Fact Sheet

Action Sponsor and Lead Agency	City of Kirkland Department of Planning and Community Development
Proposed Action	Legislative adoption of amendments to the Zoning Map, Zoning Code and Municipal Code to allow Transit-Oriented-Development (TOD) at the South Kirkland Park and Ride pursuant to Chapter 160 KZC (Process IV).
Responsible Official	**Eric R. Shields, AICP** **Planning Director**
Contact Person	Dorian Collins, Senior Planner, City of Kirkland (425) 587-3249.
Required Approvals	Adoption by Kirkland City Council Approval by Houghton Community Council.
Location of Background Data	File ZON10-00014 City of Kirkland Department of Planning and Community Development 123 Fifth Avenue Kirkland, WA 98033
Date of Issuance	3/23/11

Fact Sheet

Action Sponsor and Lead Agency	City of Kirkland Department of Planning and Community Development
Proposed Action	Legislative adoption of amendments to the Zoning Map, Zoning Code and Municipal Code to allow Transit-Oriented-Development (TOD) at the South Kirkland Park and Ride pursuant to Chapter 160 KZC (Process IV).
Responsible Official	_____ **Eric R. Shields, AICP** **Planning Director**
Contact Person	Dorian Collins, Senior Planner, City of Kirkland (425) 587-3249.
Required Approvals	Adoption by Kirkland City Council Approval by Houghton Community Council.
Location of Background Data	File ZON10-00014 City of Kirkland Department of Planning and Community Development 123 Fifth Avenue Kirkland, WA 98033
Date of Issuance	_____

City of Kirkland

Process IV: Amendments to the Zoning Map, Zoning Code and Municipal Code for the South Kirkland Park and Ride

EIS Addendum dated March 22, 2011

File No. ZON10-00014

I. Background

The City of Kirkland proposes to adopt amendments to the Zoning Map, Zoning Code and Municipal Code to allow Transit-Oriented-Development (TOD) at the South Kirkland Park & Ride. The zoning and municipal code amendments implement changes to the Comprehensive Plan that were adopted in 2008 by the Kirkland City Council and received final approval of the Houghton Community Council in January 2009. The Comprehensive Plan amendments included new text which provides policy direction for code and map changes to allow transit oriented development (TOD) on the Park & Ride site.

The proposed code amendments (see Attachments 1-3) include changes to the Zoning Map, Zoning Code and Municipal Code related to the South Kirkland Park and Ride site. The proposed Zoning Map amendments will rezone tax parcel 202505-9230 from PO (Professional Office) to a new YBD 1 zone (Yarrow Bay District 1). The proposed Zoning Code amendments will create a new zone in the Yarrow Bay Business District (YBD 1) which will retain all uses and development standards currently allowed within the PO zone, and add additional uses and standards to support transit-oriented-development.

Proposed changes include allowing Attached or Stacked Dwelling Units, with additional uses such as commercial, school, government facility, entertainment, cultural and/or recreational uses and other miscellaneous uses to be allowed on the ground floor of residential development. Proposed amendments also include requirements for affordability in residential development, regulations to establish building height, setback and other development standards. Proposed changes also include the use of design review for the review of development proposals in the YBD 1 zone. The proposed changes to the Municipal Code include the addition of new design guidelines for development in the YBD 1 zone.

The amendments will be reviewed using the Chapter 160 KZC, Process IV with adoption by City Council and final approval by the Houghton Community Council as the amendments are within their jurisdiction.

This Environmental Impact Statement (EIS) Addendum is intended to fulfill the environmental requirements pursuant to the State Environmental Policy Act (SEPA) for the proposed Comprehensive Plan amendment.

II. EIS Addendum

According to the SEPA Rules, an EIS addendum provides additional analysis and/or information about a proposal or alternatives where their significant environmental impacts have been disclosed and identified in a previous environmental document (WAC 197-11-600(2). An addendum is appropriate when the impacts of the new proposal are the same general types as those identified in the prior document, and when the new analysis does not substantially change the analysis of significant impacts and alternatives in the prior environmental document (WAC 197-11-600(4)(c), -625 and –706).

The City published the *City of Kirkland 2004 Draft and Final Comprehensive Plan 10-year Update*. This EIS addressed the 2004 Comprehensive Plan, Zoning Code and Zoning Map updates required by the Washington State Growth Management Act (GMA). Elements of the environment addressed in this EIS include population and employment growth, earth resources, air quality, water resources, plants and animals, energy, environmental health (noise, hazardous materials), land use, socioeconomics, aesthetics, parks/recreation, transportation, and public services/utilities.

This addendum to the *City of Kirkland 2004 Draft and Final Comprehensive Plan 10-year Update* is being issued pursuant to WAC 197-11-625 to meet the City's SEPA responsibilities. The EIS evaluated plan alternatives and impacts that encompass the same general development regulations and environmental impacts that are expected to be associated with the proposed amendments for transit-oriented-development discussed herein. While the specific location, precise magnitude, or timing of some impacts may vary from those estimated in the *City of Kirkland 2004 Draft and Final Comprehensive Plan 10-year Update*, they are still within the range of what was evaluated and disclosed there. No new significant impacts have been identified.

III. Non-Project Action

Decisions on the adoption or amendment of zoning ordinances are referred to in the SEPA rules as "non-project actions" (WAC 197-11-704(2)(b)). The purpose of an EIS in analyzing a non-project action is to help the public and decision-makers identify and evaluate the environmental effects of alternative policies, implementation approaches, and similar choices related to future growth. While plans and regulations do not directly result in alteration of the physical environment, they do provide a framework within which future growth and development – and resulting environmental impacts – will occur. Both the adoption of the Comprehensive Plan evaluated in the *City of Kirkland 2004 Draft and Final Comprehensive Plan 10-year Update* and eventual action on the amendments to the Zoning Map, Zoning Code and Municipal Code for the South Kirkland Park and Ride are "non-project actions".

IV. Environmental Analysis

The *City of Kirkland 2004 Draft and Final Comprehensive Plan 10-year Update* evaluated the environmental impacts associated with adoption of proposed policies and land use designations. The plan's policies are intended to accomplish responsibilities mandated by the Washington State Growth Management Act (GMA), and to mitigate the impacts of

future growth. In general, environmental impacts associated with the proposed Map and Code amendments are similar in magnitude to the potential impacts disclosed in the *City of Kirkland 2004 Draft and Final Comprehensive Plan 10-year Update*. As this proposal is consistent with the Lakeview Neighborhood Chapter of the Comprehensive Plan and the environmental impacts disclosed in the *City of Kirkland 2004 Draft and Final Comprehensive Plan 10-year Update*, no new significant impacts beyond those identified in the EIS for the Comprehensive Plan are anticipated

In considering possible impacts that might result from future development consistent with proposed changes to the Zoning Code, Zoning Map and Municipal Code, potential trip generation, changes to parking and aesthetics were evaluated.

Traffic and Parking Impacts

Attachment 4 contains the South Kirkland Park-and-Ride Transit Oriented Development Traffic and Parking Assessment, prepared by the Transpo Group, dated February 8, 2011. The study notes that while this assessment is approached in a conservative manner consistent with SEPA traffic studies, the actual project-level SEPA review would occur at a later stage in the process, when a development proposal for the site is submitted. The final residential unit count and mix of uses to be evaluated would be determined through King County's Request for Proposal (RFP) process.

Study Assumptions and Conclusions

The traffic and parking study was based on assumptions for a TOD project on the approximately 3.5 acre portion of the South Kirkland Park and Ride site that lies within the City of Kirkland. The project concept, as defined by King County would include up to 250 multi-family units, 12,500 square-feet of commercial use, and 250 additional park and-ride stalls for a total of 853 park-and-ride stalls. Only a portion of the additional park and ride stalls will be on the site that is located in the City of Kirkland.

For the purpose of the assessment it was assumed that approximately 20 to 50 percent of the multi-family units are anticipated to be affordable housing. Parking for the multifamily units and commercial use would be provided by additional stalls dedicated to the TOD project as well as through shared parking with the park-and-ride facility. Access to the site is assumed to continue via the two existing full access driveways along 38th Place NE and 108th Avenue NE.

The conclusions of the traffic and parking study are provided on page 11 of Attachment 4. They are repeated here:

A review of the potential local traffic impacts showed that relative to forecasted conditions without the project, no significant change to off-site intersection operations would occur with development of the TOD and park-and-ride expansion. For those intersections where forecasted operations are projected to be LOS E/LOS F, mitigation would not likely be triggered based on current City of Kirkland and City of Bellevue standards.

Improvements are recommended at the 108th Avenue NE/NE 38 Place intersection and the 108th Avenue NE site access. These improvements include a combination of providing additional capacity such as signalization at the 108th Avenue NE/NE 38th Place intersection and implementation of turn restrictions at the 108th Avenue NE access.

Several options exist for capacity improvements and turn restrictions, and it is recommended that this be revisited when a defined site plan is available such that any changes to the on-site circulation patterns can be considered in the final recommendation. The effect of these recommendations would be to reduce potential congestion along 108th Avenue NE near the access as well as a shift in traffic to NE 38th Place, and accommodating increased side street demand by improving the 108th Avenue NE/NE 38th Place intersection.

An analysis of the parking demand was conducted for the TOD component and park-and-ride. Due to the nature of TOD projects, it is desirable to have shared parking between the uses. Any overflow from the TOD would be accommodated in the vacant stalls in the park-and-ride lot that exist during non-peak times. The analysis showed that even with an average peak parking demand of 1.08 vehicles per unit for the residential uses, a peak demand for shared parking would not exceed 20 spaces. This can easily be met by the available parking at the park-and-ride lot.

When defining the required parking supply for the regulations to be considered for TOD at the site, the Transpo Group recommended a baseline assumption of 1.08 stalls per unit, consistent with the Redmond data, with provisions to adjust the required parking supply to account for reductions due to affordable (and possibly senior) housing components, as well as the ability to share parking with the park-and-ride facility. If overflow from the TOD is anticipated, the current utilization of the Park-and-Ride facility should be observed and the ability for shared parking confirmed.

The draft proposed regulations follow the recommendations of the traffic and parking study, with a requirement of 1.1 parking stalls required per unit. Additional parking is required for guest parking and other uses included in transit-oriented development. Provisions to consider modifications to the parking requirements according to the specific mix of uses and housing affordability are included.

Aesthetics

An analysis of the potential view impacts of development on the South Kirkland Park and Ride site was prepared by Mithun Architects (see Attachment 5). The analysis indicates that building height up to 70 feet would be below the highest point of the site to the east. Residences east of the property in the City of Bellevue are at elevations above the site's highest point, so buildings up to 70 feet would be even further below the sight line of these residences. The draft regulations (see Attachment 2) propose a building height of 53 feet above average building elevation for the Attached or Stacked Dwelling Units use listing in the YBD 1 zone.

The proposed amendments to the Municipal Code include new design guidelines for transit-oriented development at the site. The guidelines would be used to evaluate future development proposals for TOD, and address the quality of building design and

the design of any parking structure, building scale and massing, pedestrian features and amenities, streetscape elements, the gateway at this location, public amenities and open space and sustainable development.

V. Public Involvement

Public Meeting and Outreach History

In January 2010, the City began work on the Lakeview Neighborhood Plan. A Lakeview Advisory Group was formed to provide comments and recommendations on the neighborhood plan update. On March 30 2010, staff presented an overview and description of the TOD concept to a joint meeting of the Central and Lakeview Neighborhood Advisory Groups. On June 2, a special meeting of the Lakeview Advisory Group was held for the purpose of describing the adopted plan policies and code amendment process for the TOD. The meeting was an opportunity to ask questions and make comments on the adopted policy and King County's feasibility study exploring the TOD concept for the Kirkland portion of the site On July 13 2010, the Lakeview Advisory Group met on the South Kirkland Park and Ride property with a facilitated round table discussion. Each member expressed their concerns or comments related to the proposal and the comments were recorded on flip charts.

On August 23rd the preliminary recommendation and comments from the Lakeview Advisory Group for the Lakeview Neighborhood Plan were presented to a joint meeting of the Houghton Community Council and Planning Commission. Discussion comments "not in support" and "in support" of the TOD proposal were part of that discussion. The consensus of the Advisory Group was not to support housing especially affordable housing at the park and ride site.

On September 21, 2010 the City Council confirmed that the Comprehensive Plan policy direction was appropriate to guide the preparation of future regulations for the TOD. At that meeting the Council directed staff to initiate the preparation of the regulations.

Coordination with the City of Bellevue has been a key issue and the City's policy calls for that coordination to occur. This issue was also raised during the Lakeview Neighborhood Plan discussions. Staff from Kirkland, Bellevue and King County developed a set of "Principles of Agreement". These principles outline the mutual objectives for the proposal as it pertains to the zoning, site development, permitting, timing, public outreach and feasibility. The draft principles were approved by the Kirkland City Council on November 16, 2010 and transmitted to the City of Bellevue. The Bellevue City Council reviewed the principles as approved by Kirkland at a December study session and approved them with revisions on January 4, 2011. The Kirkland City Council approved the revised version on January 16, 2011.

On December 13 2010, staff presented the plan for public outreach and schedule for the code amendments to a joint meeting of the Planning Commission and Houghton Community Council (HCC). The schedule laid out a series of public workshops and study sessions before the Commission and Community Council with a public hearing to be held in the spring and action by the Planning Commission, HCC and City Council in May or June of 2011. At the meeting, staff also outlined the approach to the zoning and design

standards that would be brought to the HCC and Planning Commission following the public workshops.

Public Workshops

Public Workshops were held on January 20th at Northwest University and on January 25th at City Hall. Both workshops had the same format. Approximately 25 people signed in attending the first workshop and 36 people signed in for the second workshop. Several City Council, Houghton Community Council and Planning Commission members attended one or both workshops to observe. Staff representatives from the City, King County and ARCH described the project background and concept. Staff from the City of Bellevue was also in attendance and responded to questions. Following the presentation, the participants (excluding Council and Commission members) met in small groups at tables to discuss a central question regarding the park and ride:

Outreach and Information Materials

Along with the workshops, study sessions and public meetings there have been a variety of outreach efforts and activities to raise awareness of the proposal and engage the public as noted below.

- ✓ Postcard notices have been mailed to 433 residents and property owners within 600 feet of the site. The postcards provided dates of workshops, study sessions and the public hearing for the amendments. Public notice signs have been posted on the property.

- ✓ The City has a web page with detailed information explaining the proposal that includes background material, the schedule for meetings, links to other resources and how to provide input.

- ✓ The City has issued press releases regarding the workshops and e-mail notices have been sent to a variety of city list servs. The 4th Quarter, 2010 City Update Newsletter released in December included an in-depth article on the proposed TOD regulations for the Park and Ride site.

- ✓ At public meetings before the City Council, HCC and Planning Commission, under Items from the audience, people have provided comments on the proposal.

- ✓ Information on the workshops and the proposal were posted as a "rider alert" at the transit station at the Park and Ride lot.

- ✓ Staff has presented the concept to interested parties including the Market Neighborhood Association, the Kirkland Business Roundtable and Eastside Preparatory School.

- ✓ The Kirkland Reporter ran an editorial on the proposal in the November 26, 2010 edition and the King County Daily Journal of Commerce published an article on the project on January 14, 2011. In addition there have been various articles and letters to the editor in the Reporter.

- ✓ Kirkland Views and Kirkland Patch have posted comments on their respective blogs.

- ✓ E-mail comments and letters have been submitted to the City.

