently unfunded. With construction of a signal, as well as adding a northbound left turn pocket (channelization modifications), the intersection is estimated to operate at LOS A for AM and LOS B for PM peak hour.

All of the level of service results can be found in Appendix E.

E. Site Area Intersections (Year 2016)

This analysis focuses on the immediate area intersections in the alley and on Main St south from Kirkland Ave and is identical to the analysis and assumptions noted in Section VIII.B.

The level of service analysis herein was conducted for an expedited construction schedule for the entire project with an anticipated horizon year buildout at year 2016. The intersection volumes internal on Main St and on the alley with project volumes full build are assumed to be identical to those assumed for the analysis in Section VIII.B. It is assumed there would be no background growth on Main St south of Kirkland Ave or on the alley. Thus the level of service results will be the same as for the 2018 analysis. The only differences would occur at Kirkland Ave/Main St and at Lake St/Alley access since the volumes at these two intersections for through traffic are estimated to be slightly less than the 2018 volumes.

Table 10b identifies the level of service at the local area intersections for 2018 with project (from Table 9b above) as well as for a 2016 horizon year with project.
The intersections include: Kirkland Ave/Main St, Main St/Alley/201 Merrill Gardens garage access, Alley/Project Site Access, Alley/101 Kirkland Garage, and the Lake St/Alley intersection. The analysis also includes Kirkland Ave/Lake St and Central Way/Lake St to replicate congestion on Lake St northbound during the PM period.

The results are shown in Table 10b. This table includes the 2018 with project results as shown in Table 9b for comparison with 2016 results with project.

Table 10b
AM and PM Peak Hour Level of Service – Site Vicinity Intersections
2016 Horizon Year

Peak Hour	Intersection	Approach/ Movement	2018 with project Volume	LOS	(Delay) [a]	2016 with project Volume	LOS	(Delay) [a]
AM PEAK HOUR								
	Lake St/Alley Access [b1]	WB	4	B	10	4	B	10
	Kirkland Ave/Main St [c]	NB	34	B	13	34	B	13
		SB	102	B	15	99	B	15
		EB	165	A	1	161	A	1
		WB	201	A	2	195	A	2
	Main St/Alley/201 MG Garage [d]	EB	28	A	9	same as 2018		
		NB	4	A	0	" " "		
		SB	108	A	0	" " "		
	Alley/Lake Street Place Access [e]	NB	20	A	9	same as 2018		
		EB	24	A	0	" " "		
		WB	93	A	7	" " "		
	Alley/101 Kirkland Access [f]	SB	11	A	9	same as 2018		
		EB	15	A	1	" " "		
		WB	10	A	0	" " "		
PM PEAK HOUR								
	Lake St/Alley Access [b1]	WB	20	C	15	20	C	15
				F	279 [g2]		F	185 [g2]
	Kirkland Ave/Main St [c]	NB	135	C	16	135	C	16
		SB	126	C	17	123	C	17
		EB	152	A	1	149	A	1
		WB	281	A	2	274	A	2
	Main St/Alley/201 MG Garage [d]	EB	112	A	10	same as 2018		
		NB	14	A	0	" " "		
		SB	127	A	0	" " "		
	Alley/Lake Street Place Access [e]	NB	119	A	9	same as 2018		
		EB	32	A	0	" " "		
		WB	98	A	6	" " "		
	Alley/101 Kirkland Access [f]	SB	13	A	9	same as 2018		
		EB	22	A	1	" " "		
		WB	45	A	0	" " "		

a Delay is represented in seconds per vehicle (rounded to whole number). All results are Synchro/HCM based unless otherwise noted.
b1 Right-in, right-out only. Westbound exiting right turn generally blocked by northbound queue in PM. Computer modeling likely not accurate given human behavior. See discussion.
b2 Estimated delay for the westbound right turn out per a simulation test using SimTraffic, with stopped approach assumption. Delay is 0 with yield assumption.
c Northbound and southbound are the stopped approaches. All single lane approaches.
d The eastbound approach is the only stopped approach. The intersection is a widened circle. Analysis includes southbound u-turn movements.
e Proposed site access is the northbound approach. This approach is metered in and out with parking gates.
f The 101 Kirkland garage access just west of the proposed site access. Southbound approach to the alley. The bank drive-thru is exit only northbound from the alley.

A summary of the level of service results at each intersection are discussed below.

- Lake St/Alley Access. The alley access to Lake Street is restricted to right-in and right-out only. For the AM period, it is estimated that vehicles could exit to Lake St with relative ease since the northbound volume is relatively light, the predominant flow of traffic is southbound: the right turn out is estimated to be LOS B for 2016 with project. For the PM peak period 2016 with project, there is heavy congestion for the northbound movement through the Kirkland Ave intersection up to Central Way. The queue spill back stems from the Central Way/Lake St intersection. The northbound right turn movement at Kirkland Ave/Lake St is light with minimal queuing. The Synchro model reports a low level delay (LOS B/C range) for the right turn out, however it does not take into account the queue spillback and stop-and-go traffic from the downstream intersections. The delay when modeled through simulation (SimTraffic) with stop sign control for the right turn exiting from the alley results in high congestion, LOS F operations. However, as noted earlier in the 2018 discussion, the modeling cannot and does not allow for motorist courtesy wave-in. If vehicles can exit the alley into the northbound right turn lane and are comfortable merging into the northbound flow via that merge movement, then when modeled as a merge rather than a stop, the estimated delay is significantly better. In general, without computer modeling, it is estimated that the delay incurred by the westbound right turn movement exiting the alley would be approximately 1 vehicle per signal cycle (a 60 second signal cycle at the Kirkland Ave/Lake St intersection), thus 60 seconds per vehicle, assuming the motorist heads north through the signal. The delay could be less if the exiting motorist turns right into the northbound right turn pocket to ultimately head east on Kirkland Ave, since there is no queue estimated for that movement. The estimated right turn movement for future conditions with the project from the alley to Lake St is 20 vph in the PM peak and only 4 vph in the AM peak.

  It is estimated that 20 trips would make this movement (19 from the project site). That would equate to about 1 vehicle every 3 minutes. Therefore, contrary to the delay estimates from the computer simulation, it is estimated that traffic from the alley should be able to adequately exit to Lake St with likely no more than 60 seconds/vehicle delay, and there shouldn't be any significant queue in the alley.

- Kirkland Ave/Main St. The stopped approaches at this intersection are the north and south ones. The LOS for these approaches is estimated to be LOS B for AM conditions in 2016 with project, and LOS C for PM conditions in 2016 with project. The project is estimated to add 126 vehicles per hour (PM peak hour) through this intersection (all approaches).

- Main St/Alley Circle. No new analysis was conducted at this intersection since it is assumed there is no background growth in traffic, only new traffic from the proposed development. The results are assumed to be the same as the 2018 results.

- Alley/Site Driveway. LOS results are assumed to be the same as 2018 results, since no difference in future with project traffic.

- Alley/101 Kirkland Driveway. No changes in LOS results from 2018 results.

IX. Local Area Operations Issues (Main St & Alley)

The discussion and analyses here is focused on the Main St extension south of Kirkland Ave and the alley between Lake St and Main St. It includes an evaluation of: traffic volumes, driveway functions, delivery & moving truck activity, garbage truck activity, emergency vehicle activity, and pedestrian activity.

A. Internal Traffic Volumes (Alley and Main St Extension)

There are three developments that will share use of the alley connection between Lake Street and Kirkland Avenue. The Lake Street Place mixed use development is estimated to generate 278 PM street peak hour trips (including pass-by trips). The 101 Kirkland Ave development was estimated to generate 164 PM peak hour trips (including pass-by), and the 201 Merrill Gardens development was estimated to generate 47 PM peak hour trips (no –pass-by assumed). The existing Lake Street Place site with Hector's and Kirkland Waterfront Market is estimated to generate 118 PM peak hour trips (pass-by trips included). The total PM street peak trips estimated to be generated from these three projects is 329 for existing conditions and 489 for future conditions (which includes all pass-by trips).

As noted earlier, a traffic count was conducted at the Kirkland Ave/Main St intersection as well as at the Lake St/Alley intersection. This is very useful data for comparing data per ITE against actual counts for vehicle trips to and from the alley driveways. The counts indicate a total volume (entering and exiting) for the PM peak hour at 146 trips, compared to 329 indicates that volumes realized are about 45% of estimated volumes.

Based on ITE rates for AM and PM for all three projects, the AM peak hour volumes are estimated to be about 45% of PM volumes. Traffic counts for entering and exiting the alley area indicate AM volumes during the street peak hour are 35% of PM volumes.

1. Existing Counts

The existing traffic volumes to and from the area via the Kirkland Ave/Main St intersection reflect approximately 95% of the total volume compared with volumes to and

from Lake St. Figure 13 shows the 15-minute volume summaries between 7:30 am and 9:00 am for all approaches at the Kirkland Ave/Main St intersection.

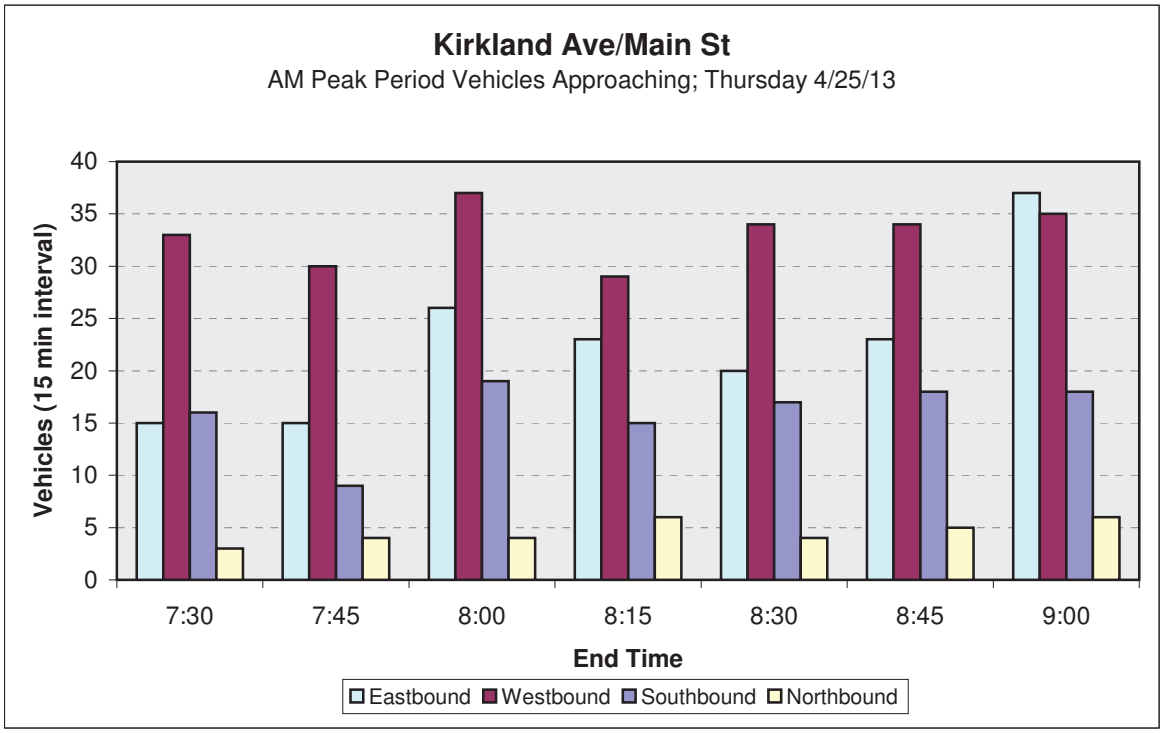


Figure 13

The intent of this figure is to show the magnitude of volumes by approach at this intersection. The eastbound and westbound approaches are the heaviest movements, although the southbound approach is too much lower. The northbound approach is averaging about 5 vehicles per 15-minute period.

Figure 14 shows the 15-minute volume summaries between 4:15 pm and 6:00 pm for all approaches at the Kirkland Ave/Main St intersection.

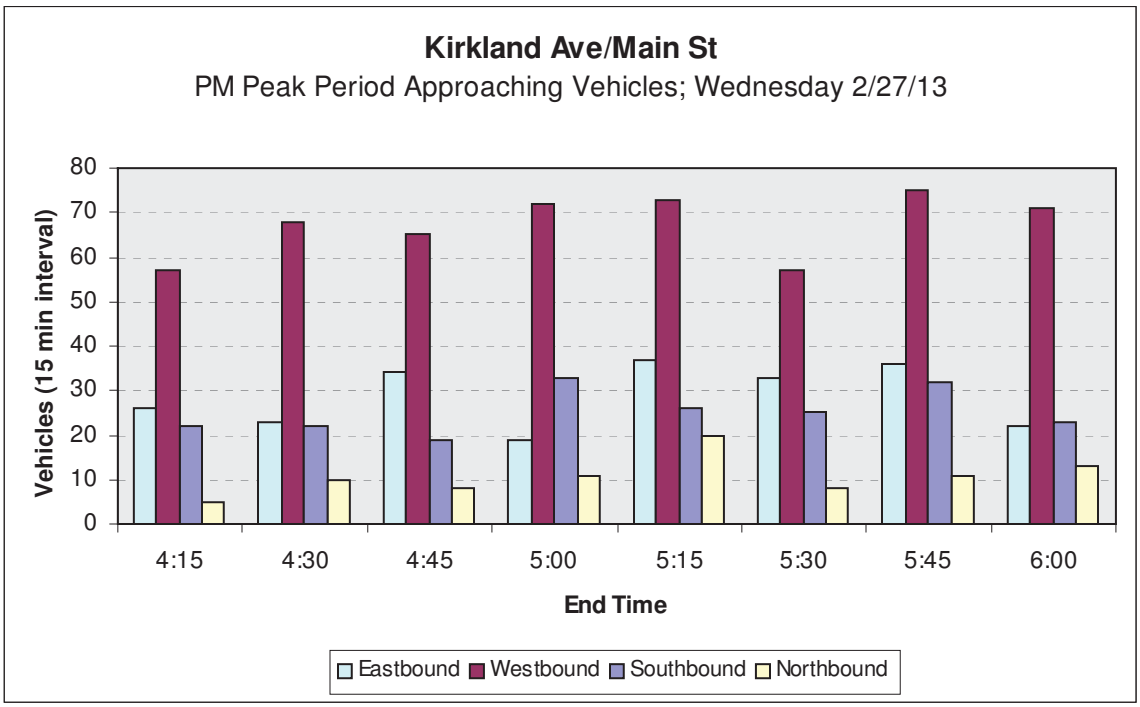


Figure 14

The figure shows that the westbound approach is the heaviest movement. The eastbound and south approaches are similar in volume and significantly less than the westbound. The northbound approach is averaging about 10 vehicles per 15-minute period with a spike of 20 between 5:00 and 5:15 pm.

2. Future Volumes

The proposed project is estimated to add 107 AM peak hour trips to the alley: 14 to the west and 93 to the east. For the PM peak hour, the project is estimated to add 160 trips to the alley, 34 to the west and 126 to the east. Of course the trip estimates to/from the east also would impact Main St between the alley and Kirkland Ave.

Table 11 below shows the peak hour volume estimates by segment on the alley and on Main St for existing conditions and with the project.

Table 11
AM & PM Alley and Main St Link Volume Estimates [a]

Peak Hour	Link Segment	Existing 2012/13 (vph)	With Project 2018 +/- (vph)
AM Street Peak Hour			
	Alley: Lake St – 101 Kirkland Garage	5	19
	Alley: 101 Kirkland Garage – Site Access	20	34
	Alley: Site Access – Main St	28	121
	Main St: Alley – Kirkland Ave	49	142
PM Street Peak – Vehicles Entering Garage			
	Alley: Lake St – 101 Kirkland Garage	9	43
	Alley: 101 Kirkland Garage – Site Access	43	77
	Alley: Site Access – Main St	84	210
	Main St: Alley – Kirkland Ave	136	262

a vehicles per hour; both directions.

The majority of project trips are to and from the east. This is also true for the existing Lake St uses and 101 Kirkland. The volume is heaviest in the PM peak hour. The peak volume for all sections is 262 vph on Main St between the alley and Kirkland Ave; the directional flow is estimated to be nearly balanced with 127 south and 135 north. The volume increase is approximately double current conditions. Even so, the future volume should be considered relatively light, with approximately one vehicle per direction every 30 seconds.

B. Driveway Functions

The proposed alley configuration east of the project driveway to Main Street will be 20 feet wide with a 2-foot rolled curb (1/2 drivable) on the north side and a 2-foot drivable valley curb on the south side, and a 4-foot sidewalk on the north side. The building on the north side abuts to the back of sidewalk and will has a varying clearance east from the Hector's building. West of the bank drive thru the alley will be as it is currently, 17 feet wide with rolled curb and 4-foot sidewalk north side, and the abutting Hector's building south side. Between the project driveway and the bank drive through, the alley will transition between a 17-foot and 20-foot traveled way width.

With the project, there will be two driveways with full access to the alley, and one northbound-only bank drive-thru access from the alley to Kirkland Ave. The proposed project's parking garage driveway will be located approximately 135 feet west from the Main St traffic circle, 30 feet from the 101 Kirkland Ave parking garage driveway, and 160 feet from Lake St. The project driveway will consist of a single entrance and a single exit lane, separated by a ticket taker/gate for entry and tollbooth window/ticket taker/gate

for exit. The gates will be setup for quick scan entry and exit for all monthly permit holders.

As currently designed, the entrance driveway ticket taker and card reader is located approximately 41 feet from the alley curb.

Based on the project assignment of trips, it is estimated that 90% of the trips entering and exiting the Lake Street Place development will be to and from the east on the alley. Thus the predominant movements at the garage entrance will be left in and right out.

The 101 Kirkland Ave building includes one driveway to the parking garage and a bank drive-thru (one-way north) that exits to Kirkland Ave. The distribution and assignment of trips from that site suggest approximately 70% will be to and from the east on the alley, 20% will enter and exit via Lake Street and 10% will exit through to Kirkland Ave from the bank drive-thru.

All of the trips associated with the 201 Merrill Gardens project are estimated to use the Main Street extension to Kirkland Ave, with very minimal trips to and from Lake Street via the alley.

C. Parking Garage Gate Operations

The current design proposal includes an automated garage door (roll down grill) that would be up during business hours (5am to midnight) and would be closed after hours (12 pm to 5 am). It is assumed that tenants would have a key card that could open the gate for after hour's entry access. Any vehicles leaving when the door is down would activate a sensor or tube to activate the door.

During normal business hours there will be a center parking booth with typical lift arm gates to control entry and payment/exit. Typical with most gated garage entrances, the entry lift arm gate will be activated by taking a ticket or swiping/scanning a key card for monthly parking tenants. A parking attendant will occupy the booth for any payment upon exit during normal business hours. All tenants, visitors, customers would enter via this single entry point.

The parking garage will be pay-to-park for public parking.

D. Parking Gate Queuing

A queue-modeling estimate was conducted for the site entrance and exit. The average queue and the 95th percentile queue were calculated for the AM and PM street peak hour for the gated entrance/exit at the alley, as well for the estimated peak time for the site. The queue estimate as calculated based on the methodology presented in the ITE Transportation and Traffic Engineering Handbook. Several assumptions were required

including time duration, volume, and average service time. The time duration was assumed to be one hour, and the volume is of course the peak hour volume. The average service time was assumed to be 10 seconds per vehicle.

A count was conducted at the City of Bellevue's guest parking entrance to City Hall during the AM period. This entrance is a single driveway entrance with a push button ticket dispenser and gate. The count recorded 31 vehicles entering the gated driveway to the garage. The service time was recorded for each vehicle to roll down window take ticket and completely pass-thru gate. The gate service times for each vehicle are shown below in Figure 15.

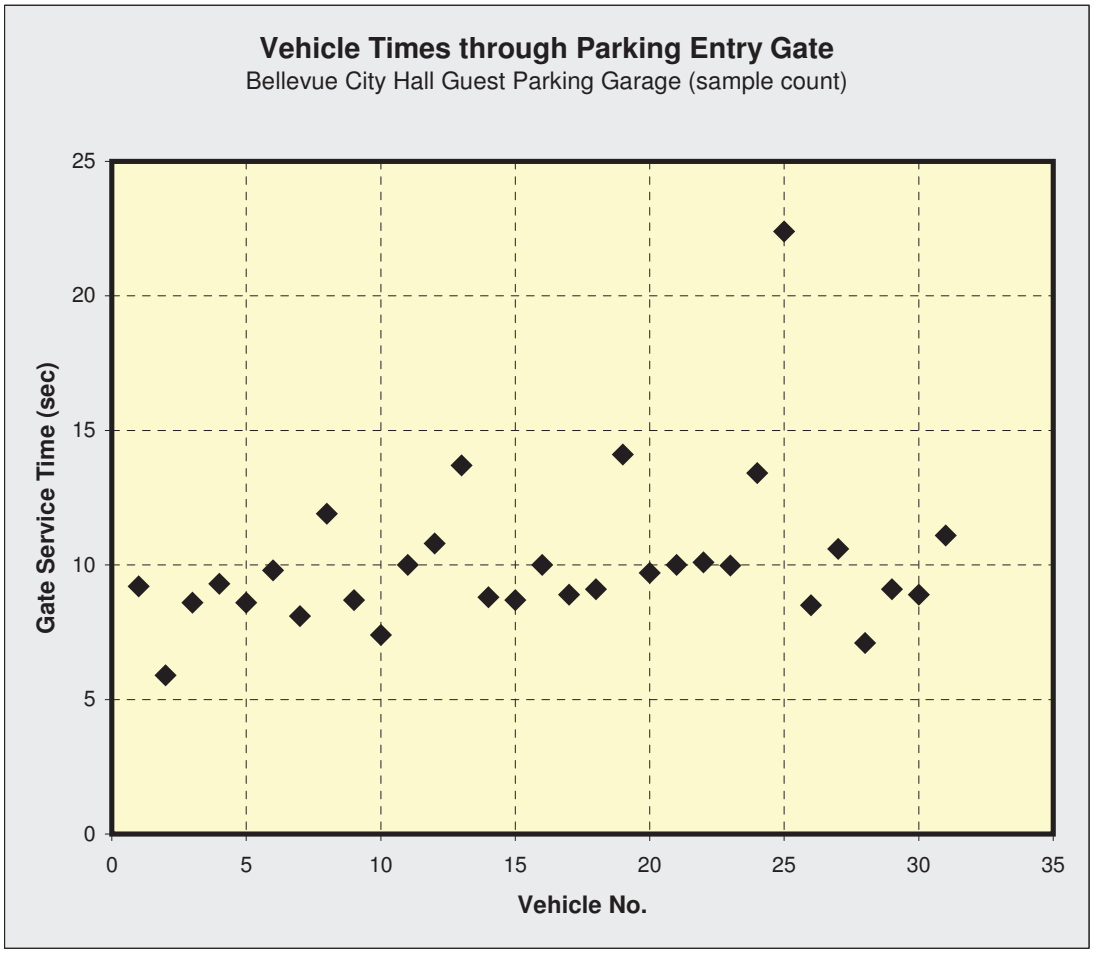


Figure 15

As shown in this scatter gram, there was one quick entry and one slow entry outlier, however for the most part the data hovered around the 10-second service time. The average time excluding the high and the low was 9.8 seconds per vehicle.

A frequency distribution plot was prepared with 0.5-second gate increment times, shown in Figure 16.

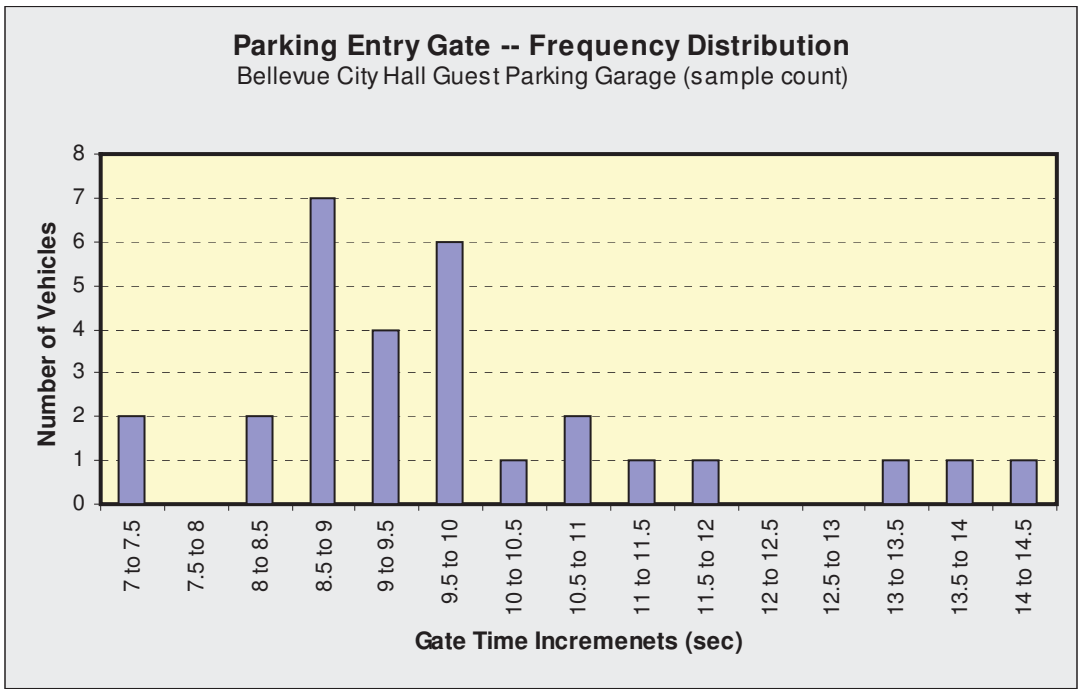


Figure 16

As shown here, given the sample size, most of the service times were between 8.5 and 10 seconds. There was some outlying data in the 13 to 14.5 second times, thus the average is around 10.

Table 12 below identifies queue estimates for average conditions and 95th percentile queue for service times of 5, 10, and 15 seconds per vehicle. The queuing was summarized for: AM Street Peak Vehicles Entering Garage, AM Street Peak Vehicles Exiting Garage, PM Street Peak Vehicles Entering Garage, PM Street Peak Vehicles Exiting Garage, and PM Site Peak Vehicles Entering Garage.

The 95th percentile queue estimates were obtained from a lookup table provided by WSDOT for known average queue estimates.

Table 12
AM & PM Queue Estimates at Garage

Vehicles at Gate (veh/hr) [a]	Service Time (sec/veh) [b]	Avg No. In System (veh) [c]	95th Q estimate (Veh) [d]
AM Street Peak – Vehicles Entering Garage			
99	5	0.16	0.3
99	10	0.38	0.9
99	15	0.70	2.1
AM Street Peak – Vehicles Exiting Garage			
20	5	0.03	0.1
20	10	0.06	0.2
20	15	0.09	0.2
PM Street Peak – Vehicles Entering Garage			
92	5	0.15	0.3
92	10	0.34	0.9
92	15	0.62	1.8
PM Street Peak – Vehicles Exiting Garage			
119	5	0.20	0.3
119	10	0.49	1.2
119	15	0.98	2.7

a Vehicles at gate, entering or exiting. Entering gate is assumed to be take ticket and enter. Exit could either be card reader or tollbooth attendant service. Volume assumes worst-case scenario to include all trips including pass-by.
b Service time for entering estimated to be no more than 5 seconds per vehicle.
c includes vehicles waiting.
d Queue estimated to not exceed this amount 95% of the time.

As noted in Table 12, the entering and exiting volume assumes the trip generation estimates for the net new building area (with pass-by) plus the existing trips for the existing site based on traffic counts. This in theory presents a worst-case scenario for the entrance gate and assumes all trips to and from the site, including pass-by trips, will use the garage. It is likely that a portion of these trips will use on-street parking (retail and restaurant). In addition, it is assumed that the total number of vehicle trips will be less given the location of the project in the CBD setting with close proximity to a major transit center and surrounding restaurant and retail uses resulting in a likely significant walk-up trip count.

Nevertheless, assuming worst-case volume conditions, it was estimated that the entrance gate service time (time to take ticket, and clear gate) to be approximately 10 seconds. The entering volume estimate for the AM street peak hour is 99 vehicles, and 92 vehicles entering in the PM street peak hour. The estimated entering volume for either peak hour is approximately 1 vehicle every 40 seconds. The average entering queue estimate for AM and PM is 0.38 and 0.34 vehicles respectively assuming a gate service time of 10 seconds. The 95th percentile queue estimate is 0.9 vehicles for either peak hour. The 95th percentile queue is closer to 2 vehicles (50’ +/-) if the average gate time is around 15 seconds.

For vehicles exiting the garage, the delay at the gate is assumed to be slightly longer as some vehicles might be paying cash with the tollbooth attendant, some will pass-through validated tickets for no payment, and some will be regular tenants with card readers. In this case, the estimated service time at the gate is 10 to 15 seconds; assume 15 seconds average. For the AM peak hour condition, it is predicted there will be essentially no queuing at the gate given the low volume estimate. For the PM street peak hour, it is estimated there could be as many as 119 vehicle trips exiting the site (30 seconds per vehicle assuming a constant rate of departure). Assuming all of these trips exit from the garage for a worst-case scenario, and assuming 15 seconds gate service time, the estimated average queue at the gate is 0.98 vehicles. The 95th percentile queue is predicted to be 2.7 vehicles. The queue storage of these vehicles exiting the garage of course would be inside the garage.

The design of the garage should consider adequate queue storage for the exiting movement such that there is no blockage of the entering vehicles. It is recommended that the entrance gate/reader be located as far as possible into the garage to maximize storage. Assuming a 2-car queue, the estimated storage could range between 40 and 50 feet depending on the size of vehicle.

E. Alley Pedestrian – Vehicle Use and Conflict

Lake Street Place is not expected to generate any noticeable amount of pedestrian traffic within the alley. The main entrance to the site, Hectors, and KWM will be from Lake St. Restaurant and retail customers walking to the site from east on Kirkland Ave (and vice-versa) are predicted to use Kirkland Ave and Lake St in lieu of the alley. Office employees that utilize transit for work trips are anticipated to walk along Lake St and Kirkland Avenue to and from the Kirkland Transit Center. Furthermore, general pedestrian traffic is not expected to use Main St and the alley for any cut-through route.

Nevertheless, the 101 Kirkland development and the 201 Merrill Gardens development do generate pedestrian traffic to and from Lake St via the alley and across Main Street. Pedestrian traffic is likely to be greater during off peak times, evenings, and weekends, in particular in warmer weather months. Regardless of the amount of pedestrian activity, with the additional passenger vehicle traffic, traffic management including traffic calming and better management of truck load/unload activity will be necessary to ensure pedestrian safety.

Traffic calming measures are discussed in Section G, and management of truck delivery load/unload activity is discussed in Section H.

F. Vehicle Paths within Alley

The heaviest volume of traffic will be on the easterly portion of the alley, between the Lake Street Place driveway and Main St. The alley roadway traveled way width is

approximately 20'. This somewhat narrowed width will serve in effect as a traffic-calming feature to control speeds. Passenger vehicles are estimated to pass each other with minimal northside sidewalk encroachment. Passenger car turning movements in and out of the alley driveways will conflict with potential opposing movements.

Figure 17 shows the passenger car conflict for a vehicle entering the 101 Kirkland garage from the east and a vehicle exiting the Lake Street Place garage to the east assuming they arrive at the same time.

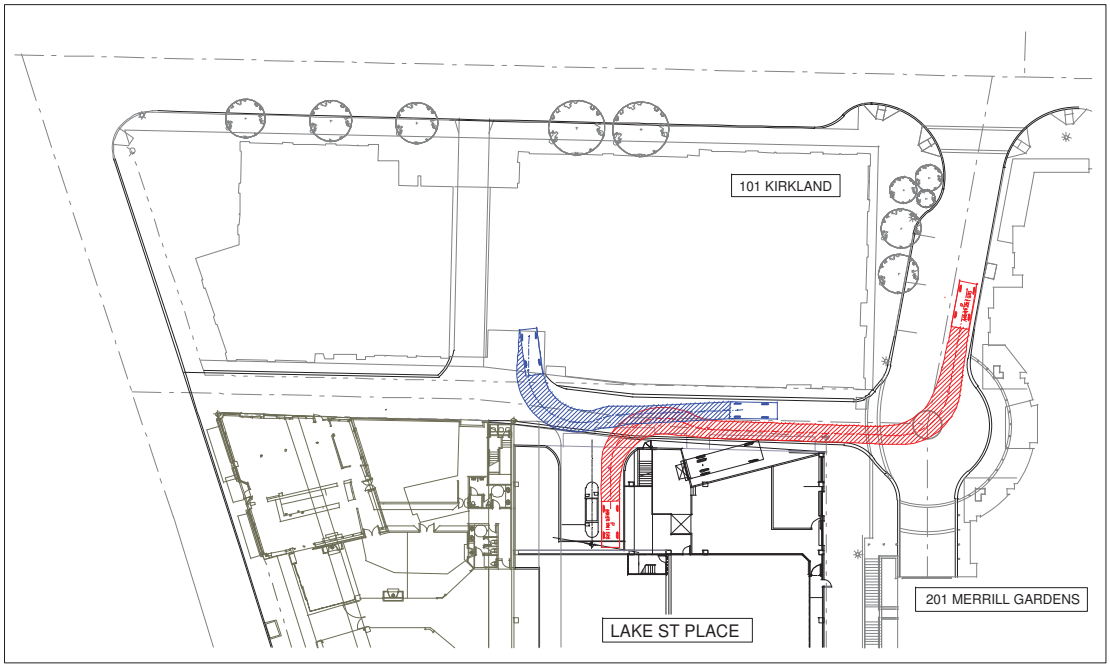


Figure 17

As shown here, a vehicle exiting the project would conflict with a vehicle entering the 101 garage.

Figure 18 shows the passenger car conflict for a vehicle entering the Lake Street Place garage from the east and a vehicle exiting the Lake Street Place garage to the east.

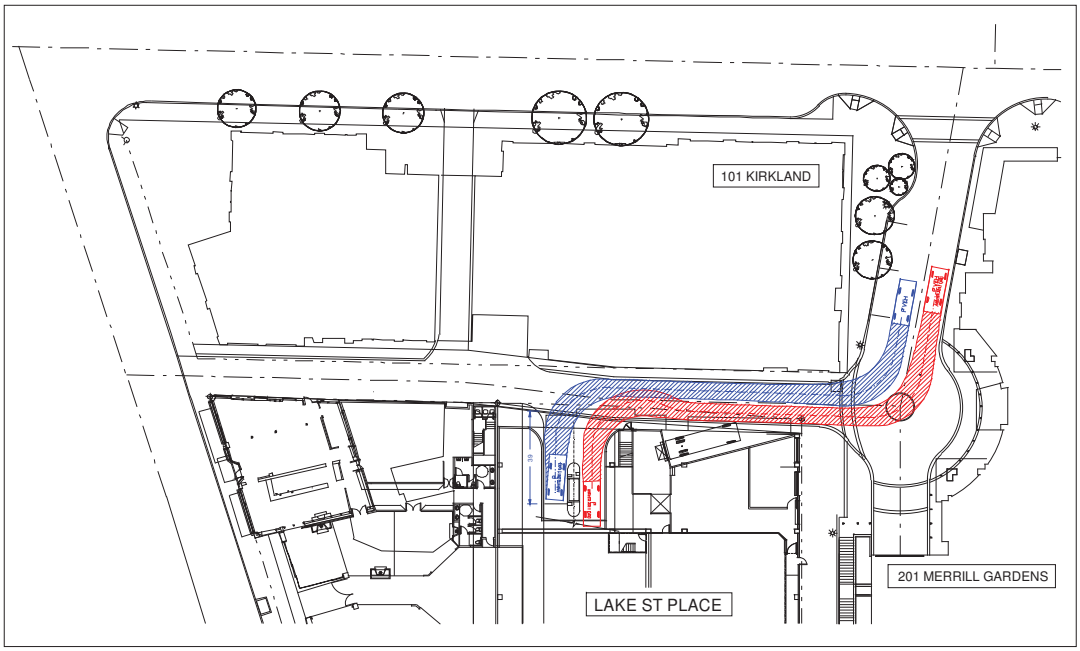


Figure 18

As shown here, similar to the previous figure, a vehicle exiting the project would conflict with a vehicle entering the garage.

Two passenger type vehicles passing each other in opposite directions is feasible but narrow. Vehicles turning in and out of driveways on the alley will require full use of the alley width for the movement. Exiting vehicles are expected to wait (yield) until the alley in the vicinity of the driveway is clear before turning out.

Courtesy yielding of right-of-way should be expected for vehicles turning into driveways, in particular right turn in.

G. Alley Traffic Calming

As noted above, the narrow width of the roadway section of the alley will control speeds. Other recommended traffic calming features could include:

- Install a raised crosswalk (crosswalk speed hump) on Main St just north of the traffic circle.
- Install a stop bar (18” wide) at the east end of the alley to augment the stop sign.

In addition, it should be noted that the vehicles exiting the Lake Street Place garage will be gate controlled, thus all vehicles will be required to stop for card reader or toll booth

attendant before entering the alley. This of course will meter the traffic exiting the project.

H. Truck Load / Unload

Presently, there is minimal control of where and when trucks park for load/unload activity. Morning observations show trucks primarily unloading on Lake St in front of Hectors, on the south side of Kirkland Ave just east of Main St, and on Main St east side south of Kirkland Ave. The width of the Main St extension does not allow for the passage of two passenger vehicles (opposite directions) with truck(s) parking on the east side. In addition, any truck currently parking in the alley significantly impedes the movement of passenger cars around the parked truck.

The adjoining properties including the subject development must mitigate truck load and unload activity. This could entail specifying delivery hours, move-in move-out times for residents/tenants, and designate more specific load/unload locations. More enforcement of no parking (currently signed no parking in the alley) on the alley and on Main St.

Existing load/unload locations for 101 Kirkland Ave are not readily available aside from on-street parking. 201 Merrill Gardens has a load/unload location in the garage that might be better utilized with improved communication between the building owners and delivery services and tenants.

To assist trucks with load/unload locations, special consideration should be given for new on-street load/unload zones. Suggested locations should include: 1) sign the two on-street parallel parking stalls on the west side of Main St for 15-min load/unload during morning periods, likely between 7am and 10am, and 2) sign two on-street parallel stalls on the south side of Kirkland Ave east of the bank drive-thru exit to 30-min load/unload during the same suggested morning times, or even 24-hour except Sunday and holidays.

Suggested load/unload zones are shown below in Figure 19.

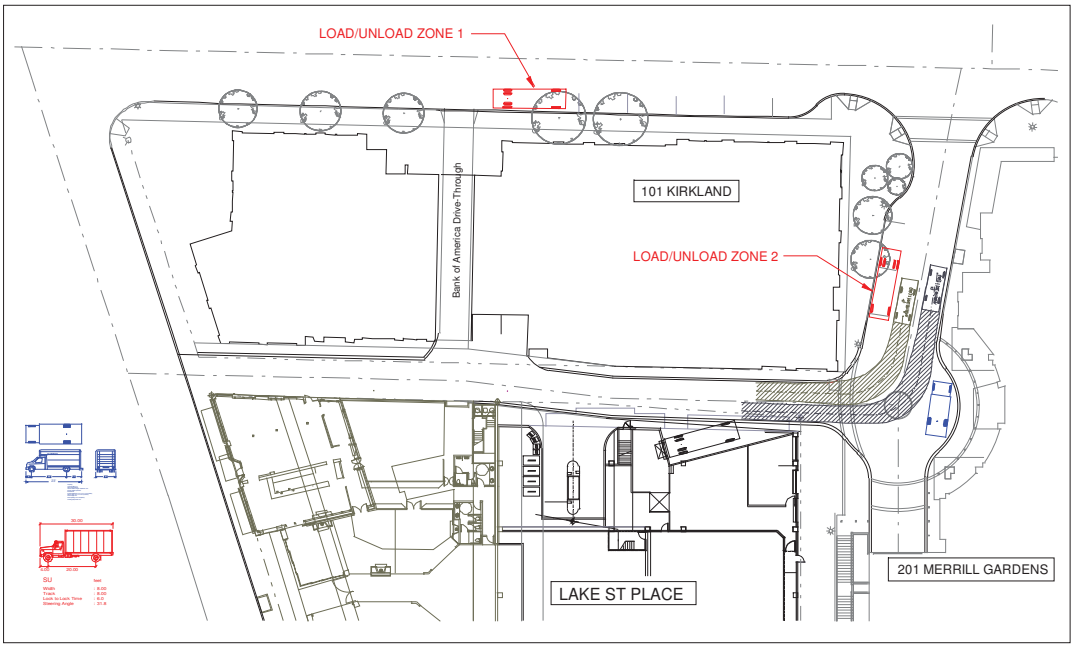


Figure 19

As shown here, two load unload zones are recommended to help with truck activity. Not shown here is also a recommendation for a load/unload zone on Lake St on the west side adjacent to Anthony's Home Port restaurant near the south end of the site. Also not shown here is an existing 24-hour load/unload zone on the south side of Kirkland Ave just east of Main St. This zone is approximately 40 feet in length.

The Lake Street Place development will be providing a loading dock on the alley facing to the east. Smaller trucks could back into this dock entering from Lake St, larger trucks (30' SU average) would likely need to enter from Main St and back into the stall. A detail of this truck path is shown is Section I.

Passenger vehicles can pass each other on Main St with a truck in the load zone on the west side. In addition, vehicles can pass-by any larger truck size vehicle properly parked in the circle in front of 201 Merrill Gardens.

The "US Mail" parking zone on the east side of Main St (south of Kirkland Ave) should be eliminated.

Garbage truck activity is discussed separately in Section J.

I. Lake Street Place Loading Dock

The proposed loading dock for the project will be located at the east end of the site, east end of the alley. It will be designed to accommodate a SU truck (30' x 8' +/-), which is a typical truck currently serving the site (Charlie's Produce for example).

Figure 20 below shows a SU truck entering from the Kirkland Ave/Main St intersection and turning around in the traffic circle and backing into the loading dock. The truck path will temporarily block the alley and the 201 garage for a short duration until parked. The exiting movement should be relatively simple to the Kirkland Ave/Main St intersection.

Also shown here is an SU entering from Lake St shown in red, which is close but not feasible based on AutoTurn details. Smaller trucks (less than 30') are likely to be able to make this movement. An SU 30 truck can exit from the alley to Lake St.

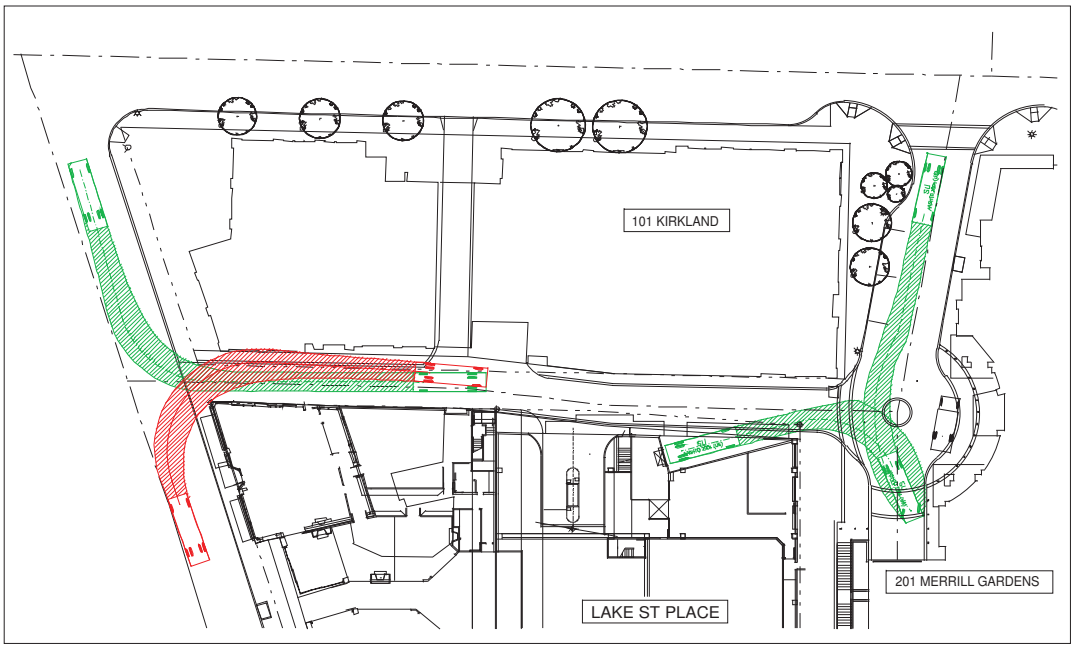


Figure 20

Typical delivery truck traffic is currently about 4 to 5 deliveries per day, and is estimated to be approximately 5 to 6 with project completion with addition of one more restaurant. The future delivery plan will be that deliveries are shared between Hector's, Milagro, and the future restaurant tenant. The majority of deliveries are estimated to occur before 10am. All SU 30 vendor trucks are assumed to use the new loading dock. Any short tractor trailer deliver will be required to park on Lake Street or in one of the proposed truck loading zones, or change to an SU 30 delivery vehicle.

J. Garbage Trucks

The trash room for the proposed development is located just to the west of the parking garage entry (and directly across the alley from the 101 Kirkland parking entry). The containers will be wheeled out of the room to the truck by the driver in the alley similar as they do at 101 Kirkland today. The 101 Kirkland trash room is located across the alley from where the proposed loading dock starts to angle in off the alley.

For the pickups in the alley, it is assumed the garbage truck would enter from Main St, load at each location and depart to Lake St. Garbage pickup is generally 2 to 3 times per week, currently in the early morning during the AM street peak period.

Figure 21 shows the garage truck and the two pickup locations in the alley. The pickup for 201 Merrill Gardens is just south of the alley.

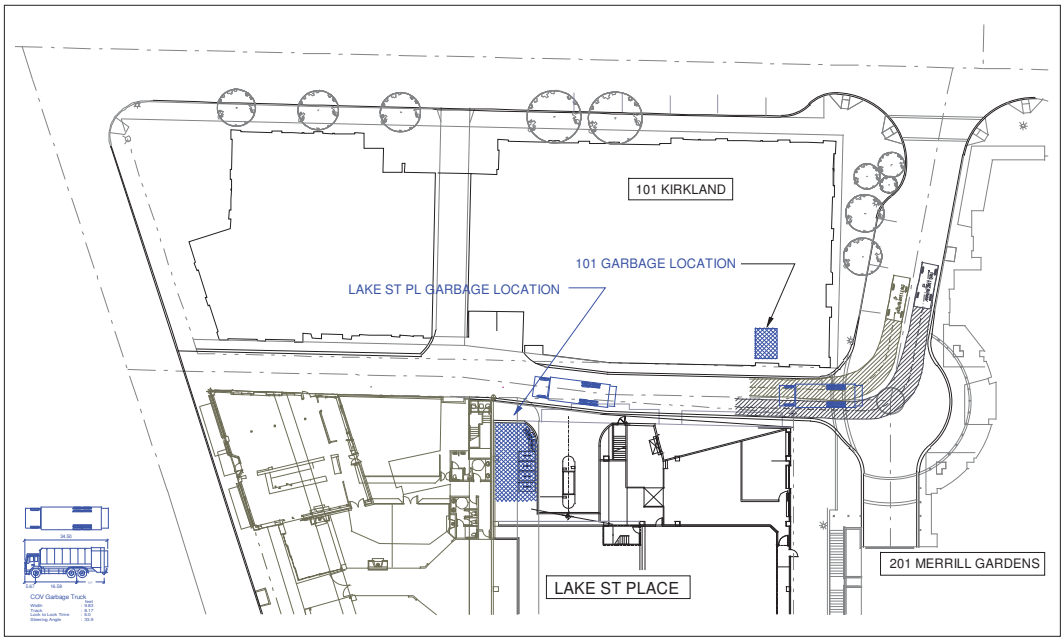


Figure 21

The garbage truck currently blocks the alley to service 101 and will block the alley for service to Lake Street Place. Given this situation, it is recommended that the garbage pickup time be set for a weekday time before 7:00 am. Traffic volumes for the project are estimated to be very light up until 7:00 am.

K. Emergency Vehicles

A one-year history (May 5, 2012 thru May 6, 2013) of emergency medical calls to both 101 Kirkland and 201 Merrill Gardens was obtained from the City of Kirkland Fire/EMS. There were a total of 11 calls made to 101 Kirkland. There were 82 calls made to 201

Merrill Gardens. Thus for both buildings, there were 93 emergency vehicle calls/visits for the past one-year period. The nearest Fire Station is Station 22 at 6602 108th Ave NE.

Figure 22 shows the annual number of emergency calls by hour of day for weekday conditions.

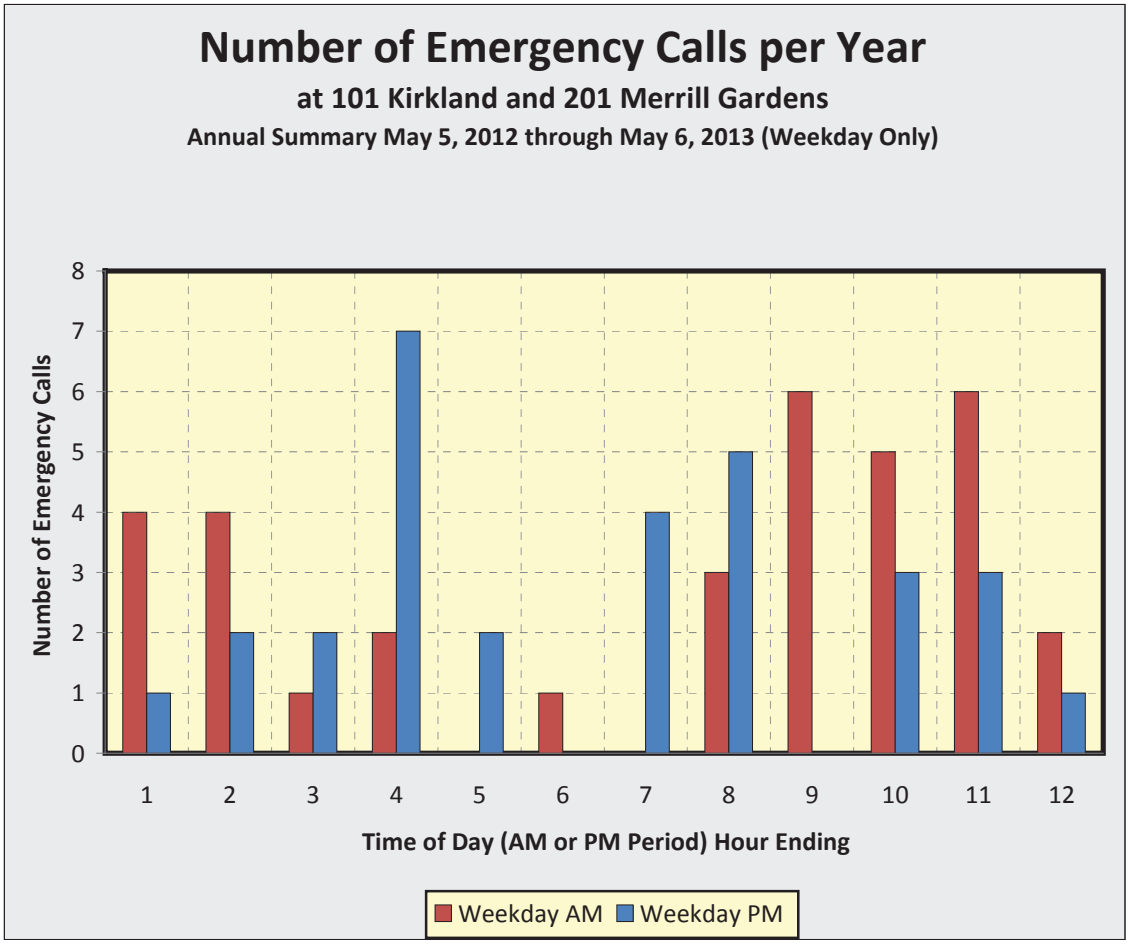


Figure 22

For the weekday period (Monday thru Friday), for the AM period, there were 34 calls, 14 of which occurred during the 4-hour period between 6 am and 10am. For the PM period, there were 30 calls, 13 of which occurred during the 4-hour period between 3 pm and 7 pm. Based on this information, it is estimated that on average there are 13.5 calls per year for either the AM or PM street peak periods. The peak periods noted here are 4-hour periods; which shoulder both sides of the typical street peak 2-hour period; one hour prior to and 1 hour after for either the AM or PM condition. The number of calls during this time (13.5 per year) equates to approximately 1 call per month in either the AM or PM extended street peak period.

It is recommended that 201 MG communicate with Kirkland Fire/EMS to implement parking area strategies for typical emergency aid car calls. Ideally any EMS vehicle would park in front of 201 MG assuming the parking area is vacant (the eastside of the circle). It is recommended that regulatory parking signs be installed to identify EMS type vehicle parking on this side of the circle.

Of course for any catastrophic fire/emergency clearly the fire department would use the roadway as they see fit and traffic circulation must accommodate until emergency situation has been addressed. Any traffic exiting from Lake Street Place or 101 Kirkland could go west to Lake St.

X. On-Site Parking

The site currently has 65 surface parking stalls with sole access to the alley. The total floor area was 40,026 gsf prior to the demo of the Lakeside and Calabria buildings. The existing site is a mix of restaurant (quality and high turnover), retail, and office uses. The required parking supply per Kirkland Parking Code would equate to 225 stalls based on City parking ratio's for each use and the floor area noted. It should be noted the City does not differentiate between the different types of restaurant uses that are in the trip generation analysis.

It is assumed that the parking code for each respective land use reflects a theoretical peak parking demand for each use. There are four different uses competing for parking and the peak demand for each of these uses is estimated not to coincide with one another. The hourly parking demand for each of the four uses, office, retail, quality restaurant and high turnover fast-food restaurant, was estimated based on data from both the ITE Parking Generation manual and the Urban Land Institute's Shared Parking manual. For office, the peak demand occurs between the hours of 10:00 AM and Noon. The peak demand for retail occurs in the afternoon period around 1:00 PM. The peak demand for quality restaurant is estimated to occur closer to the evening hours, and the peak demand for high turnover restaurant is estimated to occur around the noon hour and early evening times.

The hourly parking demand by use is shown in Table 13.

Table 13
Parking Demand Hourly Accumulation Percentages

Time of Day	Percent Parking Accumulation by Time of Day Weekday by Use			
	Office	Retail	Quality Restaurant	HT Restaurant
6:00 AM	10%	1%	0%	26%
7:00 AM	40%	7%	1%	44%
8:00 AM	71%	18%	4%	57%
9:00 AM	94%	40%	8%	76%
10:00 AM	100%	61%	15%	85%
11:00 AM	99%	87%	25%	92%
12:00 PM	90%	99%	51%	100%
1:00 PM	84%	100%	63%	90%
2:00 PM	91%	95%	50%	53%
3:00 PM	87%	91%	44%	42%
4:00 PM	75%	85%	39%	42%
5:00 PM	47%	69%	55%	76%
6:00 PM	24%	76%	81%	83%
7:00 PM	15%	86%	100%	63%
8:00 PM	7%	79%	99%	66%
9:00 PM	3%	52%	88%	63%
10:00 PM	3%	21%	78%	48%
11:00 PM	0%	10%	58%	44%
12:00 AM	0%	0%	38%	20%

a HT = High Turnover

The parking demand by time of day for the existing uses was computed utilizing the parking ratio's identified by the City's code and then allocated for each hour of the day by type of use. The total parking demand when adding all peaks for the individual uses together equates to 225 stalls. The actual peak was computed to be 181 stalls, occurring at 7:00 pm. The existing site at 40,026 gsf is grandfathered in at 65 stalls. Thus, assuming the peak demand equal to the parking supply and occurring at 7:00 pm, parking demand was proportionally allocated back to the other hours of the day. The parking demand fluctuation is shown in summary in Table 14.

The peak parking demand for the demolished areas (13,391 gsf) is estimated to be 93.5 stalls when summing the individual use peaks together. The estimated peak when accounting for the different peak periods for each of the four uses equates to 87 stalls. These parking demand estimates are to be used as credit against the new areas proposed.

The peak parking demand for the new areas (83,786 gsf) is estimated to be 289 stalls when summing the individual use peaks together. The estimated peak when accounting for the different peak periods for each of the four uses equates to 222 stalls.

The net new parking demand by time of day was estimated by negating the demo area demand from the new area demand. The estimated peak parking demand for the net new area is estimated at 176 stalls. The peak time is estimated to occur at 11:00 am, presumably driven by the large office and retail expansions.

The estimated total parking demand was computed by adding the grandfathered parking for the existing use with the net new parking demand for the project expansion. The estimated peak parking demand is 220 stalls, estimated to occur at 2:00 pm.

Table 14
Parking Demand Summaries [a]

Time of Day	Existing Site (40.026 ksf)	New Area (83.786 ksf)	Demo Area (13.391 ksf)	Net New Area (70.395 ksf)	Total Project (110.421)
6:00 AM	4	16	-3	13	17
7:00 AM	11	67	-7	60	71
8:00 AM	18	124	-12	112	130
9:00 AM	26	172	-18	154	180
10:00 AM	33	196	-26	170	203
11:00 AM	40	212	-36	176	216
12:00 PM	53	222	-57	165	218
1:00 PM	58	221	-65	156	214
2:00 PM	49	221	-50	171	220
3:00 PM	43	209	-45	164	207
4:00 PM	38	182	-40	142	180
5:00 PM	46	143	-55	88	134
6:00 PM	57	129	-74	55	112
7:00 PM	65	133	-87	46	111
8:00 PM	63	116	-87	29	92
9:00 PM	55	91	-76	15	70
10:00 PM	47	70	-64	6	53
11:00 PM	35	46	-49	-3	32
12:00 AM	22	27	-30	-3	19

a refer to Appendix F for details of the parking calculations for each scenario.

The total proposed parking supply with the full build development is 252 stalls: 65 stalls from the existing site (formerly 68 stalls less 3 removed with alley improvements) plus 187 new stalls. The required parking per Kirkland Parking Code (including grandfathered parking) is 260 stalls.

The estimated peak parking demand with shared parking adjustments is 220 occupied stalls, occurring at or around 2 pm. This assumes 171 vehicles for the net new floor area (70.395 ksf) added to the existing parking supply for the existing 40.026 ksf. This assumes the supply equals demand for the existing condition. The overall parking demand with grandfathered credit of 220 vehicles is less than the 252 stalls provided. The supply provided is estimated to exceed demand, but as noted above, the supply is less than the parking code requirement of 260 stalls.

Also, it is important to note that some of the retail and restaurant parking could and would likely park on Lake Street or Kirkland Avenue, thus reducing demand within the garage.

On a side note, the office use, which is the primary parking demand generator could be mitigated somewhat with transportation demand management strategies such as transit incentives, carpooling, and non-motorized uses such as bicycling and walking. There is the Kirkland Transit Center located approximately 800 feet away from the site. Assuming that 90% of the office parking demand is employee based, and assuming 10% transit use and 5% carpool, that would result in a parking demand reduction of approximately 30 vehicles (or occupied stalls).

McLeod Development, Co., predicts that up to 30% of the office tenant trips would be via transit. Current leasing negotiations for future tenants indicate the project location is close proximity to the transit center is a valuable asset to the project and prospective tenants are looking for this.

XI. Transportation Demand Management Plan (TDM)

The transportation demand management (TDM) plan goal is to help achieve mode-split goals by reducing the single occupant vehicle (SOV) percentage of office trips from the project thereby reducing the overall SOV travel to and from the site.

The following <u>are examples</u> of suggested TDM strategies that may or may not be implemented as part of this project:

- Provide a Commuter Information Center (CIC): A CIC would be located in a prominent location, typically in the lobby of the building. A CIC is a transportation information display in a freestanding, wall mounted, or kiosk configuration, which provides rideshare and transit service information including a destination brochure, targeted specifically to the commuter market. Preferred location will be determined by the BTC.

- Designate a Building Transportation Coordinator (BTC): The BTC would be appointed (identified by name and position) by the building or institution owner(s) and/or responsible party(s) prior to issuance of the Certificate of Occupancy. The BTC will be responsible for accomplishing program goals, and will maintain and stock the Commuter Information center. The BTC will be located on the site, available to the building's tenants, and be part of Building Management. The BTC's name, phone number and location will be displayed on the building's directories.

- Periodic Promotional Events: A minimum of one promotional event per year is recommended to promote transit and high occupancy vehicle (HOV) use and flextime programs for employees and/or tenants.

- Ridematch Opportunities: Depending on the success of the TMP, a ridematch program may be implemented. Ridematch is a Metro's computer-assisted service that matches commuting customers with similar origins, destinations, and work schedules for purposes of forming, joining, or adding to carpools, vanpools, and custom buses.

- Preferential Parking for HOV's: Preferential parking could be provided at the building near employee entrances for carpools/vanpools. Preferential parking for HOV's could be provided at a rate of 5% of total office parking stalls. These spaces will be designated specifically for carpools and will have high visibility to encourage program participation. A carpool or vanpool is defined as containing at least one person who works in the Marina Suites Office Building and others who work in the vicinity. The carpool/vanpool should commute at least four days per week to and from work. These spaces will be reserved for exclusive use by carpools/vanpools between the hours of 7:00 and 10:00 AM. Carpool/Vanpool spaces will be clearly identified with signs and located near the elevator lobby.

- Incentives for Carpool/Vanpool: A two-person carpool would receive a 25% discount from the normal monthly parking rate and a three person or larger carpool/vanpool would receive a 50% discount.

- Transit Subsidy: A peak hour transit subsidy of 50% could be offered to all employees (by tenant) that primarily commute to and from work by bus.

- Signage: Signage could be provided in the parking lot giving preferential treatment for carpools and vanpools.

- Bicycle Racks - Provide weather protected lockable bicycle racks and/or hangers to be used by employees and/or visitors.

XII. Summary

Lake Street Place mixed use development is a proposed 110,421 gsf mixed-use office/retail/restaurant development located on the east side of Lake Street south of Kirkland Ave and north of 2nd Ave. The existing site floor area is 28,607 gsf, which will be for the most part maintained. The project will be constructed in two phases, with the first phase constructed to 44,790 gsf.

The following are the summaries of this traffic study.

A. Trip Generation, Trip Distribution & Assignment

The Lake Street Place Development expansion is estimated to generate a net new of 1,442 daily, 107 AM and 160 PM peak hour trips to and from the site, including pass-by trips. The impact on the surrounding street system will be slightly less due to the fact pass-by trips are existing trips already on the street.

Without pass-by trips, the net new trips (non-pass-by) is 1,255 daily, 107 AM and 149 PM trips. These trip estimates were used for the City's transportation concurrency test. The existing site uses are estimated to generate (non pass-by) 777 daily, 36 AM and 91 PM peak hour trips.

There is one entrance/exit to the proposed parking garage. Access to the garage can be taken from Lake St via the east-west alley on the north side of the site, or from Kirkland Avenue via Main St south of Kirkland Ave. Of the 160 trips entering and exiting the site during the PM peak hour, it is estimated that 80% will use the easterly access to Kirkland Ave. The remainder will exit to Lake St.

B. Reduced Volume Assumptions

Traffic counts conducted at each of the three buildings utilizing the alley and Main St indicate that actual counts (entering/exiting the garage or lot) are less than volumes predicted per ITE. The actual volumes generated to/from the garage or lot for the three sites is about half of what would be estimated per ITE rates. It is theorized that the volumes are less, in particular at 101 Kirkland and Hectors/KWM, due to the following: 1) some of the existing restaurant and retail trips likely to utilize on-street parking, 2) given the location of the developments in the Kirkland CBD vicinity, there are more walk trips versus vehicle trips, 3) on-line banking has likely continued to increase thus decreasing vehicle trips to the bank, 4) restaurant and retail likely to have a higher customer walkup percentage given the location, and 5) more trip linking (trip capture to a

large extent beyond the bounds of the project) with all the other retail/restaurant/ residential in the area.

The trip generation estimates for the proposed project addition are based on ITE rates. It is estimated that the net new trips associated with the project addition are likely to reflect conservative traffic volumes and impacts to/from the proposed garage.

C. Concurrency, Significant Intersections

Based on the concurrency test, this project passed concurrency. There are six significant intersections defined based on the proportional share impact calculations. These intersections include:

- State St /NE 68th St (#103): Proportionate Share = 1.4%
- 108th Ave NE/NE 68th St (#104): Proportionate Share = 1.5%
- Lake St/Kirkland Ave (#108): Proportionate Share = 1.4%
- NE 85th St/114th Ave NE (#109): Proportionate Share = 2.1%
- Kirkland Ave/3rd St (#111): Proportionate Share = 5.5%
- Kirkland Way/6th St (#112): Proportionate Share = 3.4%

The project's proportional share impact at each of these intersections is greater than 1% but less than 5% except for the Kirkland Ave/3rd St intersection where the project's impact is just over 5%, but under 15%.

D. Collisions

There are no intersections (of those studied herein) that have experienced more than 10 collisions in any given year, except at the NE 85th St/114th Ave NE intersection. The "target" intersection collision rate set by the city is 1.0 collisions per million entering vehicles and focus on locations with 10 or more collisions per year. The NE 85th St/114th Ave NE intersection has experienced annual collisions just over 10 two of the three years, with collisions rates just above 1.0 for those respective years, however, the 3-year average rate for this intersection is 1.0 collisions per million entering vehicles. The other locations are all well below the threshold values. There were no collisions reported on the alley or Main Street south of Kirkland Avenue.

E. Site Access Sight Distance

The available sight distance at the alley access to Lake St and at the Kirkland Ave/Main St intersection are both adequate with consideration of on-street parking. The on-street parking on the east side of Lake Street south of the alley restricts sight distance to the south, presuming there is a car parked nearest the driveway. This appears to be a common occurrence in the CBD setting. It is recommended that the nearest on-street parking stall be removed to improve sight distance and turn radii for trucks entering the

alley. It is also recommended that the building corner at the southeast corner of this driveway include a convex mirror to improve visibility between exiting vehicles and north-south pedestrian activity near the driveway.

F. Site Access Driveway Operations

There is one driveway proposed to the project's parking garage, that will include a single entry drive and single exit drive separated by an island for ticket dispenser, gate, and parking attendant booth. The majority of the project traffic (80%) will enter and exit via Kirkland Ave. Thus, the primary movements from the alley to the parking garage will be left turns in and the primary movement exiting the garage will be right turn out.

G. Level of Service

Off-Site Intersections – with Significant Impact (>1%)

Two intersections are estimated to operate at LOS F in the future (2018) with the project. These are:

- Lake St/Kirkland Ave (#108); PM
- Kirkland Way/6th St (#112); AM and PM

At #108, the project's proportional share impact is 1.4%, less than 5%. Five percent is the threshold percentage for LOS F conditions. This intersection is currently signalized. The primary cause of the congestion at this intersection is due to the queue spillback from the Central Way/Lake St intersection. The City has in their planned improvement program a project to improve signal coordination along Central Way as well as along Lake St (NE 38th St to Central Way) that should provide a benefit to this roadway.

At #112, the project's proportional share impact is 3.4%, less than 5%. Five percent is the threshold percentage for LOS F conditions. This intersection is currently an all-way stop controlled intersection but is slated for signalization by the City, however, the project is currently unfunded.

The remaining analysis intersections are all estimated to operate at LOS D or better in 2018 with the project thus no improvements are required or suggested.

The mitigation fees that will be required per City ordinance based on the project's floor area are assumed to provide assistance in the form of traffic mitigation towards the City's roadway/intersection improvement projects for the problem analysis intersections.

Local Area Intersections and Driveways

There are six intersections/driveways that were reviewed as part of this study. Each are discussed below.

a. Lake St/Alley. The alley access to Lake St is restricted to right-in and right-out given the center c-curb configuration on Lake St. The estimated level of service for the AM peak hour is estimated to be LOS B. For the PM peak hour future condition, the level of service for a right turn exiting to Lake St is estimated to be LOS F. However, due to the heavy stop-and-go congestion on Lake St, it is estimated that the actual delay will likely be less than reported herein due to the assumption that northbound motorists will likely "wave-in" vehicles from the alley, and some aggressive motorists from the alley may take gaps left by northbound motorists with start-up delay with signal change to green. It is assumed that one car from the alley per signal cycle at Kirkland Ave/Lake St could merge into the northbound thru queue. Given that the signal cycle is approximately 60 seconds at Kirkland Ave/Lake St, it is estimated that the potential average delay for a right turn out from the alley turning into the northbound thru queue would be approximately 60 seconds assuming motorist courtesy wave-in by the northbound thru queue.

   The City has noted that they reserve the right to convert the alley to one-way westbound should traffic congestion issues arise with the current recommended and mitigated conditions. The critical point of issue with this concept would be where the alley exits to Lake St. It is estimated that the volume increase across this driveway for future PM peak hour conditions would go from 23 entering and 20 exiting to 132 exiting and 0 entering: 43 to 132. During the PM peak period Lake St is stop-and-go congested northbound through Kirkland Ave to Central Way. The modeling analysis for this condition indicates severe queue spill back through the alley into Main St. However, the modeling cannot and does not predict human/motorists courtesy factors for "wave-in" situations. Some of this is sure to occur and queues through the alley should be less than estimated. However, the ultimate queue estimate is dependent on the motorist courtesy of the northbound traffic flow. Another factor to consider is the impact to pedestrian safety along the eastside sidewalk of Lake St and the conflict with vehicles, on average about 1 vehicle every 30 seconds exiting to Lake St. As a general rule of thumb, and as noted previously, if one vehicle is "waved-in" per signal cycle (60 second signal cycle at Kirkland Ave/Lake St) then the discharge rate of the alley would be 60 vehicles. Thus queue spill back through the alley would occur. However, most of these motorists would exit the alley to ultimately head east on Kirkland Ave, thus the predominant movement would be a right turn into the northbound right turn pocket at Kirkland Ave/Lake St. Hence, the discharge rate from the alley could be greater than 60 vph. It is recommended that the one-way westbound alley concept be further evaluated only after the recommended mitigation measures to improve

the existing alley and Main St operations be set in place are tested and issues arise. It is assumed the proposed loading dock configuration would remain facing east.

b. Kirkland Ave/Main Street. The Kirkland Ave/Main Street intersection is presently a side-street stop controlled intersection with stop control on the north and south legs. The total future vehicular volume entering the intersection during street peak hours is 502 vph in the AM and 694 vph in the PM. The future AM peak hour conditions with the project are estimated to be LOS B for both the northbound and southbound approaches. For the future PM peak hour with project, the level of service is estimated to be LOS C for both the northbound and southbound approaches. The delay estimates are near the LOS B range. The analyses assume a relatively high component of pedestrian crossings all legs based on existing counts.

c. Main St/Alley/201 MG garage. This intersection was designed with a circular them, similar to a traffic circle without a center island. The circle serves the alley, the 201 Merrill Gardens parking garage, the front door entrance to 201 Merrill Gardens for passenger drop-off and pick-up as well as some truck loading and unloading and emergency vehicles due to the fact this is an assisted living retirement development. The traffic counts indicate there are u-turns that stop at 201 Merrill Gardens side of the circle and some that don't stop at all. There is also a fair amount of truck activity to all of the properties adjacent and nearby. The estimated total entering volume through this intersection is 140 vph during the AM peak hour and 253 vph during the PM peak hour. It is assumed that through mitigation recommendations as part of this study, truck activity and emergency vehicle activity will be more efficiently managed.

   The traffic control at this intersection consists of a stop sign for the approach from the alley. There are no channelization markings. With the estimated increase in traffic associated with the project, the level of service is estimated to be LOS A for both peak hours. The friction factors associated with trucks, pedestrians, EMS, u-turns, etc., will need to be better managed with the increase in vehicles.

d. Alley/Site Access. The proposed driveway is estimated to operate at LOS A for both peak hour conditions analyzed. The movements to and from the east will have some overlap in use of the alley width near the driveway, thus some extra delay is likely by the later arriving vehicle whenever this occurs. The estimated volume exiting the alley is 100 vph for the PM peak hour opposed by 98 in the opposite direction (westbound). The arrival rate for each approach is approximately 36 seconds per vehicle, thus it is anticipated there would be a low instance of similar arrival time resulting in some additional delay not estimated by the modeling analysis.

e. Alley/101 Kirkland Garage. This intersection is estimated to operate at LOS A for both peak hours. The volume on the alley and entering/exiting the garage at this

point is estimated to be light. The total entering volume is 80 vph for the PM peak hour: 33 entering and exiting the garage, and 47 thru trips on the alley.

f. Alley/Bank of America Drive Through. This drive-thru is one-way north through the 101 Kirkland property. It is estimated there would be 9 vph during the PM peak hour using the drive-through, and significantly fewer in the AM peak hour. Vehicles turning right into the drive-through will conflict with vehicles eastbound on the alley from Lake St. However, the volume and occurrence will be very light. The conflict occurrence is 8 turning vehicles opposing 20 vehicles through eastbound. This would equate to a maximum potential conflict of only 1 instance every 7.5 minutes. Of course these estimates reflect average weekday conditions.

H. Mitigation Fee Analysis

Per City Ordinance No. 3685, road impact fees will be required. Fees must be paid prior to issuance of building or tenant improvement permit. According to the City's current Road Impact Fee schedule dated January 1, 2013, the transportation impact fees by use are:

- General Office fee is $2.43 per gsf (GFA),
- Specialty Retail is $1.15 per gsf (GFA),
- Restaurant is $7.24 per gsf (GFA).

The road impact fee rates are for projects located in the CBD.

It is recognized that the City will allow a traffic mitigation fee credit for any existing use that is currently occupied or was demolished after 2009. The Lakeside and Calabria buildings were demolished in 2010. Typically, the City will identify all uses permitted on the site from 1998 to current and allow credit for the most significant. The credit would be based on the City's current Road Impact Fee Schedule and be based on floor area.

Table 15 below provides an estimate of what should be required by this development for traffic impact fees.

Table 15
TRAFFIC MITIGATION FEE ESTIMATE [a]

Building	Retail (gsf)	Quality Restaurant (gsf)	High Turnover Restaurant (gsf)	Office (gsf)	Total (gsf)
EXISTING SITE BUIDING AREA SPECFIICATIONS [b]					
Hector's	0	4,670	0	2,528	7,198
Lakeside [b]	1,646	2,715	1,667	128	6,156
KWM [c]	2,163	6,503	1,626	11,117	21,409
Main St	0	0	0	0	0
Calabria [b]	876	4,387	0	0	5,2630
All	4,685	18,275	3,293	13,773	40,026
PROPOSED FINAL PROJECT BUILDING AREA SPECIFCIATIONS (TOTAL AREA)					
Hector's	0	10,174	0	27,514	37,688
Lakeside [d]	0	0	0	0	0
KWM [c]	2163	8,592	1,626	24,894	37,275
Main St	15,349	0	0	20,109	35,458
Calabria [d]	0	0	0	0	0
All	17,512	18,766	1,626	72,517	110,421
NET INCREASE	12,827	491	-1,667	58,744	70,395
City Mitigation Fee/GFA	$1.15	$7.24	$7.24	$2.43	
Estimated Fee	$14,751	$3,555	- $12,069	$142,748	$148,985

[a] per City's Jan 1, 2013 Transportation Impact Fee Schedule and floor area estimates per Chesmore/Buck Architecture.
[b] Lakeside and Calabria demolished in 2010. Floors areas are shown for trip mitigation fee and parking credit purposes only.
[c] KWM = Kirkland Waterfront Market.
[d] this building does not exist for future site.