Additional public meetings on this topic that have followed the workshops include joint study sessions of the Houghton Community Council and the Planning Commission, held on February 10, 2011 and February 22, 2011. A public hearing on the proposed amendments is scheduled for March 24, 2011. Study sessions of the bodies are planned to follow the public hearing in April, with a study of the topic by the Kirkland City Council anticipated for May or June. Action by the City Council and final action by the Houghton Community Council are expected to occur shortly thereafter.

Public notice of these study sessions has been provided as described above for the earlier meetings and workshops.

VI. Conclusion

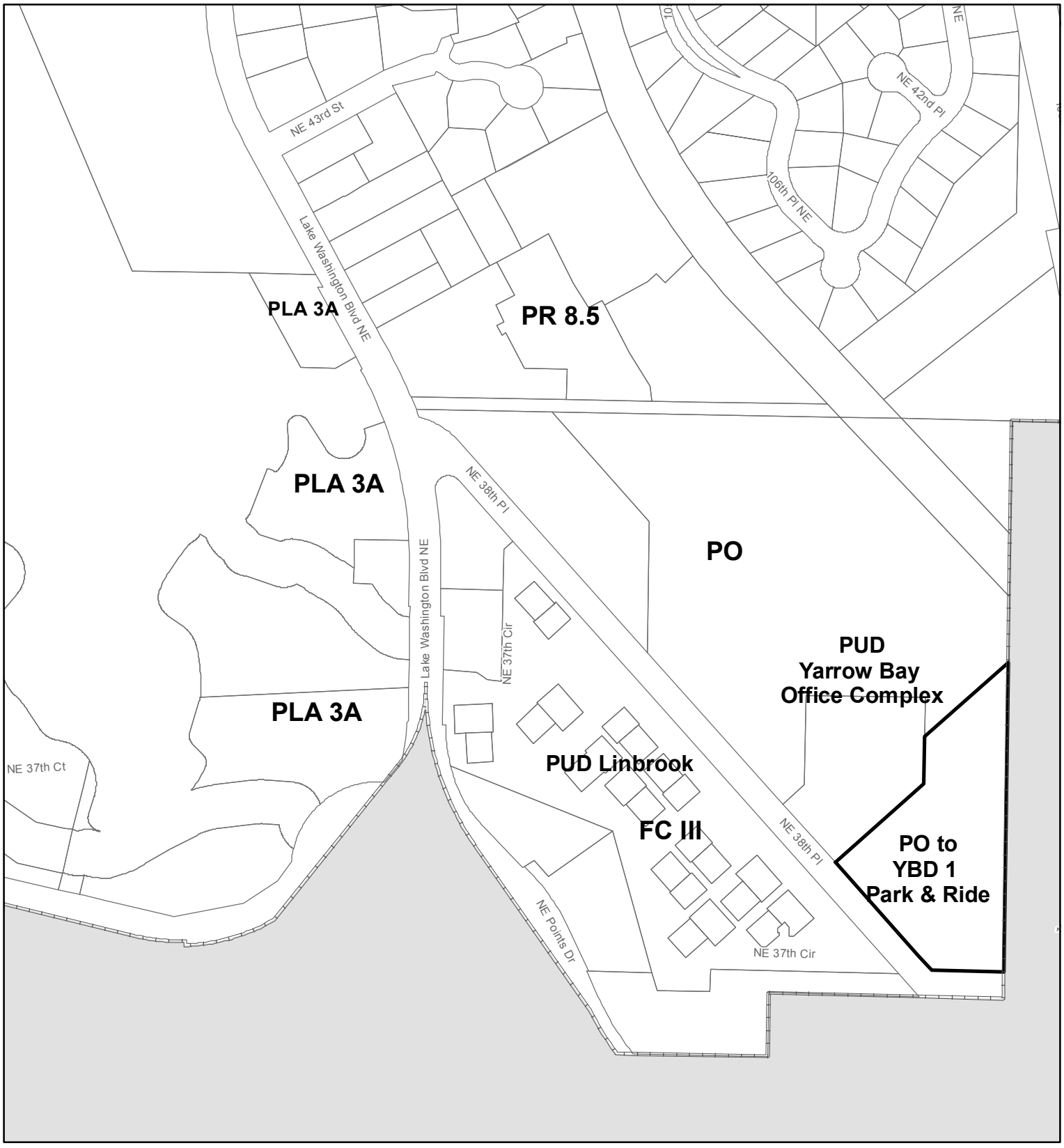
This EIS Addendum fulfills the environmental review requirements for the proposed amendments to the Zoning Map, Zoning Code and Municipal Code to allow transit-oriented development at the South Kirkland Park and Ride site. The impacts of the proposal are within the range of impacts disclosed and evaluated in the *City of Kirkland 2004 Draft and Final Comprehensive Plan 10-year Update*; no new significant impacts have been identified. Therefore, issuance of this EIS Addendum is the appropriate course of action.

Attachments:

1. Draft proposed changes to the Zoning Map
2. Draft proposed changes to the Zoning Code
3. Draft proposed design guidelines (changes to the Municipal Code).
4. South Kirkland Park-and-Ride Transit Oriented Development Traffic and Parking Assessment, prepared by the Transpo Group, dated February 8, 2011
5. Topography and View Analysis, prepared by Mithun Architects

Atttachment 1

Proposed PO to YBD 1 Rezone



Kirkland City Limits | PO to YBD 1 | Tax Parcels

N

DRAFT
March 17, 2011

Chart for Residential (Mixed Use) Development ~~and Independent Parking Structure~~ Use~~s~~
(Otherwise use PO charts as modified)
Yarrow Bay Business District 1 (YBD 1) USE ZONE CHART

56.05 User Guide. The charts in KZC 56.10 contain the basic zoning regulations that apply in the YBD 1 zone 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 56.08 - 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. In addition to the height exceptions established by KZC 115.60, the following exceptions to height regulations in the YBD 1 zone are established:
   a. Decorative parapets may exceed the height limit by a maximum of four feet; provided that the average height of the parapet around the perimeter of the structure shall not exceed two feet.
   b. For structures with a peaked roof, the peak may extend eight feet above the height limit if the slope of the roof is equal to or greater than four feet vertical to 12 feet horizontal.

USE ZONE CHART

Section 56.010

1) Use: Attached or Stacked Dwelling Units:

See Special Regulations.

Required Review Process: DR, Chapter 142 KZC.

Minimums:

Lot Size: None
Required Yards:
Front: 5' (see Special Regulation 2)
Side: 0'
Rear: 0'

Maximums:

Lot Coverage: 100%.
Height of Structures: 53' above average building elevation.

Landscape Category: C

Sign Category: E. See Special Regulation 9.

Required Parking (See KZC 105.103):

- Residential use: 1.1 per unit. ~~See KZC 105.25~~.
- Restaurant/tavern: 1 per 125 square feet of gross floor area
- Retail: 1 per 350 square feet of gross floor area
- Office: 1 per350 square feet of gross floor area
- Entertainment, Cultural, Recreational: Chapter 105.25

Special Regulations:

1. The required minimum front yard for any portion of the structure containing parking facilities shall be 10'.
2. The front setback may be reduced to 0' where retail uses or other ground floor space is designed to provide direct pedestrian access to the street are located adjacent to a pedestrian oriented street, major pedestrian pathway or adjacent to a transit facility.
3. May include one or more of the other uses allowed in this zone.

4 The following uses are prohibited:
   a. Any retail establishment exceeding 7,500~~15,000~~ square feet.
   b. Drive-through facilities.
   c. The outdoor storage, sale, service and/or rental of motor vehicles, sailboats, motor boats, and recreational trailers.

5. At least 50% of the linear frontage of the ground floor along NE 38th Place must include one or more of the following uses: Retail uses selling goods or providing services, including restaurants or taverns; Banking and Related Financial Services; School, Day-Care or Mini School or Mini Day-Care Center; Government Facility; Community Facility; and retail establishments providing entertainment, cultural and/or recreational activities. 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). 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 are allowed within this space subject to applicable design guidelines. The minimum ground floor story height for these uses shall be 13 feet.

6. Gross floor area constructed above the first~~second~~ floor must be dedicated to residential use.

7. Development of residential uses within the zoning district shall result in a minimum of 20 percent of total residential units being affordable with affordability levels as follows:

   a. For rental housing:
      - A minimum of 20 percent of the total residential units shall be affordable at 50% and 70% of median income, with a minimum of 10 percent of total residential units affordable at 50% of median income. Affordable rent levels will be determined using the same methodology used in the definition of Affordable Housing Unit in Chapter 5 KZC.

   b. For ownership housing:
      - A minimum of 20 percent of total residential units shall be affordable housing units as defined in Chapter 5 KZC.

8. The following additional regulations apply to affordable housing units included in development:

a. Alternative Affordability Levels – Subject to Director approval, an applicant may propose affordability levels different from those defined in this Chapter. In approving any different affordability levels, the Director shall use ratios similar to those in Chapter KZC 112.20.3.b.

b. Affordable housing provided pursuant to this section shall also comply with the following sections of Chapter 112KZC: 112.15.4 (Rounding); 112.35.2 (Affordability Agreement)

c. The following provisions of Chapter 112KZC do not apply to this zoning district: 112.15.5 (Alternative Compliance); 112.20 (Basic Affordable Housing Incentives); 112.25 (Additional Affordable Housing Incentives); 112.30 (Alternative Compliance).

d. Other provisions for the affordable housing units and moderate income units include:

- The type of ownership of the affordable housing units shall be the same as the type of ownership for the rest of the housing units in the development.
- The affordable housing units shall consist of a range in number of bedrooms that are comparable to units in the overall development.
- The size of the affordable housing units, if smaller than the other units with the same number of bedrooms in the development, must be approved by the Planning Director. In no case shall the affordable housing units be more than 10 percent smaller than the comparable dwelling units in the development, based on number of bedrooms, or less than 500 square feet for a one-bedroom unit, 700 square feet for a two-bedroom unit, or 900 square feet for a three-bedroom unit, whichever is less.
- The affordable housing units shall be available for occupancy in a time frame comparable to the availability of the rest of the dwelling units in the development.
- The exterior design of the affordable housing units must be compatible and comparable with the rest of the dwelling units in the development.
- The interior finish and quality of construction of the affordable housing units shall at a minimum be comparable to entry level rental or ownership housing in the City of Kirkland.

e. Applicants providing affordable housing units may request an exemption from payment of road impact fees for the affordable housing units as established by KMC 27.04.050.

f. Applicants providing affordable housing units may request an exemption from payment of park impact fees for the affordable housing units as established by KMC 27.06.050.

g. Applicants providing affordable housing units are eligible for exemption from various planning, building, plumbing, mechanical and electrical permit fees for the affordable housing and moderate income units as established in KMC 5.74.070 and KMC Title 21.

h. Property Tax Exemption – A property providing affordable housing units may be eligible for a property tax exemption as established in Chapter 5.88 KMC

9. Signs for a development approved under this provision must be proposed within a Master Sign Plan application (KZC 100.80) for all signs within the project.

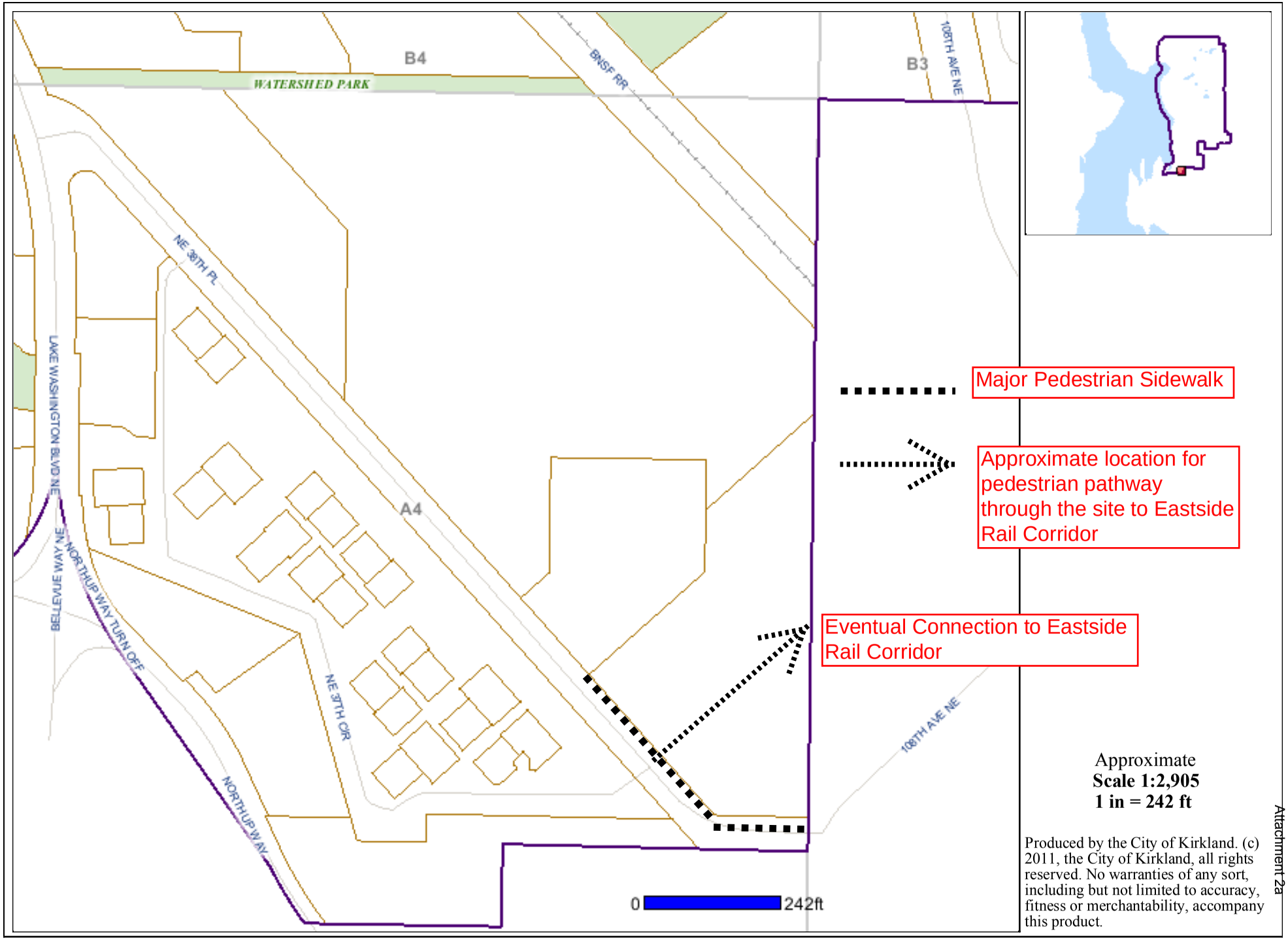
10. ~~Regulations to address sustainability in development are under study.~~ LEED Silver Certification or better.

11. This use must be part of a development that includes an increase in the number of parking stalls available exclusively to users of the Park and Ride facility.

12. Parking stalls to serve the use must be in addition to those provided as part of the expansion of capacity for the Park and Ride facility.

~~2) Use: Independent Parking Structure~~

~~(Standards to be developed. Likely issues: Building height, design guidelines, site design standards. See memo for discussion)~~



Approximate
Scale 1:2,905
1 in = 242 ft

Attachment 2a

105.58 Location of Parking Areas Specific to Design Districts

If the subject property is located in a Design District, the applicant shall locate parking areas on the subject property according to the following requirements:

1. Location of Parking Areas in the CBD, TC (TL 1, TL 2, TL 3) Zones

   a. Parking areas shall not be located between a pedestrian-oriented street and a building unless specified in a Conceptual Master Plan in TL 2. (See Plate 34 in Chapter 180 KZC and Chapters 92 and 110 KZC for additional requirements regarding pedestrian-oriented streets).

   b. On all other streets, parking lots shall not be located between the street and the building on the subject property unless no other feasible alternative exists.

2. Location of Parking Areas in the JBD 2, ~~and the~~ NRHBD and YBD 1 Zones – Parking areas shall not be located between the street and the building unless no other feasible alternative exists on the subject property.

3. Location of Parking Areas in the MSC Zones – Parking areas in the MSC zones shall not be located between the street and the building unless the Planning Official determines that the proposed landscape design provides superior visual screening of the parking area.

4. Location of Parking Areas in Certain TLN and RHBD Zones – Parking areas and vehicular access may not occupy more than 50 percent of the street frontage in the following zones (see Figure 105.58.A):

   a. TL 4, only properties fronting on 120th Avenue NE;

   b. TL 5;

   c. TL 6A, only properties fronting on 124th Avenue NE. Auto dealers in this zone are exempt from this requirement;

   d. TL 6B, only properties fronting on NE 124th Street;

   e. TL 10E.

   Alternative configurations may be considered through the Design Review process, if the project meets the objectives of the KMC Design Guidelines for the Totem Lake Neighborhood.

   f. In the Regional Center (RH 1A, RH 2A, RH 3 and RH 5A zones west of 124th Avenue). For parcels over two acres in size, parking lots and vehicular access areas may not occupy more than 50 percent of the NE 85th Street property frontage (see Figure 105.58.A). Alternative configurations will be considered through the Design Review process, if the project meets the intent of the KMC Design Guidelines for the Rose Hill Business District.

FIGURE 105.58.A

110.52 Sidewalks and Other Public Improvements in Design Districts

1. This section contains regulations that require various sidewalks, pedestrian circulation and pedestrian-oriented improvements on or adjacent to properties located in Design Districts subject to Design Review pursuant to Chapter 142 KZC such as CBD, JBD, TLN, TC, RHBD, ~~and~~ NRHBD and YBD zones.

   The applicant must comply with the following development standards in accordance with the location and designation of the abutting right-of-way as a pedestrian-oriented street or major pedestrian sidewalk shown in Plate 34 of Chapter 180 KZC. See also Public Works Pre-Approved Plans manual for public improvements for each Design District. If the required sidewalk improvements cannot be accommodated within the existing right-of-way, the difference may be made up with a public easement over private property; provided, that a minimum of five feet from the curb shall be retained as public right-of-way and may not be in an easement. Buildings may cantilever over such easement areas, flush with the property line in accordance with the International Building Code as adopted in KMC Title 21. (See Figure 110.52.A and Plate 34).

2. Pedestrian-Oriented Street Standards – Unless a different standard is specified in the applicable use zone chart, the applicant shall install a 10-foot-wide sidewalk along the entire frontage of the subject property abutting each pedestrian-oriented street. (See Figure 110.52.A).

Required Sidewalk on Pedestrian-Oriented Streets and Major Pedestrian Sidewalks

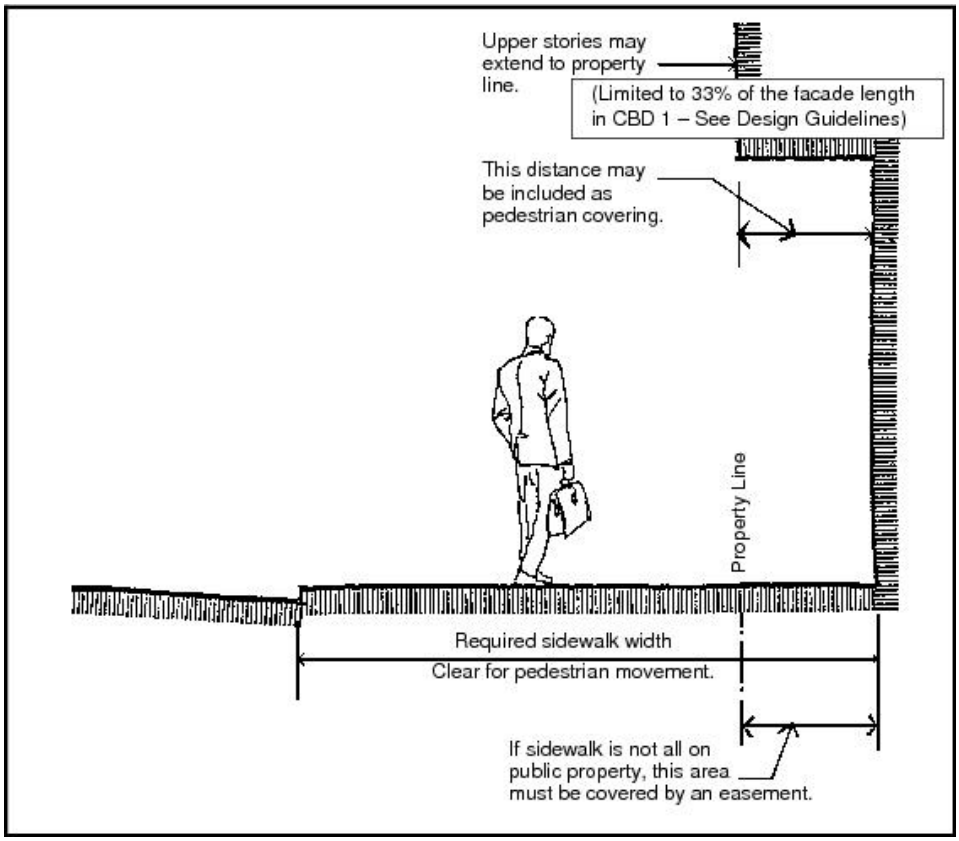


FIGURE 110.52.A

3. Major Pedestrian Sidewalk Standards – If the subject property abuts a street designated to contain a major pedestrian sidewalk in Plate 34, Chapter 180 KZC, the applicant shall install that sidewalk on and/or adjacent to the subject property consistent with the following standards:

   a. Install in the approximate location and make the connections shown in Plate 34;

   b. A sidewalk width of at least eight feet, unless otherwise noted in Plate 34;

   c. Have adequate lighting with increased illumination around building entrances and transit stops; and

   d. If parcels are developed in aggregate, then alternative solutions may be proposed.

4. Streets in the Totem Lake Neighborhood – Streets in the Totem Lake Neighborhood designated as major pedestrian sidewalks in Plate 34.E that are also shown to be within the landscaped boulevard alignment or "Circulator" in Plate 34.D in Chapter 180 KZC may have varied or additional requirements, such as wider sidewalks, widened and meandering planting areas, continuous and clustered tree plantings, special lighting, directional signs, benches, varying pavement textures and public art, as determined by the Director of Public Works.

5. NE 85th Street Sidewalk Standards – If the subject property abuts NE 85th Street, the applicant shall install a minimum 6.5-foot-wide landscape strip planted with street trees located adjacent to the curb and a minimum seven-foot-wide sidewalk along the property frontage. Where the public right-of-way lacks adequate width to meet the previous standard, a 10-foot-wide sidewalk with street trees in tree grates may be permitted or in an easement established over private property.

March 17, 2011

South Kirkland Park & Ride TOD
Design Guideline Matrix

Existing Comprehensive Plan Policies	Proposed Design Guidelines[1] - *Design Review Board Authority*	Proposed Zoning Regulations	Existing Zoning Regulations	Additional Guidelines Needed?	Specific Regulations Needed?
1. *Ensure high quality building and design*	• Building materials should exhibit permanence. • Building materials and color should be selected to integrate with each other and complement architectural design. • Ornament and applied art should be integrated with the structures and the site environment and not haphazardly applied. • Emphasis should be placed on highlighting building features such as doors, windows, and eaves, and on the use of materials such as wood siding and ornamental masonry. Ornament may take the form of traditional or contemporary elements • Original artwork or hand-crafted details should be considered in special areas.	• Require Design Review Board approval • A Master Sign Plan is required for signs on the subject property.	• Design Review Board provisions in KZC Chapter 142 • Master Sign Plan provisions in KZC Chapter 100		

[1] Proposed guidelines may address more than one policy.

Existing Comprehensive Plan Policies	Proposed Design Guidelines[1] - *Design Review Board Authority*	Proposed Zoning Regulations	Existing Zoning Regulations	Additional Guidelines Needed?	Specific Regulations Needed?
2. *Ensure that regulations support appropriate building scale and massing throughout the site, produce buildings that exhibit high quality design and incorporate pedestrian features and amenities that contribute to a livable urban village character for the TOD.*	***Building Scale & Massing*** • Large window areas should be avoided. Instead smaller window units should be used to achieve human scale. • Above the street level, buildings above the 2nd story should use upper story step backs to create receding building forms as building height increases to maintain human scale. A rigid stair step of "wedding cake" approach to upper story step backs is not appropriate. • Decks and/or balconies should be designed so that they do not significantly increase the apparent mass of the building. • The final arrangement of building mass should be placed in context with existing and/or planned improvements, gateway features, location of plazas and open space, and orientation with the public realm. • Building facades should be well modulated to avoid blank walls and provide architectural interest. • Landscaping should be used to provide visual interest and help soften building form at appropriate locations, including upper level terraces. • To help moderate the vertical scale of buildings, buildings should	• Limit size of any retail establishment to 7,500~~15,000~~ sq. ft. • Limit height to 53' above average building elevation • Require limited types of street level uses which include retail and restaurant uses • Allow for decorative parapets and peaked roofs to extend above the height limit • Create new Plate 34L which shows pedestrian connections in the YBD and future connection to Eastside Rail Corridor	• Various provisions in KZC Section 105.18 – Pedestrian Access o Pedestrian access from buildings to sidewalks and transit facilities o Pedestrian access between uses on subject property o Pedestrian connections between properties o Pedestrian access through parking areas o Pedestrian access through parking garages o Overhead weather protection • Various provisions in KZC 110.19 – Public Pedestrian Walkways • KZC 105.32 – Bicycle Parking o Ratio of 1 bicycle space for each 12 required motor vehicle spaces. Planning official may modify this requirement based on development size and anticipated pedestrian and bicycle activity. o Contains requirements for bike racks or enclosed storage container locations. • 115.142 Transit Shelters and Centers, Public.		

Existing Comprehensive Plan Policies	Proposed Design Guidelines[1] - *Design Review Board Authority*	Proposed Zoning Regulations	Existing Zoning Regulations	Additional Guidelines Needed?	Specific Regulations Needed?
	incorporate design techniques which clearly define the building's top, middle, and bottom. Examples include using a sloped roof and strong eave lines to help define the top; using windows, balconies, and material changes to define a building's middle; and pedestrian-oriented storefronts, awnings, and use of 'earth' materials such as concrete and stone to help define the building's bottom. • Vertical building modulation should be used to add variety avoiding monotonous design and to make large buildings appear to be an aggregation of smaller buildings. • Horizontal building modulation should be used to reduce the perceived mass of a building and to provide continuity at the ground level of large building complexes. Building design should incorporate strong pedestrian-oriented elements at the ground level and distinctive roof treatments. ***High Quality Design*** See Policy #1 ***Pedestrian Features & Amenities*** • Pedestrian walkways should be placed throughout the site to allow for efficient access between the residential, commercial, transit center uses, and adjacent streets. The walkways should be situated to		Public transit shelters and centers are allowed in all zones and shall not exceed 15 feet above average building elevation in low density zones. The public transit shelters and centers must not unreasonably impede pedestrian movement or create traffic safety problems. Transit route and information signs and markers may be installed. One hundred percent lot coverage is allowed. There are no specific requirements for review process, minimum lot size, minimum required yards, landscaping, or parking for this use.		

Existing Comprehensive Plan Policies	Proposed Design Guidelines[1] - *Design Review Board Authority*	Proposed Zoning Regulations	Existing Zoning Regulations	Additional Guidelines Needed?	Specific Regulations Needed?
	minimize walking distance from the public sidewalk and transit facilities to building entrances. • Pedestrian and bicycle connections should be well-defined and safe. • Pedestrian connections should be provided to adjacent properties to allow for efficient access to the transit facilities and commercial uses. • Landscaping should be used to help define and provide visual interest along pedestrian walkways. • Convenient and safe pedestrian areas should be designed in centralized locations to accommodate transit users. • Lighting should be provided to walkways and sidewalks through building mounted light and canopy or awning mounted lights. • Low level lighting in the form of bollards or similar style of lighting should be encouraged along pedestrian pathways not adjacent to buildings. • Vehicular (car and bus) circulation should not conflict with bicycle and pedestrian circulation throughout the site. • Safe crossing locations for pedestrians should be provided.				

Existing Comprehensive Plan Policies	Proposed Design Guidelines[1] - *Design Review Board Authority*	Proposed Zoning Regulations	Existing Zoning Regulations	Additional Guidelines Needed?	Specific Regulations Needed?
3. *Provide guidance for the streetscapes along NE 38th Place and 108th Avenue NE to ensure buildings do not turn their backs on the streets and development provides a welcoming and attractive presence at this gateway to Kirkland.*	***Streetscape*** • Street trees species should be selected and spaced to allow for visual continuity along NE 38th Place, buffer pedestrians from the street, and provide visibility of ground floor retail uses. • Buildings should be oriented towards the street when located along NE 38th Place. • Design elements such as multiple storefronts, pedestrian-oriented signs, exterior light fixtures, glazing, landscaping, and awnings should be utilized to add human scale and interest at the street level. • Ground floor spaces along NE 38th Place should be transparent with windows of clear vision glass beginning no higher than 2' above grade to at least 10' above grade. Windows should extend across, at a minimum, 75% of the façade length. Continuous window walls should be avoided by providing architectural building treatments, mullions, building modulation, entry doors, and/or columns at appropriate intervals. • Varied window treatments should be encouraged. Architectural detailing at window jambs, sills, and heads should be emphasized. Use of ribbon windows should be avoided.	• Identify NE 38th Place as a Major Pedestrian Sidewalk area	• 110.52 - Sidewalks and Other Public Improvements in Design Districts • KZC 110.60.11 - Entry or Gateway Features in Design Districts – In Design Districts, if the Comprehensive Plan or Design Guidelines designate the subject property for an entry or gateway feature, then the applicant shall design and install an entry feature area on the subject property. The size of the entry feature area shall be at least 100 square feet, and may include landscaping, art, signage or lighting. The design shall be reviewed by the City and decided upon as part of the Design Review for the proposed development. The applicant shall provide an easement or dedication of property surrounding the entry feature.		