As shown in Table 15, the project is estimated to be responsible for $148,985 in traffic mitigation fees for the Lake Street Place project based on the estimated floor areas noted above.

I. Frontage Improvements

The project will be constructing frontage improvements on three sides of the site. These will include:

- Frontage improvements along Lake Street including: new street tree's, new street lights, new sidewalk, new curb and gutter adjacent to crosswalk, and new planters/landscaping adjacent to crosswalk.

- Frontage improvements along the Alley to include: new curb, gutter and sidewalk from Hector's to Main St.

- Frontage improvements at Main Street will include: new curb, gutter and sidewalk to complement existing traffic circle details, new planters including landscaping to screen existing electrical transformer, and overhead weather protection (sidewalk canopies).

XIII. Site Specific Mitigation Recommendations

As noted above in Section XII.G., the project will be required to pay towards the City's traffic impact fee program based on the City's current fee structure and project floor area/land use type. In addition to that, the following are recommendations for the project for immediate area concerns to better manage the following:

Truck Load/Unload Management

1. Convert the two parking stalls on the north side of Main St between Kirkland Ave and the alley to a load/unload zone.
2. Convert the two on-street parking stalls on Kirkland Ave south side immediately east of the Bank of America drive through to a 40' load/unload zone 24-hour duration, except Sundays and holidays.
3. Move the short load/unload zone on the west side of Lake St near the south end of the site to a longer curb-front in front of the Anthony's Home Port.
4. Install a "No Outlet" sign in SW corner of the Kirkland Ave/Main St intersection, south leg facing north. The intent of this sign would be to reduce U-turn activity in the traffic circle that does not stop.
5. Make more efficient use of the load/unload parking area within the 201 Merrill Gardens garage. This will be the responsibility of 201 MG to communicate with tenants and delivery vehicles for acceptable parking locations.
6. Add signage along the alley to note "NO LOADING or UNLOADING". Current signage along the alley on the north side (attached to the 101 Kirkland building) includes several "No Parking" signs that are expected to remain.
7. Coordinate with the garbage company for preferred pickup times to minimize alley traffic disruption. Pickup times would preferably be before 7 am on weekdays.
8. Work with the City of Kirkland to enforce these loading areas in the normal course of monitoring on-street parking.
9. Establish a mutual loading management plan (or program) among the owners/property managers of the buildings with frontage on the alley and Main Street to:
    a. Self-monitor compliance with City of Kirkland loading restrictions,
    b. Manage the loading activities of each of their own buildings to minimize conflicts with through traffic, and

c. Regularly meet and/or communicate with each other to discuss and resolve any unanticipated loading/unloading problems.

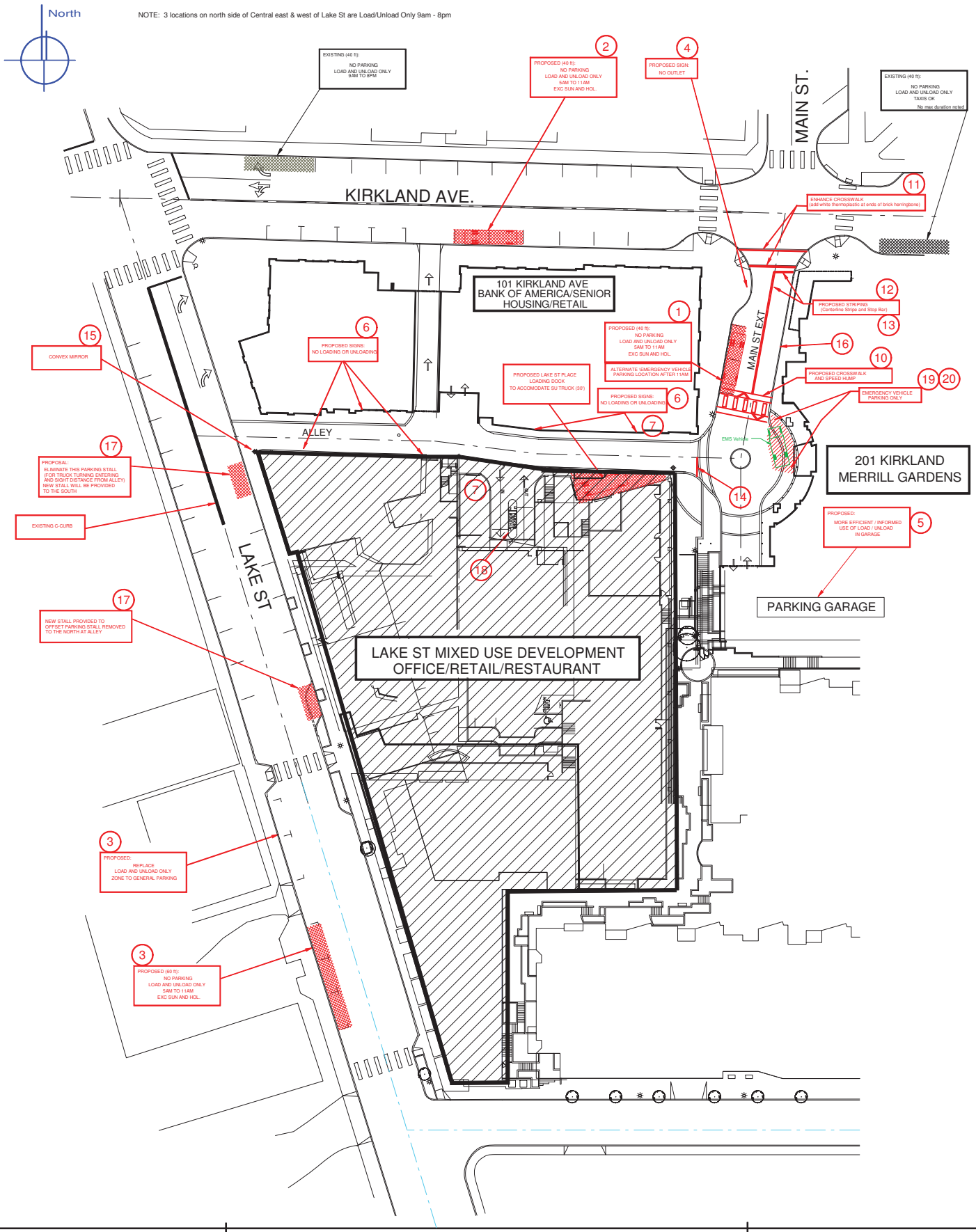
Traffic Calming/Safety Measures

10. Install a raised pedestrian crosswalk speed hump on Main St north of the traffic circle to provide pedestrian access to and from 201 Merrill Gardens to Lake St and to control speeds on Main St in this area.
11. Install 10" thermoplastic crosswalk bars on both sides of the brick paver crosswalk on the south leg of the Kirkland Ave/Main St intersection.
12. Install an 18" thermoplastic stop bar for the northbound approach at the Kirkland Ave/Main St intersection.
13. Install a 4" yellow solid centerline stripe on Main St from Kirkland Ave south to the proposed raised crosswalk north of the alley.
14. Install an 18" thermoplastic stop bar at the east end of the alley for the eastbound approach at Main St and new stop sign on metal post.
15. Install a convex mirror on the hector's building to enhance visibility around corner for pedestrians and vehicles exiting the alley.
16. Eliminate any parking zone including the U.S. Mail curb-front on the east side of Main St between the traffic circle and Kirkland Ave.
17. Eliminate the first parking stall on the east side of Lake St just south of the alley to provide a more comfortable radius for large vehicles turning into the alley, which will also allow for better sight distance for vehicles exiting the alley looking south. A new stall will be provided mid-block just north of crosswalk.
18. Install the parking gate and ticket dispenser for vehicles entering the garage such that the storage distance between the ticket dispenser and the alley can accommodate two vehicles to minimize queue spill back into the alley.

Emergency Vehicles

19. Provide an emergency vehicle parking near the north end of the plaza area in front of 201 Merrill Gardens. Location shall be set back as to not block any northbound vehicle movement on Main St. Mutual property owner coordination (101 Kirkland, 201 MG, and Lake Street Place) and City of Kirkland Fire Department to communicate ideal parking locations to minimize disruptions to general traffic activity.
20. Sign the preferred location "NO PARKING EXCEPT EMERGENCY VEHICLES" to provide dedicated space for EMS, Police and Fire vehicles.

Refer to Figure 23 for a depiction of these recommendations along with key code numbering matching these 20 items.



WILLIAM POPP ASSOCIATES

Bellevue, WA 98007
425.401.1030

MITIGATION PLAN

Figure 23

Lake Street Place
Office/Restaurant/Retail
Mixed Use Development

William Popp Associates *Transportation Engineers/Planners*

(425) 401-1030
FAX (425) 401-2125
e-mail: info@wmpoppassoc.com

TECHNICAL APPENDIX

for

Lake St Place
Mixed-Use Development
Traffic Impact Analysis

September 24, 2013

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B. Traffic Counts
   1. Daily Traffic Count Summaries
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   a. 2016 Subsection; Volumes and LOS
F. Parking Demand Estimate (average weekday)
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14-400 Building ● Suite 206 ● 14400 Bel-Red Road ● Bellevue, WA 98007

APPENDIX A

TECHNICAL APPENDIX
for
Lake St Mixed Use Development

Phase 1 Traffic Impact Analysis

William Popp Associates *Transportation Engineers/Planners*

(425) 401-1030
FAX (425) 401-2125
e-mail: info@wmpoppassoc.com

March 12, 2013

To: Thang Nguyen
Transportation Engineer
City of Kirkland

From: William Popp, Jr.
William Popp Associates

Subject: **Lake Street Mixed Use Development**
Re: **Phase 1 Traffic Study**

The following traffic study memorandum was prepared to identify site area traffic impacts associated with the Phase 1 of the Lake Street Development. The Lake St Development consists of redevelopment of the Hector's site and redevelopment of the Kirkland Waterfront Market (KWM) site. The Phase 1 development includes only analysis of the KWM redevelopment. This study includes a summary of trip generation estimates associated with the proposed additional building area, intersection operations analysis at the site access locations, parking, pedestrian safety, and alley impacts.

Project Description – Existing and New Floor Areas

The existing site uses consist of office, retail, and various restaurant uses. The total floor area for the existing site as of today is approximately 28,607 gsf. The Lakeside building and the Calabria building have been demolished and are not included in this current floor area total. The proposed Phase 1 project consists of an increase in building area to the KWM building with an increase in restaurant and office space. The total floor area of KWM increases 16,183 gsf. The total new building area on the site is 44,790 gsf.

Table 1 identifies the floor areas for existing and proposed expansion to KWM, and by the various land uses.

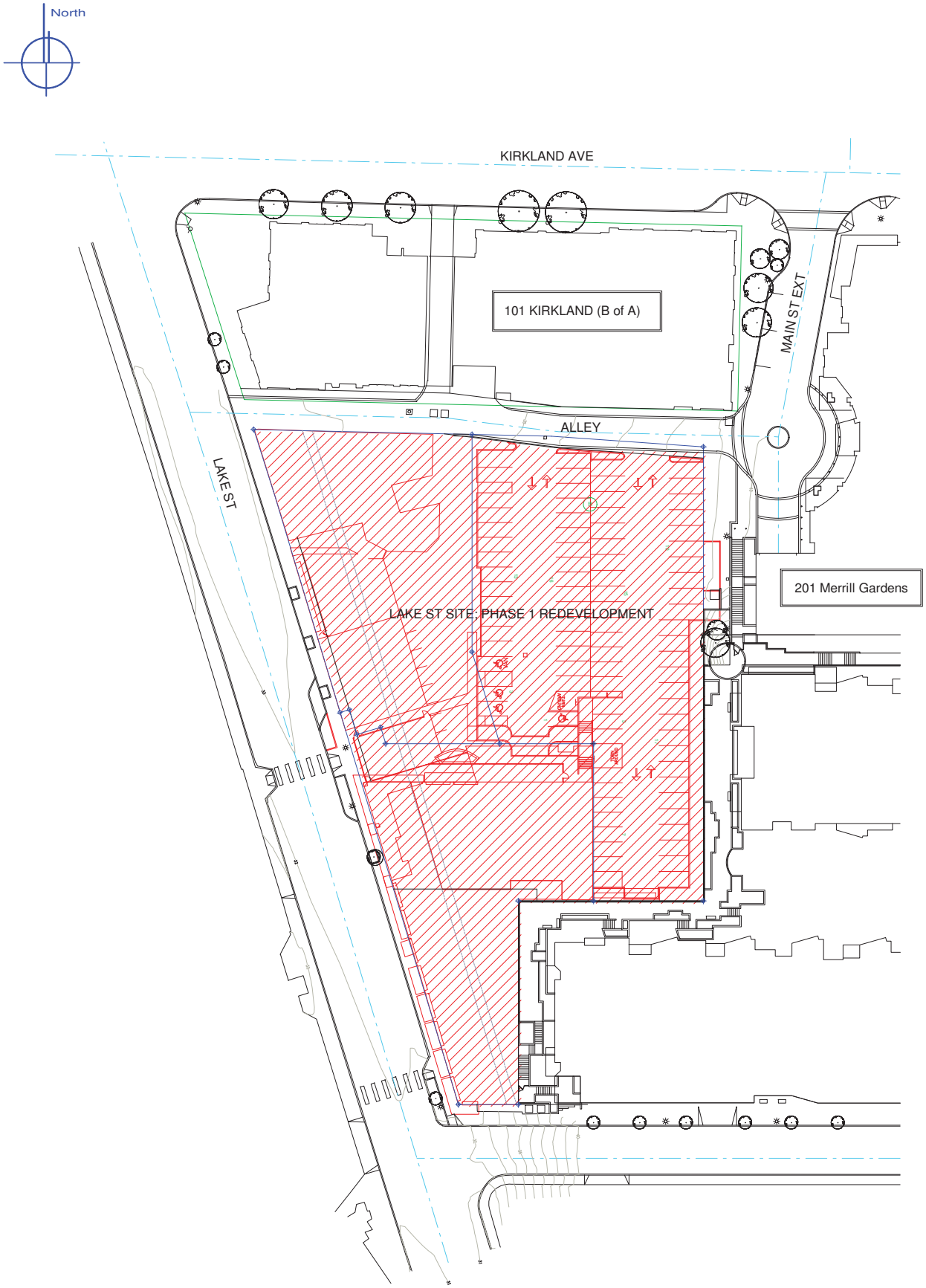
Table 1
Project Specifications EXISTING and PHASE 1 Redevelopment [a]

Building	Retail (gsf)	Quality Restaurant (gsf)	High Turnover Restaurant (gsf)	Office (gsf)	Total (gsf)
EXISTING SITE BUIDING AREA SPECFIICATIONS [b]					
Hector's	0	4,670	0	2,528	7,198
Lakeside	0	0	0	0	0
KWM	2,163	6,503	1,626	11,117	21,409
Main St	0	0	0	0	0
Calabria	0	0	0	0	0
All	2,163	11,173	1,626	13,645	28,607
PROPOSED PHASE 1 REDEVELOPMENT OF KWM					
Hector's	0	4,670	0	2,528	7,198
Lakeside [d]	0	0	0	0	0
KWM	2,163	8,617	1,626	25,186	37,592
Main St	0	0	0	0	0
Calabria [d]	0	0	0	0	0
All	2,163	13,287	1,626	27,714	44,790
New	0	2,114	0	14,069	16,183

[a] per Chesmore/Buck Architecture, as of March 1, 2013.
[b] Lakeside and Calabria currently demolished, buildings shown for placeholder purpose.
[c] KWM=Kirkland Waterfront Market.
[d] this building does not exist for future site.

As shown in Table 1, the existing total gross floor area is 28,607 gsf. This floor area is the current floor area as of March 1, 2013. The Lakeside building and the Calabria building were previously demolished and are not included in these totals. The proposed Phase 1 expansion of the KWM is proposed to be approximately 16,183 gsf. Thus, the new total building area for the site will be 44,790 gsf. The largest use increase in the project is in the office use. The quality restaurant use increases slightly and there is no change in the retail or high-turnover restaurant use.

A site plan is shown in Figure 1.



WILLIAM POPP ASSOCIATES

14400 Bel-Red Rd #206
Bellevue, WA 98007
425.401.1030
info@wmpoppassoc.com

SITE PLAN

Figure 1

Lake St Mixed Use
McLeod Development, Co.

Existing Traffic Volumes

PM peak period counts were conducted at both the Lake St/Alley driveway intersection and the Kirkland Ave/Main St intersection in February 2013. The counts also included pedestrian activity at both intersections. The Lake St/Alley driveway count indicated a very low volume entering and exiting during the PM peak hour; 6 vehicles and 2 vehicles respectively. The pedestrian activity on the east side of Lake St crossing the driveway was observed to be 33 pedestrians during the PM peak hour. The pedestrian activity is more than likely to be higher during warmer months. The volume entering the Main St extension was recorded to be 86 vehicles entering and 50 exiting.

Alley counts were conducted in May 2012 and recorded trip activity for all of the existing driveways including the Lake St parking area (two access points), the Bank of America drive-thru lane, the 101 Kirkland parking garage entry, and the 201 Merrill Gardens driveway. It should be noted that the volume entering and exiting the alley and Main St extension is significantly less than what would be estimated per ITE for the three subject properties.

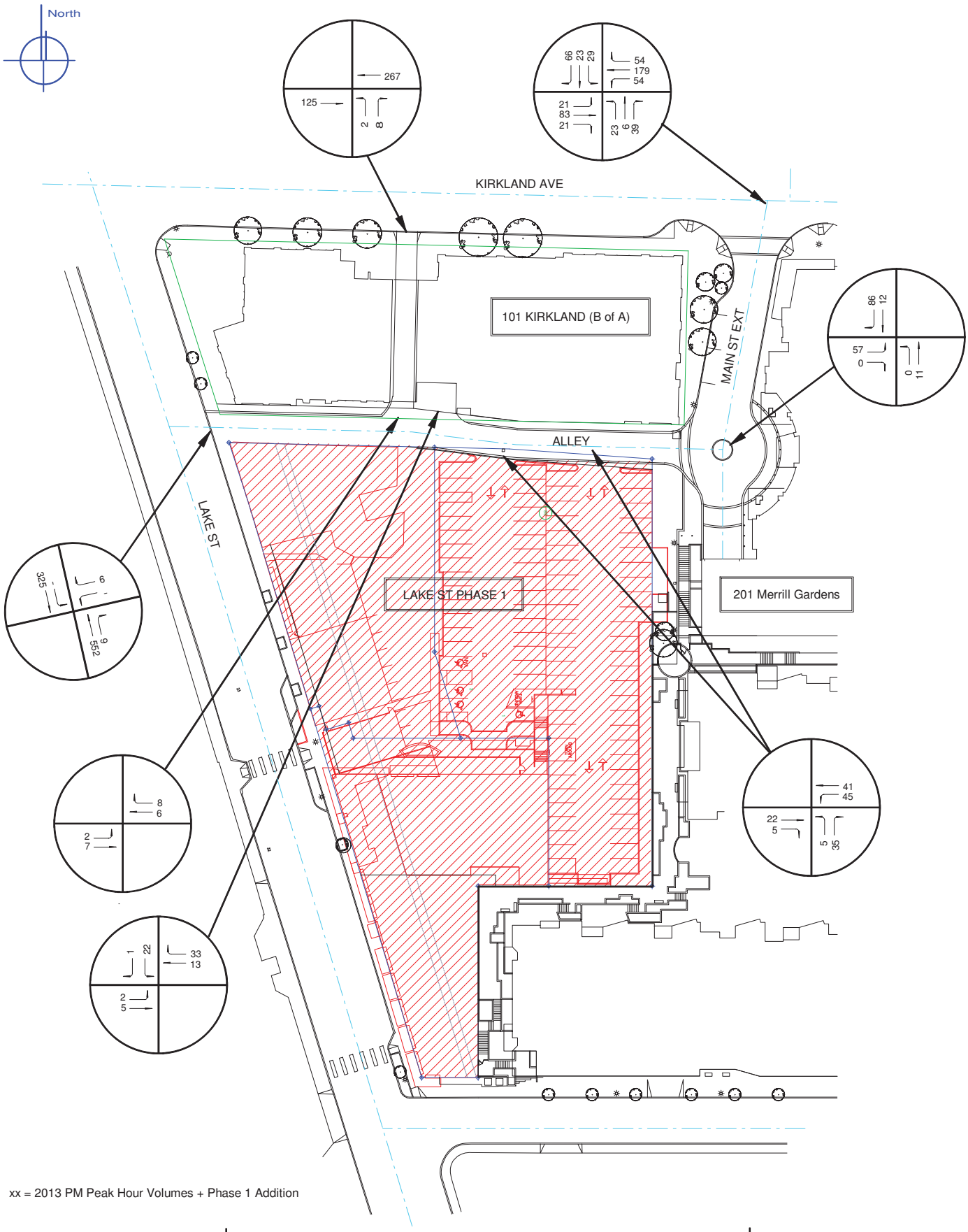
For existing count estimates, the driveway volumes were all proportionately reduced from the past TIA and ITE estimates in order to match the terminal point counts. The existing volumes are shown in Figure 2.

Trip Generation

Trip generation estimates daily, AM and PM peak hours for the proposed project were calculated using trip generation rates obtained from the Eighth Edition of the ITE *Trip Generation Report*, 2008 as well as supplemented with information presented in the ITE Trip Generation Handbook. This would include estimates for internal site trip making characteristics as well as pass-by assumptions for the restaurant uses. The retail use is expected to also have some pass-by trips however; there is no information within ITE to support a pass-by rate for non-specified retail use. It is estimated the pass-by rate could be approximately 25% of total external retail trips.

Trip generation estimates for the existing uses were computed with the same trip making assumptions noted for the future site.

The trip generation estimate for the existing conditions for Daily, AM, and PM street peak hours are shown in Table 2 below. The supporting trip capture assumptions used for the existing site uses are the same as for the future site uses.



xx = 2013 PM Peak Hour Volumes + Phase 1 Addition

WILLIAM POPP ASSOCIATES

14400 Bel-Red Rd #206
Bellevue, WA 98007
425.401.1030
info@wmpoppassoc.com

EXISTING VOLUMES WITH PHASE 1

Figure 3

Lake St Mixed Use
McLeod Development, Co.

Table 2
Trip Generation – Existing Site Uses

Land Use	AWDT	AM Peak Total	AM Peak In	AM Peak Out	PM Peak Total	PM Peak In	PM Peak Out
Office (13,645 gsf)							
LUC 710 Rate	11.01	1.55	0.88	0.12	1.49	0.17	0.83
All Trips	150	21	19	2	20	3	17
Internal Capture[1]	38	1	1	0	3	1	2
External[2]	112	20	18	2	17	2	15
Quality Restaurant (11,173 gsf)							
LUC 931 Rate	89.95	0.81	n/a	n/a	7.49	0.67	0.33
All Trips	1,005	9	7	2	84	56	28
Internal Capture[1]	56	1	0	1	4	2	2
External[2]	949	8	7	1	80	54	26
pass-by[3]	420	4	3	1	21	14	7
non-pass-by[4]	529	4	4	0	59	40	19
High Turnover Restaurant (1,626 gsf)							
LUC 931 Rate	89.95	0.81	n/a	n/a	7.49	0.67	0.33
All Trips	207	19	10	9	18	11	7
Internal Capture[1]	35	0	0	0	1	1	0
External[2]	172	19	10	9	17	10	7
pass-by[3]	73	8	4	4	6	3	3
non-pass-by[4]	99	11	6	5	11	7	4
Retail (2,163 gsf)							
LUC 814 Rate	44.32	1.09	0.66	0.34	2.71	0.44	0.56
All Trips	96	2	1	1	6	3	3
Internal Capture[1]	59	1	0	1	2	1	1
External [2]	37	1	1	0	4	2	2
TOTALS							
All Trips	1,458	51	40	15	128	73	55
Capture	188	3	4	3	10	5	5
External	1,270	48	36	12	118	68	50
pass-by	493	12	7	5	27	17	10
non-pass-by	777	36	29	7	91	51	40

1 See Attachment 1, 2, and 3 for estimated internal trip capture for AM, PM, and Daily respectively.
2 External vehicle trips entering or exiting the site
3 Pass-by for Quality Restaurant: 26% for PM Peak, and 44% for AM and daily. Pass-by for high turnover restaurant is 43% for all cases. These are for trips entering or existing the site (excludes all internal trips).
4 Non-pass-by trips are new and/or diverted trips entering or exiting the site (excludes all internal trips.

As shown in Table 2, the existing site is estimated to generate 1,270 daily, 48 AM, and 118 PM peak hour trips to areas surrounding the site (pass-by and non-pass-by trips).

Table 3
Trip Generation – FUTURE Site Uses with PHASE 1

Land Use	AWDT	AM Peak Total	AM Peak In	AM Peak Out	PM Peak Total	PM Peak In	PM Peak Out
Office (27,714 gsf)							
LUC 710 Rate	11.01	1.55	0.88	0.12	1.49	0.17	0.83
All Trips	305	43	38	5	41	7	34
Internal Capture[1]	52	1	1	0	3	1	2
External2	253	42	37	5	38	6	32
Quality Restaurant (13,287 gsf)							
LUC 931 Rate	89.95	0.81	n/a	n/a	7.49	0.67	0.33
All Trips	1,195	11	9	2	100	67	33
Internal Capture[1]	70	1	1	0	4	2	2
External[2]	1,125	10	8	2	96	65	31
pass-by[3]	499	6	4	2	26	18	8
non-pass-by[4]	626	4	4	0	70	47	23
High Turnover Restaurant (1,626 gsf)							
LUC 931 Rate	89.95	0.81	n/a	n/a	7.49	0.67	0.33
All Trips	207	19	10	9	18	11	7
Internal Capture[1]	35	0	0	0	1	1	0
External[2]	172	19	10	9	17	10	7
pass-by[3]	73	8	4	4	7	4	3
non-pass-by[4]	99	11	6	5	10	6	4
Retail (2,163 gsf)							
LUC 814 Rate	44.32	1.09	0.66	0.34	2.71	0.44	0.56
All Trips	96	2	1	1	6	3	3
Internal Capture[1]	59	1	0	1	2	1	1
External[2]	37	1	1	0	4	2	2
TOTALS							
All Trips	1,803	75	58	17	165	94	81
Capture	216	3	2	1	10	5	5
External	1,587	72	56	16	155	83	72
pass-by	572	14	8	6	33	22	11
non-pass-by	1,015	58	48	10	122	61	61

1 See Attachment 1, 2, and 3 for estimated internal trip capture for AM, PM, and Daily respectively.
2 External vehicle trips entering or exiting the site
3 Pass-by for Quality Restaurant: 26% for PM Peak, and 44% for AM and daily. Pass-by for high turnover restaurant is 43% for all cases. These are for trips entering or existing the site (excludes all internal trips).
4 Non-pass-by trips are new and/or diverted trips entering or exiting the site (excludes all internal trips.

As shown in Table 3, the proposed site redevelopment is estimated to generate 1,587 daily, 72 AM and 155 PM peak hour trips to the areas surrounding the site. It is important to note that all trips noted above represent average weekday conditions and reflect the external (off-site) pass-by and non-pass-by trips.

Table 4 below identifies the change in trip generation "net new" conditions as a result of the land use and floor area increase associated with Phase 1.

Table 4
NET NEW Trip Generation [1]

		AM Peak			PM Peak		
Land Use	AWDT	Total	In	Out	Total	In	Out
EXISTING SITE [2]	1,270	48	36	12	118	68	50
FUTURE SITE [3]	1,587	72	56	16	155	83	72
NET NEW [4]	317	24	20	4	37	15	22

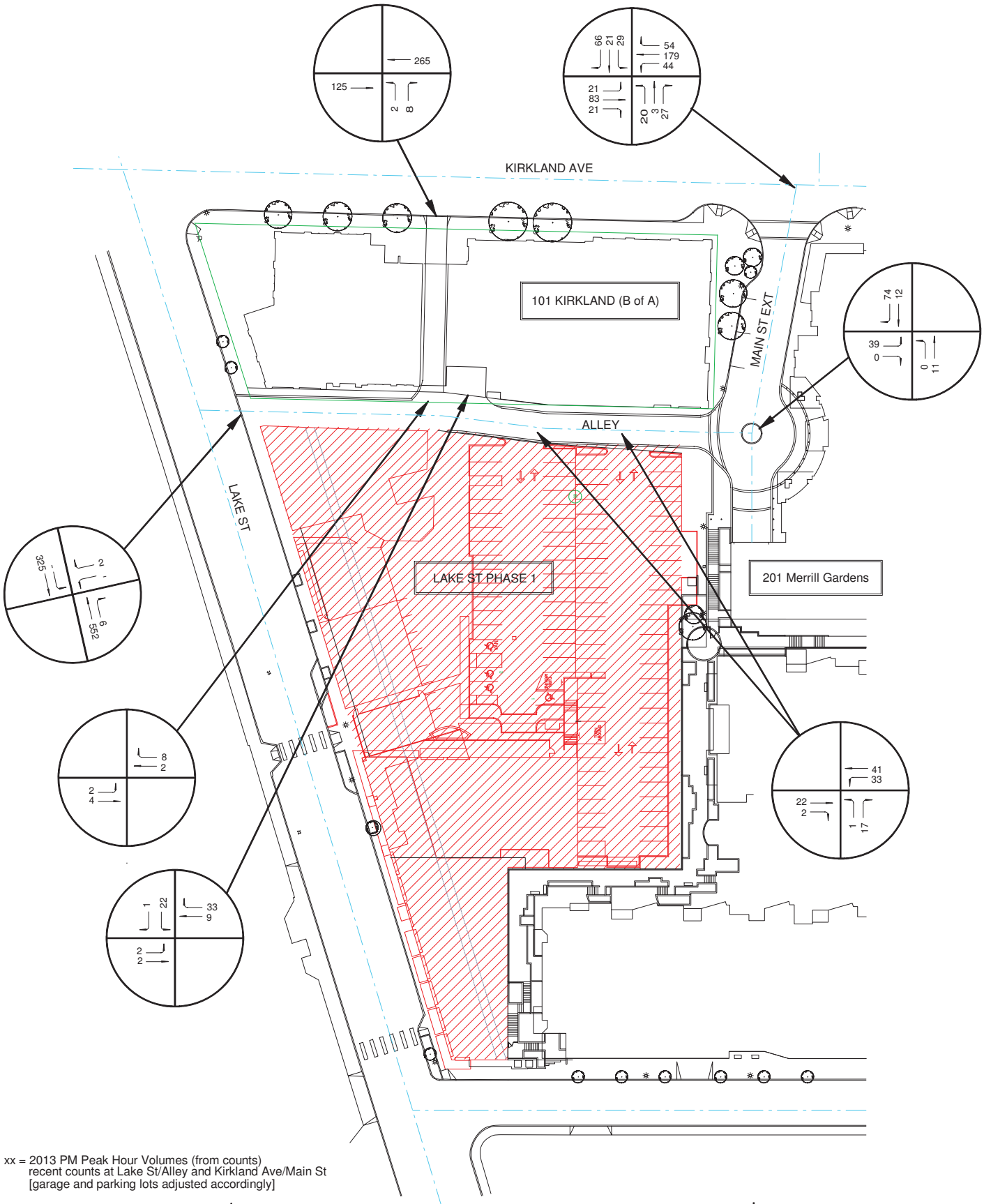
[3] External (trips entering or exiting the site) pass-by and non-pass-by trips, ie., excluding all internal trips (trip capture for mixed uses).
[2] Pass-by and non-pass-by external-trips-only for existing site (including some recently vacant or demo'd); see Table 2 for trip generation details.
[3] Pass-by and non-pass-by external-trips-only for future site (all uses); see Table 3 for trip generation details.
[4] Net New = project external pass-by and non-pass-by trips minus the existing external pass-by and non-pass-by trips.

As shown in Table 4, the trip generation totals predict that the site redevelopment's net new vehicular trip impact on the areas surrounding the site (pass-by and non-pass-by) will result in an increase of 317 daily trips, 24 AM peak hour trips and 37 PM peak hour trips.

Traffic Volumes with Phase 1

The net new trips as identified in Table 4 for the PM peak period were added to the existing volumes shown in Figure 2. The additional traffic associated with the Phase 1 project expansion of the KWM building results in 15 new trips entering and 22 trips exiting the Lake St parking lot. The estimated total volumes with Phase 1 are shown in Figure 3.

A summary of the alley volumes for the PM peak hour are shown in Table 5.



xx = 2013 PM Peak Hour Volumes (from counts)
recent counts at Lake St/Alley and Kirkland Ave/Main St
[garage and parking lots adjusted accordingly]

WILLIAM POPP ASSOCIATES

14400 Bel-Red Rd #206
Bellevue, WA 98007
425.401.1030
info@wmpoppassoc.com

EXISTING VOLUMES

Figure 2

Lake St Mixed Use
McLeod Development, Co.

Table 5
2013 PM Peak Hour Alley & Main St Extension Volumes [1]

Section	Existing Volume	Volume with Phase 1
Alley Section		
between Lake St and Bank Drive-thru	8	15
between Bank Drive-thru and 101 Kirkland Parking	14	21
between 101 Kirkland and Lake St Parking	66	73
between Lake St Parking and Main St Ext	113	143
Main St Extension		
between Alley and Kirkland Ave	136	166
between Alley and 201 Parking	23	23

[1] PM peak hour volumes; see Figure 2 and 3.

As shown in Table 5, the Phase 1 redevelopment of KWM as part of the Lake St project results in an additional 7 PM peak hour trips to/from the west to Lake St, and 30 additional PM peak hour trips to/from the northeast to Kirkland Ave.

Level-of-Service

Level-of-service (LOS) is a term defined by transportation and traffic engineers as a qualitative and quantitative measure of operational conditions within a traffic stream and the perception of these conditions by motorists and/or passengers. There are several quantitative indices utilized depending on the type of intersection control present. There are six levels-of-service that are given letter designations from "A" to "F", with "A" being the best, or minimum delay conditions, and "F" being the worst, with maximum delay or jammed conditions. LOS "C" or "D" is generally considered acceptable for planning and design purposes, while LOS "E" represents operating conditions at or near capacity with freedom to maneuver being extremely difficult.

Level-of-service for the existing condition as well as the existing plus Phase 1 condition was calculated using Trafficware's Synchro software. This software replicates the analytical procedures specified in the Highway Capacity Manual. Level-of-service for signalized and non-signalized intersections is quantified in terms of vehicular delay. Delay, measured in terms of time (seconds), also represents driver discomfort, frustration, excess fuel consumption and lost travel time.

The level of service analyses are shown below in Table 6.

Table 6
2013 Level of Service Results[a]

Intersection		2013 Weekday PM Peak Hour LOS	Delay	
2013 Existing Conditions [a]				
Lake St/Alley Access				Alley Driveway Stop Control
	WB	B	12.8	Westbound Right
Kirkland Ave/Main St				Side Street Stop Control
	NB	B	12.1	Northbound (all)
	SB	B	12.6	Southbound (all)
	Overall	A	4.7	Overall (all approaches)
2013 with Phase 1 [b]				
Lake St/Alley Access				Alley Driveway Stop Control
	WB	B	12.9	Westbound Right
Kirkland Ave/Main St				Side Street Stop Control
	NB	B	12.3	Northbound (all)
	SB	B	13.0	Southbound (all)
	Overall	A	5.1	Overall (all approaches)

a based on Feb-2013 PM Peak period counts (attached)
b with addition of Phase 1 traffic. See Table 4.

As shown in Table 6, both of the site area 'terminal' intersections operate at satisfactory levels of service and are estimated to continue to operate at satisfactory levels with the addition of the Phase 1 project traffic.

Parking

The current total parking supply for the Lake St site is 65 stalls. According to City Code KZC 50.60.3.a, *Special Parking Provisions in CBD 1, 2 and 8 Zones*, the Phase 1 project is required to provide parking per code for only the new building area less any credit for buildings removed. The site is located in Zone 1B.

The total parking required for the 16,1833 gsf addition to the KWM building would be 57 stalls. The allowable credit for Calabria building removed is 38 stalls. Thus, the total new stalls required, as part of the Phase 1 project is 20 additional new stalls. There are currently 65 stalls on site; hence the new total required number of stalls with Phase 1 is 85 stalls. The project is providing 85 stalls.

It is anticipated that some of the patrons (parking demand) to the Lake St site will likely utilize on-street parking where practical.

It should be noted that a one-day parking count was conducted on Wednesday 5/16/12 during the PM peak period. The peak parking demand was observed to be 50 vehicles; the supply at the time of the count was 68 stalls. The observed demand was found to be approximately one-half of what the estimated peak demand would be per ITE and City code parking rates. Based on that, it is estimated that the parking demand for the redevelopment should be adequate for the Phase 1 expansion.

Pedestrian Access/Safety

The pedestrian facilities in the area surrounding the project are very suitable to pedestrian activity. All of the roadways have relatively large sidewalks on both sides and there are pedestrian crosswalks at all signalized intersections. The Kirkland Ave/Main St intersection is a NB-SB side street stop controlled intersection however there are crosswalks on all legs. The alley driveway to Lake St is a typical concrete sidewalk driveway opening.

The pedestrian counts on Lake Street across the alley driveway were observed to be 33 pedestrians during the PM peak hour. This volume is expected to be higher in warmer months. The alley volume during the PM peak hour is only 8 vehicles: 6 vehicles entering and 2 vehicles exiting. The PM peak hour volume with the Phase 1 development is estimated to increase this volume to 15 vehicles: 9 entering and 6 exiting. The sight lines at the south corner of the alley to Lake St is somewhat obstructed by the existing Hector's building. However, given that the estimated traffic volumes on the alley are notably low, in particular the exiting volume, it is assumed that the vehicular-pedestrian conflict safety will not be significantly compromised with the extra traffic associated with Phase 1. The alley itself between Lake St and the Main St extension is not well suited for pedestrian activity.

The predominant ingress/egress to the Lake St as well as 101 Kirkland and 201 Merrill Gardens will be from the Kirkland Ave/Main St intersection using the Main St extension leg (south leg). The Main St extension has large sidewalks on both sides, and there is a pedestrian crosswalk on the south leg. All of which was recently constructed and is very well designed for safe pedestrian use.

I believe that this analysis should address your needs pertaining to the trip generation adjustments for the subject project. Please call me at (425) 401-2124 if you have any questions.

cc: Eric DeGroot
Chesmore/Buck Architecture

Rick Chesmore
Chesmore/Buck Architecture

Stuart McLeod
McLeod Development Co.

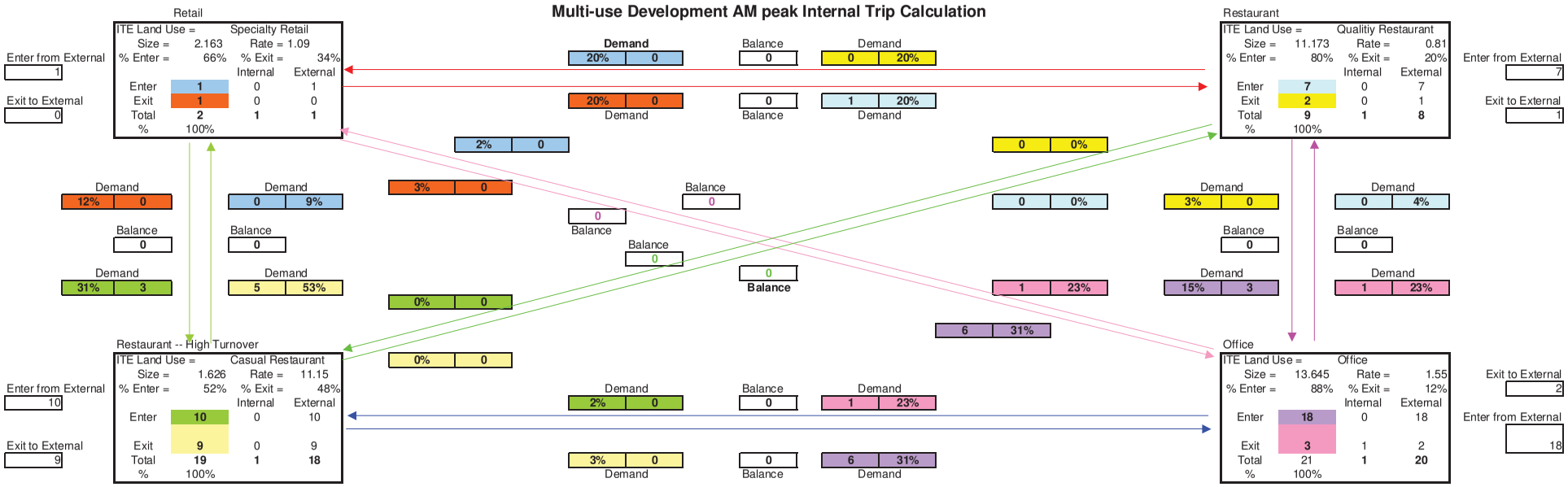
Attachments –

1-6	Internal Capture Estimate – Existing & Proposed Site for AM, PM, and Daily
7	Parking Calcs for Phase 1 per KZC 50.60.3.a
8	Lake St/Alley Traffic Count
9	Kirkland Ave/Main St Traffic Count
10-13	PM Peak Hour Level of Service Results (2 intersections, 2 cases)

EXISTING SITE (without Lakeside or Calabria)
AM PEAK HOUR AVERAGE WEEKDAY VOLUMES

	gkfa	am rates rate		Gross AM TE's
710 Office	13.645	1.55	per gkfa	21
814 Retail	2.163	1.09	per gkfa	2
931 Quality Re	11.173	0.81	per gkfa	9
932 High Turn	1.626	11.15	per gkfa	19
	28.607			51

Multi-use Development AM peak Internal Trip Calculation



External Trips

	Specialty Retail	Casual Restaurant	Qualitiy Restaurant	Office	Sub-Total
External Enter	1	10	7	18	36
External Exit	0	9	1	2	12
Total External Trips	1	19	8	20	48
Internal Trips	1	0	1	1	3
Gross Trips	2	19	9	21	51
Overall Average Internal Capture Rate	50%	0%	11%	5%	6%
Pass-by Rate	0%	43%	44%	0%	
Pass-by Trips	0	8	4	0	12
non-pass-by	1	11	4	20	36

Source: 2001 ITE Trip Generation Handbook Methodology
Data Source: 7th Edition Trip Generation Report

	IN	OUT	TOTAL
Specialty Retail	1	0	1
Quality Restaurant (total)	7	1	8
Quality Restaurant (pass-by)	3	1	4
Quality Restaurant (non-pass-by)	4	0	4
High Turnover Restaurant	10	9	19
High Turnover Restaurant (pass-by)	*4*	*4*	*8*
High Turnover Restaurant (non-pass-by)	*6*	*5*	*11*
Office	18	2	20
Total External (non-pass-by only)	29	7	36
Total External (non- and pass-by)	36	12	48

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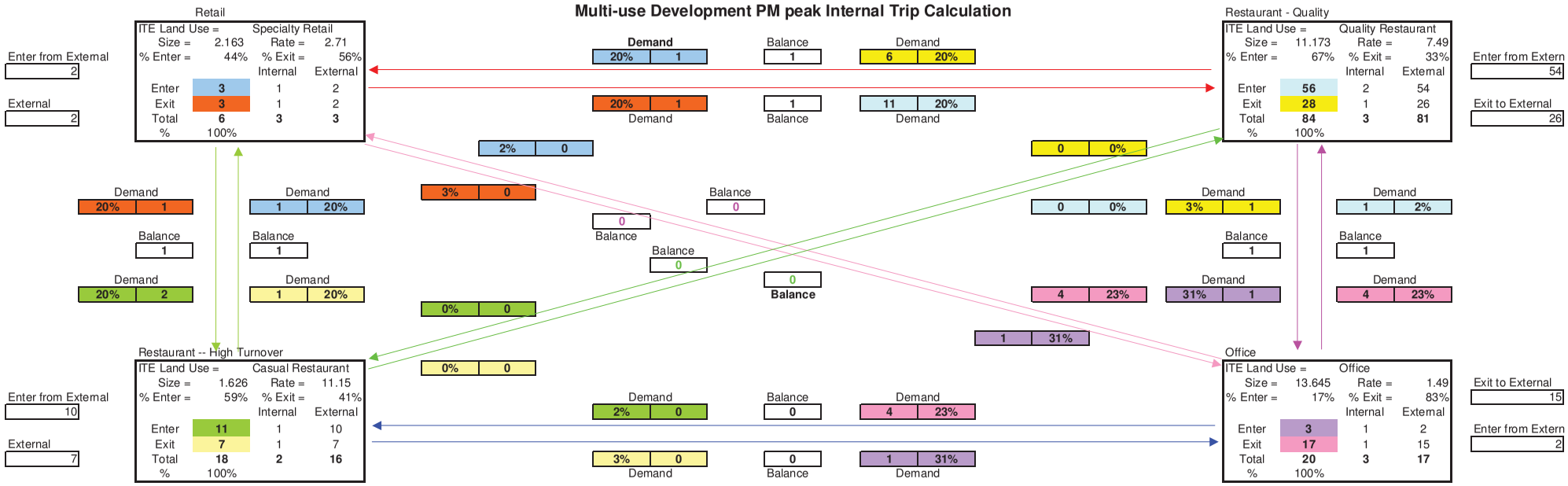
EXISTING SITE (without Lakeside or Calabria)
PROJECT PM PEAK HOUR (AVERAGE WEEKDAY)

	gkfa	PM rate		Gross PM TE's
710 Office	13.645	1.49	per gkfa	20
814 Retail	2.163	2.71	per gkfa	6
931 Quality Re	11.173	7.49	per gkfa	84
932 High Turnc	1.626	11.15	per gkfa	18
	28.607			128

Multi-use Development PM peak Internal Trip Calculation



External Trips

	Specialty Retail	Casual Restaura	Quality Restaura	Office	Sub-Total
External Enter	2	10	54	2	68
External Exit	2	7	26	15	50
Total External Trips	4	17	80	17	118
Internal Trips	2	1	4	3	10
Gross Trips	6	18	84	20	128
Overall Average Internal Capture Rate	33%	6%	5%	15%	8%
Pass-by Rate	0%	37%	26%	0%	
Pass-by Trips	0	6	21	0	27
non-pass-by	4	11	59	17	91

Source: 2001 ITE Trip Generation Handbook Methodology
Data Source: 8th Edition Trip Generation Report

	IN	OUT	TOTAL
Specialty Retail	2	2	4
Quality Restaurant (total)	54	26	80
Quality Restaurant (pass-by)	*15*	*7*	*22*
Quality Restaurant (non-pass-by)	*39*	*19*	*58*
High Turnover Restaurant	10	7	17
High Turnover Restaurant (pass-by)	*4*	*3*	*7*
High Turnover Restaurant (non-pass-by)	*6*	*4*	*10*
Office	2	15	17
Total External (non-pass-by only)	49	40	89
Total External (non- and pass-by)	68	50	118

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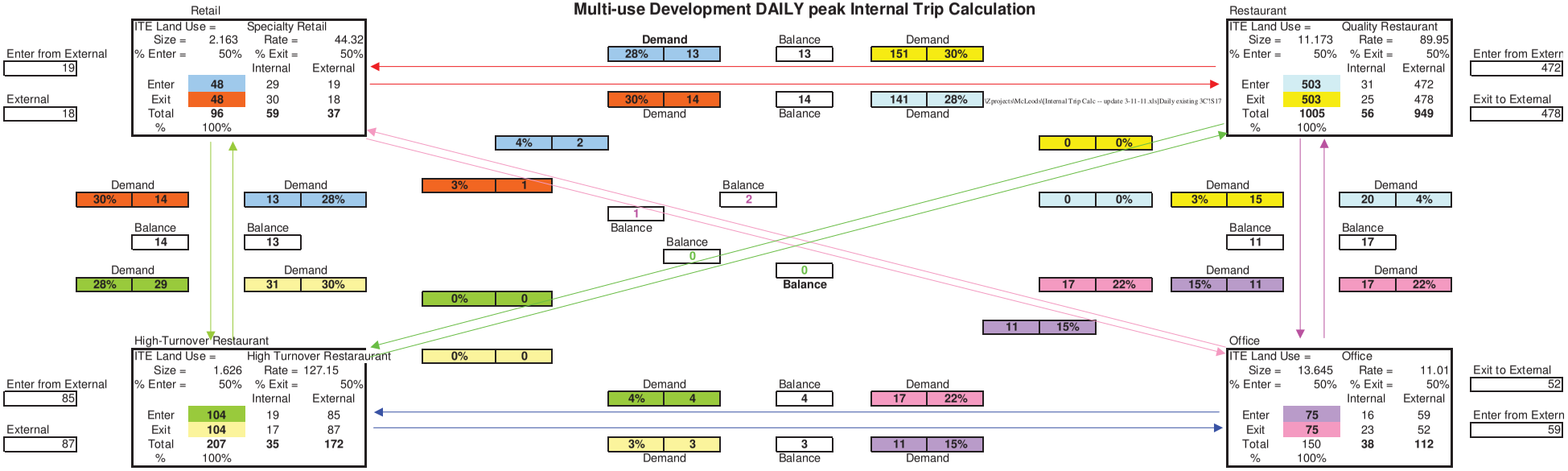
APPLICANT TIA

EXISTING SITE (without Lakeside or Calabria)
PROJECT DAILY VOLUME ESTIMATE (AVERAGE WEEKDAY)

	gkfa	daily rate		Gross Daily TE's
710 Office	13.645	11.01	per gkfa	150
814 Retail	2.163	44.32	per gkfa	96
931 Quality Re	11.173	89.95	per gkfa	1005
932 High Turn	1.626	127.15	per gkfa	207
	28.607			1458

Multi-use Development DAILY peak Internal Trip Calculation



External Trips

	Specialty Retail	High Turnover	Quality Restaurant	Office	Sub-Total
External Enter	19	85	472	59	**635**
External Exit	18	87	478	52	**635**
Total External Trips	**37**	**172**	**949**	**112**	**1270**
Internal Trips	**59**	**35**	**56**	**38**	**188**
Gross Trips	**96**	**207**	**1005**	**150**	**1458**
Overall Average Internal Capture Rate					13%
Pass-by Rate	0%	43%	44%	0%	
Pass-by Trips	0	73	420	0	493
non-pass-by	**37**	**99**	**529**	**112**	**777**

Source: 2001 ITE Trip Generation Handbook Methodology
Data Source: 7th Edition Trip Generation Report

	IN	OUT	TOTAL
Specialty Retail	19	18	37
Quality Restaurant (total)	472	478	949
Quality Restaurant (pass-by)	*209*	*211*	*420*
Quality Restaurant (non-pass-by)	*263*	*267*	*529*
High Turnover Restaurant	85	87	172
High Turnover Restaurant (pass-by)	*36*	*37*	*73*
High Turnover Restaurant (non-pass-by)	*49*	*50*	*99*
Office	59	52	112
Total External (non-pass-by only)	390	387	777
Total External (non- and pass-by)	635	635	1270

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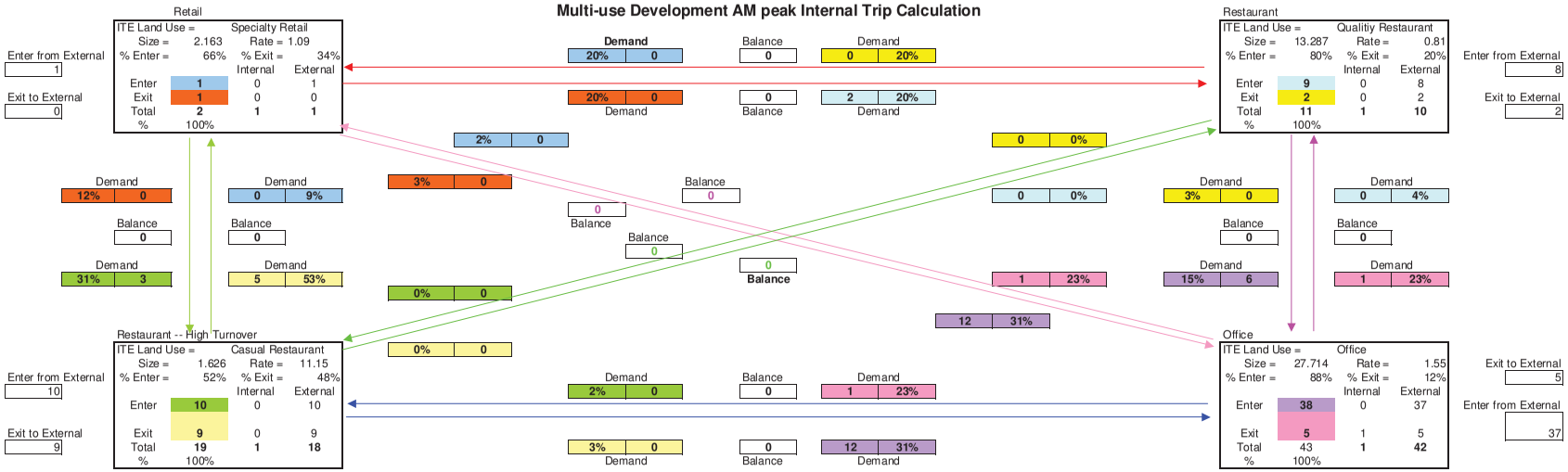
APPLICANT TIA

PHASE 1 TOTAL FUTURE SITE
PROJECT AM PEAK HOUR (AVERAGE WEEKDAY)

	gkfa	am rates rate		Gross AM TE's
710 Office	27.714	1.55	per gkfa	43
814 Retail	2.163	1.09	per gkfa	2
931 Quality R	13.287	0.81	per gkfa	11
932 High Turn	1.626	11.15	per gkfa	19
	44.790			75

Multi-use Development AM peak Internal Trip Calculation



External Trips

	Specialty Retail	Casual Restaurant	Qualitiy Restaurant	Office	Sub-Total
External Enter	1	10	8	37	**56**
External Exit	0	9	2	5	**16**
Total External Trips	**1**	**19**	**10**	**42**	**72**
Internal Trips	**1**	**0**	**1**	**1**	**3**
Gross Trips	**2**	**19**	**11**	**43**	**75**
Overall Average Internal Capture Rate	50%	0%	9%	2%	4%
Pass-by Rate	0%	43%	44%	0%	
Pass-by Trips	0	8	4	0	13
non-pass-by	1	11	6	42	59

Source: 2001 ITE Trip Generation Handbook Methodology
Data Source: 7th Edition Trip Generation Report

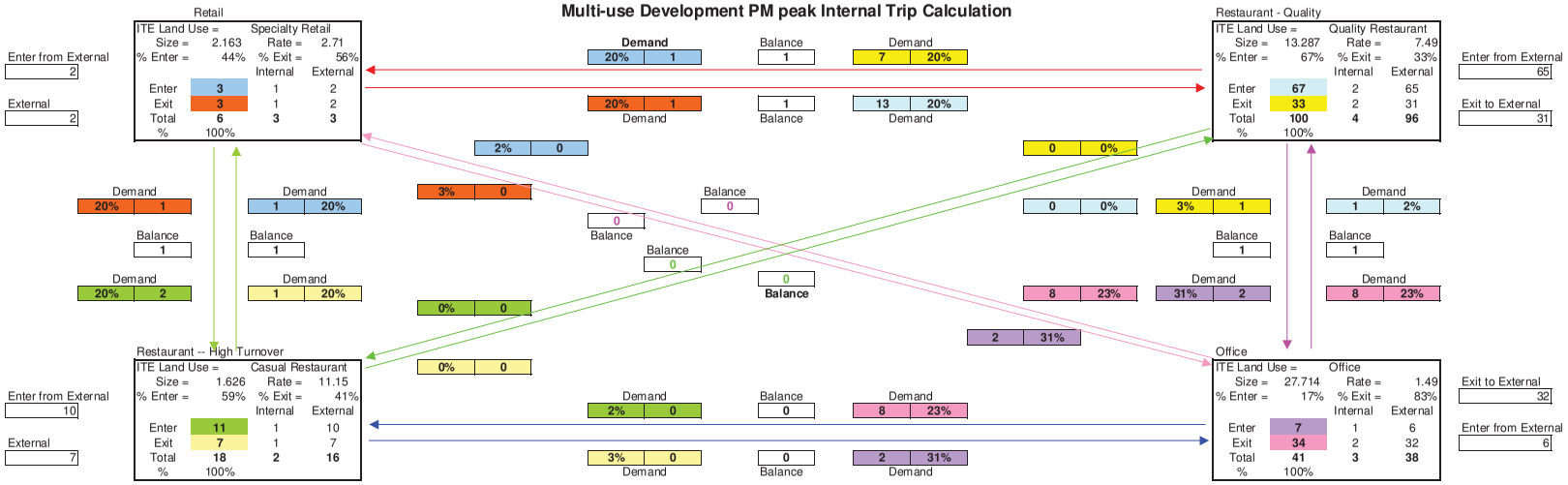
		IN	OUT	TOTAL
Specialty Retail		1	0	1
Quality Restaurant (total)		8	2	10
Quality Restaurant (pass-by)		4	2	6
Quality Restaurant (non-pass-by)		4	0	4
High Turnover Restaurant		10	9	19
High Turnover Restaurant (pass-by)		*4*	*4*	*8*
High Turnover Restaurant (non-pass-by)		*6*	*5*	*11*
Office		37	5	42
Total External (non-pass-by only)		48	10	58
Total External (non- and pass-by)		56	16	72
estimate 15% use on-street public or other public pkg areas	0.15	8.4	2.4	
rounded>		8	2	
total to/from project garage>		48	14	
estimate 20% to/from alley west of dvwy >	0.2	10	3	
trips to/from alley east of dvwy >		38	11	

ATTACHMENT 8
SEP13-00959
APPLICANT TIA

PHASE 1 TOTAL FUTURE SITE
PROJECT PM PEAK HOUR (AVERAGE WEEKDAY)

	gkfa	PM rate		Gross PM TE's
710 Office	27.714	1.49	per gkfa	41
814 Retail	2.163	2.71	per gkfa	6
931 Quality Re	13.287	7.49	per gkfa	100
932 High Turn	1.626	11.15	per gkfa	18
	44.790			165

Multi-use Development PM peak Internal Trip Calculation



External Trips

	Specialty Retail	Casual Restaura	Quality Restaura	Office	Sub-Total
External Enter	2	10	65	6	83
External Exit	2	7	31	32	72
Total External Trips	4	17	96	38	155
Internal Trips	2	1	4	3	10
Gross Trips	6	18	100	41	165
Overall Average Internal Capture Rate	33%	6%	4%	7%	6%
Pass-by Rate	0%	37%	26%	0%	
Pass-by Trips	0	6	25	0	31
non-pass-by	4	11	71	38	124

Source: 2001 ITE Trip Generation Handbook Methodology
Data Source: 8th Edition Trip Generation Report

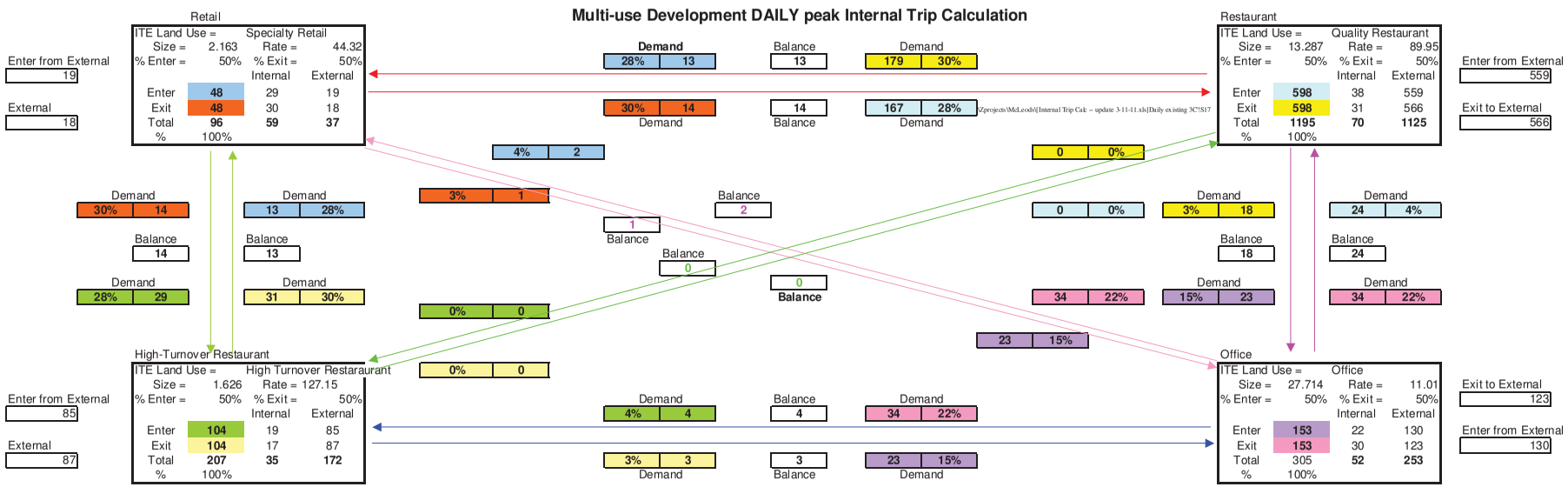
	IN	OUT	TOTAL
Specialty Retail	2	2	4
Quality Restaurant (total)	65	31	96
Quality Restaurant (pass-by)	*18*	*8*	*26*
Quality Restaurant (non-pass-by)	*47*	*23*	*70*
High Turnover Restaurant	10	7	17
High Turnover Restaurant (pass-by)	*4*	*3*	*7*
High Turnover Restaurant (non-pass-by)	*6*	*4*	*10*
Office	6	32	38
Total External (non-pass-by only)	61	61	122
Total External (non- and pass-by)	83	72	155

estimate 15% use on-street public or other public pkg areas	0.15	12.45	10.8
rounded>		12	11
total to/from project garage>		71	61
estimate 20% to/from alley west of dvwy >	0.2	14	12
trips to/from alley east of dvwy >		57	49

ATTACHMENT 8
SEP13-00959
APPLICANT TIA

PHASE 1 TOTAL FUTURE SITE
PROJECT DAILY VOLUME ESTIMATE (AVERAGE WEEKDAY)

	gkfa	daily rate		Gross Daily TE's
710 Office	27.714	11.01	per gkfa	305
814 Retail	2.163	44.32	per gkfa	96
931 Quality Re	13.287	89.95	per gkfa	1195
932 High Turn	1.626	127.15	per gkfa	207
	44.790			1803



External Trips

	Specialty Retail	High Turnover	Quality Restaurant	Office	Sub-Total
External Enter	19	85	559	130	**793**
External Exit	18	87	566	123	**793**
Total External Trips	**37**	**172**	**1125**	**253**	**1587**
Internal Trips	**59**	**35**	**70**	**52**	**216**
Gross Trips	**96**	**207**	**1195**	**305**	**1803**
Overall Average Internal Capture Rate	62%	17%	6%	17%	12%
Pass-by Rate	0%	43%	44%	0%	
Pass-by Trips	0	73	498	0	571
non-pass-by	**37**	**99**	**627**	**253**	**1016**

Source: 2001 ITE Trip Generation Handbook Methodology
Data Source: 7th Edition Trip Generation Report

		IN	OUT	TOTAL
Specialty Retail		19	18	37
Quality Restaurant (total)		559	566	1125
Quality Restaurant (pass-by)		*248*	*251*	*499*
Quality Restaurant (non-pass-by)		*311*	*315*	*626*
High Turnover Restaurant		85	87	172
High Turnover Restaurant (pass-by)		*36*	*37*	*73*
High Turnover Restaurant (non-pass-by)		*49*	*50*	*99*
Office		130	123	253
Total External (non-pass-by only)		509	505	1015
Total External (non- and pass-by)		793	793	1587
estimate 15% use on-street public or other public pkg areas	0.15	119	119	
rounded>		119	119	
total to/from project garage>		674	674	
estimate 20% to/from alley west of dvwy >	0.2	135	135	
trips to/from alley east of dvwy >		540	540	

ATTACHMENT 8
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APPLICANT TIA

LSP - Phase I - KWM New Area/Parking Analysis

2/26/2013

Building/Use	Gross Floor Area	Parking Ratio	Required Parking	Existing parking
Kirkland Waterfront Market 2009 Remodel				
Restaurant	1124	1/125	9	
Retail	0	1/350	0	
Office	784	1/350	2	
Subtotal	**1908**		**11**	
Kirkland Waterfront Market Addition				
Restaurant	990	1/125	8	
Retail	0	1/350	0	
Office	13285	1/350	38	
Subtotal	**14275**		**46**	
Total	**16183**		**57**	**65**

Summary By Use			
Restaurant	2114	1/125	17
Retail	0	1/350	0
Office	14069	1/350	40
Total	**16183**		**57**

Required Parking for New Gross Area	57	
Grandfathered (Demo) Credit	-38	(Calabria building)
Unoccupied Restaurant Space*	-2	
Required Parking	**18**	

New parking stalls	20	
Demolished parking stalls for KWM addition	-2	
Provided Parking	**18**	
	0	Surplus

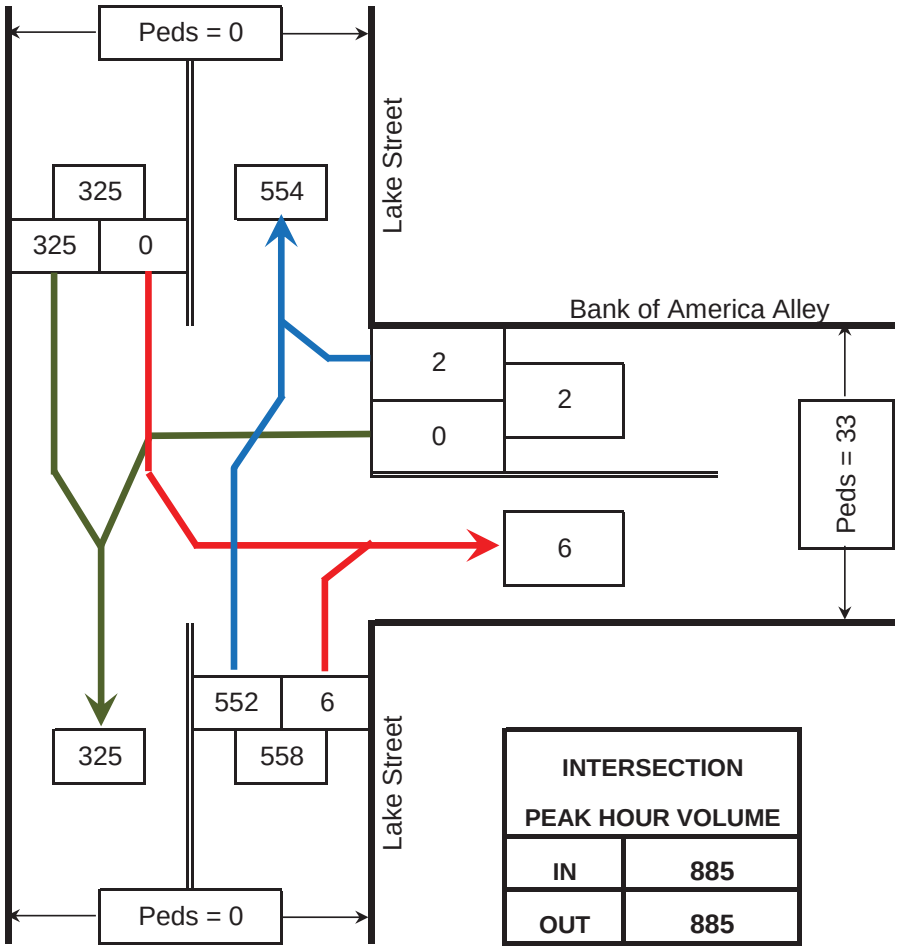
Total stalls on Site	
65	Existing
18	New
83.0	

* Restaurant space temporarily walled off (until Phase II is built) to reduce parking requirements (250sf @ 125sf/stall)
** Applicant reserves the right to share parking between uses on three (3) parcels as allowed by KZC 105.45.

TRAFFIC DATA GATHERING

TURNING MOVEMENTS DIAGRAM

4:00 PM - 6:00 PM PEAK HOUR: 4:00 PM TO 5:00 PM



	HV	PHF
SB	1%	0.84
NB	1%	0.87
WB	0%	0.25
INTRS.	1%	0.92

INTERSECTION PEAK HOUR VOLUME	
IN	885
OUT	885

HV = Heavy Vehicles
PHF = Peak Hour Factor

Lake Street @ Bank of America Alley

Kirkland, WA

COUNTED BY: RH

REDUCED BY: CN

REDUCTION DATE: Thu. 2/28/13

DATE OF COUNT: Wed. 2/27/13

TIME OF COUNT: 4:00 PM - 6:00 PM

WEATHER: Rainy

TRAFFIC DATA GATHERING

INTERSECTION TURNING MOVEMENTS REDUCTION SHEET

LOCATION: Lake Street @ Bank of America Alley
Kirkland, WA

DATE OF COUNT: Wed. 2/27/13
TIME OF COUNT: 4:00 PM - 6:00 PM

COUNTED BY: RH
WEATHER: Rainy

TIME INTERVAL ENDING AT	FROM NORTH ON Lake Street					FROM SOUTH ON Lake Street					FROM EAST ON Bank of America Alley					FROM WEST ON					INTERVAL TOTALS
	Peds	HV	Left	Thru	Right	Peds	HV	Left	Thru	Right	Peds	HV	Left	Thru	Right	Peds	HV	Left	Thru	Right	
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	70	0	0	3	0	135	1	10	0	0	0	0	0	0	0	0	0	206
04:30 PM	0	3	0	78	0	0	3	0	133	1	7	0	0	0	0	0	0	0	0	0	212
04:45 PM	0	1	0	80	0	0	1	0	157	3	10	0	0	0	0	0	0	0	0	0	240
05:00 PM	0	0	0	97	0	0	0	0	127	1	6	0	0	0	2	0	0	0	0	0	227
05:15 PM	0	0	0	66	0	0	1	0	109	1	12	0	0	0	5	0	0	0	0	0	181
05:30 PM	0	0	0	70	0	0	0	0	127	3	9	0	0	0	1	0	0	0	0	0	201
05:45 PM	0	0	0	69	0	0	0	0	115	3	12	0	0	0	1	0	0	0	0	0	188
06:00 PM	0	0	0	53	0	0	0	0	112	3	6	0	0	0	1	0	0	0	0	0	169
PEAK HOUR TOTALS	0	4	0	325	0	0	7	0	552	6	33	0	0	0	2	0	0	0	0	0	INTERSECTION
ALL MOVEMENTS	325					558					2					0					885
% HV	1%					1%					0%					#N/A					1%
PEAK HOUR FACTOR	0.84					0.87					0.25					#N/A					0.92

PHF = Peak Hour Factor

4:00 PM - 6:00 PM PEAK HOUR: 4:00 PM TO 5:00 PM

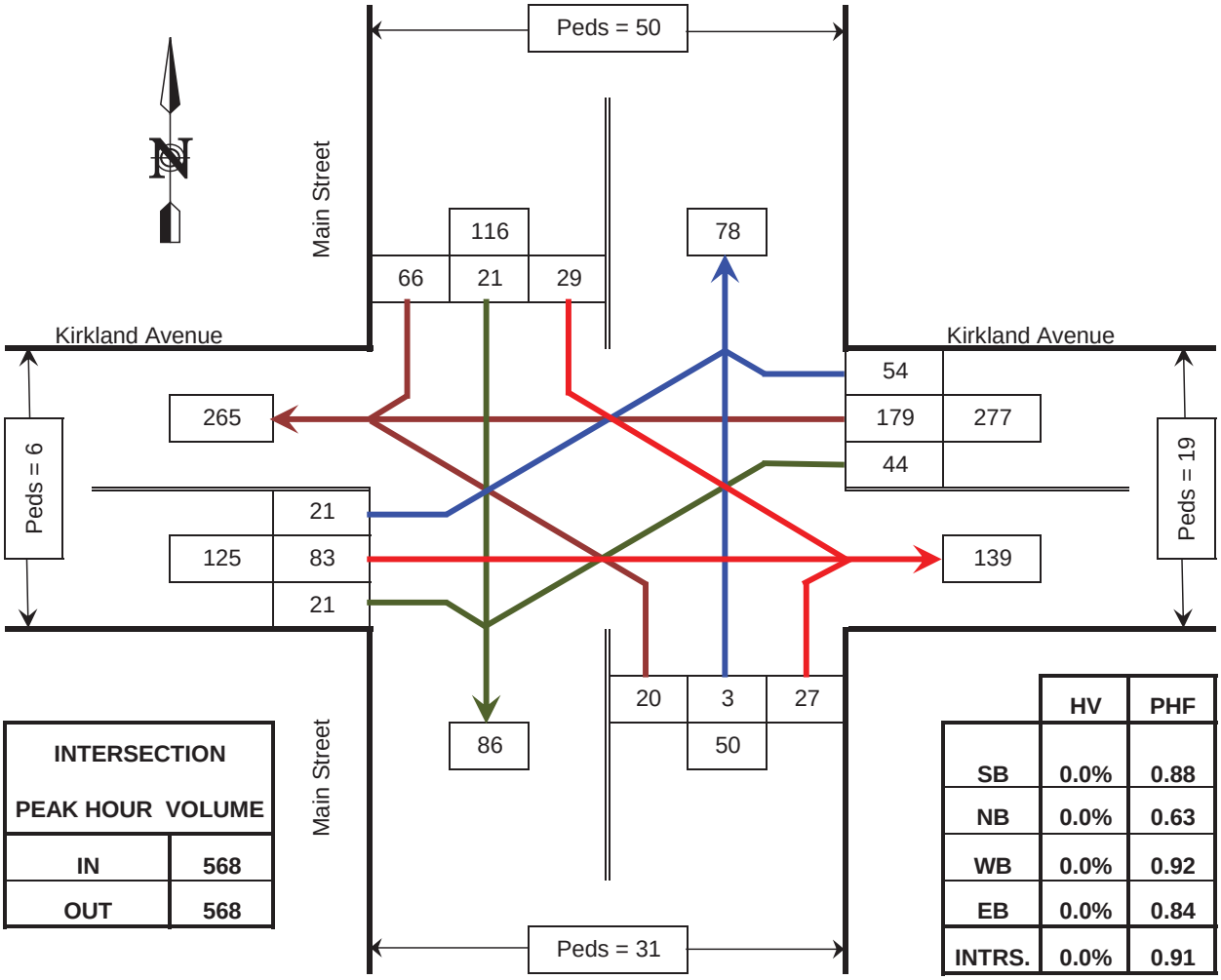
REDUCED BY: CN

DATE OF REDUCTION: 2/28/2013

TRAFFIC DATA GATHERING

TURNING MOVEMENTS DIAGRAM

4:00 PM - 6:00 PM PEAK HOUR: 4:45 PM TO 5:45 PM



INTERSECTION PEAK HOUR VOLUME	
IN	568
OUT	568

	HV	PHF
SB	0.0%	0.88
NB	0.0%	0.63
WB	0.0%	0.92
EB	0.0%	0.84
INTRS.	0.0%	0.91

PHF = Peak Hour Factor
HV = Heavy Vehicles

Main Street @ Kirkland Avenue

Kirkland, WA

COUNTED BY:	CN	DATE OF COUNT:	Wed. 2/27/13
REDUCED BY:	CN	TIME OF COUNT:	4:00 PM - 6:00 PM
REDUCTION DATE:	Wed. 2/27/13	WEATHER:	Rainy

TRAFFIC DATA GATHERING

INTERSECTION TURNING MOVEMENTS REDUCTION SHEET

LOCATION: Main Street @ Kirkland Avenue
Kirkland, WA

DATE OF COUNT: Wed. 2/27/13
TIME OF COUNT: 4:00 PM - 6:00 PM

COUNTED BY: CN
WEATHER: Rainy

TIME INTERVAL ENDING AT	FROM NORTH ON Main Street					FROM SOUTH ON Main Street					FROM EAST ON Kirkland Avenue					FROM WEST ON Kirkland Avenue					INTERVAL TOTALS HR
	Peds	HV	Left	Thru	Right	Peds	HV	Left	Thru	Right	Peds	HV	Left	Thru	Right	Peds	HV	Left	Thru	Right	
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	2	0	7	2	13	10	0	2	0	3	2	0	3	47	7	2	0	6	18	2	110
04:30 PM	7	0	6	0	16	12	0	4	0	6	4	0	7	46	15	0	1	3	18	2	123
04:45 PM	15	0	6	4	9	5	0	2	1	5	2	1	5	45	15	0	0	5	26	3	126
05:00 PM	9	0	6	9	18	4	0	5	1	5	7	0	12	42	18	2	0	0	16	3	135
05:15 PM	15	0	7	3	16	9	0	8	2	10	4	0	16	51	6	3	0	3	28	6	156
05:30 PM	18	0	6	4	15	9	0	1	0	7	2	0	7	38	12	1	0	9	17	7	123
05:45 PM	8	0	10	5	17	9	0	6	0	5	6	0	9	48	18	0	0	9	22	5	154
06:00 PM	14	0	4	3	16	11	0	0	0	13	1	1	15	40	16	2	0	2	15	5	129
PEAK HOUR TOTALS	50	0	29	21	66	31	0	20	3	27	19	0	44	179	54	6	0	21	83	21	INTERSECTION
ALL MOVEMENTS	116					50					277					125					568
% HV	0%					0%					0%					0%					0%
PEAK HOUR FACTOR	0.88					0.63					0.92					0.84					0.91

PHF = Peak Hour Factor

4:00 PM - 6:00 PM PEAK HOUR: 4:45 PM TO 5:45 PM

REDUCED BY: CN

DATE OF REDUCTION: 2/27/2013

HCM Unsignalized Intersection Capacity Analysis
1: alley & Lake St

3/5/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	2	552	6	0	325
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	2	613	7	0	361
Pedestrians	33					
Lane Width (ft)	10.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	2					
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1011	650			653	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1011	650			653	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	262	462			922	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	2	620	361
Volume Left	0	0	0
Volume Right	2	7	0
cSH	462	1700	1700
Volume to Capacity	0.00	0.36	0.21
Queue Length 95th (ft)	0	0	0
Control Delay (s)	12.8	0.0	0.0
Lane LOS	B		
Approach Delay (s)	12.8	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
1: alley & Lake St

3/5/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	6	552	9	0	325
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	7	613	10	0	361
Pedestrians	33					
Lane Width (ft)	10.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	2					
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1012	651			656	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1012	651			656	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	261	461			919	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	7	623	361
Volume Left	0	0	0
Volume Right	7	10	0
cSH	461	1700	1700
Volume to Capacity	0.01	0.37	0.21
Queue Length 95th (ft)	1	0	0
Control Delay (s)	12.9	0.0	0.0
Lane LOS	B		
Approach Delay (s)	12.9	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	47.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
13: Kirkland Ave & Main St

3/5/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	21	83	21	44	179	54	20	3	27	29	21	66
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	23	92	23	49	199	60	22	3	30	32	23	73
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	259			116			562	507	104	509	489	229
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	259			116			562	507	104	509	489	229
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			97			94	99	97	93	95	91
cM capacity (veh/h)	1317			1486			371	448	956	443	458	815

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	139	308	56	129
Volume Left	23	49	22	32
Volume Right	23	60	30	73
cSH	1317	1486	563	603
Volume to Capacity	0.02	0.03	0.10	0.21
Queue Length 95th (ft)	1	3	8	20
Control Delay (s)	1.4	1.4	12.1	12.6
Lane LOS	A	A	B	B
Approach Delay (s)	1.4	1.4	12.1	12.6
Approach LOS			B	B

Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	41.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
13: Kirkland Ave & Main St

3/5/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	21	83	21	54	179	54	23	6	39	29	23	66
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	23	92	23	60	199	60	26	7	43	32	26	73
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	259			116			586	529	104	546	511	229
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	259			116			586	529	104	546	511	229
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			96			93	98	95	92	94	91
cM capacity (veh/h)	1317			1486			354	431	956	407	442	815

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	139	319	76	131
Volume Left	23	60	26	32
Volume Right	23	60	43	73
cSH	1317	1486	568	578
Volume to Capacity	0.02	0.04	0.13	0.23
Queue Length 95th (ft)	1	3	11	22
Control Delay (s)	1.4	1.7	12.3	13.0
Lane LOS	A	A	B	B
Approach Delay (s)	1.4	1.7	12.3	13.0
Approach LOS			B	B

Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	43.6%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX B

TECHNICAL APPENDIX
for
Lake St Mixed Use Development

Daily Traffic Count Summaries
AM Peak Hour Counts
PM Peak Hour Counts

CITY OF KIRKLAND

TRAFFIC COUNT SUMMARY - - Average Daily Traffic in both directions

6/22/2012

	LOCATION	TERMINI	2011	2009	2007	2005	2002	2001	2000	1999	1998
1	CENTRAL WAY	E OF LAKE ST	13559	15899	15814	15679	16851	17055	18050	17796	16427
2	CENTRAL WAY	W OF LAKE ST	19361	17730	19704	19559	20880	19525	19419	19819	18414
3	CENTRAL WAY	E OF 3RD ST	20236	20361	21515	18797	21675	21269	21186	19676	20051
4	CENTRAL WAY	E OF 6TH ST	26032	25152	27753	27297	29476	30214	28988	29205	28696
5	CARRILLON PT.	W OF LK. WASH. BLVD.	5070	5947	5506	6741	6216	6538	6348	7433	7009
6	PARK PLACE	S OF CENTRAL WAY	3241	1733	5043	5635	8487	5919	3571		
7	PARK LANE	E OF LAKE ST	1335	1408	1540	1284	1682	1289	1381	1821	1713
8	FORBES CR DR	E OF MARKET ST	1700	1773	1997	1936	1755	2321	2048	2134	2128
9	HOLMES POINT DR	W OF JUANITA DR	1684								
10	JUANITA DR	N OF NE 145TH ST	12405								
11	JUANITA DR	S OF NE 145TH ST	11865								
12	JUANITA DR	N OF NE 141ST ST	10093								
13	JUANITA DR	N OF NE 132ND ST	10777								
14	JUANITA DR	N OF NE 122ND /76TH PL	10388								
15	JUANITA DR	S OF NE 122ND /76TH PL	14516								
16	JUANITA DR	W OF 93RD AVE NE	16599	16234	17434	18064	16666	11845	17776	17595	18040
17	JUANITA DR	W OF 98TH AVE NE	16722	17298	17784	17890	16207	14316	17290	17400	16844
18	JUANITA-WOODINVILLE RD	N OF NE 145TH ST	20170								
19	JUANITA-WOODINVILLE RD	S OF NE 145TH ST	11113								
20	JUANITA-WOODINVILLE RD	SW OF 108TH AVE NE	8923								
21	JUANITA-WOODINVILLE RD	NE OF 100TH AVE NE	9469								
22	KIRKLAND AVE	E OF LAKE ST	6610	4099	4591	4605	5679	5204	5130	5183	4916
23	KIRKLAND AVE.	W OF 6TH	1257	1319	1640	1324	1503	1607	2149	1868	1973
24	KIRKLAND WAY	S OF CENTRAL	11177	8264	8593	8736	8788	7884	7956	7726	7627
25	KIRKLAND WAY	E OF 6TH ST	7142	5072	5626	5042	5048	5263	5220	5183	5040
26	KIRKLAND WAY	W OF 6TH ST	9016	6126	6495	5991	6422	6576	6835	6651	6691
27	LAKE ST	S OF CENTRAL WAY	17457	13185	13738	13997	13717	13371	13291	13037	12610
28	LAKE ST	N OF LAKEVIEW DR	13247	12473	13802	16447	14183	14859	15081	14649	14340
29	LAKE (WA. BLVD.)	S OF LAKEVIEW DR	21116	19859	21776	22699	22934	23259	23699	23759	23106
30	LAKE (WA. BLVD.)	N OF NE 38TH PL	24451	22108	23149	23423	24188	24783	24930	24965	24067
31	LAKE (WA. BLVD.)	S OF NE 38TH PL	21700	25952	25330	24477	24464	27216	26350	26089	25913
32	LAKEVIEW DR	N OF LAKE WA. BLVD	8370	8217	9420	8746	8576	8406	8380	8344	8587
33	MAIN ST	S OF CENTRAL WAY	4147	1957	1887	1786	2188	2400	1864		
34	MARKET ST	S OF FORBES CR DR	19127	18887	20682	20808	19804	20139	23414	22771	20384
35	MARKET ST	N OF 7TH AVE	18165	17064	20347	18998	18903	19104	18703	22027	19716
36	SIMONDS RD	W OF 100TH AVE NE	17023								
37	SIMONDS RD	N OF NE 145TH ST ST	12347								
38	SLATER AVE	N OF NE 116TH ST	14656	15636	15197	16221	12578	9808	11001	10619	10259
39	SLATER AVE NE	N OF NE 124TH ST	14309	17244	15864	16587	13025	11734	14369	12482	10701
40	SLATER AVE NE	S OF NE 124TH ST	14113	16257	15096	16426	12186	10748	11638	11136	10380
41	SLATER AVE NE	S OF NE 132ND ST	12629	13711	13514	13409	11238	9784	11558	10383	9319
42	STATE ST	S OF KIRKLAND AVE	8152	8112	7956	8755	9052	9016	9110	8910	8329
43	STATE ST	N OF NE 68TH ST	7935	7769	8219	8006	8422	8290	8566	8223	7905
44	TOTEM LAKE BLVD	W OF 120TH AVE NE	10611	10715	10323	9986	10675	11269	10834	10752	10179
45	TOTEM LAKE BLVD	N OF 124TH AVE NE	16799	17776	19339	20980	22451	22671	21438	22191	21272
46	TOTEM LAKE BLVD	N OF NE 132ND ST	4535	5247	5551	5344	6080	5999	6845	6730	6644
47	TOTEM LAKE BLVD	S OF NE 132ND ST	8291	8092	8189	9443	10014	10661	10317	10133	9600
48	2ND PLACE	N OF CENTRAL WAY		944	1320	4022	1028	1144			

ATTACHMENT 8
SEP13-00959
APPLICANT TIA

CITY OF KIRKLAND

TRAFFIC COUNT SUMMARY - - Average Daily Traffic in both directions

6/22/2012

	LOCATION	TERMINI	2011	2009	2007	2005	2002	2001	2000	1999	1998
49	3RD ST	N OF CENTRAL WAY	5772	4876	5242	5763	5566	5660	5450	5667	5201
50	3RD ST	S OF CENTRAL WAY	10832		7679	10058	10470	10277	9480	9241	8484
51	3RD ST	N OF 7TH AVE	2928	2720	2916	2949	2817	3164	2950	3163	2900
52	4TH AVE	E OF 6TH ST	5285	461	5667	8756	6152	7049	6419	6395	
53	6TH ST	N OF CENTRAL WAY	8347	9396	8447	8745	7468	8929	8864	7961	7883
54	6TH ST	S OF CENTRAL WAY	12002	8547	12772	12394	12538	12051	12441	12023	12568
55	6TH ST	S OF KIRKLAND WAY	12305	7807	7517	7942	7974	8219	8112	8103	7873
56	6TH ST	N OF 7TH AVE	4428	4870	5602	5003	4420	5455	5495	5550	5182
57	6TH ST S	N OF NE 68TH ST	10858	10279	10637	11101	11087	11221	11332	10523	10988
58	7TH AVE	E OF MARKET ST		2102	2479	3057	2458	2677	2672	2529	2228
59	7TH AVE W	W OF MARKET ST		575	539	402	627	611	747	619	685
60	7TH AVE	E OF 4TH ST	3784	3439	3183	3467	3223	3512	3327	3514	3251
61	7TH AVE	W OF 8TH ST				4044					
62	7TH AVE	E OF RAILROAD X-ING		4913	5603	5049	5371	5465	5487	6054	5242
63	15TH AVE	E OF MARKET ST		761	1043	976	801	982	971	905	953
64	NE 38TH PL	E OF LAKE WASH BLVD	3283	3154	4158	3609	3310	3460	3948	3837	3642
65	NE 52ND ST	E OF LAKE WASH BLVD		580		693	734	762	774	809	649
66	NE 52ND ST	W OF 108TH AVE NE		732	835	725	835	969	889	835	815
67	NE 53RD ST	W OF 108TH AVE NE		423	360	386		523	523	416	334
68	NE 53RD ST	E OF 108TH AVE NE		2309	3021	2605	2906	2908	2843	2742	2592
69	NE 60TH ST	E OF 108TH AVE NE		795	1778	2144	983	1074	923	1313	1030
70	NE 60TH ST	W OF 108TH AVE NE		797	953	915	871	854	839	826	860
71	NE 60TH ST	E OF 111TH AVE NE		733	1014	1167	1310	948	980	861	985
72	NE 60TH ST	W OF 111TH AVE NE		598	1449	1848	1063	958	1003	1110	1318
73	NE 60TH ST	E OF 116TH AVE NE		3196	3618	3518	3268	3492	3422	4748	3074
74	NE 60TH ST	W OF 132ND AVE NE		2891	3001	2944	2876	2987	2871	3039	3076
75	NE 65TH ST	E OF 111TH AVE NE		960	1299	1048	990	1174	1139	882	494
76	NE 65TH ST	W OF 111TH AVE NE		478	516	1243	1423	1344	1546	1231	1179
77	NE 68TH ST	E OF STATE ST	11392	9844	10971	10951	11107	11096	12349	11029	10917
78	NE 68TH ST	W OF STATE ST	9039	8573	9712	9256	9037	8977	9303	9444	9668
79	NE 68TH ST	E OF 108TH AVE NE	17020	16876	17276	18296	18715	18718	18211	16271	16637
80	NE 68TH ST	W OF 108TH AVE NE	12146	11613	13256	13986	12185	12091	12591	11988	11830
81	NE 70TH ST	W OF I-405 SB OFF R	18890	17693	18895	19146	18890	19708	19029	20452	19296
82	NE 70TH PL	E OF 116TH AVE NE	13516	13910	14478	15248	16281	16095	16052	15924	15324
83	NE 70TH PL	W OF 116TH AVE NE	19395	19953	19267	22047	21194	21658	21734	21465	19960
84	NE 70TH ST	E OF 122ND AVE NE	13047	13112	14018	14631	16055	15884	15903	16005	14846
85	NE 70TH ST	W OF 122ND AVE NE	13152	12926	13999	14646	16381	15935	15415	15023	15154
86	NE 70TH ST	W OF 132ND AVE NE	11455	10823	14161	13361	13544	13941	14112	15543	13432
87	NE 80TH ST	E OF 120TH AVE NE	6251	6572	7783	6761	7532	7684	7452	8308	6668
88	NE 80TH ST	W OF 120TH AVE NE	5320	5968	7300	6823	6922	6916	6679	6756	5576
89	NE 80TH ST	E OF 124TH AVE NE	4666	5506	6264	4699	6179	6540	6187	6767	5643
90	NE 80TH ST	W OF 132ND AVE NE	3292	4052	4769	4092	4900	4996	5214	5445	4559
91	NE 85TH ST	E OF 114TH AVE NE	44552	40743	45060	44178	44843	44728	44236	46816	44825
92	NE 85TH ST	W OF 120TH AVE NE	46098	44454	44957	44950	48447	48101	47837	46305	47781
93	NE 85TH ST	E OF 124TH AVE NE	36181	36493	35023	38517	38523	40851	37960	39513	38750
94	NE 85TH ST	W OF 124TH AVE NE	37457	37100	39454	39709	41068	42207	38949	41675	40623
95	NE 85TH ST	E OF 132ND AVE NE	35682	35536	33868	38419	37274	38498	38492		
96	NE 85TH ST	W OF 132ND AVE NE	33261	34389	33811	35511	36233	35104	36252	35897	35347

TRAFFIC COUNT SUMMARY - - Average Daily Traffic in both directions

	LOCATION	TERMINI	2011	2009	2007	2005	2002	2001	2000	1999	1998
97	NE 90TH ST	E OF 124TH AVE NE	763	790	711	712	838	791	739	780	660
98	NE 90TH ST	W OF 124TH AVE NE	4535	4205	4759	4946	4765	4615	4358	3624	3802
99	84TH AVE NE	N OF NE 145TH ST	2272								
100	84TH AVE NE	S OF NE 145TH ST	2830								
101	84TH AVE NE	S OF NE 141ST ST	3855								
102	84TH AVE NE	S OF NE 132ND ST	3174								
103	88TH AVE NE	S OF NE 145TH ST	1608								
104	90TH AVE NE	N OF NE 134TH ST	4547								
105	93RD AVE NE	N OF JUANITA DR	1337	1193	1524	1666	2027	1431	1947	2655	2046
106	NE 95TH ST	E OF 124TH AVE NE	1039	1170	1121	1091	1108	1162	739	603	1169
107	NE 95TH ST	W OF 132ND AVE NE	775	1032	1015	1029	1017	1028	1097	1159	926
108	97TH AVE NE	N OF JUANITA DR	4254	3520	3776	3075	2980	2956	2343	2644	2632
109	98TH AVE NE	N OF NE 116TH ST	14657	14572	17246	16511	15498	15865	15415	17554	16389
110	98TH AVE NE	S OF NE 116TH ST	18019	17557	19956	20332	19604	19352	20917	19126	18637
111	98TH AVE NE	N OF NE 120TH PL	17878	17017	20898	18941	17452	19783	17034	16543	17470
112	98TH AVE NE	S OF NE 120TH PL	14813	14157	16021	16101	15224	15236	15112	15336	14592
113	NE 100TH ST	W OF 132ND AVE NE	1995	2195	2423	2466	2602	2729	2479	2732	2421
114	NE 100TH ST	E OF 124TH AVE NE	2537	2794	3027	2764	2945	2959	2957	3681	3205
115	NE 100TH ST.	W OF 124TH AVE NE	691	694	825	751	869	659	664	662	526
116	100TH AVE NE	N OF NE 124TH ST	25124	24126	28577	26076	25012	27830	25685	26743	25126
117	100TH AVE NE	S OF NE 124TH ST	20601	19274	21536	20906	19537	22072	19674	19109	19646
118	100TH AVE NE	N OF NE 132ND ST	25631	29160	29162	29110	29284	31395	28392	27836	28635
119	100TH AVE NE	S OF NE 132ND ST	25903	24689	28246	25754	25409	27814	25209	25829	25858
120	100TH AVE NE	N OF SIMONDS RD	16405								
121	100TH AVE NE	S OF SIMONDS RD	16538								
122	100TH AVE NE	N OF 145TH ST	9964								
123	103RD AVE NE	S OF NE 124TH ST			1488	1338	1395	1516	1413	1328	1411
124	NE 104TH ST	E OF 124TH AVE NE	1004	956	889	919	807	795	766	481	534
126	NE 104TH ST	W OF 132ND AVE NE			708	628	510		449	550	
127	104TH AVE NE	N OF NE 116TH ST	915	1056	969	961	1172	1040	1117	1125	1094
128	108TH AVE NE	N OF CITY LIMITS	8732	10036	9278	9750	8915	9309	9241	9055	8968
129	108TH AVE NE	N OF NE 53RD ST	9532	10564	11591	11073	11212	11518	11401	12491	10882
130	108TH AVE NE	S OF NE 53RD ST	8851	9774	10818	10321	10512	10656	10908	8457	10091
131	108TH AVE NE	N OF NE 60TH ST	9890	11242	12199	11111	12053	12121	12139	11682	11290
132	108TH AVE NE	S OF NE 68TH ST	10188	11276	12698	12072	12842	12538	12228	12067	11541
133	108TH AVE NE	S OF NE 116TH ST	943	958	1210	1116	1491	1928	1393	1718	1434
134	108TH AVE NE	N OF NE 132ND ST	4807	4812	4860	5460	5288	5428	6390	6265	6040
135	112TH AVE NE	N OF NE 87TH ST		2069	2824	2007	2113	1930	1953	2083	2171
136	NE 112TH ST	E OF 100TH AVE NE		659	1175	985	718	852	904	956	873
137	NE 112TH ST	E OF 108TH AVE NE		1639	2078	1819	1776	2205	2011	2066	1870
138	NE 112TH ST	E OF 116TH AVE NE	4671	4513	4854	4555	4838	5235	4769	6283	4754
139	NE 112TH ST	W OF 116TH AVE NE	2496	2360	2353	2685	2387	2967	2841	2925	2705
140	NE 112TH ST	W OF 120TH AVE NE	6397	6448	6444	3306	5883	6683	6383	6548	6673
141	113TH PL NE	N OF 124TH ST.	4692	3386	4321	3716	3650	4546	4711	5274	4448
142	113TH AVE NE	S OF NE 124TH ST	4025	3914	3685	4759	4210	4865	5229	5429	5629
143	114TH AVE NE	N OF NE 85TH ST	13122	8334	9918	9480	9064	9267	8510	8133	8287
144	116TH AVE NE	N OF NE 40TH ST	4741	4684	5242	4952	5009	5247	5184	5675	4287
145	116TH AVE NE	N OF NE 60TH ST	6321	5792	6117	6389	6229	6842	6078	5503	5946

TRAFFIC COUNT SUMMARY - - Average Daily Traffic in both directions

	LOCATION	TERMINI	2011	2009	2007	2005	2002	2001	2000	1999	1998
146	116TH AVE NE	S OF NE 60TH ST	5069	4802	5450	5076	5169	5448	5268	5289	4686
147	116TH AVE NE	N OF NE 70TH PL	6424	7259	7439	7773	7410	7414	7114	7471	7263
148	116TH AVE NE	S OF NE 70TH PL	15241	16208	16562	17718	16905	16951	17089	13730	16590
149	116TH AVE NE	N OF NE 87TH ST	4069	4071	4116	4229	4516	4553	4527	4609	4360
150	116TH AVE NE	S OF NE 112TH ST	3069	2743	2940	2900	2838	2919	2794	2869	2990
151	116TH AVE NE	N OF NE 124TH ST	16176	15566	11699	16937	14572	18575	15790	16947	15507
152	116TH AVE NE	S OF NE 124TH ST	10438	10679	10767	11095	11294	12560	12283	13288	12082
153	116TH AVE NE	N OF NE 128TH ST	12542	11864	9579	13351	14045	13846	13974	14962	12881
154	116TH AVE NE	S OF NE 128TH ST	15639	15052	10635	15731	15578	17175	15487	16947	15042
155	116TH WAY NE	N OF NE 132ND ST	1810	1767	1326	1746	2045	1933	1915	1982	1813
156	116TH WAY NE	S OF NE 132ND ST	13164	13405	9388	14357	14218	14036	13882	14154	12937
157	NE 116TH ST	E OF 98TH AVE NE	15175	15387	16170	16458	14546	16276	15129	14838	15255
158	NE 116TH ST	E OF 108TH AVE NE	15350	15798	16237	16865	15414	14784	15720	16317	14717
159	NE 116TH ST	E OF 120TH AVE NE	28133	30636	30321	30200	30083	30064	30741	29597	30801
160	NE 116TH ST	W OF 120TH AVE NE	15895	16975	19836	18463	16742	15919	16785	17346	16723
161	NE 116TH ST	E OF 124TH AVE NE	15911	16605	16924	19606	14802	11498	12522	11914	11925
162	NE 116TH ST	W OF 124TH AVE NE*	21181	22847	25028	24112	22627	16462	21470	22020	21298
163	NE 118TH ST.	W OF 116TH AVE NE	3625	3298	4090	4370	2763	4182	5412	5713	5214
164	120TH AVE NE	N OF TOTEM LAKE BLVD	14023	15630	15751	18722	18054	18100	17483	19040	18060
165	120TH AVE NE	N OF NE 80TH ST	4425	4062	5039	4580	4992	5108	5259	4362	4439
166	120TH AVE NE	S OF NE 80TH ST	2316	3459	2608	2856	3580	3515	3329	3488	3423
167	120TH AVE NE	N OF NE 85TH ST	7216	7739	9452	8341	9089	8607	5780	8153	8626
168	120TH AVE NE	S OF NE 85TH ST	4480	5116	5433	4761	4931	5431	4219	4205	4400
169	120TH AVE NE	N OF NE 116TH ST	12781	12093	13539	13643	12499	17700	15456	15051	13353
170	120TH AVE NE	N OF NE 118TH ST	10155	10004	11912		10272	11784	10579	10870	10281
171	120TH AVE NE	S OF NE 118TH ST	10155		13067	13167	12258	17530	15367	14303	13343
172	120TH AVE NE	S OF NE 116TH ST	9258	9693	10370	9221	9179	9921	11047	10958	10837
173	120TH AVE NE	N OF NE 128TH ST	12954	13503	14514	11501	13010	11594	13595	13924	13849
174	120TH AVE NE	S OF NE 132ND ST	9266	10011	9125	8865	9369	9883	8961	10200	9635
175	120TH AVE NE	N OF NE 132ND ST	528								
176	NE 120TH PL	W OF 98TH AVE NE	4261	3673	4164	3677	4091	4662	4034	3658	3183
177	NE 120TH ST	E OF SLATER AVE NE	9162	11837	9663	10573	9505	6181	6659	6752	6166
178	122ND AVE NE	S OF NE 70TH ST	1552	1644	1762	1724	1603	1827	1890	2018	2001
179	122ND AVE NE	N OF NE 70TH ST	1311	1430	1847	1536	1505	1571	1486	3148	1468
180	122ND AVE NE	S OF NE 80TH ST	1552	1813	2616	2538	2646	2710	2459	2766	2386
181	122ND AVE NE	N OF NE 85TH ST	4922	5759	6329	5621	6359	6078	5153	3994	4230
182	122ND AVE NE	S OF NE 85TH ST	1798	4658	2654	3219	3294	3565	3118	3524	3243
183	NE 122ND ST	E of JUANITA DRIVE	3558								
184	NE 123RD ST	E OF SLATER AVE	1329	1422	1158	1690	1611	1068	1624		
185	124TH AVE NE	N OF NE 85TH ST	12047	13359	13478	13509	12852	13318	13496	13354	12800
186	124TH AVE NE	S OF NE 85TH ST	4449	5333	5634	4841	4672	5145	3398	5376	5271
187	124TH AVE NE	S OF NE 100TH ST	12858	13498	14957	14943	15304	14786	15157	15964	14687
188	124TH AVE NE	N OF NE 100TH ST	12906	13210	14091	14868	16390	15044	15386	15670	14907
189	124TH AVE NE	N OF NE 104TH ST	12946	13236	14717	15105	15143	13357	15543	16015	15084
190	124TH AVE NE	N OF NE 116TH ST	14623	14913	17998	16817	18748	20349	18559	18149	17652
191	124TH AVE NE	S OF NE 116TH ST	16220	16065	16373	17405	17857	15608	17976	18666	16857
192	124TH AVE NE	S OF NE 124TH ST	15261	14898	15949	16574	19949	24193	18445	19513	17950
193	124TH AVE NE	N OF NE 132ND ST	12995	15485	13504	13350	13490	13303	13111	12854	13800

TRAFFIC COUNT SUMMARY - - Average Daily Traffic in both directions

	LOCATION	TERMINI	2011	2009	2007	2005	2002	2001	2000	1999	1998
194	124TH AVE NE	S OF NE 132ND ST	5271	5436	5450	4861	5029	4512	4311	5680	5033
195	124TH AVE NE	N OF NE 144TH ST	12834								
196	124TH AVE NE	S OF NE 144TH ST	13363								
197	NE 124TH ST	E OF 100TH AVE NE	21671	20788	23778	21485	20436	21599	24042	21079	20912
198	NE 124TH ST	W OF 100TH AVE NE	3409	3156	3276	3562	4105	4428	4519	4451	3783
199	NE 124TH ST	W OF 113TH AVE NE	23465	22324	22701	25010	23572	23681	24591	24334	24775
200	NE 124TH ST	E OF 116TH AVE NE	37511	38942	37668	41375	38937	42160	39013	39739	39121
201	NE 124TH ST	W OF 116TH AVE NE	27272	26978	26033	27774	27648	24325	27056	27045	27738
202	NE 124TH ST	W OF 120TH PL	31525	32616	31144	35959	34034	34456	36032	34261	33567
203	NE 124TH ST	E OF 124TH AVE NE	31671	31352	29822	31576	31395	34780	30562	28687	27738
204	NE 124TH ST	W OF 124TH AVE NE	31619	32402	32655	36151	33897	35063	36208	37157	34264
205	NE 124TH ST	E OF SLATER AVE NE	39691	32246	31120	30449		27418	27924	25308	24086
206	NE 124TH ST	W OF SLATER AVE NE	28388	28909	27644	28145	27691	28250	26914	24969	23510
207	126TH AVE NE	N OF NE 85TH ST	537	759							
208	126TH AVE NE	S OF NE 85TH ST	987	1300							
209	128TH AVE NE	N OF NE 85TH ST	1450	1895	1903	1627	1399				
210	128TH AVE NE	S OF NE 85TH ST	1476	1754	1727	1923	1518				
211	NE 128TH ST	E OF TOTEM LAKE BLVD	10499	10125							
212	NE 128TH ST	W OF TOTEM LAKE BLVD	13809	10667							
213	NE 128TH ST	E OF 116TH AVE NE	12907	13771							
214	NE 128TH ST	W OF 116TH AVE NE	2524	2668	2392	2362	2769	2045	2530	2450	2319
215	NE 128TH ST	E OF 120TH AVE NE	6248	6351	4972	4578	4686	5577	3523	4169	3716
216	NE 128TH ST	W OF 120TH AVE NE	10533	9935	7766	2383	2857	2960	2844	2580	2412
217	NE 130TH LN	W OF 124TH AVE NE	2683	2948	3487	2980	2827	2534	4196	3833	3037
218	132ND AVE NE	N OF NE 40TH ST	4323	4383	5055	5519	4830	4689	4284	5385	4840
219	132ND AVE NE	N OF NE 60TH ST	5533	5778	5895	6089	6346	6507	5928	6326	6670
220	132ND AVE NE	S OF NE 60TH ST	4490	4493	5213	5036	5126	5203	4481	5441	5017
221	132ND AVE NE	N OF NE 70TH ST	7903	7196	7574	8107	8507	8529	8249	8889	8448
222	132ND AVE NE	S OF NE 70TH ST	6835	6726	7563	7759	7586	7839	7484	8018	7300
223	132ND AVE NE	S OF NE 80TH ST	7045	7255	7101	7689	8167	7986	7501	7868	7542
224	132ND AVE NE	N OF NE 85TH ST	10440	11742	11513	11878	11097	10961	11008	11153	10263
225	132ND AVE NE	S OF NE 85TH ST	5917	6618	6869	7300	7166	6744	6584	6782	6637
226	132ND AVE NE	N OF NE 100TH ST	6838	8163	8789	8347	7958	5703	6879	7120	7023
227	132ND AVE NE	S OF NE 100TH ST	8891	9895	10763	10530	9861	7738	8627	8477	8352
228	132ND AVE NE	S OF NE 113TH ST.	6044	7045	7048	6845	7020	5919	5829	7592	5424
229	132ND AVE NE	N OF NE 132ND ST	11732	12541	12433	12450	11970	11796	12441	12197	11290
230	132ND AVE NE	S OF NE 132ND ST	12629	15126	14888	13620	13930	15802	11235	11015	11020
231	132ND AVE NE	N OF 143RD ST	1562								
232	132ND AVE NE	S OF 143RD ST	8361								
233	NE 132ND ST	E of JUANITA DRIVE	1934								
234	NE 132ND ST	E of 84TH AVE NE	4132								
235	NE 132ND ST	E of 108TH PL	18684	20641	18621	20690	19032	25928	19054	18681	21370
236	NE 132ND ST	W of 108TH PL	15387	17255	15458	16870	15836	16905	16034	15720	17280
237	NE 132ND ST	E OF TOTEM LAKE BLVD		17198	15910	15770	15460	15235	16075	15760	15536
238	NE 132ND ST	W OF TOTEM LAKE BLVD	16025	18289	18662	21549	22314	22721	22212	23778	21943
239	NE 132ND ST	E OF 100TH AVE NE	14987	14688	15692	13398	14767	14813	12469	12819	12920
240	NE 132ND ST	W OF 100TH AVE NE	10503	10689	12088	12473	11211	12619	11736	11584	11506
241	NE 132ND ST	W OF 116TH WAY NE	18358	19027	17868	17957	18145	19764	19478		18143

TRAFFIC COUNT SUMMARY - - Average Daily Traffic in both directions

	LOCATION	TERMINI	2011	2009	2007	2005	2002	2001	2000	1999	1998
242	NE 132ND ST	W OF 120TH AVE NE	11072	11951	11040	13166	14796	13864	14494	14245	13630
243	NE 132ND ST	E OF 124TH AVE NE	11495	14261	13580	14180	14460	14434	13666	13398	14310
244	NE 132ND ST	W OF 124TH AVE NE	13521	17331	14792	16520	16960	16723	16349	16028	18770
245	NE 132ND ST	E OF 132ND AVE NE		5287	6103	6340	8660	8540	8420	8306	6720
246	NE 132ND ST	W OF 132ND AVE NE	9819		11616	11760	10680	10537	11089	10872	11250
246	NE 141ST ST	E of JUANITA DRIVE	4341								
248	NE 141ST ST	E OF 84TH AVE NE	3967								
249	NE 143RD ST	E OF 132ND AVE NE	7003								
250	NE 143RD ST	W OF 132ND AVE NE	5588								
251	NE 144TH ST	E OF 124TH AVE NE	7598								
252	NE 145TH ST	E OF 100TH AVE NE	11414								
253	NE 145TH ST	E OF 88TH AVE NE	3607								
255	NE 145TH ST	E OF 84TH AVE NE	4001								
256	NE 145TH ST	W OF 84TH AVE NE	1818								
257	NE 145TH ST	W OF JUANITA-WOODIN	12120								

2011 AM	Existing Traffic	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
101	Lake WA Blvd/NE 38th Pl	2	1	8	40	10	41	17	451	52	94	1141	22	x
102	Lake WA Blvd/Lakeview Dr	8	16	38	229	96	12	123	142	161	4	922	60	x
103	NE 68th St/State St	58	162	3	12	188	99	10	10	19	219	4	147	x
104	NE 68th St/108th Ave NE	81	236	155	302	229	110	73	111	139	135	354	67	x
105	Central Way/6th St	19	361	63	251	391	120	16	88	20	252	166	35	x
106	Central Way/3rd St S	9	413	144	108	310	47	28	37	56	121	123	26	x
107	Central Way/Lake St	0	427	693	136	161	0	136	0	44	0	0	0	x
108	Lake St/Kirkland Ave	7	76	91	77	20	39	8	188	47	7	787	5	x
109	NE 85th St/114th Ave NE	7	699	10	255	774	125	8	2	121	374	31	1	x
110	6th St S/4th St	19	10	0	37	11	12	18	105	24	94	331	81	x
111	Kirkland Ave/3rd Street	9	111	40	63	94	33	30	71	94	84	271	26	x
112	Kirkland Way/6th Street	36	166	42	87	145	30	40	114	16	22	272	59	x
201	NE 116th St/98th Ave NE	44	426	620	143	181	68	91	128	43	169	694	31	x
202	NE 124th St/100th Ave NE	37	114	26	145	21	160	6	191	261	973	762	13	x
203	NE 132nd St/100th Ave NE	81	373	246	94	99	148	64	294	74	525	1331	37	x
204	NE 132nd St/116th Way NE	12	613	392	284	320	14	104	12	90	31	41	10	x
205	Forbes Creek Dr/Market St	4	0	2	103	0	16	3	311	49	8	1329	5	x
206	NE 120th Pl/100th Ave NE	156	0	34	1	0	3	6	273	1	0	794	76	x
207	Juanita Dr/93rd Ave NE													
208	Juanita Dr/97th Ave NE	86	961	2	6	261	27	0	2	8	88	4	39	x
209	Market St/7th Ave													
211	Maket St/15th Ave													
301	NE 132nd St/120th Ave NE	1	358	91	296	452	2	26	1	79	6	9	4	x
302	NE 130th St/120th Ave NE	6	4	8	96	8	20	30	131	187	56	280	25	x
303	NE 128th St/120th Ave NE	126	153	80	77	77	10	65	252	140	11	231	136	x
304	NE 132nd St/124th Ave NE	103	272	38	102	271	70	20	49	62	331	225	376	x
306	NE 124th St/Slater Ave NE	93	1120	64	232	750	158	44	164	252	292	497	194	x
307	Totem Lake Blvd/120th Ave NE	7	372	44	46	135	182	123	302	9	258	97	6	x
308	NE 124th St/120th Ave NE	9	1314	31	23	914	10	25	2	21	18	1	20	x
309	NE 118th St/120th Ave NE	16	0	108	0	0	0	175	245	0	0	263	63	x
310	NE 116th St/120th Ave NE	52	606	25	177	284	248	22	125	347	181	151	44	x
311	NE 116th St/124th Ave NE	129	354	473	215	275	58	135	197	69	70	493	73	x
312	NE 124th St/116th Way NE	331	1264	58	162	387	214	19	59	132	458	149	82	X
313	NE 124th St/113th Ave NE	7	1448	200	163	274	39	22	7	55	44	25	5	X
314	NE 120th St/Slater Ave NE	4	5	7	102	3	115	3	321	285	56	416	8	x
315	NE 124th St/124th Ave NE	50	984	264	90	680	135	143	173	32	222	328	75	X
316	NE 132nd St/Totem Lake Blvd	67	455	228	115	378	4	98	31	14	9	128	125	X
317	NE 124th St/SB I-405 off Ramp	0	1001	857	0	461	287	0	0	0	427	0	382	X
318	NE 124th St/NB I-405 on/off Ramp	0	1194	235	0	528	397	171	0	183	0	0	0	X
319	NE 116th St/SB I-405 on Ramp	0	566	582	257	687	0	0	0	0	0	0	0	x
320	NE 116th St/NB I-405 off Ramp	0	565	0	0	491	0	490	0	412	0	0	0	x
323	NE 116th St/Slater Ave NE	0	0	0	73	0	95	0	430	60	18	507	0	x
324	NE 128th St/116th Way NE	25	94	100	170	40	78	22	203	202	173	417	21	x
325	NE 124th St/128th Lane NE	104	1180	2	1	930	19	4	0	6	11	1	30	x
326	NE 128th St/Totem Lk Blvd	0	268	172	0	195	28	61	194	78	45	282	114	x

ATTACHMENT 8
SEP13-00959
APPLICANT TIA

401	NE 85th St/132nd Ave NE	103	1188	15	13	612	59	59	71	17	371	305	235	x
402	NE 85th St/124th Ave NE	101	1077	19	13	897	62	62	70	24	349	303	291	x
403	NE 85th St/120th Ave NE	23	1297	203	33	1225	15	130	6	22	7	24	83	x
404	NE 100th St/124th Ave NE	0	19	35	88	7	41	7	159	14	102	892	2	x
406	NE 70th St/132nd Ave NE	37	317	61	145	310	20	51	48	92	89	264	67	x
407	NE 70th St/116th Ave NE	121	263	273	178	470	8	210	64	71	23	196	213	x
408	NE 90th St/124th Ave NE	15	2	2	2	5	3	5	162	4	5	835	107	x
409	NE 85th St/122nd Ave NE	78	1147	92	66	1216	36	63	18	50	14	20	46	x
410	116th Ave NE/I-405 NB off Ramp	305	0	46	0	0	0	76	128	0	0	330	287	x
411	NE 70th St/I-405 SB off Ramp	0	0	0	216	0	196	0	468	166	379	518	0	x
412	NE 85th St/128th Ave NE	16	1325	31	40	884	9	25	11	55	42	16	42	x
413	NE 60th St/132nd Ave NE	85	0	31	0	0	0	88	463	0	0	229	82	x
416	NE 80th St/132nd Ave NE	77	90	67	16	134	23	124	360	29	13	176	51	x
999														
501	North Holmes Pt Dr NE/Juanita Dr NE	0	0	0	183	0	11	0	241	50	12	708	0	x
502	South Holmes Pt Dr NE/Juanita Dr NE	21	4	74	0	0	2	23	268	6	0	882	9	x
503	NE 141st Street/Juanita Dr NE	36	14	20	72	14	43	6	254	49	37	485	13	x
504	Juanita-Woodinville Way/100th Ave NE	15	22	22	320	38	39	14	340	244	25	1210	63	x
505	NE 137th Street/100th Avenue NE	37	63	166	18	9	17	44	209	18	76	1201	14	x
506	Simonds Road/100th Avenue NE	422	0	667	0	0	0	182	149	0	0	555	223	x
507	NE 145th street/100th Avenue NE	0	0	0	209	0	69	0	151	425	135	518	0	x
508	NE 145th Street/Juanita-Woodinville Way	447	5	118	7	19	39	35	345	0	8	347	195	x
509	NE 140th Street/132nd Avenue NE	15	6	69	0	0	0	19	242	29	13	616	37	x
510	NE 132nd Street/132nd Avenue NE	83	235	388	39	76	56	128	157	18	217	537	130	x
511	NE 144th Street/124th Avenue NE	15	69	51	135	33	108	12	155	73	92	539	16	x
512	NE 124th Street/Willows Road NE	0	446	778	334	673	33	199	61	23	64	347	11	x

ATTACHMENT 8
SEP13-00959
APPLICANT TIA

2012 PM Peak Hour Turning Movements

2012		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
101	Lake WA Blvd/NE 38th Pl	11	5	22	107	15	214	21	1019	123	54	648	11
102	Lake WA Blvd/Lakeview Dr	39	93	90	222	83	12	77	570	433	12	358	16
103	NE 68th St/State St	267	322	5	18	247	271	6	11	18	148	10	104
104	NE 68th St/108th Ave NE	166	292	64	193	244	148	154	257	124	170	123	105
105	Central Way/6th St	29	429	55	149	429	97	182	298	90	133	166	20
106	Central Way/3rd St S	12	332	65	115	518	104	145	215	138	99	82	20
107	Central Way/Lake St	0	283	210	175	494	0	473	0	96	0	0	0
108	Lake St/Kirkland Ave	17	61	36	70	44	87	3	507	73	3	320	43
109	NE 85th St/114th Ave NE	8	636	4	156	691	204	1	25	254	327	19	5
110	6th St S/4th St	127	9	20	39	10	176	48	366	51	150	168	81
111	Kirkland Ave/3rd Street	20	104	32	115	121	123	78	325	156	86	149	40
112	Kirkland Way/6th Street	73	201	41	46	150	36	62	345	21	29	162	70
201	NE 116th St/98th Ave NE	91	308	160	67	446	110	476	779	136	185	287	73
202	NE 124th St/100th Ave NE	29	54	19	352	169	849	35	704	238	337	375	28
203	NE 132nd St/100th Ave NE	90	169	139	59	250	700	292	1239	110	270	607	91
204	NE 132nd St/116th Way NE	21	446	171	121	716	29	484	40	221	15	33	14
205	Forbes Creek Dr/Market St	8	0	9	51	1	11	7	1305	84	14	539	5
206	NE 120th Pl/98th Ave NE	130	2	13	3	1	2	47	906	3	5	510	209
207	Juanita Dr/93rd Ave NE	0	0	0	0	0	0	0	0	0	0	0	0
208	Juanita Dr/97th Ave NE	72	448	16	19	882	73	26	25	30	46	20	115
209	n/a	0	0	0	0	0	0	0	0	0	0	0	0
211	n/a	0	0	0	0	0	0	0	0	0	0	0	0
301	NE 132nd St/120th Ave NE	5	427	59	134	444	3	157	6	403	4	4	3
302	NE 130th St/120th Ave NE	25	12	36	215	6	60	36	432	199	18	210	11
303	NE 128th St/120th Ave NE	171	121	142	181	194	20	94	479	98	11	342	162
304	NE 132nd St/124th Ave NE	407	379	11	68	320	286	21	257	172	105	76	212
306	NE 124th St/Slater Ave NE	176	987	90	160	1127	182	156	615	348	143	258	180
307	Totem Lake Blvd/120th Ave NE	32	228	37	144	495	367	280	351	16	487	142	32
310	NE 116th St/120th Ave NE	90	469	28	203	698	410	30	168	277	308	153	159
311	NE 1166th St/124th Ave NE	156	378	229	121	456	92	442	586	263	77	286	120
312	NE 124th St/116th Way NE	134	740	75	233	1346	321	130	234	231	383	123	167
313	NE 124th St/113th Ave NE	44	629	43	54	1402	122	197	26	192	112	19	70
314	NE 120th St/Slater Ave NE	3	0	4	322	2	565	4	448	138	221	301	2
315	NE 124th St/124th Ave NE	113	840	173	112	1044	383	323	488	59	230	264	213
316	NE 132nd St/Totem Lake Blvd	143	404	120	67	451	16	293	193	100	6	55	135
317	NE 124th St/SB I-405 off Ramp	0	776	640	0	1272	450	0	0	0	537	0	536
318	NE 124th St/NB I-405 on/off Ramp	0	1068	282	0	1264	463	482	0	153	0	0	0
319	n/a	0	463	573	273	1323	0	0	0	0	0	0	0
320	NE 116th St/NB I-405 off Ramp	0	456	0	0	970	0	668	0	395	0	0	0
324	NE 128th St/116th Way NE	0	0	0	41	0	60	0	600	104	35	616	0
325	NE 124th St/128th Lane NE	49	1082	2	4	1444	19	15	0	6	36	1	148
401	NE 85th St/132nd Ave NE	145	989	77	91	1399	678	82	379	59	143	90	62
402	NE 85th St/124th Ave NE	152	1024	68	65	1318	426	75	310	59	144	94	133
403	NE 85th St/120th Ave NE	172	1396	138	14	1404	67	236	105	37	100	49	240
404	NE 100th St/124th Ave NE	4	5	16	42	19	166	15	868	55	27	382	7
406	NE 70th St/132nd Ave NE	143	392	58	188	543	110	119	306	164	55	199	53
407	NE 70th St/116th Ave NE	225	420	358	235	345	18	292	479	285	14	81	184
408	NE 90th St/124th Ave NE	170	12	16	4	18	2	51	701	5	3	414	82
409	NE 85th St/122nd Ave NE	469	1229	80	52	1347	75	83	64	45	62	29	77
410	116th Ave NE/I-405 NB off Ramp	696	0	93	0	0	0	457	317	0	0	175	519
411	NE 70th St/I-405 SB off Ramp	0	0	0	179	0	283	0	726	106	237	613	0
412	NE 85th St/128th Ave NE	52	1208	36	26	1477	40	30	35	36	10	13	22
416	NE 80th St/132nd Ave NE	7	1	45	12	6	3	176	826	26	2	196	13
999		0	0	0	0	0	0	0	0	0	0	0	0
501	North Holmes Pt Dr NE/Juanita Dr NE	0	0	0	99	0	22	0	679	166	22	372	0
502	South Holmes Pt Dr NE/Juanita Dr NE	33	4	52	10	2	0	73	811	6	0	436	34
503	NE 141st Street/Juanita Dr NE	29	11	10	74	20	60	17	532	80	71	335	34
504	Juanita-Woodinville Way/100th Ave NE	32	24	21	317	25	58	38	1410	430	39	525	23
505	NE 137th Street/100th Avenue NE	41	32	64	51	76	99	142	1112	106	56	455	53
506	Simonds Road/100th Avenue NE	295	0	279	0	0	0	613	577	0	0	245	423
507	NE 145th street/100th Avenue NE	0	0	0	453	0	183	0	561	318	100	234	0
508	NE 145th Street/Juanita-Woodinville Way	334	10	30	12	17	37	146	433	19	42	401	512
509	NE 140th Street/132nd Avenue NE	9	2	20	0	0	0	37	719	0	1	262	11
510	NE 132nd Street/132nd Avenue NE	148	84	187	26	239	199	281	527	42	36	203	66
511	NE 144th Street/124th Avenue NE	66	90	24	164	90	284	39	639	147	130	286	27
512	NE 124th Street/Willows Road NE	1	816	327	74	507	38	842	342	326	66	64	6

2018 AM PEAK HOUR VOLUMES

BACKGROUND VOLUMES (without Google of Lake St)

2018	**AM PK WITHOUT GOOGLE PH2**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
101	Lake WA Blvd/NE 38th Pl	2	1	8	43	11	45	18	514	56	102	1240	23
102	Lake WA Blvd/Lakeview Dr	8	17	41	252	104	13	134	154	200	4	1000	65
103	NE 68th St/State St	89	175	3	13	204	107	11	11	20	237	4	163
104	NE 68th St/108th Ave NE	88	256	168	327	248	151	79	149	151	152	396	72
105	Central Way/6th St	20	391	68	445	494	130	17	97	79	273	238	43
106	Central Way/3rd St S	10	477	156	117	342	51	31	40	60	151	134	29
107	Central Way/Lake St	0	493	751	147	181	0	147	0	48	0	0	0
108	Lake St/Kirkland Ave	7	83	99	85	21	42	8	204	62	7	852	5
109	NE 85th St/114th Ave NE	7	814	11	391	1082	136	8	2	143	405	34	1
110	6th St S/4th St	64	11	26	45	12	23	126	113	83	173	358	248
111	Kirkland Ave/3rd Street	10	121	43	68	139	36	33	77	102	91	294	29
112	Kirkland Way/6th Street	39	180	46	94	157	147	43	173	17	36	313	64
201	NE 116th St/98th Ave NE	48	461	705	166	196	73	101	143	48	183	804	34
202	NE 124th St/100th Ave NE	40	123	29	161	22	173	6	211	283	1054	873	14
203	NE 132nd St/100th Ave NE	88	404	266	102	107	160	69	322	81	568	1489	40
204	NE 132nd St/116th Way NE	13	664	424	312	347	15	112	13	98	34	45	11
205	Forbes Creek Dr/Market St	4	0	2	116	0	17	3	344	54	8	1536	5
206	NE 120th Pl/98th Ave NE	169	0	37	1	0	3	6	300	1	0	912	83
207	Juanita Dr/93rd Ave NE	0	34	0	0	2	0	0	0	0	0	0	0
208	Juanita Dr/97th Ave NE	93	1074	2	6	285	30	0	2	8	95	4	42
209	n/a	0	0	0	0	0	0	0	0	0	0	0	0
211	n/a	0	0	0	0	5	0	0	0	0	0	0	0
301	NE 132nd St/120th Ave NE	1	388	99	320	490	2	29	1	86	6	10	4
302	NE 130th St/120th Ave NE	6	4	8	104	8	21	33	142	203	60	303	28
303	NE 128th St/120th Ave NE	137	165	87	84	90	11	70	273	152	12	250	147
304	NE 132nd St/124th Ave NE	111	295	41	110	294	75	21	53	67	358	250	412
306	NE 124th St/Slater Ave NE	101	1213	69	251	823	171	48	183	273	316	550	210
307	Totem Lake Blvd/120th Ave NE	7	403	48	50	146	197	134	327	10	279	105	6
310	NE 116th St/120th Ave NE	56	656	28	192	307	268	23	136	375	196	163	48
311	NE 1166th St/124th Ave NE	140	389	512	233	298	63	146	213	74	75	533	79
312	NE 124th St/116th Way NE	358	1369	63	175	419	232	20	64	143	507	161	89
313	NE 124th St/113th Ave NE	7	1568	216	176	297	42	23	7	59	48	28	5
314	NE 120th St/Slater Ave NE	4	5	7	110	3	124	3	353	309	60	462	8
315	NE 124th St/124th Ave NE	54	1066	286	109	736	146	155	188	35	241	355	82
316	NE 132nd St/Totem Lake Blvd	72	493	247	124	414	4	106	34	15	10	139	136
317	NE 124th St/SB I-405 off Ramp	0	1084	939	0	499	311	0	0	0	462	0	414
318	NE 124th St/NB I-405 on/off Ramp	0	1292	254	0	571	429	186	0	198	0	0	0
319	n/a	0	613	630	278	744	0	0	0	0	0	0	0
320	NE 116th St/NB I-405 off Ramp	0	612	0	0	531	0	530	0	446	0	0	0
324	NE 128th St/116th Way NE	28	102	108	184	43	85	23	219	218	188	452	22
325	NE 124th St/128th Lane NE	112	1278	2	1	1018	20	4	0	6	12	1	33
401	NE 85th St/132nd Ave NE	111	1301	16	14	743	64	64	77	18	402	330	276
402	NE 85th St/124th Ave NE	110	1181	20	14	1083	67	67	75	26	377	328	315
403	NE 85th St/120th Ave NE	26	1424	219	36	1438	16	141	6	23	7	26	107
404	NE 100th St/124th Ave NE	0	20	38	95	7	45	7	174	15	110	983	2
406	NE 70th St/132nd Ave NE	40	345	66	157	351	21	57	52	100	96	286	72
407	NE 70th St/116th Ave NE	131	286	296	193	530	8	238	69	77	24	212	231
408	NE 90th St/124th Ave NE	17	2	2	2	5	3	5	175	4	5	904	134
409	NE 85th St/122nd Ave NE	85	1262	100	71	1429	39	68	19	54	15	21	50
410	116th Ave NE/I-405 NB off Ramp	341	0	50	0	0	0	83	139	0	0	357	311
411	NE 70th St/I-405 SB off Ramp	0	0	0	234	0	212	0	508	185	410	582	0
412	NE 85th St/128th Ave NE	17	1450	34	43	1069	10	28	12	59	46	17	46
416	NE 80th St/132nd Ave NE	84	98	72	17	145	24	135	390	32	14	191	55
501	North Holmes Pt Dr NE/Juanita Dr NE	0	0	0	198	0	12	0	284	54	13	769	0
502	South Holmes Pt Dr NE/Juanita Dr NE	22	4	81	0	0	2	24	305	13	0	957	10
503	NE 141st Street/Juanita Dr NE	39	15	21	78	15	47	6	286	53	40	526	14
504	Juanita2Woodinville Way/100th Ave NE	16	23	23	364	41	42	15	371	265	28	1340	68
505	NE 137th Street/100th Avenue NE	40	68	180	19	10	18	48	230	19	83	1331	15
506	Simonds Road/100th Avenue NE	457	0	733	0	0	0	198	163	0	0	620	242
507	NE 145th street/100th Avenue NE	0	0	0	228	0	74	0	164	460	146	578	0
508	NE 145th Street/Juanita2Woodinville Way	483	5	128	7	20	42	38	373	0	8	386	211
509	NE 140th Street/132nd Avenue NE	16	6	74	0	0	0	20	262	32	14	673	40
510	NE 132nd Street/132nd Avenue NE	90	254	420	42	83	60	139	170	19	235	593	141
511	NE 144th Street/124th Avenue NE	16	74	55	146	36	117	13	168	79	100	591	17
512	NE 124th Street/Willows Road NE	0	482	843	362	740	36	215	66	24	69	375	12

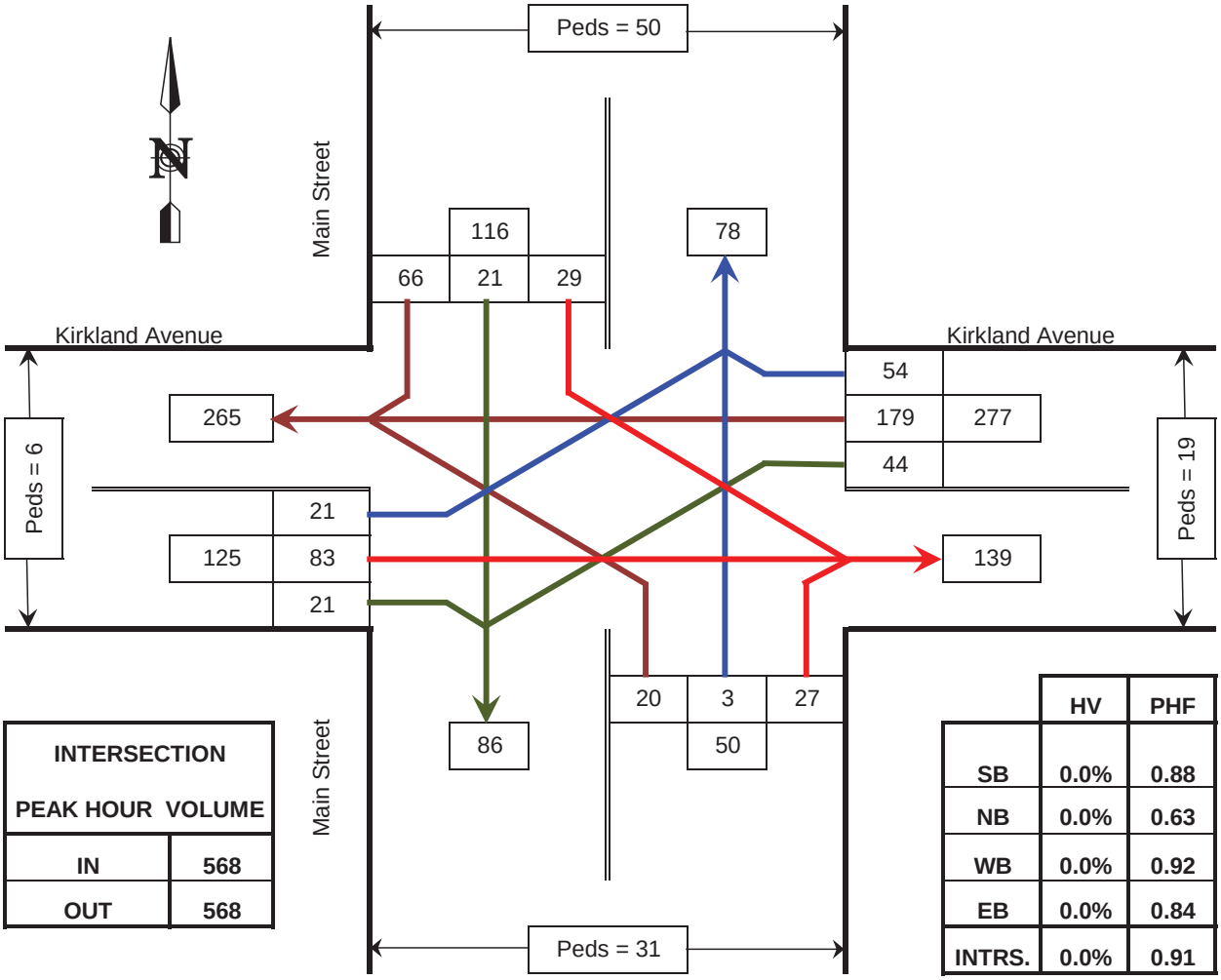
2018 PM PEAK HOUR VOLUMES
WITHOUT PROJECT

1	2	3	4	5	6	7	8	9	10	11	12	13	14
2018	Future w/o Project	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
101	Lake WA Blvd/NE 38th Pl	14	7	25	130	17	258	24	1203	154	74	759	13
102	Lake WA Blvd/Lakeview Dr	45	106	104	260	94	14	89	686	512	14	434	18
103	NE 68th St/State St	313	380	6	21	294	326	7	13	21	169	11	132
104	NE 68th St/108th Ave NE	192	352	76	231	303	177	177	331	148	257	172	125
105	Central Way/6th St	34	534	58	173	590	110	229	365	106	152	193	24
106	Central Way/3rd St S	14	386	74	136	591	128	165	257	165	125	95	26
107	Central Way/Lake St	0	322	245	199	563	0	540	0	113	2	1	0
108	Lake St/Kirkland Ave	20	69	41	79	51	99	3	589	83	4	381	49
109	NE 85th St/114th Ave NE	9	768	2	180	891	232	1	29	336	372	22	6
110	6th St S/4th St	145	10	25	45	11	201	58	467	58	172	203	92
111	Kirkland Ave/3rd Street	24	119	37	132	140	150	88	379	178	98	176	47
112	Kirkland Way/6th Street	85	229	49	57	171	42	86	447	72	33	198	80
201	NE 116th St/98th Ave NE	103	352	187	77	510	125	554	913	159	210	343	85
202	NE 124th St/100th Ave NE	33	62	22	403	194	971	40	822	271	388	432	32
203	NE 132nd St/100th Ave NE	102	193	159	70	286	803	332	1432	128	309	695	103
204	NE 132nd St/116th Way NE	24	512	199	138	816	33	555	46	252	17	38	16
205	Forbes Creek Dr/Market St	9	0	10	58	1	13	8	1529	96	16	640	6
206	NE 120th Pl/100th Ave NE	148	2	15	3	1	2	54	1045	3	6	581	238
207	Juanita Dr/93rd Ave NE	0	4	0	0	12	0	0	0	0	0	0	0
208	Juanita Dr/97th Ave NE	82	514	18	22	1014	85	30	29	34	53	23	131
209	n/a	0	0	0	0	0	0	0	6	0	0	10	0
211	n/a	0	0	0	0	0	0	0	6	0	0	10	0
301	NE 132nd St/120th Ave NE	6	487	68	153	506	3	178	7	460	5	5	3
302	NE 130th St/120th Ave NE	29	14	41	245	7	68	41	494	226	21	239	13
303	NE 128th St/120th Ave NE	194	138	162	206	221	23	107	546	113	13	389	184
304	NE 132nd St/124th Ave NE	464	433	13	77	365	326	24	294	195	119	86	241
306	NE 124th St/Slater Ave NE	200	1178	102	181	1283	207	177	703	416	163	293	204
307	Totem Lake Blvd/120th Ave NE	37	270	43	164	568	420	318	400	18	555	162	37
310	NE 116th St/120th Ave NE	102	540	32	232	800	473	34	191	318	369	175	181
311	NE 1166th St/124th Ave NE	177	445	293	143	535	105	526	695	305	87	338	139
312	NE 124th St/116th Way NE	153	850	87	275	1541	369	150	268	263	440	142	190
313	NE 124th St/113th Ave NE	51	725	49	62	1604	139	226	30	220	128	22	79
314	NE 120th St/Slater Ave NE	4	0	5	367	2	644	5	529	157	253	362	2
315	NE 124th St/124th Ave NE	129	996	197	128	1219	440	374	561	73	273	306	242
316	NE 132nd St/Totem Lake Blvd	163	460	140	76	514	18	335	220	115	7	63	154
317	NE 124th St/SB I-405 off Ramp	0	891	728	0	1460	512	0	0	0	633	0	611
318	NE 124th St/NB I-405 on/off Ramp	0	1246	320	0	1450	526	550	0	173	0	0	0
319	n/a	0	526	652	313	1505	0	0	0	0	0	0	0
320	NE 116th St/NB I-405 off Ramp	0	546	0	0	1155	0	760	3	469	0	2	0
324	NE 128th St/116th Way NE	0	0	0	47	3	69	0	684	118	43	701	0
325	NE 124th St/128th Lane NE	56	1286	2	5	1683	22	17	0	7	41	1	169
401	NE 85th St/132nd Ave NE	166	1142	87	103	1615	772	94	432	67	163	102	71
402	NE 85th St/124th Ave NE	187	1185	77	74	1528	490	85	361	67	166	107	156
403	NE 85th St/120th Ave NE	204	1626	157	16	1628	76	282	121	43	115	56	274
404	NE 100th St/124th Ave NE	5	6	18	48	22	192	17	1026	64	32	439	8
406	NE 70th St/132nd Ave NE	163	460	65	214	618	125	136	348	186	62	226	60
407	NE 70th St/116th Ave NE	267	499	425	268	402	21	347	544	324	16	92	214
408	NE 90th St/124th Ave NE	195	14	18	5	21	2	57	802	6	3	472	93
409	NE 85th St/122nd Ave NE	533	1424	91	60	1553	85	95	80	52	70	36	87
410	116th Ave NE/I-405 NB off Ramp	803	0	106	0	0	0	519	361	0	0	204	601
411	NE 70th St/I-405 SB off Ramp	0	0	0	215	1	322	0	880	162	270	727	0
412	NE 85th St/128th Ave NE	59	1398	41	30	1701	46	34	44	41	11	15	25
416	NE 80th St/132nd Ave NE	8	1	52	14	7	3	200	940	30	2	223	15
999		88	0	86	0	0	5	9	0	0	9	0	16
501	North Holmes Pt Dr NE/Juanita Dr NE	0	0	0	113	0	25	0	778	188	25	424	0
502	South Holmes Pt Dr NE/Juanita Dr NE	38	5	59	11	2	0	83	928	7	0	497	39
503	NE 141st Street/Juanita Dr NE	33	13	11	84	23	68	20	608	91	80	381	39
504	Juanita-Woodinville Way/100th Ave NE	38	28	24	361	29	65	44	1619	497	45	599	26
505	NE 137th Street/100th Avenue NE	47	37	72	57	86	113	162	1273	121	63	517	60
506	Simonds Road/100th Avenue NE	335	0	320	0	0	0	701	668	0	0	279	481
507	NE 145th street/100th Avenue NE	0	0	0	516	0	208	1	644	363	114	267	0
508	NE 145th Street/Juanita-Woodinville Way	380	11	34	14	20	43	168	500	22	48	457	582
509	NE 140th Street/132nd Avenue NE	10	2	23	0	0	0	43	819	0	1	298	13
510	NE 132nd Street/132nd Avenue NE	169	95	213	30	272	226	319	603	48	41	231	75
511	NE 144th Street/124th Avenue NE	75	102	28	186	102	323	45	728	168	148	325	31
512	NE 124th Street/Willows Road NE	1	932	372	84	577	44	958	389	371	75	72	7
	Lake St/Alley	0	0	0	0	0	0	0	0	0	0	0	0
	Main St/Alley	0	0	0	0	0	0	0	0	0	0	0	0
	Main St/Kirkland Ave	0	0	0	0	0	0	0	0	0	0	0	0
	Alley/Driveway	0	0	0	0	0	0	0	0	0	0	0	0

TRAFFIC DATA GATHERING

TURNING MOVEMENTS DIAGRAM

4:00 PM - 6:00 PM PEAK HOUR: 4:45 PM TO 5:45 PM



INTERSECTION PEAK HOUR VOLUME	
IN	568
OUT	568

	HV	PHF
SB	0.0%	0.88
NB	0.0%	0.63
WB	0.0%	0.92
EB	0.0%	0.84
INTRS.	0.0%	0.91

PHF = Peak Hour Factor
HV = Heavy Vehicles

Main Street @ Kirkland Avenue

Kirkland, WA

COUNTED BY: CN

DATE OF COUNT: Wed. 2/27/13

REDUCED BY: CN

TIME OF COUNT: 4:00 PM - 6:00 PM

REDUCTION DATE: Wed. 2/27/13

WEATHER: Rainy

TRAFFIC DATA GATHERING

INTERSECTION TURNING MOVEMENTS REDUCTION SHEET

LOCATION: Main Street @ Kirkland Avenue
Kirkland, WA

DATE OF COUNT: Wed. 2/27/13
TIME OF COUNT: 4:00 PM - 6:00 PM

COUNTED BY: CN
WEATHER: Rainy

TIME INTERVAL ENDING AT	FROM NORTH ON Main Street					FROM SOUTH ON Main Street					FROM EAST ON Kirkland Avenue					FROM WEST ON Kirkland Avenue					INTERVAL TOTALS
	Peds	HV	Left	Thru	Right	Peds	HV	Left	Thru	Right	Peds	HV	Left	Thru	Right	Peds	HV	Left	Thru	Right	
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	2	0	7	2	13	10	0	2	0	3	2	0	3	47	7	2	0	6	18	2	110
04:30 PM	7	0	6	0	16	12	0	4	0	6	4	0	7	46	15	0	1	3	18	2	123
04:45 PM	15	0	6	4	9	5	0	2	1	5	2	1	5	45	15	0	0	5	26	3	126
05:00 PM	9	0	6	9	18	4	0	5	1	5	7	0	12	42	18	2	0	0	16	3	135
05:15 PM	15	0	7	3	16	9	0	8	2	10	4	0	16	51	6	3	0	3	28	6	156
05:30 PM	18	0	6	4	15	9	0	1	0	7	2	0	7	38	12	1	0	9	17	7	123
05:45 PM	8	0	10	5	17	9	0	6	0	5	6	0	9	48	18	0	0	9	22	5	154
06:00 PM	14	0	4	3	16	11	0	0	0	13	1	1	15	40	16	2	0	2	15	5	129
PEAK HOUR TOTALS	50	0	29	21	66	31	0	20	3	27	19	0	44	179	54	6	0	21	83	21	INTERSECTION
ALL MOVEMENTS	116					50					277					125					568
% HV	0%					0%					0%					0%					0%
PEAK HOUR FACTOR	0.88					0.63					0.92					0.84					0.91

PHF = Peak Hour Factor

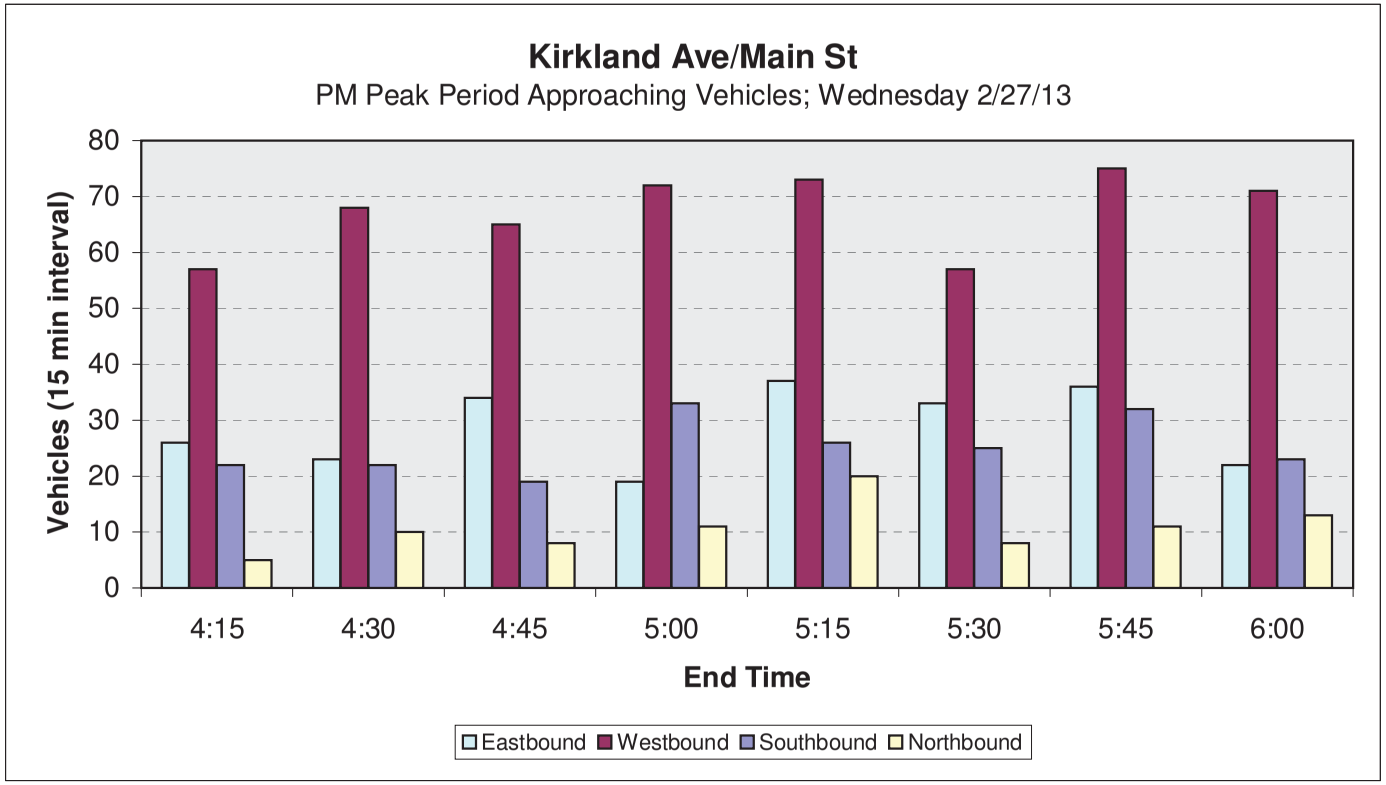
4:00 PM - 6:00 PM PEAK HOUR: 4:45 PM TO 5:45 PM

REDUCED BY: CN

DATE OF REDUCTION: 2/27/2013

PM TMC AT KIRKLAND AVE/MAIN ST
2/27/2013 WED
OVERCAST/RAIN

END	SB			WB			NB			EB			APPROACHES								SOUTH LEG			
TIME	R	T	L	R	T	L	R	T	L	R	T	L	SB	WB	NB	EB	EB/WB	NB/SB	ALL		NB	SB	Bothways	
4:15	13	2	7	7	47	3	3	0	2	2	18	6	22	57	5	26	83	27	110	494	5	7	12	86
4:30	16	0	6	15	46	7	6	0	4	2	18	3	22	68	10	23	91	32	123	540	10	9	19	119
4:45	9	4	6	15	45	5	5	1	2	3	26	5	19	65	8	34	99	27	126	540	8	12	20	126
5:00	18	9	6	18	42	12	5	1	5	3	16	0	33	72	11	19	91	44	135	568	11	24	35	136
5:15	16	3	7	6	51	16	10	2	8	6	28	3	26	73	20	37	110	46	156	562	20	25	45	137
5:30	15	4	6	12	38	7	7	0	1	7	17	9	25	57	8	33	90	33	123		8	18	26	
5:45	17	5	10	18	48	9	5	0	6	5	22	9	32	75	11	36	111	43	154		11	19	30	
6:00	16	3	4	16	40	15	13	0	0	5	15	2	23	71	13	22	93	36	129		13	23	36	
pk hr	66	21	29	54	179	44	27	3	20	21	83	21	116	277	50	125	402	166	568		50	86	136	