Existing Comprehensive Plan Policies	Proposed Design Guidelines[1] - *Design Review Board Authority*	Proposed Zoning Regulations	Existing Zoning Regulations	Additional Guidelines Needed?	Specific Regulations Needed?
	• A street wall is a wall or portion of a wall of a building facing a street. Continuous street walls should incorporate vertical and horizontal modulations into the building form. • Along pedestrian oriented streets, upper story building facades should be stepped back to provide enough space for decks, balconies, and other activities overlooking the street. • Awnings or canopies should be required on facades adjoining sidewalks. Blank walls should be avoided near sidewalks, open spaces, and pedestrian areas. • Blank walls should not be visible from the street or sidewalk. Where blank walls are unavoidable, they should be treated with landscaping, art, or other architectural treatments. ***Gateway*** • A gateway is an urban design feature that signifies a sense of place and arrival into a city or neighborhood. A gateway should be designed in the location shown in the Comprehensive Plan. • The design of the gateway should include a combination of landscaping, architectural features, and artwork which: o Establishes a landmark that reflects the TOD elements of the site				

Existing Comprehensive Plan Policies	Proposed Design Guidelines[1] - *Design Review Board Authority*	Proposed Zoning Regulations	Existing Zoning Regulations	Additional Guidelines Needed?	Specific Regulations Needed?
	o Reinforces NE 38th Place and 108th Avenue NE as a focal point o Transitions between Kirkland and Bellevue and the Yarrow Bay Business District to the west				
4. *Protect the vegetative buffers and significant trees along the site's eastern and southeastern borders through development standards.*	None Proposed		• Tree retention standards in KZC Section 95.30		
5. *Minimize the visual impacts of parking facilities from adjacent rights-of-ways.*	• Parking areas should not be located between NE 38th Place and buildings. • Access driveways to parking areas should be minimized. • Parking lots should be designed to provide for clear vehicular and pedestrian circulation and be well organized. • Screening and landscaping should be used to reduce the visual impact of parking lots and/or parking structures to the surrounding neighborhood. • Intervening uses, artwork, building setbacks, and/or dense landscaping should be used to reduce the visual impact of parking structures along streets. Portions of parking structures visible from the street should be designed to complement neighboring buildings.	• Minimum 10' setback for parking structures along NE 38th Place • Add regulation to KZC 105.58 – Location of Parking Areas Specific to Design Districts	• KZC 95.44 – Internal Parking Lot Landscaping Requirements • KZC 95.45 – Perimeter Landscape Buffering for Driving and Parking Areas		

Existing Comprehensive Plan Policies	Proposed Design Guidelines[1] - *Design Review Board Authority*	Proposed Zoning Regulations	Existing Zoning Regulations	Additional Guidelines Needed?	Specific Regulations Needed?
6. Foster the creation of vibrant and desirable living environment through the use of high quality design, public amenities, and open space.	***High Quality Design*** See Policy #1 ***Public amenities and Open Space*** • Public open space should be provided on the subject property which can be used by the general public, residents, and transit users. • Public open space should be open to the sky except where overhead weather protection is provided (e.g. canopies and awnings). The space should appear and function as public space rather than private space. • Public open space should be designed in close proximity to adjacent shops and contain outdoor dining/seating areas, art, water features, and/or landscaping while still allowing enough room for pedestrian flow. • A combination of lighting, access to sunlight, paving, landscaping, and seating should be used to enhance the pedestrian experience with the public open space.	None Proposed	None		
7. Promote sustainable development through support of green building practices at the Park and Ride.	None Proposed	• ~~Regulations to address sustainability in development are under study. A reference to these regulations t will be added~~New regulation calls for LEED Silver Certification	None		

Existing Comprehensive Plan Policies		Proposed Design Guidelines[1] - *Design Review Board Authority*	Proposed Zoning Regulations	Existing Zoning Regulations	Additional Guidelines Needed?	Specific Regulations Needed?
			or better.			

Chapter 3.30

DESIGN REVIEW BOARD

Sections:

3.30.010 Membership—Appointment—Compensation—Removal.

The design review board shall be composed of seven appointed members. In addition, the director of planning and community development shall sit on the design review board ("DRB") as a nonvoting member for purposes of advising the board on regulatory and urban design issues. Members shall be appointed by a majority vote of the city council, without regard to political affiliation. The members of the DRB shall serve without compensation. Each member shall be appointed to a four-year term; provided, that as to the two positions added in 2003, one new member's initial term shall expire March 31, 2005, and the other new member's initial term shall expire March 31, 2007. Any vacancy shall be filled for the remainder of the unexpired term of the vacant position. When a member misses three or more consecutive meetings not excused by a majority vote of the DRB, the DRB will consider recommending removal of that member. The board shall recommend removal if the absences have negatively affected the board's abilities to perform its duties. The recommendation will be forwarded to city council. Members finding themselves unable to attend regular meetings are expected to tender their resignations. A member may be removed by a majority vote of the city council. (Ord. 3901 § 1, 2003: Ord. 3683A § 1 (part), 1999)

3.30.020 Qualifications.

Members of the design review board shall include design professionals and building/construction experts, and residents of Kirkland capable of reading and understanding architectural plans and knowledgeable in matters of building and design. The board shall at all times have a majority composition of professionals from architecture, landscape architecture, urban design/planning, or similar disciplines. In selecting members, professionals who are residents and/or whose place of business is within Kirkland will be preferred. (Ord. 3683A § 1 (part), 1999)

3.30.030 Powers and duties.

The design review board shall have the responsibilities designated in the Zoning Code. In addition, the design review board shall perform such advisory functions related to design issues as designated by the city council. (Ord. 3683A § 1 (part), 1999)

3.30.040 Design guidelines adopted by reference.

The design review board in combination with the authority set forth in Chapter 142 of the Zoning Code shall use the following design guidelines documents to review development permits:

(1) The document entitled "Design Guidelines for Pedestrian Oriented Business Districts" bearing the signature of the mayor and the director of the department of planning and community development dated August 3, 2004, is adopted by reference as though fully set forth herein. The city council shall consult with the planning commission prior to amending this document.

(2) The document entitled "Design Guidelines for the Rose Hill Business District" bearing the signature of the mayor and the director of the department of planning and community development dated January 3, 2006, is adopted by reference as though fully set forth herein. The city council shall consult with the planning commission prior to amending this document.

(3) The document entitled "Design Guidelines for the Totem Lake Neighborhood" bearing the signature of the mayor and the director of the department of planning and community development dated June 6, 2006, is adopted by reference as though fully set forth herein. The city council shall consult with the planning commission prior to amending this document.

(4) The document entitled "Kirkland Parkplace Mixed Use Development Master Plan and Design Guidelines" bearing the signature of the mayor and the director of the department of planning and community development, dated December 16, 2008, is adopted by reference as though fully set forth herein. The city council shall consult with the planning commission prior to amending this document.

(5) The document entitled "Design Guidelines for the Yarrow Bay Business District 1 Zone" bearing the signature of the mayor and the director of the department of planning and community development dated X, is adopted by reference as though fully set forth herein. The city council shall consult with the planning commission and the Houghton community council prior to amending this document.

(5) Text Amended. The following specific portions of the text of the design guidelines are amended as set forth in Attachment A attached to Ordinance 4106 and incorporated by reference. (Ord. 4172 § 1, 2008: Ord. 4106 § 1, 2007; Ord. 4052 § 1, 2006: Ord. 4038 § 1, 2006: Ord. 4031 § 1, 2006)

3.30.050 Conflict of interest.

If a member of the design review board is an applicant or a paid or unpaid advocate, agent, or representative for an applicant on a design review application, the member shall not participate in a decision on that design review application. (Ord. 3683A § 1 (part), 1999)

transpoGROUP
WHAT TRANSPORTATION CAN BE.

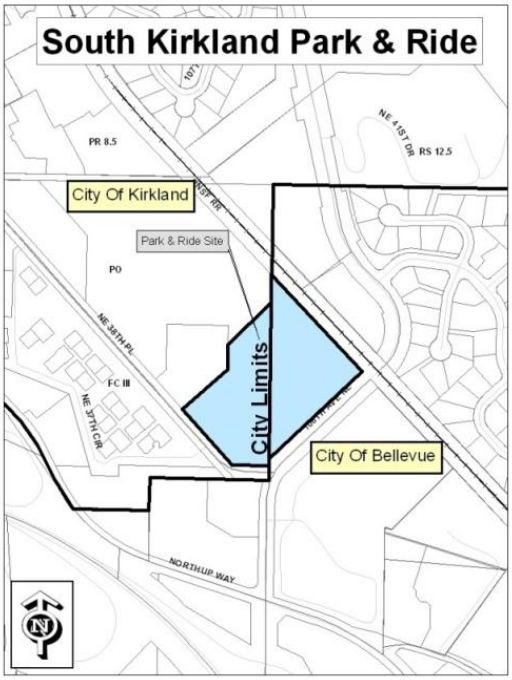
MEMORANDUM

Date:	February 8, 2011	**TG:**	10222.00
To:	Gary Prince – King County Metro Paul Stewart – City of Kirkland		
From:	Mike Swenson and Stefanie Herzstein – Transpo Group		
cc:	Kurt Gahnberg – Transpo Group		
Subject:	South Kirkland Park-and-Ride Transit Oriented Development Traffic and Parking Assessment		

This memorandum provides information to help inform the City's on-going efforts to consider amendments to the Zoning and Municipal Codes. These would ultimately include new transit oriented development (TOD) standards, design guidelines and/or regulations, and related code amendments to implement existing Comprehensive Plan policies. While this assessment is approached in a conservative manner consistent with SEPA traffic studies, the actual SEPA review would occur at a later stage in the process. The work to-date has been coordinated with City of Kirkland, City of Bellevue, and King County Metro staff.

TOD/Park and Ride Development Assumptions

The South Kirkland Park-and-Ride is located on the northwest corner of the 108th Avenue NE/38th Place NE intersection, at the southern boundary of the City of Kirkland. The park-and-ride lot contains approximately 600 designated parking stalls. King County currently owns and operates the seven acre park-and-ride. Approximately half of the seven acre park-and-ride is located within the City of Kirkland, while the remainder is located in the City of Bellevue.



The TOD project is anticipated to include up to 250[1] multi-family units, 12,500 square-feet of commercial use, and 250 additional park-and-ride stalls for a total of 853 park-and-ride stalls.

For the purpose of this assessment it is assumed that approximately 20 to 50 percent of the multi-family units are anticipated to be affordable housing. Parking for the multi-family units and commercial use would be provided by additional stalls dedicated to the TOD project as well as through shared parking with the park-and-ride facility. Access to the site is assumed to continue via the two existing full access driveways along 38th Place NE and 108th Avenue NE.

[1] The final residential unit count will be determined through King County's Request for Proposal (RFP) process.

Executive Summary

- **Benefits of TOD** – The development of TOD typically results in improved mobility by locating housing near transit services, reducing vehicle miles travelled for the region due to higher transit use, and improving air quality by reducing trip-making and trip lengths.
- **Benefits of the Park-and-Ride** – Provision of additional spaces within the park-and-ride will contribute to reducing regional vehicle demand for trips downstream of the park-and-ride by converting auto trips to transit trips and reduce off-site parking related to users parking along the transit routes.
- **Localized Impacts** – There is no significant change to off-site intersection operations anticipated to occur with development of the TOD and park-and-ride expansion, and mitigation is not likely to be triggered based on the current City standards.
- **Access Improvements** – A combination of providing additional capacity such as signalization at the 108th Avenue NE/NE 38th Place intersection and implementation of turn restrictions at the 108th Avenue NE may be required. The extent of these improvements are contingent on the final development plan and anticipated trip generation.
- **Parking Requirements -** When defining the required parking supply for the project, we recommend a baseline assumption of 1.08 stalls per unit, consistent with the Redmond data, with provisions to adjust the required parking supply to account for reductions due to senior and affordable housing components, as well as the ability to share parking with the park-and-ride facility. If overflow from the TOD is anticipated, the current utilization of the Park-and-Ride facility should be observed and the ability for shared parking confirmed.

Project Approach

The proposed TOD project and increase in park-and-ride parking supply represents one element of the region's future transportation strategy to make more efficient use of limited resources. While the technical analysis that follows is largely focused on the *localized* transportation impacts that could occur, the TOD proposal can be viewed in the larger context of smart growth planning.

TOD Housing Development Considerations

While the analysis that is contained herein presents a conservative picture of the nature of potential localized impacts of added housing on the site, there is a substantial amount of research that has been published regarding the potential benefits of TOD projects. These benefits include (but are not limited to):

- **Increase Mobility** – Improved mobility options within congested areas occurs when housing development is located proximate to regional transit service. The South Kirkland Park-and-Ride facility provides transit service to the entire region, and a quick connection to the regional employment centers of Seattle and Bellevue.
- **Reduce Vehicle Miles Traveled (VMT)** – A critical metric for many Transportation Management Programs for employment facilities focuses on reducing overall VMT. This can occur through reduced trip generation, as well as through shortening of vehicle trips.
- **Improved Air Quality** – Linking housing development with access to transit would result in reduced emissions through both reduced trip-making (vehicle trip generation)

and reduced trip lengths when housing is located within the urbanized area instead of suburban or rural locations.

- **Provide Affordable Housing Opportunities/Reduced Auto Demand** – Not only does a TOD project such as this contribu**te to the supply of affo**rdable housing, but also its location adjacent to park-and-ride/transit facilities reinforces the opportunity to reside in such housing without the need for an automobile. This results in a significant reduction in both vehicle trip generation and the parking supply needed to directly serve the housing.

The regional benefits to TOD projects can be significant, although there is often some increase in localized impacts in the immediate vicinity of the TOD project. The detailed analysis that follows is largely focused on helping to understand the localized impacts of the TOD component and the increased size of the park and ride facility. However, a TOD should also be considered in the context of the overall regional smart growth strategies.

Park-and-Ride Considerations

Similar to the discussion above regarding the TOD component of the proposal, the proposed increase in parking associated with the park-and-ride facility could accommodate additional and future travel demand that would otherwise be making an auto trip, and would serve those parking and accessing the transit system at other locations due to the high utilization currently experienced at the South Kirkland Park-and-Ride. In all cases, since the proposal is simply to increase the supply of parking, no new regional travel demand would occur as a result of the increased parking, it would simply accommodate demand already on the system, effectively diverting trips from other routes. The majority of these regional trips would be attracted from SR 520 and I-405. A lesser proportion would be diverted from local streets near or adjacent to the site, such as Lake Washington Boulevard, 108th Avenue NE, and Northup Way. These travel patterns to the park-and-ride facility would result in the following impacts and benefits:

- **Reduced Regional Auto Demand** – Increasing the transit share of regional travel marginally (i.e., by auto trips being converted to park-and-ride users) improves the travel environment for all remaining travel modes on the system, including single occupant autos and high occupancy vehicles (HOV), especially for that portion of the regional trip "downstream" from the park-and-ride facility (i.e. to the west on SR 520).
- **Minor Increases in Local Access Traffic** – As traffic from other routes is reoriented to the park-and-ride facility, minor increases in local access traffic would occur.
- **Reduced Off-Site Parking** – While the level of current off-site parking is unknown, there have been comments from the community that such parking occurs as a result of the parking supply limitations of the existing park-and-ride. Increasing the on-site parking supply would reduce the demand for transit access parking that occurs elsewhere along transit routes serving the park-and-ride.

Overall, the combined development of proposed TOD (with an affordable housing component) and the increase in parking supply of park-and-ride facility would:

- Further King County/Metro's and the City's goals to facilitate smart growth through encouraging development with reduced trip making characteristics
- Result in localized impacts associated with vehicle access that would be addressed in more detail at the project proposal/SEPA evaluation stage of the development process.

The remainder of the technical review is primarily focused on understanding the likely level of local impacts and how those impacts should inform zoning requirements. As mentioned above, the

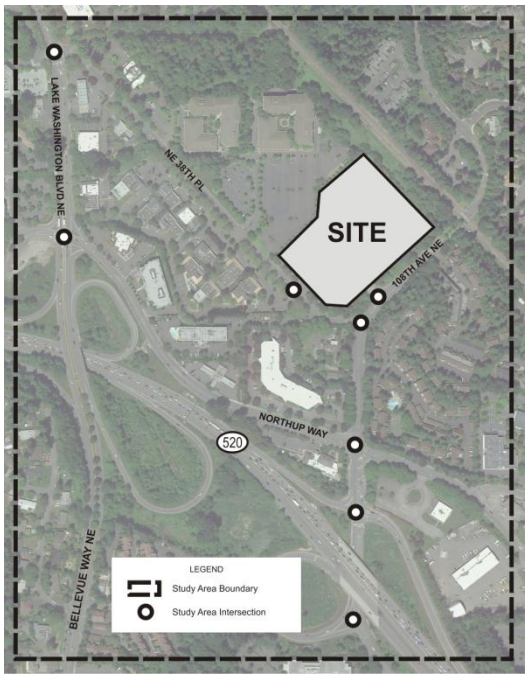
detailed project-specific SEPA evaluation, including the City of Kirkland transportation concurrency review, would be conducted as part of a separate review process.

Local Traffic Impacts

This section describes the potential traffic volume and intersection operation impacts associated with a potential project (inclusive of the TOD and increase in park-and-ride stalls). The evaluation focuses on the weekday PM peak hour (of the adjacent street system) consistent with the City of Kirkland requirements and the final traffic analysis conducted by Washington State Department of Transportation (WSDOT) as part of their coordination on SR 520 with the City of Bellevue.

The year 2030 was selected for analysis of the impacts of the long term affects of the proposed rezone because it is consistent with the horizon year for the regional transportation modeling that supports the SR 520 improvements (tolling, etc.); thus, the analysis gives decision makers the best sense of how the proposal will integrate with the long term transportation vision. SEPA review and concurrency analysis will occur at a later stage, and be based on the City of Kirkland TIA procedures.

The scope of this study includes an evaluation of a number of key intersections along Bellevue Way and Lake Washington Boulevard as illustrated on the map located to the right. Several of the study area intersections are under the City of Bellevue jurisdiction.



Trip Generation

The potential project has two primary components: residential/retail mixed-use and the park-and-ride expansion. The following provides a summary of the assumptions made in regards to the development of trip generation estimates for the project.

TOD Component. As identified in multiple research studies, TOD housing projects have a lower vehicle trip generation rates when compared to stand alone residential projects due to the location of the projects near transit service. Research has shown that TOD housing results in up to 50 percent fewer trips than non-TOD housing due to residents using transit rather than personal vehicles[2,3]. There is also a component of affordable housing to be included in the TOD project. Studies show that auto ownership for affordable housing residents (i.e., lower incomes) is less[4]. To account for the affordable housing as well as the transit oriented nature of the residential component, the trip rates published in the ITE Trip Generation Manual, 8th Edition, were reduced by 40 percent. The detailed calculations are shown in Table 1.

Due to the presence of the retail use, there is also an element of trip internalization between uses that needs to be considered. Internal trips that would occur within the site between the apartment

[2] *Transit Cooperative Research Program (TCRP) Report 128 Effects of TOD on Housing, Parking, and Travel*, G.B. Arrington and Robert Cervero, Federal Transit Administration, Transportation Research Board, Washington D.C., 2008.

[3] *New Transit Cooperative Research Program Research Confirms Transit-Oriented Developments Produce Fewer Auto Trips*, G.B. Arrington and Kimi Iboshi Sloop, ITE Journal, June 2009.

[4] National Household Travel Survey, 2009.

and retail and park-and-ride and retail uses were estimated for purposes of developing overall off-site trip generation. An internal trip reduction of approximately 4 percent or 13 trips was calculated using the ITE *Trip Generation Handbook*, 2nd Edition. In addition to internalization of the residential /retail trips, a portion of the retail trips are typically assumed to be pass-by trips i.e., trips already on the adjacent roadway system that would travel to and from the retail. Based on the ITE *Trip Generation Handbook*, 34 percent of the retail trips were assumed to be pass-by.

Park-and-Ride Facility. As discussed in the introduction to this memorandum, park-and-ride lots are not anticipated to generate new traffic on a regional scale. The purpose of a park-and-ride is to attract existing traffic in the area, concentrate it at one location, and transfer people to transit. As a result, there would be some localized impact in the immediate vicinity of the project, and an overall benefit to the region's transportation system. With the tolling of SR 520 scheduled to begin spring 2011, park-and-ride demand is expected to increase. To evaluate the potential impacts of the park-and-ride component of the project, it was assumed that 50 percent of the park-and-ride trips would be diverted from an existing route in the immediate vicinity while the remaining 50 percent would be a "new trip" within the limits of the study area.

Traffic counts were conducted at the park-and-ride driveways on December 15, 2010 from 4:00 to 6:00 p.m. to develop an existing trip rate per stall for the South Kirkland Park-and-Ride during the weekday PM peak hour of the adjacent street network. Although the parking lot is typically fully occupied during the day, the weekday peak hour represents when traffic volumes to and from the driveway and on the surrounding roadway system would be highest. Attachment A provides the park-and-ride traffic counts. This data showed that for the existing 603 stall park-and-ride there was a total of 303 vehicle trips (inbound and outbound) during the weekday PM peak hour of the adjacent street or 0.50 trips per stall (see Attachment A).

Table 1 provides a summary of the trip generation estimated for the TOD project. Detailed trip generation calculations are provided in Attachment B. As shown in the table, the potential TOD and park-and-ride project would generate 194 net new weekday PM peak hour trips.

Table 1. Estimated Weekday PM Peak Hour Trip Generation for the TOD and Park-and-Ride

			PM Peak Hour Trips		
Land Use	**Size**	**Rate[1]**	**Inbound**	**Outbound**	**Total**
Apartment (#220)	250 units	0.62	101	54	155
Transit/Affordable Housing Reduction[3]			*-39*	*-21*	*-60*
Retail (#820)	12,500 square-feet	3.73	23	24	47
Internal Trip Reduction[2]			*-7*	*-6*	*-13*
Pass-by Trip Reduction[4]			*-7*	*-7*	*-14*
Park-and-Ride	250 stalls	0.50	34	91	125
Diverted Trip Reduction[5]			*0*	*-46*	*-46*
		Total Trips	*158*	*169*	*327*
		Trip Reductions (Diverted/Pass-by)	*53*	*80*	*133*
		Net New Trips	**105**	**89**	**194**

Source: Transpo Group, 2011.

1. Trip generation rate based on ITE *Trip Generation*, 8th Edition regression equation for apartment land use #220, average trip rate for shopping center (retail) land use #820, and traffic counts conducted at the South Kirkland park-and-ride on December 15, 2010 for the park-and-ride use.
2. Internal trips calculated using ITE *Trip Generation Handbook*, 2nd Edition assuming internal trips only between apartment and retail and retail and park-and-ride. The ITE office data was used for the park-and-ride internal trip rates.
3. Based the Transit Cooperative Research Program (TCRP) Report 128 (2008), *New Transit Cooperative Research Program Research Confirms Transit-Oriented Developments Produce Fewer Auto Trips*, ITE Journal, (June 2009), and National Household Travel Survey (2009), a 40 percent reduction was taken to account for residents using transit rather than driving personal vehicles.
4. Pass-by rate (34 percent) is based on ITE *Trip Generation Handbook*, 2nd Edition for shopping center land use.
5. Fifty percent of the park-and-ride peak direction trips are assumed to be diverted.

Trip Distribution and Assignment

The project-related trips were assigned to the roadway network based on existing travel patterns and the Bellevue Kirkland Redmond (BKR) travel demand model. Given the differences in the travel behaviors for the TOD (apartments and retail) and park-and-ride components, a separate distribution was determined for each. Attachments C and D display the distribution for the TOD and park-and-ride. Traffic was assigned to the study area based on the travel patterns as shown on Attachments E and F.

2030 Traffic Volume Forecasts

Forecast Methodology. Baseline 2030 traffic volumes for the weekday PM peak hour were provided by WSDOT and are based on the BKR travel demand model and work completed as part of the coordination with Bellevue on the SR 520 project. For locations not included in the SR 520 evaluation, an annual growth rate of two percent per year was applied to the existing traffic volumes based the forecasted growth from the travel demand model. This growth rate is conservative when considering a 20year forecast, but it is inclusive of general background growth as well as changes in travel patterns that may result from the SR 520 project. As mentioned, 2030 was selected as the analysis year to assure consistency with the long term regional planning and anticipated improvements to SR 520. Project-specific SEPA analysis and concurrency review at a later stage. Attachment A includes the existing weekday PM peak hour intersection turning movement counts for the site access locations and the 108th Avenue NE/NE 38th Place intersection. Attachment G shows the baseline 2030 traffic volumes for the study area. Project traffic volumes were added to the future baseline traffic volumes to develop the 2030 with-project traffic forecasts. Attachment H shows the weekday PM peak hour traffic volumes at the study intersections.

Proportionate Share. Table 2 summarizes the anticipated total intersection traffic with the project as well as the percent of future with-project volume attributable to the proposed project during the weekday PM peak hour. As shown in the table, the TOD and park-and-ride would increase traffic locally along 108th Avenue NE, NE 38th Place, and Northup Way. However, traffic would decrease along Lake Washington Boulevard in the vicinity of the SR 520 interchange since the additional park-and-ride stalls would attract users that may have otherwise travelled to and from Seattle via SR 520.

Table 2. Future 2030 Weekday PM Peak Hour Traffic Volume Impact at Study Intersections

Intersection[1]	With-Project Traffic Volume	TOD/Park-and-Ride Traffic[1]	Percent TOD Impact
1. Lake Washington Boulevard/NE 38th Place	3,278	18	0.5%
2. Lake Washington Boulevard/Northup Way/NE Points Drive	5,023	-7	-0.1%
3. Lake Washington Boulevard/SR 520 WB On-Ramp	4,002	-8	-0.2%
4. Lake Washington Boulevard/SR 520 EB Off-Ramp	3,590	-20	-0.6%
5. NE 38th Place/South Access Park-and-Ride	805	60	7.5%
6. 108th Avenue NE/East Access Park-and-Ride	2,041	171	8.4%
7. 108th Avenue NE/NE 38th Place	2,334	134	5.7%
8. 108th Avenue NE/Northup Way	4,797	127	2.6%
9. 108th Avenue NE/SR 520 WB On-Ramp	2,928	98	3.3%
10. 108th Avenue NE/SR 520 Transit-HOV Ramp/WB Off-Ramp	3,754	94	2.5%
11. 108th Avenue NE/SR 520 EB Off-Ramp	3,075	65	2.1%

Source: Transpo Group, 2010.
Notes: EB = eastbound and WB = westbound
1. Negative traffic volume and percent impact due to park-and-ride trips being diverted from SR 520 to the park-and-ride and using transit to travel rather than SR 520.

In addition to the intersection impacts shown in Table 2, impacts on key corridors include:

- **Lake Washington Boulevard.** North of NE 38th Place, the TOD/Park-and-Ride expansion traffic is anticipated to constitute approximately 0.6% of the project 2030 volumes.
- **108th Avenue NE.** North of the South Kirkland Park-and-Ride Driveway, the TOD/Park-and-Ride expansion traffic is anticipated to constitute approximately 2.8% of the project 2030 volumes.

The amount of TOD/Park-and-Ride expansion traffic volumes anticipated along Lake Washington Boulevard and 108th Avenue NE are within the range of day-to-day traffic fluctuations.

Traffic Operations Impacts

Methodology. Traffic operational analysis was conducted for 2030 traffic forecasts at the study intersections defined for this analysis. The City of Kirkland's adopted intersection LOS standard is LOS D. Based on the City's *Traffic Impact Analysis Guidelines* (February 2004), they generally define a SEPA impact requiring mitigation at a signalized location where the project's proportional share of daily intersection traffic related to the capacity of the intersection represents[5]:

- More than 15 percent at intersections operating at LOS E
- More than 5 percent at intersections operating at LOS F

Although this analysis is not being prepared for SEPA purposes, review of the City's thresholds is reasonable criteria to apply. The Lake Washington Boulevard/NE 38th Place intersection is the only signalized study intersection located in the City of Kirkland. The City of Bellevue does not have an adopted intersection LOS standard; however, LOS D/E are generally considered acceptable.

Results. The results of the with-project analysis were compared to the 2030 baseline conditions to identify long range localized traffic impacts associated with the proposal. The analysis assumes that by 2030 WSDOT completes improvements at the SR 520 interchanges as well as tolling of SR 520. Table 3 summarizes the future with and without-project LOS for the weekday PM peak hour. Detailed LOS worksheets are included in Attachment I.

[5] See Table 1 of the City of Kirkland *Traffic Impact Analysis Guidelines*, Revised February 2004.

Table 3. Future 2030 Weekday PM Peak Hour LOS Summary

Intersection	Baseline			With-Project		
	LOS[1]	Delay[2]	V/C[3] or WM[4]	LOS	Delay	V/C or WM
1. Lake Washington Boulevard/NE 38th Place	F	>120	1.36	F	>120	1.36
2. Lake Washington Boulevard/Northup Way/NE Points Drive	E	59	1.00	E	59	1.00
3. Lake Washington Boulevard/SR 520 WB On-Ramp	B	12	0.77	B	12	0.78
4. Lake Washington Boulevard/SR 520 EB Off-Ramp	C	21	0.59	C	21	0.58
5. NE 38th Place/South Access Park-and-Ride	B	12	SB	B	13	SB
6. 108th Avenue NE/East Access Park-and-Ride	E	35	EB	F	76	EB
7. 108th Avenue NE/NE 38th Place	F	>120	EBL	F	>120	EBL
8. 108th Avenue NE/Northup Way	E	64	0.97	E	70	1.00
10. 108th Avenue NE/SR 520 Transit-HOV Ramp/WB Off-Ramp	D	49	0.92	D	51	0.93
11. 108th Avenue NE/SR 520 EB Off-Ramp	B	16	0.69	B	16	0.69

1. Level of service, based on 2000 Highway Capacity Manual methodology.
2. Average delay in seconds per vehicle.
3. Volume-to-capacity ratio reported for signalized intersections.
4. Worst movement reported for unsignalized intersections where, SB = southbound approach, EB = eastbound approach, and EBL = eastbound left-turn movement.

As shown in the table, several intersections are forecast to operate at LOS E/F in the future with or without the proposed project.

The **108th Avenue NE intersections with the park-and-ride access and NE 38th Place** are anticipated to operate poorly due to the increase in vehicles to and from the site as well as the anticipated growth along the 108th Avenue NE corridor. In order to enhance access to and from the TOD and park-and-ride, intersection improvements would be needed at these locations. Potential improvements to these locations would include:

- **Access Restrictions at the 108th Avenue NE Driveway**: Depending on the final project level of development and future traffic growth, the 108th Avenue NE driveway would likely need to have some access restrictions. The actual restriction should be determined in conjunction with the on-site design to ensure circulation is adequate for transit and general purpose vehicles. Examples of potential restrictions include right-in/right-out only or right-in/right-out/left-in only access.
- **NE 38th Place Main Access:** Given the restricted access along 108th Avenue NE, the majority of the traffic would use this driveway. The site should be configured to allow for approximately 100-feet of storage on the outbound approach and to direct users to this location.
- **Enhanced Traffic Control at 108th Avenue NE/NE 38th Place Intersection**: Traffic control improvements should be implemented to add capacity to NE 38th Place such as installation of a traffic signal or similar traffic control measures.

Lake Washington Boulevard/NE 38th Place. This intersection is anticipated to operate at LOS F during the PM peak hour, with or without the proposed project. Based on the City of Kirkland proportional share calculation worksheet, the TOD and park-and-ride proportional share at the Lake Washington Boulevard/NE 38th Place intersection is approximately 1.70 percent. Based on the City of Kirkland's criteria, this would not be considered a significant impact in terms of the SEPA thresholds.