	2013 Extg pM
EBLT	21
EBT	83
EBRT	21
WBLT	44
WBT	179
WBRT	54
NBLT	20
NBT	3
NBRT	27
SBLT	29
SBT	21
SBRT	66
	568

PM PEAK HOUR

	116	78	
265			277
125			139
	86	50	

224	56
192	36
32	20
84	0
8	31
214	164
306	195
231	120
75	75

ATTACHMENT 8
SEP13-00959
APPLICANT TIA

PM TMC AT KIRKLAND AVE/MAIN ST
2/27/2013 WED
RAINING

PEDESTRIANS& BIKES

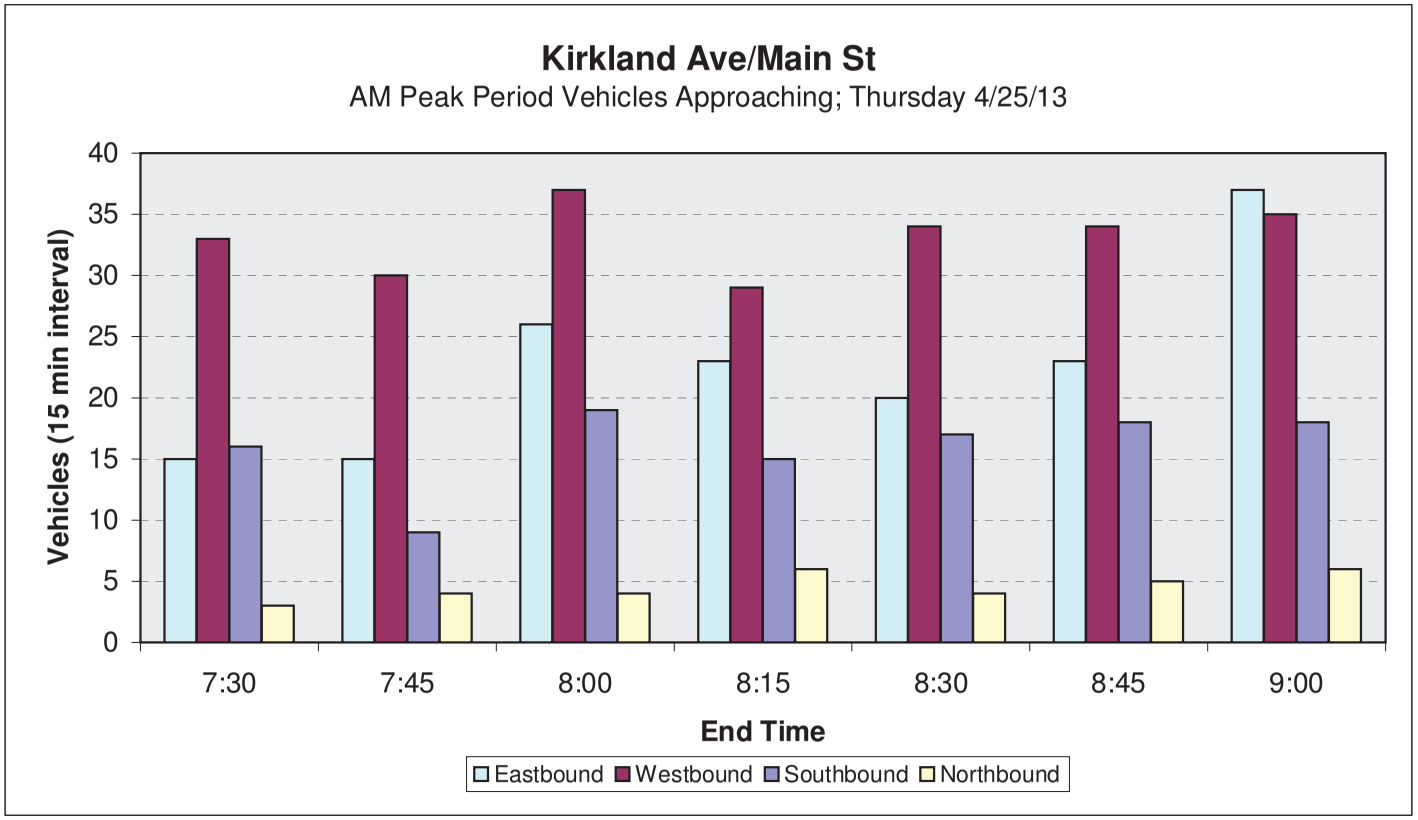
END TIME	SB	WB	NB	EB	APPROACHES SB	WB	NB	EB	EB/WB	NB/SB	ALL	
4:15	2	2	10	2	2	2	10	2	4	12	16	83
4:30	7	4	12	0	7	4	12	0	4	19	23	98
4:45	15	2	5	0	15	2	5	0	2	20	22	105
5:00	9	7	4	2	9	7	4	2	9	13	22	106
5:15	15	4	9	3	15	4	9	3	7	24	31	
5:30	18	2	9	1	18	2	9	1	3	27	30	
5:45	8	6	9	0	8	6	9	0	6	17	23	
6:00	14	1	11	2	14	1	11	2	3	25	28	
pk hr	0 50 0 0	19 0 0	31 0 0	6 0	50	19	31	6	25	81	106	
veh					116	277	50	125				
					43.1%	6.9%	62.0%	4.8%				

TRUCKS

END TIME	SB	WB	NB	EB	APPROACHES SB	WB	NB	EB	EB/WB	NB/SB	ALL	
4:15	0	0	0	0	0	0	0	0	0	0	0	2
4:30	0	0	0	1	0	0	0	1	1	0	1	2
4:45	0	1	0	0	0	1	0	0	1	0	1	1
5:00	0	0	0	0	0	0	0	0	0	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	
5:30	0	0	0	0	0	0	0	0	0	0	0	
5:45	0	0	0	0	0	0	0	0	0	0	0	
6:00	0	1	0	0	0	1	0	0	1	0	1	
pk hr	0 0 0 0	0 0 0	0 0 0	0 0	0	0	0	0	0	0	0	
veh					116	277	50	125				
					0.0%	0.0%	0.0%	0.0%				

AM TMC AT KIRKLAND AVE/MAIN ST
4/25/2013 THURSDAY
SUNNY/DRY/CLEAR 46 DEG

END	SB			WB			NB			EB			APPROACHES								SOUTH LEG			
TIME	R	T	L	R	T	L	R	T	L	R	T	L	SB	WB	NB	EB	EB/WB	NB/SB	ALL		NB	SB	Bothways	
7:30	9	1	6	12	18	3	2	0	1	2	12	1	16	33	3	15	48	19	67	284	3	6	9	43
7:45	3	2	4	5	22	3	2	2	0	1	14	0	9	30	4	15	45	13	58	292	4	6	10	44
8:00	9	4	6	7	28	2	2	2	0	2	22	2	19	37	4	26	63	23	86	314	4	8	12	44
8:15	6	2	7	4	21	4	1	3	2	0	22	1	15	29	6	23	52	21	73	324	6	6	12	49
8:30	4	3	10	5	27	2	3	1	0	1	16	3	17	34	4	20	54	21	75		4	6	10	
8:45	8	1	9	3	29	2	3	1	1	2	17	4	18	34	5	23	57	23	80		5	5	10	
9:00	4	7	7	5	27	3	3	2	1	1	33	3	18	35	6	37	72	24	96		6	11	17	
pk hr	22	13	33	17	104	11	10	7	4	4	88	11	68	132	21	103	235	89	324		21	28	49	



	2013 Extg AM
EBLT	11
EBT	88
EBRT	4
WBLT	11
WBT	104
WBRT	17
NBLT	4
NBT	7
NBRT	10
SBLT	33
SBT	13
SBRT	22
	324

PM PEAK HOUR

	68	35	
130			132
103			131
	28	21	

224	56
192	36
32	20
84	0
8	31
214	164
306	195
231	120
75	75

ATTACHMENT 8
SEP13-00959
APPLICANT TIA

Kirkland-Main AM Count 4-25-13.xls, vehicles
6/5/2013

AM TMC AT KIRKLAND AVE/MAIN ST
4/25/2013 THURSDAY
SUNNY/DRY/CLEAR 46 DEG

	PEDESTRIANS								BIKES												
	SB		NB		EB		WB		SB			WB			NB			EB			
	East Leg	West Leg	East Leg	West Leg	North Leg	South Leg	North Leg	South Leg	R	T	L	R	T	L	R	T	L	R	T	L	
END TIME																					
7:30	1		1		1		1	1					1						1	1	
	1		1					2											1		
			1					1													
subtotal	2	0	3	0	1	0	1	4	0	0	0	0	1	0	0	0	0	0	2	1	15
7:45	1		1		1	3	1	2											1		
						1	1	1											1		
								1													
subtotal	1	0	1	0	1	4	2	4	0	0	0	0	0	0	0	0	0	0	2	0	15
8:00	1	1	1		1	1		1					1								
	1	2	1	1		1		1													
						1															
						1															
subtotal	2	3	2	1	1	4	0	2	0	0	0	0	1	0	0	0	0	0	0	0	16
8:15	1		1	1	1	1	1	1													
	1				1	1	1	1													
	1					1	3	1													
subtotal	3	0	1	1	2	3	5	3	0	0	0	0	0	0	0	0	0	0	0	0	18
8:30	1	2	2	1		1	1	1			2		1								
	1	1				1	1	1													
		1				1	1	1													
subtotal	2	4	2	1	0	3	4	3	0	0	2	0	1	0	0	0	0	0	0	0	22
8:45	1	2		1	1	1		1			1								1		
	1	1		1	1	1															
		1																			
		2																			
subtotal	2	6	0	2	2	2	0	1	0	0	1	0	0	0	0	0	0	0	1	0	17
9:00	2	1	1	1	1	1	1	1					1						1		
	1	1	1	1	1	1	2	1													
	1		1	1	2		1	1													
	1						1														
	1						1														
							1														
subtotal	6	2	3	3	4	2	7	3	0	0	0	0	1	0	0	0	0	0	1	0	32

	PEDESTRIANS								BIKES												
	SB		NB		EB		WB		SB			WB			NB			EB			
	East Leg	West Leg	East Leg	West Leg	North Leg	South Leg	North Leg	South Leg	R	T	L	R	T	L	R	T	L	R	T	L	
8 to 9am	13	12	6	7	8	10	16	10	0	0	3	0	2	0	0	0	0	0	2	0	89

8-9am

North Leg Crosswalk	24
South Leg Crosswalk	20
East Leg Crosswalk	19
West Leg Crosswalk	19

Total Entering vehicles (pk hr) =	324
Total Entering bikes (pk hr) =	7
	2.2%

AM TMC AT KIRKLAND AVE/MAIN ST
4/25/2013 THURSDAY
SUNNY/DRY/CLEAR 46 DEG

END	SB			WB			NB			EB			APPROACHES							
TIME	R	T	L	R	T	L	R	T	L	R	T	L	SB	WB	NB	EB	EB/WB	NB/SB	ALL	
7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
7:45	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	1	4
8:00	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	1	5
8:15	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	1	5
8:30	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	
8:45	0	1	0	0	0	1	0	0	0	0	0	0	1	1	0	0	1	1	2	
9:00	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	1	
pk hr	0	1	0	1	0	2	0	0	0	0	0	1	1	3	0	1	4	1	5	
veh													68	132	21	103				
													1.5%	2.3%	0.0%	1.0%				

this truck at 7:31 SU30 from east drives thru intersection into EB lane, then backs into south leg
and parks on east side of road north of the circle. Stays until 7:53; leaves as NBT

small MG truck (small delivery type)

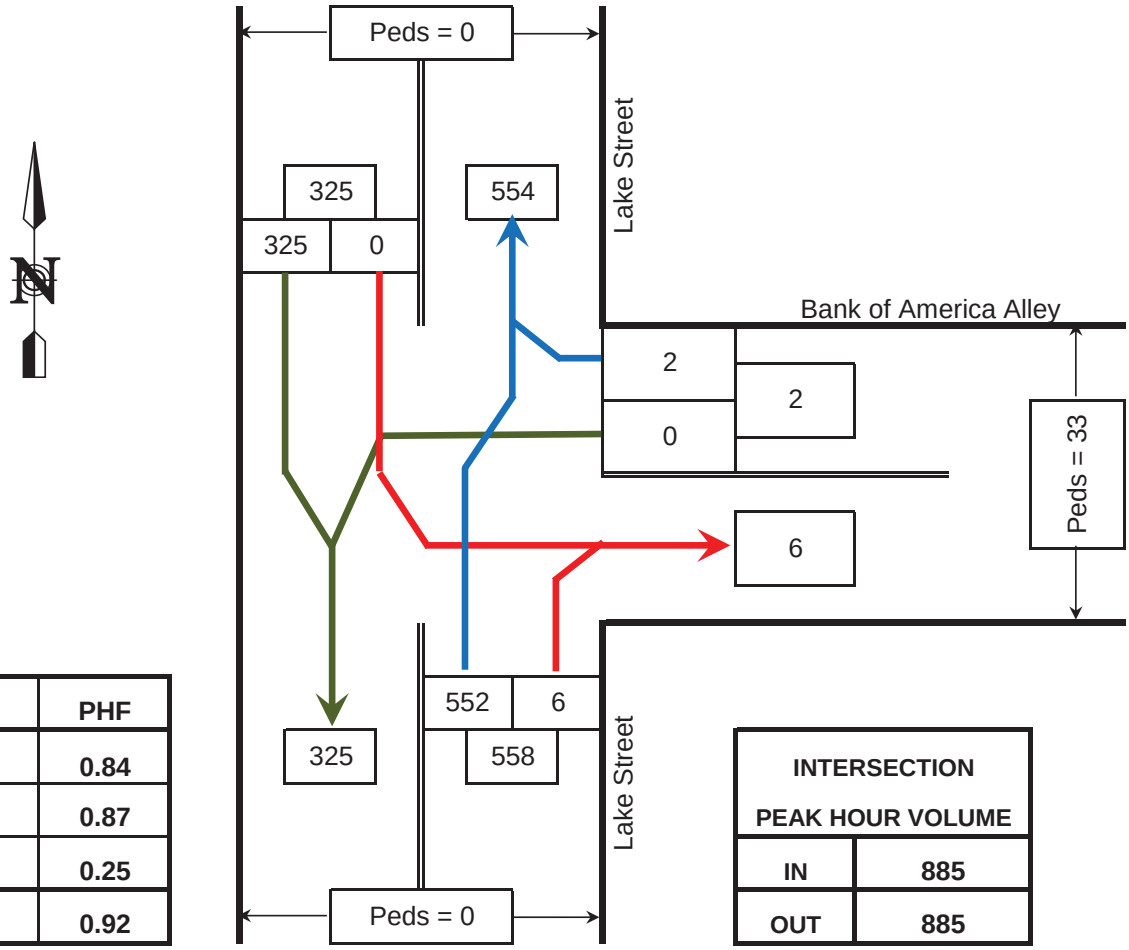
note: an SU30 type truck parks south side of Kirkland Ave east of Main; unloads boxes onto handtruck
delivers to west side of Main possibly 101 or Hectors
8:26 back to truck and leaves EB

Charlies Produce SU 30 truck arrives at 8:32
same truck likely at 8:47 makes EBLT; lexited alley to Lake St and likely circled around

TRAFFIC DATA GATHERING

TURNING MOVEMENTS DIAGRAM

4:00 PM - 6:00 PM PEAK HOUR: 4:00 PM TO 5:00 PM



	HV	PHF
SB	1%	0.84
NB	1%	0.87
WB	0%	0.25
INTRS.	1%	0.92

INTERSECTION PEAK HOUR VOLUME	
IN	885
OUT	885

HV = Heavy Vehicles
PHF = Peak Hour Factor

Lake Street @ Bank of America Alley

Kirkland, WA

COUNTED BY: RH

REDUCED BY: CN

REDUCTION DATE: Thu. 2/28/13

DATE OF COUNT: Wed. 2/27/13

TIME OF COUNT: 4:00 PM - 6:00 PM

WEATHER: Rainy

TRAFFIC DATA GATHERING

INTERSECTION TURNING MOVEMENTS REDUCTION SHEET

LOCATION: Lake Street @ Bank of America Alley
Kirkland, WA

DATE OF COUNT: Wed. 2/27/13
TIME OF COUNT: 4:00 PM - 6:00 PM

COUNTED BY: RH
WEATHER: Rainy

TIME INTERVAL ENDING AT	FROM NORTH ON Lake Street					FROM SOUTH ON Lake Street					FROM EAST ON Bank of America Alley					FROM WEST ON					INTERVAL TOTALS
	Peds	HV	Left	Thru	Right	Peds	HV	Left	Thru	Right	Peds	HV	Left	Thru	Right	Peds	HV	Left	Thru	Right	
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	70	0	0	3	0	135	1	10	0	0	0	0	0	0	0	0	0	206
04:30 PM	0	3	0	78	0	0	3	0	133	1	7	0	0	0	0	0	0	0	0	0	212
04:45 PM	0	1	0	80	0	0	1	0	157	3	10	0	0	0	0	0	0	0	0	0	240
05:00 PM	0	0	0	97	0	0	0	0	127	1	6	0	0	0	2	0	0	0	0	0	227
05:15 PM	0	0	0	66	0	0	1	0	109	1	12	0	0	0	5	0	0	0	0	0	181
05:30 PM	0	0	0	70	0	0	0	0	127	3	9	0	0	0	1	0	0	0	0	0	201
05:45 PM	0	0	0	69	0	0	0	0	115	3	12	0	0	0	1	0	0	0	0	0	188
06:00 PM	0	0	0	53	0	0	0	0	112	3	6	0	0	0	1	0	0	0	0	0	169
PEAK HOUR TOTALS	0	4	0	325	0	0	7	0	552	6	33	0	0	0	2	0	0	0	0	0	INTERSECTION
ALL MOVEMENTS	325					558					2					0					885
% HV	1%					1%					0%					#N/A					1%
PEAK HOUR FACTOR	0.84					0.87					0.25					#N/A					0.92

PHF = Peak Hour Factor

4:00 PM - 6:00 PM PEAK HOUR: 4:00 PM TO 5:00 PM

REDUCED BY: CN

DATE OF REDUCTION: 2/28/2013

Lake St Place Mixed Use Office/Restaurant/Retail Development (110.421 ksf)
AM Peak Hour Turn Movement Volume Estimates

103 NE 68th St/State St

	Existing 2012 AM PK	2018 Future Growth [a]	2018 Background Traffic	Project Trips [b]	Horizon Yr 2018 AM PK
EBLT	59	30	89	6	95
EBT	164	16	180	0	180
EBRT	3	0	3	0	3
WBLT	12	1	13	0	13
WBT	190	16	206	0	206
WBRT	100	7	107	14	121
NBLT	10	1	11	0	11
NBT	10	1	11	0	11
NBRT	19	1	20	0	20
SBLT	221	17	238	3	241
SBT	4	0	4	0	4
SBRT	148	15	163	0	163
	940	105	1045	23	1068
			3.6%		

Existing 2012
PM PEAK HOUR

	373	169	
348			302
226			404
	19	39	

Background 2018
PM PEAK HOUR

	405	207	
380			326
272			438
	20	42	

Horizon Yr 2018
PM PEAK HOUR

	408	227	
380			340
278			441
	20	42	

[a] Background growth determined by City for 2017 (added 2% plus Google Ph2)
[b] Project trips are net-new non-pass-by trips (106 trips, 15 out, 91 in)

104 NE 68th St/108th Ave NE

	Existing 2012 AM PK	2018 Future Growth [a]	2018 Background Traffic	Project Trips [b]	Horizon Yr 2018 AM PK
EBLT	82	12	94	0	94
EBT	238	18	256	1	257
EBRT	157	11	168	2	170
WBLT	305	22	327	0	327
WBT	231	17	248	8	256
WBRT	111	108	219	0	219
NBLT	74	5	79	6	85
NBT	112	54	166	0	166
NBRT	140	11	151	0	151
SBLT	136	26	162	0	162
SBT	358	41	399	0	399
SBRT	68	6	74	0	74
	2012	331	2343	17	2360
			5.2%		

Existing 2012
PM PEAK HOUR

	562	305	
373			647
477			514
	820	326	

Background 2018
PM PEAK HOUR

	635	479	
401			794
518			569
	894	396	

Horizon Yr 2018
PM PEAK HOUR

	635	479	
415			802
521			570
	896	402	

[a] Background growth determined by City for 2017 (added 2% plus Google Ph2)
[b] Project trips are net-new non-pass-by trips (106 trips, 15 out, 91 in)

Lake St Place Mixed Use Office/Restaurant/Retail Development (110.421 ksf)
AM Peak Hour Turn Movement Volume Estimates

108 Lake St/Kirkland Ave

	Existing 2012 AM PK	2018 Future Growth [a]	2018 Background Traffic	Project Trips [b]	Horizon Yr 2018 AM PK
EBLT	7	0	7	0	7
EBT	77	6	83	0	83
EBRT	92	7	99	0	99
WBLT	78	8	86	4	90
WBT	20	1	21	0	21
WBRT	39	3	42	0	42
NBLT	8	0	8	0	8
NBT	190	14	204	1	205
NBRT	47	18	65	0	65
SBLT	7	2	9	15	24
SBT	795	57	852	0	852
SBRT	5	0	5	0	5
	1365	116	1481	20	1501
			2.8%		

Existing 2012
PM PEAK HOUR

	807	236	
33			137
176			131
	965	245	

Background 2018
PM PEAK HOUR

	866	253	
34			149
189			157
	1037	277	

Horizon Yr 2018
PM PEAK HOUR

	881	254	
34			153
189			172
	1041	278	

[a] Background growth determined by City for 2017 (added 2% plus Google Ph2)
[b] Project trips are net-new non-pass-by trips (106 trips, 15 out, 91 in)

109 NE 85th St/114th Ave NE

	Existing 2012 AM PK	2018 Future Growth [a]	2018 Background Traffic	Project Trips [b]	Horizon Yr 2018 AM PK
EBLT	7	0	7	0	7
EBT	706	108	814	3	817
EBRT	10	1	11	0	11
WBLT	258	163	421	10	431
WBT	782	320	1102	25	1127
WBRT	126	10	136	0	136
NBLT	8	0	8	0	8
NBT	2	0	2	0	2
NBRT	122	26	148	3	151
SBLT	378	27	405	0	405
SBT	31	3	34	0	34
SBRT	1	0	1	0	1
	2431	658	3089	41	3130
			8.3%		

Existing 2012
PM PEAK HOUR

	410	135	
791			1166
723			1206
	299	132	

Background 2018
PM PEAK HOUR

	440	145	
1111			1659
832			1367
	466	158	

Horizon Yr 2018
PM PEAK HOUR

	440	145	
1136			1694
835			1373
	476	161	

[a] Background growth determined by City for 2017 (added 2% plus Google Ph2)
[b] Project trips are net-new non-pass-by trips (106 trips, 15 out, 91 in)

Lake St Place Mixed Use Office/Restaurant/Retail Development (110.421 ksf)
AM Peak Hour Turn Movement Volume Estimates

111 Kirkland Ave/3rd Street

	Existing 2012 AM PK	2018 Future Growth [a]	2018 Background Traffic	Project Trips [b]	Horizon Yr 2018 AM PK
EBLT	9	1	10	0	10
EBT	112	16	128	4	132
EBRT	40	3	43	3	46
WBLT	64	4	68	0	68
WBT	95	45	140	17	157
WBRT	33	4	37	0	37
NBLT	30	3	33	22	55
NBT	72	5	77	0	77
NBRT	95	7	102	0	102
SBLT	85	13	98	0	98
SBT	274	20	294	0	294
SBRT	26	3	29	0	29
	935	124	1059	46	1105
			4.2%		

Existing 2012
PM PEAK HOUR

385	114
151	192
161	292
378	197

Background 2018
PM PEAK HOUR

421	124
202	245
181	328
405	212

Horizon Yr 2018
PM PEAK HOUR

421	124
241	262
188	332
408	234

[a] Background growth determined by City for 2017 (added 2% plus Google Ph2)
[b] Project trips are net-new non-pass-by trips (106 trips, 15 out, 91 in)

112 Kirkland Way/6th Street

	Existing 2012 AM PK	2018 Future Growth [a]	2018 Background Traffic	Project Trips [b]	Horizon Yr 2018 AM PK
EBLT	36	18	54	0	54
EBT	168	12	180	3	183
EBRT	42	4	46	1	47
WBLT	88	36	124	0	124
WBT	146	11	157	10	167
WBRT	30	117	147	0	147
NBLT	40	5	45	2	47
NBT	115	63	178	0	178
NBRT	16	6	22	0	22
SBLT	22	14	36	0	36
SBT	275	83	358	0	358
SBRT	60	4	64	5	69
	1038	373	1411	21	1432
			10.8%		

Existing 2012
PM PEAK HOUR

357	181
246	264
246	206
405	171

Background 2018
PM PEAK HOUR

458	379
266	428
280	238
528	245

Horizon Yr 2018
PM PEAK HOUR

463	379
283	438
284	241
529	247

[a] Background growth determined by City for 2017 (added 2% plus Google Ph2)
[b] Project trips are net-new non-pass-by trips (106 trips, 15 out, 91 in)

Lake St Place Mixed Use Office/Restaurant/Retail Development (110.421ksf)
PM Peak Hour Turn Movement Volume Estimates

103 NE 68th St/State St

	Existing 2012 PM PK	2018 Future Growth [a]	2018 Background Traffic	Project Trips [b]	Horizon Yr 2018 PM PK
EBLT	267	46	313	0	313
EBT	322	58	380	0	380
EBRT	5	1	6	0	6
WBLT	18	3	21	0	21
WBT	247	47	294	0	294
WBRT	271	55	326	8	334
NBLT	6	1	7	0	7
NBT	11	2	13	0	13
NBRT	18	3	21	0	21
SBLT	148	21	169	14	183
SBT	10	1	11	0	11
SBRT	104	28	132	6	138
	1427	266	1693 5.9%	28	1721

Existing 2012
PM PEAK HOUR

	262	549	
357			536
594			488
	33	35	

Background 2018
PM PEAK HOUR

	313	652	
434			641
699			570
	38	40	

Horizon Yr 2018
PM PEAK HOUR

	333	660	
440			649
699			584
	38	40	

[a] Background growth determined by City

[b] Project trips are net new non-pass-by trips (149 trips, 99 out, 50 in)

104 NE 68th St/108th Ave NE

	Existing 2012 PM PK	2018 Future Growth [a]	2018 Background Traffic	Project Trips [b]	Horizon Yr 2018 PM PK
EBLT	166	26	192	0	192
EBT	292	60	352	8	360
EBRT	64	12	76	6	82
WBLT	193	38	231	0	231
WBT	244	59	303	3	306
WBRT	148	29	177	0	177
NBLT	154	23	177	5	182
NBT	257	74	331	0	331
NBRT	124	24	148	0	148
SBLT	170	87	257	0	257
SBT	123	49	172	0	172
SBRT	105	20	125	0	125
	2040	502	2542 7.6%	22	2564

Existing 2012
PM PEAK HOUR

	398	571	
503			585
522			586
	380	535	

Background 2018
PM PEAK HOUR

	555	700	
605			711
621			757
	480	656	

Horizon Yr 2018
PM PEAK HOUR

	555	700	
613			714
635			765
	486	661	

[a] Background growth determined by City

[b] Project trips are net new non-pass-by trips (149 trips, 99 out, 50 in)

Lake St Place Mixed Use Office/Restaurant/Retail Development (110.421ksf)
PM Peak Hour Turn Movement Volume Estimates

108 Lake St/Kirkland Ave

	Existing 2012 PM PK	2018 Future Growth [a]	2018 Background Traffic	Project Trips [b]	Horizon Yr 2018 PM PK
EBLT	17	3	20	0	20
EBT	61	8	69	0	69
EBRT	36	5	41	0	41
WBLT	70	9	79	11	90
WBT	44	7	51	0	51
WBRT	87	12	99	6	105
NBLT	3	0	3	0	3
NBT	507	82	589	10	599
NBRT	73	10	83	0	83
SBLT	3	1	4	0	4
SBT	320	61	381	0	381
SBRT	43	6	49	0	49
	1264	204	1468	27	1495
			5.1%		

Existing 2012
PM PEAK HOUR

	366	611	
90			201
114			137
	426	583	

Background 2018
PM PEAK HOUR

	435	707	
103			229
130			156
	502	675	

Horizon Yr 2018
PM PEAK HOUR

	435	723	
103			246
130			156
	513	685	

[a] Background growth determined by City

[b] Project trips are net new non-pass-by trips (149 trips, 99 out, 50 in)

109 NE 85th St/114th Ave NE

	Existing 2012 PM PK	2018 Future Growth [a]	2018 Background Traffic	Project Trips [b]	Horizon Yr 2018 PM PK
EBLT	8	1	9	0	9
EBT	636	132	768	12	780
EBRT	4	-2	2	0	2
WBLT	156	24	180	11	191
WBT	691	200	891	9	900
WBRT	204	28	232	0	232
NBLT	1	0	1	0	1
NBT	25	4	29	0	29
NBRT	254	82	336	26	362
SBLT	327	45	372	0	372
SBT	19	3	22	0	22
SBRT	5	1	6	0	6
	2330	517	2847	58	2905
			6.9%		

Existing 2012
PM PEAK HOUR

	351	237	
697			1051
648			1217
	179	280	

Background 2018
PM PEAK HOUR

	400	270	
898			1303
778			1476
	203	366	

Horizon Yr 2018
PM PEAK HOUR

	400	270	
907			1323
790			1514
	214	392	

[a] Background growth determined by City

[b] Project trips are net new non-pass-by trips (149 trips, 99 out, 50 in)

Lake St Place Mixed Use Office/Restaurant/Retail Development (110.421ksf)
PM Peak Hour Turn Movement Volume Estimates

111 Kirkland Ave/3rd Street

	Existing 2012 PM PK	2018 Future Growth [a]	2018 Background Traffic	Project Trips [b]	Horizon Yr 2018 PM PK
EBLT	20	4	24	0	24
EBT	104	15	119	33	152
EBRT	32	5	37	22	59
WBLT	115	17	132	0	132
WBT	121	19	140	14	154
WBRT	123	27	150	0	150
NBLT	78	10	88	8	96
NBT	325	54	379	0	379
NBRT	156	22	178	0	178
SBLT	86	12	98	0	98
SBT	149	27	176	0	176
SBRT	40	7	47	0	47
	1349	219	1568	77	1645
			5.1%		

Existing 2012
PM PEAK HOUR

	275	468	
239			359
156			346
	296	559	

Background 2018
PM PEAK HOUR

	321	553	
275			422
180			395
	345	645	

Horizon Yr 2018
PM PEAK HOUR

	321	553	
297			436
235			428
	367	653	

[a] Background growth determined by City
[b] Project trips are net new non-pass-by trips (149 trips, 99 out, 50 in)

112 Kirkland Way/6th Street

	Existing 2012 PM PK	2018 Future Growth [a]	2018 Background Traffic	Project Trips [b]	Horizon Yr 2018 PM PK
EBLT	73	12	85	2	87
EBT	201	28	229	27	256
EBRT	41	8	49	2	51
WBLT	46	11	57	0	57
WBT	150	21	171	11	182
WBRT	36	6	42	0	42
NBLT	62	24	86	1	87
NBT	345	102	447	0	447
NBRT	21	51	72	0	72
SBLT	29	4	33	0	33
SBT	162	36	198	0	198
SBRT	70	10	80	0	80
	1236	313	1549	43	1592
			7.8%		

Existing 2012
PM PEAK HOUR

	261	454	
282			232
315			251
	249	428	

Background 2018
PM PEAK HOUR

	311	574	
337			270
362			334
	304	605	

Horizon Yr 2018
PM PEAK HOUR

	311	576	
349			281
393			361
	306	606	

[a] Background growth determined by City
[b] Project trips are net new non-pass-by trips (149 trips, 99 out, 50 in)

APPENDIX C

TECHNICAL APPENDIX
for
Lake St Mixed Use Development

City of Kirkland Concurrency Test Notice
and
Concurrency Results Forms

CITY OF KIRKLAND

123 FIFTH AVENUE • KIRKLAND, WASHINGTON 98033-6189 • (425) 587-3800

DEPARTMENT OF PUBLIC WORKS MEMORANDUM

To: Jon Regala, Senior Planner

From: Thang Nguyen, Transportation Engineer

Date: August 29, 2013

Subject: McCleod Mixed-Use Development Concurrency Test Notice, Tran13-00304

The purpose of this memo is to inform you that the proposed McCleod Mixed-Use development has been tested for traffic concurrency and passed.

Project Description

The applicant proposes to expand a mixed-use commercial site to a total of 81,814 square feet of gross floor area. The build-out of the development will be completed in two phases. Phase I is anticipated to be completed and occupied by 2015. The full build-out is anticipated to be completed by the end of 2018. One driveway from an alley will provide vehicular access into the multi-level parking garage that will serve the development. Table 1 summarizes the development size.

Table 1. Development Gross Floor Area Summary (Square Feet)

	Retail	**Quality Restaurant**	**High-Turnover Restaurant**	**Office**	**Total**
Proposed	17,512	18,766	1,626	72,517	110,421
Existing	2,163	11,173	1,626	13,645	28,607
Net New	**15,349**	**7,593**	**0**	**58,872**	**81,814**

Trip Generation

ITE Trip Generation Report was used to calculate trip generation for the proposed project. The proposed development is forecasted to generate 1,255 daily, 107 AM and 149 PM peak hour trips.

This memo will serve as the concurrency test notice for the proposed project. A traffic impact analysis report must be submitted to the City for review within 90 days of this memo to maintain this concurrency memo current.

EXPIRATION

The concurrency test notice shall expire and a new concurrency test application is required unless:

1. A complete SEPA checklist, traffic impact analysis and all required documentation are submitted to the City within 90 calendar days from the date of this memo .

2. A Certificate of Concurrency is issued or an extension is requested and granted by the Public Works Department within one year of issuance of this concurrency test notice. (A Certificate of Concurrency is issued at the same time a development permit or building permit is issued if the applicant holds a valid concurrency test notice.)

3. A Certificate of Concurrency shall expire six years from the date of issuance of this concurrency test notice unless all building permits are issued for buildings approved under the concurrency test notice.

APPEALS

The concurrency test notice may be appealed by the public or agency with jurisdiction. The concurrency test notice is subject to an appeal until the SEPA review process is complete and the appeal deadline has passed. Concurrency appeals are heard before the Hearing Examiner along with any applicable SEPA appeal. For more information, refer to the Kirkland Municipal Code, Title 25. If you have any questions, please call me at x3869.

cc: William Popp Associates
Rob Jammerman, Development Engineer Manager

1) Project ID:	McCleod Mixed-Use 2013	4) Transportation Concurrency Status	6) Transportation Concurrency Certificate Date:
2) Project Description:	Expansion of a mixed-use development	PASS	
	Enter 47 / Exit 97 / Enter / Exit	5) Transportation Concurrency Test Date	7) Certificate of Occupancy Date
3) Build-out Year: 2018	factor = 1	August 29, 2013	

SUMMARY OF TRAFFIC IMPACTS

8) Daily Trips	1,255	PM Peak Trips:	149 (50, 99) Net New	Impacted Subarea(s):	South	TAZ:	254	Case #

Signalized Intersection PM Peak Traffic Impact

Code	Intersection	Project PM Peak Turning Volumes												PM Peak	Daily Trips	Sum of	Vol.
		Eastbound			Westbound			Northbound			Southbound						
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT				
401	NE 85th St/132nd Ave NE		9			5								14			
402	NE 85th St/124th Ave NE	2	10			6								18			
403	NE 85th St/120th Ave NE	3	13			7		1						24			
404	NE 100th St/124th Ave NE								4					4			
406	NE 70th St/132nd Ave NE		1											1			
407	NE 70th St/116th Ave NE		1	1				3						5			
408	NE 90th St/124th Ave NE	2							2					4			
409	NE 85th St/122nd Ave NE		13			6								19			
410	116th Ave NE/I-405 NB off Ramp	3												3			
411	NE 70th St/I-405 SB off Ramp		2	6								3		11			
														0			
														0			
														0			
														0			
														0			
	Lake St/Alley						10			13		11		34			
	Main St/Alley	89											37	126			
	Main St/Kirkland Ave			0	22			17	17	55		15		126			
	Alley/Driveway			13	37			10		89				149			

Transportation Concurency Test

	LOS Standards		LOS with Project Impacts			
Subarea No	A= Max. Intersection LOS	B=Average 2013 V/C	a=No. exceeding 1.4	b=Average V/C	a <= A?	b<= B?
Southwest (1xx)	1.4	0.91	0	0.69	yes	yes
Northwest (2xx)	1.4	0.95	0	0.84	yes	yes
Northeast (3xx)	1.4	0.93	0	0.80	yes	yes
East(4xx)	1.4	1.07	0	0.95	yes	yes
Annex(5xx)	1.4	n/a	0	n/a	yes	n/a

TEST RESULTS

Result: PASS

* Based on Critical Movement, Planning Method TRC #212.

1. Number of intersection exceeding Average V/C LOS Standard

1. Sixth Year Target Average V/C ratio, see step 6, part 1 of the guidelines

ATTACHMENT 8
SEP13-00959
APPLICANT TIA

		PM PK Project Assignment											
ginal		Eastbound			Westbound			Northbound			Southbound		
rt order		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
101	Lake WA Blvd/NE 38th Pl	1			1				9		1		1
102	Lake WA Blvd/Lakeview Dr	2			6				9		3	12	
103	NE 68th St/State St						8				14		6
104	NE 68th St/108th Ave NE		8	6		3		5					
105	Central Way/6th St		12			9			1				1
106	Central Way/3rd St S	4	13			10							1
107	Central Way/Lake St		3	0				16					
108	Lake St/Kirkland Ave				11		0		16		0		
109	NE 85th St/114th Ave NE		12		11	9				26			
110	6th St S/4th St				0				1	1			
111	Kirkland Ave/3rd Street		33	22		14		8					
112	Kirkland Way/6th Street	2	27	2		11		1					
201	NE 116th St/98th Ave NE			1				5	9	1		1	
202	NE 124th St/100th Ave NE								8	1		1	
203	NE 132nd St/100th Ave NE								8			1	
204	NE 132nd St/116th Ave NE												
205	Forbes Creek Dr/Market St								16	1		3	
206	NE 120th Pl/100th Ave NE								9			1	
207	Juanita Dr/93rd Ave NE		1			5							
208	Juanita Dr/97th Ave NE		1			5							
209	n/a												
211	n/a												
301	NE 132nd St/120th Ave NE												
302	NE 130th St/120th Ave NE												
303	NE 128th St/120th Ave NE												
304	NE 132nd St/124th Ave NE												
306	NE 124th St/Slater Ave NE								1	1			
307	Totem Lake Blvd/120th Ave NE												
310	NE 116th St/120th Ave NE												
311	NE 116th St/124th Ave NE		1						4				1
312	NE 124th St/116th Way NE												
313	NE 124th St/113th Ave NE												
314	NE 120th St/Slater Ave NE												
315	NE 124th St/124th Ave NE								1	1			
316	NE 132nd St/Totem Lake Blvd												
317	NE 124th St/SB I.405 off Ramp												
318	NE 124th St/NB I.405 on/off Ramp												
319	NE 116th St/SB I.405 on Ramp				1								
320	NE 116th St/NB I.405 off Ramp					1				1			
324	NE 128th St/116th Way NE												
325	NE 124th St/128th Lane NE		1										
401	NE 85th St/132nd Ave NE		9			5							
402	NE 85th St/124th Ave NE	2	10			6							
403	NE 85th St/120th Ave NE	3	13			7		1					
404	NE 100th St/124th Ave NE								4				
406	NE 70th St/132nd Ave NE		1										
407	NE 70th St/116th Ave NE		1	1				3					
408	NE 90th St/124th Ave NE	2							2				
409	NE 85th St/122nd Ave NE		13			6							
410	116th Ave NE/I.405 NB off Ramp	3											
411	NE 70th St/I.405 SB off Ramp		2	6									
412	NE 85th St/128th Ave NE		9			6							
416	NE 80th St/132nd Ave NE					1							
501	North Holmes Pt Dr NE/Juanita Dr NE								2				
502	South Holmes Pt Dr NE/Juanita Dr NE								2				
503	NE 141st Street/Juanita Dr NE								2				
504	Juanita.Woodinville Way/100th Ave NE					4	4					1	
505	NE 137th St/100th Ave NE												
506	Simonds Road/100th Avenue NE							1	3			1	
507	NE 145th street/100th Avenue NE				1				3				
508	NE 145th Street/Juanita.Woodinville Way								3				
509	NE 140th St/132nd Ave NE												
510	NE 132nd Street/132nd Avenue NE								1				
511	NE 144th Street/124th Avenue NE												
512	NE 124th Street/Willows Road NE		1										
1001	Lake St/Alley						10			13		11	
1002	Main St/Alley	89											37
1003	Main St/Kirkland Ave			0	22			17	17	55		15	
1004	Alley/Project Driveway			13	37			10		89			

William Popp Associates *Transportation Engineers/Planners*

(425) 401-1030
FAX (425) 401-2125
e-mail: info@wmpoppassoc.com

May 9, 2013

To: Thang Nguyen
Transportation Engineer
City of Kirkland

From: William Popp, Jr.
William Popp Associates

Subject: **Lake Street Mixed Use Development**
Re: **Trip Generation Analysis for Concurrency (Update of May 1, 2013 submittal; trip capture and pass-by adjustments)**

The following memorandum was prepared to identify trip generation estimates associated with the proposed land use changes to the site. This is an update to the previous 5/1/13 submittal and reflects a few corrections to the trip capture in-out volumes (trip capture totals correct) and a few minor adjustments to pass-by trip estimates; to clean up rounding issues in the spreadsheet calculations. This memorandum does not reflect any changes to floor areas, but nevertheless they are restated herein.

Project Description – Existing and New Floor Areas

The existing site uses consists of office, retail, and various restaurant uses. The total floor area for the existing site (as it would have been within one year of today) is approximately 28,607 gsf. The proposed redevelopment of the site will also be a mix of office, retail, and restaurant uses. The total floor area increases to 110,421 gsf. The net increase in building area is 81,814 gsf, which includes 83,786 gsf of proposed new floor area and 1,972 gsf of existing renovated floor area.

Table 1 below identifies the floor areas for existing and proposed redevelopment, and by the various land uses.

Table 1
Project Specifications EXISITNG and FUTURE SITE Redevelopment [a]

Building	Retail (gsf)	Quality Restaurant (gsf)	High Turnover Restaurant (gsf)	Office (gsf)	Total (gsf)
EXISTING SITE BUIDING AREA SPECFIICATIONS [b]					
Hector's	0	4,670	0	2,528	7,198
Lakeside	0	0	0	0	0
KWM	2,163	6,503	1,626	11,117	21,409
Main St	0	0	0	0	0
Calabria	0	0	0	0	0
All	2,163	11,173	1,626	13,645	28,607
PROPOSED FINAL PROJECT BUILDING AREA SPECIFCIATIONS (TOTAL AREA)					
Hector's	0	10,174	0	27,514	37,688
Lakeside [d]	0	0	0	0	0
KWM	2163	8,592	1,626	24,894	37,275
Main St	15,349	0	0	20,109	35,458
Calabria [d]	0	0	0	0	0
All	17,512	18,766	1,626	72,517	110,421

[a] per Chesmore/Buck Architecture.
[b] Lakeside and Calarbria currently demolished, floors areas shown for trip generation credit purposes.
[c] KWM=Kirkland Waterfront Market.
[d] this building does not exist for future site.

As shown in Table 1, the existing total gross floor area is 28,607 gsf, which does not include the Lakeside and Calabria buildings, which were demolished in 2010. The proposed project redevelopment's gross floor area is proposed to be approximately 110,421 gsf. The largest land use increase in the project is in the office land use. The retail use increases significantly as well. There is a minor increase in the quality restaurant space, and the high turnover restaurant use declines slightly.

Trip Generation

Trip generation estimates daily, AM and PM peak hours for the proposed project were calculated using trip generation rates obtained from the Eighth Edition of the ITE *Trip Generation Report*, 2008 as well as supplemented with information presented in the ITE Trip Generation Handbook. This would include estimates for internal site trip making characteristics as well as pass-by assumptions for the restaurant uses. The retail use is expected to also have some pass-by trips however; there is no information within ITE to support a pass-by rate for non-specified retail use. It is estimated the pass-by rate could be approximately 25% of total external retail trips.

Trip generation estimates for the existing uses were computed with the same trip making assumptions noted for the future site.

The trip generation estimate for the existing conditions for Daily, AM, and PM street peak hours are shown in Table 2 below. The supporting trip capture assumptions used for the existing site uses are the same as for the future site uses.

It should be noted that the summary of trip generation for the City's concurrency run effort summarize only the external non-pass-by trips for each of the respective conditions. The external trips reflect those trips that have either an origin or destination trip end associated with the project. Due to the fact this is a mixed-use project, it is anticipated some of the trips will remain on-site for trips between land uses. In addition, this analysis summarizes only the non-pass-by trips since the pass-by trips are trips that would already be on the surrounding street system beyond the perimeter of the site.

Table 2
Trip Generation – Existing Site Uses

Land Use	AWDT	AM Peak Total	AM Peak In	AM Peak Out	PM Peak Total	PM Peak In	PM Peak Out
Office (13,645 gsf)							
LUC 710 Rate	11.01	1.55	0.88	0.12	1.49	0.17	0.83
All Trips	150	21	19	2	20	3	17
Internal Capture[1]	38	1	1	0	3	1	2
External[2]	112	20	18	2	17	2	15
Quality Restaurant (11,173 gsf)							
LUC 931 Rate	89.95	0.81	n/a	n/a	7.49	0.67	0.33
All Trips	1,005	9	7	2	84	56	28
Internal Capture[1]	56	1	0	1	4	2	2
External[2]	949	8	7	1	80	54	26
pass-by[3]	420	4	3	1	21	14	7
non-pass-by[4]	529	4	4	0	59	40	19
High Turnover Restaurant (1,626 gsf)							
LUC 931 Rate	89.95	0.81	n/a	n/a	7.49	0.67	0.33
All Trips	207	19	11	10	18	11	7
Internal Capture[1]	35	0	1	1	1	1	0
External[2]	172	19	10	9	17	10	7
pass-by[3]	73	8	4	4	6	3	3
non-pass-by[4]	99	11	6	5	11	7	4
Retail (2,163 gsf)							
LUC 814 Rate	44.32	1.09	0.66	0.34	2.71	0.44	0.56
All Trips	96	2	2	1	6	3	5
Internal Capture[1]	59	1	1	1	2	1	1
External [2]	37	1	1	0	4	2	2
TOTALS							
All Trips	1,458	51	37	14	128	73	55
Capture	188	3	1	2	10	5	5
External	1,270	48	36	12	118	68	50
pass-by	493	12	7	5	27	17	10
non-pass-by	777	36	29	7	91	51	40

1 See Attachment 1, 2, and 3 for estimated internal trip capture for AM, PM, and Daily respectively.
2 External vehicle trips entering or exiting the site
3 Pass-by for Quality Restaurant: 26% for PM Peak, and 44% for AM and daily. Pass-by for high turnover restaurant is 43% for all cases. These are for trips entering or existing the site (excludes all internal trips).
4 Non-pass-by trips are new and/or diverted trips entering or exiting the site (excludes all internal trips.

As shown in Table 2, the existing site is estimated to generate 777 daily, 36 AM, and 91 PM peak hour trips to the surrounding street system (non-pass-by trips only).

Table 3
Trip Generation – FUTURE Site Uses

Land Use	AWDT	AM Peak Total	AM Peak In	AM Peak Out	PM Peak Total	PM Peak In	PM Peak Out
Office (72,517 gsf)							
LUC 710 Rate	11.01	1.55	0.88	0.12	1.49	0.17	0.83
All Trips	798	112	99	13	108	18	90
Internal Capture[1]	93	1	1	0	5	2	3
External[2]	705	111	98	13	103	16	87
Quality Restaurant (18,766 gsf)							
LUC 931 Rate	89.95	0.81	n/a	n/a	7.49	0.67	0.33
All Trips	1,688	15	11	3	141	94	47
Internal Capture[1]	284	3	1	1	13	7	6
External[2]	1,404	12	10	2	128	87	41
pass-by[3]	621	6	4	2	33	22	11
non-pass-by[4]	783	6	6	0	95	65	30
High Turnover Restaurant (1,626 gsf)							
LUC 931 Rate	89.95	0.81	n/a	n/a	7.49	0.67	0.33
All Trips	207	19	10	9	18	10	8
Internal Capture[1]	67	2	1	1	4	2	2
External[2]	140	17	9	8	14	8	6
pass-by[3]	59	7	4	3	5	3	2
non-pass-by[4]	81	10	5	5	9	5	4
Retail (17,512 gsf)							
LUC 814 Rate	44.32	1.09	0.66	0.34	2.71	0.44	0.56
All Trips	776	19	12	5	47	22	25
Internal Capture1	312	4	1	1	14	7	7
External[2]	464	15	11	4	33	15	18
TOTALS							
All Trips	3,469	165	134	31	314	144	170
Capture	757	10	6	4	36	18	18
External	2,712	155	128	27	278	126	152
pass-by	680	13	8	5	38	25	13
non-pass-by	2,032	142	120	22	240	101	139

1 See Attachment 1, 2, and 3 for estimated internal trip capture for AM, PM, and Daily respectively.
2 External vehicle trips entering or exiting the site
3 Pass-by for Quality Restaurant: 26% for PM Peak, and 44% for AM and daily. Pass-by for high turnover restaurant is 43% for all cases. These are for trips entering or existing the site (excludes all internal trips).
4 Non-pass-by trips are new and/or diverted trips entering or exiting the site (excludes all internal trips.

As shown in Table 3, the proposed site redevelopment is estimated to generate 2,032 daily, 142 AM and 240 PM peak hour non-pass-by trips to the surrounding street

network. It is important to note that all these trips noted above represent average weekday conditions and reflect the external non-pass-by trips only.

Table 4 below identifies the change in trip generation "net new" conditions as a result of the land use and floor area adjustments for all of the four uses.

Table 4
NET NEW Trip Generation [1]

Land Use	AWDT	AM Peak Total	AM Peak In	AM Peak Out	PM Peak Total	PM Peak In	PM Peak Out
EXISTING SITE [2]	777	36	29	7	91	51	40
FUTURE SITE [3]	2,032	143	120	23	240	101	139
NET NEW [4]	1,255	107	91	16	149	50	99

[3] External (trips entering or exiting the site) non-pass-by trips, ie., excluding all internal trips (trip capture for mixed uses).
[2] Non-pass-by external-trips-only for existing site (including some recently vacant or demo'd); see Table 2 for trip generation details.
[3] Non-pass-by external-trips-only for future site (all uses); see Table 3 for trip generation details.
[4] Net New = project external non-pass-by trips minus the existing external non-pass-by trips.

As shown in Table 4, per ITE trip generation rates, the net new trip generation totals show that the site redevelopment's net new vehicular trip impact on the surrounding street system (non-pass-by) will result in an increase of 1,255 daily trips, 107 AM peak hour trips and 149 PM peak hour trips.

I believe that this analysis should address your needs pertaining to the trip generation adjustments for the subject project. Please call me at (425) 401-2124 if you have any questions.

cc: Eric DeGroot
Chesmore/Buck Architecture

Rick Chesmore
Chesmore/Buck Architecture

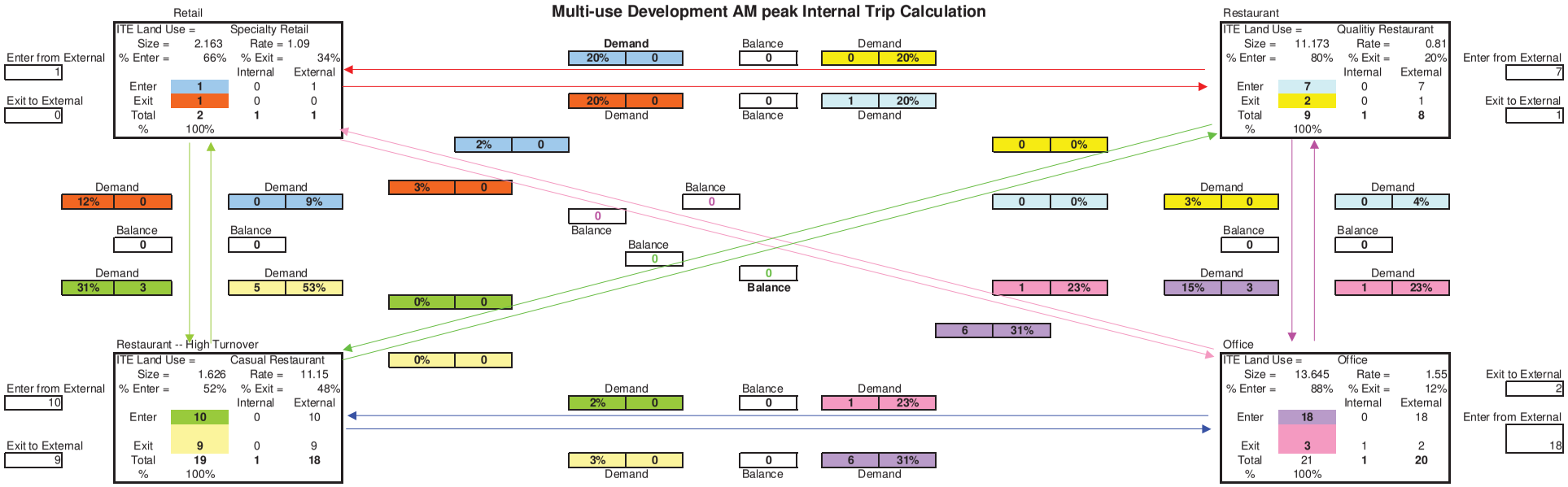
Stuart McLeod
McLeod Development Co.

Attachments –
1-6 Internal Capture Estimate – Existing & Proposed Site for AM, PM, and Daily

EXISTING SITE (without Lakeside or Calabria)
AM PEAK HOUR AVERAGE WEEKDAY VOLUMES

	gkfa	am rates rate		Gross AM TE's
710 Office	13.645	1.55	per gkfa	21
814 Retail	2.163	1.09	per gkfa	2
931 Quality Re	11.173	0.81	per gkfa	9
932 High Turn	1.626	11.15	per gkfa	19
	28.607			51

Multi-use Development AM peak Internal Trip Calculation



External Trips

	Specialty Retail	Casual Restaurant	Qualitiy Restaurant	Office	Sub-Total
External Enter	1	10	7	18	36
External Exit	0	9	1	2	12
Total External Trips	1	19	8	20	48
Internal Trips	1	0	1	1	3
Gross Trips	2	19	9	21	51
Overall Average Internal Capture Rate	50%	0%	11%	5%	6%
Pass-by Rate	0%	43%	44%	0%	
Pass-by Trips	0	8	4	0	12
non-pass-by	1	11	4	20	36

Source: 2001 ITE Trip Generation Handbook Methodology
Data Source: 7th Edition Trip Generation Report

	IN	OUT	TOTAL
Specialty Retail	1	0	1
Quality Restaurant (total)	7	1	8
Quality Restaurant (pass-by)	3	1	4
Quality Restaurant (non-pass-by)	4	0	4
High Turnover Restaurant	10	9	19
High Turnover Restaurant (pass-by)	*4*	*4*	*8*
High Turnover Restaurant (non-pass-by)	*6*	*5*	*11*
Office	18	2	20
Total External (non-pass-by only)	29	7	36
Total External (non- and pass-by)	36	12	48

ATTACHMENT 8
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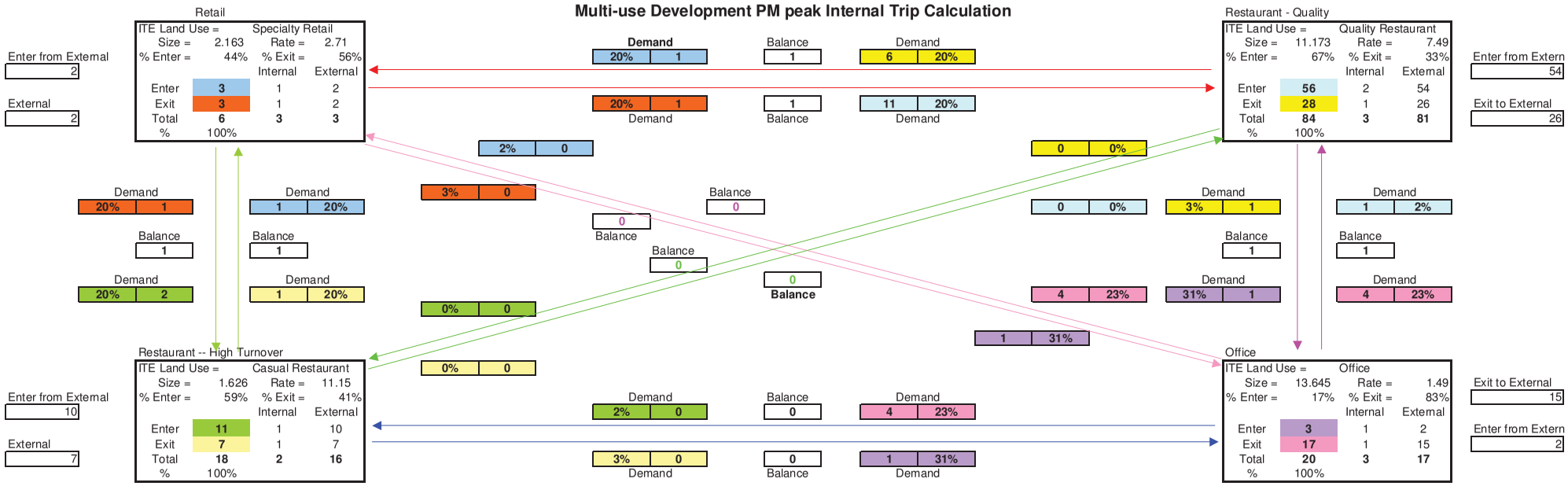
APPLICANT TIA

EXISTING SITE (without Lakeside or Calabria)
PROJECT PM PEAK HOUR (AVERAGE WEEKDAY)

	gkfa	PM rate		Gross PM TE's
710 Office	13.645	1.49	per gkfa	20
814 Retail	2.163	2.71	per gkfa	6
931 Quality Re	11.173	7.49	per gkfa	84
932 High Turnc	1.626	11.15	per gkfa	18
	28.607			128

Multi-use Development PM peak Internal Trip Calculation



External Trips

	Specialty Retail	Casual Restaura	Quality Restaura	Office	Sub-Total
External Enter	2	10	54	2	**68**
External Exit	2	7	26	15	**50**
Total External Trips	**4**	**17**	**80**	**17**	**118**
Internal Trips	**2**	**1**	**4**	**3**	**10**
Gross Trips	**6**	**18**	**84**	**20**	**128**
Overall Average Internal Capture Rate	33%	6%	5%	15%	8%
Pass-by Rate	0%	37%	26%	0%	
Pass-by Trips	0	6	21	0	27
non-pass-by	**4**	**11**	**59**	**17**	**91**

Source: 2001 ITE Trip Generation Handbook Methodology
Data Source: 8th Edition Trip Generation Report

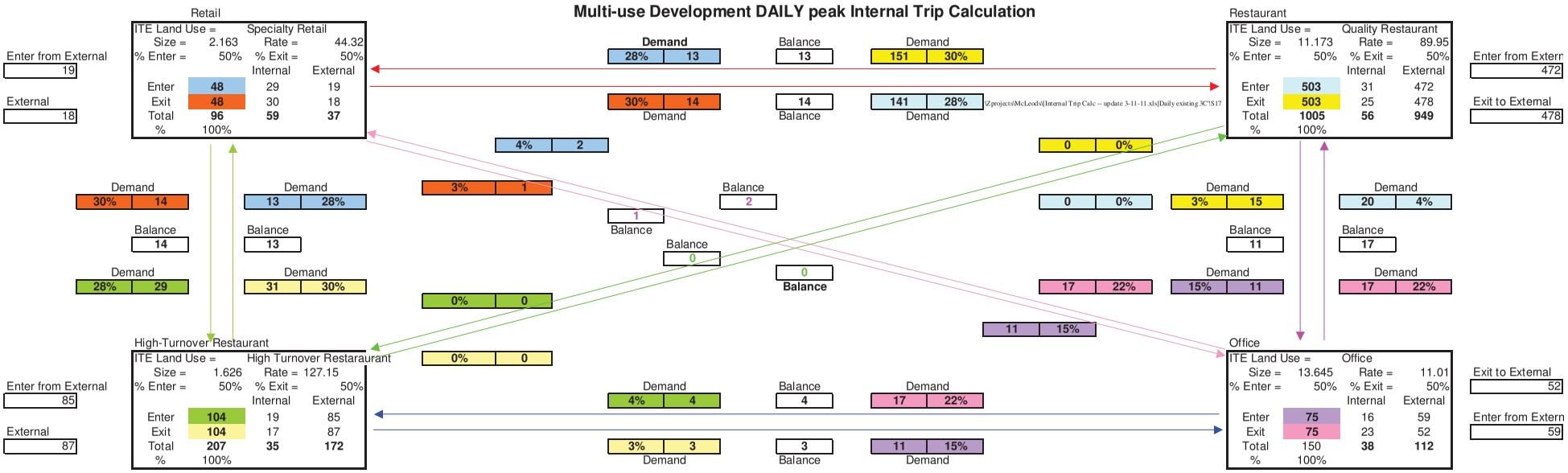
	IN	OUT	TOTAL
Specialty Retail	2	2	4
Quality Restaurant (total)	54	26	80
Quality Restaurant (pass-by)	*15*	*7*	*22*
Quality Restaurant (non-pass-by)	*39*	*19*	*58*
High Turnover Restaurant	10	7	17
High Turnover Restaurant (pass-by)	*4*	*3*	*7*
High Turnover Restaurant (non-pass-by)	*6*	*4*	*10*
Office	2	15	17
Total External (non-pass-by only)	49	40	89
Total External (non- and pass-by)	68	50	118

ATTACHMENT 8
SEP13-00959
APPLICANT TIA

EXISTING SITE (without Lakeside or Calabria)
PROJECT DAILY VOLUME ESTIMATE (AVERAGE WEEKDAY)

	gkfa	daily rate		Gross Daily TE's
710 Office	13.645	11.01	per gkfa	150
814 Retail	2.163	44.32	per gkfa	96
931 Quality Re	11.173	89.95	per gkfa	1005
932 High Turn	1.626	127.15	per gkfa	207
	28.607			1458

Multi-use Development DAILY peak Internal Trip Calculation



External Trips

	Specialty Retail	High Turnover	Quality Restaurant	Office	Sub-Total
External Enter	19	85	472	59	**635**
External Exit	18	87	478	52	**635**
Total External Trips	**37**	**172**	**949**	**112**	**1270**
Internal Trips	**59**	**35**	**56**	**38**	**188**
Gross Trips	**96**	**207**	**1005**	**150**	**1458**
Overall Average Internal Capture Rate					13%
Pass-by Rate	0%	43%	44%	0%	
Pass-by Trips	0	73	420	0	493
non-pass-by	**37**	**99**	**529**	**112**	**777**

Source: 2001 ITE Trip Generation Handbook Methodology
Data Source: 7th Edition Trip Generation Report

	IN	OUT	TOTAL
Specialty Retail	19	18	37
Quality Restaurant (total)	472	478	949
Quality Restaurant (pass-by)	*209*	*211*	*420*
Quality Restaurant (non-pass-by)	*263*	*267*	*529*
High Turnover Restaurant	85	87	172
High Turnover Restaurant (pass-by)	*36*	*37*	*73*
High Turnover Restaurant (non-pass-by)	*49*	*50*	*99*
Office	59	52	112
Total External (non-pass-by only)	390	387	777
Total External (non- and pass-by)	635	635	1270

ATTACHMENT 8
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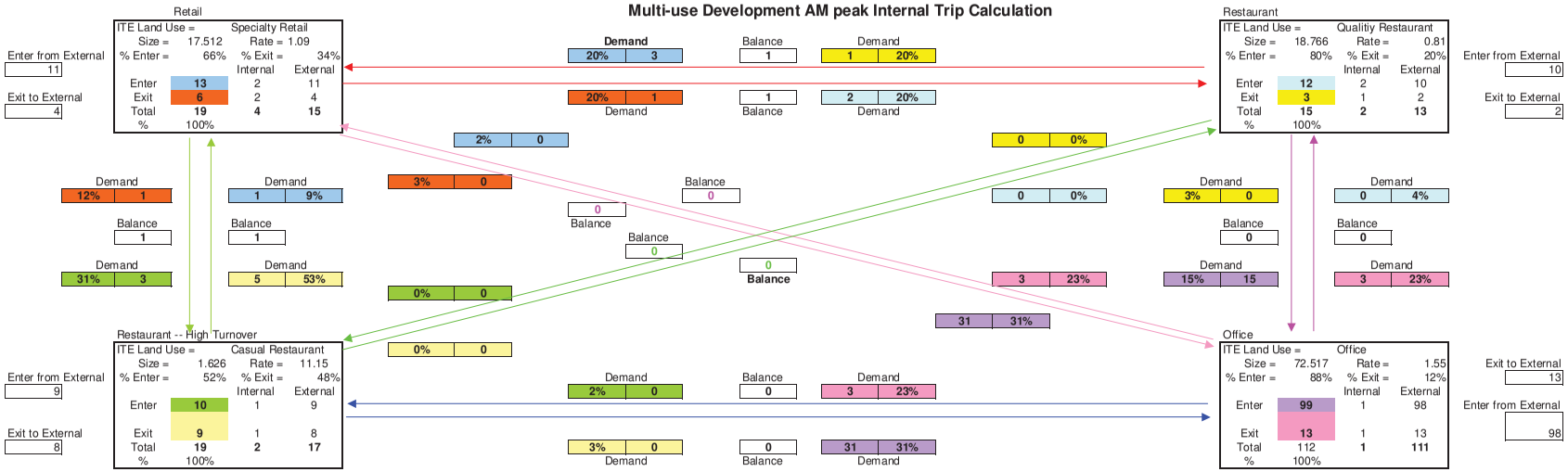
APPLICANT TIA

FUTURE SITE
PROJECT AM PEAK HOUR (AVERAGE WEEKDAY)

	gkfa	am rates rate		Gross AM TE's
710 Office	72.517	1.55	per gkfa	112
814 Retail	17.512	1.09	per gkfa	19
931 Quality R	18.766	0.81	per gkfa	15
932 High Turn	1.626	11.15	per gkfa	19
	110.421			165

Multi-use Development AM peak Internal Trip Calculation



External Trips

	Specialty Retail	Casual Restaurant	Qualitiy Restaurant	Office	Sub-Total
External Enter	11	9	10	98	**128**
External Exit	4	8	2	13	**27**
Total External Trips	**15**	**17**	**12**	**111**	**155**
Internal Trips	**4**	**2**	**3**	**1**	**10**
Gross Trips	**19**	**19**	**15**	**112**	**165**
Overall Average Internal Capture Rate	21%	11%	20%	1%	6%

Source: 2001 ITE Trip Generation Handbook Methodology
Data Source: 7th Edition Trip Generation Report

Pass-by Rate	0%	43%	44%	0%	
Pass-by Trips	0	7	5	0	13
non-pass-by	**15**	**10**	**7**	**111**	**142**

		IN	OUT	TOTAL
Specialty Retail		11	4	15
Quality Restaurant (total)		10	2	12
Quality Restaurant (pass-by)		4	2	6
Quality Restaurant (non-pass-by)		6	0	6
High Turnover Restaurant		9	8	17
High Turnover Restaurant (pass-by)		*4*	*3*	*7*
High Turnover Restaurant (non-pass-by)		*5*	*5*	*10*
Office		98	13	111
Total External (non-pass-by only)		120	22	142
Total External (non- and pass-by)		128	27	155
estimate 15% use on-street public or other public pkg areas	0.15	19.2	4.05	
rounded>		19	4	
total to/from project garage>		109	23	
estimate 20% to/from alley west of dvwy >	0.2	22	5	
trips to/from alley east of dvwy >		87	18	

ATTACHMENT 8
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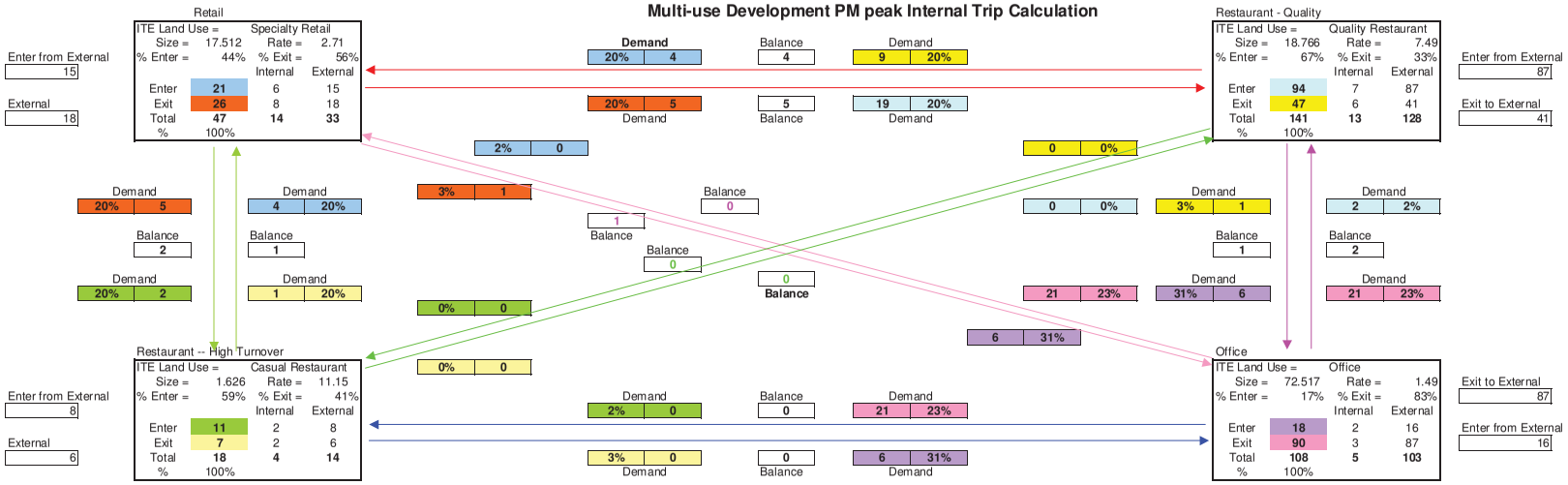
APPLICANT TIA

FUTURE SITE
PROJECT PM PEAK HOUR (AVERAGE WEEKDAY)

	gkfa	PM rate		Gross PM TE's
710 Office	72.517	1.49	per gkfa	108
814 Retail	17.512	2.71	per gkfa	47
931 Quality Re	18.766	7.49	per gkfa	141
932 High Turn	1.626	11.15	per gkfa	18
	110.421			314

Multi-use Development PM peak Internal Trip Calculation



External Trips

	Specialty Retail	Casual Restaura	Quality Restaura	Office	Sub-Total
External Enter	15	8	87	16	**126**
External Exit	18	6	41	87	**152**
Total External Trips	**33**	**14**	**128**	**103**	**278**
Internal Trips	**14**	**4**	**13**	**5**	**36**
Gross Trips	**47**	**18**	**141**	**108**	**314**
Overall Average Internal Capture Rate	30%	22%	9%	5%	11%

Pass-by Rate	0%	37%	26%	0%	
Pass-by Trips	0	5	33	0	38
non-pass-by	**33**	**9**	**95**	**103**	**240**

Source: 2001 ITE Trip Generation Handbook Methodology
Data Source: 8th Edition Trip Generation Report

	IN	OUT	TOTAL
Specialty Retail	15	18	33
Quality Restaurant (total)	87	41	128
Quality Restaurant (pass-by)	*24*	*11*	*35*
Quality Restaurant (non-pass-by)	*63*	*30*	*93*
High Turnover Restaurant	8	6	14
High Turnover Restaurant (pass-by)	*3*	*2*	*5*
High Turnover Restaurant (non-pass-by)	*5*	*4*	*9*
Office	16	87	103
Total External (non-pass-by only)	99	139	238
Total External (non- and pass-by)	126	152	278

estimate 15% use on-street public or other public pkg areas	0.15	18.9	22.8
rounded>		19	23
total to/from project garage>		107	129
estimate 20% to/from alley west of dvwy >	0.2	21	26
trips to/from alley east of dvwy >		86	103

ATTACHMENT 8
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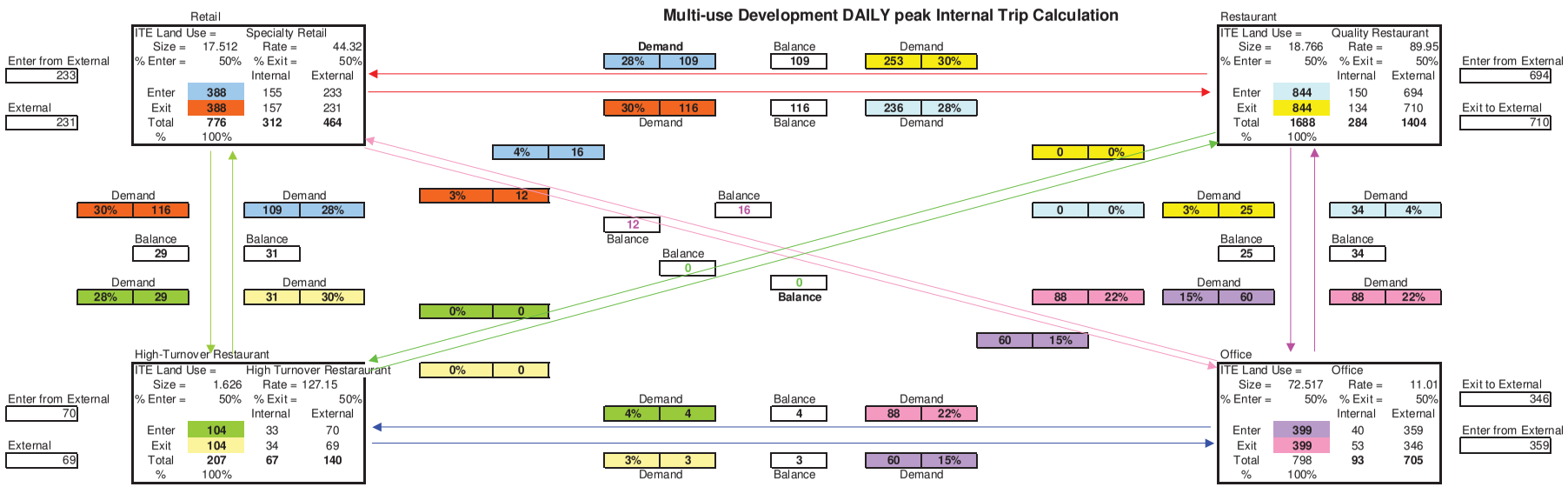
APPLICANT TIA

FUTURE SITE
PROJECT DAILY VOLUME ESTIMATE (AVERAGE WEEKDAY)

	gkfa	daily rate		Gross Daily TE's
710 Office	72.517	11.01	per gkfa	798
814 Retail	17.512	44.32	per gkfa	776
931 Quality Re	18.766	89.95	per gkfa	1688
932 High Turn	1.626	127.15	per gkfa	207
	110.421			3469



External Trips

	Specialty Retail	High Turnover	Quality Restaurant	Office	Sub-Total
External Enter	233	70	694	359	**1356**
External Exit	231	69	710	346	**1356**
Total External Trips	**464**	**140**	**1404**	**705**	**2712**
Internal Trips	**312**	**67**	**284**	**93**	**757**
Gross Trips	**776**	**207**	**1688**	**798**	**3469**
Overall Average Internal Capture Rate	40%	33%	17%	12%	22%
Pass-by Rate	0%	43%	44%	0%	
Pass-by Trips	0	59	621	0	681
non-pass-by	**464**	**80**	**783**	**705**	**2031**

Source: 2001 ITE Trip Generation Handbook Methodology
Data Source: 7th Edition Trip Generation Report

		IN	OUT	TOTAL
Specialty Retail		233	231	464
Quality Restaurant (total)		694	710	1404
Quality Restaurant (pass-by)		*308*	*314*	*622*
Quality Restaurant (non-pass-by)		*386*	*396*	*782*
High Turnover Restaurant		70	69	140
High Turnover Restaurant (pass-by)		*30*	*30*	*60*
High Turnover Restaurant (non-pass-by)		*40*	*39*	*80*
Office		359	346	705
Total External (non-pass-by only)		1018	1012	2030
Total External (non- and pass-by)		1356	1356	2712
estimate 15% use on-street public or other public pkg areas	0.15	203	203	
rounded>		203	203	
total to/from project garage>		1153	1153	
estimate 20% to/from alley west of dvwy >	0.2	231	231	
trips to/from alley east of dvwy >		922	922	

ATTACHMENT 8
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APPLICANT TIA

APPENDIX D

TECHNICAL APPENDIX
for
Lake St Mixed Use Development

Proportional Results Share Impact Summary Worksheet (Individual Proportional Results Share Impact Worksheets at Significant Intersections that equal or exceed 1.0%)

Proportional Share Impact Summary Worksheet

Codes	Intersections	Major[1] Street	Major[1] # of Thru Lanes	Minor[1] Street	Minor[1] # of Thru Lanes	f_1	f_2	f_3	f_4	V_1	V_2	P_1	P_2	P_3	P_4	S_1	S_2	Max S_n	Significant (>1%)	
101	Lake Wash/NE 38th Pl	ake Washington Blv	1	NE 38th Pl	1	0.833	1	0.833	1	46	8	0.56%	0.17%	0.37%	0.34%	0.4%	0.4%	0.4%	No	0
102	Lake Wash/Lakeview Dr	ake Washington Blv	1	Lakeview Dr	1	0.833	1	0.833	1	112	23	1.34%	0.46%	0.89%	0.93%	0.9%	0.9%	0.9%	No	0
103	State St/NE 68th St	NE 68th St	1	State St	1	0.833	1	0.833	1	59	59	0.71%	1.18%	0.47%	2.36%	0.9%	1.4%	1.4%	Yes	103
104	108th Ave NE/NE 68th St	108th Ave NE	1	NE 68th St	1	0.833	1	0.833	1	23	69	0.28%	1.39%	0.19%	2.78%	0.8%	1.5%	1.5%	Yes	104
105	Central Way/6th St	Central Way	2	6th St	1	1	1	1	1	91	6	0.91%	0.13%	0.60%	0.25%	0.5%	0.4%	0.5%	No	0
106	Central Way/3rd St	Central Way	2	3rd St	1	1	1	1	1	107	11	1.07%	0.21%	0.72%	0.42%	0.6%	0.6%	0.6%	No	0
107	Central Way/Lake St	Central Way	2	Lake St	1	1	1	1	1	46	34	0.46%	0.67%	0.31%	1.35%	0.6%	0.8%	0.8%	No	0
108	Lake St/Kirkland Ave	Lake St	1	Kirkland Ave	1	0.833	1	0.833	1	124	46	1.49%	0.93%	0.99%	1.85%	1.2%	1.4%	1.4%	Yes	108
109	NE 85th St/114th Ave NE	NE 85th St	2	114th Ave NE	1	1	1	1	1	166	78	1.66%	1.56%	1.11%	3.12%	1.6%	2.1%	2.1%	Yes	109
110	6th St/4th Ave	6th St	1	4th Ave	1	0.833	1	0.833	1	6	2	0.08%	0.04%	0.05%	0.08%	0.1%	0.1%	0.1%	No	0
111	Kirkland Ave/3rd Ave	3rd St	1	Kirkland Ave	1	0.833	1	0.833	1	63	261	0.76%	5.22%	0.51%	10.44%	3.0%	5.5%	5.5%	Yes	111
112	Kirkland Way/6th St	6th St	1	Kirkland Way	1	0.833	1	0.833	1	11	171	0.13%	3.41%	0.08%	6.82%	1.8%	3.5%	3.5%	Yes	112
113	Kirkland Ave/6th St	6th St	1	Kirkland Ave	1	0.833	1	0.833	1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
201	98th Ave NE/Juanita Dr	98th Ave NE	2	Juanita Dr	1	1	1	1	1	57	15	0.57%	0.29%	0.38%	0.59%	0.4%	0.5%	0.5%	No	0
202	100th Ave NE/NE 124th St	100th Ave NE	2	NE 124th St	1	1	1	1	1	40	2	0.40%	0.04%	0.27%	0.08%	0.2%	0.2%	0.2%	No	0
203	100th Ave NE/NE 132nd St	100th Ave NE	2	NE 132nd St	1	1	1	1	1	38	0	0.38%	0.00%	0.25%	0.00%	0.2%	0.1%	0.2%	No	0
204	116th Way NE/NE 132nd St	NE 132nd St	1	116th Way NE	1	0.833	1	0.833	1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
205	Market St/Forbes Creek	Market St	1	Forbes Creek	1	0.833	1	0.833	1	82	2	0.99%	0.04%	0.66%	0.08%	0.5%	0.4%	0.5%	No	0
206	98th Ave NE/NE 120th Pl	98th Ave NE	2	NE 120th Pl	1	1	1	1	1	42	0	0.42%	0.00%	0.28%	0.00%	0.2%	0.1%	0.2%	No	0
207	Juanita Drive/93rd Ave NE	Juanita Dr	1	93rd Ave NE	1	0.833	1	0.833	1	25	0	0.30%	0.00%	0.20%	0.00%	0.2%	0.1%	0.2%	No	0
208	Juanita Dr/97th Ave NE	Juanita Dr	1	97th Ave NE	1	0.833	1	0.833	1	25	0	0.30%	0.00%	0.20%	0.00%	0.2%	0.1%	0.2%	No	0
209	Market St/7th Ave	Market St	1	7th Ave	1	0.833	1	0.833	1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
210	?	?	?	?	?	0.833	1	0.833	1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
211	Market St/15th Ave	Market St	1	15th Ave	1	0.833	1	0.833	1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
301	120th Ave NE/NE 132nd St	NE 132nd St	1	120th Ave NE	1	0.833	1	0.833	1	0	0	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	No	0
302	120th Ave NE/NE 130th St	120th Ave NE	1	NE 130th St	1	0.833	1	0.833	1	0	0	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	No	0
303	120th Ave NE/NE 128th St	120th Ave NE	1	NE 128th St	1	0.833	1	0.833	1	0	0	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	No	0
304	NE 132nd St/124th Ave NE	NE 132nd St	1	124th Ave NE	1	0.833	1	0.833	1	0	0	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	No	0
305	?	?	?	?	?	0.833	1	0.833	1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
306	NE 124th St/ Slater Ave NE	NE 124th St	2	Slater Ave NE	1	1	1	1	1	2	6	0.02%	0.13%	0.01%	0.25%	0.1%	0.1%	0.1%	No	0
307	Totem Lake Blvd/120th Ave NE	Totem Lake Blvd	2	120th Ave NE	1	1	1	1	1	0	0	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	No	0
308	NE 124th St/120th Pl NE	NE 124th St	2	120th Pl NE	1	1	1	1	1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
309	NE 118th St/120th Ave NE	120th Ave NE	1	NE 118th St	1	0.833	1	0.833	1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
310	NE 116th St/120th Ave NE	NE 116th St	1	120th Ave NE	1	0.833	1	0.833	1	0	0	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	No	0
311	NE 116th St/124th Ave NE	124th Ave NE	1	NE 116th St	1	0.833	1	0.833	1	19	6	0.23%	0.13%	0.15%	0.25%	0.2%	0.2%	0.2%	No	0
312	NE 124th St/116th Ave NE	NE 124th St	2	116th Ave NE	1	1	1	1	1	0	0	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	No	0
313	NE 124th St/113th Pl NE	NE 124th St	2	113th Pl NE	1	1	1	1	1	0	0	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	No	0
314	Slater Ave NE/NE 120th St	Slater Ave NE	1	NE 120th St	1	0.833	1	0.833	1	0	0	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	No	0
315	NE 124th St/124th Ave NE	NE 124th St	2	124th Ave NE	1	1	1	1	1	2	6	0.02%	0.13%	0.01%	0.25%	0.1%	0.1%	0.1%	No	0
316	Totem Lake Blvd/NE 132nd St	NE 132nd St	1	Totem Lake Blvd	1	0.833	1	0.833	1	0	0	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	No	0
317	I-405/SB Off NE 124th St	NE 124th St	2	I-405 SB	1	1	1	1	1	0	0	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	No	0
318	I-405/NB Off NE 124th St	NE 124th St	2	I-405 NB	1	1	1	1	1	0	0	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	No	0
319	I-405/SB Off NE 116th St	NE 116th St	1	I-405 SB	1	0.833	1	0.833	1	2	2	0.03%	0.04%	0.02%	0.08%	0.0%	0.1%	0.1%	No	0
320	I-405/NB Off NE 116th St	NE 116th St	1	I-405 NB	1	0.833	1	0.833	1	6	2	0.08%	0.04%	0.05%	0.08%	0.1%	0.1%	0.1%	No	0
321	120th Ave NE/NE 112th St	120th Ave NE	1	NE 112th St	1	0.833	1	0.833	1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
322	NE 116th St/NE 118th St	NE 116th St	1	NE 118th St	1	0.833	1	0.833	1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
323	Slater Ave NE/NE 116th St	NE 116th St	1	Slater Ave NE	1	0.833	1	0.833	1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
324	NE 128th St/116th Way NE	116th Way NE	2	NE 128th St	1	1	1	1	1	0	0	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	No	0

ATTACHMENT 8
SEP13-00959
APPLICANT TAA

William Popp Associates
425-401-2124

Proportional Share Impact Summary Worksheet

		Major[1]		Minor[1]																			
Codes	**Intersections**	***Street***	***# of Thru Lanes***	***Street***	***# of Thru Lanes***		f_1	f_2	f_3	f_4	V_1	V_2	P_1	P_2	P_3	P_4	S_1	S_2	Max S_n	Significant (>1%)	
325	NE 124th St/128th Ln NE	NE 124th St	2	128th Ln NE	1		1	1	1	1	4	0	0.04%	0.00%	0.03%	0.00%	0.0%	0.0%	0.0%	No	0
401	NE 85th St/ 132nd Ave NE	NE 85th St	2	132nd Ave NE	1		1	1	1	1	59	0	0.59%	0.00%	0.39%	0.00%	0.3%	0.2%	0.3%	No	0
402	NE 85th St/124th Ave NE	NE 85th St	2	124th Ave NE	1		1	1	1	1	72	4	0.72%	0.08%	0.48%	0.17%	0.4%	0.3%	0.4%	No	0
403	NE 85th St/ 120th Ave NE	NE 85th St	2	120th Ave NE	1		1	1	1	1	93	8	0.93%	0.17%	0.62%	0.34%	0.5%	0.5%	0.5%	No	0
404	124th Ave NE/NE 100th St	124th Ave NE	1	NE 100th St	1		0.833	1	0.833	1	17	0	0.20%	0.00%	0.13%	0.00%	0.1%	0.1%	0.1%	No	0
405	120th Ave NE/NE 80th St	NE 80th St	1	120th Ave NE	1		0.833	1	0.833	1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
406	NE 70th St/132nd Ave NE	132nd Ave NE	1	NE 70th St	1		0.833	1	0.833	1	0	4	0.00%	0.08%	0.00%	0.17%	0.0%	0.1%	0.1%	No	0
407	NE 70th St/116th Ave NE	116th Ave NE	1	NE 70th St	1		0.833	1	0.833	1	8	13	0.10%	0.25%	0.07%	0.51%	0.2%	0.3%	0.3%	No	0
408	NE 90th St/ 124th Ave NE	124th Ave NE	1	NE 90th St	1		0.833	1	0.833	1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
409	NE 85th St/122nd Ave NE	NE 85th St	2	122nd Ave NE	1		1	1	1	1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
410	116th Ave NE/I-405 NB Ramp	116th Ave NE	1	I-405 NB Ramp	1	add	0.833	1	0.833	1	6	6	0.08%	0.13%	0.05%	0.25%	0.1%	0.2%	0.2%	No	0
411	NE 70th Pl/I-405 SB Ramp	NE 70th Pl	1	I-405 SB Ramp	1	add	0.833	1	0.833	1	21	13	0.25%	0.25%	0.17%	0.51%	0.3%	0.3%	0.3%	No	0
412	NE 85th St/128th Ave NE	NE 85th St	2	128th Ave NE	1		1	1	1	1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
413	NE 60th St/132nd Ave NE	132nd Ave NE	1	NE 60th St	1		0.833	1	0.833	1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
414	NE 60th St/116th Ave NE	116th Ave NE	1	NE 60th St	1		0.833	1	0.833	1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
415	NE 70th St/120th Ave NE	NE 70th St	1	120th Ave NE	1		0.833	1	0.833	1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
416	NE 80th St/132nd Ave NE	132nd Ave NE	1	NE 80th St	1		0.833	1	0.833	1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
417	NE 100th St/132nd Ave NE	132nd Ave NE	1	NE 100th St	1		0.833	1	0.833	1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

ATTACHMENT 8
SEP13-00959
APPLICANT TIA

William Popp Associates
425-401-2124

Proportional Share Impact Worksheet

[1] See "*Intersection Description*" worksheet for descriptions

1. May Change without notice, call Thang Nguyen 425-587-3869 with questions

Input appropriate information in green cells

			Through Lanes[1]
Project Name:	McLeod Lake St Place Development		
Intersection No.	103		
Major Street[1]	NE 68th St	# of Lanes*=	1
Minor Street[1]	State St	# of Lanes*=	1

DATE:
5/1/2013

Daily Project Traffic Entering the Intersection

		Daily Volumes	*Entering Leg Volumes* *		
(Total of both approaches divided by two)	Major Street Volume V_1 =	59	25	93	***Major***
(Total of both approaches divided by two)	Minor Street Volume V_2 =	59	0	118	***Minor***

***Do not leave cell empty for zero volume**

Determine Geometric Factors

Number of Lanes		Geometric Factors			
Major Street	Minor Street	f_1	f_2	f_3	f_4
2	2	1.000	1.330	1.000	1.330
2	1	1.000	1.000	1.000	1.000
1	2	0.833	1.330	0.833	1.330
1	1	0.833	1.000	0.833	1.000

f_1	f_2	f_3	f_4
0.833	***1***	***0.833***	***1***

Calculate Base Percentages

$P_1=V_1/(10{,}000 \times f_1)$ =	0.71%
$P_2=V_2/(5{,}000 \times f_2)$ =	1.18%
$P_3=V_1/(15{,}000 \times f_3)$ =	0.47%
$P_4=V_2/(2{,}500 \times f_4)$ =	2.36%

Calculate Proportional Share

$S_1=(P_1+P_2)/2$=	0.94%
$S_2=(P_3+P_4)/2$=	1.42%

Intersection Proportional Share = Maximum of S1 and S2 = 1.42%

Significant Intersection? **yes**

1. Number of through lanes. Do not count exclusive turn lanes. Use the smaller number of lanes if the number of lanes is unequal on two legs. For Example, if one minor leg has two lanes and one minor leg has one lane, the number of lanes on the minor leg is one.

Computed By:	Bill Popp Jr
Company:	William Popp Associates

Proportional Share Impact Worksheet

[1] See "*Intersection Description*" worksheet for descriptions

1. May Change without notice, call Thang Nguyen 425-587-3869 with questions

Input appropriate information in green cells

			Through Lanes[1]
Project Name:	McLeod Lake St Place Development		
Intersection No.	104		
Major Street[1]	108th Ave NE	# of Lanes*=	1
Minor Street[1]	NE 68th St	# of Lanes*=	1

DATE:
5/1/2013

Daily Project Traffic Entering the Intersection

		Daily Volumes	*Entering Leg Volumes* *		
(Total of both approaches divided by two)	Major Street Volume V_1 =	23	46	0	***Major***
(Total of both approaches divided by two)	Minor Street Volume V_2 =	69.5	93	46	***Minor***

***Do not leave cell empty for zero volume**

Determine Geometric Factors

Number of Lanes		Geometric Factors			
Major Street	Minor Street	f_1	f_2	f_3	f_4
2	2	1.000	1.330	1.000	1.330
2	1	1.000	1.000	1.000	1.000
1	2	0.833	1.330	0.833	1.330
1	1	0.833	1.000	0.833	1.000

f_1	f_2	f_3	f_4
0.833	***1***	***0.833***	***1***

Calculate Base Percentages

$P_1=V_1/(10{,}000 \times f_1)$ =	0.28%
$P_2=V_2/(5{,}000 \times f_2)$ =	1.39%
$P_3=V_1/(15{,}000 \times f_3)$ =	0.18%
$P_4=V_2/(2{,}500 \times f_4)$ =	2.78%

Calculate Proportional Share

$S_1=(P_1+P_2)/2$=	0.83%
$S_2=(P_3+P_4)/2$=	1.48%

Intersection Proportional Share = Maximum of S1 and S2 = 1.48%

Significant Intersection? **yes**

1. Number of through lanes. Do not count exclusive turn lanes. Use the smaller number of lanes if the number of lanes is unequal on two legs. For Example, if one minor leg has two lanes and one minor leg has one lane, the number of lanes on the minor leg is one.

Computed By: Bill Popp Jr
Company: William Popp Associates

Proportional Share Impact Worksheet

[1] See "*Intersection Description*" worksheet for descriptions

1. May Change without notice, call Thang Nguyen 425-587-3869 with questions

Input appropriate information in green cells

			Through Lanes[1]
Project Name:	McLeod Lake St Place Development		
Intersection No.	106		
Major Street[1]	Central Way	# of Lanes*=	2
Minor Street[1]	3rd St	# of Lanes*=	1

DATE:
5/1/2013

Daily Project Traffic Entering the Intersection

		Daily Volumes	*Entering Leg Volumes* *		
(Total of both approaches divided by two)	Major Street Volume V_1 =	107.5	118	97	***Major***
(Total of both approaches divided by two)	Minor Street Volume V_2 =	10.5	0	21	***Minor***

***Do not leave cell empty for zero volume**

Determine Geometric Factors

Number of Lanes		Geometric Factors			
Major Street	Minor Street	f_1	f_2	f_3	f_4
2	2	1.000	1.330	1.000	1.330
2	1	1.000	1.000	1.000	1.000
1	2	0.833	1.330	0.833	1.330
1	1	0.833	1.000	0.833	1.000

f_1	f_2	f_3	f_4
1	***1***	***1***	***1***

Calculate Base Percentages

$P_1=V_1/(10{,}000 \times f_1)$ =	1.08%
$P_2=V_2/(5{,}000 \times f_2)$ =	0.21%
$P_3=V_1/(15{,}000 \times f_3)$ =	0.72%
$P_4=V_2/(2{,}500 \times f_4)$ =	0.42%

Calculate Proportional Share

$S_1=(P_1+P_2)/2$=	0.64%
$S_2=(P_3+P_4)/2$=	0.57%

Intersection Proportional Share = Maximum of S1 and S2 = 0.64%

Significant Intersection? **no**

1. Number of through lanes. Do not count exclusive turn lanes. Use the smaller number of lanes if the number of lanes is unequal on two legs. For Example, if one minor leg has two lanes and one minor leg has one lane, the number of lanes on the minor leg is one.

Computed By: Bill Popp Jr
Company: William Popp Associates

Proportional Share Impact Worksheet

[1] See "*Intersection Description*" worksheet for descriptions

1. May Change without notice, call Thang Nguyen 425-587-3869 with questions

Input appropriate information in green cells

			Through Lanes[1]
Project Name:	McLeod Lake St Place Development		
Intersection No.	107		
Major Street[1]	Central Way	# of Lanes*=	2
Minor Street[1]	Lake St	# of Lanes*=	1

DATE:
5/1/2013

Daily Project Traffic Entering the Intersection

		Daily Volumes	*Entering Leg Volumes* *		
(Total of both approaches divided by two)	Major Street Volume V_1 =	46.5	80	13	***Major***
(Total of both approaches divided by two)	Minor Street Volume V_2 =	33.5	67	0	***Minor***

***Do not leave cell empty for zero volume**

Determine Geometric Factors

Number of Lanes		Geometric Factors			
Major Street	Minor Street	f_1	f_2	f_3	f_4
2	2	1.000	1.330	1.000	1.330
2	1	1.000	1.000	1.000	1.000
1	2	0.833	1.330	0.833	1.330
1	1	0.833	1.000	0.833	1.000

f_1	f_2	f_3	f_4
1	***1***	***1***	***1***

Calculate Base Percentages

$P_1=V_1/(10{,}000 \times f_1)$ =	0.47%
$P_2=V_2/(5{,}000 \times f_2)$ =	0.67%
$P_3=V_1/(15{,}000 \times f_3)$ =	0.31%
$P_4=V_2/(2{,}500 \times f_4)$ =	1.34%

Calculate Proportional Share

$S_1=(P_1+P_2)/2$=	0.57%
$S_2=(P_3+P_4)/2$=	0.83%

Intersection Proportional Share = Maximum of S1 and S2 = 0.83%

Significant Intersection? **no**

1. Number of through lanes. Do not count exclusive turn lanes. Use the smaller number of lanes if the number of lanes is unequal on two legs. For Example, if one minor leg has two lanes and one minor leg has one lane, the number of lanes on the minor leg is one.

Computed By: Bill Popp Jr
Company: William Popp Associates

Proportional Share Impact Worksheet

[1] See "*Intersection Description*" worksheet for descriptions

1. May Change without notice, call Thang Nguyen 425-587-3869 with questions

Input appropriate information in green cells

			Through Lanes[1]
Project Name:	McLeod Lake St Place Development		
Intersection No.	108		
Major Street[1]	Lake St	# of Lanes*=	1
Minor Street[1]	Kirkland Ave	# of Lanes*=	1

DATE:
5/31/2013

Daily Project Traffic Entering the Intersection

		Daily Volumes	*Entering Leg Volumes* *		
(Total of both approaches divided by two)	Major Street Volume V_1 =	124.5	114	135	***Major***
(Total of both approaches divided by two)	Minor Street Volume V_2 =	46.5	0	93	***Minor***

***Do not leave cell empty for zero volume**

Determine Geometric Factors

Number of Lanes		Geometric Factors			
Major Street	Minor Street	f_1	f_2	f_3	f_4
2	2	1.000	1.330	1.000	1.330
2	1	1.000	1.000	1.000	1.000
1	2	0.833	1.330	0.833	1.330
1	1	0.833	1.000	0.833	1.000

f_1	f_2	f_3	f_4
0.833	***1***	***0.833***	***1***

Calculate Base Percentages

$P_1=V_1/(10{,}000 \times f_1)$ =	1.49%
$P_2=V_2/(5{,}000 \times f_2)$ =	0.93%
$P_3=V_1/(15{,}000 \times f_3)$ =	1.00%
$P_4=V_2/(2{,}500 \times f_4)$ =	1.86%

Calculate Proportional Share

$S_1=(P_1+P_2)/2$=	1.21%
$S_2=(P_3+P_4)/2$=	1.43%

Intersection Proportional Share = Maximum of S1 and S2 = 1.43%

Significant Intersection? **yes**

1. Number of through lanes. Do not count exclusive turn lanes. Use the smaller number of lanes if the number of lanes is unequal on two legs. For Example, if one minor leg has two lanes and one minor leg has one lane, the number of lanes on the minor leg is one.

Computed By:	Bill Popp Jr
Company:	William Popp Associates

Proportional Share Impact Worksheet

[1] See "*Intersection Description*" worksheet for descriptions

1. May Change without notice, call Thang Nguyen 425-587-3869 with questions

Input appropriate information in green cells

			Through Lanes[1]
Project Name:	McLeod Lake St Place Development		
Intersection No.	109		
Major Street[1]	NE 85th St	# of Lanes*=	2
Minor Street[1]	114th Ave NE	# of Lanes*=	1

DATE:
5/1/2013

Daily Project Traffic Entering the Intersection

		Daily Volumes	*Entering Leg Volumes* *		
(Total of both approaches divided by two)	Major Street Volume V_1 =	166	88	244	***Major***
(Total of both approaches divided by two)	Minor Street Volume V_2 =	78	156	0	***Minor***

***Do not leave cell empty for zero volume**

Determine Geometric Factors

Number of Lanes		Geometric Factors			
Major Street	Minor Street	f_1	f_2	f_3	f_4
2	2	1.000	1.330	1.000	1.330
2	1	1.000	1.000	1.000	1.000
1	2	0.833	1.330	0.833	1.330
1	1	0.833	1.000	0.833	1.000

f_1	f_2	f_3	f_4
1	***1***	***1***	***1***

Calculate Base Percentages

$P_1=V_1/(10{,}000 \times f_1)$ =	1.66%
$P_2=V_2/(5{,}000 \times f_2)$ =	1.56%
$P_3=V_1/(15{,}000 \times f_3)$ =	1.11%
$P_4=V_2/(2{,}500 \times f_4)$ =	3.12%

Calculate Proportional Share

$S_1=(P_1+P_2)/2$=	1.61%
$S_2=(P_3+P_4)/2$=	2.11%

Intersection Proportional Share = Maximum of S1 and S2 = 2.11%

Significant Intersection? **yes**

1. Number of through lanes. Do not count exclusive turn lanes. Use the smaller number of lanes if the number of lanes is unequal on two legs. For Example, if one minor leg has two lanes and one minor leg has one lane, the number of lanes on the minor leg is one.

Computed By:	Bill Popp Jr
Company:	William Popp Associates

Proportional Share Impact Worksheet

[1] See "*Intersection Description*" worksheet for descriptions

1. May Change without notice, call Thang Nguyen 425-587-3869 with questions

Input appropriate information in green cells

			Through Lanes[1]
Project Name:	McLeod Lake St Place Development		
Intersection No.	111		
Major Street[1]	3rd St	# of Lanes*=	1
Minor Street[1]	Kirkland Ave	# of Lanes*=	1

DATE:
5/1/2013

Daily Project Traffic Entering the Intersection

		Daily Volumes	*Entering Leg Volumes* *		
(Total of both approaches divided by two)	Major Street Volume V_1 =	63	126	0	***Major***
(Total of both approaches divided by two)	Minor Street Volume V_2 =	261	324	198	***Minor***

***Do not leave cell empty for zero volume**

Determine Geometric Factors

Number of Lanes		Geometric Factors			
Major Street	Minor Street	f_1	f_2	f_3	f_4
2	2	1.000	1.330	1.000	1.330
2	1	1.000	1.000	1.000	1.000
1	2	0.833	1.330	0.833	1.330
1	1	0.833	1.000	0.833	1.000

f_1	f_2	f_3	f_4
0.833	***1***	***0.833***	***1***

Calculate Base Percentages

$P_1=V_1/(10{,}000 \times f_1)$ =	0.76%
$P_2=V_2/(5{,}000 \times f_2)$ =	5.22%
$P_3=V_1/(15{,}000 \times f_3)$ =	0.50%
$P_4=V_2/(2{,}500 \times f_4)$ =	10.44%

Calculate Proportional Share

$S_1=(P_1+P_2)/2$=	2.99%
$S_2=(P_3+P_4)/2$=	5.47%

Intersection Proportional Share = Maximum of S1 and S2 = 5.47%

Significant Intersection? **yes**

1. Number of through lanes. Do not count exclusive turn lanes. Use the smaller number of lanes if the number of lanes is unequal on two legs. For Example, if one minor leg has two lanes and one minor leg has one lane, the number of lanes on the minor leg is one.

Computed By: Bill Popp Jr
Company: William Popp Associates

Proportional Share Impact Worksheet

[1] See "*Intersection Description*" worksheet for descriptions

1. May Change without notice, call Thang Nguyen 425-587-3869 with questions

Input appropriate information in green cells

			Through Lanes[1]
Project Name:	McLeod Lake St Place Development		
Intersection No.	112		
Major Street[1]	6th St	# of Lanes*=	1
Minor Street[1]	Kirkland Way	# of Lanes*=	1

DATE:
5/1/2013

Daily Project Traffic Entering the Intersection

		Daily Volumes	*Entering Leg Volumes* *		
(Total of both approaches divided by two)	Major Street Volume V_1 =	10.5	13	8	***Major***
(Total of both approaches divided by two)	Minor Street Volume V_2 =	170.5	181	160	***Minor***

***Do not leave cell empty for zero volume**

Determine Geometric Factors

Number of Lanes		Geometric Factors			
Major Street	Minor Street	f_1	f_2	f_3	f_4
2	2	1.000	1.330	1.000	1.330
2	1	1.000	1.000	1.000	1.000
1	2	0.833	1.330	0.833	1.330
1	1	0.833	1.000	0.833	1.000

f_1	f_2	f_3	f_4
0.833	***1***	***0.833***	***1***

Calculate Base Percentages

$P_1=V_1/(10{,}000 \times f_1)$ =	0.13%
$P_2=V_2/(5{,}000 \times f_2)$ =	3.41%
$P_3=V_1/(15{,}000 \times f_3)$ =	0.08%
$P_4=V_2/(2{,}500 \times f_4)$ =	6.82%

Calculate Proportional Share

$S_1=(P_1+P_2)/2$=	1.77%
$S_2=(P_3+P_4)/2$=	3.45%

Intersection Proportional Share = Maximum of S1 and S2 = 3.45%

Significant Intersection? **yes**

1. Number of through lanes. Do not count exclusive turn lanes. Use the smaller number of lanes if the number of lanes is unequal on two legs. For Example, if one minor leg has two lanes and one minor leg has one lane, the number of lanes on the minor leg is one.

Computed By:	Bill Popp Jr
Company:	William Popp Associates

APPENDIX E

TECHNICAL APPENDIX
for
Lake St Mixed Use Development

AM and PM Peak Hour Level of Service Calculation Results

HCM Signalized Intersection Capacity Analysis
103: NE 68th St & State St

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.94			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99			0.95	1.00
Satd. Flow (prot)	1770	1858		1770	1863	1583		1720			1775	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.99			0.95	1.00
Satd. Flow (perm)	1770	1858		1770	1863	1583		1720			1775	1583
Volume (vph)	59	164	3	12	190	100	10	10	19	221	4	148
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.85	0.85	0.85	0.92	0.92	0.92
Adj. Flow (vph)	64	178	3	13	207	109	12	12	22	240	4	161
RTOR Reduction (vph)	0	1	0	0	0	90	0	14	0	0	0	135
Lane Group Flow (vph)	64	180	0	13	207	19	0	32	0	0	244	26
Turn Type	Prot			Prot		Perm	Split			Split		Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	2.5	12.8		0.6	10.9	10.9		22.1			10.1	10.1
Effective Green, g (s)	2.5	12.8		0.6	10.9	10.9		22.1			10.1	10.1
Actuated g/C Ratio	0.04	0.21		0.01	0.18	0.18		0.36			0.16	0.16
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	72	386		17	330	280		617			291	260
v/s Ratio Prot	c0.04	0.10		0.01	c0.11			c0.03			c0.14	
v/s Ratio Perm						0.07						0.10
v/c Ratio	0.89	0.47		0.76	0.63	0.07		0.05			0.84	0.10
Uniform Delay, d1	29.4	21.4		30.4	23.5	21.1		12.9			25.0	21.9
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	68.3	0.9		106.9	3.7	0.1		0.2			18.6	0.2
Delay (s)	97.7	22.3		137.3	27.2	21.2		13.1			43.6	22.1
Level of Service	F	C		F	C	C		B			D	C
Approach Delay (s)		42.0			29.6			13.1			35.0	
Approach LOS		D			C			B			D	

Intersection Summary			
HCM Average Control Delay	33.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	61.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	42.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
103: NE 68th St & State St

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.94			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99			0.95	1.00
Satd. Flow (prot)	1770	1859		1770	1863	1583		1720			1775	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.99			0.95	1.00
Satd. Flow (perm)	1770	1859		1770	1863	1583		1720			1775	1583
Volume (vph)	89	180	3	13	206	107	11	11	20	238	4	163
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.85	0.85	0.85	0.92	0.92	0.92
Adj. Flow (vph)	97	196	3	14	224	116	13	13	24	259	4	177
RTOR Reduction (vph)	0	1	0	0	0	94	0	16	0	0	0	148
Lane Group Flow (vph)	97	198	0	14	224	22	0	34	0	0	263	29
Turn Type	Prot			Prot		Perm	Split			Split		Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	4.3	15.6		0.7	12.0	12.0		21.7			10.4	10.4
Effective Green, g (s)	4.3	15.6		0.7	12.0	12.0		21.7			10.4	10.4
Actuated g/C Ratio	0.07	0.24		0.01	0.19	0.19		0.34			0.16	0.16
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	118	450		19	347	295		580			287	256
v/s Ratio Prot	c0.05	c0.11		0.01	c0.12			c0.03			c0.15	
v/s Ratio Perm						0.07						0.11
v/c Ratio	0.82	0.44		0.74	0.65	0.07		0.06			0.92	0.11
Uniform Delay, d1	29.7	20.7		31.8	24.2	21.6		14.4			26.6	23.1
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	34.9	0.7		88.4	4.1	0.1		0.2			31.9	0.2
Delay (s)	64.6	21.4		120.2	28.3	21.7		14.6			58.4	23.2
Level of Service	E	C		F	C	C		B			E	C
Approach Delay (s)		35.6			29.8			14.6			44.3	
Approach LOS		D			C			B			D	

Intersection Summary			
HCM Average Control Delay	36.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	64.4	Sum of lost time (s)	20.0
Intersection Capacity Utilization	45.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
103: NE 68th St & State St

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.94			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99			0.95	1.00
Satd. Flow (prot)	1770	1859		1770	1863	1583		1720			1775	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.99			0.95	1.00
Satd. Flow (perm)	1770	1859		1770	1863	1583		1720			1775	1583
Volume (vph)	95	180	3	13	206	121	11	11	20	241	4	163
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.85	0.85	0.85	0.92	0.92	0.92
Adj. Flow (vph)	103	196	3	14	224	132	13	13	24	262	4	177
RTOR Reduction (vph)	0	1	0	0	0	108	0	16	0	0	0	148
Lane Group Flow (vph)	103	198	0	14	224	24	0	34	0	0	266	29
Turn Type	Prot			Prot		Perm	Split			Split		Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	4.3	15.5		0.7	11.9	11.9		21.7			10.5	10.5
Effective Green, g (s)	4.3	15.5		0.7	11.9	11.9		21.7			10.5	10.5
Actuated g/C Ratio	0.07	0.24		0.01	0.18	0.18		0.34			0.16	0.16
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	118	447		19	344	293		580			289	258
v/s Ratio Prot	c0.06	c0.11		0.01	c0.12			c0.03			c0.15	
v/s Ratio Perm						0.08						0.11
v/c Ratio	0.87	0.44		0.74	0.65	0.08		0.06			0.92	0.11
Uniform Delay, d1	29.8	20.8		31.8	24.3	21.7		14.4			26.5	23.0
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	46.0	0.7		88.4	4.4	0.1		0.2			32.8	0.2
Delay (s)	75.8	21.5		120.2	28.7	21.9		14.6			59.3	23.2
Level of Service	E	C		F	C	C		B			E	C
Approach Delay (s)		40.0			29.7			14.6			44.9	
Approach LOS		D			C			B			D	

Intersection Summary			
HCM Average Control Delay	37.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	64.4	Sum of lost time (s)	20.0
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
104: NE 68th St & 6th St

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1818	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1818	
Volume (vph)	82	238	157	305	231	111	74	112	140	136	358	68
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	89	259	171	332	251	121	80	122	152	148	389	74
RTOR Reduction (vph)	0	0	138	0	0	82	0	0	109	0	8	0
Lane Group Flow (vph)	89	259	33	332	251	39	80	122	43	148	455	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	6.7	15.1	15.1	16.8	25.2	25.2	3.9	22.0	22.0	8.7	26.8	
Effective Green, g (s)	6.7	15.1	15.1	16.8	25.2	25.2	3.9	22.0	22.0	8.7	26.8	
Actuated g/C Ratio	0.09	0.19	0.19	0.21	0.32	0.32	0.05	0.28	0.28	0.11	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	151	358	304	378	597	508	88	521	443	196	620	
v/s Ratio Prot	0.05	c0.14		c0.19	0.13		0.05	0.07		c0.08	c0.25	
v/s Ratio Perm			0.11			0.08			0.10			
v/c Ratio	0.59	0.72	0.11	0.88	0.42	0.08	0.91	0.23	0.10	0.76	0.73	
Uniform Delay, d1	34.6	29.8	26.2	29.9	21.0	18.6	37.2	21.8	20.9	33.9	22.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.8	7.1	0.2	20.0	0.5	0.1	65.8	1.1	0.4	15.2	7.5	
Delay (s)	40.4	36.9	26.4	49.9	21.4	18.7	103.0	22.9	21.4	49.1	30.3	
Level of Service	D	D	C	D	C	B	F	C	C	D	C	
Approach Delay (s)		34.0			34.4			40.3			34.9	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM Average Control Delay	35.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	78.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
104: NE 68th St & 6th St

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1819	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1819	
Volume (vph)	94	256	168	327	248	219	79	166	151	162	399	74
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	102	278	183	355	270	238	86	180	164	176	434	80
RTOR Reduction (vph)	0	0	141	0	0	163	0	0	120	0	7	0
Lane Group Flow (vph)	102	278	42	355	270	75	86	180	44	176	507	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	7.9	16.1	16.1	19.5	27.7	27.7	4.6	23.4	23.4	12.9	31.7	
Effective Green, g (s)	7.9	16.1	16.1	19.5	27.7	27.7	4.6	23.4	23.4	12.9	31.7	
Actuated g/C Ratio	0.09	0.18	0.18	0.22	0.32	0.32	0.05	0.27	0.27	0.15	0.36	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	159	341	290	393	587	499	93	496	421	260	656	
v/s Ratio Prot	0.06	c0.15		c0.20	0.14		c0.05	0.10		c0.10	c0.28	
v/s Ratio Perm			0.12			0.15			0.10			
v/c Ratio	0.64	0.82	0.14	0.90	0.46	0.15	0.92	0.36	0.10	0.68	0.77	
Uniform Delay, d1	38.6	34.5	30.1	33.3	24.1	21.6	41.5	26.2	24.3	35.5	24.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	8.5	13.9	0.2	23.4	0.6	0.1	68.6	2.1	0.5	6.8	8.6	
Delay (s)	47.2	48.4	30.3	56.7	24.7	21.8	110.0	28.2	24.8	42.3	33.5	
Level of Service	D	D	C	E	C	C	F	C	C	D	C	
Approach Delay (s)		42.3			37.0			43.3			35.8	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	38.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	87.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
104: NE 68th St & 6th St

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1819	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1819	
Volume (vph)	94	257	170	327	256	219	85	166	151	162	399	74
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	102	279	185	355	278	238	92	180	164	176	434	80
RTOR Reduction (vph)	0	0	142	0	0	163	0	0	120	0	7	0
Lane Group Flow (vph)	102	279	43	355	278	75	92	180	44	176	507	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	8.1	16.2	16.2	19.9	28.0	28.0	6.0	24.0	24.0	13.1	31.1	
Effective Green, g (s)	8.1	16.2	16.2	19.9	28.0	28.0	6.0	24.0	24.0	13.1	31.1	
Actuated g/C Ratio	0.09	0.18	0.18	0.22	0.31	0.31	0.07	0.27	0.27	0.15	0.35	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	161	338	287	395	585	497	119	501	426	260	634	
v/s Ratio Prot	0.06	c0.15		c0.20	0.15		0.05	0.10		c0.10	c0.28	
v/s Ratio Perm			0.12			0.15			0.10			
v/c Ratio	0.63	0.83	0.15	0.90	0.48	0.15	0.77	0.36	0.10	0.68	0.80	
Uniform Delay, d1	39.1	35.1	30.7	33.7	24.7	22.0	40.9	26.4	24.5	36.0	26.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	7.9	15.0	0.2	22.4	0.6	0.1	26.2	2.0	0.5	6.8	10.2	
Delay (s)	47.0	50.2	30.9	56.0	25.3	22.2	67.1	28.4	25.0	42.9	36.4	
Level of Service	D	D	C	E	C	C	E	C	C	D	D	
Approach Delay (s)		43.3			37.0			35.3			38.1	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	38.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	89.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
108: Kirkland Ave & Lake St

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Frt		0.93			1.00	0.85		1.00	0.85		1.00	
Flt Protected		1.00			0.96	1.00		1.00	1.00		1.00	
Satd. Flow (prot)		1728			1792	1583		1859	1583		1860	
Flt Permitted		0.99			0.49	1.00		0.97	1.00		1.00	
Satd. Flow (perm)		1707			909	1583		1810	1583		1858	
Volume (vph)	7	77	92	78	20	39	8	190	47	7	795	5
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	84	100	85	22	42	9	207	51	8	864	5
RTOR Reduction (vph)	0	75	0	0	0	35	0	0	15	0	0	0
Lane Group Flow (vph)	0	117	0	0	107	7	0	216	36	0	877	0
Turn Type	Perm			Perm		Perm	Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		9.4			9.4	9.4		42.8	42.8		42.8	
Effective Green, g (s)		9.4			9.4	9.4		42.8	42.8		42.8	
Actuated g/C Ratio		0.16			0.16	0.16		0.71	0.71		0.71	
Clearance Time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)		267			142	247		1287	1125		1321	
v/s Ratio Prot												
v/s Ratio Perm		0.11			c0.12	0.03		0.12	0.03		c0.47	
v/c Ratio		0.44			0.75	0.03		0.17	0.03		0.66	
Uniform Delay, d1		23.0			24.3	21.5		2.9	2.6		4.8	
Progression Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2		1.1			20.0	0.0		0.3	0.1		2.6	
Delay (s)		24.2			44.3	21.6		3.1	2.6		7.4	
Level of Service		C			D	C		A	A		A	
Approach Delay (s)		24.2			37.9			3.0			7.4	
Approach LOS		C			D			A			A	

Intersection Summary			
HCM Average Control Delay	11.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	60.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
108: Kirkland Ave & Lake St

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Frt		0.93			1.00	0.85		1.00	0.85		1.00	
Flt Protected		1.00			0.96	1.00		1.00	1.00		1.00	
Satd. Flow (prot)		1728			1791	1583		1859	1583		1860	
Flt Permitted		0.99			0.50	1.00		0.97	1.00		1.00	
Satd. Flow (perm)		1710			928	1583		1808	1583		1856	
Volume (vph)	7	83	99	86	21	42	8	204	65	9	852	5
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	90	108	93	23	46	9	222	71	10	926	5
RTOR Reduction (vph)	0	74	0	0	0	38	0	0	23	0	0	0
Lane Group Flow (vph)	0	132	0	0	116	8	0	231	48	0	941	0
Turn Type	Perm			Perm		Perm	Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		10.9			10.9	10.9		40.6	40.6		40.6	
Effective Green, g (s)		10.9			10.9	10.9		40.6	40.6		40.6	
Actuated g/C Ratio		0.18			0.18	0.18		0.68	0.68		0.68	
Clearance Time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)		313			170	290		1234	1080		1266	
v/s Ratio Prot												
v/s Ratio Perm		0.12			c0.13	0.03		0.13	0.04		c0.51	
v/c Ratio		0.42			0.68	0.03		0.19	0.04		0.74	
Uniform Delay, d1		21.5			22.7	20.0		3.4	3.1		6.1	
Progression Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2		0.9			10.7	0.0		0.3	0.1		4.0	
Delay (s)		22.4			33.4	20.0		3.8	3.2		10.1	
Level of Service		C			C	B		A	A		B	
Approach Delay (s)		22.4			29.6			3.6			10.1	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM Average Control Delay	12.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	59.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
108: Kirkland Ave & Lake St

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Frt		0.93			1.00	0.85		1.00	0.85		1.00	
Flt Protected		1.00			0.96	1.00		1.00	1.00		1.00	
Satd. Flow (prot)		1728			1790	1583		1859	1583		1859	
Flt Permitted		0.99			0.50	1.00		0.97	1.00		0.99	
Satd. Flow (perm)		1710			934	1583		1807	1583		1843	
Volume (vph)	7	83	99	90	21	42	8	205	65	24	852	5
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	90	108	98	23	46	9	223	71	26	926	5
RTOR Reduction (vph)	0	73	0	0	0	37	0	0	23	0	0	0
Lane Group Flow (vph)	0	133	0	0	121	9	0	232	48	0	957	0
Turn Type	Perm			Perm		Perm	Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		11.1			11.1	11.1		40.3	40.3		40.3	
Effective Green, g (s)		11.1			11.1	11.1		40.3	40.3		40.3	
Actuated g/C Ratio		0.19			0.19	0.19		0.68	0.68		0.68	
Clearance Time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)		320			175	296		1226	1074		1250	
v/s Ratio Prot												
v/s Ratio Perm		0.12			c0.13	0.03		0.13	0.04		c0.52	
v/c Ratio		0.42			0.69	0.03		0.19	0.04		0.77	
Uniform Delay, d1		21.3			22.6	19.7		3.5	3.2		6.4	
Progression Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2		0.9			11.2	0.0		0.3	0.1		4.5	
Delay (s)		22.2			33.7	19.8		3.9	3.2		10.9	
Level of Service		C			C	B		A	A		B	
Approach Delay (s)		22.2			29.9			3.7			10.9	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM Average Control Delay	12.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	59.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
109: NE 85th St & 114th Ave NE

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583		1790	1583	3433	1855	
Flt Permitted	0.33	1.00	1.00	0.18	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (perm)	619	3539	1583	331	3539	1583		1790	1583	3433	1855	
Volume (vph)	7	706	10	258	782	126	8	2	122	378	31	1
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	767	11	280	850	137	9	2	133	411	34	1
RTOR Reduction (vph)	0	0	8	0	0	76	0	0	103	0	1	0
Lane Group Flow (vph)	8	767	3	280	850	61	0	11	30	411	34	0
Turn Type	Perm		Perm	pm+pt		Perm	Split		Perm	Split		
Protected Phases		4		3	8		2	2		6	6	
Permitted Phases	4		4	8		8			2			
Actuated Green, G (s)	18.5	18.5	18.5	33.9	33.9	33.9		17.1	17.1	13.7	13.7	
Effective Green, g (s)	18.5	18.5	18.5	33.9	33.9	33.9		17.1	17.1	13.7	13.7	
Actuated g/C Ratio	0.24	0.24	0.24	0.44	0.44	0.44		0.22	0.22	0.18	0.18	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	149	854	382	360	1564	700		399	353	613	331	
v/s Ratio Prot		c0.22		c0.12	0.24			0.01		c0.12	0.02	
v/s Ratio Perm	0.01		0.01	0.23		0.09			0.08			
v/c Ratio	0.05	0.90	0.01	0.78	0.54	0.09		0.03	0.08	0.67	0.10	
Uniform Delay, d1	22.4	28.2	22.1	16.5	15.7	12.4		23.3	23.6	29.4	26.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	12.1	0.0	10.1	0.4	0.1		0.1	0.5	2.9	0.1	
Delay (s)	22.5	40.3	22.1	26.7	16.1	12.5		23.4	24.1	32.3	26.5	
Level of Service	C	D	C	C	B	B		C	C	C	C	
Approach Delay (s)		39.9			18.0			24.0			31.8	
Approach LOS		D			B			C			C	

Intersection Summary			
HCM Average Control Delay	27.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	76.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
109: NE 85th St & 114th Ave NE

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583		1790	1583	3433	1855	
Flt Permitted	0.24	1.00	1.00	0.15	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (perm)	438	3539	1583	287	3539	1583		1790	1583	3433	1855	
Volume (vph)	7	814	11	421	1102	136	8	2	148	405	34	1
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	885	12	458	1198	148	9	2	161	440	37	1
RTOR Reduction (vph)	0	0	9	0	0	73	0	0	130	0	1	0
Lane Group Flow (vph)	8	885	3	458	1198	75	0	11	31	440	37	0
Turn Type	Perm		Perm	pm+pt		Perm	Split		Perm	Split		
Protected Phases		4		3	8		2	2		6	6	
Permitted Phases	4		4	8		8			2			
Actuated Green, G (s)	22.0	22.0	22.0	45.0	45.0	45.0		17.0	17.0	14.9	14.9	
Effective Green, g (s)	22.0	22.0	22.0	45.0	45.0	45.0		17.0	17.0	14.9	14.9	
Actuated g/C Ratio	0.25	0.25	0.25	0.51	0.51	0.51		0.19	0.19	0.17	0.17	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	108	876	392	462	1791	801		342	303	575	311	
v/s Ratio Prot		0.25		c0.21	0.34			0.01		c0.13	0.02	
v/s Ratio Perm	0.02		0.01	c0.29		0.09			0.10			
v/c Ratio	0.07	1.01	0.01	0.99	0.67	0.09		0.03	0.10	0.77	0.12	
Uniform Delay, d1	25.6	33.5	25.2	24.9	16.4	11.4		29.3	29.7	35.3	31.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	33.0	0.0	39.5	1.0	0.1		0.2	0.7	6.0	0.2	
Delay (s)	25.9	66.4	25.2	64.3	17.3	11.4		29.4	30.3	41.4	31.6	
Level of Service	C	E	C	E	B	B		C	C	D	C	
Approach Delay (s)		65.5			28.8			30.3			40.6	
Approach LOS		E			C			C			D	

Intersection Summary			
HCM Average Control Delay	40.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	88.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
109: NE 85th St & 114th Ave NE

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583		1790	1583	3433	1855	
Flt Permitted	0.23	1.00	1.00	0.15	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (perm)	426	3539	1583	287	3539	1583		1790	1583	3433	1855	
Volume (vph)	7	817	11	431	1127	136	8	2	151	405	34	1
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	888	12	468	1225	148	9	2	164	440	37	1
RTOR Reduction (vph)	0	0	9	0	0	73	0	0	133	0	1	0
Lane Group Flow (vph)	8	888	3	468	1225	75	0	11	31	440	37	0
Turn Type	Perm		Perm	pm+pt		Perm	Split		Perm	Split		
Protected Phases		4		3	8		2	2		6	6	
Permitted Phases	4		4	8		8			2			
Actuated Green, G (s)	22.0	22.0	22.0	45.0	45.0	45.0		17.0	17.0	14.9	14.9	
Effective Green, g (s)	22.0	22.0	22.0	45.0	45.0	45.0		17.0	17.0	14.9	14.9	
Actuated g/C Ratio	0.25	0.25	0.25	0.51	0.51	0.51		0.19	0.19	0.17	0.17	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	105	876	392	462	1791	801		342	303	575	311	
v/s Ratio Prot		0.25		c0.22	0.35			0.01		c0.13	0.02	
v/s Ratio Perm	0.02		0.01	c0.30		0.09			0.10			
v/c Ratio	0.08	1.01	0.01	1.01	0.68	0.09		0.03	0.10	0.77	0.12	
Uniform Delay, d1	25.7	33.5	25.2	25.0	16.6	11.4		29.3	29.7	35.3	31.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	33.9	0.0	45.2	1.1	0.1		0.2	0.7	6.0	0.2	
Delay (s)	26.0	67.3	25.2	70.2	17.7	11.4		29.4	30.3	41.4	31.6	
Level of Service	C	E	C	E	B	B		C	C	D	C	
Approach Delay (s)		66.4			30.5			30.3			40.6	
Approach LOS		E			C			C			D	

Intersection Summary			
HCM Average Control Delay	41.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	88.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
111: Kirkland Ave & 3rd Ave

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.96		1.00	0.91		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1790		1770	1790		1770	1704		1770	1839	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1790		1770	1790		1770	1704		1770	1839	
Volume (vph)	9	112	40	64	95	33	30	72	95	85	274	26
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	122	43	70	103	36	33	78	103	92	298	28
RTOR Reduction (vph)	0	25	0	0	24	0	0	58	0	0	4	0
Lane Group Flow (vph)	10	140	0	70	115	0	33	123	0	92	322	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	0.7	10.0		2.8	12.1		1.5	25.1		3.4	27.0	
Effective Green, g (s)	0.7	10.0		2.8	12.1		1.5	25.1		3.4	27.0	
Actuated g/C Ratio	0.01	0.17		0.05	0.21		0.03	0.44		0.06	0.47	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	22	312		86	378		46	746		105	867	
v/s Ratio Prot	0.01	c0.09		c0.04	0.08		0.02	0.11		c0.05	c0.18	
v/s Ratio Perm												
v/c Ratio	0.45	0.45		0.81	0.31		0.72	0.17		0.88	0.37	
Uniform Delay, d1	28.1	21.2		27.0	19.1		27.7	9.8		26.7	9.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	14.2	1.0		42.3	0.5		41.5	0.5		50.4	1.2	
Delay (s)	42.3	22.2		69.3	19.5		69.2	10.2		77.2	10.9	
Level of Service	D	C		E	B		E	B		E	B	
Approach Delay (s)		23.4			36.2			19.3			25.5	
Approach LOS		C			D			B			C	

Intersection Summary			
HCM Average Control Delay	26.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	57.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	44.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
111: Kirkland Ave & 3rd Ave

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.97		1.00	0.91		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1792		1770	1805		1770	1704		1770	1837	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1792		1770	1805		1770	1704		1770	1837	
Volume (vph)	10	128	43	68	140	37	33	77	102	98	294	29
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	139	47	74	152	40	36	84	111	107	320	32
RTOR Reduction (vph)	0	23	0	0	17	0	0	60	0	0	5	0
Lane Group Flow (vph)	11	163	0	74	175	0	36	135	0	107	347	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	0.8	11.2		2.4	12.8		1.6	26.9		4.2	29.5	
Effective Green, g (s)	0.8	11.2		2.4	12.8		1.6	26.9		4.2	29.5	
Actuated g/C Ratio	0.01	0.18		0.04	0.21		0.03	0.44		0.07	0.49	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	23	331		70	381		47	755		122	893	
v/s Ratio Prot	0.01	0.10		c0.04	c0.11		0.02	0.11		c0.06	c0.19	
v/s Ratio Perm												
v/c Ratio	0.48	0.49		1.06	0.46		0.77	0.18		0.88	0.39	
Uniform Delay, d1	29.7	22.2		29.2	20.9		29.4	10.2		28.0	9.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	14.8	1.2		124.2	0.9		52.3	0.5		45.7	1.3	
Delay (s)	44.6	23.4		153.4	21.8		81.6	10.7		73.7	11.2	
Level of Service	D	C		F	C		F	B		E	B	
Approach Delay (s)		24.5			58.4			21.8			25.7	
Approach LOS		C			E			C			C	

Intersection Summary			
HCM Average Control Delay	32.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	60.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
111: Kirkland Ave & 3rd Ave

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.97		1.00	0.91		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1790		1770	1810		1770	1704		1770	1837	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1790		1770	1810		1770	1704		1770	1837	
Volume (vph)	10	132	46	68	157	37	55	77	102	98	294	29
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	143	50	74	171	40	60	84	111	107	320	32
RTOR Reduction (vph)	0	24	0	0	16	0	0	63	0	0	5	0
Lane Group Flow (vph)	11	169	0	74	195	0	60	132	0	107	347	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	0.7	10.6		2.2	12.1		2.2	23.7		3.8	25.3	
Effective Green, g (s)	0.7	10.6		2.2	12.1		2.2	23.7		3.8	25.3	
Actuated g/C Ratio	0.01	0.19		0.04	0.21		0.04	0.42		0.07	0.45	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	22	337		69	389		69	717		119	826	
v/s Ratio Prot	0.01	0.11		c0.04	c0.12		0.03	0.11		c0.06	c0.19	
v/s Ratio Perm												
v/c Ratio	0.50	0.50		1.07	0.50		0.87	0.18		0.90	0.42	
Uniform Delay, d1	27.6	20.5		27.0	19.4		26.9	10.2		26.1	10.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	16.8	1.2		129.7	1.0		64.4	0.6		51.9	1.6	
Delay (s)	44.4	21.7		156.7	20.5		91.3	10.8		77.9	12.1	
Level of Service	D	C		F	C		F	B		E	B	
Approach Delay (s)		22.9			55.9			29.7			27.4	
Approach LOS		C			E			C			C	

Intersection Summary			
HCM Average Control Delay	33.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	56.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
112: Kirkland Ave & 6th St

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	36	168	42	88	146	30	40	115	16	22	275	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	39	183	46	96	159	33	43	125	17	24	299	65

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total (vph)	267	287	186	24	364
Volume Left (vph)	39	96	43	24	0
Volume Right (vph)	46	33	17	0	65
Hadj (s)	-0.04	0.03	0.02	0.53	-0.09
Departure Headway (s)	6.4	6.5	6.8	7.3	6.6
Degree Utilization, x	0.48	0.51	0.35	0.05	0.67
Capacity (veh/h)	504	504	463	468	514
Control Delay (s)	15.2	16.1	13.4	9.4	20.8
Approach Delay (s)	15.2	16.1	13.4	20.1	
Approach LOS	C	C	B	C	

Intersection Summary			
Delay	16.8		
HCM Level of Service	C		
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
112: Kirkland Ave & 6th St

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	54	180	46	124	157	147	45	178	22	36	358	64
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	59	196	50	135	171	160	49	193	24	39	389	70

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total (vph)	304	465	266	39	459
Volume Left (vph)	59	135	49	39	0
Volume Right (vph)	50	160	24	0	70
Hadj (s)	-0.03	-0.11	0.02	0.53	-0.07
Departure Headway (s)	8.6	8.0	9.0	9.0	8.4
Degree Utilization, x	0.73	1.03	0.66	0.10	1.07
Capacity (veh/h)	406	447	389	392	436
Control Delay (s)	31.7	79.7	27.8	11.8	91.9
Approach Delay (s)	31.7	79.7	27.8	85.6	
Approach LOS	D	F	D	F	

Intersection Summary			
Delay	63.1		
HCM Level of Service	F		
Intersection Capacity Utilization	84.0%	ICU Level of Service	E
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
112: Kirkland Ave & 6th St

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	54	183	47	124	167	147	47	178	22	36	358	69
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	59	199	51	135	182	160	51	193	24	39	389	75

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total (vph)	309	476	268	39	464
Volume Left (vph)	59	135	51	39	0
Volume Right (vph)	51	160	24	0	75
Hadj (s)	-0.03	-0.11	0.02	0.53	-0.08
Departure Headway (s)	8.7	8.0	9.0	9.1	8.4
Degree Utilization, x	0.74	1.06	0.67	0.10	1.09
Capacity (veh/h)	406	445	387	391	436
Control Delay (s)	32.8	89.1	28.5	11.8	97.5
Approach Delay (s)	32.8	89.1	28.5	90.9	
Approach LOS	D	F	D	F	

Intersection Summary			
Delay	68.0		
HCM Level of Service	F		
Intersection Capacity Utilization	85.0%	ICU Level of Service	E
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
112: Kirkland Ave & 6th St

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.98			0.95		1.00	0.98		1.00	0.98	
Flt Protected		0.99			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1804			1754		1770	1832		1770	1818	
Flt Permitted		0.88			0.84		0.35	1.00		0.62	1.00	
Satd. Flow (perm)		1604			1494		646	1832		1160	1818	
Volume (vph)	54	183	47	124	167	147	47	178	22	36	358	69
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	59	199	51	135	182	160	51	193	24	39	389	75
RTOR Reduction (vph)	0	13	0	0	33	0	0	7	0	0	12	0
Lane Group Flow (vph)	0	296	0	0	444	0	51	210	0	39	452	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		16.7			16.7		15.2	15.2		15.2	15.2	
Effective Green, g (s)		16.7			16.7		15.2	15.2		15.2	15.2	
Actuated g/C Ratio		0.42			0.42		0.38	0.38		0.38	0.38	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		671			625		246	698		442	693	
v/s Ratio Prot								0.12			c0.26	
v/s Ratio Perm		0.19			c0.32		0.08			0.03		
v/c Ratio		0.44			0.71		0.21	0.30		0.09	0.65	
Uniform Delay, d1		8.3			9.6		8.3	8.6		7.9	10.2	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.5			3.8		0.4	0.2		0.1	2.2	
Delay (s)		8.7			13.4		8.7	8.9		8.0	12.4	
Level of Service		A			B		A	A		A	B	
Approach Delay (s)		8.7			13.4			8.8			12.0	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	11.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	39.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
103: NE 68th St & State St

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.93			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99			0.96	1.00
Satd. Flow (prot)	1770	1859		1770	1863	1583		1719			1780	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.99			0.96	1.00
Satd. Flow (perm)	1770	1859		1770	1863	1583		1719			1780	1583
Volume (vph)	267	322	5	18	247	271	6	11	18	148	10	104
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	290	350	5	20	268	295	7	13	21	174	12	122
RTOR Reduction (vph)	0	1	0	0	0	230	0	17	0	0	0	102
Lane Group Flow (vph)	290	354	0	20	268	65	0	24	0	0	186	20
Turn Type	Prot			Prot		Perm	Split			Split		Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	14.7	29.8		1.5	16.6	16.6		16.2			12.3	12.3
Effective Green, g (s)	14.7	29.8		1.5	16.6	16.6		16.2			12.3	12.3
Actuated g/C Ratio	0.19	0.39		0.02	0.22	0.22		0.21			0.16	0.16
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	343	731		35	408	347		367			289	257
v/s Ratio Prot	c0.16	0.19		0.01	0.14			c0.02			c0.10	
v/s Ratio Perm						0.19						0.08
v/c Ratio	0.85	0.48		0.57	0.66	0.19		0.07			0.64	0.08
Uniform Delay, d1	29.5	17.2		36.8	27.0	24.1		23.8			29.7	26.9
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	17.1	0.5		20.6	3.8	0.3		0.4			4.8	0.1
Delay (s)	46.6	17.8		57.4	30.8	24.4		24.1			34.5	27.1
Level of Service	D	B		E	C	C		C			C	C
Approach Delay (s)		30.7			28.5			24.1			31.6	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	29.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	75.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	53.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
103: NE 68th St & State St

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.93			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99			0.96	1.00
Satd. Flow (prot)	1770	1858		1770	1863	1583		1717			1779	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.99			0.96	1.00
Satd. Flow (perm)	1770	1858		1770	1863	1583		1717			1779	1583
Volume (vph)	313	380	6	21	294	326	7	13	21	169	11	132
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.85	0.85	0.85	0.92	0.92	0.92
Adj. Flow (vph)	340	413	7	23	320	354	8	15	25	184	12	143
RTOR Reduction (vph)	0	1	0	0	0	274	0	20	0	0	0	120
Lane Group Flow (vph)	340	419	0	23	320	80	0	28	0	0	196	23
Turn Type	Prot			Prot		Perm	Split			Split		Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	16.1	32.3		1.5	17.7	17.7		16.1			12.9	12.9
Effective Green, g (s)	16.1	32.3		1.5	17.7	17.7		16.1			12.9	12.9
Actuated g/C Ratio	0.20	0.41		0.02	0.22	0.22		0.20			0.16	0.16
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	362	762		34	418	356		351			291	259
v/s Ratio Prot	c0.19	0.23		0.01	0.17			c0.03			c0.11	
v/s Ratio Perm						0.22						0.09
v/c Ratio	0.94	0.55		0.68	0.77	0.22		0.08			0.67	0.09
Uniform Delay, d1	30.9	17.7		38.4	28.6	24.9		25.4			31.0	28.0
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	31.6	0.9		42.2	8.1	0.3		0.4			6.0	0.2
Delay (s)	62.5	18.6		80.6	36.8	25.3		25.8			37.0	28.1
Level of Service	E	B		F	D	C		C			D	C
Approach Delay (s)		38.2			32.4			25.8			33.3	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	34.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	78.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
103: NE 68th St & State St

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.93			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99			0.95	1.00
Satd. Flow (prot)	1770	1858		1770	1863	1583		1717			1779	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.99			0.95	1.00
Satd. Flow (perm)	1770	1858		1770	1863	1583		1717			1779	1583
Volume (vph)	313	380	6	21	294	334	7	13	21	183	11	138
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.85	0.85	0.85	0.92	0.92	0.92
Adj. Flow (vph)	340	413	7	23	320	363	8	15	25	199	12	150
RTOR Reduction (vph)	0	1	0	0	0	282	0	20	0	0	0	125
Lane Group Flow (vph)	340	419	0	23	320	81	0	28	0	0	211	25
Turn Type	Prot			Prot		Perm	Split			Split		Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	16.1	32.3		1.5	17.7	17.7		16.1			13.2	13.2
Effective Green, g (s)	16.1	32.3		1.5	17.7	17.7		16.1			13.2	13.2
Actuated g/C Ratio	0.20	0.41		0.02	0.22	0.22		0.20			0.17	0.17
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	360	759		34	417	354		349			297	264
v/s Ratio Prot	c0.19	0.23		0.01	0.17			c0.03			c0.12	
v/s Ratio Perm						0.23						0.09
v/c Ratio	0.94	0.55		0.68	0.77	0.23		0.08			0.71	0.09
Uniform Delay, d1	31.1	17.9		38.6	28.8	25.1		25.5			31.1	27.9
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	33.1	0.9		42.2	8.2	0.3		0.5			7.8	0.2
Delay (s)	64.1	18.8		80.8	37.0	25.5		26.0			38.9	28.0
Level of Service	E	B		F	D	C		C			D	C
Approach Delay (s)		39.1			32.5			26.0			34.4	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	35.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	79.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
104: NE 68th St & 6th St

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1734	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1734	
Volume (vph)	166	292	64	193	244	148	154	257	124	170	123	105
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	180	317	70	210	265	161	167	279	135	185	134	114
RTOR Reduction (vph)	0	0	54	0	0	124	0	0	99	0	47	0
Lane Group Flow (vph)	180	317	16	210	265	37	167	279	36	185	201	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	8.7	14.2	14.2	9.0	14.5	14.5	7.0	17.0	17.0	7.0	17.0	
Effective Green, g (s)	8.7	14.2	14.2	9.0	14.5	14.5	7.0	17.0	17.0	7.0	17.0	
Actuated g/C Ratio	0.14	0.22	0.22	0.14	0.23	0.23	0.11	0.27	0.27	0.11	0.27	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	244	419	356	252	427	363	196	501	426	196	466	
v/s Ratio Prot	0.10	c0.17		c0.12	0.14		0.09	c0.15		c0.10	0.14	
v/s Ratio Perm			0.04			0.10			0.09			
v/c Ratio	0.74	0.76	0.04	0.83	0.62	0.10	0.85	0.56	0.09	0.94	0.43	
Uniform Delay, d1	26.2	22.9	19.2	26.4	21.9	19.2	27.6	19.9	17.3	27.9	19.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	11.0	7.6	0.1	20.4	2.8	0.1	28.2	4.4	0.4	48.1	2.9	
Delay (s)	37.2	30.5	19.2	46.8	24.7	19.3	55.8	24.3	17.7	76.0	22.0	
Level of Service	D	C	B	D	C	B	E	C	B	E	C	
Approach Delay (s)		31.2			30.6			31.8			45.1	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM Average Control Delay	33.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	63.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
104: NE 68th St & 6th St

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1745	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1745	
Volume (vph)	192	352	76	231	303	177	177	331	148	257	172	125
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	209	383	83	251	329	192	192	360	161	279	187	136
RTOR Reduction (vph)	0	0	57	0	0	147	0	0	107	0	35	0
Lane Group Flow (vph)	209	383	26	251	329	45	192	360	54	279	288	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	11.4	16.8	16.8	12.0	17.4	17.4	10.6	17.0	17.0	13.0	19.4	
Effective Green, g (s)	11.4	16.8	16.8	12.0	17.4	17.4	10.6	17.0	17.0	13.0	19.4	
Actuated g/C Ratio	0.15	0.22	0.22	0.16	0.23	0.23	0.14	0.23	0.23	0.17	0.26	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	270	418	356	284	433	368	251	423	360	308	453	
v/s Ratio Prot	0.12	c0.21		c0.14	0.18		0.11	c0.19		c0.16	0.19	
v/s Ratio Perm			0.05			0.12			0.10			
v/c Ratio	0.77	0.92	0.07	0.88	0.76	0.12	0.76	0.85	0.15	0.91	0.64	
Uniform Delay, d1	30.5	28.3	22.9	30.7	26.8	22.7	30.9	27.7	23.1	30.3	24.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	12.9	24.5	0.1	26.0	7.5	0.1	13.0	19.0	0.9	28.3	6.7	
Delay (s)	43.4	52.8	23.0	56.7	34.3	22.8	43.9	46.6	24.0	58.6	31.2	
Level of Service	D	D	C	E	C	C	D	D	C	E	C	
Approach Delay (s)		46.2			38.7			40.8			43.9	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	42.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	74.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
104: NE 68th St & 6th St

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1745	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1745	
Volume (vph)	192	360	82	231	306	177	182	331	148	257	172	125
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	209	391	89	251	333	192	198	360	161	279	187	136
RTOR Reduction (vph)	0	0	59	0	0	147	0	0	107	0	35	0
Lane Group Flow (vph)	209	391	30	251	333	45	198	360	54	279	288	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	11.4	17.0	17.0	12.0	17.6	17.6	10.6	17.0	17.0	13.0	19.4	
Effective Green, g (s)	11.4	17.0	17.0	12.0	17.6	17.6	10.6	17.0	17.0	13.0	19.4	
Actuated g/C Ratio	0.15	0.23	0.23	0.16	0.23	0.23	0.14	0.23	0.23	0.17	0.26	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	269	422	359	283	437	371	250	422	359	307	451	
v/s Ratio Prot	0.12	c0.21		c0.14	0.18		0.11	c0.19		c0.16	0.19	
v/s Ratio Perm			0.06			0.12			0.10			
v/c Ratio	0.78	0.93	0.08	0.89	0.76	0.12	0.79	0.85	0.15	0.91	0.64	
Uniform Delay, d1	30.6	28.4	22.9	30.8	26.7	22.6	31.1	27.8	23.2	30.4	24.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	13.1	26.2	0.1	26.5	7.7	0.1	15.6	19.2	0.9	28.8	6.8	
Delay (s)	43.7	54.6	23.0	57.3	34.4	22.8	46.8	47.0	24.1	59.2	31.5	
Level of Service	D	D	C	E	C	C	D	D	C	E	C	
Approach Delay (s)		47.2			39.0			41.8			44.3	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	42.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
108: Kirkland Ave & Lake St

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Frt		0.96			1.00	0.85		1.00	0.85		0.98	
Flt Protected		0.99			0.97	1.00		1.00	1.00		1.00	
Satd. Flow (prot)		1770			1807	1583		1862	1583		1832	
Flt Permitted		0.94			0.74	1.00		1.00	1.00		1.00	
Satd. Flow (perm)		1685			1379	1583		1860	1583		1829	
Volume (vph)	17	61	36	70	44	87	3	507	73	3	320	43
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	18	66	39	76	48	95	3	551	79	3	348	47
RTOR Reduction (vph)	0	32	0	0	0	79	0	0	23	0	5	0
Lane Group Flow (vph)	0	91	0	0	124	16	0	554	56	0	393	0
Turn Type	Perm			Perm		Perm	Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		10.6			10.6	10.6		44.8	44.8		44.8	
Effective Green, g (s)		10.6			10.6	10.6		44.8	44.8		44.8	
Actuated g/C Ratio		0.17			0.17	0.17		0.71	0.71		0.71	
Clearance Time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)		282			231	265		1314	1119		1292	
v/s Ratio Prot												
v/s Ratio Perm		0.07			c0.09	0.06		c0.30	0.05		0.22	
v/c Ratio		0.32			0.54	0.06		0.42	0.05		0.30	
Uniform Delay, d1		23.2			24.2	22.2		3.9	2.8		3.5	
Progression Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2		0.7			2.4	0.1		1.0	0.1		0.6	
Delay (s)		23.9			26.5	22.3		4.9	2.9		4.1	
Level of Service		C			C	C		A	A		A	
Approach Delay (s)		23.9			24.7			4.6			4.1	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	9.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	63.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
108: Kirkland Ave & Lake St

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Frt		0.96			1.00	0.85		1.00	0.85		0.98	
Flt Protected		0.99			0.97	1.00		1.00	1.00		1.00	
Satd. Flow (prot)		1769			1808	1583		1862	1583		1834	
Flt Permitted		0.94			0.72	1.00		1.00	1.00		1.00	
Satd. Flow (perm)		1668			1345	1583		1860	1583		1828	
Volume (vph)	20	69	41	79	51	99	3	589	83	4	381	49
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	75	45	86	55	108	3	640	90	4	414	53
RTOR Reduction (vph)	0	34	0	0	0	89	0	0	28	0	5	0
Lane Group Flow (vph)	0	108	0	0	141	19	0	643	62	0	466	0
Turn Type	Perm			Perm		Perm	Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		10.0			10.0	10.0		40.1	40.1		40.1	
Effective Green, g (s)		10.0			10.0	10.0		40.1	40.1		40.1	
Actuated g/C Ratio		0.17			0.17	0.17		0.69	0.69		0.69	
Clearance Time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)		287			231	272		1284	1093		1262	
v/s Ratio Prot												
v/s Ratio Perm		0.09			c0.10	0.07		c0.35	0.06		0.26	
v/c Ratio		0.38			0.61	0.07		0.50	0.06		0.37	
Uniform Delay, d1		21.3			22.2	20.1		4.3	2.9		3.7	
Progression Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2		0.8			4.7	0.1		1.4	0.1		0.8	
Delay (s)		22.1			27.0	20.3		5.7	3.0		4.6	
Level of Service		C			C	C		A	A		A	
Approach Delay (s)		22.1			24.0			5.3			4.6	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	9.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	58.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
108: Kirkland Ave & Lake St