Lake Washington Boulevard/Northup Way. This intersection is anticipated to operate at LOS E during the weekday PM peak hour by 2030 with or without the project. The park-and-ride and TOD

project would increase the total intersection volume at this location by less than one percent (see Table 2). This intersection would continue operating at LOS E, which is within the acceptable LOS D/E range typically used by the City of Bellevue.

108th Avenue NE/Northup Way. This intersection would operate at LOS E during the weekday PM peak hour by 2030 with or without the project. The park-and-ride and TOD project would increase the total intersection volume at this location by less than three percent (see Table 2). This intersection would continue operating at LOS E, which is within the acceptable LOS D/E range typically used by the City of Bellevue.

The suggested improvements have the potential to alter the circulation patterns internal to the site; therefore, these improvements should be reassessed during the SEPA review at the time a detailed plan is developed and a project moves forward. In general, the analysis shows that some form of turn restrictions would be necessary at the 108th driveway and capacity improvements would be needed at the 108th Avenue NE/NE 38th Place intersection to accommodate future traffic levels associated with the project and potential shifts in traffic due to the turn restrictions on 108th Avenue NE.

Parking Guidelines

The purpose of this parking discussion is to provide information around the anticipated parking demand in order to develop zoning regulations for the project. Currently no specific project has been identified and as such no defined parking supply established. Parking demand for TOD projects can be influenced by several key factors such as the mix of affordable housing and provision of a senior housing component.

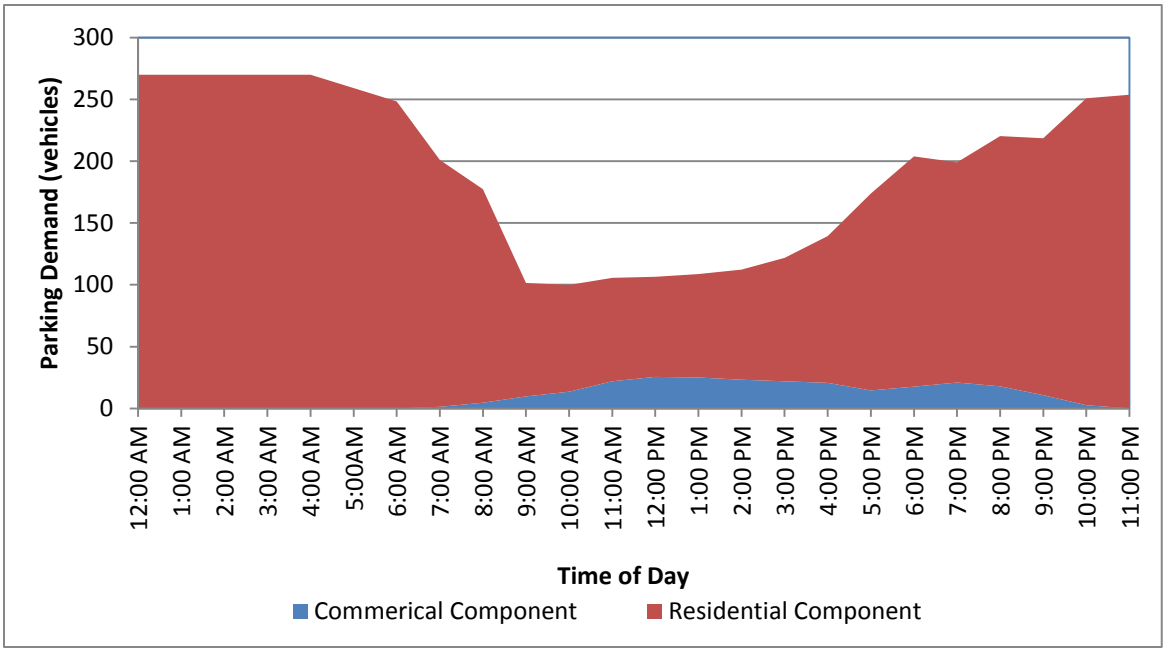
Data collected locally at four sites in the Redmond Urban Center, with market rate residential units, shows a parking demand range of 1.01 to 1.12 vehicles per unit[6]. Provision of affordable and/or senior housing would impact the parking demand significantly.

To understand the potential parking demand of the TOD component, this analysis assumed a peak demand rate of 1.08 vehicles per unit for the residential component, which represents the weighted average of the Redmond data. This does not take into consideration of factors discussed previously regarding affordable and senior housing. Parking demand for the retail component was calculated based on the average rate provided in the ITE *Parking Generation*, 4th Edition. It anticipated the retail uses would be geared towards users of the park-and-ride facility as well as the residential component; however, at this time only a 20 percent reduction in retail parking demand has been assumed. In addition, TOD development in suburban areas is shown to the less than projected by ITE *Parking Generation,* 4th Edition. These assumptions should be further refined when a development plan and potential uses are defined.

Based on the size of the TOD and the parking rates described above, Figure 1 shows the 24-hour parking demand profiles for the retail and residential components of the TOD project. Time of day distribution is also based on ITE.

[6] *Assessing Multifamily Residential Parking Demand and Transit Service*, ITE Journal, December 2010,

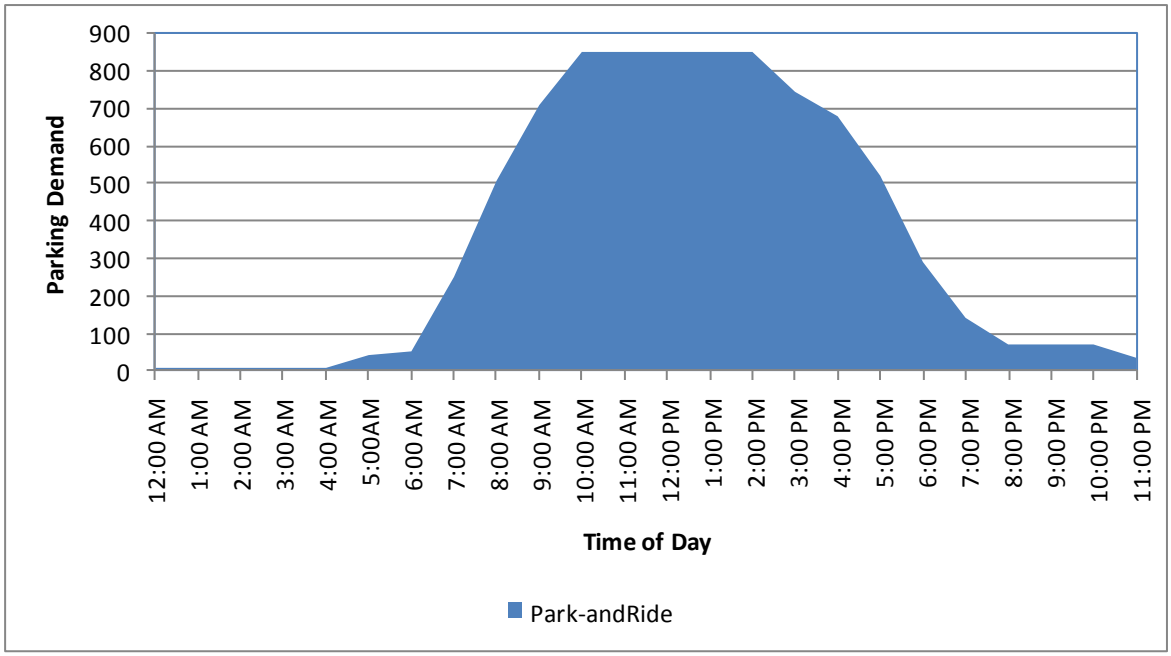
Figure 1. TOD Component Weekday Parking Demand Curve



Initial plans call for approximately one stall per unit or 250 stalls dedicated to the TOD portion (250 residential units/ 12,500 square-feet of retail) of the project, but this could change with the final development plans. As shown in the figure, assuming a supply of 250 stalls, the peak parking demands for the TOD component could exceed the dedicated parking between 6:00 p.m. and 7:00 a.m. by approximately 20 vehicles. This coincides with the low utilization periods of the park-and-ride lot. As discussed above, the rate used to calculate residential parking demand is based on market rate housing; therefore, this overflow from the TOD component would be less based on adjustments to the peak demand to account for the affordable and/or senior housing.

Figure 2 provides an estimated parking demand curve for the park-and-ride based on data collected at the South Kirkland Park-and-Ride during the peak periods (morning and evening) and an assumed 100 percent occupancy during the peak periods. As discussed previously, the total parking supply for the park-and-ride would be approximately 850 spaces with the project. The graph shows that during the fringes of the peak period (i.e., prior to 7:00 a.m. and after 6:00 p.m.), more than adequate capacity would exist to accommodate any overflow from the TOD components, even assuming the upper end of the demand curve and only 200 stalls of dedicated TOD parking provided.

Figure 2. Figure 2. Park-and-Ride Weekday Demand Curve



Conclusions

A review of the potential local traffic impacts showed that relative to forecasted conditions without the project, no significant change to off-site intersection operations would occur with development of the TOD and park-and-ride expansion. For those intersections where forecasted operations are projected to be LOS E/LOS F, mitigation would not likely be triggered based on current City of Kirkland and City of Bellevue standards.

Improvements are recommended at the 108th Avenue NE/NE 38 Place intersection and the 108th Avenue NE site access. These improvements include a combination of providing additional capacity such as signalization at the 108th Avenue NE/NE 38th Place intersection and implementation of turn restrictions at the 108th Avenue NE access. Several options exist for capacity improvements and turn restrictions, and it is recommended that this be revisited when a defined site plan is available such that any changes to the on-site circulation patterns can be considered in the final recommendation. The effect of these recommendations would be to reduce potential congestion along 108th Avenue NE near the access as well as a shift in traffic to NE 38th Place, and accommodating increased side street demand by improving the 108th Avenue NE/ NE 38th Place intersection.

An analysis of the parking demand was conducted for the TOD component and park-and-ride. Due to the nature of the TOD projects, it is desirable to have shared parking between the uses. Any overflow from the TOD would be accommodated in the vacant stalls in the park-and-ride lot that exist during non-peak times. The analysis showed that even with an average peak parking demand of 1.08 vehicles per unit for the residential uses, a peak demand for shared parking would not exceed 20 spaces. This can easily be met by the available parking at the park-and-ride lot.

When defining the required parking supply for the project, we recommend a baseline assumption of 1.08 stalls per unit, consistent with the Redmond data, with provisions to adjust the required parking supply to account for reductions due to senior and affordable housing components, as well as the ability to share parking with the park-and-ride facility. If overflow from the TOD is anticipated, the current utilization of the Park-and-Ride facility should be observed and the ability for shared parking confirmed.

Attachment A: Traffic Counts and Existing Park-and-Ride Trip Generation

Type of peak hour being reported: Intersection Peak

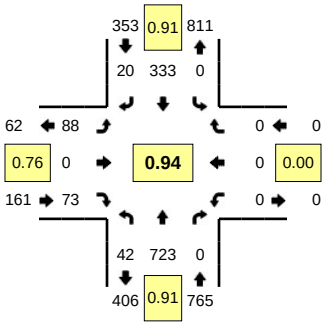
Method for determining peak hour: Total Entering Volume

LOCATION: 108th -- Park-n-Ride

CITY/STATE: Kirkland, WA

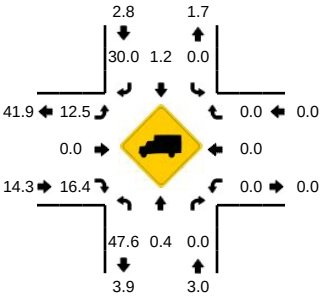
QC JOB #: 10565001

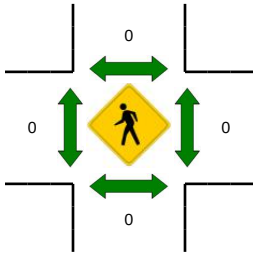
DATE: 12/15/2010

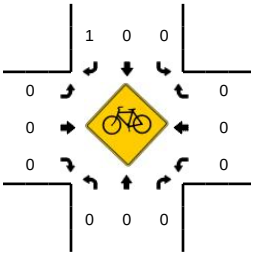


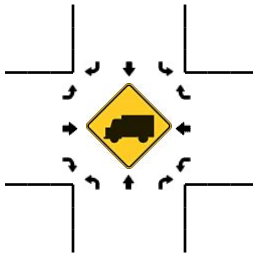
Peak-Hour: 4:30 PM -- 5:30 PM

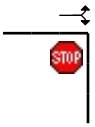
Peak 15-Min: 5:15 PM -- 5:30 PM

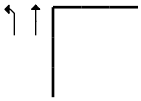


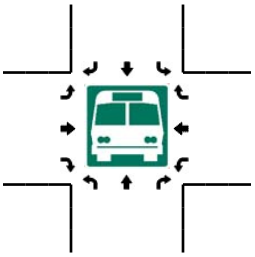












5-Min Count Period Beginning At	108th (Northbound)				108th (Southbound)				Park-n-Ride (Eastbound)				Park-n-Ride (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	3	46	0	0	0	17	2	0	5	0	6	0	0	0	0	0	79	
4:05 PM	1	43	0	0	0	42	0	0	1	0	6	0	0	0	0	0	93	
4:10 PM	3	65	0	0	0	26	1	0	2	0	2	0	0	0	0	0	99	
4:15 PM	0	53	0	0	0	23	0	0	4	0	5	0	0	0	0	0	85	
4:20 PM	5	51	0	0	0	27	2	0	3	0	3	0	0	0	0	0	91	
4:25 PM	1	50	0	0	0	27	2	0	1	0	2	0	0	0	0	0	83	
4:30 PM	7	56	0	0	0	24	1	0	8	0	9	0	0	0	0	0	105	
4:35 PM	3	68	0	0	0	32	2	0	10	0	12	0	0	0	0	0	127	
4:40 PM	5	63	0	0	0	23	1	0	5	0	5	0	0	0	0	0	102	
4:45 PM	4	61	0	0	0	28	0	0	2	0	3	0	0	0	0	0	98	
4:50 PM	5	52	0	0	0	26	3	0	6	0	5	0	0	0	0	0	97	
4:55 PM	3	48	0	0	0	24	1	0	15	0	6	0	0	0	0	0	97	1156
5:00 PM	5	69	0	0	0	27	1	0	7	0	10	0	0	0	0	0	119	1196
5:05 PM	1	46	0	0	0	30	2	0	2	0	2	0	0	0	0	0	83	1186
5:10 PM	0	72	0	0	0	30	1	0	6	0	3	0	0	0	0	0	112	1199
5:15 PM	5	59	0	0	0	23	2	0	14	0	7	0	0	0	0	0	110	1224
5:20 PM	3	64	0	0	0	24	5	0	7	0	4	0	0	0	0	0	107	1240
5:25 PM	1	65	0	0	0	42	1	0	6	0	7	0	0	0	0	0	122	1279
5:30 PM	1	62	0	0	0	21	1	0	4	0	4	0	0	0	0	0	93	1267
5:35 PM	9	64	0	0	0	24	2	0	1	0	4	0	0	0	0	0	104	1244
5:40 PM	3	71	0	0	0	28	2	0	5	0	11	0	0	0	0	0	120	1262
5:45 PM	4	65	0	0	0	17	3	0	11	0	8	0	0	0	0	0	108	1272
5:50 PM	2	54	0	0	0	25	3	0	9	0	9	0	0	0	0	0	102	1277
5:55 PM	4	57	0	0	0	20	0	0	8	0	10	0	0	0	0	0	99	1279