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Frt		0.96			1.00	0.85		1.00	0.85		0.98	
Flt Protected		0.99			0.97	1.00		1.00	1.00		1.00	
Satd. Flow (prot)		1769			1805	1583		1862	1583		1834	
Flt Permitted		0.93			0.72	1.00		1.00	1.00		1.00	
Satd. Flow (perm)		1666			1340	1583		1860	1583		1828	
Volume (vph)	20	69	41	90	51	105	3	599	83	4	381	49
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	75	45	98	55	114	3	651	90	4	414	53
RTOR Reduction (vph)	0	34	0	0	0	94	0	0	29	0	5	0
Lane Group Flow (vph)	0	108	0	0	153	20	0	654	61	0	466	0
Turn Type	Perm			Perm		Perm	Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		10.1			10.1	10.1		38.9	38.9		38.9	
Effective Green, g (s)		10.1			10.1	10.1		38.9	38.9		38.9	
Actuated g/C Ratio		0.18			0.18	0.18		0.68	0.68		0.68	
Clearance Time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)		295			237	280		1269	1080		1248	
v/s Ratio Prot												
v/s Ratio Perm		0.09			c0.11	0.07		c0.35	0.06		0.26	
v/c Ratio		0.37			0.65	0.07		0.52	0.06		0.37	
Uniform Delay, d1		20.6			21.8	19.5		4.4	3.0		3.9	
Progression Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2		0.8			5.9	0.1		1.5	0.1		0.9	
Delay (s)		21.4			27.7	19.7		5.9	3.1		4.7	
Level of Service		C			C	B		A	A		A	
Approach Delay (s)		21.4			24.3			5.6			4.7	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	9.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	57.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
109: NE 85th St & 114th Ave NE

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583		1859	1583	3433	1809	
Flt Permitted	0.37	1.00	1.00	0.21	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)	683	3539	1583	384	3539	1583		1859	1583	3433	1809	
Volume (vph)	8	636	4	156	691	204	1	25	254	327	19	5
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	691	4	170	751	222	1	27	276	355	21	5
RTOR Reduction (vph)	0	0	3	0	0	136	0	0	180	0	4	0
Lane Group Flow (vph)	9	691	1	170	751	86	0	28	96	355	22	0
Turn Type	Perm		Perm	pm+pt		Perm	Split		Perm	Split		
Protected Phases		4		3	8		2	2		6	6	
Permitted Phases	4		4	8		8			2			
Actuated Green, G (s)	15.4	15.4	15.4	25.4	25.4	25.4		16.0	16.0	11.9	11.9	
Effective Green, g (s)	15.4	15.4	15.4	25.4	25.4	25.4		16.0	16.0	11.9	11.9	
Actuated g/C Ratio	0.24	0.24	0.24	0.39	0.39	0.39		0.25	0.25	0.18	0.18	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	161	835	373	277	1377	616		455	388	626	330	
v/s Ratio Prot		c0.20		0.06	c0.21			0.02		c0.10	0.01	
v/s Ratio Perm	0.01		0.00	0.18		0.14			0.17			
v/c Ratio	0.06	0.83	0.00	0.61	0.55	0.14		0.06	0.25	0.57	0.07	
Uniform Delay, d1	19.3	23.7	19.1	14.9	15.5	12.9		18.9	19.8	24.4	22.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	6.8	0.0	4.0	0.4	0.1		0.3	1.5	1.2	0.1	
Delay (s)	19.5	30.5	19.1	18.9	15.9	13.0		19.2	21.3	25.5	22.2	
Level of Service	B	C	B	B	B	B		B	C	C	C	
Approach Delay (s)		30.3			15.8			21.1			25.3	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM Average Control Delay	21.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	65.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
109: NE 85th St & 114th Ave NE

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583		1860	1583	3433	1800	
Flt Permitted	0.25	1.00	1.00	0.17	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)	474	3539	1583	321	3539	1583		1860	1583	3433	1800	
Volume (vph)	9	768	2	180	891	232	1	29	336	372	22	6
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	835	2	196	968	252	1	32	365	404	24	7
RTOR Reduction (vph)	0	0	1	0	0	149	0	0	150	0	6	0
Lane Group Flow (vph)	10	835	1	196	968	103	0	33	215	404	25	0
Turn Type	Perm		Perm	pm+pt		Perm	Split		Perm	Split		
Protected Phases		4		3	8		2	2		6	6	
Permitted Phases	4		4	8		8			2			
Actuated Green, G (s)	19.2	19.2	19.2	29.2	29.2	29.2		17.1	17.1	13.2	13.2	
Effective Green, g (s)	19.2	19.2	19.2	29.2	29.2	29.2		17.1	17.1	13.2	13.2	
Actuated g/C Ratio	0.27	0.27	0.27	0.41	0.41	0.41		0.24	0.24	0.18	0.18	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	127	950	425	253	1445	646		445	379	634	332	
v/s Ratio Prot		c0.24		0.07	c0.27			0.02		c0.12	0.02	
v/s Ratio Perm	0.02		0.00	0.25		0.16			0.23			
v/c Ratio	0.08	0.88	0.00	0.77	0.67	0.16		0.07	0.57	0.64	0.08	
Uniform Delay, d1	19.5	25.0	19.1	16.5	17.2	13.4		21.1	23.9	26.9	24.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	9.3	0.0	13.7	1.2	0.1		0.3	6.0	2.1	0.1	
Delay (s)	19.8	34.3	19.1	30.2	18.4	13.5		21.4	30.0	29.0	24.2	
Level of Service	B	C	B	C	B	B		C	C	C	C	
Approach Delay (s)		34.1			19.2			29.3			28.7	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM Average Control Delay	25.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	71.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
109: NE 85th St & 114th Ave NE

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583		1860	1583	3433	1800	
Flt Permitted	0.24	1.00	1.00	0.17	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)	449	3539	1583	325	3539	1583		1860	1583	3433	1800	
Volume (vph)	9	780	2	191	900	232	1	29	362	372	22	6
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	848	2	208	978	252	1	32	393	404	24	7
RTOR Reduction (vph)	0	0	1	0	0	151	0	0	149	0	6	0
Lane Group Flow (vph)	10	848	1	208	978	101	0	33	244	404	25	0
Turn Type	Perm		Perm	pm+pt		Perm	Split		Perm	Split		
Protected Phases		4		3	8		2	2		6	6	
Permitted Phases	4		4	8		8			2			
Actuated Green, G (s)	18.9	18.9	18.9	28.9	28.9	28.9		18.0	18.0	13.3	13.3	
Effective Green, g (s)	18.9	18.9	18.9	28.9	28.9	28.9		18.0	18.0	13.3	13.3	
Actuated g/C Ratio	0.26	0.26	0.26	0.40	0.40	0.40		0.25	0.25	0.18	0.18	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	118	926	414	250	1417	634		464	395	632	332	
v/s Ratio Prot		0.24		c0.07	0.28			0.02		c0.12	0.02	
v/s Ratio Perm	0.02		0.00	c0.26		0.16			0.25			
v/c Ratio	0.08	0.92	0.00	0.83	0.69	0.16		0.07	0.62	0.64	0.08	
Uniform Delay, d1	20.1	25.9	19.7	17.2	17.9	13.9		20.7	24.0	27.2	24.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	13.4	0.0	20.4	1.5	0.1		0.3	7.0	2.1	0.1	
Delay (s)	20.4	39.2	19.7	37.7	19.4	14.0		21.0	31.1	29.4	24.5	
Level of Service	C	D	B	D	B	B		C	C	C	C	
Approach Delay (s)		39.0			21.1			30.3			29.0	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	28.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	72.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
111: Kirkland Ave & 3rd Ave

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.92		1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1797		1770	1722		1770	1772		1770	1804	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1797		1770	1722		1770	1772		1770	1804	
Volume (vph)	20	104	32	115	121	123	78	325	156	86	149	40
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	113	35	125	132	134	85	353	170	93	162	43
RTOR Reduction (vph)	0	19	0	0	59	0	0	23	0	0	12	0
Lane Group Flow (vph)	22	129	0	125	207	0	85	500	0	93	193	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	0.7	12.2		4.8	16.3		4.7	26.6		4.0	25.9	
Effective Green, g (s)	0.7	12.2		4.8	16.3		4.7	26.6		4.0	25.9	
Actuated g/C Ratio	0.01	0.19		0.08	0.26		0.07	0.42		0.06	0.41	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	19	345		134	441		131	741		111	735	
v/s Ratio Prot	0.01	0.08		c0.07	c0.15		0.05	c0.30		c0.05	0.11	
v/s Ratio Perm												
v/c Ratio	1.16	0.38		0.93	0.47		0.65	0.68		0.84	0.26	
Uniform Delay, d1	31.4	22.4		29.2	20.0		28.6	15.0		29.5	12.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	260.5	0.7		57.2	0.8		10.6	4.9		39.6	0.9	
Delay (s)	292.0	23.1		86.5	20.8		39.2	19.9		69.0	13.4	
Level of Service	F	C		F	C		D	B		E	B	
Approach Delay (s)		57.9			41.8			22.6			30.8	
Approach LOS		E			D			C			C	

Intersection Summary			
HCM Average Control Delay	33.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	63.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
111: Kirkland Ave & 3rd Ave

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.92		1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1797		1770	1718		1770	1774		1770	1804	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1797		1770	1718		1770	1774		1770	1804	
Volume (vph)	24	119	37	132	140	150	88	379	178	98	176	47
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	26	129	40	143	152	163	96	412	193	107	191	51
RTOR Reduction (vph)	0	15	0	0	53	0	0	20	0	0	11	0
Lane Group Flow (vph)	26	154	0	143	262	0	96	585	0	107	231	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	1.4	13.0		6.0	17.6		6.5	30.5		4.5	28.5	
Effective Green, g (s)	1.4	13.0		6.0	17.6		6.5	30.5		4.5	28.5	
Actuated g/C Ratio	0.02	0.19		0.09	0.25		0.09	0.44		0.06	0.41	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	35	334		152	432		164	773		114	734	
v/s Ratio Prot	0.01	0.09		c0.08	c0.18		0.05	c0.34		c0.06	0.13	
v/s Ratio Perm												
v/c Ratio	0.74	0.46		0.94	0.61		0.59	0.76		0.94	0.31	
Uniform Delay, d1	34.1	25.4		31.8	23.1		30.5	16.6		32.6	14.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	58.7	1.0		55.3	2.4		5.2	6.8		64.4	1.1	
Delay (s)	92.9	26.4		87.1	25.5		35.7	23.4		97.0	15.2	
Level of Service	F	C		F	C		D	C		F	B	
Approach Delay (s)		35.2			44.8			25.1			40.3	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM Average Control Delay	34.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
111: Kirkland Ave & 3rd Ave

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.93		1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1785		1770	1725		1770	1774		1770	1804	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1785		1770	1725		1770	1774		1770	1804	
Volume (vph)	24	152	59	132	154	150	96	379	178	98	176	47
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	26	165	64	143	167	163	104	412	193	107	191	51
RTOR Reduction (vph)	0	19	0	0	48	0	0	21	0	0	12	0
Lane Group Flow (vph)	26	210	0	143	282	0	104	584	0	107	230	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	1.4	14.0		6.0	18.6		6.9	30.1		4.5	27.7	
Effective Green, g (s)	1.4	14.0		6.0	18.6		6.9	30.1		4.5	27.7	
Actuated g/C Ratio	0.02	0.20		0.08	0.26		0.10	0.43		0.06	0.39	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	35	354		150	454		173	756		113	708	
v/s Ratio Prot	0.01	0.13		c0.08	c0.19		0.06	c0.34		c0.06	0.13	
v/s Ratio Perm												
v/c Ratio	0.74	0.59		0.95	0.62		0.60	0.77		0.95	0.33	
Uniform Delay, d1	34.4	25.7		32.2	22.9		30.5	17.3		32.9	14.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	58.7	2.7		59.1	2.6		5.8	7.5		67.3	1.2	
Delay (s)	93.2	28.4		91.3	25.5		36.3	24.9		100.2	16.2	
Level of Service	F	C		F	C		D	C		F	B	
Approach Delay (s)		35.0			45.4			26.6			41.9	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM Average Control Delay	35.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	70.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
112: Kirkland Ave & 6th St

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	73	201	41	46	150	36	62	345	21	29	162	70
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	79	218	45	50	163	39	67	375	23	32	176	76

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total (vph)	342	252	465	32	252
Volume Left (vph)	79	50	67	32	0
Volume Right (vph)	45	39	23	0	76
Hadj (s)	0.00	-0.02	0.03	0.53	-0.18
Departure Headway (s)	7.6	7.9	7.3	8.7	8.0
Degree Utilization, x	0.72	0.55	0.94	0.08	0.56
Capacity (veh/h)	459	427	486	394	426
Control Delay (s)	27.9	20.3	54.5	11.2	19.4
Approach Delay (s)	27.9	20.3	54.5	18.5	
Approach LOS	D	C	F	C	

Intersection Summary			
Delay	33.7		
HCM Level of Service	D		
Intersection Capacity Utilization	69.9%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
112: Kirkland Ave & 6th St

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	85	229	49	57	171	42	86	447	72	33	198	80
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	92	249	53	62	186	46	93	486	78	36	215	87

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total (vph)	395	293	658	36	302
Volume Left (vph)	92	62	93	36	0
Volume Right (vph)	53	46	78	0	87
Hadj (s)	0.00	-0.02	-0.01	0.53	-0.17
Departure Headway (s)	8.2	8.6	8.3	9.4	8.7
Degree Utilization, x	0.90	0.70	1.52	0.09	0.73
Capacity (veh/h)	395	395	435	367	398
Control Delay (s)	50.8	29.7	267.4	12.2	30.5
Approach Delay (s)	50.8	29.7	267.4	28.6	
Approach LOS	F	D	F	D	

Intersection Summary			
Delay	127.3		
HCM Level of Service	F		
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
112: Kirkland Ave & 6th St

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	87	256	51	57	182	42	87	447	72	33	198	80
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	95	278	55	62	198	46	95	486	78	36	215	87

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total (vph)	428	305	659	36	302
Volume Left (vph)	95	62	95	36	0
Volume Right (vph)	55	46	78	0	87
Hadj (s)	0.00	-0.02	-0.01	0.53	-0.17
Departure Headway (s)	8.4	8.9	8.7	9.7	9.0
Degree Utilization, x	1.00	0.76	1.60	0.10	0.76
Capacity (veh/h)	426	395	415	363	391
Control Delay (s)	72.1	34.8	301.1	12.6	33.9
Approach Delay (s)	72.1	34.8	301.1	31.6	
Approach LOS	F	D	F	D	

Intersection Summary			
Delay	144.8		
HCM Level of Service	F		
Intersection Capacity Utilization	87.5%	ICU Level of Service	E
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
112: Kirkland Ave & 6th St

5/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.98			0.98		1.00	0.98		1.00	0.96	
Flt Protected		0.99			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1810			1807		1770	1824		1770	1782	
Flt Permitted		0.88			0.88		0.55	1.00		0.28	1.00	
Satd. Flow (perm)		1610			1610		1024	1824		514	1782	
Volume (vph)	87	256	51	57	182	42	87	447	72	33	198	80
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	95	278	55	62	198	46	95	486	78	36	215	87
RTOR Reduction (vph)	0	9	0	0	11	0	0	10	0	0	25	0
Lane Group Flow (vph)	0	419	0	0	295	0	95	554	0	36	277	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		15.8			15.8		17.6	17.6		17.6	17.6	
Effective Green, g (s)		15.8			15.8		17.6	17.6		17.6	17.6	
Actuated g/C Ratio		0.38			0.38		0.43	0.43		0.43	0.43	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		614			614		435	775		219	758	
v/s Ratio Prot								c0.31			0.17	
v/s Ratio Perm		c0.27			0.19		0.09			0.07		
v/c Ratio		0.68			0.48		0.22	0.71		0.16	0.37	
Uniform Delay, d1		10.7			9.7		7.5	9.8		7.4	8.1	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		3.1			0.6		0.3	3.1		0.4	0.3	
Delay (s)		13.8			10.3		7.8	13.0		7.7	8.4	
Level of Service		B			B		A	B		A	A	
Approach Delay (s)		13.8			10.3			12.2			8.3	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	11.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	41.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
4: alley & 101 kirkland garage

6/4/2013

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	1	2	2	6	10	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	1	2	2	7	11	1
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	9				10	6
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	9				10	6
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	100
cM capacity (veh/h)	1624				1015	1083

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	3	9	12
Volume Left	1	0	11
Volume Right	0	7	1
cSH	1624	1700	1021
Volume to Capacity	0.00	0.01	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	2.4	0.0	8.6
Lane LOS	A		A
Approach Delay (s)	2.4	0.0	8.6
Approach LOS			A

Intersection Summary			
Average Delay	4.6		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
4: alley & 101 kirkland garage

6/4/2013

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	1	14	4	6	10	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	1	16	4	7	11	1
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	11				26	8
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	11				26	8
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	100
cM capacity (veh/h)	1621				994	1080

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	17	11	12
Volume Left	1	0	11
Volume Right	0	7	1
cSH	1621	1700	1002
Volume to Capacity	0.00	0.01	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.5	0.0	8.6
Lane LOS	A		A
Approach Delay (s)	0.5	0.0	8.6
Approach LOS			A

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
3: alley & Lake St Pkg

6/4/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	11	1	6	7	1	4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	12	1	7	8	1	4
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			13		34	13
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			13		34	13
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1618		980	1073

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	13	14	6
Volume Left	0	7	1
Volume Right	1	0	4
cSH	1700	1618	1053
Volume to Capacity	0.01	0.00	0.01
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	3.4	8.4
Lane LOS		A	A
Approach Delay (s)	0.0	3.4	8.4
Approach LOS			A

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	18.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
3: alley & Lake St Pkg

6/4/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	11	13	86	7	3	17
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	12	14	96	8	3	19
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			27		218	19
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			27		218	19
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			94		100	98
cM capacity (veh/h)			1600		728	1064

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	27	103	22
Volume Left	0	96	3
Volume Right	14	0	19
cSH	1700	1600	995
Volume to Capacity	0.02	0.06	0.02
Queue Length 95th (ft)	0	5	2
Control Delay (s)	0.0	6.9	8.7
Lane LOS		A	A
Approach Delay (s)	0.0	6.9	8.7
Approach LOS			A

Intersection Summary			
Average Delay	5.9		
Intersection Capacity Utilization	26.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
1: Kirkland Ave & Main St Est

6/4/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	11	118	4	11	114	17	4	7	10	33	13	22
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	12	131	4	12	127	19	4	8	11	37	14	24
Pedestrians		30			30			30				
Lane Width (ft)		10.0			10.0			10.0				
Walking Speed (ft/s)		4.0			4.0			4.0				
Percent Blockage		2			2			2				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		413										
pX, platoon unblocked												
vC, conflicting volume	146			166			410	358	193	363	351	166
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	146			166			410	358	193	363	351	166
tC, single (s)	4.1			4.2			7.3	6.7	6.4	7.1	6.7	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.7	4.2	3.5	3.5	4.2	3.3
p0 queue free %	99			99			99	99	99	93	97	97
cM capacity (veh/h)	1437			1337			462	520	771	549	525	860

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	148	158	23	76
Volume Left	12	12	4	37
Volume Right	4	19	11	24
cSH	1437	1337	599	616
Volume to Capacity	0.01	0.01	0.04	0.12
Queue Length 95th (ft)	1	1	3	10
Control Delay (s)	0.7	0.7	11.3	11.7
Lane LOS	A	A	B	B
Approach Delay (s)	0.7	0.7	11.3	11.7
Approach LOS			B	B

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	33.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
1: Kirkland Ave & Main St Est

6/4/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	13	133	19	50	134	17	7	10	17	36	39	27
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	14	148	21	56	149	19	8	11	19	40	43	30
Pedestrians		30			30			30				
Lane Width (ft)		10.0			10.0			10.0				
Walking Speed (ft/s)		4.0			4.0			4.0				
Percent Blockage		2			2			2				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		413										
pX, platoon unblocked												
vC, conflicting volume	168			199			568	496	218	511	497	188
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	168			199			568	496	218	511	497	188
tC, single (s)	4.1			4.2			7.3	6.7	6.4	7.1	6.7	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.7	4.2	3.5	3.5	4.2	3.3
p0 queue free %	99			96			98	97	97	90	90	96
cM capacity (veh/h)	1410			1299			328	417	746	418	417	836

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	183	223	38	113
Volume Left	14	56	8	40
Volume Right	21	19	19	30
cSH	1410	1299	499	481
Volume to Capacity	0.01	0.04	0.08	0.24
Queue Length 95th (ft)	1	3	6	23
Control Delay (s)	0.7	2.2	12.8	14.8
Lane LOS	A	A	B	B
Approach Delay (s)	0.7	2.2	12.8	14.8
Approach LOS			B	B

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
6: alley & Lake St

6/4/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	2	245	3	0	965
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	2	272	3	0	1072
Pedestrians	33					
Lane Width (ft)	9.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	2					
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						135
pX, platoon unblocked						
vC, conflicting volume	1379	307			309	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1379	307			309	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	156	718			1237	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	2	276	1072
Volume Left	0	0	0
Volume Right	2	3	0
cSH	718	1700	1700
Volume to Capacity	0.00	0.16	0.63
Queue Length 95th (ft)	0	0	0
Control Delay (s)	10.0	0.0	0.0
Lane LOS	B		
Approach Delay (s)	10.0	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	67.7%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
6: alley & Lake St

6/4/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	4	277	15	0	1037
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	4	308	17	0	1152
Pedestrians	33					
Lane Width (ft)	9.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	2					
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						135
pX, platoon unblocked						
vC, conflicting volume	1501	349			357	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1501	349			357	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	131	680			1187	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	4	324	1152
Volume Left	0	0	0
Volume Right	4	17	0
cSH	680	1700	1700
Volume to Capacity	0.01	0.19	0.68
Queue Length 95th (ft)	0	0	0
Control Delay (s)	10.3	0.0	0.0
Lane LOS	B		
Approach Delay (s)	10.3	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
7: Kirkland Ave & Lake St

6/4/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Frpb, ped/bikes		0.94			1.00	0.89		1.00	0.89		1.00	
Flpb, ped/bikes		1.00			0.95	1.00		1.00	1.00		1.00	
Frt		0.93			1.00	0.85		1.00	0.85		1.00	
Flt Protected		1.00			0.96	1.00		1.00	1.00		1.00	
Satd. Flow (prot)		1237			1302	1071		1417	1071		1418	
Flt Permitted		0.99			0.53	1.00		0.97	1.00		1.00	
Satd. Flow (perm)		1225			716	1071		1379	1071		1415	
Volume (vph)	7	77	92	78	20	39	8	190	47	7	795	5
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	8	86	102	87	22	43	9	211	52	8	883	6
RTOR Reduction (vph)	0	72	0	0	0	35	0	0	17	0	0	0
Lane Group Flow (vph)	0	124	0	0	109	8	0	220	35	0	897	0
Confl. Peds. (#/hr)	50		50	50		50	50		50	50		50
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm			Perm		Perm	Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		11.8			11.8	11.8		41.2	41.2		41.2	
Effective Green, g (s)		11.8			11.8	11.8		41.2	41.2		41.2	
Actuated g/C Ratio		0.19			0.19	0.19		0.68	0.68		0.68	
Clearance Time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)		237			139	207		931	723		956	
v/s Ratio Prot												
v/s Ratio Perm		c0.16			0.15	0.04		0.16	0.05		c0.63	
v/c Ratio		0.52			0.78	0.04		0.24	0.05		0.94	
Uniform Delay, d1		22.1			23.4	20.0		3.8	3.3		8.8	
Progression Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2		2.1			24.5	0.1		0.6	0.1		17.5	
Delay (s)		24.2			47.9	20.1		4.4	3.4		26.3	
Level of Service		C			D	C		A	A		C	
Approach Delay (s)		24.2			40.0			4.2			26.3	
Approach LOS		C			D			A			C	

Intersection Summary			
HCM Average Control Delay	23.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	61.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	97.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Kirkland Ave & Lake St

6/4/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Frpb, ped/bikes		0.94			1.00	0.89		1.00	0.89		1.00	
Flpb, ped/bikes		1.00			0.95	1.00		1.00	1.00		1.00	
Frt		0.93			1.00	0.85		1.00	0.85		1.00	
Flt Protected		1.00			0.96	1.00		1.00	1.00		1.00	
Satd. Flow (prot)		1237			1304	1073		1418	1073		1418	
Flt Permitted		0.99			0.51	1.00		0.97	1.00		1.00	
Satd. Flow (perm)		1226			698	1073		1378	1073		1415	
Volume (vph)	7	83	99	86	21	42	8	202	65	9	852	5
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	8	92	110	96	23	47	9	224	72	10	947	6
RTOR Reduction (vph)	0	71	0	0	0	37	0	0	24	0	0	0
Lane Group Flow (vph)	0	139	0	0	119	10	0	233	48	0	963	0
Confl. Peds. (#/hr)	50		50	50		50	50		50	50		50
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm			Perm		Perm	Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		12.4			12.4	12.4		39.9	39.9		39.9	
Effective Green, g (s)		12.4			12.4	12.4		39.9	39.9		39.9	
Actuated g/C Ratio		0.21			0.21	0.21		0.66	0.66		0.66	
Clearance Time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)		252			144	221		912	710		936	
v/s Ratio Prot												
v/s Ratio Perm		c0.17			0.17	0.04		0.17	0.07		c0.68	
v/c Ratio		0.55			0.83	0.04		0.26	0.07		1.03	
Uniform Delay, d1		21.4			22.9	19.2		4.2	3.6		10.2	
Progression Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2		2.4			30.5	0.1		0.7	0.2		36.9	
Delay (s)		23.9			53.4	19.3		4.8	3.8		47.1	
Level of Service		C			D	B		A	A		D	
Approach Delay (s)		23.9			43.7			4.6			47.1	
Approach LOS		C			D			A			D	

Intersection Summary			
HCM Average Control Delay	35.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	60.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	104.3%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Kirkland Ave & Lake St

6/4/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Frpb, ped/bikes		0.94			1.00	0.89		1.00	0.89		1.00	
Flpb, ped/bikes		1.00			0.95	1.00		1.00	1.00		1.00	
Frt		0.93			1.00	0.85		1.00	0.85		1.00	
Flt Protected		1.00			0.96	1.00		1.00	1.00		1.00	
Satd. Flow (prot)		1237			1303	1072		1418	1072		1415	
Flt Permitted		0.99			0.52	1.00		0.97	1.00		0.99	
Satd. Flow (perm)		1225			700	1072		1377	1072		1402	
Volume (vph)	7	83	99	89	21	42	8	204	65	24	852	5
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	8	92	110	99	23	47	9	227	72	27	947	6
RTOR Reduction (vph)	0	71	0	0	0	37	0	0	25	0	0	0
Lane Group Flow (vph)	0	139	0	0	122	10	0	236	47	0	980	0
Confl. Peds. (#/hr)	50		50	50		50	50		50	50		50
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm			Perm		Perm	Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		12.6			12.6	12.6		39.8	39.8		39.8	
Effective Green, g (s)		12.6			12.6	12.6		39.8	39.8		39.8	
Actuated g/C Ratio		0.21			0.21	0.21		0.66	0.66		0.66	
Clearance Time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)		256			146	224		907	706		924	
v/s Ratio Prot												
v/s Ratio Perm		0.17			c0.17	0.04		0.17	0.07		c0.70	
v/c Ratio		0.54			0.84	0.04		0.26	0.07		1.06	
Uniform Delay, d1		21.3			22.9	19.1		4.2	3.7		10.3	
Progression Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2		2.3			31.9	0.1		0.7	0.2		46.9	
Delay (s)		23.7			54.8	19.2		4.9	3.9		57.2	
Level of Service		C			D	B		A	A		E	
Approach Delay (s)		23.7			44.9			4.7			57.2	
Approach LOS		C			D			A			E	

Intersection Summary			
HCM Average Control Delay	42.0	HCM Level of Service	D
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	60.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	114.4%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
2: alley & Main St Est

6/4/2013

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Sign Control	Stop			Free		Free	
Grade	0%			0%		0%	
Volume (veh/h)	14	1	0	4	3	12	13
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	16	1	0	4	0	13	14
Pedestrians	25			25		25	
Lane Width (ft)	9.0			9.0		4.5	
Walking Speed (ft/s)	4.0			4.0		4.0	
Percent Blockage	2			2		1	
Right turn flare (veh)							
Median type	None						
Median storage veh)							
Upstream signal (ft)							
pX, platoon unblocked					0.00		
vC, conflicting volume	75	71	53		0		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	75	71	53		0		
tC, single (s)	6.4	6.2	4.1		0.0		
tC, 2 stage (s)							
tF (s)	3.5	3.3	2.2		0.0		
p0 queue free %	98	100	100		0		
cM capacity (veh/h)	900	961	1529		0		

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	17	4	28	0
Volume Left	16	0	0	0
Volume Right	1	0	14	0
cSH	903	1529	1700	1700
Volume to Capacity	0.02	0.00	0.02	0.00
Queue Length 95th (ft)	1	0	0	0
Control Delay (s)	9.1	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	9.1	0.0	0.0	
Approach LOS	A			

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	25.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
2: alley & Main St Est

6/4/2013

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Sign Control	Stop			Free		Free	
Grade	0%			0%		0%	
Volume (veh/h)	27	1	0	4	3	12	93
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	30	1	0	4	0	13	103
Pedestrians	25			25		25	
Lane Width (ft)	9.0			9.0		4.5	
Walking Speed (ft/s)	4.0			4.0		4.0	
Percent Blockage	2			2		1	
Right turn flare (veh)							
Median type	None						
Median storage veh)							
Upstream signal (ft)							
pX, platoon unblocked					0.00		
vC, conflicting volume	119	115	142		0		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	119	115	142		0		
tC, single (s)	6.4	6.2	4.1		0.0		
tC, 2 stage (s)							
tF (s)	3.5	3.3	2.2		0.0		
p0 queue free %	96	100	100		0		
cM capacity (veh/h)	849	908	1419		0		

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	31	4	117	0
Volume Left	30	0	0	0
Volume Right	1	0	103	0
cSH	851	1419	1700	1700
Volume to Capacity	0.04	0.00	0.07	0.00
Queue Length 95th (ft)	3	0	0	0
Control Delay (s)	9.4	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	9.4	0.0	0.0	
Approach LOS	A			

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	29.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
4: alley & 101 kirkland garage

6/4/2013

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	2	3	10	18	12	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	2	3	11	20	13	1
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	31				29	21
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	31				29	21
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	100
cM capacity (veh/h)	1594				989	1062

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	6	31	14
Volume Left	2	0	13
Volume Right	0	20	1
cSH	1594	1700	995
Volume to Capacity	0.00	0.02	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	2.9	0.0	8.7
Lane LOS	A		A
Approach Delay (s)	2.9	0.0	8.7
Approach LOS			A

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	13.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
4: alley & 101 kirkland garage

6/4/2013

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	2	20	27	18	12	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	2	22	30	20	13	1
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	50				67	40
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	50				67	40
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	100
cM capacity (veh/h)	1570				942	1037

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	24	50	14
Volume Left	2	0	13
Volume Right	0	20	1
cSH	1570	1700	949
Volume to Capacity	0.00	0.03	0.02
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.7	0.0	8.9
Lane LOS	A		A
Approach Delay (s)	0.7	0.0	8.9
Approach LOS			A

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	15.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
3: alley & Lake St Pkg

6/4/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	12	3	31	26	2	15
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	13	3	34	29	2	17
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			17		113	15
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			17		113	15
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		100	98
cM capacity (veh/h)			1614		870	1070

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	17	63	19
Volume Left	0	34	2
Volume Right	3	0	17
cSH	1700	1614	1042
Volume to Capacity	0.01	0.02	0.02
Queue Length 95th (ft)	0	2	1
Control Delay (s)	0.0	4.0	8.5
Lane LOS		A	A
Approach Delay (s)	0.0	4.0	8.5
Approach LOS			A

Intersection Summary			
Average Delay	4.2		
Intersection Capacity Utilization	22.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
3: alley & Lake St Pkg

6/4/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	12	20	72	26	19	100
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	13	22	80	29	21	111
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			36		213	24
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			36		213	24
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		97	89
cM capacity (veh/h)			1589		740	1058

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	36	109	132
Volume Left	0	80	21
Volume Right	22	0	111
cSH	1700	1589	990
Volume to Capacity	0.02	0.05	0.13
Queue Length 95th (ft)	0	4	12
Control Delay (s)	0.0	5.5	9.2
Lane LOS		A	A
Approach Delay (s)	0.0	5.5	9.2
Approach LOS			A

Intersection Summary			
Average Delay	6.6		
Intersection Capacity Utilization	37.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
1: Kirkland Ave & Main St Est

6/4/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	21	93	21	44	139	54	20	3	27	29	21	51
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	23	103	23	49	154	60	22	3	30	32	23	57
Pedestrians		30			30			30				
Lane Width (ft)		10.0			10.0			10.0				
Walking Speed (ft/s)		4.0			4.0			4.0				
Percent Blockage		2			2			2				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		413										
pX, platoon unblocked												
vC, conflicting volume	214			157			572	504	175	506	486	214
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	214			157			572	504	175	506	486	214
tC, single (s)	4.1			4.2			7.2	6.6	6.3	7.1	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.6	4.1	3.4	3.5	4.1	3.3
p0 queue free %	98			96			93	99	96	92	95	93
cM capacity (veh/h)	1356			1347			339	426	813	422	436	808

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	150	263	56	112
Volume Left	23	49	22	32
Volume Right	23	60	30	57
cSH	1356	1347	503	561
Volume to Capacity	0.02	0.04	0.11	0.20
Queue Length 95th (ft)	1	3	9	18
Control Delay (s)	1.3	1.7	13.0	13.0
Lane LOS	A	A	B	B
Approach Delay (s)	1.3	1.7	13.0	13.0
Approach LOS			B	B

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	44.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
1: Kirkland Ave & Main St Est

6/4/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	23	108	21	68	159	54	32	20	83	32	38	56
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	26	120	23	76	177	60	36	22	92	36	42	62
Pedestrians		30			30			30				
Lane Width (ft)		10.0			10.0			10.0				
Walking Speed (ft/s)		4.0			4.0			4.0				
Percent Blockage		2			2			2				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		413										
pX, platoon unblocked												
vC, conflicting volume	237			173			684	601	192	674	582	237
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	237			173			684	601	192	674	582	237
tC, single (s)	4.1			4.2			7.2	6.6	6.3	7.1	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.6	4.1	3.4	3.5	4.1	3.3
p0 queue free %	98			94			87	94	88	87	89	92
cM capacity (veh/h)	1330			1328			264	366	796	282	375	786

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	169	312	150	140
Volume Left	26	76	36	36
Volume Right	23	60	92	62
cSH	1330	1328	482	441
Volume to Capacity	0.02	0.06	0.31	0.32
Queue Length 95th (ft)	1	5	33	34
Control Delay (s)	1.3	2.3	15.8	16.9
Lane LOS	A	A	C	C
Approach Delay (s)	1.3	2.3	15.8	16.9
Approach LOS			C	C

Intersection Summary			
Average Delay	7.4		
Intersection Capacity Utilization	57.7%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
2: alley & Main St Est

6/4/2013

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Sign Control	Stop			Free		Free	
Grade	0%			0%		0%	
Volume (veh/h)	27	0	0	14	9	20	57
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	30	0	0	16	0	22	63
Pedestrians	25			25		25	
Lane Width (ft)	9.0			9.0		4.5	
Walking Speed (ft/s)	4.0			4.0		4.0	
Percent Blockage	2			2		1	
Right turn flare (veh)							
Median type	None						
Median storage veh)							
Upstream signal (ft)							
pX, platoon unblocked					0.00		
vC, conflicting volume	119	104	111		0		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	119	104	111		0		
tC, single (s)	6.4	6.2	4.1		0.0		
tC, 2 stage (s)							
tF (s)	3.5	3.3	2.2		0.0		
p0 queue free %	96	100	100		0		
cM capacity (veh/h)	856	921	1456		0		

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	30	16	86	0
Volume Left	30	0	0	0
Volume Right	0	0	63	0
cSH	856	1456	1700	1700
Volume to Capacity	0.04	0.00	0.05	0.00
Queue Length 95th (ft)	3	0	0	0
Control Delay (s)	9.4	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	9.4	0.0	0.0	
Approach LOS	A			

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	27.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
2: alley & Main St Est

6/4/2013

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Sign Control	Stop			Free		Free	
Grade	0%			0%		0%	
Volume (veh/h)	112	0	0	14	9	20	98
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	124	0	0	16	0	22	109
Pedestrians	25			25		25	
Lane Width (ft)	9.0			9.0		4.5	
Walking Speed (ft/s)	4.0			4.0		4.0	
Percent Blockage	2			2		1	
Right turn flare (veh)							
Median type	None						
Median storage veh)							
Upstream signal (ft)							
pX, platoon unblocked					0.00		
vC, conflicting volume	142	127	156		0		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	142	127	156		0		
tC, single (s)	6.4	6.2	4.1		0.0		
tC, 2 stage (s)							
tF (s)	3.5	3.3	2.2		0.0		
p0 queue free %	85	100	100		0		
cM capacity (veh/h)	831	895	1402		0		

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	124	16	131	0
Volume Left	124	0	0	0
Volume Right	0	0	109	0
cSH	831	1402	1700	1700
Volume to Capacity	0.15	0.00	0.08	0.00
Queue Length 95th (ft)	13	0	0	0
Control Delay (s)	10.1	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	10.1	0.0	0.0	
Approach LOS	B			

Intersection Summary			
Average Delay	4.6		
Intersection Capacity Utilization	34.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
6: alley & Lake St

6/4/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	3	583	6	0	426
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	3	648	7	0	473
Pedestrians	33					
Lane Width (ft)	9.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	2					
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						135
pX, platoon unblocked						
vC, conflicting volume	1157	684			687	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1157	684			687	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	212	439			897	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	3	654	473
Volume Left	0	0	0
Volume Right	3	7	0
cSH	439	1700	1700
Volume to Capacity	0.01	0.38	0.28
Queue Length 95th (ft)	1	0	0
Control Delay (s)	13.3	0.0	0.0
Lane LOS	B		
Approach Delay (s)	13.3	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	49.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
6: alley & Lake St

6/4/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	20	675	23	0	514
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	22	750	26	0	571
Pedestrians	33					
Lane Width (ft)	9.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	2					
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						135
pX, platoon unblocked						
vC, conflicting volume	1367	796			809	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1367	796			809	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	94			100	
cM capacity (veh/h)	159	379			809	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	22	776	571
Volume Left	0	0	0
Volume Right	22	26	0
cSH	379	1700	1700
Volume to Capacity	0.06	0.46	0.34
Queue Length 95th (ft)	5	0	0
Control Delay (s)	15.1	0.0	0.0
Lane LOS	C		
Approach Delay (s)	15.1	0.0	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	56.9%	ICU Level of Service	B
Analysis Period (min)	15		

SimTraffic Performance Report
v2 volume scenario

6/4/2013

1: Kirkland Ave & Main St Est Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay / Veh (s)	2.0	0.3	0.5	1.8	0.8	0.7	4.1	6.9	2.7	7.0	6.5	3.7

1: Kirkland Ave & Main St Est Performance by movement

Movement	All
Delay / Veh (s)	2.0

2: alley & Main St Est Performance by movement

Movement	EBL	NBT	SBU	SBT	SBR	All
Delay / Veh (s)	1.3	0.8	0.3	0.3	0.2	0.6

3: alley & Lake St Pkg Performance by movement

Movement	EBT	WBL	WBT	NBR	All
Delay / Veh (s)	0.1	0.3	0.1	1.4	0.4

4: alley & 101 kirkland garage Performance by movement

Movement	EBT	WBT	WBR	SBL	SBR	All
Delay / Veh (s)	0.0	0.0	0.0	1.1	1.1	0.5

5: alley & BofA Dvwy Performance by movement

Movement	EBT	WBT	WBR	All
Delay / Veh (s)	0.1	0.1	0.1	0.1

6: alley & Lake St Performance by movement

Movement	WBT	WBR	NBT	NBR	SBT	All
Delay / Veh (s)	0.0	136.6	52.3	75.7	0.9	30.3

7: Kirkland Ave & Lake St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay / Veh (s)	63.2	26.4	22.2	31.6	10.6	31.3	26.6	16.4	1.4	16.7	7.7	3.6

7: Kirkland Ave & Lake St Performance by movement

Movement	All
Delay / Veh (s)	15.3

SimTraffic Performance Report
v2 volume scenario

6/4/2013

1: Kirkland Ave & Main St Est Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay / Veh (s)	3.4	0.5	0.0	1.5	0.7	0.7	5.0	5.6	3.3	5.2	7.2	4.9

1: Kirkland Ave & Main St Est Performance by movement

Movement	All
Delay / Veh (s)	2.6

2: alley & Main St Est Performance by movement

Movement	EBL	EBT	NBT	SBU	SBT	SBR	All
Delay / Veh (s)	3.5	0.1	0.4	6.9	0.5	0.9	2.0

3: alley & Lake St Pkg Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Delay / Veh (s)	0.1	0.7	1.7	0.2	2.3	1.5	1.3

4: alley & 101 kirkland garage Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Delay / Veh (s)	0.0	0.0	0.3	0.0	1.0	1.1	0.2

5: alley & BofA Dvwy Performance by movement

Movement	EBL	EBT	WBT	WBR	All
Delay / Veh (s)	0.0	0.1	0.2	0.0	0.1

6: alley & Lake St Performance by movement

Movement	WBR	NBT	NBR	SBT	All
Delay / Veh (s)	279.2	245.3	209.5	0.9	134.3

7: Kirkland Ave & Lake St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR	All
Delay / Veh (s)	59.0	36.3	20.1	31.0	24.7	38.5	12.4	17.0	2.4	7.6	6.1	17.9

8: Central & Lake St Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Delay / Veh (s)	40.4	12.8	55.5	23.7	22.4	9.2	10.2	26.3

SimTraffic Performance Report
v2 volume scenario

6/4/2013

1: Kirkland Ave & Main St Est Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay / Veh (s)	1.8	0.7	2.3	3.1	1.5	1.0	11.9	7.3	4.6	10.2	6.1	4.3

1: Kirkland Ave & Main St Est Performance by movement

Movement	All
Delay / Veh (s)	3.3

2: alley & Main St Est Performance by movement

Movement	EBL	EBT	NBT	SBU	SBT	SBR	All
Delay / Veh (s)	2.5	0.1	0.0	1.1	1.1	0.5	1.4

3: alley & Lake St Pkg Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Delay / Veh (s)	0.2	0.8	1.1	0.4	2.6	1.4	1.2

4: alley & 101 kirkland garage Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	All
Delay / Veh (s)	0.0	0.0	0.4	0.0	1.0	0.2

5: alley & BofA Dvwy Performance by movement

Movement	EBT	WBT	WBR	All
Delay / Veh (s)	0.1	0.1	1.1	0.2

6: alley & Lake St Performance by movement

Movement	WBR	NBT	NBR	SBT	All
Delay / Veh (s)	0.9	258.1	399.6	1.0	130.8

7: Kirkland Ave & Lake St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR	All
Delay / Veh (s)	98.3	74.9	62.2	25.5	22.0	38.1	18.0	7.1	8.0	4.5	21.6

8: Central & Lake St Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Delay / Veh (s)	41.3	15.1	67.1	29.5	25.1	6.0	9.8	31.3

SimTraffic Performance Report
v2 volume scenario (special for #108)

6/4/2013

1: Kirkland Ave & Main St Est Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay / Veh (s)	2.1	0.9	1.2	2.1	0.7	0.5	5.2	4.0	3.2	7.0	8.5	4.1

1: Kirkland Ave & Main St Est Performance by movement

Movement	All
Delay / Veh (s)	2.2

2: alley & Main St Est Performance by movement

Movement	EBL	EBT	NBT	SBU	SBT	SBR	All
Delay / Veh (s)	1.9	0.1	0.0	1.0	0.4	0.4	0.6

3: alley & Lake St Pkg Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Delay / Veh (s)	0.1	0.0	0.3	0.1	1.3	1.8	0.5

4: alley & 101 kirkland garage Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Delay / Veh (s)		0.1	0.0	0.2	1.2	0.9	0.4

7: Kirkland Ave & Lake St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay / Veh (s)	40.4	22.8	14.4	23.7	17.9	28.9	86.1	62.5	50.0		7.0	5.7

7: Kirkland Ave & Lake St Performance by movement

Movement	All
Delay / Veh (s)	36.0

8: Central & Lake St Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Delay / Veh (s)	36.9	13.4	63.6	30.0	20.9	9.0	11.0	28.6

Total Network Performance

Delay / Veh (s)	44.6

SimTraffic Performance Report
v2 volume scenario

6/4/2013

1: Kirkland Ave & Main St Est Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay / Veh (s)	2.4	1.1	1.0	2.4	1.5	0.8	9.0	8.4	4.4	9.0	14.4	7.5

1: Kirkland Ave & Main St Est Performance by movement

Movement	All
Delay / Veh (s)	4.0

2: alley & Main St Est Performance by movement

Movement	EBL	EBT	NBT	SBU	SBT	SBR	All
Delay / Veh (s)	2.9	0.1	1.0	1.6	0.4	0.5	1.7

3: alley & Lake St Pkg Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Delay / Veh (s)	0.3	0.9	1.1	0.5	2.0	1.6	1.3

4: alley & 101 kirkland garage Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Delay / Veh (s)	0.1	0.2	0.1	0.3	1.8	0.9	0.4

6: test link for parking booth & Lake St Pkg Performance by movement

Movement	NBT	SBT	All
Delay / Veh (s)	3.3	1.7	2.7

7: Kirkland Ave & Lake St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay / Veh (s)	48.4	33.0	23.4	40.3	28.7	55.4		335.2	295.6		7.3	6.1

7: Kirkland Ave & Lake St Performance by movement

Movement	All
Delay / Veh (s)	152.8

8: Central & Lake St Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Delay / Veh (s)	41.2	15.6	60.6	28.4	24.0	10.1	13.7	29.6

2016 AM AND PM PEAK HOUR WITH PROJECT

TURN VOLUMES AND LEVEL OF SERVICE ANALYSIS

2016 AM PEAK HOUR TURN VOLUME ESTIMATES

103 NE 68th St/State St

	Existing 2012 AM PK	2016 Future Growth [a]	2016 Background Traffic	AM PK Project Trips b	Horizon Yr 2016 AM PK
EBLT	59	5	64	6	70
EBT	164	14	178	0	178
EBRT	3	0	3	0	3
WBLT	12	1	13	0	13
WBT	190	16	206	0	206
WBRT	100	8	108	14	122
NBLT	10	1	11	0	11
NBT	10	1	11	0	11
NBRT	19	2	21	0	21
SBLT	221	18	239	3	242
SBT	4	0	4	0	4
SBRT	148	12	160	0	160
	940	78	1018	23	1041
			2.7%		

Existing 2012
AM PEAK HOUR

	373	169	
348			302
226			404
	19	39	

Background 2016
AM PEAK HOUR

	403	183	
377			327
245			438
	20	43	

Horizon Yr 2016
AM PEAK HOUR

	406	203	
377			341
251			441
	20	43	

[a] Background growth determined by City at 2%/yr
[b] Project trips are net new non-pass-by trips (107 trips, 16 out, 91 in)

104 NE 68th St/108th Ave NE

	Existing 2012 AM PK	2016 Future Growth [a]	2016 Background Traffic	AM PK Project Trips b	Horizon Yr 2016 AM PK
EBLT	82	8	90	0	90
EBT	238	8	246	1	247
EBRT	157	4	161	2	163
WBLT	305	9	314	0	314
WBT	231	7	238	8	246
WBRT	111	99	210	0	210
NBLT	74	2	76	6	82
NBT	112	47	159	0	159
NBRT	140	5	145	0	145
SBLT	136	20	156	0	156
SBT	358	25	383	0	383
SBRT	68	3	71	0	71
	2012	238	2250	17	2267
			3.8%		

Existing 2012
AM PEAK HOUR

	562	305	
373			647
477			514
	820	326	

Background 2016
AM PEAK HOUR

	610	460	
385			763
497			546
	859	380	

Horizon Yr 2016
AM PEAK HOUR

	610	460	
399			771
500			547
	861	386	

[a] Background growth determined by City at 2%/yr
[b] Project trips are net new non-pass-by trips (107 trips, 16 out, 91 in)

2016 AM PEAK HOUR TURN VOLUME ESTIMATES

108 Lake St/Kirkland Ave

	Existing 2012 AM PK	2016 Future Growth [a]	2016 Background Traffic	AM PK Project Trips b	Horizon Yr 2016 AM PK
EBLT	7	1	8	0	8
EBT	77	6	83	0	83
EBRT	92	8	100	0	100
WBLT	78	6	84	4	88
WBT	20	2	22	0	22
WBRT	39	3	42	0	42
NBLT	8	1	9	0	9
NBT	190	16	206	2	208
NBRT	47	4	51	0	51
SBLT	7	1	8	15	23
SBT	795	66	861	0	861
SBRT	5	0	5	0	5
	1365	114	1479	21	1500
			2.7%		

Existing 2012
AM PEAK HOUR

	807	236	
33			137
176			131
	965	245	

Background 2016
AM PEAK HOUR

	874	256	
36			148
191			142
	1045	266	

Horizon Yr 2016
AM PEAK HOUR

	889	258	
36			152
191			157
	1049	268	

[a] Background growth determined by City at 2%/yr
[b] Project trips are net new non-pass-by trips (107 trips, 16 out, 91 in)

109 NE 85th St/114th Ave NE

	Existing 2012 AM PK	2016 Future Growth [a]	2016 Background Traffic	AM PK Project Trips b	Horizon Yr 2016 AM PK
EBLT	7	1	8	0	8
EBT	706	58	764	3	767
EBRT	10	1	11	0	11
WBLT	258	21	279	10	289
WBT	782	64	846	25	871
WBRT	126	10	136	0	136
NBLT	8	1	9	0	9
NBT	2	0	2	0	2
NBRT	122	10	132	3	135
SBLT	378	31	409	0	409
SBT	31	3	34	0	34
SBRT	1	0	1	0	1
	2431	200	2631	41	2672
			2.7%		

Existing 2012
AM PEAK HOUR

	410	135	
791			1166
723			1206
	299	132	

Background 2016
AM PEAK HOUR

	444	146	
856			1261
783			1305
	324	143	

Horizon Yr 2016
AM PEAK HOUR

	444	146	
881			1296
786			1311
	334	146	

[a] Background growth determined by City at 2%/yr
[b] Project trips are net new non-pass-by trips (107 trips, 16 out, 91 in)

2016 AM PEAK HOUR TURN VOLUME ESTIMATES

111 Kirkland Ave/3rd Street

	Existing 2012 AM PK	2016 Future Growth [a]	2016 Background Traffic	AM PK Project Trips b	Horizon Yr 2016 AM PK
EBLT	9	1	10	0	10
EBT	112	9	121	4	125
EBRT	40	3	43	3	46
WBLT	64	5	69	0	69
WBT	95	8	103	17	120
WBRT	33	3	36	0	36
NBLT	30	2	32	22	54
NBT	72	6	78	0	78
NBRT	95	8	103	0	103
SBLT	85	7	92	0	92
SBT	274	23	297	0	297
SBRT	26	2	28	0	28
	935	77	1012	46	1058
			2.7%		

Existing 2012
AM PEAK HOUR

385	114
151	192
161	292
378	197

Background 2016
AM PEAK HOUR

417	124
163	208
174	316
409	213

Horizon Yr 2016
AM PEAK HOUR

417	124
202	225
181	320
412	235

[a] Background growth determined by City at 2%/yr

[b] Project trips are net new non-pass-by trips (107 trips, 16 out, 91 in)

112 Kirkland Way/6th Street

	Existing 2012 AM PK	2016 Future Growth [a]	2016 Background Traffic	AM PK Project Trips b	Horizon Yr 2016 AM PK
EBLT	36	16	52	0	52
EBT	168	5	173	3	176
EBRT	42	2	44	1	45
WBLT	88	31	119	0	119
WBT	146	5	151	10	161
WBRT	30	111	141	0	141
NBLT	40	3	43	2	45
NBT	115	56	171	0	171
NBRT	16	5	21	0	21
SBLT	22	13	35	0	35
SBT	275	69	344	0	344
SBRT	60	1	61	5	66
	1038	317	1355	21	1376
			9.3%		

Existing 2012
AM PEAK HOUR

357	181
246	264
246	206
405	171

Background 2016
AM PEAK HOUR

440	364
255	411
269	229
507	235

Horizon Yr 2016
AM PEAK HOUR

445	364
272	421
273	232
508	237

[a] Background growth determined by City at 2%/yr

[b] Project trips are net new non-pass-by trips (107 trips, 16 out, 91 in)

2016 AM PEAK HOUR TURN VOLUME ESTIMATES

107 Central Way/Lake St

	Existing 2012 AM PK	2016 Future Growth [a]	2016 Background Traffic	AM PK Project Trips b	Horizon Yr 2016 AM PK
EBLT	0	0	0	0	0
EBT	431	36	467	0	467
EBRT	700	58	758	15	773
WBLT	137	11	148	0	148
WBT	163	13	176	0	176
WBRT	0	0	0	0	0
NBLT	137	11	148	0	148
NBT	0	0	0	0	0
NBRT	44	4	48	2	50
SBLT	0	0	0	0	0
SBT	0	0	0	0	0
SBRT	0	0	0	0	0
	1612	133	1745	17	1762
			2.7%		

Existing 2012
AM PEAK HOUR

	0	0	
300			300
1131			475
	837	181	

Background 2016
AM PEAK HOUR

	0	0	
324			324
1225			515
	906	196	

Horizon Yr 2016
AM PEAK HOUR

	0	0	
324			324
1240			517
	921	198	

[a] Background growth determined by City at 2%/yr
[b] Project trips are net new non-pass-by trips (107 trips, 16 out, 91 in)

x Kirkland Ave/Main St

	Existing Adj 2013 AM PK	2016 Future Growth [a]	2016 Background Traffic	Project Trips b	Horizon Yr 2016 AM PK
EBLT	11	1	12	0	12
EBT	118	12	130	0	130
EBRT	4	0	4	15	19
WBLT	11	0	11	39	50
WBT	114	14	128	0	128
WBRT	17	0	17	0	17
NBLT	4	0	4	3	7
NBT	7	0	7	3	10
NBRT	10	0	10	7	17
SBLT	33	2	35	0	35
SBT	13	0	13	26	39
SBRT	22	3	25	0	25
	364	32	396	93	489
			2.8%		

Existing Adj 2013
AM PEAK HOUR

	68	35	
140			142
133			161
	28	21	

Background 2016
AM PEAK HOUR

	73	36	
157			156
146			175
	28	21	

Horizon Yr 2016
AM PEAK HOUR

	99	39	
160			195
161			182
	108	34	

[a] Background growth determined by City at 2%/yr
[b] Project trips are net new pass-by and non-pass-by trips (107 trips, 15 out, 92 in)

2016 PM PEAK TURN VOLUME ESTIMATES

103 NE 68th St/State St

	Existing 2012 PM PK	2016 Future Growth [a]	2016 Background Traffic	Project Trips [b]	Horizon Yr 2016 PM PK
EBLT	267	34	301	0	301
EBT	322	44	366	0	366
EBRT	5	1	6	0	6
WBLT	18	2	20	0	20
WBT	247	36	283	0	283
WBRT	271	43	314	8	322
NBLT	6	1	7	0	7
NBT	11	1	12	0	12
NBRT	18	2	20	0	20
SBLT	148	14	162	14	176
SBT	10	1	11	0	11
SBRT	104	24	128	6	134
	1427	203	1630	28	1658
			4.5%		

Existing 2012
PM PEAK HOUR

	262	549	
357			536
594			488
	33	35	

Background 2016
PM PEAK HOUR

	301	627	
418			617
673			548
	37	39	

Horizon Yr 2016
PM PEAK HOUR

	321	635	
424			625
673			562
	37	39	

[a] Background growth determined by City
[b] Project trips are net new non-pass-by trips (149 trips, 99 out, 50 in)

104 NE 68th St/108th Ave NE

	Existing 2012 PM PK	2016 Future Growth [a]	2016 Background Traffic	Project Trips [b]	Horizon Yr 2016 PM PK
EBLT	166	19	185	0	185
EBT	292	47	339	8	347
EBRT	64	10	74	6	80
WBLT	193	30	223	0	223
WBT	244	48	292	3	295
WBRT	148	22	170	0	170
NBLT	154	16	170	5	175
NBT	257	62	319	0	319
NBRT	124	19	143	0	143
SBLT	170	79	249	0	249
SBT	123	44	167	0	167
SBRT	105	16	121	0	121
	2040	412	2452	22	2474
			6.3%		

Existing 2012
PM PEAK HOUR

	398	571	
503			585
522			586
	380	535	

Background 2016
PM PEAK HOUR

	537	674	
583			685
598			731
	464	632	

Horizon Yr 2016
PM PEAK HOUR

	537	674	
591			688
612			739
	470	637	

[a] Background growth determined by City
[b] Project trips are net new non-pass-by trips (149 trips, 99 out, 50 in)

2016 PM PEAK TURN VOLUME ESTIMATES

108 Lake St/Kirkland Ave

	Existing 2012 PM PK	2016 Future Growth [a]	2016 Background Traffic	Project Trips [b]	Horizon Yr 2016 PM PK
EBLT	17	2	19	0	19
EBT	61	5	66	0	66
EBRT	36	4	40	0	40
WBLT	70	6	76	12	88
WBT	44	5	49	0	49
WBRT	87	8	95	0	95
NBLT	3	0	3	0	3
NBT	507	59	566	17	583
NBRT	73	6	79	0	79
SBLT	3	1	4	0	4
SBT	320	47	367	0	367
SBRT	43	4	47	0	47
	1264	147	1411	29	1440
			3.7%		

Existing 2012
PM PEAK HOUR

	366	611	
90			201
114			137
	426	583	

Background 2016
PM PEAK HOUR

	418	680	
99			220
125			149
	483	648	

Horizon Yr 2016
PM PEAK HOUR

	418	697	
99			232
125			149
	495	665	

[a] Background growth determined by City
[b] Project trips are net new non-pass-by trips (149 trips, 99 out, 50 in)

109 NE 85th St/114th Ave NE

	Existing 2012 PM PK	2016 Future Growth [a]	2016 Background Traffic	Project Trips [b]	Horizon Yr 2016 PM PK
EBLT	8	1	9	0	9
EBT	636	104	740	12	752
EBRT	4	-3	1	0	1
WBLT	156	17	173	11	184
WBT	691	169	860	9	869
WBRT	204	19	223	0	223
NBLT	1	0	1	0	1
NBT	25	3	28	0	28
NBRT	254	71	325	26	351
SBLT	327	31	358	0	358
SBT	19	2	21	0	21
SBRT	5	1	6	0	6
	2330	415	2745	58	2803
			5.6%		

Existing 2012
PM PEAK HOUR

	351	237	
697			1051
648			1217
	179	280	

Background 2016
PM PEAK HOUR

	385	260	
867			1256
750			1423
	195	354	

Horizon Yr 2016
PM PEAK HOUR

	385	260	
876			1276
762			1461
	206	380	

[a] Background growth determined by City
[b] Project trips are net new non-pass-by trips (149 trips, 99 out, 50 in)

2016 PM PEAK TURN VOLUME ESTIMATES

111 Kirkland Ave/3rd Street

	Existing 2012 PM PK	2016 Future Growth [a]	2016 Background Traffic	Project Trips [b]	Horizon Yr 2016 PM PK
EBLT	20	3	23	0	23
EBT	104	11	115	33	148
EBRT	32	3	35	22	57
WBLT	115	12	127	0	127
WBT	121	13	134	14	148
WBRT	123	22	145	0	145
NBLT	78	7	85	8	93
NBT	325	40	365	0	365
NBRT	156	15	171	0	171
SBLT	86	8	94	0	94
SBT	149	20	169	0	169
SBRT	40	5	45	0	45
	1349	159	1508	77	1585
			3.8%		

Existing 2012
PM PEAK HOUR

	275	468	
239			359
156			346
	296	559	

Background 2016
PM PEAK HOUR

	308	533	
264			406
173			380
	331	621	

Horizon Yr 2016
PM PEAK HOUR

	308	533	
286			420
228			413
	353	629	

[a] Background growth determined by City
[b] Project trips are net new non-pass-by trips (149 trips, 99 out, 50 in)

112 Kirkland Way/6th Street

	Existing 2012 PM PK	2016 Future Growth [a]	2016 Background Traffic	Project Trips [b]	Horizon Yr 2016 PM PK
EBLT	73	8	81	2	83
EBT	201	19	220	27	247
EBRT	41	6	47	2	49
WBLT	46	9	55	0	55
WBT	150	15	165	11	176
WBRT	36	5	41	0	41
NBLT	62	21	83	1	84
NBT	345	87	432	0	432
NBRT	21	50	71	0	71
SBLT	29	3	32	0	32
SBT	162	29	191	0	191
SBRT	70	7	77	0	77
	1236	259	1495	43	1538
			6.5%		

Existing 2012
PM PEAK HOUR

	261	454	
282			232
315			251
	249	428	

Background 2016
PM PEAK HOUR

	300	554	
325			261
348			323
	293	586	

Horizon Yr 2016
PM PEAK HOUR

	300	556	
337			272
379			350
	295	587	

[a] Background growth determined by City
[b] Project trips are net new non-pass-by trips (149 trips, 99 out, 50 in)

2016 PM PEAK TURN VOLUME ESTIMATES

107 Central Way/Lake St

	Existing 2012 PM PK	2016 Future Growth [a]	2016 Background Traffic	Project Trips [b]	Horizon Yr 2016 PM PK
EBLT	0	0	0	0	0
EBT	283	26	309	3	312
EBRT	210	26	236	0	236
WBLT	175	16	191	0	191
WBT	494	47	541	0	541
WBRT	0	0	0	0	0
NBLT	473	46	519	16	535
NBT	0	0	0	0	0
NBRT	96	13	109	0	109
SBLT	0	2	2	0	2
SBT	0	1	1	0	1
SBRT	0	0	0	0	0
	1731	177	1908	19	1927
			3.3%		

Existing 2012
PM PEAK HOUR

0	0
967	669
493	379
385	569

Background 2016
PM PEAK HOUR

3	0
1060	732
545	420
428	628

Horizon Yr 2016
PM PEAK HOUR

3	0
1076	732
548	423
428	644

[a] Background growth determined by City
[b] Project trips are net new non-pass-by trips (149 trips, 99 out, 50 in)

x Kirkland Ave/Main St

	Existing 2013 PM PK	2016 Future Growth [a]	2016 Background Traffic	Project Trips [b]	Horizon Yr 2016 PM PK
EBLT	21	1	22	0	22
EBT	93	13	106	0	106
EBRT	21	0	21	0	21
WBLT	44	0	44	24	68
WBT	139	13	152	0	152
WBRT	54	0	54	0	54
NBLT	20	0	20	12	32
NBT	3	0	3	17	20
NBRT	27	0	27	56	83
SBLT	29	2	31	0	31
SBT	21	0	21	17	38
SBRT	51	3	54	0	54
	523	32	555	126	681
			2.0%		

Existing 2013
PM PEAK HOUR

101	78
210	237
135	149
86	50

Background 2016
PM PEAK HOUR

106	79
226	250
149	164
86	50

Horizon Yr 2016
PM PEAK HOUR

123	96
238	274
149	220
127	135

[a] Background growth determined by City
[b] Project trips are net new pass-by and non-pass-by trips (160 trips, 102 out, 58 in)

HCM Signalized Intersection Capacity Analysis
103: NE 68th St & State St

10/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.93			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99			0.95	1.00
Satd. Flow (prot)	1770	1858		1770	1863	1583		1718			1775	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.99			0.95	1.00
Satd. Flow (perm)	1770	1858		1770	1863	1583		1718			1775	1583
Volume (vph)	70	178	3	13	206	122	11	11	21	242	4	160
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.85	0.85	0.85	0.92	0.92	0.92
Adj. Flow (vph)	76	193	3	14	224	133	13	13	25	263	4	174
RTOR Reduction (vph)	0	1	0	0	0	110	0	16	0	0	0	145
Lane Group Flow (vph)	76	195	0	14	224	23	0	35	0	0	267	29
Turn Type	Prot			Prot		Perm	Split			Split		Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	3.0	13.2		0.6	10.8	10.8		21.6			10.3	10.3
Effective Green, g (s)	3.0	13.2		0.6	10.8	10.8		21.6			10.3	10.3
Actuated g/C Ratio	0.05	0.21		0.01	0.18	0.18		0.35			0.17	0.17
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	86	397		17	326	277		601			296	264
v/s Ratio Prot	c0.04	0.11		0.01	c0.12			c0.03			c0.15	
v/s Ratio Perm						0.08						0.11
v/c Ratio	0.88	0.49		0.82	0.69	0.08		0.06			0.90	0.11
Uniform Delay, d1	29.2	21.3		30.5	23.9	21.3		13.3			25.2	21.8
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	59.9	1.0		132.1	5.9	0.1		0.2			28.5	0.2
Delay (s)	89.1	22.3		162.6	29.8	21.4		13.5			53.8	22.0
Level of Service	F	C		F	C	C		B			D	C
Approach Delay (s)		40.9			31.8			13.5			41.2	
Approach LOS		D			C			B			D	

Intersection Summary			
HCM Average Control Delay	36.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	61.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	45.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
104: NE 68th St & 6th St

10/30/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1819	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1819	
Volume (vph)	90	247	163	314	246	210	82	159	145	156	383	71
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	268	177	341	267	228	89	173	158	170	416	77
RTOR Reduction (vph)	0	0	142	0	0	157	0	0	115	0	7	0
Lane Group Flow (vph)	98	268	35	341	267	71	89	173	43	170	486	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	7.8	15.9	15.9	19.0	27.1	27.1	4.6	23.6	23.6	12.7	31.7	
Effective Green, g (s)	7.8	15.9	15.9	19.0	27.1	27.1	4.6	23.6	23.6	12.7	31.7	
Actuated g/C Ratio	0.09	0.18	0.18	0.22	0.31	0.31	0.05	0.27	0.27	0.15	0.36	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	158	340	289	386	579	492	93	504	428	258	661	
v/s Ratio Prot	0.06	c0.14		c0.19	0.14		c0.05	0.09		c0.10	c0.27	
v/s Ratio Perm			0.11			0.14			0.10			
v/c Ratio	0.62	0.79	0.12	0.88	0.46	0.14	0.96	0.34	0.10	0.66	0.74	
Uniform Delay, d1	38.3	34.0	29.8	33.0	24.2	21.7	41.2	25.6	23.8	35.2	24.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	7.4	11.5	0.2	20.5	0.6	0.1	78.4	1.9	0.5	6.0	7.1	
Delay (s)	45.6	45.5	30.0	53.6	24.8	21.8	119.6	27.4	24.3	41.2	31.2	
Level of Service	D	D	C	D	C	C	F	C	C	D	C	
Approach Delay (s)		40.5			35.7			45.8			33.8	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	38.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	87.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
108: Kirkland Ave & Lake St

10/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Frt		0.93			1.00	0.85		1.00	0.85		1.00	
Flt Protected		1.00			0.96	1.00		1.00	1.00		1.00	
Satd. Flow (prot)		1727			1791	1583		1859	1583		1859	
Flt Permitted		0.99			0.50	1.00		0.97	1.00		0.99	
Satd. Flow (perm)		1707			935	1583		1799	1583		1844	
Volume (vph)	8	83	100	88	22	42	9	208	51	23	861	5
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	90	109	96	24	46	10	226	55	25	936	5
RTOR Reduction (vph)	0	73	0	0	0	37	0	0	18	0	0	0
Lane Group Flow (vph)	0	135	0	0	120	9	0	236	37	0	966	0
Turn Type	Perm			Perm		Perm	Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		11.1			11.1	11.1		40.2	40.2		40.2	
Effective Green, g (s)		11.1			11.1	11.1		40.2	40.2		40.2	
Actuated g/C Ratio		0.19			0.19	0.19		0.68	0.68		0.68	
Clearance Time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)		320			175	296		1220	1073		1250	
v/s Ratio Prot												
v/s Ratio Perm		0.12			c0.13	0.03		0.13	0.03		c0.52	
v/c Ratio		0.42			0.69	0.03		0.19	0.03		0.77	
Uniform Delay, d1		21.3			22.5	19.7		3.5	3.2		6.5	
Progression Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2		0.9			10.6	0.0		0.4	0.1		4.7	
Delay (s)		22.2			33.1	19.7		3.9	3.2		11.1	
Level of Service		C			C	B		A	A		B	
Approach Delay (s)		22.2			29.4			3.8			11.1	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM Average Control Delay	13.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	59.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	88.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
7: Kirkland Ave & Lake St #108

10/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Frpb, ped/bikes		0.94			1.00	0.89		1.00	0.89		1.00	
Flpb, ped/bikes		1.00			0.95	1.00		1.00	1.00		1.00	
Frt		0.93			1.00	0.85		1.00	0.85		1.00	
Flt Protected		1.00			0.96	1.00		1.00	1.00		1.00	
Satd. Flow (prot)		1237			1303	1072		1418	1072		1415	
Flt Permitted		0.99			0.52	1.00		0.97	1.00		0.99	
Satd. Flow (perm)		1225			700	1072		1377	1072		1402	
Volume (vph)	7	83	99	89	21	42	8	204	65	24	852	5
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	8	92	110	99	23	47	9	227	72	27	947	6
RTOR Reduction (vph)	0	71	0	0	0	37	0	0	25	0	0	0
Lane Group Flow (vph)	0	139	0	0	122	10	0	236	47	0	980	0
Confl. Peds. (#/hr)	50		50	50		50	50		50	50		50
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm			Perm		Perm	Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		12.6			12.6	12.6		39.8	39.8		39.8	
Effective Green, g (s)		12.6			12.6	12.6		39.8	39.8		39.8	
Actuated g/C Ratio		0.21			0.21	0.21		0.66	0.66		0.66	
Clearance Time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)		256			146	224		907	706		924	
v/s Ratio Prot												
v/s Ratio Perm		0.17			c0.17	0.04		0.17	0.07		c0.70	
v/c Ratio		0.54			0.84	0.04		0.26	0.07		1.06	
Uniform Delay, d1		21.3			22.9	19.1		4.2	3.7		10.3	
Progression Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2		2.3			31.9	0.1		0.7	0.2		46.9	
Delay (s)		23.7			54.8	19.2		4.9	3.9		57.2	
Level of Service		C			D	B		A	A		E	
Approach Delay (s)		23.7			44.9			4.7			57.2	
Approach LOS		C			D			A			E	

Intersection Summary			
HCM Average Control Delay	42.0	HCM Level of Service	D
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	60.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	114.4%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
109: NE 85th St & 114th Ave NE

10/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583		1788	1583	3433	1855	
Flt Permitted	0.30	1.00	1.00	0.16	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (perm)	563	3539	1583	290	3539	1583		1788	1583	3433	1855	
Volume (vph)	8	767	11	289	871	136	9	2	135	409	34	1
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	834	12	314	947	148	10	2	147	445	37	1
RTOR Reduction (vph)	0	0	9	0	0	77	0	0	117	0	1	0
Lane Group Flow (vph)	9	834	3	314	947	71	0	12	30	445	37	0
Turn Type	Perm		Perm	pm+pt		Perm	Split		Perm	Split		
Protected Phases		4		3	8		2	2		6	6	
Permitted Phases	4		4	8		8			2			
Actuated Green, G (s)	21.7	21.7	21.7	40.6	40.6	40.6		17.1	17.1	14.5	14.5	
Effective Green, g (s)	21.7	21.7	21.7	40.6	40.6	40.6		17.1	17.1	14.5	14.5	
Actuated g/C Ratio	0.26	0.26	0.26	0.48	0.48	0.48		0.20	0.20	0.17	0.17	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	145	912	408	402	1706	763		363	321	591	319	
v/s Ratio Prot		c0.24		c0.14	0.27			0.01		c0.13	0.02	
v/s Ratio Perm	0.02		0.01	0.24		0.09			0.09			
v/c Ratio	0.06	0.91	0.01	0.78	0.56	0.09		0.03	0.09	0.75	0.12	
Uniform Delay, d1	23.6	30.3	23.2	18.1	15.4	11.8		26.9	27.3	33.1	29.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	13.4	0.0	9.5	0.4	0.1		0.2	0.6	5.4	0.2	
Delay (s)	23.8	43.7	23.2	27.6	15.8	11.9		27.1	27.8	38.5	29.6	
Level of Service	C	D	C	C	B	B		C	C	D	C	
Approach Delay (s)		43.2			18.0			27.8			37.8	
Approach LOS		D			B			C			D	

Intersection Summary			
HCM Average Control Delay	29.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	84.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
111: Kirkland Ave & 3rd St

10/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.97		1.00	0.91		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1788		1770	1798		1770	1704		1770	1839	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1788		1770	1798		1770	1704		1770	1839	
Volume (vph)	10	125	46	69	120	36	54	78	103	92	297	28
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	136	50	75	130	39	59	85	112	100	323	30
RTOR Reduction (vph)	0	25	0	0	19	0	0	64	0	0	4	0
Lane Group Flow (vph)	11	161	0	75	150	0	59	133	0	100	349	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	0.8	12.0		3.4	14.6		2.5	25.3		6.0	28.8	
Effective Green, g (s)	0.8	12.0		3.4	14.6		2.5	25.3		6.0	28.8	
Actuated g/C Ratio	0.01	0.19		0.05	0.23		0.04	0.40		0.10	0.46	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	23	342		96	419		71	688		169	845	
v/s Ratio Prot	0.01	c0.10		c0.04	c0.09		0.03	0.12		c0.06	c0.19	
v/s Ratio Perm												
v/c Ratio	0.48	0.47		0.78	0.36		0.83	0.19		0.59	0.41	
Uniform Delay, d1	30.7	22.5		29.3	20.1		29.9	12.1		27.2	11.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	14.8	1.0		32.8	0.5		53.3	0.6		5.5	1.5	
Delay (s)	45.6	23.6		62.0	20.7		83.2	12.7		32.6	12.8	
Level of Service	D	C		E	C		F	B		C	B	
Approach Delay (s)		24.8			33.4			29.0			17.2	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	24.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	62.7	Sum of lost time (s)	20.0
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
112: Kirkland Ave & 6th St

10/30/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	52	176	45	119	161	141	45	171	21	35	344	66
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	57	191	49	129	175	153	49	186	23	38	374	72

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total (vph)	297	458	258	38	446
Volume Left (vph)	57	129	49	38	0
Volume Right (vph)	49	153	23	0	72
Hadj (s)	-0.03	-0.11	0.02	0.53	-0.08
Departure Headway (s)	8.6	7.9	9.0	9.1	8.5
Degree Utilization, x	0.71	1.00	0.64	0.10	1.05
Capacity (veh/h)	408	451	390	395	446
Control Delay (s)	29.8	71.0	26.6	11.9	86.2
Approach Delay (s)	29.8	71.0	26.6	80.4	
Approach LOS	D	F	D	F	

Intersection Summary			
Delay	58.2		
HCM Level of Service	F		
Intersection Capacity Utilization	82.0%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
112: Kirkland Ave & 6th St