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	36	752	0	0	0	356	32	0	108	0	72	0	0	0	0	0	1356
Heavy Trucks	12	0	0		0	0	8		16	0	16		0	0	0		52
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/20/2010 11:56 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: Intersection Peak

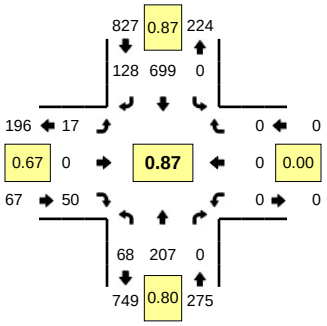
Method for determining peak hour: Total Entering Volume

LOCATION: 108th -- Park-n-Ride

CITY/STATE: Kirkland, WA

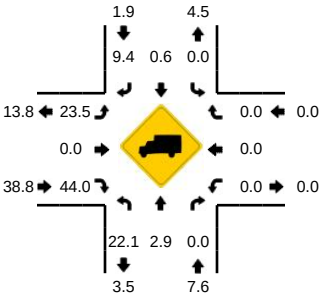
QC JOB #: 10565002

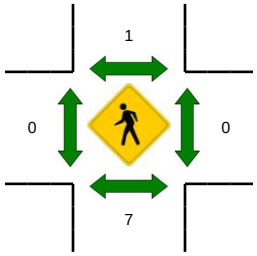
DATE: 12/15/2010

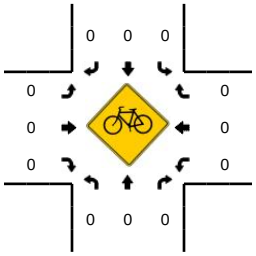


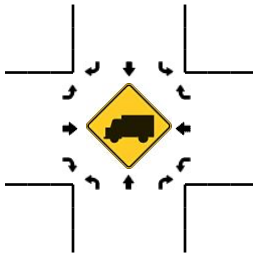
Peak-Hour: 7:30 AM -- 8:30 AM

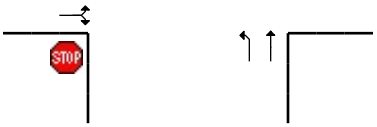
Peak 15-Min: 8:00 AM -- 8:15 AM

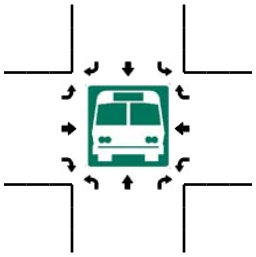












5-Min Count Period Beginning At	108th (Northbound)				108th (Southbound)				Park-n-Ride (Eastbound)				Park-n-Ride (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	5	12	0	0	0	33	3	0	0	0	2	0	0	0	0	0	55	398
7:05 AM	3	11	0	0	0	39	14	0	0	0	4	0	0	0	0	0	71	449
7:10 AM	6	16	0	0	0	33	7	0	1	0	2	0	0	0	0	0	65	495
7:15 AM	8	10	0	0	0	38	11	0	0	0	5	0	0	0	0	0	72	543
7:20 AM	8	12	0	0	0	40	7	0	1	0	4	0	0	0	0	0	72	582
7:25 AM	6	13	0	0	0	50	8	0	0	0	4	0	0	0	0	0	81	645
7:30 AM	10	9	0	0	0	49	9	0	4	0	6	0	0	0	0	0	87	705
7:35 AM	6	20	0	0	0	69	10	0	3	0	8	0	0	0	0	0	116	793
7:40 AM	11	14	0	0	0	46	10	0	0	0	4	0	0	0	0	0	85	846
7:45 AM	4	11	0	0	0	57	16	0	2	0	4	0	0	0	0	0	94	909
7:50 AM	5	8	0	0	0	50	16	0	1	0	3	0	0	0	0	0	83	941
7:55 AM	8	15	0	0	0	58	6	0	1	0	3	0	0	0	0	0	91	972
8:00 AM	3	27	0	0	0	63	14	0	1	0	2	0	0	0	0	0	110	1027
8:05 AM	3	29	0	0	0	76	5	0	0	0	3	0	0	0	0	0	116	1072
8:10 AM	1	23	0	0	0	74	7	0	2	0	2	0	0	0	0	0	109	1116
8:15 AM	9	21	0	0	0	61	14	0	0	0	5	0	0	0	0	0	110	1154
8:20 AM	1	17	0	0	0	47	11	0	1	0	2	0	0	0	0	0	79	1161
8:25 AM	7	13	0	0	0	49	10	0	2	0	8	0	0	0	0	0	89	1169
8:30 AM	5	15	0	0	0	34	5	0	1	0	1	0	0	0	0	0	61	1143
8:35 AM	3	9	0	0	0	60	11	0	0	0	3	0	0	0	0	0	86	1113
8:40 AM	1	13	0	0	0	63	6	0	0	0	3	0	0	0	0	0	86	1114
8:45 AM	6	19	0	0	0	51	4	0	1	0	0	0	0	0	0	0	81	1101
8:50 AM	4	15	0	0	0	57	8	0	1	0	2	0	0	0	0	0	87	1105
8:55 AM	3	16	0	0	0	43	2	0	0	0	1	0	0	0	0	0	65	1079

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	28	316	0	0	0	852	104	0	12	0	28	0	0	0	0	0	1340
Heavy Trucks	20	12	0		0	8	8		8	0	20		0	0	0		76
Pedestrians		4				0				0				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/20/2010 11:56 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: Intersection Peak

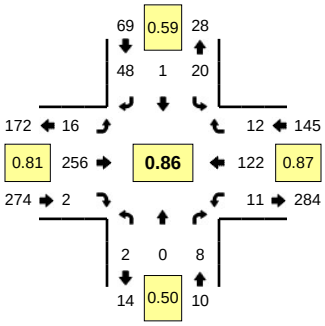
Method for determining peak hour: Total Entering Volume

LOCATION: Park-n-Ride -- 38th

QC JOB #: 10565003

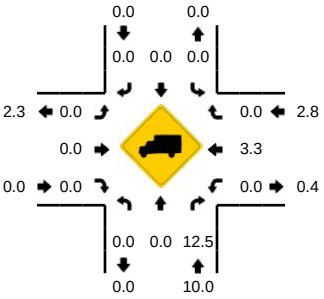
CITY/STATE: Kirkland, WA

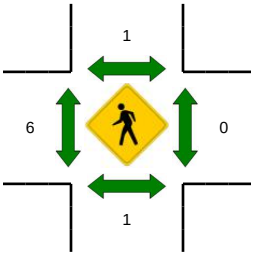
DATE: 12/15/2010

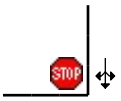


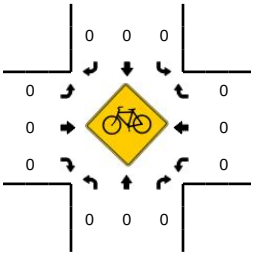
Peak-Hour: 4:55 PM -- 5:55 PM

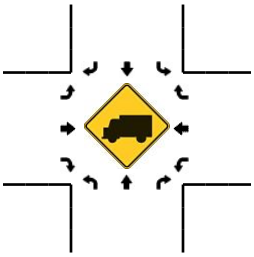
Peak 15-Min: 5:05 PM -- 5:20 PM

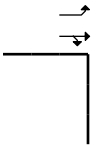


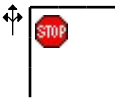


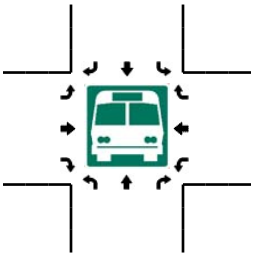












5-Min Count Period Beginning At	Park-n-Ride (Northbound)				Park-n-Ride (Southbound)				38th (Eastbound)				38th (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	0	0	2	0	1	20	0	0	1	14	1	0	39	
4:05 PM	0	0	0	0	1	0	1	0	1	29	0	0	3	12	3	0	50	
4:10 PM	1	0	2	0	1	0	1	0	0	24	2	0	2	11	0	0	44	
4:15 PM	0	0	2	0	1	0	4	0	0	20	1	0	2	8	0	0	38	
4:20 PM	0	0	2	0	1	0	0	0	1	14	0	0	2	14	1	0	35	
4:25 PM	1	0	1	0	0	0	0	0	0	17	0	0	0	12	0	0	31	
4:30 PM	0	0	0	0	0	0	1	0	2	14	1	0	1	9	1	0	29	
4:35 PM	0	0	1	0	1	0	10	0	1	26	0	0	1	8	0	0	48	
4:40 PM	0	0	0	0	1	0	2	0	0	14	1	0	0	8	0	0	26	
4:45 PM	0	0	3	0	0	0	0	0	0	19	1	0	0	10	1	0	34	
4:50 PM	0	0	0	0	0	0	0	0	2	22	0	0	0	15	1	0	40	
4:55 PM	0	0	1	0	4	0	5	0	1	21	0	0	1	7	0	0	40	454
5:00 PM	0	0	0	0	2	0	2	0	3	26	0	0	0	6	1	0	40	455
5:05 PM	0	0	0	0	1	0	6	0	0	30	0	0	1	9	1	0	48	453
5:10 PM	0	0	0	0	1	0	4	0	2	27	0	0	1	15	0	0	50	459
5:15 PM	0	0	1	0	2	0	6	0	1	21	0	0	1	12	2	0	46	467
5:20 PM	1	0	0	0	2	0	3	0	0	19	1	0	0	10	0	0	36	468
5:25 PM	0	0	1	0	0	1	1	0	5	20	0	0	2	12	1	0	43	480
5:30 PM	1	0	3	0	2	0	4	0	1	20	1	0	0	11	0	0	43	494
5:35 PM	0	0	1	0	2	0	0	0	0	14	0	0	2	11	2	0	32	478
5:40 PM	0	0	0	0	0	0	3	0	0	19	0	0	1	15	2	0	40	492
5:45 PM	0	0	1	0	0	0	6	0	2	22	0	0	1	6	1	0	39	497
5:50 PM	0	0	0	0	4	0	8	0	1	17	0	0	1	8	2	0	41	498
5:55 PM	0	0	0	0	4	0	9	0	2	12	0	0	0	9	0	0	36	494

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	4	0	16	0	64	0	12	312	0	0	12	144	12	0	576
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	4	0		4
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/20/2010 11:56 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: Intersection Peak

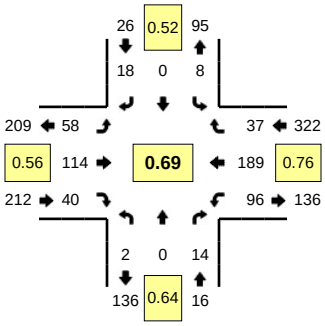
Method for determining peak hour: Total Entering Volume

LOCATION: Park-n-Ride -- 38th

CITY/STATE: Kirkland, WA

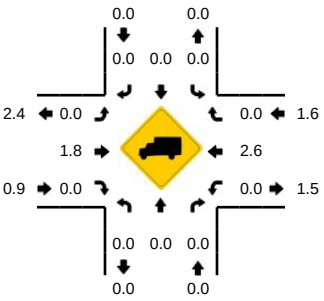
QC JOB #: 10565004

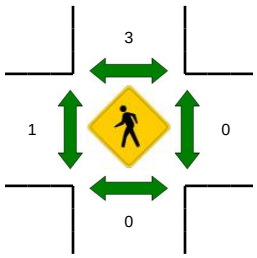
DATE: 12/15/2010

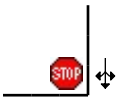


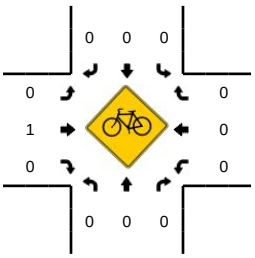
Peak-Hour: 7:20 AM -- 8:20 AM

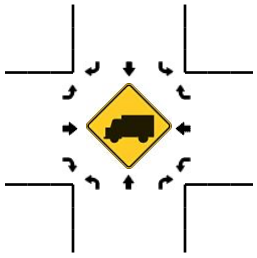
Peak 15-Min: 7:45 AM -- 8:00 AM

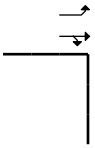


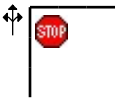


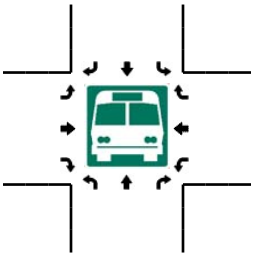












5-Min Count Period Beginning At	Park-n-Ride (Northbound)				Park-n-Ride (Southbound)				38th (Eastbound)				38th (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:50 AM	0	0	0	0	1	0	0	0	0	3	1	0	1	9	3	0	18	
6:55 AM	0	0	0	0	0	0	0	0	7	7	2	0	4	14	0	0	34	172
7:00 AM	0	0	0	0	1	0	2	0	4	2	0	0	1	17	1	0	28	192
7:05 AM	0	0	0	0	0	0	1	0	3	5	0	0	3	14	3	0	29	214
7:10 AM	0	0	0	0	0	1	2	0	5	2	1	0	0	5	4	0	20	227
7:15 AM	0	0	0	0	0	0	1	0	6	1	0	0	0	11	1	0	20	234
7:20 AM	0	0	0	0	0	0	1	0	3	6	0	0	2	12	2	0	26	246
7:25 AM	0	0	0	0	0	0	0	0	3	2	2	0	5	14	6	0	32	264
7:30 AM	0	0	3	0	1	0	2	0	12	5	4	0	6	12	1	0	46	293
7:35 AM	0	0	2	0	2	0	6	0	6	3	2	0	6	17	4	0	48	322
7:40 AM	0	0	1	0	0	0	2	0	3	11	4	0	13	15	1	0	50	359
7:45 AM	1	0	1	0	1	0	2	0	3	14	13	0	15	10	4	0	64	415
7:50 AM	0	0	1	0	0	0	0	0	7	17	5	0	15	15	1	0	61	458
7:55 AM	0	0	2	0	0	0	2	0	5	27	4	0	21	20	4	0	85	509
8:00 AM	0	0	2	0	1	0	0	0	5	14	5	0	9	18	3	0	57	538
8:05 AM	1	0	2	0	0	0	2	0	6	5	0	0	3	22	4	0	45	554
8:10 AM	0	0	0	0	2	0	1	0	3	4	1	0	0	17	6	0	34	568
8:15 AM	0	0	0	0	1	0	0	0	2	6	0	0	1	17	1	0	28	576
8:20 AM	0	0	0	0	1	0	0	0	3	4	0	0	0	15	2	0	25	575
8:25 AM	1	0	1	0	0	0	0	0	1	7	0	0	1	16	2	0	29	572
8:30 AM	0	0	0	0	0	0	1	0	2	3	2	0	0	8	0	0	16	542
8:35 AM	0	0	0	0	1	0	0	0	1	6	0	0	0	20	1	0	29	523
8:40 AM	0	0	0	0	0	0	0	0	2	5	0	0	1	17	0	0	25	498
8:45 AM	0	0	0	0	0	0	3	0	0	4	0	0	1	12	2	0	22	456

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	4	0	16	0	4	0	16	0	60	232	88	0	204	180	36	0	840
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	4	0		4
Pedestrians		0				4				0				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/20/2010 11:56 AM