10/30/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.98			0.95		1.00	0.98		1.00	0.98	
Flt Protected		0.99			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1804			1754		1770	1832		1770	1818	
Flt Permitted		0.89			0.85		0.38	1.00		0.63	1.00	
Satd. Flow (perm)		1615			1506		717	1832		1168	1818	
Volume (vph)	52	176	45	119	161	141	45	171	21	35	344	66
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	57	191	49	129	175	153	49	186	23	38	374	72
RTOR Reduction (vph)	0	18	0	0	46	0	0	12	0	0	18	0
Lane Group Flow (vph)	0	279	0	0	411	0	49	197	0	38	428	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		13.0			13.0		12.3	12.3		12.3	12.3	
Effective Green, g (s)		13.0			13.0		12.3	12.3		12.3	12.3	
Actuated g/C Ratio		0.39			0.39		0.37	0.37		0.37	0.37	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		630			588		265	677		431	672	
v/s Ratio Prot								0.11			c0.25	
v/s Ratio Perm		0.18			c0.30		0.07			0.03		
v/c Ratio		0.44			0.70		0.18	0.29		0.09	0.64	
Uniform Delay, d1		7.5			8.5		7.1	7.4		6.8	8.7	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.5			3.6		0.3	0.2		0.1	2.0	
Delay (s)		8.0			12.1		7.4	7.7		6.9	10.6	
Level of Service		A			B		A	A		A	B	
Approach Delay (s)		8.0			12.1			7.6			10.3	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	10.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
1: Kirkland Ave & Main St Est

10/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	12	130	19	50	128	17	7	10	17	35	39	25
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	13	144	21	56	142	19	8	11	19	39	43	28
Pedestrians		30			30			30				
Lane Width (ft)		10.0			10.0			10.0				
Walking Speed (ft/s)		4.0			4.0			4.0				
Percent Blockage		2			2			2				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		413										
pX, platoon unblocked												
vC, conflicting volume	161			196			554	484	215	499	485	182
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	161			196			554	484	215	499	485	182
tC, single (s)	4.1			4.2			7.3	6.7	6.4	7.1	6.7	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.7	4.2	3.5	3.5	4.2	3.3
p0 queue free %	99			96			98	97	97	91	90	97
cM capacity (veh/h)	1418			1303			337	425	750	426	424	843

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	179	217	38	110
Volume Left	13	56	8	39
Volume Right	21	19	19	28
cSH	1418	1303	508	486
Volume to Capacity	0.01	0.04	0.07	0.23
Queue Length 95th (ft)	1	3	6	22
Control Delay (s)	0.6	2.3	12.7	14.6
Lane LOS	A	A	B	B
Approach Delay (s)	0.6	2.3	12.7	14.6
Approach LOS			B	B

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
103: NE 68th St & State St

10/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.93			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99			0.96	1.00
Satd. Flow (prot)	1770	1858		1770	1863	1583		1717			1779	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.99			0.96	1.00
Satd. Flow (perm)	1770	1858		1770	1863	1583		1717			1779	1583
Volume (vph)	301	366	6	20	283	322	7	12	20	176	11	134
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.85	0.85	0.85	0.92	0.92	0.92
Adj. Flow (vph)	327	398	7	22	308	350	8	14	24	191	12	146
RTOR Reduction (vph)	0	1	0	0	0	272	0	19	0	0	0	122
Lane Group Flow (vph)	327	404	0	22	308	78	0	27	0	0	203	24
Turn Type	Prot			Prot		Perm	Split			Split		Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	15.7	31.7		1.5	17.5	17.5		16.1			12.9	12.9
Effective Green, g (s)	15.7	31.7		1.5	17.5	17.5		16.1			12.9	12.9
Actuated g/C Ratio	0.20	0.41		0.02	0.22	0.22		0.21			0.16	0.16
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	355	753		34	417	354		354			293	261
v/s Ratio Prot	c0.18	0.22		0.01	0.17			c0.03			c0.11	
v/s Ratio Perm						0.22						0.09
v/c Ratio	0.92	0.54		0.65	0.74	0.22		0.08			0.69	0.09
Uniform Delay, d1	30.6	17.7		38.1	28.2	24.8		25.0			30.8	27.7
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	28.6	0.7		35.3	6.7	0.3		0.4			6.9	0.2
Delay (s)	59.2	18.4		73.4	34.9	25.1		25.5			37.7	27.8
Level of Service	E	B		E	C	C		C			D	C
Approach Delay (s)		36.7			31.1			25.5			33.6	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	33.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	78.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
104: NE 68th St & 6th St

10/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1745	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1745	
Volume (vph)	185	347	80	223	295	170	175	319	143	249	167	121
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	201	377	87	242	321	185	190	347	155	271	182	132
RTOR Reduction (vph)	0	0	60	0	0	142	0	0	107	0	35	0
Lane Group Flow (vph)	201	377	27	242	321	43	190	347	48	271	279	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	11.3	16.6	16.6	11.8	17.1	17.1	10.5	17.0	17.0	12.9	19.4	
Effective Green, g (s)	11.3	16.6	16.6	11.8	17.1	17.1	10.5	17.0	17.0	12.9	19.4	
Actuated g/C Ratio	0.15	0.22	0.22	0.16	0.23	0.23	0.14	0.23	0.23	0.17	0.26	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	269	416	354	281	429	364	250	426	362	307	456	
v/s Ratio Prot	0.11	c0.20		c0.14	0.17		0.11	c0.19		c0.15	0.18	
v/s Ratio Perm			0.05			0.12			0.10			
v/c Ratio	0.75	0.91	0.08	0.86	0.75	0.12	0.76	0.81	0.13	0.88	0.61	
Uniform Delay, d1	30.1	28.1	22.8	30.5	26.6	22.6	30.7	27.2	22.8	30.0	24.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	10.8	22.8	0.1	22.6	7.0	0.1	12.7	15.6	0.8	24.4	6.0	
Delay (s)	40.9	50.9	22.9	53.1	33.6	22.8	43.4	42.8	23.5	54.4	30.2	
Level of Service	D	D	C	D	C	C	D	D	C	D	C	
Approach Delay (s)		44.2			37.2			38.6			41.4	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	40.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	74.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
108: Kirkland Ave & Lake St

10/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Frt		0.96			1.00	0.85		1.00	0.85		0.98	
Flt Protected		0.99			0.97	1.00		1.00	1.00		1.00	
Satd. Flow (prot)		1770			1805	1583		1862	1583		1834	
Flt Permitted		0.94			0.73	1.00		1.00	1.00		1.00	
Satd. Flow (perm)		1669			1353	1583		1860	1583		1828	
Volume (vph)	19	66	40	87	49	101	3	576	79	4	367	47
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	72	43	95	53	110	3	626	86	4	399	51
RTOR Reduction (vph)	0	34	0	0	0	91	0	0	27	0	5	0
Lane Group Flow (vph)	0	102	0	0	148	19	0	629	59	0	449	0
Turn Type	Perm			Perm		Perm	Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		10.2			10.2	10.2		40.0	40.0		40.0	
Effective Green, g (s)		10.2			10.2	10.2		40.0	40.0		40.0	
Actuated g/C Ratio		0.18			0.18	0.18		0.69	0.69		0.69	
Clearance Time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)		293			237	277		1278	1088		1256	
v/s Ratio Prot												
v/s Ratio Perm		0.08			c0.11	0.07		c0.34	0.05		0.25	
v/c Ratio		0.35			0.62	0.07		0.49	0.05		0.36	
Uniform Delay, d1		21.1			22.2	20.0		4.3	3.0		3.8	
Progression Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2		0.7			5.1	0.1		1.4	0.1		0.8	
Delay (s)		21.8			27.3	20.1		5.7	3.1		4.6	
Level of Service		C			C	C		A	A		A	
Approach Delay (s)		21.8			24.2			5.3			4.6	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	9.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	58.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
109: NE 85th St & 114th Ave NE

10/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583		1860	1583	3433	1798	
Flt Permitted	0.26	1.00	1.00	0.18	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)	490	3539	1583	331	3539	1583		1860	1583	3433	1798	
Volume (vph)	9	752	1	184	869	223	1	28	351	358	21	6
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	817	1	200	945	242	1	30	382	389	23	7
RTOR Reduction (vph)	0	0	1	0	0	146	0	0	153	0	6	0
Lane Group Flow (vph)	10	817	0	200	945	96	0	31	229	389	24	0
Turn Type	Perm		Perm	pm+pt		Perm	Split		Perm	Split		
Protected Phases		4		3	8		2	2		6	6	
Permitted Phases	4		4	8		8			2			
Actuated Green, G (s)	18.5	18.5	18.5	28.5	28.5	28.5		18.0	18.0	13.0	13.0	
Effective Green, g (s)	18.5	18.5	18.5	28.5	28.5	28.5		18.0	18.0	13.0	13.0	
Actuated g/C Ratio	0.26	0.26	0.26	0.40	0.40	0.40		0.25	0.25	0.18	0.18	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	127	916	410	253	1411	631		468	399	624	327	
v/s Ratio Prot		0.23		0.07	c0.27			0.02		c0.11	0.02	
v/s Ratio Perm	0.02		0.00	c0.25		0.15			0.24			
v/c Ratio	0.08	0.89	0.00	0.79	0.67	0.15		0.07	0.57	0.62	0.07	
Uniform Delay, d1	20.1	25.5	19.6	16.9	17.6	13.8		20.4	23.4	27.0	24.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	10.9	0.0	15.4	1.2	0.1		0.3	5.9	1.9	0.1	
Delay (s)	20.3	36.5	19.6	32.2	18.9	13.9		20.6	29.3	28.9	24.4	
Level of Service	C	D	B	C	B	B		C	C	C	C	
Approach Delay (s)		36.2			19.9			28.7			28.6	
Approach LOS		D			B			C			C	

Intersection Summary			
HCM Average Control Delay	26.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	71.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
111: Kirkland Ave & 3rd St

10/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.93		1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1785		1770	1724		1770	1774		1770	1804	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1785		1770	1724		1770	1774		1770	1804	
Volume (vph)	23	148	57	127	148	145	93	365	171	94	169	45
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	25	161	62	138	161	158	101	397	186	102	184	49
RTOR Reduction (vph)	0	19	0	0	48	0	0	21	0	0	11	0
Lane Group Flow (vph)	25	204	0	138	271	0	101	562	0	102	222	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	1.4	13.8		6.0	18.4		6.9	30.3		4.5	27.9	
Effective Green, g (s)	1.4	13.8		6.0	18.4		6.9	30.3		4.5	27.9	
Actuated g/C Ratio	0.02	0.20		0.08	0.26		0.10	0.43		0.06	0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	35	349		150	449		173	761		113	713	
v/s Ratio Prot	0.01	0.12		c0.08	c0.18		0.06	c0.33		c0.06	0.13	
v/s Ratio Perm												
v/c Ratio	0.71	0.58		0.92	0.60		0.58	0.74		0.90	0.31	
Uniform Delay, d1	34.4	25.8		32.1	22.9		30.5	16.8		32.8	14.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	51.0	2.5		50.2	2.3		4.9	6.4		55.0	1.1	
Delay (s)	85.4	28.3		82.3	25.2		35.4	23.2		87.8	15.9	
Level of Service	F	C		F	C		D	C		F	B	
Approach Delay (s)		34.0			42.4			25.0			37.8	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM Average Control Delay	33.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	70.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
112: Kirkland Ave & 6th St

10/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	83	247	49	55	176	41	84	432	71	32	191	77
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	90	268	53	60	191	45	91	470	77	35	208	84

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total (vph)	412	296	638	35	291
Volume Left (vph)	90	60	91	35	0
Volume Right (vph)	53	45	77	0	84
Hadj (s)	0.00	-0.02	-0.01	0.53	-0.17
Departure Headway (s)	8.2	8.7	8.4	9.5	8.8
Degree Utilization, x	0.94	0.71	1.49	0.09	0.71
Capacity (veh/h)	412	394	431	365	392
Control Delay (s)	57.8	30.5	253.6	12.2	29.5
Approach Delay (s)	57.8	30.5	253.6	27.6	
Approach LOS	F	D	F	D	

Intersection Summary			
Delay	121.8		
HCM Level of Service	F		
Intersection Capacity Utilization	84.8%	ICU Level of Service	E
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
112: Kirkland Ave & 6th St

10/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.98			0.98		1.00	0.98		1.00	0.96	
Flt Protected		0.99			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1810			1806		1770	1823		1770	1782	
Flt Permitted		0.88			0.89		0.58	1.00		0.30	1.00	
Satd. Flow (perm)		1619			1618		1075	1823		560	1782	
Volume (vph)	83	247	49	55	176	41	84	432	71	32	191	77
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	90	268	53	60	191	45	91	470	77	35	208	84
RTOR Reduction (vph)	0	12	0	0	15	0	0	14	0	0	34	0
Lane Group Flow (vph)	0	399	0	0	281	0	91	533	0	35	258	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		13.2			13.2		15.2	15.2		15.2	15.2	
Effective Green, g (s)		13.2			13.2		15.2	15.2		15.2	15.2	
Actuated g/C Ratio		0.36			0.36		0.42	0.42		0.42	0.42	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		587			587		449	761		234	744	
v/s Ratio Prot								c0.30			0.16	
v/s Ratio Perm		c0.25			0.18		0.08			0.06		
v/c Ratio		0.68			0.48		0.20	0.70		0.15	0.35	
Uniform Delay, d1		9.8			8.9		6.7	8.7		6.6	7.2	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		3.1			0.6		0.2	2.9		0.3	0.3	
Delay (s)		12.9			9.6		7.0	11.6		6.9	7.5	
Level of Service		B			A		A	B		A	A	
Approach Delay (s)		12.9			9.6			11.0			7.4	
Approach LOS		B			A			B			A	

Intersection Summary			
HCM Average Control Delay	10.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	36.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
1: Kirkland Ave & Main St Est

10/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	22	106	21	68	152	54	32	20	83	31	38	54
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	24	118	23	76	169	60	36	22	92	34	42	60
Pedestrians		30			30			30				
Lane Width (ft)		10.0			10.0			10.0				
Walking Speed (ft/s)		4.0			4.0			4.0				
Percent Blockage		2			2			2				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		413										
pX, platoon unblocked												
vC, conflicting volume	229			171			669	588	189	662	570	229
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	229			171			669	588	189	662	570	229
tC, single (s)	4.1			4.2			7.2	6.6	6.3	7.1	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.6	4.1	3.4	3.5	4.1	3.3
p0 queue free %	98			94			87	94	88	88	89	92
cM capacity (veh/h)	1339			1331			272	372	798	288	381	793

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	166	304	150	137
Volume Left	24	76	36	34
Volume Right	23	60	92	60
cSH	1339	1331	490	447
Volume to Capacity	0.02	0.06	0.31	0.31
Queue Length 95th (ft)	1	5	32	32
Control Delay (s)	1.3	2.3	15.6	16.6
Lane LOS	A	A	C	C
Approach Delay (s)	1.3	2.3	15.6	16.6
Approach LOS			C	C

Intersection Summary			
Average Delay	7.3		
Intersection Capacity Utilization	57.7%	ICU Level of Service	B
Analysis Period (min)	15		

SimTraffic Performance Report
v2 volume scenario (special for Lake-Kirkland)

10/28/2013

1: Kirkland Ave & Main St Est Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay / Veh (s)	2.7	0.8	0.6	2.3	1.2	0.9	12.2	6.2	5.6	10.0	13.6	7.7

1: Kirkland Ave & Main St Est Performance by movement

Movement	All
Delay / Veh (s)	3.9

2: alley & Main St Est Performance by movement

Movement	EBL	EBT	NBT	SBU	SBT	SBR	All
Delay / Veh (s)	3.1	0.1	0.9	3.0	0.9	0.8	1.8

3: alley & Lake St Pkg Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Delay / Veh (s)	0.3	0.7	1.7	0.6	2.3	1.5	1.4

4: alley & 101 kirkland garage Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Delay / Veh (s)	0.1	0.1	0.1	0.3	1.6	0.9	0.4

5: alley & BofA Dvwy Performance by movement

Movement	EBL	EBT	WBT	WBR	All
Delay / Veh (s)	0.6	0.1	0.0	0.0	0.1

7: Kirkland Ave & Lake St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay / Veh (s)	60.9	39.2	28.4	29.9	20.0	38.4		288.1	272.4		7.6	6.0

7: Kirkland Ave & Lake St Performance by movement

Movement	All
Delay / Veh (s)	132.1

8: Central & Lake St Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Delay / Veh (s)	39.6	15.4	63.0	28.7	23.6	7.6	11.1	29.2

SimTraffic Performance Report
v2 volume scenario

10/28/2013

1: Kirkland Ave & Main St Est Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Delay / Veh (s)	1.7	0.2	0.4	2.2	0.9	0.9	5.7	7.4	4.4	10.1	7.1	2.9

1: Kirkland Ave & Main St Est Performance by movement

Movement	All
Delay / Veh (s)	2.7

2: alley & Main St Est Performance by movement

Movement	EBL	EBT	NBT	SBU	SBT	SBR	All
Delay / Veh (s)	2.6	0.1	0.0	3.9	0.7	1.1	1.7

3: alley & Lake St Pkg Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Delay / Veh (s)	0.2	1.4	2.1	0.8	3.9	1.4	1.6

4: alley & 101 kirkland garage Performance by movement

Movement	EBT	WBT	WBR	SBL	SBR	All
Delay / Veh (s)	0.0	0.3	0.3	1.1	1.1	0.3

5: alley & BofA Dvwy Performance by movement

Movement	EBT	WBT	WBR	All
Delay / Veh (s)	0.1	0.1	0.2	0.1

6: alley & Lake St Performance by movement

Movement	WBR	NBT	NBR	SBT	All
Delay / Veh (s)	185.0	45.7	29.0	0.9	28.4

7: Kirkland Ave & Lake St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT	SBR	All
Delay / Veh (s)	43.2	21.6	18.4	23.0	24.6	30.2	16.1	1.7	2.3	7.7	6.5	14.5

8: Central & Lake St Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Delay / Veh (s)	36.4	13.3	68.3	30.0	21.8	6.4	8.8	29.0

APPENDIX F

TECHNICAL APPENDIX
for
Lake St Mixed Use Development

Parking Demand Estimate (average weekday)

Existing Parking Analysis

4/4/2013

Existing Parking				**68**	
Building/Use	**Gross Floor Area**	**Parking Ratio**	**Required Parking**	**Existing Parking**	**Parking Credit**
Hector's Building					
Restaurant (Hector's)	4556	1/125	36.4	0	
Office	2422	1/350	6.9	0	
Common - Restaurant	114	1/125	0.9	0	
Common - Office	106	1/350	0.3	0	
Subtotal	**7198**		**44.6**	**0**	
Lakeside Building					
Restaurant (Hector's BoH)	2715	1/125	21.7	0	
Restaurant (World Wrapps)	1667	1/125	13.3	0	
Retail	1646	1/350	4.7		
Office	128	1/350	0.4	0	
Subtotal	**6156**		**40.1**	**0**	
Kirkland Waterfront Market					
Restaurant (Szmania)	3704	1/125	29.6	46	
Restaurant (Sushi)	1701	1/125	13.6	0	
Restaurant (Thin Pan)	1626	1/125	13.0	0	
Retail (Tully's)	1348	1/350	3.9	11	
Retail (Ben & Jerry's)	534	1/350	1.5	0	
Office	8460	1/350	24.2	11	
Common-Restaurant	1098	1/125	8.8		
Common-Retail	281	1/350	0.8		
Common-Office	2657	1/350	7.6		
Subtotal	**21409**		**103.0**	**68**	
Calabria Building					
Restaurant (Calabria)	4387	1/125	35.1	0	
Retail (Sasi)	876	1/350	2.5	0	
Subtotal	**5263**		**37.6**	**0**	
Total	**40026**		**225.3**	**68**	**157.3**
SUMMARY					
Parking per Use					
Restaurant	21568	1/125	172.5	46	
Retail	4685	1/350	13.4	11	
Office	13773	1/350	39.4	11	
Total	**40026**		**225.3**	**68**	

Parking Required	**225.3**
Existing	**68**
Parking Credit	**157.3**

ATTACHMENT 8
SEP13-00959
APPLICANT TIA

Demo Space/Parking Analysis

4/4/2013

Building/Use	Gross Floor Area	Parking Ratio	Required Parking	
Hector's Building				
Restaurant (Hector's)	1972	1/125	15.8	
Office	0	1/350	0.0	
Subtotal	**1972**		**15.8**	(to be demolished)
Lakeside Building				
Restaurant (Hector's BoH)	2715	1/125	21.7	
Restaurant (World Wrapps)	1667	1/125	13.3	
Retail	1646	1/350	4.7	
Office	128	1/350	0.4	
Subtotal	**6156**		**40.1**	(demolished)
Kirkland Waterfront Market				
Restaurant	0	1/125	0.0	
Retail/Office (Upstairs Patio)	0	1/350	0.0	
Subtotal	**0**		**0.0**	(no demolition)
Calabria Building				
Restaurant (Calabria)	4387	1/125	35.1	
Retail (Sasi)	876	1/350	2.5	
Subtotal	**5263**		**37.6**	(demolished)
Total	**13391**		**93.5**	

SUMMARY

Parking per Use			
Restaurant	10741	1/125	85.9
Retail/Office	2650	1/350	7.6
Total	**13391**		**93.5**

Grandfathered Parking Credit	**93.5**
Existing Parking	68
Removed for alley easment	-3
Parking stalls to be maintained	**65**

ATTACHMENT 8
SEP13-00959
APPLICANT TIA

New Area/Parking Analysis

4/4/2013

Building/Use	Gross Floor Area	Parking Ratio	Required Parking	Existing parking
Hector's Building Expansion				
Restaurant	7476	1/125	59.8	
Retail	0	1/350	0.0	
Office	24986	1/350	71.4	
Subtotal	**32462**		**131.2**	
Kirkland Waterfront Market 2009 Remodel				
Restaurant	1124	1/125	9.0	
Retail	0	1/350	0.0	
Office	784	1/350	2.2	
Subtotal	**1908**		**11.2**	
Kirkland Waterfront Market Addition				
Restaurant	965	1/125	7.7	
Retail	0	1/350	0.0	
Office	12993	1/350	37.1	
Subtotal	**13958**		**44.8**	65
Main Street Building				
Restaurant	0	1/125	0.0	
Retail	13740	1/350	39.3	
Office	18001	1/350	51.4	
Common - Restaurant	0	1/125	0.0	
Common - Retail	1609	1/350	4.6	
Common - Office	2108	1/350	6.0	
Subtotal	**35458**		**101.3**	
Total	**83786**		**288.6**	**65**

Summary By Use			
Restaurant	9565	1/125	76.5
Retail	15349	1/350	43.9
Office	58872	1/350	168.2
Total	**83786**		**288.6**

Required Parking for New Gross Area	288.6
Grandfathered (Demo) Credit	-93.5
Required Parking	**195.1**

New parking stalls	187.0	
Provided Parking	**187.0**	
	-8.1	Deficit

Total stalls on Site
65 existing
187 new
252.0

* Applicant reserves the right to share parking between uses on three (3) parcels as allowed by KZC 105.45.
* Applicant currently in negotiations with City regarding (5) displaced public parking stalls located at the Parcel C frontage on Main Street.

ATTACHMENT 8
SEP13-00959
APPLICANT TIA

McLeod Development -- Parking Demand Estimates by Land Use Type

EXISTING AND EXISTING CREDITS

40.026

Land Use	Office Parking		Retail		Quality Restaurant		High Turnover Restaurant		Totals	
Size	13.773 kgsf		4.685 kgsf		18.275 kgsf		3.293 kgsf			
City Parking Code or Rate	2.86 (1 per 350)		2.86 (1 per 350)		8.00 (1 per 125)		8.00 (1 per 125)			
	2.47 ITE				10.60 ITE		5.55 ITE			
Parking Demand	39		13		146		26		225	
					0		0			
TDM adj	0	0%	0	0%	0	0%	0	0%	0	
Internal Trip Adj	0	0%	0	0%	0	0%	0	0%	0	
Adjusted Parking Demand	39		13		146		26		225	

Parking Demand by Time of Day	Office		Retail		Restaurant		Restaurant		Total Demand	Supply	Shortage/ Surplus
6:00 AM	10%	4	1%	0	0%	0	26%	7	11	65	54
7:00 AM	40%	16	7%	1	1%	1	44%	12	30	65	35
8:00 AM	71%	28	18%	2	4%	5	57%	15	50	65	15
9:00 AM	94%	37	40%	5	8%	11	76%	20	73	65	-8
10:00 AM	100%	39	61%	8	15%	22	85%	22	91	65	-26
11:00 AM	99%	39	87%	12	25%	37	92%	24	112	65	-47
12:00 PM	90%	35	99%	13	51%	74	100%	26	148	65	-83
1:00 PM	84%	33	100%	13	63%	92	90%	24	162	65	-97
2:00 PM	91%	36	95%	13	50%	73	53%	14	136	65	-71
3:00 PM	87%	34	91%	12	44%	64	42%	11	121	65	-56
4:00 PM	75%	29	85%	11	39%	56	42%	11	107	65	-42
5:00 PM	47%	18	69%	9	55%	80	76%	20	127	65	-62
6:00 PM	24%	9	76%	10	81%	118	83%	22	159	65	-94
7:00 PM	15%	6	86%	12	100%	146	63%	17	181	65	-116
8:00 PM	7%	3	79%	11	99%	144	66%	17	175	65	-110
9:00 PM	3%	1	52%	7	88%	128	63%	17	153	65	-88
10:00 PM	3%	1	21%	3	78%	113	48%	13	130	65	-65
11:00 PM	0%	0	10%	1	58%	84	44%	12	97	65	-32
12:00 AM	0%	0	0%	0	38%	55	20%	5	60	65	5

5/8/2013

DEMO CREDITS

13.391

Land Use	Office Parking		Retail		Quality Restaurant		High Turnover Restaurant		Totals	
Size	0.128 kgsf		2.522 kgsf		9.074 kgsf		1.667 kgsf			
City Parking Code or Rate	2.86 (1 per 350)		2.86 (1 per 350)		8.00 (1 per 125)		8.00 (1 per 125)			
	2.47 ITE				10.60 ITE		0.00 ITE			
Parking Demand	0		7		73		13		93.5	
					0		0			
TDM adj	0	0%	0	0%	0	0%	0	0%	0	
Internal Trip Adj	0	0%	0	0%	0	0%	0	0%	0	
Adjusted Parking Demand	0		7		73		13		93	

Parking Demand by Time of Day	Office		Retail		Restaurant		Restaurant		Total Demand	Supply	Shortage/ Surplus
6:00 AM	10%	0	1%	0	0%	0	26%	3	3	n/a	n/a
7:00 AM	40%	0	7%	0	1%	1	44%	6	7	n/a	n/a
8:00 AM	71%	0	18%	1	4%	3	57%	8	12	n/a	n/a
9:00 AM	94%	0	40%	3	8%	5	76%	10	18	n/a	n/a
10:00 AM	100%	0	61%	4	15%	11	85%	11	26	n/a	n/a
11:00 AM	99%	0	87%	6	25%	18	92%	12	36	n/a	n/a
12:00 PM	90%	0	99%	7	51%	37	100%	13	57	n/a	n/a
1:00 PM	84%	0	100%	7	63%	46	90%	12	65	n/a	n/a
2:00 PM	91%	0	95%	7	50%	36	53%	7	50	n/a	n/a
3:00 PM	87%	0	91%	7	44%	32	42%	6	45	n/a	n/a
4:00 PM	75%	0	85%	6	39%	28	42%	6	40	n/a	n/a
5:00 PM	47%	0	69%	5	55%	40	76%	10	55	n/a	n/a
6:00 PM	24%	0	76%	5	81%	58	83%	11	74	n/a	n/a
7:00 PM	15%	0	86%	6	100%	73	63%	8	87	n/a	n/a
8:00 PM	7%	0	79%	6	99%	72	66%	9	87	n/a	n/a
9:00 PM	3%	0	52%	4	88%	64	63%	8	76	n/a	n/a
10:00 PM	3%	0	21%	2	78%	56	48%	6	64	n/a	n/a
11:00 PM	0%	0	10%	1	58%	42	44%	6	49	n/a	n/a
12:00 AM	0%	0	0%	0	38%	27	20%	3	30	n/a	n/a

5/8/2013

McLeod Development -- Parking Demand Estimates by Land Use Type

NEW BUILDING AND PARKING REQUIREMENTS

83.786

Land Use	Office Parking		Retail		Quality Restaurant		High Turnover Restaurant		Totals		
Size	58.872 kgsf		15.349 kgsf		9.565 kgsf		0.000 kgsf				
City Parking Code or Rate	2.86 (1 per 350)		2.86 (1 per 350)		8.00 (1 per 125)		8.00 (1 per 125)				
	2.47 ITE				10.60 ITE		0.00 ITE				
Parking Demand	168		44		77		0		289		
					0		0				
TDM adj	0	0%	0	0%	0	0%	0	0%	0		
Internal Trip Adj	8	5%	2	5%	4	5%	0	5%	14		
Adjusted Parking Demand	160		42		73		0		274		
Parking Demand by Time of Day	Office		Retail		Restaurant		Restaurant		Total Demand	Supply	Shortage/ Surplus
6:00 AM	10%	16	1%	0	0%	0	26%	0	16	n/a	n/a
7:00 AM	40%	63	7%	3	1%	1	44%	0	67	n/a	n/a
8:00 AM	71%	113	18%	8	4%	3	57%	0	124	n/a	n/a
9:00 AM	94%	150	40%	17	8%	5	76%	0	172	n/a	n/a
10:00 AM	100%	160	61%	25	15%	11	85%	0	196	n/a	n/a
11:00 AM	99%	158	87%	36	25%	18	92%	0	212	n/a	n/a
12:00 PM	90%	144	99%	41	51%	37	100%	0	222	n/a	n/a
1:00 PM	84%	133	100%	42	63%	46	90%	0	221	n/a	n/a
2:00 PM	91%	145	95%	40	50%	36	53%	0	221	n/a	n/a
3:00 PM	87%	139	91%	38	44%	32	42%	0	209	n/a	n/a
4:00 PM	75%	119	85%	35	39%	28	42%	0	182	n/a	n/a
5:00 PM	47%	74	69%	29	55%	40	76%	0	143	n/a	n/a
6:00 PM	24%	38	76%	32	81%	59	83%	0	129	n/a	n/a
7:00 PM	15%	24	86%	36	100%	73	63%	0	133	n/a	n/a
8:00 PM	7%	11	79%	33	99%	72	66%	0	116	n/a	n/a
9:00 PM	3%	5	52%	22	88%	64	63%	0	91	n/a	n/a
10:00 PM	3%	5	21%	9	78%	56	48%	0	70	n/a	n/a
11:00 PM	0%	0	10%	4	58%	42	44%	0	46	n/a	n/a
12:00 AM	0%	0	0%	0	38%	27	20%	0	27	n/a	n/a

5/8/2013

70.395

Land Use	Office Parking		Retail		Quality Restaurant		High Turnover Restaurant		Totals		
Size	58.744 kgsf		12.827 kgsf		0.491 kgsf		-1.667 kgsf				
City Parking Code or Rate	2.86 (1 per 350)		2.86 (1 per 350)		8.00 (1 per 125)		8.00 (1 per 125)				
	2.47 ITE				10.60 ITE		0.00 ITE				
Parking Demand	168		37		4		-13		195		
					0		0				
TDM adj	0	0%	0	0%	0	0%	0	0%	0		
Internal Trip Adj	0	0%	0	0%	0	0%	0	0%	0		
Adjusted Parking Demand	168		37		4		-13		195		
Parking Demand by Time of Day	Office		Retail		Restaurant		Restaurant		Total Demand	Supply	Shortage/ Surplus
6:00 AM		16		0		0		-3	13	n/a	n/a
7:00 AM		63		3		0		-6	60	n/a	n/a
8:00 AM		113		7		0		-8	112	n/a	n/a
9:00 AM		150		14		0		-10	154	n/a	n/a
10:00 AM		160		21		0		-11	170	n/a	n/a
11:00 AM		158		30		0		-12	176	n/a	n/a
12:00 PM		144		34		0		-13	165	n/a	n/a
1:00 PM		133		35		0		-12	156	n/a	n/a
2:00 PM		145		33		0		-7	171	n/a	n/a
3:00 PM		139		31		0		-6	164	n/a	n/a
4:00 PM		119		29		0		-6	142	n/a	n/a
5:00 PM		74		24		0		-10	88	n/a	n/a
6:00 PM		38		27		1		-11	55	n/a	n/a
7:00 PM		24		30		0		-8	46	n/a	n/a
8:00 PM		11		27		0		-9	29	n/a	n/a
9:00 PM		5		18		0		-8	15	n/a	n/a
10:00 PM		5		7		0		-6	6	n/a	n/a
11:00 PM		0		3		0		-6	-3	n/a	n/a
12:00 AM		0		0		0		-3	-3	n/a	n/a

5/8/2013

McLeod Development -- Parking Demand Estimates by Land Use Type

						110.421
Land Use	EXISTING PRE-DEMO	NEW AREA	DEMO AREA	NET NEW AREA	TOTAL	
Size	40.026 kgsf	83.786 kgsf	13.391 kgsf	70.395 kgsf	110.421 kgsf	
Parking Demand						
TDM adj						Parking Supply
Internal Trip Adj						
Adjusted Parking Demand						252
Parking Demand by Time of Day	veh	veh	veh	veh	Total Demand	Shortage/ Surplus
6:00 AM	4	16	-3	13	17	235
7:00 AM	11	67	-7	60	71	181
8:00 AM	18	124	-12	112	130	122
9:00 AM	26	172	-18	154	180	72
10:00 AM	33	196	-26	170	203	49
11:00 AM	40	212	-36	176	216	36
12:00 PM	53	222	-57	165	218	34
1:00 PM	58	221	-65	156	214	38
2:00 PM	49	221	-50	171	220	32
3:00 PM	43	209	-45	164	207	45
4:00 PM	38	182	-40	142	180	72
5:00 PM	46	143	-55	88	134	118
6:00 PM	57	129	-74	55	112	140
7:00 PM	65	133	-87	46	111	141
8:00 PM	63	116	-87	29	92	160
9:00 PM	55	91	-76	15	70	182
10:00 PM	47	70	-64	6	53	199
11:00 PM	35	46	-49	-3	32	220
12:00 AM	22	27	-30	-3	19	233

APPENDIX G

TECHNICAL APPENDIX
for
Lake St Mixed Use Development

Public Comments, Resident Forum 4/3/13

Merrill Gardens at Kirkland
April 3, 2013
Resident Forum
Mayor Joan McBride & Staff
Topic: Proposed Lake Street Development
QUESTIONS FROM MERRILL GARDENS RESIDENTS AND STAFF RESPONSES:

1. **If the new project is built in front of Merrill Gardens, traffic on State Street and the "Hector's Alley" will increase. What will be done to protect pedestrians crossing State Street from Merrill Gardens?**

   At the meeting we'd like to hear from you on what you see as the existing or potential difficulties. What are the main directions that Merrill Garden residents are trying to walk? Would a crosswalk at the Merrill Gardens entrance be helpful? We can look at additional treatments as part of SEPA analysis.

2. **Has a traffic study been done to determine the impact of the proposed project on an area that is already congested with delivery trucks, moving trucks, bank customers, and emergency vehicles responding to 911 calls at Merrill Gardens?**

   Since the issues being described here all have to do with existing uses, we'd like to hear more about the specific problems you see today. Perhaps there are some measures we could take now that would improve the current situation. The applicant is still working on the report that will tell us exactly how many trips will be coming from the new development, but it's on the order of 1,200 trips per day, 106 AM and 145 PM peak hour trips.

3. **Is there a King County zoning restriction on building near a retirement community or nursing home?**

   The City does not have additional zoning restrictions when building near a retirement community or nursing home.

4. **Have City engineers checked the proposed site for soil stability and the risk of soil liquefaction from excess ground water or lake water?**

   The City's sensitive areas map does not identify the Lake Street Place property as being located within a seismic hazard area. However, the Building Dept. will be requiring that the applicant submit a geotechnical report as part of the applicant's building permit submittal for the project. The geotechnical report will address soil stability and ground water impacts, if any, to the project. The structural engineer will need to confirm compliance with any geotechnical report recommendations.

5. **Has the City approved a variance to allow a sidewalk in the Hector's alley that is narrower than normal with a rolled edge curb to accommodate trucks driving over it to access loading docks?**

   The previous alley right-of-way was 15 feet, the City of Kirkland negotiated with the Hector's developer to widen to 20 feet to allow of a 5-foot pedestrian path on the north side of the alley. The intention was to maintain a narrow vehicular path to slow traffic and minimize pass-through traffic but using a rolled-curb to allow for two vehicles to pass each other when necessary. It was made clear to the developers that the alley may be converted to one-way in the future if increase vehicular and/or pedestrian traffic present a safety issue. One-way operation could potentially mean more trips past the

Merrill Gardens entrance and possibly higher speeds in the alley, but would offer more space for vehicles and pedestrians.

6. **What will be done to minimize the negative health effects of auto emissions from the large parking garage proposed for the project?**

   The same standard for ventilating the parking garage will be required of the project similar to the Merrill Garden and Bank of America development.

   The garage will be exhausted per the 2009 International Mechanical Code, which is applicable to this project. The purpose of the garage exhaust system, is to prevent Carbon Monoxide (CO) from accumulating to a high level where it may become toxic and be dangerous to people. The system will be designed to flush out any potentially dangerous accumulation before it becomes a problem by following the prescribed method as stated in the Code. The Code does not indicate any further treatment of emissions, i.e. filters or scrubbers, because that air will be mixed with outdoor air and, therefore, the CO levels will be properly diluted to lower and safer levels before it reaches the code required distance (10′) from any adjacent property lines. As proposed, the garage exhaust is 11′-2″ from the east property line near the top of the Portsmith pedestrian pathway stairs.

7. **Will the City of Kirkland require the developer to do an Environmental Impact Statement?**

   It is not known at this time if an EIS will be required. The City will determine as part of the SEPA process whether an EIS would be required. A SEPA application has not yet been submitted to the City for review.

8. **What is a SEPA, and how is that different from an EIS?**

   See the attached SEPA handout and the following text from the Washington State Dept. of Ecology website regarding SEPA, SEPA Determinations, and EIS.

   SEPA is the abbreviation or acronym for the State Environmental Policy Act, Chapter 43.21C RCW. Enacted in 1971, it provides the framework for agencies to consider the environmental consequences of a proposal before taking action. It also gives agencies the ability to condition or deny a proposal due to identified likely significant adverse impacts. The Act is implemented through the SEPA Rules, Chapter 197-11 WAC.

   The threshold determination process is the process used to evaluate the environmental consequences of a proposal and determine whether the proposal is likely to have any "significant adverse environmental impact." This determination is made by the lead agency (the City in this case) and is documented in either a determination of nonsignificance (DNS), or a determination of significance (DS) and subsequent preparation of an environmental impact statement (EIS).

   A mitigated DNS may also be issued. A mitigated DNS is a DNS that contains mitigation or conditions that reduce likely significant adverse environmental impact(s) to a nonsignificant level. A mitigated DNS requires a comment period.

   WAC 197-11-794 defines "significant" as "a reasonable likelihood of more than a moderate adverse impact on environmental quality." What is considered significant will vary from one site to another and from one jurisdiction to another, both because of the conditions surrounding the proposal at a particular location, and because of the judgment of the responsible official.

   If all significant impacts have been or will be mitigated to a nonsignificant level through the requirements in local, state, or federal regulations, or with the use of SEPA substantive authority, an EIS is not required. The applicant and lead agency may work

together to revise the proposal's impacts or identify mitigation measures that would allow the lead agency to issue a determination of nonsignificance.

An environmental impact statement (EIS) must be prepared when the lead agency determines a proposal is likely to have significant adverse environmental impacts. The EIS provides an impartial discussion of significant environmental impacts, reasonable alternatives, and mitigation measures that would avoid or minimize adverse impacts. The lead agency will issue a draft EIS with a 30-day comment period to allow other agencies, tribes, and the public to comment on the environmental analysis and conclusions. The lead agency will use these comments to finalize the environmental analysis and issue a final EIS.

9. How are variances granted with regard to required setbacks and height restrictions?

The CBD 1B zone authorizes the Design Review Board to grant a reduction (up to 5') to the upper story setback requirement along Lake Street South (30'). The applicant did request a 5' reduction to the upper story setback to the office addition proposed atop the Milagro Restaurant. Rooftop appurtenances are allowed to exceed the height limit by 4'. Peaked roofs and parapets are also allowed to exceed the height limit. Otherwise, variances to required setbacks and height restrictions in the Downtown would require approval through a Process IIA zoning permit (public hearing and Hearing Examiner decision).

10. Does the City require a certain number of parking spaces for a new building, and how is this determined?

Parking requirements are based on the zoning district and the proposed use. In the CBD 1A/1B, CBD 2, and CBD 8 zones, restaurants are required 1 parking stall for each 125 square feet of gross floor area. Office and retails uses are required 1 stall for each 350 square feet of gross floor area. In addition, these CBD zones have a grandfathered parking regulation which allows an owner to not increase the number of parking spaces for any floor area that existed prior to May 12, 2002. The following is the methodology used by staff:

A. If applicable, determine the amount of gross floor area being demolished based on existing square footage, existing uses, and the associated number of parking stalls required (grandfathered parking amount).

B. Note the amount of existing parking stalls if any.

C. Determine the amount of new floor area to be constructed based on proposed square footage, proposed uses, and the required number of parking stalls.

D. Make sure that the number of parking stalls that existed prior to the redevelopment is maintained with the new project.

E. Subtract the grandfathered parking amount from the required number of parking stalls for the new project.

F. If the difference is positive, then the difference needs to be provided onsite. If the difference is negative, then no additional parking is required onsite.

ATTACHMENT 8
SEP13-00959
APPLICANT TIA

Bill Popp Jr

From: "Thang Nguyen" <TNguyen@kirklandwa.gov>
To: "'Rick Chesmore'" <rick@chesmorebuck.com>; <bpoppjr@wmpoppassoc.com>
Cc: "Jon Regala" <JRegala@kirklandwa.gov>
Sent: Wednesday, May 15, 2013 11:14 AM
Attach: Merril Garden Forum.pdf
Subject: RE: Merril gardens SEPA concerns

The questions from the forum are attached. Here are some of the comments:

- **McCleod project trips together with existing traffic from development along the alley will make the alley congested and unsafe for pedestrians.**
- **Two vehicles cannot past each other in the alley and with truck parking on the alley it is impossible to past around the truck when sight distance is reduced, pedestrian safety is compromised.**
- **The development project will put significantly more traffic than Main Street and the alley can handle. Senior residents are going to be severely impacted and crossing Main Street will be more dangerous.**
- **Traffic and queuing from the bank of America drive-through the parking garage to the Bank of America building and from the development garage will create high congestion in the alley where those parking garage entrances are.**
- **How will truck loading be provided? How will it maneuver to get to the loading dock? If the alley is one-way westbound, how does that impact truck entry and exiting and will truck be backing out onto Main Street as the exit or enter?**
- **Crosswalk are not very visible, the crosswalk treatment is not working**
  - **Merrill's Garden would like a painted crosswalk on all three legs of the intersection in front of their main entrance.**
- **Delivery trucks park on the sidewalk along the alley prevents elderly pedestrian from using the sidewalk.**
  - **Merrill's Garden like to see No Stopping sign along the alley so truck cannot park on the sidewalk.**
- **Vehicles are not stopping and making fast turn in and out of the alley to/from Main Street.**
  - **Merrill's Garden like to have speed limit signs or speed hump to slow down traffic.**
- **There are a lot of congestions with delivery trucks, waste management trucks, traffic from the Bank of American, Hectors… the McCleod project will make it worst.**
- **The existing STOP sign for driveway exiting the alley to Main Street is too far back and is not visible to stop vehicle.**

Thang T. Nguyen
Transportation Engineer
City of Kirkland
Public Works Department
123 Fifth Avenue
Kirkland WA 98033-6189
Phone: (425) 587-3869
Fax: (425) 587-3807
tnguyen@kirklandwa.gov

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CITY OF KIRKLAND
Department of Public Works
123 Fifth Avenue, Kirkland, WA 98033 425.587.3800
www.kirklandwa.gov

MEMORANDUM

To: Jon Regala, Senior Planner

From: Thang Nguyen, Transportation Engineer

Date: December 19, 2013

Subject: Lake Street Place Mixed-Use Development Traffic Impact Analysis Staff Review, TRAN13-00304

This memo provides Public Works' review and comments on the traffic impact analysis (TIA) report dated October 28, 2013 completed by William Popp Associates for the proposed Lake Street Mixed-use development project.

Project Description

The subject property consists of three parcels. The applicant proposes to expand two existing mixed-use commercial buildings (Hector's and Kirkland Waterfront Market) on their respective parcels. A new multi-story parking garage with ground floor commercial space and top floor office space is proposed on the third parcel which currently contains a surface parking lot. The new parking garage will serve all three buildings. A total of 110,421 square feet of gross floor area is proposed. The development may be completed in two phases. Phase I is anticipated to be completed and occupied by 2015 with full build-out anticipated by the end of 2018. If the project is not phased and is instead constructed in its entirety, the estimated completion date is spring 2016.

Table 1 below summarizes the project development. One driveway from an Alley (the Alley is the alley section between Lake Street and Main Street along the project's north property line) will provide vehicular access to the multi-level parking garage. The applicant proposes to provide 252 parking spaces to serve the entire development. Based on the City parking code, the existing parking supply is calculated to be sufficient to serve Phase I of the project. Therefore, the applicant is not proposing additional parking for Phase I.

Table 1. Development Gross Floor Area Summary (Square Feet)

	Retail	Quality Restaurant	High-Turnover Restaurant	Office	Total
Proposed					
Phase I	0	2,114	0	14,069	16,183
Phase II	15,349	5,479	0	44,803	65,631
Proposed	***15,346***	***7,593***	***0***	***58,872***	***81,814***
Existing	2,163	11,173	1,626	13,645	28,607
TOTAL	**17,512**	**18,766**	**1,626**	**72,517**	**110,421**

Trip Generation
ITE Trip Generation Report was used to calculate trip generation for the proposed project. The proposed development is forecasted to generate ***1,255 daily***, ***107 AM*** and ***149 PM*** peak hour net new trips.

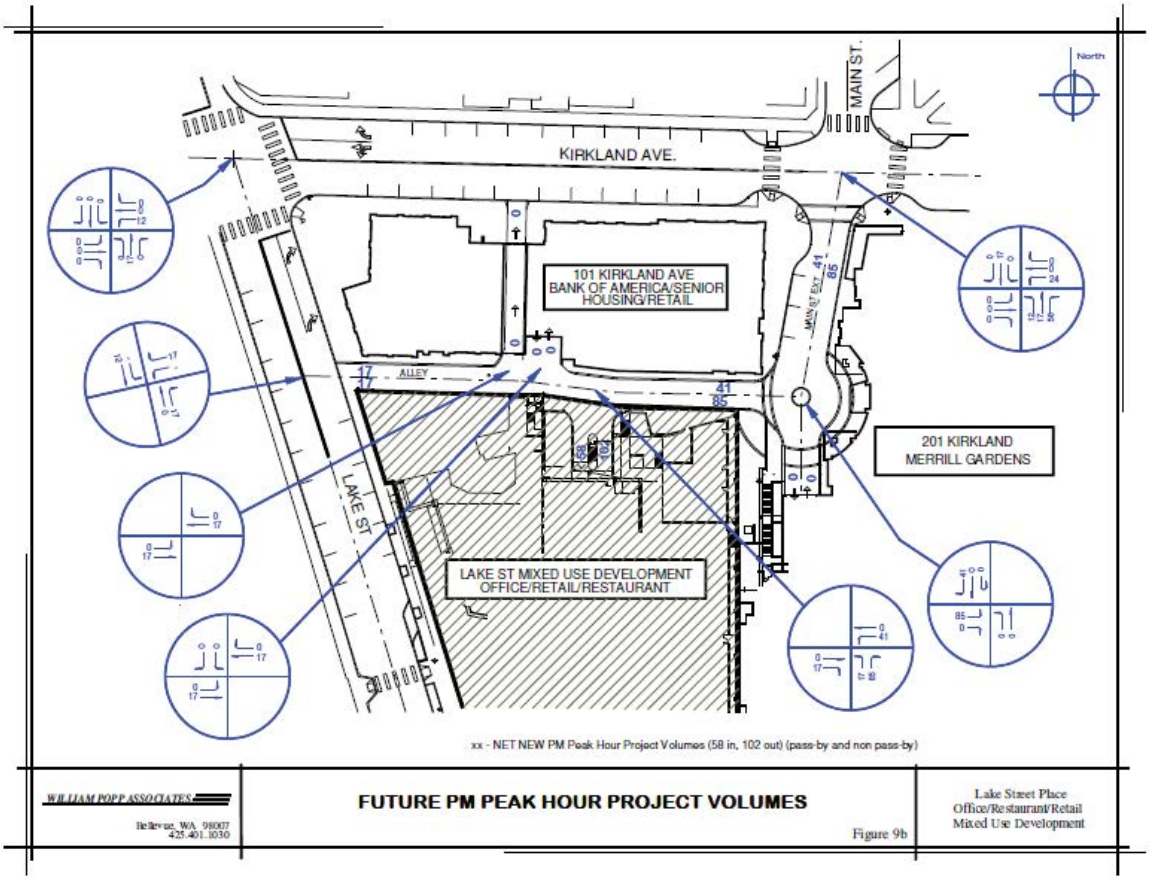
Trip Distribution
The city-wide trip distribution was determined by using the Bellevue-Kirkland-Redmond (BKR) traffic model. Manual adjustment of the traffic assignment was done at the local level (for the Alley that will provide access to the project site) based on counts of existing traffic in the vicinity of the Alley. The existing Alley provides two-way East-West traffic flow. Because of the existing westbound and southbound left-turn restrictions at the Lake Street/Alley intersection, approximately 95% of the project trips would access the proposed (phase II) project garage via Main Street and the other 5% via Lake Street.

Traffic Concurrency
The full build out (Phase I & II) of the proposed project was tested for traffic concurrency and passed. A concurrency test notice of approval, valid for one year, was issued on August 20, 2013. If a complete building permit is not submitted or a development permit is not issued by August 20, 2014 then the applicant may request an one-year extension prior to the expiration of the concurrency test notice or resubmit for traffic concurrency testing.

Traffic Concurrency Appeal
The concurrency test notice may be appealed by the public or by an agency with jurisdiction. The concurrency test notice is subject to an appeal until the SEPA review process is complete and the appeal deadline has passed. Concurrency appeals are heard before the Hearing Examiner along with any applicable SEPA appeal. For more information, refer to the Kirkland Municipal Code, Title 25.

Traffic Impacts
The traffic report was completed following the City of Kirkland TIA guidelines. As described above, project general traffic distribution and assignment were forecasted using the City's BKR Traffic Model with refinement at the local level as shown in Figure 1 below. The traffic impacts discussed in this memo are based on the full build-out of the proposed project that includes both Phase I and II.

Figure 1. PM Peak Project Traffic Distribution



The City's Traffic Impact Analysis Guidelines (TIAG) requires a level of service (LOS) analysis using the Highway Capacity Manual Operational Method for intersections that have a proportionate share greater than 1% as calculated using the method in the TIAG. Based on the proportionate share calculation for the full build-out of the proposed project, the following ten (10) intersections met the 1% proportionate share threshold and were further analyzed for level of service, operation and safety for both AM and PM peak hours (the proportional share results are shown on page 38 of the TIA report dated September 24, 2013 completed by William Popp & Associates):

1) State Street/NE 68th Street
2) 108th Avenue NE/NE 68th Street
3) Lake Street/Kirkland Avenue
4) NE 85th Street/114th Avenue NE
5) Kirkland Avenue/3rd Street
6) Kirkland Avenue/6th Street
7) Lake Street/Alley
8) Project Driveway/Alley
9) Main Street/Alley
10) Main Street/Kirkland Avenue

Mitigation Threshold

The City requires developers to mitigate traffic impacts when one of the following two conditions is met:

1. An intersection level of service is at E and the project has a proportional share of 15% or more at the intersection.
2. An intersection level of service is at F and the project has a proportional share of 5% or more at the intersection.

Of the ten intersections analyzed with full build-out of the proposed project, only the intersection of Kirkland Avenue/3rd Street was calculated to have more than 5% but less than 15% proportional impact. This intersection is calculated to operate at LOS-D or better for both AM and PM peak hours. Since neither condition above was met, mitigation is not required.

The intersections of Lake Street/Kirkland Avenue and Kirkland Way/6th Street South are forecasted to operate at LOS-F in 2016 and 2018 with the full build-out of the proposed project. However, the proposed project has less than 5% of proportional impact at those two intersections thus, a need for traffic mitigation is not triggered. Furthermore, with the development of the Google Phase II project in 2018, the intersection of Kirkland Way/6th Street South will be signalized. With signalization, the intersection of Kirkland Way/6th Street South is calculated to operate at LOS-B.

All other intersections analyzed are calculated to operate at LOS-D or better in 2018. Thus, off-site traffic mitigation to improve level of service is not warranted for those intersections.

Since build-out of Phase I will have less impact than the build-out of the entire proposed project and the full build-out condition will not trigger level of service mitigation, then level of service mitigation for Phase I will not be triggered.

Complete Build-out in 2016

The applicant indicated that the project may be constructed in one phase and be completed in 2016. A level of service analysis was completed for this scenario. Based on the analysis, the LOS remains the same as the 2018 built-out condition and for the same reasons discussed above, specific off-site traffic mitigation is not required.

In summary, no mitigation is required for any of the impacted intersections based on City's level of service mitigation thresholds. However, there are other mitigation requirements based on other operational factors as discussed in the rest of this memo.

Alley Design History

During our review of the alley between Main Street and Lake Street, Public Works Engineering recommended that future developments along the alley should have their driveway connected to the alley and to prohibit driveway access onto Lake Street and Kirkland Avenue. Staff also recommended that the alley have a minimum 4-foot wide sidewalk because of the pedestrian use of the alley by the patrons from the completed Bank of America and Merrill Gardens development projects. Per Kirkland Zoning Code Chapter

110 and Kirkland Public Works Pre-approved plans, a standard alley is typically paved 12 feet wide and has no sidewalk. Staff realized that a standard alley width was too narrow to accommodate the vehicular traffic and pedestrian use from Merrill Gardens, Bank of America, and the Mcleod property. Therefore, it was decided that the alley should be widened to a minimum of 22 feet in width to provide 18 foot drive aisle and a 4 foot wide sidewalk to accommodate future vehicular and pedestrian use. The modified alley provides the following:

- Direct pedestrian access to Lake Street from Main Street
- Two-way traffic and possibly one-way in the future when traffic volumes warrant it.
- Minimize cut-through traffic.
- Minimize speed.
- Minimize impacts to the traffic flow on Lake Street.

Alley Intersection Operation and Impacts

This section discusses traffic impacts along the Alley and on Main Street, the benefits of converting part of the Alley from two-way traffic flow to one-way westbound, the queues at the Main Street/Alley and Lake Street/Alley intersections for the one-way and two-way Alley scenarios and possible mitigations.

The alley standard width can be as narrow as 12 feet to minimize cut-through traffic and to slow traffic. With the Bank of America development the Alley was widened to 18 feet to provide two-way traffic while keeping the functions and characteristics of an alley. The rolled curb is designed to allow for the occasional opposing vehicle traffic to able to use the sidewalk to by-pass each other. This works well with low volumes of traffic. However, there are no designated truck loading areas nearby to serve developments along the Alley and Main Street so trucks are parking on the sidewalk in the Alley while load/unloading. This restricts two-way traffic flow and creates conflicts between on-coming traffic and impacts pedestrian use of the sidewalk. Public comments indicate that drivers heading eastbound on the Alley are not stopping as they approach Main Street. These traffic issues will worsen with additional traffic from the proposed development.

The analysis of traffic delay and queuing at the Lake Street/Alley intersection was completed using Highway Capacity Manual methodology initially then substantiated with a simulation analysis and verified with queue and delay data at a near-by intersection. Queue and delay data was not collected at the Lake Street/Alley itself because current volume is too low to produce meaningful results that would help provide a meaningful evaluation of future conditions.

Conditions with two-way traffic in the Alley

Existing traffic counts show there are three westbound trips exiting the Alley onto Lake Street during the PM peak hour. The traffic analysis forecasts 20 PM peak hour trips exiting the Alley onto Lake Street in the future with the build-out of the Lake Street Place development. Using the Highway Capacity Manual methodology (HCM), the Lake Street/Alley intersection is forecasted to operate at LOS-B with average queue of less than one vehicle.

“Saturated” conditions exist when the traffic demand is at or beyond the intersection capacity that can be served; in this case, the maximum that the traffic signal at Lake

Street/Kirkland Avenue can serve the approaching traffic volume before significant queuing and delay are experienced. Currently, Lake Street operates in saturated conditions in the PM peak hour with stop-and-go traffic and this will continue to be the condition at the time of development. Northbound queuing on Lake Street often extends past 2nd Avenue South. The HCM methodology cannot accurately account for the stop-and-go condition that occurs when an intersection is in a saturated condition.

To analyze the saturated conditions, the traffic consultant further analyzed the Lake Street/Alley intersection using a traffic simulation model (SimTraffic) to determine delay and queuing. The analysis assumed the Lake Street/Alley intersection is controlled with **STOP sign** for the westbound traffic from the Alley. The SimTraffic calculations assumed that Alley traffic can enter Lake Street only when there is no queue on Lake Street blocking the Alley and there is adequate space between cars on Lake Street to allow traffic from the Alley to enter. With those assumptions, SimTraffic indicates that the Lake Street/Alley intersection would operate at LOS-F with significant delay and queues greater than four vehicles. The calculated result is worse than what staff has observed at other nearby intersections with similar conditions because SimTraffic does not use courtesy “wave-in” in its calculations.

Staff has observed that during saturated congested condition with stop-and-go traffic side street traffic is often given a courtesy “wave-in” by drivers on Lake Street. This condition was also observed by the traffic consultant. Staff also observed that drivers on Lake Street are less likely to give a courtesy “wave-in” when traffic is continuously flowing than when traffic is in a stop-and-go condition. Thus, vehicle delays from the side street were shorter during stop-and-go conditions then when traffic was continuously flowing. This type of traffic flow is more similar to the side street traffic having a **Yield sign** condition than a **STOP sign** condition.

Therefore, to determine the estimated real-life queuing and delay conditions, staff reviewed collected queue and delay data (provided in Attachment B) at the intersection of Lake Street/2nd Avenue South. Staff chose this location because it is closest to the Alley and it has side street traffic volume (61 vehicles per hour, vph) that is more than what is anticipated for the Alley (20 vph). Furthermore, just like the Alley, the operation at this intersection is also impacted by the operation of the traffic signal cycle at Lake Street/Kirkland Avenue.

Based on the data collected, the average queue length for 2nd Avenue South was one vehicle and the maximum queue was three (the maximum queue was observed only once during the PM peak hour). The average vehicle delay for the right-turn from the side street is approximately 6 seconds which equates to a LOS-A.

The forecasted traffic volumes exiting onto Lake Street from the Alley is less than current volumes exiting 2nd Avenue South. Therefore, it is anticipated that the Lake Street/Alley will operate at LOS-A and with a maximum queue of two vehicle or less.

One-way Traffic in the Alley

Although it is forecasted that the Lake Street/Alley intersection could operate well with minimal queuing with two-way traffic flow as discussed above, there are other traffic impacts that exist with the Alley being two-way. This section discusses potential one-way Alley operation.

Because the existing C-curb on Lake Street restricts traffic from turning left into and out of the Alley, the majority of traffic from the project site will use Main Street. Neighboring residents and pedestrians that use Main Street are concerned about the Main Street/Alley intersection being congested and that two-way traffic on the Alley impacts pedestrian safety along the Alley. In response, staff requested the traffic consultant to analyze the Alley under one-way westbound operation to determine if a one-way alley could work without creating significant queue that would impact the 101 Kirkland building's driveways.

A one-way westbound Alley will eliminate the pedestrian impacts from two-way operation on a narrow alley; it also lessen the congestion at the Main Street/Alley intersection by diverting exiting traffic from the 101 Kirkland building and the proposed project to exit onto Lake Street instead of Main Street.

If the entire length of the Alley is one-way westbound, approximately 112 additional PM peak trips that are forecasted to exit to Main Street will exit onto Lake Street instead, thus increasing the westbound volumes at Lake Street to 132 trips (112 + 20). The traffic consultant ran a traffic simulation for a one-way Alley with **Yield sign** control for the westbound Alley traffic to closely replicate the "wave-in" condition as discussed earlier. The result indicates the intersection would operate at LOS-C with an average queue length of approximately two vehicles. The result is based on uniform arrival rate.

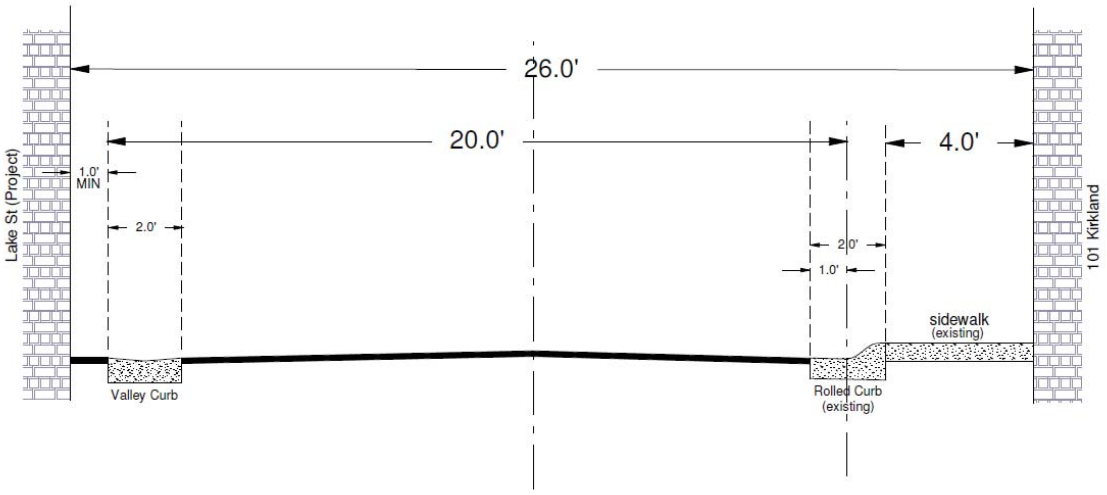
One-way and Two-way Alley Design

To minimize the queue in the Alley at Lake Street, it is best to provide two-way traffic flow to and from the project driveway and Main Street. At the same time, traffic flow between the project driveway and Lake Street can be limited to one-way westbound. The one-way traffic flow to Lake Street will mitigate the following conditions:

- The section between the project driveway and Lake Street is narrow 18 feet wide between the building and the curb) this is too narrow for two-way traffic without driving onto the sidewalk and conflicting with pedestrians.
- There is no additional right-of-way to widen the Alley for two-way traffic.
- As shown on Figure 20 in the traffic report, the Alley has an acute angle to Lake Street with reduced safe sight distance that doesn't allow passenger vehicles and trucks to turn into the Alley from Lake Street without either conflicting with exiting vehicles and/or hitting the 101 Kirkland building, respectively.

However, with the section of the alley east of the project driveway being two-way and with the increase traffic from the proposed project, it should be widen to provide for a 20 foot driving lane, a rolled curb on the north side, a valley curb on the south side and a 4-foot sidewalk on the north side as shown in Figure 2. This will accommodate the pedestrian use of the sidewalk and the increase amount of traffic due to the proposed development without creating pedestrian-vehicle conflicts.

Figure 2. Alley X-section East of Project Driveway



ALLEY CROSS SECTION (OPTION1A)
VALLEY GUTTER (CK-R.17B) -- SOUTH SIDE
Looking West from Main St

Main Street and the Alley

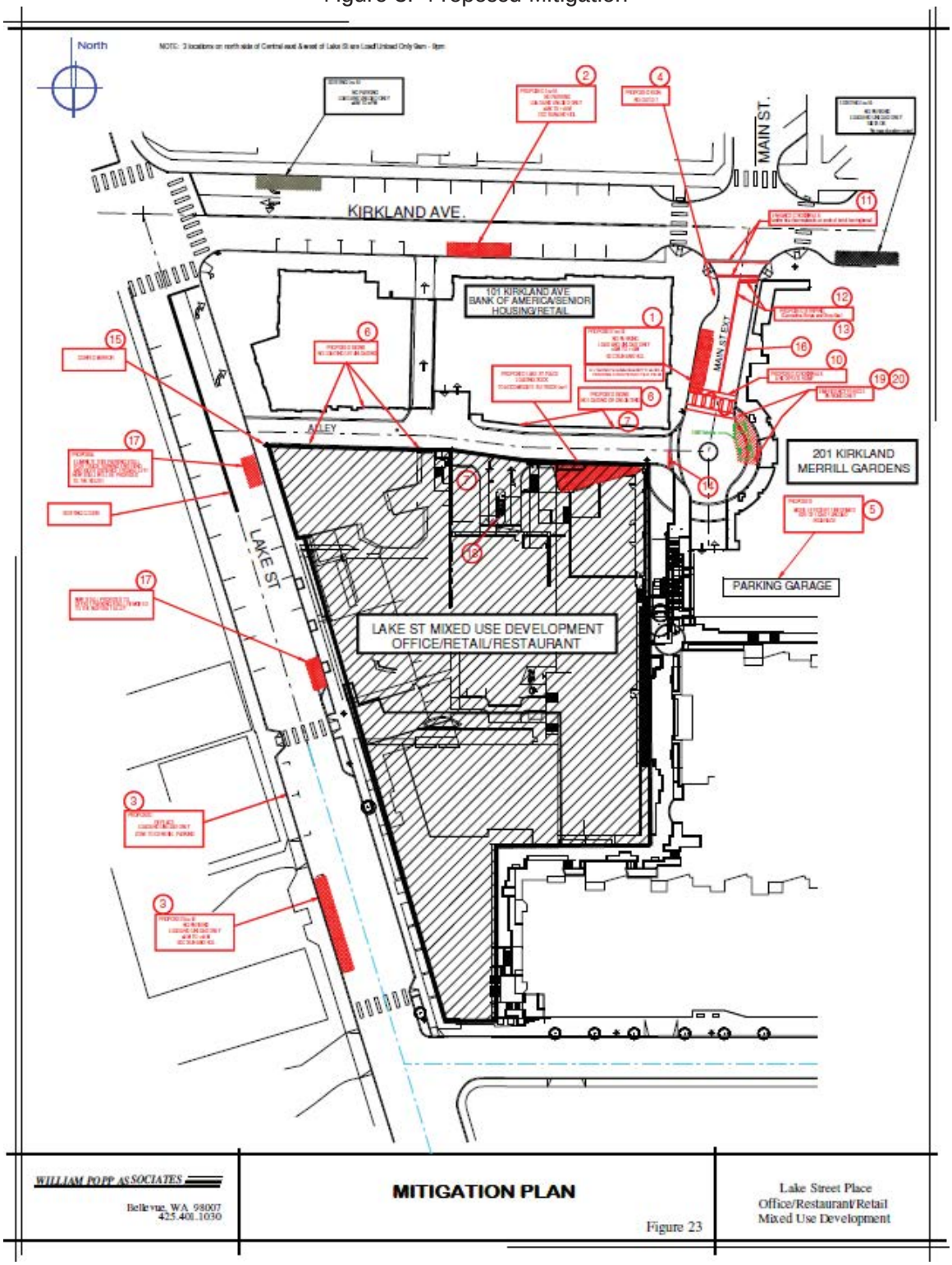
The Main Street/Alley intersection is a 3-way intersection. This intersection has light volume, rarely operates in a saturated congested condition and is calculated to operate at LOS-A. The main traffic flow movements at this intersection are southbound right-turn and eastbound left-turn. The greatest total traffic volume occurs during the PM Peak hour. With the proposed development, it is forecasted that there would 98 southbound right-turns and 112 eastbound left-turns. It is calculated that the intersection will operate at LOS-B for both the AM and PM peak hours.

However, there is a fair amount of pedestrian and truck traffic at or near the intersection on a regular basis. For a short period in the morning the combination of delivery trucks, occasional moving vans, taxis, and garbage trucks can make the intersection congested. At these times the intersection can feel unsafe to pedestrians. The proposed development will add more trips and truck traffic through this intersection.

Applicant's Proposed Mitigation

According to the traffic consultant, representatives from the 101 Kirkland building, Merrill Gardens and the applicant have met to discuss mitigating options for the current conditions. Based on what staff understands to be their mutual agreement, the applicant is proposing several mitigating measures to address the public concerns and impacts as described above. Figure 3 illustrates (also shown in the traffic impact analysis report as Figure 23) the list of the mitigation measures proposed by the applicant.

Figure 3. Proposed Mitigation



Truck Load/Unload Management

1. Convert the two parking stalls on the west side of Main St between Kirkland Ave and the alley to a load/unload zone.
2. Convert the two on-street parking stalls on Kirkland Ave south side immediately east of the Bank of America drive through to a 40' load/unload zone 24-hour duration, except Sundays and holidays.
3. Move the short load/unload zone on the west side of Lake St near the south end of the site to a longer curb-front in front of the Anthony's Home Port.
4. Install a "No Outlet" sign in SW corner of the Kirkland Ave/Main St intersection, south leg facing north. The intent of this sign would be to reduce U-turn activity in the traffic circle that does not stop.
5. Make more efficient use of the load/unload parking area within the 201 Merrill Gardens garage. This will be the responsibility of 201 MG to communicate with tenants and delivery vehicles for acceptable parking locations.
6. Add signage along the alley to note "NO LOADING or UNLOADING". Current signage along the alley on the north side (attached to the 101 Kirkland building) includes several "No Parking" signs that are expected to remain.
7. Coordinate with Waste Management for preferred pickup times to minimize alley traffic disruption. Pickup times would preferably be before 7 am on weekdays.
8. Work with the City of Kirkland to enforce these loading areas in the normal course of monitoring on-street parking.
9. Establish a mutual loading management plan (or program) among the owners/property managers of the buildings with frontage on the alley and Main Street to:
a. Self-monitor compliance with City of Kirkland loading restrictions,
b. Manage the loading activities of each of their own buildings to minimize conflicts with through traffic, and
c. Regularly meet and/or communicate with each other to discuss and resolve any unanticipated loading/unloading problems.

Traffic Calming/Safety Measures

10. Install a raised pedestrian crosswalk speed hump on Main St north of the traffic circle to provide pedestrian access to and from 201 Merrill Gardens to Lake St and to control speeds on Main St in this area.
11. Install 10" thermoplastic crosswalk bars on both sides of the brick paver crosswalk on the south leg of the Kirkland Ave/Main St intersection.
12. Install an 18" thermoplastic stop bar for the northbound approach at the Kirkland Ave/Main St intersection.
13. Install a 4" yellow solid centerline stripe on Main St from Kirkland Ave south to the proposed raised crosswalk north of the alley.
14. Install an 18" thermoplastic stop bar at the east end of the alley for the eastbound approach at Main St and new stop sign on metal post.
15. Install and maintain a convex mirror on the Hector's building to enhance visibility around corner for pedestrians and vehicles exiting the alley.
16. Eliminate any parking zones including the U.S. Mail curb-front on the east side of Main St between the traffic circle and Kirkland Ave.

17. Eliminate the first parking stall on the east side of Lake St just south of the alley to provide a more comfortable radius for large vehicles turning into the alley, which will also allow for better sight distance for vehicles exiting the alley looking south. A new stall will be provided mid-block just north of crosswalk.
18. Install the parking gate and ticket dispenser for vehicles entering the garage such that the storage distance between the ticket dispenser and the alley can accommodate two vehicles to minimize queue spill back into the alley.

Emergency Vehicles

19. Provide an emergency vehicle parking near the north end of the plaza area in front of 201 Merrill Gardens. Location shall be set back as to not block any northbound vehicle movement on Main St. Mutual property owner coordination (101 Kirkland, 201 MG, and Lake Street Place) and City of Kirkland Fire Department to communicate ideal parking locations to minimize disruptions to general traffic activity.
20. Sign the preferred location "NO PARKING EXCEPT EMERGENCY VEHICLES" to provide dedicated space for EMS, Police and Fire vehicles.

Staff Assessment of the Applicant's Proposed Mitigation

Of the mitigation proposed staff agrees with all mitigations except for mitigations 2, 3, 4, 10, 16, 19, and 20 for the reasons provided following:

The proposed mitigation 2 and 3 will reduce the on-street parking supply and impact adjacent businesses. Removal of on-street parking will require a public approval process and agreement from adjacent businesses. Based on existing policy on-street parking in the downtown area should be maximized. Furthermore, staff believes mitigation 1 and the proposed loading dock is sufficient to lessen the impacts of truck delivery. However, interested parties are welcome to pursue adding more loading zones on Lake Street and Kirkland Avenue by contacting the Public Works department outside of this SEPA development review.

The proposed mitigation 4 is not an effective mitigation to enforce drivers to stop at the cul-de-sac. The "No Outlet" sign will misdirect driver since there is an outlet and it would also negatively impact the use of the public parking stalls within the Merrill Garden parking lot. Staff has not received any data to conclude that a "No Outlet" sign is warranted.

With the current design of the sidewalk and roadway, the proposed mitigation 10 has a negative impact to ADA (American Disability Act) accessibility requirements. The cul-de-sac was designed to comply with ADA requirements and allow crossing without ramps. The sidewalks on both sides are currently flush with the street at the crossing location. Installing a raised crosswalk would require the sidewalks to be raised and then ramped back down. Pavement striping meeting the City's sidewalk design standard would be just as effective in providing a visible crosswalk.

The proposed mitigation 16 to remove the US Mail on-street parking space impacts mail delivery. Mail delivery occurs only once for a short period of time during the mid-day when traffic is light. Therefore, it has little impact to the cul-de-sac. Staff will support the removal of the current US Mail loading zone if the applicant, the postal office, the Merrill Garden and 101 Kirkland building managements are in agreement and if the new location does not impact public parking or traffic operation.

The proposed mitigation 19 and 20 are not necessary in its entirety. Items 5 and 6 below can be as effective as the proposed mitigations.

In addition, staff believes the following mitigation measures are necessary to mitigate the pedestrian/vehicle congestion and conflicts in the alley:

1. Widen the alley to 26 feet (20 foot drive aisle, 2-foot rolled curb and 4 foot sidewalk) between the project driveway and Main Street to provide adequate width for opposing vehicles to travel without the need to drive on the sidewalk. This will minimize the effects of putting all exiting traffic onto the congested Lake Street.
2. Convert the Alley to one-way westbound between the project driveway and Lake Street. The one-way operation will reduce the conflicts between vehicles and pedestrians and eliminate conflicts between opposing traffic.
3. To maintain slow vehicle speed in the Alley, a speed hump should be installed in the Alley east of the proposed project driveway.
4. The curb along the Alley should be painted red and the existing "NO PARKING" signs should be replaced by "NO STOPPING" signs.
5. Three additional "No Parking" signs should be installed in front of Merrill Gardens and Merrill Garden management should notify its venders to use the appropriated loading area within their garage to minimize impacts to pedestrians and traffic flow on Main Street and the Alley. These proposed mitigating measures will improve traffic safety along the Alley and at the Main Street intersection.
6. Mutual property owner coordination (101 Kirkland, 201 MG, and Lake Street Place) and City of Kirkland Fire Department to communicate ideal parking locations to minimize disruptions to general traffic activity.

Driveway Operation

The second phase of development will include a parking garage with direct access to the Alley.

Based on the traffic impact analysis report, the level of service at the 101 Kirkland garage driveway and Project's driveway are calculated to operate at LOS-A. Thus, no mitigation is proposed. The proposed Lake Street Place parking garage is proposed to be gated with a toll booth manned by an attendant. The gate and booth is proposed to be located at approximately 41 feet from the driveway edge. This allows for a queue for two vehicles.

A queuing analysis was completed at the toll both to determine queue length for entering traffic. Data was collected from a parking garage in downtown Bellevue that has a toll both similar to the one to be installed in the new parking garage. The average and the 95th percentile queue length for entering traffic are approximately one and two vehicles, respectively during both AM and PM peak hours. The average and the maximum 95th percentile queue length for exiting traffic are approximately one and three vehicles, respectively during the PM peak hour. There is very little traffic exiting during the AM peak hour so the queue is negligible. Based on the queuing analysis results, the booth should be located 41 feet from the edge of the Alley (bottom of the rolled curb) to provide sufficient queue capacity to accommodate the project traffic without impacting the Alley.

The turning radius analysis indicates that there will be a conflict between on-coming traffic in the Alley whenever two opposing vehicles attempt to enter and exit the parking garage driveway at the same time. Staff believes the occurrence will be rare and there is sufficiently sight distance for drivers to yield to one another.

Loading Dock and Garbage Truck Operation

For the second phase of development, the proposed building will have a loading dock for smaller delivery trucks (type SU-30 or smaller). The SU-30 type truck can park in the loading dock without encroaching into the Alley travel way. Larger trucks are anticipated to continue to deliver from loading zones on Lake Street and Kirkland Avenue. The loading dock will face east and be located approximately 50 feet west of Main Street. Trucks will enter from Kirkland Avenue, continue down Main Street pass the Alley and back into the loading dock as shown on Figure 20 of the traffic report. This maneuver requires that there are no other vehicles within or parked near the Merrill Garden garage and the Merrill Garden main entrance. It is estimated that there will be approximately six delivery trucks per day with the majority of the deliveries occurring before 10 A.M. Staff believes that the proposed loading dock can work safely if the delivery trucks are limited to a SU-30 size and with the applicant has proposed list of mitigations, the vehicles are prevented from parking along the Alley and on Main Street near the Merrill Garden garage.

The project garbage dumpsters will be located west of the parking garage driveway away from Main Street. This will remove traffic conflicts with the loading dock and lessen conflicts at Main Street.

Traffic Safety

Three-years (2009 to 2012) of traffic crash data was reviewed for the streets surrounding the site. There have been few crashes on Lake Street and on Kirkland Avenue. On average, there were less than two collisions per year on Lake Street near the Alley and at the intersection of Lake Street/Kirkland Avenue. The year with the most collisions at the intersection of Lake Street/Kirkland Avenue was 2011; since then, collisions have decreased. The majority of collisions were rear-end collisions caused by drivers following too close and inattentiveness. According to the collision reports, there were no traffic crashes in the Alley or on Main Street south of Kirkland Avenue. The project driveway will be designed to meet the safe sight distance requirements.

There has not been any documented vehicle-vehicle or vehicle-pedestrian accidents at the Alley/Lake Street intersection. The traffic analysis recommends installing a convex mirror for westbound traffic from the Alley to Lake Street and removing one parking space on Lake Street closest to the Alley to improve visibility between exiting vehicles and pedestrians. Staff agrees that the parking space on Lake Street closest to the Alley should be removed and a convex mirror or other pedestrian warning system approved by the City should be installed on the applicant's property to enhance traffic safety at the Lake Street/Alley intersection. The warning system and its location shall be provided to the City for review and approval through the building permit process. In addition, a pavement stop bar should be painted to keep vehicles from obstructing the sidewalk. A "DO NOT ENTER" and One-Way signs in compliance with the MUTCD (Manual on Uniform Traffic Control Design) should also be installed to restrict drivers from turning into the Alley from Lake Street.

Parking
Based on the City's parking code, the Phase I and the full build-out of the proposed development will need 84 and 260 parking spaces, respectively. The four existing public parking stalls adjacent to the site at the end of the cul-de-sac shall remain. If they are eliminated with the proposed project, then they will need to be replaced elsewhere in the parking garage and be accessible to the public at all times. The final number of required parking stalls should be verified with the building permit review for the project.

Transportation Management Program (TMP)
The reduced road impact fee rate for downtown Kirkland was developed in recognition of the reduce trip generation due to complimentary mixed use developments and the proximity to the transit center. The City supports sustainable mixed-use development and car/trip reduction through parking management and the use of alternative transportation modes. The success of trip reduction and thus reduced parking depends on the continual management of parking and promotion of multi-modal transportation.

To ensure the sustainability of the parking demand and minimizing parking and vehicle impacts, the site would be manage through a Transportation Management Plan (TMP). A TMP will be required for the project site prior to occupancy. The TMP shall be recorded with the property. The TMP shall consist of the following:

1. Provide a Building Transportation Coordinator (BTC) to be responsible for managing the TMP and be a point of contact with the City or its agent. The BTC should be located on site and be available to the building tenants and be part of the building management staff. The BTC shall work with the City or its agent to have at least one promotional event per year to promote alternative transportation. The BTC is required to attend TMP meetings organized by the City or its agent. The BTC is responsible for notifying the tenants and its employees about the TMP program and incentives.
2. Provide a centrally located commuter Information Center (CIC) in a prominent location such as the lobby of the building. The CIC must provide and display rideshare, transit service information. The preferred location shall be approved by the City or its agent prior to occupancy.
3. The applicant shall designate 10% of the parking as preferential parking for high-occupancy vehicles such as carpool and vanpool. These stalls shall be signed and located closest to the building main entrance and/or elevator.
4. Incentives for carpool/vanpool- monthly parking for carpool and vanpool shall be discounted by 25% for a 2-person carpool and 50% for a 3+ person carpool and vanpool.
5. Transit Subsidy- A peak hour two-zone transit subsidy of 50% shall be offered to all employees.
6. All employees within the buildings shall be notified about the TMP program.
7. Provide bicycle racks per City's code requirement.
8. Two shower stalls shall be provided for men and women separately to support commuters using alternative transportation.
9. Provide 14 lockers for cyclist within a secured building location accessible by cyclists for each building.

10. Provide a Guaranteed Ride Home program for (occupants/employees) who use a commute mode other than driving alone. This program will ensure that a ride home is available if a personal emergency arises. At the minimum each occupants/employees shall be eligible for three guaranteed ride home annually.

Road Impact Fees

Per City's Ordinance 3685, Transportation Impact Fees is required for all developments. Road impact fees are used to construct transportation improvements throughout the City. Table 2 summarizes the road impact fee calculation.

Table 2. Road Impact Fee Summary

	Retail	Quality Restaurant	High-Turnover Restaurant	Office	Total
Fee Rate (per square foot)	$1.15	$7.42	$9.29	$2.43	
Phase I square footages	0	+2,114	0	+14,069	
Phase I Impact Fees		***$15,685.88***		***$34,187.67***	***$49,873.55***
Phase II square footages	+15,349	+5,479	0	+44,803	
Phase II Impact Fees	***$17,651.35***	***$40,654.18***		***$108,871.29***	***$167,176.53***
Total					**$217,050.08**
Existing Use Demoed	(-2,522)	(-7,102)	(1,667)	(-128)	
Existing Use Credit	(-$11,651.64)	(-$52,696.84)	(-$15,486.43)	(-$43.74)	(-$79,878.65)
Net New Impact Fee					**$137,171.43**

The final impact fee shall be determined at building permit acceptance.

Staff Recommendations

Public Works Staff concludes that the proposed project will not create significant traffic impacts at affected off-site intersections that would require specific off-site traffic mitigation. Staff recommends approval of the proposed project with the conditions listed below. If the project is not phased and instead constructed all at once, all of the conditions listed below would still be required for the project prior to occupancy.

Phase I:

1. Pay Road Impact Fees.
2. Provide the minimum code required parking spaces.
3. Install a speed hump in the Alley east of the proposed Lake Street Place garage driveway.
4. Paint the curb yellow and sign the two on-street parking spaces on the west side of Main Street as a 30-minute loading area for delivery vehicles between the hours of 6 a.m. and 7 p.m.
5. Paint a pedestrian crossing on the north leg of the Main Street cul-de-sac per the City of Kirkland Pre-Approved Plans.
6. Install a convex mirror within the project site or other pedestrian warning system for vehicle exiting the alley onto Lake Street. The mirror or warning system design and location must be submitted to the City for final approval and maintained by the building owner.
7. Paint a stop bar in the Alley at the approach to Lake Street per the City of Kirkland Pre-Approved Plans.
8. Paint the rolled-curb red along the Alley to eliminate vehicle parking.

9. Install “NO STOPPING” signs, MUTCD R8-5, on both sides of the Alley to restrict vehicles from loading and unloading on the Alley. Add signage along the alley to note “NO LOADING or UNLOADING”.
10. Convert the Alley to a one-way westbound between the 101 Kirkland Garage driveway and Lake Street.
11. Widen the alley from the project driveway to Main Street for a 20 foot driving lane, a rolled curb on the north side, a valley curb on the south side and a 4-foot sidewalk on the north side.
12. Install “DO NOT ENTER” sign, MUTCD R5-1, and One-Way signs, MUTCD R6-2, for Lake Street traffic approaching the Alley.
13. Work with the City of Kirkland to enforce these loading areas in the normal course of monitoring on-street parking.
14. Install 10” thermoplastic crosswalk bars on both sides of the brick paver crosswalk on the south leg of the Kirkland Ave/Main St intersection.
15. Install an 18” thermoplastic stop bar for the northbound approach at the Kirkland Ave/Main St intersection.
16. Install a 4” yellow solid centerline stripe on Main St from Kirkland Ave south to the proposed crosswalk north of the alley.
17. Install an 18” thermoplastic stop bar and a new stop sign on metal post at the east end of the alley for the eastbound approach at Main St.
18. Eliminate the first parking stall on the east side of Lake Street just south of the Alley.
19. Reconstruct the project site frontage on Lake Street to provide a new parking stall mid-block just north of the existing crosswalk.

Phase II:

1. Pay Road Impact Fees.
2. Implement the TMP as described in Attachment A of this memo. The TMP shall be approved by the City and recorded with King County prior to occupancy of Phase II building.
3. Provide the minimum code required parking spaces.
4. The property owner must notify its vendors and tenants that all delivery trucks that will use the loading dock must be limited to a size of a SU-30 or smaller.
5. Locate the entry parking gate a minimum of 41 feet between the gate and the driveway edge to allow for a two-vehicle queue at the parking garage entrance.
6. The four existing public parking spaces adjacent to the site east property line should be allowed to remain. If the applicant wants to vacate those parking spaces then the stalls shall be relocated within the parking garage and outside of the garage gate so that they are accessible to the public at all times.

Additional Voluntary Recommended Mitigations:

1. Install three additional “NO PARKING” signs or 10-Minutes Passenger Load/Unload signs on existing bollards and paint the curb red per City’s standard, to restrict parking in front of the Merrill Garden building.
2. Make more efficient use of the load/unload parking area within the 201 Merrill Gardens garage. This will be the responsibility of 201 MG to communicate with tenants and delivery vehicles for acceptable parking locations.

3. Establish a mutual loading management plan (or program) among the owners/property managers of the buildings with frontage on the alley and Main Street to:
    a. Self-monitor compliance with City of Kirkland loading restrictions,
    b. Manage the loading activities of each of their own buildings to minimize conflicts with through traffic, and
    c. Regularly meet and/or communicate with each other to discuss and resolve any unanticipated loading/unloading problems.
4. Mutual property owner coordination (101 Kirkland, 201 MG, and Lake Street Place) and City of Kirkland Fire Department to communicate ideal parking locations to minimize disruptions to general traffic activity.
5. Coordinate with Waste Management for preferred pickup times to minimize alley traffic disruption. Pickup times would preferably be before 7 am on weekdays.

All signs installed must meet the City of Kirkland and MUTCD standards.

cc: Rob Jammerman, Development Engineer Manager
File- Energov

ATTACHMENT A

CITY OF KIRKLAND
TRANSPORTATION MANAGEMENT PLAN
FOR : **Lake Street Place ("Project")**
File No. SEP 13-00959:

This Transportation Management Plan (TMP) is entered into by and between [insert entity name] and the City of Kirkland. This TMP has been developed to provide for the transit and ridesharing needs for the (occupants/employees) of the above mentioned Project. The purpose of the TMP is to reduce the number of single-occupant vehicle trips generated by the subject property and to assist in mitigating the traffic impacts of the project on streets in the project vicinity. A legal description of the subject property is attached hereto as Exhibit A.

Definitions:

For the purpose of this TMP, the following words, acronyms or phrases, when used within this document shall have the following meanings:
BTC – means Building Transportation Coordinator and is generally an employee of the building owner or the property manager.
TC – means Transportation Coordinator and is a liaison on site (one representative for each of the companies within a site in the case of a multiple tenant office building), within a TMP conditioned building(s). Each coordinator is identified to represents their respective company for the purposes of survey, promotions and assisting their employees with commuting issues.
Drive-alone – means employee that drive alone to work.

TMP Goals

The goal of this TMP shall be to reduce by 10% the number of drive-alone trips by employees of tenants to the site. An initial commute trip survey shall be completed for all tenants to determine the 10% drive-along trip reduction.

TMP Elements

The following elements of this plan shall be implemented by the owner of the project. The owner or authorized agent shall coordinate with Metro and utilize their services and materials as available:

1. Through coordination with the City and/or its representative, complete a base tenant employee commuting survey within one year after building occupancy permit.

2. Initially, 10 parking stalls shall be designated and parking permits issued for preferential parking spaces for carpool and vanpool vehicles operated by employees of site tenants(the "Preferential Spaces") and will be provided in the parking garage structure in a location designated by the owner and approved by the City. The number of Preferential Spaces shall be expanded, as necessary, to a maximum total of 10% of the required parking spaces, which at the time of this TMP is 17 spaces based on the number of office parking spaces required for the new development, if there is an employee demand for such additional Preferential Spaces based on information from the biennial commute survey. The Preferential Spaces shall be signed as reserved for carpool and vanpool vehicles between the hours of 6 a.m. and 5 p.m. Monday through Friday. If the Preferential Spaces are not first occupied between 6:00 am and 10:00 a.m. Monday through Friday, the spaces may be occupied by other vehicles, however, if a permitted carpool or vanpool vehicle returns to the site after such time period, it may park in another available space. The owner will provide parking incentives for carpool/vanpool discounted by 25% for a 2-person carpool and 50% for a 3+ person carpool and vanpool if employees are charged for parking.

3. Bicycle parking spaces shall be provided at a ratio of one (1) bicycle space for each 12 required motor vehicle parking spaces, which at the time of this TMP is 22 bike parking spaces based on the number of parking spaces required for the new development. An equal amount of lockers shall be constructed for bike commuters for use on a first come, first served bases. In addition, the owner shall provide 2 men's and 2 women's shower stalls and 1 changing area for each of the two showers.

4. The owner will provide all tenants with the TMP requirements. Each tenant will assign a representative to act as transportation coordinator (TC) and liaison between the owner or property manager and the tenant's employees. Each tenant TC will inform their employees regarding commuter-related information and be available for survey assistance during biennial survey weeks. The survey will be provided by the City and/or its representative.

5. The owner will encourage all tenants to provide a Guaranteed Ride Home Program for their employees who use a commuter mode other than driving alone. This program is intended to ensure that a ride home is available if a personal emergency arises and should include three guaranteed rides home annually for emergencies for each tenant employee. For tenants with 12 or more employees, the owner shall ensure that a Guaranteed Ride Home program is available to all employees of such tenant.

6. The owner will encourage all tenants to make available a monthly subsidy to employees equal to half the cost of a two zone Orca transit pass or equivalent transit pass for each tenant employee who wishes to use public transit. For tenants with 12 or more employees, the owner will be responsible for, or shall cause the tenant to make available, a monthly subsidy to each tenant employee equal to half the cost of two zone Orca transit pass or an equivalent transit pass for each tenant employee who wishes to use public transit.

7. The owner will provide and install a commuter information center (CIC) in a highly visible, accessible area in the building lobby or other location approved by the City.

8. Upon receiving the Certificate of Occupancy for the Project, a permanent Building Transportation Coordinator (BTC) shall be appointed for the entire building. The BTC will coordinate and administer the owner's TMP responsibilities, and shall receive sufficient support and direction from management to carry out these responsibilities effectively. The name, phone number and fax number of the building BTC shall be forwarded to the City planning department. The BTC will perform the following duties:

   Commuter Information Center (CIC): maintain and stock the center, including prominent display of building BTC name and phone number, bus transit schedules, and posting of Ridematch Bulletins and signs when made available.

   a) Commuter Information Packet: The BTC shall prepare a Commuter Benefits brochure, containing information on all commute-related amenities, programs and benefits provided by the TMP. The BTC shall distribute this, along with other commuter information deemed appropriate by the City, to each (occupant/employee). The brochure and packet contents shall be updated and distributed on an annual basis to all tenants including at time of initial tenant occupancy.

   b) Promotions: The BTC shall promote alternatives to single-occupancy-vehicle ("SOV") commuting by implementing the promotional campaigns made available by the City. The primary function of the BTC in this regard is to inform tenants and employees of contests, promotions and information about reducing SOV trips.

   c) Training/Network Group Meetings: The BTC will attend a TMP training session and at least two quarterly local network group meetings per year as made available by the city or its representative.

d) Annual Report: The BTC shall complete and submit a report form no more than one time each year at a time designated by the City, documenting TMP activities. The applicable form will be provided by the City or its agent and will be consistent with the TMP for this project.

e) Biennial Survey: Within a reasonable time after occupancy is attained, the BTC will provide tenants with an initial survey provided by the City or its agent to determine the existing amount of non-SOV commuting.

f) Guaranteed Ride Home Program: The BTC will be responsible for the owner's obligations for the program.

g) Transit Subsidy: The BTC will be responsible for administering the program and making the subsidy available to site occupants. The BTC shall coordinate with Metro to provide the subsidy through on-site pass sales or by providing reimbursement through Commuter Bonus Vouchers or other acceptable methods.

9. This TMP shall be recorded with King County as part of the covenants, conditions and restrictions of the project to assure its implementation. The TMP shall run for the duration of the current use of the building, and shall be binding on the heirs, successors and assignees of the parties.

ENTERED into this ____ day of _____, 2014.

INSERT ENTITY NAME

By: _____
Its: _____

CITY OF KIRKLAND

By: _____
Its: _____

STATE OF WASHINGTON)
) ss.
COUNTY OF KING)

On this _____ day of March, 2014, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared _____, to me known to be the _____ of **[insert entity name]**, the Washington limited liability company that executed the foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said limited liability company, for the uses and purposes therein mentioned, and on oath stated that he/she was authorized to execute the said instrument.

WITNESS my hand and official seal hereto affixed the day and year first above written.

_____
Printed name: _____
Notary Public in and for the State of
Washington, residing at

_____

My Commission Expires: _____

STATE OF WASHINGTON)
) ss.
COUNTY OF KING)

On this ___ day of March, 2014, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared _____, to me known to be the _____ of the CITY OF KIRKLAND, the Washington municipal corporation that executed the foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said municipal corporation, for the uses and purposes therein mentioned, and on oath stated that he/she was authorized to execute the said instrument.

WITNESS my hand and official seal hereto affixed the day and year first above written.

_____
Print Name: _____
Notary Public in and for the State of
Washington, residing: _____
My Commission Expires: _____

CHAPTER 50 - CENTRAL BUSINESS DISTRICT (CBD) ZONES

50.05 User Guide.

The charts in KZC 50.12 contain the basic zoning regulations that apply in the CBD 1 zones of the City. Use these charts by reading down the left hand column entitled Use. Once you locate the use in which you are interested, read across to find the regulations that apply to that use.

Section 50.10

Zone CBD-1A, 1B

Section 50.10 – GENERAL REGULATIONS
The following regulations apply to all uses in this zone unless otherwise noted:

1. Refer to Chapter 1 KZC to determine what other provisions of this code may apply to the subject property.

2. The maximum height of structure shall be measured at the midpoint of the frontage of the subject property on the abutting right-of-way, excluding First Avenue South. See KZC 50.62 for additional building height provisions.

3. The street level floor of all buildings shall be limited to one or more of the following uses: Retail; Restaurant or Tavern; Banking and Related Financial Services; Entertainment, Cultural and/or Recreational Facility; Parks; Government Facility; or Community Facility. The street level floor of buildings south of Second Avenue South may also include Office Use. The required uses shall have a minimum depth of 20 feet and an average depth of at least 30 feet (as measured from the face of the building on the abutting right-of-way, not including alleys and similar service access streets). Buildings proposed and built after April 1, 2009, and buildings that existed prior to April 1, 2009, which are at least 10 feet below the maximum height of structure, shall have a minimum depth of 10 feet and an average depth of at least 20 feet containing the required uses listed above.
   The Design Review Board (or Planning Director if not subject to D.R.) may approve a minor reduction in the depth requirements if the applicant demonstrates that the requirement is not feasible given the configuration of existing or proposed improvements and that the design of the retail frontage will maximize visual interest. Lobbies for residential, hotel, and office uses may be allowed within this space subject to applicable design guidelines.

4. Where public improvements are required by Chapter 110 KZC, sidewalks on pedestrian-oriented streets within CBD 1A and 1B shall be as follows:
   Sidewalks shall be a minimum width of 12 feet. The average width of the sidewalk along the entire frontage of the subject property abutting each pedestrian-oriented street shall be 13 feet. The sidewalk configuration shall be approved through D.R.

5. Upper story setback requirements are listed below. For purposes of the following regulations, the term "setback" shall refer to the horizontal distance between the property line and any exterior wall of the building. The measurements shall be taken from the property line abutting the street prior to any potential right-of-way dedication.
   a. Lake Street: No portion of a building within 30 feet of Lake Street may exceed a height of 28 feet above Lake Street except as provided in KZC 50.62.
   b. Central Way: No portion of a building within 30 feet of Central Way may exceed a height of 41 feet above Central Way except as provided in KZC 50.62.
   c. Third Street and Main Street: Within 40 feet of Third Street and Main Street, all stories above the second story shall maintain an average setback of at least 10 feet from the front property line.
   d. All other streets: Within 40 feet of any front property line, other than Lake Street, Central Way, Third Street, or Main Street, all stories above the second story shall maintain an average setback of at least 20 feet from the front property line.
   e. The required upper story setbacks for all floors above the second story shall be calculated as Total Upper Story Setback Area as follows:
      Total Upper Story Setback Area = (Linear feet of front property line(s), not including portions of the site without buildings that are set aside for vehicular areas) x (Required average setback) x (Number of stories proposed above the second story). See Plate 35.
   f. The Design Review Board is authorized to allow a reduction of the required upper story setback by no more than five feet subject to the following:
      1) Each square foot of additional building area proposed within the setback is offset with an additional square foot of public open space (excluding area required for sidewalk dedication) at the street level.
      2) The public open space is located along the sidewalk frontage and is not covered by buildings.
      3) For purposes of calculating the offsetting square footage, along Central Way, the open space area at the second and third stories located directly above the proposed ground level public open space is included. Along all other streets, the open space area at the second story located directly above the proposed ground level public open space is included.
      4) The design and location is consistent with applicable design guidelines.
   g. The Design Review Board is authorized to allow rooftop garden structures within the setback area.

6. May also be regulated under the Shoreline Master Program; refer to Chapter 83 KZC.

link to Section 50.12 table

Section 50.12 Zone CBD-1A, 1B USE ZONE CHART

Section 50.12	USE ⇩ / REGULATIONS ⇨	DIRECTIONS: FIRST, read down to find use...THEN, across for REGULATIONS										
		Required Review Process	MINIMUMS				MAXIMUMS		Landscape Category (See Ch. 95)	Sign Category (See Ch. 100)	Required Parking Spaces (See Ch. 105)	Special Regulations (See also General Regulations)
			Lot Size	REQUIRED YARDS (See Ch. 115)			Lot Coverage	Height of Structure				
				Front	Side	Rear						
.010	Restaurant or Tavern	D.R., Chapter 142 KZC	None	0'	0'	0'	100%	CBD 1A – 45' above each abutting right-of-way. CBD 1B – 55' above each abutting right-of-way.	D	E	One per each 125 sq. ft. of gross floor area. See KZC 50.60.	1. Drive-in or drive-through facilities are prohibited.
.020	Any Retail Establishment, other than those specifically listed, limited or prohibited in this zone, selling goods or providing services, excluding banking and related financial services										One per each 350 sq. ft. of gross floor area. See KZC 50.60.	1. The following uses are not permitted in this zone: a. Vehicle service stations. b. The sale, service and/or rental of motor vehicles, sailboats, motor boats, and recreational trailers; provided, that motorcycle sales, service, or rental is permitted if conducted indoors. c. Drive-in facilities and drive-through facilities. 2. Ancillary assembly and manufacture of goods on the premises of this use are permitted only if: a. The assembled manufactured goods are directly related to and dependent upon this use, and are available for purchase and removal from the premises. b. The outward appearance and impacts of this use with ancillary assembly or manufacturing activities must be no different from other retail uses.

Section 50.12	USE ⇩ / REGULATIONS ⇨	DIRECTIONS: FIRST, read down to find use...THEN, across for REGULATIONS										
		Required Review Process	MINIMUMS				MAXIMUMS		Landscape Category (See Ch. 95)	Sign Category (See Ch. 100)	Required Parking Spaces (See Ch. 105)	Special Regulations (See also General Regulations)
			Lot Size	REQUIRED YARDS (See Ch. 115)			Lot Coverage	Height of Structure				
				Front	Side	Rear						
.025	Banking and Related Financial Services See Spec. Reg. 2.	D.R., Chapter 142 KZC	None	0'	0'	0'	100%	CBD 1A – 45' above each abutting right-of-way. CBD 1B – 55' above each abutting right-of-way.	D	E	One per each 350 sq. ft. of gross floor area. See KZC 50.60.	1. Drive-through facilities are permitted as an accessory use only if: a. The drive-through facility is not located on a property that abuts either Park Lane or Lake Street. b. The drive-through facility existed prior to January 1, 2004, OR the drive-through facility will replace a drive-through facility which existed in CBD 1A or 1B on January 1, 2004, and which drive-through facility: 1) Was demolished to allow redevelopment of the site on which the primary use was located; and 2) Will serve the same business served by the replaced facility, even if that business moves to a new location; and 3) Does not result in a net increase in the number of drive-through lanes serving the primary use; and c. The Public Works Department determines that vehicle stacking will not impede pedestrian or vehicular movement within the right-of-way, and that the facility will not impede vehicle or pedestrian visibility as vehicles enter the sidewalk zone; and d. The vehicular access lanes will not be located between the street and the buildings and the configuration of the facility and lanes is generally perpendicular to the street; and e. Any replacement drive-through facility is reviewed and approved pursuant to Chapter 142 KZC for compliance with the following criteria: 1) The design of the vehicular access for any new drive-through facility is compatible with pedestrian walkways and parking access. 2) Disruption of pedestrian travel and continuity of pedestrian-oriented retail is limited by minimizing the width of the facility and associated curb-cuts. 2. Unless this use existed on the subject property prior to January 1, 2004, Banking and Financial Services may not be located within the 30-foot depth (as established by General Regulation 3) on the street level floor of a building fronting on Park Lane and Lake Street.

ATTACHMENT 10
SEP13-00959
CBD 1B

Section 50.12 — Zone CBD-1A, 1B — USE ZONE CHART

Section 50.12	USE ⇩ / REGULATIONS ⇨	Required Review Process	MINIMUMS: Lot Size	MINIMUMS: REQUIRED YARDS (See Ch. 115): Front	Side	Rear	MAXIMUMS: Lot Coverage	Height of Structure	Landscape Category (See Ch. 95)	Sign Category (See Ch. 100)	Required Parking Spaces (See Ch. 105)	Special Regulations (See also General Regulations)
		DIRECTIONS: FIRST, read down to find use...THEN, across for REGULATIONS										
.030	Hotel or Motel	D.R., Chapter 142 KZC	None	0'	0'	0'	100%	CBD 1A – 45' above each abutting right-of-way. CBD 1B – 55' above each abutting right-of-way.	D	E	One for each room. See Spec. Reg. 2 and KZC 50.60.	1. The following uses are not permitted in this zone: a. Vehicle service stations. b. Vehicle and/or boat sale, repair, service or rental. c. Drive-in facilities and drive-through facilities. 2. The parking requirement for hotel or motel use does not include parking requirements for ancillary meetings and convention facilities. Additional parking requirements for ancillary uses shall be determined on a case-by-case basis.
.040	Entertainment, Cultural and/or Recreational Facility										See KZC 50.60 and 105.25.	
.060	Private Club or Lodge									B	See KZC 50.60 and 105.25.	1. Ancillary assembly and manufacture of goods on premises may be permitted as part of an office use if: a. The ancillary assembled or manufactured goods are subordinate to and dependent on this office use; and b. The outward appearance and impacts of this office use with ancillary assembly and manufacturing activities must be no different from other office uses. 2. The following regulations apply to veterinary offices only: a. May only treat small animals on the subject property. b. Outside runs and other outside facilities for the animals are not permitted. c. Site must be designed so that noise from this use will not be audible off the subject property. A certification to this effect, signed by an Acoustical Engineer, must be submitted with the D.R. and building permit applications. d. A veterinary office is not permitted if the subject property contains dwelling units.
.070	Office Use									D	One per each 350 sq. ft. of gross floor area. See KZC 50.60.	
.080	Stacked or Attached Dwelling Units									A	1.7 per unit. See KZC 50.60.	
.090	School, Day-Care Center or Mini School or Day-Care Center									B	See KZC 50.60 and 105.25.	1. A six-foot-high fence is required along all property lines adjacent to outside play areas. 2. Structured play areas must be set back from all property lines by at least five feet. 3. Hours of operation may be limited by the City to reduce impacts on nearby residential uses. 4. An on-site passenger loading area may be required depending on the number of attendees and the extent of the abutting right-of-way improvements. 5. These uses are subject to the requirements established by the Department of Social and Health Services (WAC Title 388).

Section 50.12	USE ⇩ / REGULATIONS ⇨	DIRECTIONS: FIRST, read down to find use...THEN, across for REGULATIONS										
		Required Review Process	MINIMUMS				MAXIMUMS		Landscape Category (See Ch. 95)	Sign Category (See Ch. 100)	Required Parking Spaces (See Ch. 105)	Special Regulations (See also General Regulations)
			Lot Size	REQUIRED YARDS (See Ch. 115)			Lot Coverage	Height of Structure				
				Front	Side	Rear						
.100	Assisted Living Facility	D.R., Chapter 142 KZC.	None	0'	0'	0'	100%	CBD 1A – 45' above each abutting right-of-way. CBD 1B – 55' above each abutting right-of-way.	D	A	1.7 per independent unit. 1 per assisted living unit. See KZC 50.60.	1. A facility that provides both independent dwelling units and assisted living units shall be processed as an assisted living facility. 2. A nursing home use may be permitted as part of an assisted living facility use in order to provide a continuum of care for residents. If a nursing home use is included, the following parking standard shall apply to the nursing home portion of the facility: a. One parking stall shall be provided for each bed.
.110	Public Utility, Government Facility, or Community Facility								D See Special Reg. 1.	B	See KZC 50.60 and 105.25.	1. Landscape Category B or C may be required depending on the type of use on the subject property and the impacts associated with the use on nearby uses.
.120	Public Park	Development standards will be determined on a case-by-case basis. See Chapter 49 KZC for required review process.										

ATTACHMENT 10
SEP13-00959
CBD 1B

FINDINGS AND DECISION OF THE HEARING EXAMINER FOR THE CITY OF KIRKLAND

In the Matter of the Appeals of

File No. DRV12-00921

Residents of Merrill Gardens and
Dr. and Mrs. Brian Rohrback, Sandi Hart and
Stan Christie

From a Design Review Board decision

Introduction

The Design Review Board issued a decision approving the design response conference application for the proposed Lake Street Place mixed-use project addressed as 112 and 150 Lake Street South. The decision was appealed by Residents of Merrill Gardens and by Dr. and Mrs. Brian Rohrback, Sandi Hart, and Stan Christie. The appeal hearing was held on April 4, 2013, before the Hearing Examiner, in City Council Chambers, Kirkland City Hall, 123 Fifth Avenue, Kirkland, WA. Appellants Residents of Merrill Gardens (Ellen Glauert and Barbara Flagg) were represented by Brent Carson, attorney at law; Appellants Dr. and Mrs. Brian Rohrback, Sandi Hart, and Stan Christie, were represented by Dr. Rohrback (a letter from Dr. Rohrback's counsel, J. Richard Aramburu, was also submitted by the appellants); the Department was represented by Jon Regala, Senior Planner, and by Oscar Rey, Assistant City Attorney; and the Applicant, Stuart McLeod, by Christopher Brain, attorney at law. The Examiner viewed the site on April 4, 2013.

After due consideration of the evidence elicited during the hearing and the Examiner's inspection of the site, the following shall constitute the findings of fact, conclusions and decision of the Hearing Examiner on this appeal.

Findings of Fact

1. The site is composed of three parcels located at 112 and 150 Lake Street South. The property is zoned Central Business District 1B (CBD 1B) and is developed with the existing Hector's Restaurant and the Kirkland Waterfront Market. A parking lot occupies the third parcel.

2. Immediately north of the site is property which is also zoned CBD 1B which is developed with the Bank of America building, a five-story mixed use project, with a maximum height of 55 feet. The property to the east is zoned CBD 4, and is developed with the Portsmith Condominiums, with a maximum height of 55.4 feet. To the south is an area zoned CBD 1B, which is currently used as a parking lot for the Chaffey Building, with a maximum height of 55 feet; and to the west is property zoned CBD 2, with a

maximum height of 28 feet, and which is developed with a number of retail and restaurant uses.

3. The Merrill Gardens retirement housing is located east of the site. The Residents of Merrill Gardens Appellants, Ms. Flagg and Ms. Glauert, noted at hearing that they and other residents utilize the sidewalk adjacent to their building for walks, and have concerns about hazards posed by the existing traffic in the area.

4. The Portsmith Condominiums are located east of the site, and were developed in 1996 and 1997. A public walkway located within a public easement on the Portsmith site was created during development of that site, and is open to public use during daylight hours. The walkway is further described in Exhibit 8, a landscaping improvement agreement between the applicant and the Portsmith Owners Association.

5. The current proposal, which is the subject of the January 24, 2013 Design Review Board (DRB) decision, is known as the Lake Street Place Mixed Use Development. The applicant proposes to construct a new mixed-use development on the three existing parcels. One parcel will include an expansion of Hector's restaurant, the second parcel will be the site of the Kirkland Waterfront Market building and new offices, and the third parcel will be the site of a new building with ground floor retail and restaurant space, four levels of enclosed parking, and additional office space on the top floor. The proposal is shown in Enclosure 3 to Ex. 1.

6. In 2008, the applicant received design review approval and City Council approval for a mixed use project at this site that would have been substantially larger than the proposal which was approved by the DRB's January 2013 decision. The applicant received a building permit and SEPA approval for the 2008 project. A comparison between the square footages of development proposed under the 2008 and the current proposal is shown at Enclosure 3 of the staff report. Enclosure 3 also includes renderings which compare the design and appearance of the two proposals, see, e.g., pages 65 and 67.

7. The Design Review Board held an initial Conceptual Design Conference on January 9, 2012, and held subsequent conferences on October 1, 2012, November 19, 2012, December 17, 2012, and January 14, 2013. The DRB considered the applicant's proposals at these conferences, took public comment, and provided recommendations to the applicant. During the DRB review process, several changes were made to the proposed design in response to the DRB's comments, including: the provision of a 10-foot upper story setback at the east property line; the parking garage was changed to be completely enclosed rather than open; rooftop parking was removed; landscaping was proposed to be provided to the neighboring public walkway; and ground floor retail/commercial was added.

8. At its January 14 meeting, the DRB voted to approve the plan subject to several conditions, including the submittal of a complete SEPA application, parking calculations,

and other plan details; the conditions included a statement that "Phasing the project will require a new Design Response Conference application." (The written DRB decision was issued on January 24, 2013.) Enclosure 3, p. 22, staff report.

9. The applicant has not yet applied for a building permit for the current proposal, nor has a SEPA application been submitted for the City's review. The Department at hearing noted that design review under the City's Code constitutes a free-standing process, and projects are not considered vested merely because they have received approval from the Design Review Board. Instead, the City can require any needed modifications to the design after the SEPA or building permit review, pursuant to KZC 142.50.

10. The applicant has separately applied for a Design Response Conference for "Phase I" of this proposal, involving the property located at 150 Lake Street.

11. KZC 142.35.3 states that the Design Review Board "shall review projects for consistency with" the design guidelines referenced.

12. The Design Guidelines for Pedestrian-Oriented Business Districts appear in Enclosure 4 of Ex. 1.

Conclusions

1. The Hearing Examiner has jurisdiction over this appeal pursuant to KZC 142.40 and KZC 145.60. KZC 142.40.11 provides that unless substantial relevant information is presented which was not considered by the Design Review Board, the decision of the Board shall be accorded substantial weight. The Board's decision may be reversed or modified if the Hearing Examiner determines that a mistake has been made.

2. The appeal of the Residents of Merrill Gardens asserted that no residents of Merrill Gardens received notice of the project. The Department has argued that this issue is not one within the authority of the Board and therefore not an issue subject to appeal before the Examiner; the Department also presented evidence that the notice requirements of KZC 142.35.8, which require notice to property owners rather than residents, were met in this case. Thus, even if the issue were within the scope of an appeal allowed by the Code, the notice met the Code-required notice provisions.

3. The Residents' appeal identified several concerns regarding the project's potential traffic impacts and impacts on pedestrian safety. In particular, the Appellants are concerned about vehicles accessing the project and the potential for safety hazards to elderly and/or frail residents of Merrill Gardens; they are also concerned that the traffic generated by this project will affect access by emergency vehicles to Merrill Gardens.

4. The Department contends that the potential traffic impacts from the project are not within the scope of the DRB's review authority, and is a matter to be reviewed during

the project's SEPA review, which has yet to occur. At the time of permit/SEPA review, impacts can be identified and mitigated, and if necessary, the design approval would be modified. The Appellants correctly point out that design can influence traffic circulation patterns (e.g., the location of the garage access) and that the design guidelines call for the intrusive qualities of parking garages to be mitigated. And on the ground to a pedestrian, as Ms. Flagg noted, "it's all one thing."

5. Nevertheless, the City's design review process does not require the applicant to apply for a building permit or SEPA review prior to receiving design review approval. Instead, the Code anticipates that the design review process may move forward first, and that is what has occurred here. Thus, the fact that the DRB did not consider traffic impacts is not a basis for overturning its decision; the DRB is restricted to reviewing the proposed design in light of the applicable design guidelines.

6. The DRB did review the proposed design, including the proposed parking garage and pedestrian connections and spaces, for consistency with the design review guidelines, considering factors such as the garage's visibility from neighborhood properties, its upper level setbacks, massing, and other design issues. The DRB's decision was consistent with the applicable design guidelines.

7. The appeal filed by Dr. and Ms. Rohrback, Sandi Hart, and Stan Christie, identified a number of objections to the proposal's design, and objected to the DRB's decision to approve the project given its scale, and in the absence of parking calculations. The appeal also cited portions of the Comprehensive Plan that the Appellants asserted would be violated by the project.

8. The Appellants argued that there was no vantage point from where the architectural modifications (intended to moderate the scale and massing of the building) would be effective. The DRB did identify key vantage points and applied relevant guidelines, e.g., vertical and horizontal building modulation, architectural elements, etc., t address the project's scale and mass, and its decision was consistent with the applicable design guidelines. The relative scale of the project, compared with nearby development (e.g., building areas for Bank of America/101, Portsmith, etc.), shows no errors on the DRB's part.

9. The appeal also objected to the lack of building setbacks and upper story setbacks on the 3rd, 4th and 5th floors of the Main Street building. However, no building setbacks are required by Code. The upper story setbacks provided (at the 5th and 6th floors along the Main Street side) meet Code requirements, and an additional 10-foot upper story setback is provided along the public pedestrian walkway. The DRB did not act inconsistently with the design guidelines by approving the project with these setbacks.

10. The appeal raised concerns about whether adequate parking was being required. The design guidelines do not require that a particular amount of parking be required, since the Code, and possibly the City's SEPA review, will determine the amount and

location of parking to be provided. The DRB was not required to consider the adequacy of parking to serve the project.

11. The appeal contended that the proposed landscaping should not have been approved, because the planters would excessively reduce the access way and the wall treatments could only be appreciated from a distance. However, the planters would retain walkway widths of between 7 and 11 feet, which would satisfy the width requirements for the walkway. The proposed landscaping was considered by the DRB in relationship to the applicable design guidelines, including mitigation of blank wall space, and its decision was consistent with those guidelines.

12. The appeal identified other concerns related to precedent, views, and other issues, but the evidence does not show that the DRB decision was incorrect as to any of these matters. The appeal also argued that the decision was not consistent with the Comprehensive Plan. Even if a DRB decision concerning non-residential projects (i.e., those not subject to KZC 142.35.3.c) were to be compared with the Comprehensive Plan, the project here was shown to comply with the development standards that implement the Plan, and to comply with the applicable design guidelines. The Plan policies cited do not show that the DRB decision was in error.

13. At hearing, the Appellants submitted a letter from their attorney which argued that the DRB decision violated SEPA because it was made without SEPA review. The letter also requested that in light of 2008 and 2009 approvals, the current proposal, as well as the "Phase I" proposal now before the DRB, the Examiner determine the status of the 2008 and 2009 project applications, and continue the current proceeding pending the outcome of the DRB review (and any appeals of that review) of Phase I. The issue of whether the DRB decision violated SEPA was not raised in the initial appeal letter, and is outside the scope of the appeal; KZC 142.40.7; it cannot be considered in this appeal. But even if this issue could be considered, it is not clear from this record that the Hearing Examiner would have authority under KZC 142.40 to reverse the DRB decision because of the lack of SEPA review, or to conduct a review of previous or subsequent design review applications.

14. The evidence does not show that the DRB's decision was in error. It should therefore be affirmed.

Decision

The Design Review Board's decision is AFFIRMED.

Entered this 10th day of April, 2013.

Anne A. Tanner, for

Anne Watanabe
Hearing Examiner

The following exhibits were entered into the record on this matter:

Exhibit 1: Staff report dated March 26, 2013, together with Enclosures 1-10.
Exhibit 2: Department power point presentation
Exhibit 3: Appellant Rohrback power point presentation
Exhibit 4: Letter dated April 4, 2013, from J. Richard Aramburu, attorney at law (submitted by Appellants Rohrback, Hart and Christie)
Exhibit 5: Restrictive covenant dated August 4, 1995 (Applicant)
Exhibits 6 and 7: Applicant's photos of site
Exhibit 8: Landscaping Improvement Agreement dated February 7, 2013 (Applicant)
Exhibit 9: April 2008 Appeal of March 2008 DRB decision (Applicant)

Parties of Record:

Department of Planning and Community Development
Applicant Rick Chesmore with Chesmore/Buck Architecture, by Christopher Brain, attorney at law
Appellant Residents of Merrill Gardens (Ellen Glauert and Barbara Flagg), by Brent Carson, attorney at law
Appellant Dr. and Mrs. Brian Rohrback, Sandi Hart and Stan Christie, and J. Richard Aramburu, attorney at law

Concerning Further Review

KZC 142.40.1.b provides that the judicial review procedures and provisions in KZC 145.110 apply. KZC 145.110 provides that *"The action of the City in granting or denying an application under this chapter may be reviewed pursuant to the standards set forth in RCW 36.70C.130 in the King County Superior Court. The land use petition must be filed within 21 calendar days of the issuance of the final land use decision by the City. For more information on the judicial review process for land use decisions, see Chapter 36.70C RCW."*

BEFORE THE HEARING EXAMINER
CITY OF KIRKLAND

CERTIFICATE OF SERVICE

I certify under penalty of perjury under the laws of the State of Washington that on this date I sent true and correct copies of the attached FINDINGS AND DECISION to each person listed below, or on the attached mailing list, in the matter of RESIDENTS OF MERRILL GARDENS AND DR. AND MRS. BRIAN ROHRBACK, SANDI HART AND STAN CHRISTIE, Hearing Examiner File DRV12-00921, in the manner indicated.

Party	Method of Service
Stuart McLeod 112 Lake Street South, Suite 200 Kirkland, WA 98033	☒ U.S. First Class Mail, postage prepaid ☐ Inter-office Mail ☐ E-mail ☐ Fax ☐ Hand Delivery ☐ Legal Messenger
Rich Chesmore 27 100th Avenue NE, Suite 100 Bellevue, WA 98004	☒ U.S. First Class Mail, postage prepaid ☐ Inter-office Mail ☐ E-mail ☐ Fax ☐ Hand Delivery ☐ Legal Messenger
Chris Brain Attorney at Law 1700 Seventh Avenue, Suite 2200 Seattle, WA 98101-4416	☒ U.S. First Class Mail, postage prepaid ☐ Inter-office Mail ☐ E-mail ☐ Fax ☐ Hand Delivery ☐ Legal Messenger
Ellen Glauert 201 Kirkland Avenue, Unit #326 Kirkland, WA 98033	☒ U.S. First Class Mail, postage prepaid ☐ Inter-office Mail ☐ E-mail ☐ Fax ☐ Hand Delivery ☐ Legal Messenger
Barbara Flagg 201 Kirkland Avenue, Unit #324 Kirkland, WA 98033	☒ U.S. First Class Mail, postage prepaid ☐ Inter-office Mail ☐ E-mail ☐ Fax ☐ Hand Delivery ☐ Legal Messenger

Dr. and Mrs. Brian Rohrback 109 2nd Street S., Unit #237 Kirkland, WA 98033	☒ U.S. First Class Mail, postage prepaid ☐ Inter-office Mail ☐ E-mail ☐ Fax ☐ Hand Delivery ☐ Legal Messenger
Sandi Hart and Stan Christie 109 2nd Street S., Unit #239 Kirkland, WA 98033	☒ U.S. First Class Mail, postage prepaid ☐ Inter-office Mail ☐ E-mail ☐ Fax ☐ Hand Delivery ☐ Legal Messenger
J. Richard Aramburu Aramburu & Eustis, LLP 720 Third Avenue, Suite 2112 Seattle, WA 98104	☒ U.S. First Class Mail, postage prepaid ☐ Inter-office Mail ☐ E-mail ☐ Fax ☐ Hand Delivery ☐ Legal Messenger
Brent Carson Attorney at Law Van Ness Feldman LLP 719 2nd Ave Ste 1150 Seattle, WA 98104-1700	☒ U.S. First Class Mail, postage prepaid ☐ Inter-office Mail ☐ E-mail ☐ Fax ☐ Hand Delivery ☐ Legal Messenger
John Regala, Senior Planner City of Kirkland 123 5th Avenue Kirkland, WA 98033	☒ U.S. First Class Mail, postage prepaid ☐ Inter-office Mail ☐ E-mail ☐ Fax ☐ Hand Delivery ☐ Legal Messenger

Dated: April 10, 2013

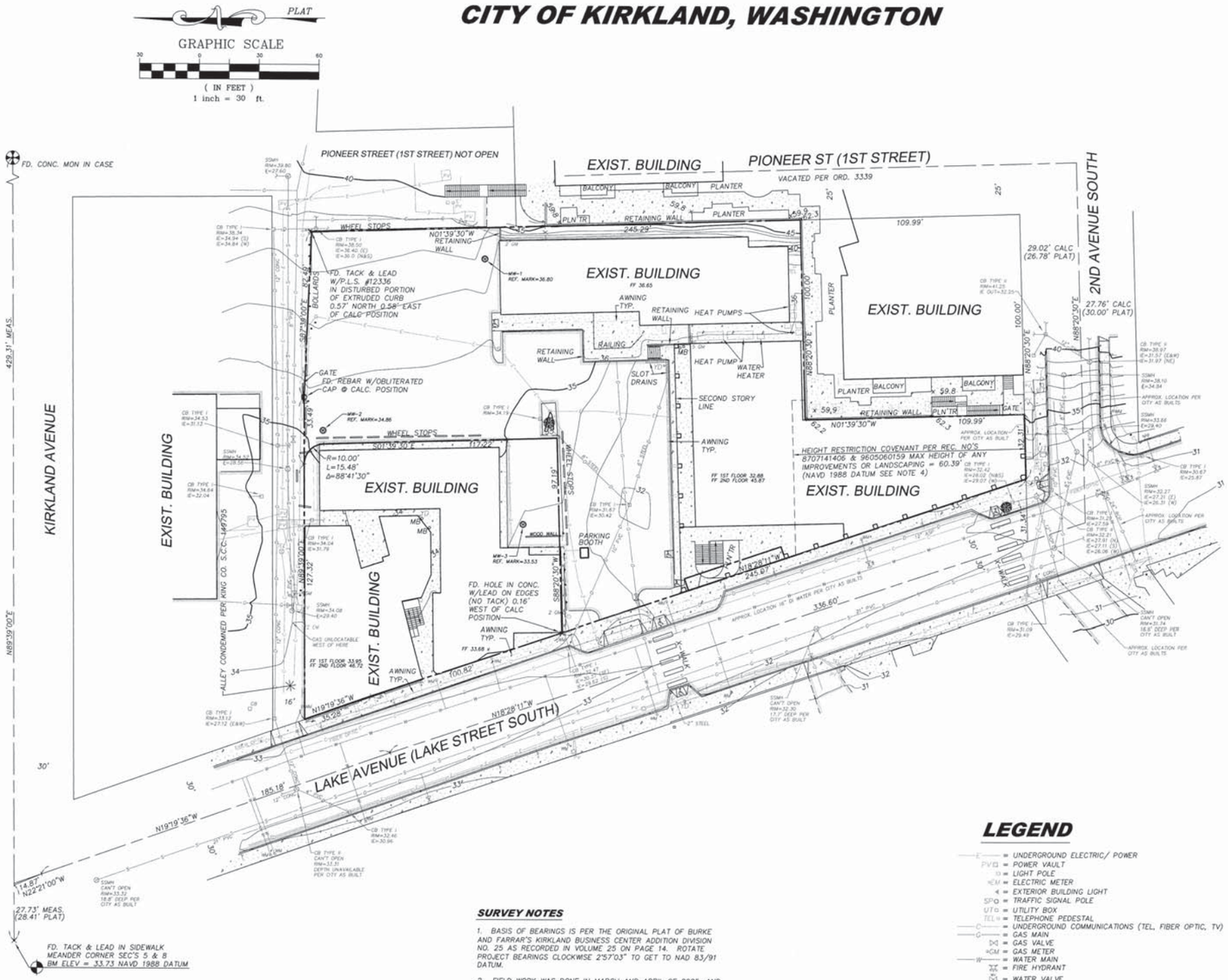
Name: Linda Vee
Title: Legal Assistant

ATTACHMENT 12
SEP13-00959
PROPERTY SURVEY

KIRKLAND WATERFRONT MARKET

SEC.8, T.25N., R.5E., W.M.

CITY OF KIRKLAND, WASHINGTON



EXISTING LEGAL DESCRIPTIONS

PARCEL A:
PARCEL A OF CITY OF KIRKLAND LOT LINE ADJUSTMENT NO. LL-86-36, RECORDED MAY 5, 1986 UNDER RECORDING NO. 8605050568, DESCRIBED AS FOLLOWS:

PARCEL B:

LOTS 6 AND 7, BLOCK 1, LOGGIE & EVANS ADDITION TO KIRKLAND, ACCORDING TO THE PLAT THEREOF RECORDED IN VOLUME 7 OF PLATS, PAGE 87, RECORDS OF KING COUNTY, WASHINGTON.

PARCEL C:

THAT PORTION OF GOVERNMENT LOT 1 IN SECTION 8, TOWNSHIP 25 NORTH, RANGE 5 EAST, W.M., IN KING COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:

BEGINNING AT THE INTERSECTION OF THE EASTERLY LINE OF LAKE AVENUE AS SHOWN ON THE PLAT OF BURKE & FARRAR'S KIRKLAND BUSINESS CENTER ADDITION DIVISION NO. 25, ACCORDING TO THE PLAT THEREOF RECORDED IN VOLUME 25 OF PLATS, PAGE 14, RECORDS OF KING COUNTY, WASHINGTON, AND THE SOUTHERLY LINE OF AN ALLEY CONDEMNED IN KING COUNTY SUPERIOR COURT CAUSE NO. 149795, AS PROVIDED BY ORDINANCE NO. 212 OF THE CITY OF KIRKLAND;
THENCE ALONG SAID ALLEY LINE NORTH 89°39'00" EAST 127.32 FEET TO THE TRUE POINT OF BEGINNING;
THENCE ON A CURVE TO THE RIGHT WITH A RADIUS OF 10 FEET 15.47 FEET;
THENCE SOUTH 01°39'30" EAST 117.23 FEET;
THENCE SOUTH 88°20'30" WEST 97.17 FEET TO SAID EASTERLY LINE OF LAKE AVENUE;
THENCE ALONG SAID EASTERLY LINE SOUTH 18°28'11" EAST 78.50 FEET TO THE SOUTH LINE OF UNPLATTED BLOCK 98 AS SHOWN ON SAID PLAT;
THENCE NORTH 88°20'30" EAST ALONG SAID SOUTH LINE 180.51 FEET TO THE WESTERLY LINE OF PIONEER STREET AS SHOWN UPON THE PLAT OF SAID BURKE & FARRAR'S KIRKLAND BUSINESS CENTER ADDITION, DIVISION NO. 25;
THENCE NORTH 01°30'30" WEST 195.76 FEET TO THE SOUTHERLY LINE OF SAID ALLEY AS CONDEMNED;
THENCE WESTERLY ALONG SAID SOUTHERLY ALLEY LINE 121.98 FEET TO THE TRUE POINT OF BEGINNING.

PARCEL D

THAT PORTION OF UNPLATTED BLOCK 98 AS SHOWN ON BURKE AND FARRAR'S BUSINESS CENTER ADDITION, DIVISION NO. 25, ACCORDING TO THE PLAT THEREOF RECORDED IN VOLUME 25 OF PLATS, PAGE 14, IN KING COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:

BEGINNING AT THE INTERSECTION OF THE EAST LINE OF LAKE AVENUE AND THE SOUTH LINE OF THE ALLEY CONDEMNED, AS PROVIDED BY ORDINANCE NO. 212 OF THE CITY OF KIRKLAND, BOTH AS SHOWN ON SAID PLAT;
THENCE ALONG SAID SOUTH LINE, NORTH 89°39'00" EAST 127.32 FEET TO A POINT OF CURVE;
THENCE ALONG THE ARC OF A CURVE TO THE RIGHT HAVING A RADIUS OF 10 FEET, A DISTANCE OF 15.47 FEET;
THENCE SOUTH 01°39'30" EAST 117.23 FEET;
THENCE SOUTH 88°20'30" WEST 97.17 FEET TO THE EASTERLY MARGIN OF SAID LAKE AVENUE;
THENCE ALONG SAID EASTERLY MARGIN, NORTH 18°28'11" WEST 100.82 FEET;
THENCE NORTH 19°19'36" WEST 35.20 FEET TO THE TRUE POINT OF BEGINNING;

(ALSO KNOWN AS LOTS 1 TO 5, INCLUSIVE, OF ALLEN'S POST OFFICE TRACTS, ACCORDING TO THE UNRECORDED PLAT THEREOF);

(ALSO KNOWN AS LOT LINE ADJUSTMENT NO. LL-96-35 RECORDED MAY 2, 1996 UNDER RECORDING NO. 9605021059).

LEGEND

- E = UNDERGROUND ELECTRIC/ POWER
- PV = POWER VAULT
- = LIGHT POLE
- EM = ELECTRIC METER
- = EXTERIOR BUILDING LIGHT
- SP = TRAFFIC SIGNAL POLE
- UT = UTILITY BOX
- TEL = TELEPHONE PEDESTAL
- C = UNDERGROUND COMMUNICATIONS (TEL, FIBER OPTIC, TV)
- G = GAS MAIN
- = GAS VALVE
- GM = GAS METER
- W = WATER MAIN
- FH = FIRE HYDRANT
- = WATER VALVE
- WM = WATER METER
- = MANHOLE (STORM, SEWER, TELEPHONE, WATER)
- YD = YARD DRAIN
- CB = CATCH BASIN
- D = STORM DRAIN LINE
- S = SEWER LINE
- = EDGE OF ASPHALT
- = CONCRETE AREA
- MB = MAIL BOX
- = SIGN
- = BOLLARD
- = A.D.A./HANDICAP RAMP
- = DECIDUOUS TREE
- x 59.9 = SPOT ELEVATION
- = MONITORING WELL
- x = FOUND LEAD AND TACK
- = FOUND REBAR & CAP
- = FOUND MONUMENT IN CASE

SURVEY NOTES

1. BASIS OF BEARINGS IS PER THE ORIGINAL PLAT OF BURKE AND FARRAR'S KIRKLAND BUSINESS CENTER ADDITION DIVISION NO. 25 AS RECORDED IN VOLUME 25 ON PAGE 14. ROTATE PROJECT BEARINGS CLOCKWISE 2°57'03" TO GET TO NAD 83/91 DATUM.

2. FIELD WORK WAS DONE IN MARCH AND APRIL OF 2005, AND JULY OF 2007 USING A PENTAX PTS –V3, THREE SECOND TOTAL STATION AND A SOKKIA SET 530R3 THREE SECOND TOTAL STATION WITH CLOSED TRAVERSE METHODS IN ACCORDANCE WITH W.A.C. 332–130.

3. BOUNDARY INFORMATION IS BASED ON THE FOLLOWING SURVEYS DONE BY TRIAD ASSOCIATES:
A) RECORD OF SURVEY PER REC. NO. 8203099002
B) RECORD OF SURVEY PER REC. NO. 8203099003
C) UNRECORDED A.L.T.A. SURVEY DATED 5/19/99

4. THE HEIGHT RESTRICTION COVENANT SHOWN PER RECORDING NUMBERS 8707141406 AND 9605060159 LISTS A MAXIMUM HEIGHT OF 56.9 FEET BASED ON USC & GS VERTICAL DATUM OF 1929/ 1947 ADJUSTED. THIS SURVEY IS BASED ON NAVD 1988 DATUM. THE DATUM CONVERSION FACTOR IS AS FOLLOWS (NAVD88 = [USCGS29/47] + 3.49'). THE MAXIMUM RESTRICTIVE ELEVATION BASED ON NAVD 1988 DATUM IS 60.39'.

5. EXISTING UNDERGROUND UTILITY LOCATIONS ARE BASED ON A COMBINATION OF CITY AS BUILTS, SURFACE FEATURES, PAINTED LOCATIONS BY LOCATING INC IN JULY OF 2007, AND PAINTED LOCATIONS BY UTILITY DETECTION SERVICES, LLC IN DECEMBER OF 2007. ALL UNDERGROUND UTILITIES SHOWN ARE ONLY APPROXIMATE AND SHALL BE VERIFIED PRIOR TO ANY CONSTRUCTION ON OR AROUND THE SITE. ADDITIONAL UNDERGROUND UTILITIES MAY ALSO EXIST ON OR AROUND THE SITE WHICH ARE NOT SHOWN ON THE DRAWING AT THIS TIME.

Call Before You Dig
1-800-424-5555

REVISIONS	BY	DATE

© THE PLANS SET FORTH ON THIS SHEET ARE AND SHALL REMAIN THE PROPERTY OF EASTSIDE CONSULTANTS, INC.

EXISTING SITE SURVEY

KIRKLAND WATERFRONT MARKET
150 LAKE STREET SOUTH
KIRKLAND, WA 98033

ENGINEERS - SURVEYORS
EASTSIDE CONSULTANTS, INC.
1320 N.W. MALL ST., SUITE B
ISSAQUAH, WASHINGTON 98027
PH(425)392-5351 FAX:392-4676

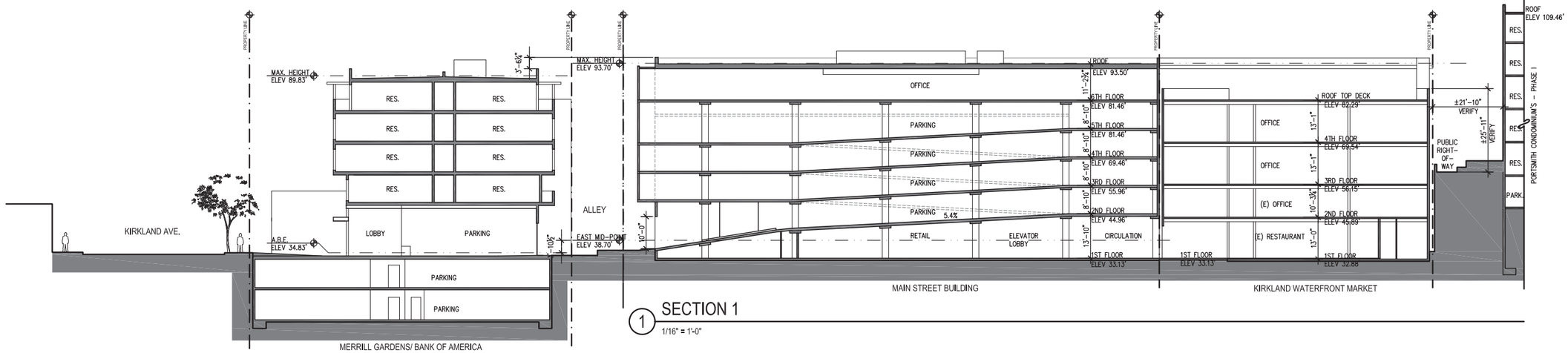
STEVEN W. KITZ
STATE OF WASHINGTON
27826
REGISTERED
PROFESSIONAL LAND SURVEYOR
7/15/09

SEC. 8, T.25N., R.5E., W.M.
8

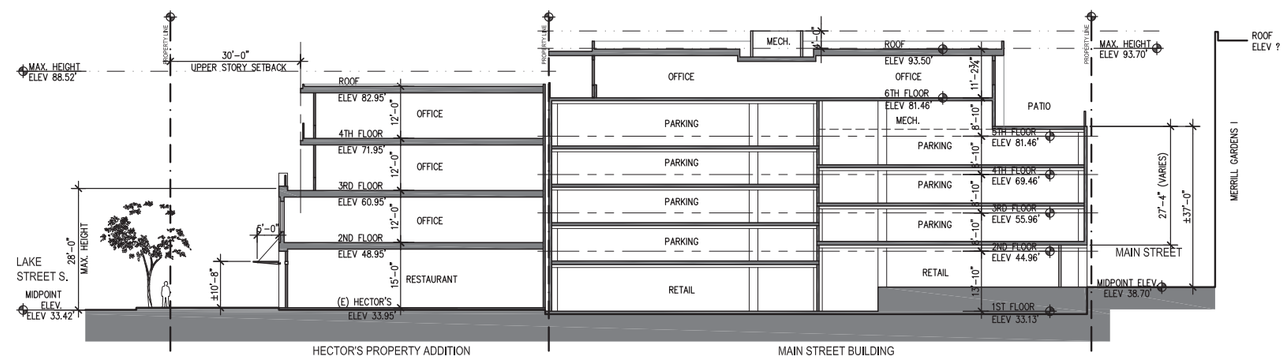
JOB NO.	05030
DATE	7/09
SCALE	1"=30'
DESIGNED	S.K.
DRAWN	S.K.
CHECKED	S.K.
APPROVED	.

SHEET C6 OF 6

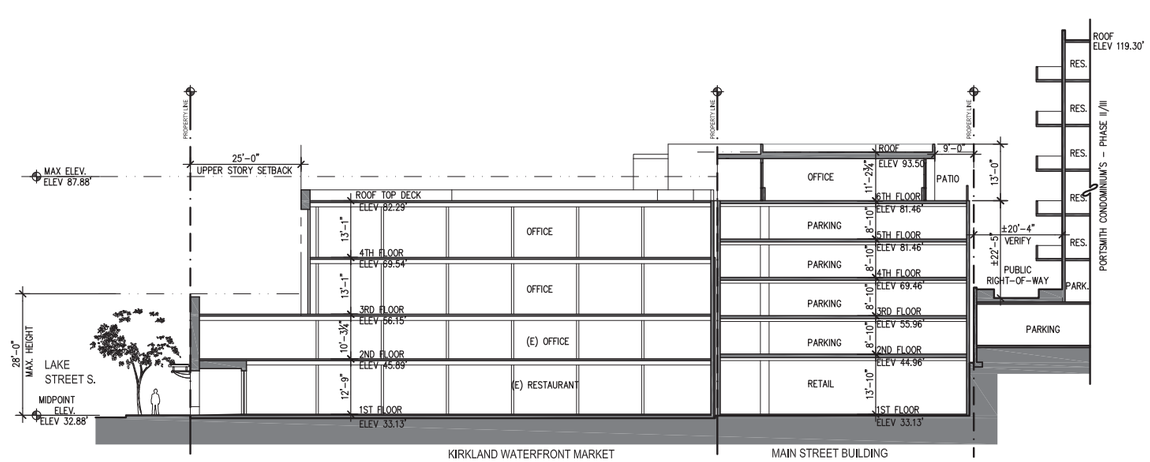
ATTACHMENT 13
SEP13-00959
CROSS SECTION



1 SECTION 1
1/16" = 1'-0"



2 SECTION 2
1/16" = 1'-0"



3 SECTION 3
1/16" = 1'-0"

CHESMORE|BUCK architecture
27 100TH AVENUE NE, SUITE 100
BELLEVUE, WA 98004
PHONE: 425-679-0907
FAX: 425-679-0804

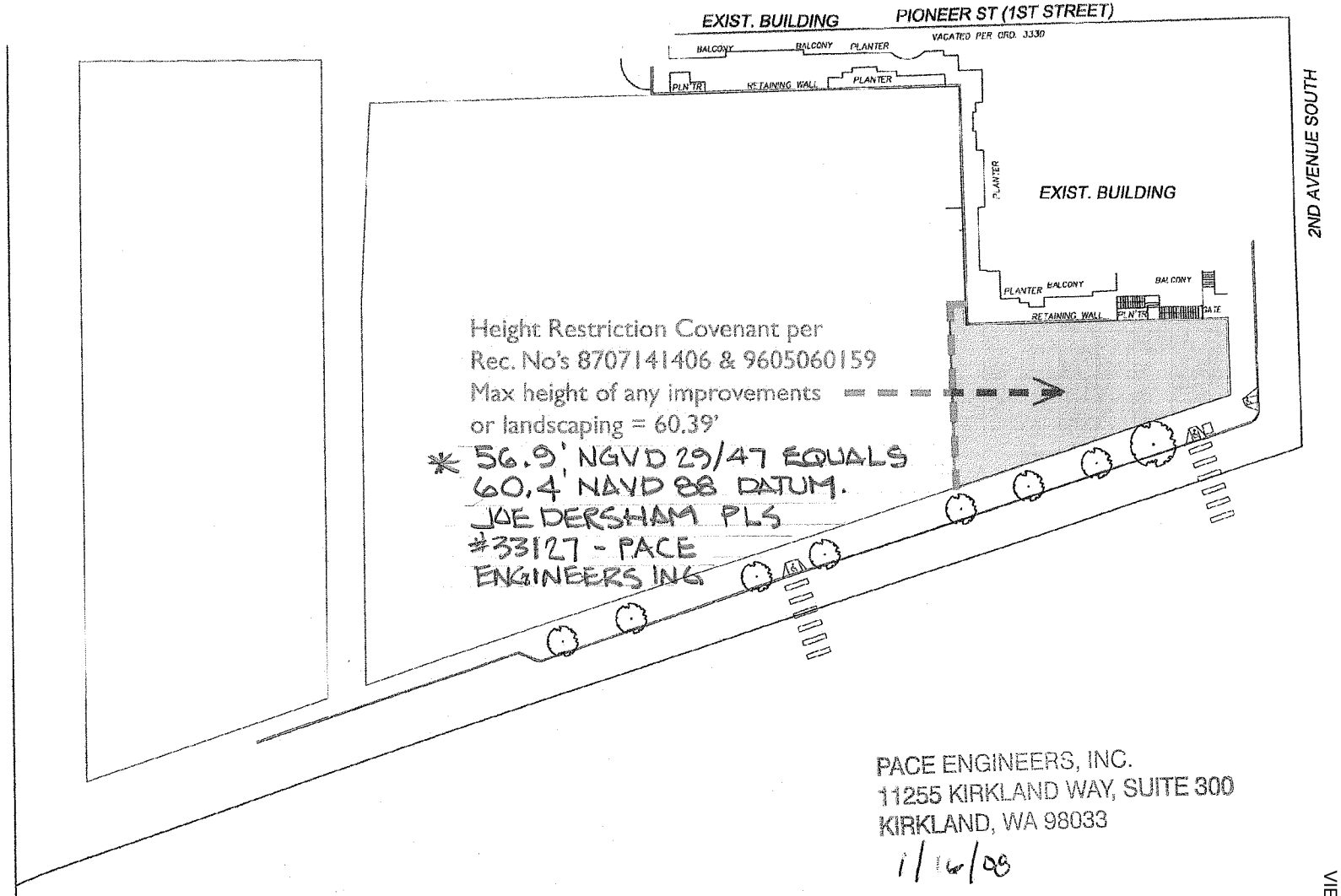
No.	Date	Revision
	12/03/12	DRB SUBMITTAL 3
	11/02/12	DRB SUBMITTAL 2
	08/10/12	DRB SUBMITTAL

LAKE STREET PLACE

112-150 LAKE STREET S
KIRKLAND, WA 98033

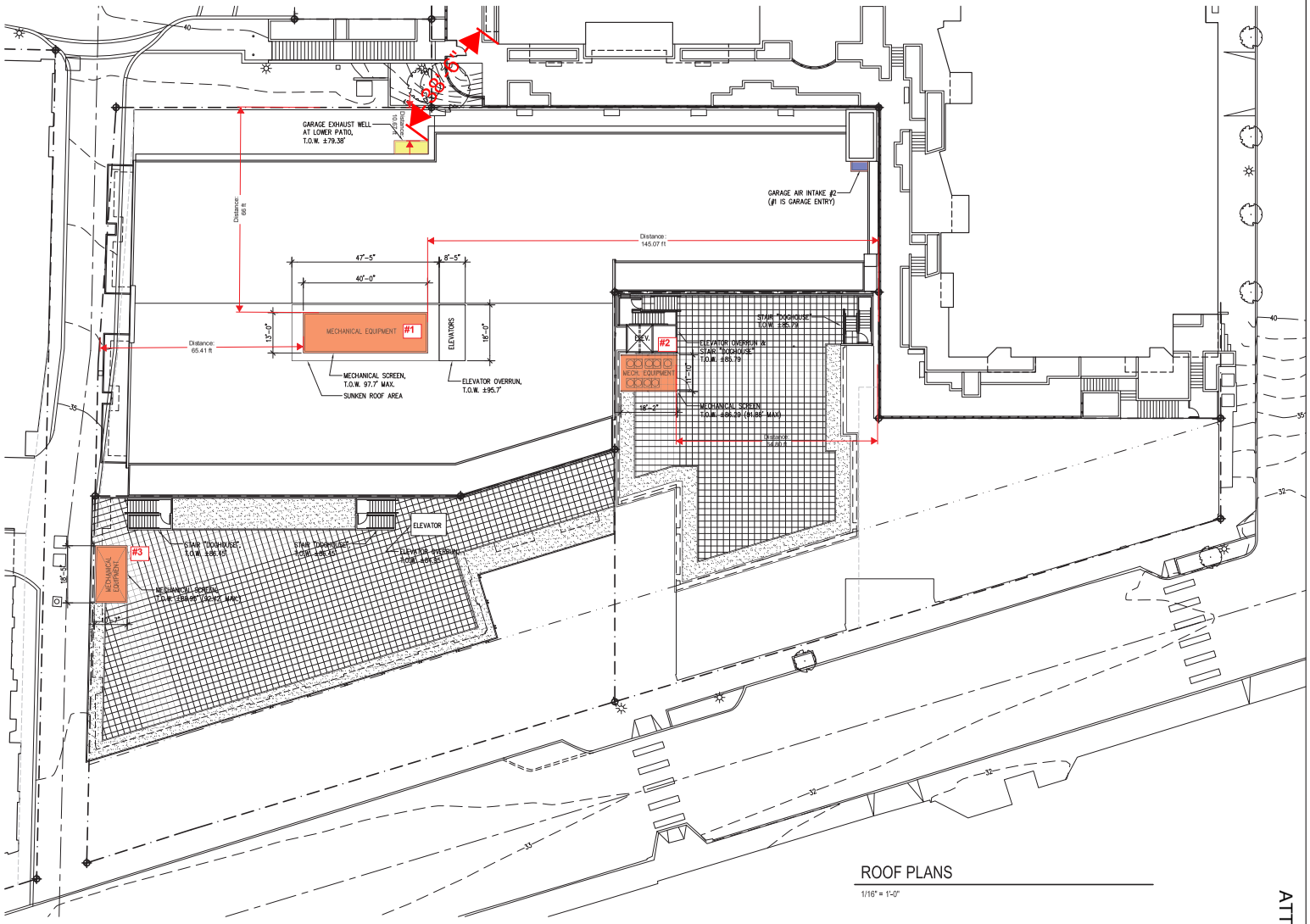
SECTIONS

Sheet No. 3.6
Project No. 1105
Date: 07/30/12



PACE ENGINEERS, INC.
11255 KIRKLAND WAY, SUITE 300
KIRKLAND, WA 98033
1/16/08

ATTACHMENT 14
SEP13-00959
VIEW COVENANT



ROOF PLANS

1/16" = 1'-0"

ATTACHMENT 15
SEP13-00959
ROOF PLAN

CHESMORE | BUCK
architecture
27 100TH AVENUE NE, SUITE 100
BELLEVUE, WA 98004
PHONE: 425-679-9804
FAX: 425-679-9807

No.	Date	Revision
	01/02/13	DRB SUBMITTAL 4
	12/03/12	DRB SUBMITTAL 3
	11/02/12	DRB SUBMITTAL 2
	08/10/12	DRB SUBMITTAL

LAKE STREET PLACE

112-150 LAKE STREET S
KIRKLAND, WA 98033

ROOF PLANS

Sheet No.	2.6
Project No.	1105
Date:	07/30/12