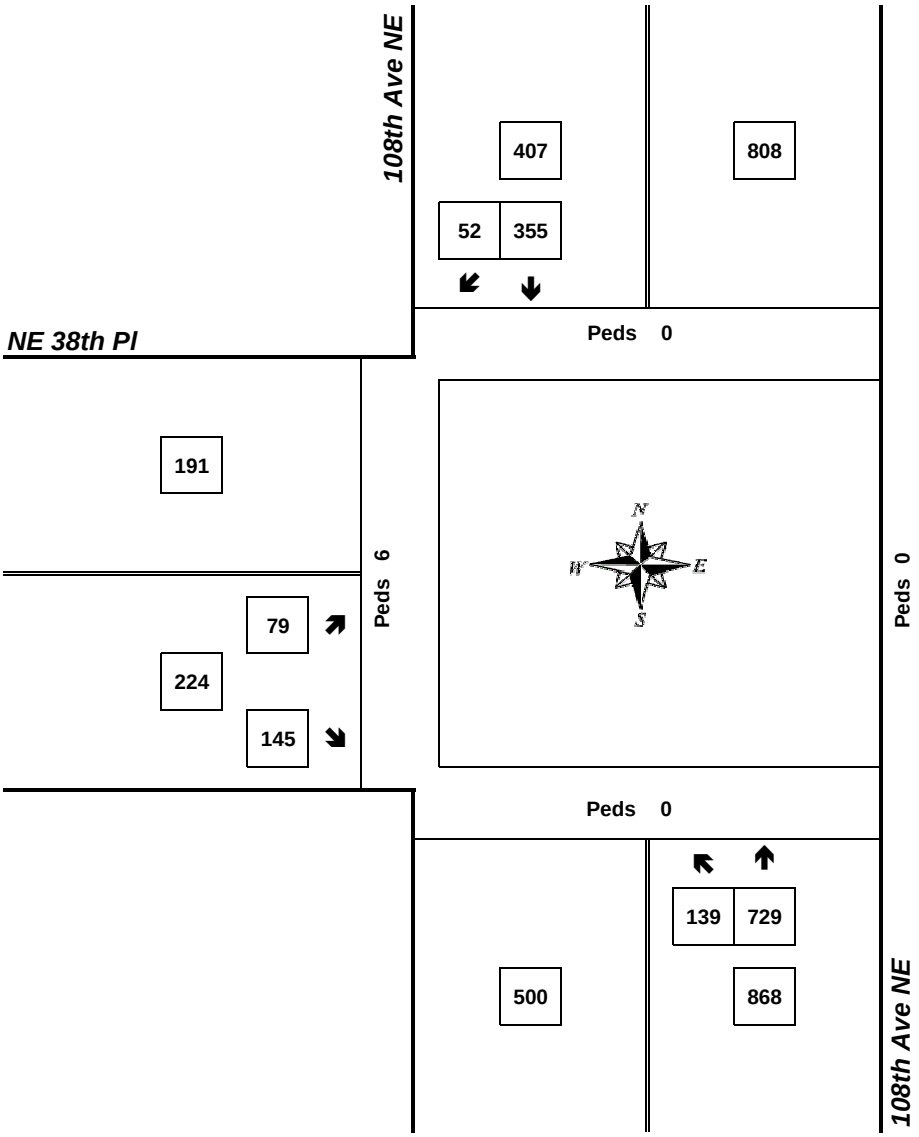
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Peak Hour Summary

All Traffic Data Services Inc.
Mark Skaggs
(206) 251-0300

108th Ave NE & NE 38th Pl

5:00 PM to 6:00 PM
Thursday, January 20, 2011

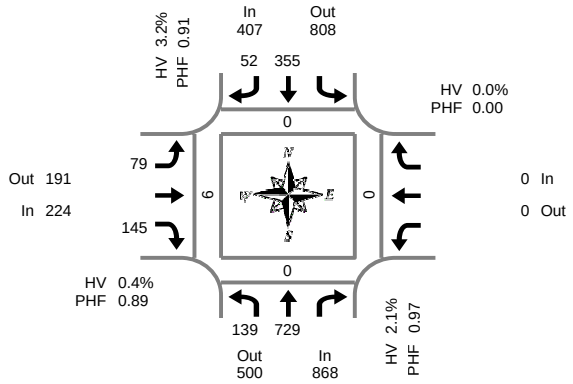


Approach	PHF	HV%	Volume
EB	0.89	0.4%	224
WB	0.00	0.0%	0
NB	0.97	2.1%	868
SB	0.91	3.2%	407
Intersection	0.95	2.1%	1,499

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

Total Vehicle Summary

All Traffic Data Services Inc.
Mark Skaggs
(206) 251-0300



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

108th Ave NE & NE 38th Pl

Thursday, January 20, 2011
4:00 PM to 6:00 PM

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

Interval Start Time	Northbound 108th Ave NE				Southbound 108th Ave NE				Eastbound NE 38th Pl				Westbound NE 38th Pl				Interval Total	Pedestrians Crosswalk			
	L	T		HV	T	R	HV		L	R	HV							North	South	East	West
4:00 PM	21	127		6	91	4	3		20	47	0						310	0	0	0	2
4:15 PM	22	151		5	75	9	7		16	30	0						303	0	0	0	3
4:30 PM	30	149		5	91	9	2		19	46	1						344	0	0	0	1
4:45 PM	21	174		5	75	8	3		10	50	0						338	0	0	0	1
5:00 PM	32	180		4	87	9	3		24	26	0						358	0	0	0	1
5:15 PM	47	177		7	90	16	4		18	45	1						393	0	0	0	1
5:30 PM	30	187		4	98	14	4		17	37	0						383	0	0	0	2
5:45 PM	30	185		3	80	13	2		20	37	0						365	0	0	0	2
Total Survey	233	1,330		39	687	82	28		144	318	2						2,794	0	0	0	13

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

By Approach	Northbound 108th Ave NE				Southbound 108th Ave NE				Eastbound NE 38th Pl				Westbound NE 38th Pl				Total	Pedestrians Crosswalk			
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total			North	South	East	West
Volume	868	500	1,368	18	407	808	1,215	13	224	191	415	1	0	0	0		1,499	0	0	0	6
%HV	2.1%				3.2%				0.4%				0.0%				2.1%				
PHF	0.97				0.91				0.89				0.00				0.95				

By Movement	Northbound 108th Ave NE				Southbound 108th Ave NE				Eastbound NE 38th Pl				Westbound NE 38th Pl				Total
	L	T		Total	T	R	Total		L	R	Total					Total	
Volume	139	729		868	355	52	407		79	145	224					0	1,499
PHF	0.74	0.97		0.97	0.91	0.81	0.91		0.82	0.81	0.89					0.00	0.95

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

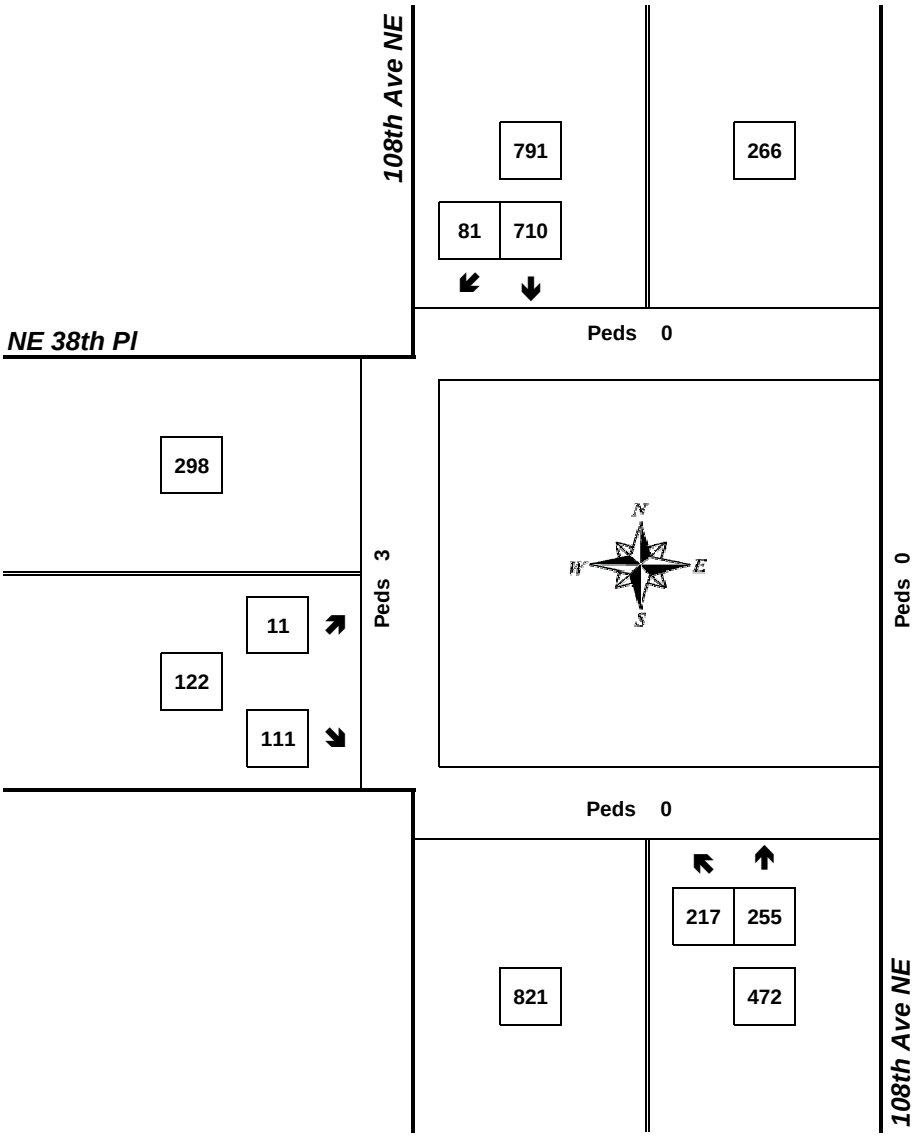
Interval Start Time	Northbound 108th Ave NE				Southbound 108th Ave NE				Eastbound NE 38th Pl				Westbound NE 38th Pl				Interval Total	Pedestrians Crosswalk			
	L	T		HV	T	R	HV		L	R	HV							North	South	East	West
4:00 PM	94	601		21	332	30	15		65	173	1						1,295	0	0	0	7
4:15 PM	105	654		19	328	35	15		69	152	1						1,343	0	0	0	6
4:30 PM	130	680		21	343	42	12		71	167	2						1,433	0	0	0	4
4:45 PM	130	718		20	350	47	14		69	158	1						1,472	0	0	0	5
5:00 PM	139	729		18	355	52	13		79	145	1						1,499	0	0	0	6

Peak Hour Summary

All Traffic Data Services Inc.
Mark Skaggs
(206) 251-0300

108th Ave NE & NE 38th Pl

7:30 AM to 8:30 AM
Thursday, January 20, 2011

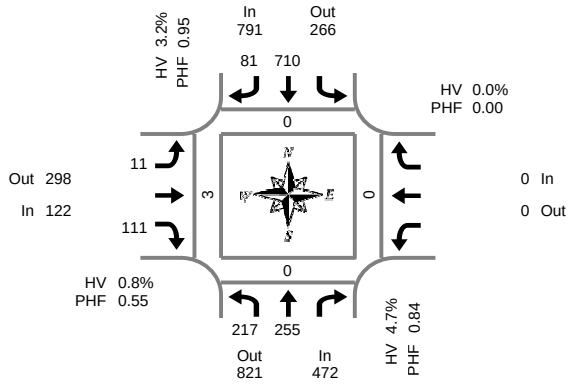


Approach	PHF	HV%	Volume
EB	0.55	0.8%	122
WB	0.00	0.0%	0
NB	0.84	4.7%	472
SB	0.95	3.2%	791
Intersection	0.86	3.5%	1,385

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

Total Vehicle Summary

All Traffic Data Services Inc.
Mark Skaggs
(206) 251-0300



108th Ave NE & NE 38th Pl

Thursday, January 20, 2011
7:00 AM to 9:00 AM

Peak Hour Summary
7:30 AM to 8:30 AM

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

Interval Start Time	Northbound 108th Ave NE				Southbound 108th Ave NE				Eastbound NE 38th Pl				Westbound NE 38th Pl				Interval Total	Pedestrians Crosswalk			
	L	T		HV	T	R	HV		L	R	HV							North	South	East	West
7:00 AM	29	39		6	86	11	10		1	10	0						176	0	0	0	0
7:15 AM	48	51		2	104	11	3		1	15	0						230	0	0	0	0
7:30 AM	50	70		10	169	18	9		4	24	1						335	0	0	0	0
7:45 AM	73	67		3	181	27	5		2	53	0						403	0	0	0	0
8:00 AM	46	68		7	187	22	8		3	23	0						349	0	0	0	2
8:15 AM	48	50		2	173	14	3		2	11	0						298	0	0	0	1
8:30 AM	36	47		4	156	19	6		3	16	0						277	0	0	0	2
8:45 AM	54	60		6	126	15	5		5	16	0						276	0	0	0	2
Total Survey	384	452		40	1,182	137	49		21	168	1						2,344	0	0	0	7

Peak Hour Summary
7:30 AM to 8:30 AM

By Approach	Northbound 108th Ave NE				Southbound 108th Ave NE				Eastbound NE 38th Pl				Westbound NE 38th Pl				Total	Pedestrians Crosswalk			
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total			North	South	East	West
Volume	472	821	1,293	22	791	266	1,057	25	122	298	420	1	0	0	0		1,385	0	0	0	3
%HV	4.7%				3.2%				0.8%				0.0%				3.5%				
PHF	0.84				0.95				0.55				0.00				0.86				

By Movement	Northbound 108th Ave NE				Southbound 108th Ave NE				Eastbound NE 38th Pl				Westbound NE 38th Pl				Total
	L	T		Total	T	R	Total		L	R	Total					Total	
Volume	217	255		472	710	81	791		11	111	122					0	1,385
PHF	0.74	0.91		0.84	0.95	0.75	0.95		0.69	0.52	0.55					0.00	0.86

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

Interval Start Time	Northbound 108th Ave NE				Southbound 108th Ave NE				Eastbound NE 38th Pl				Westbound NE 38th Pl				Interval Total	Pedestrians Crosswalk			
	L	T		HV	T	R	HV		L	R	HV							North	South	East	West
7:00 AM	200	227		21	540	67	27		8	102	1						1,144	0	0	0	0
7:15 AM	217	256		22	641	78	25		10	115	1						1,317	0	0	0	2
7:30 AM	217	255		22	710	81	25		11	111	1						1,385	0	0	0	3
7:45 AM	203	232		16	697	82	22		10	103	0						1,327	0	0	0	5
8:00 AM	184	225		19	642	70	22		13	66	0						1,200	0	0	0	7

Existing Park-and-Ride Peak Hour Trip Generation

	Size		Trips			Distribution		Trip
Existing	603 spaces		**In**	**Out**	**Total**	**In**	**Out**	**Rate**
Peak Hour of the Park-and-Ride								
AM Peak Hour			301	88	389	77%	23%	0.65
PM Peak Hour			90	232	322	28%	72%	0.53
Peak Hour of the Adjacent Street								
AM Peak Hour			285	93	378	73%	27%	0.63
PM Peak Hour			87	216	303	27%	73%	0.50
Difference Between Park-and-Ride and Adjacent Street Peak								
AM Peak Hour			16	-5	11			
PM Peak Hour			3	16	19			
Comparison to ITE	**Rate**							
AM Peak Hour	0.76	Equation	371	87	458	81%	19%	
PM Peak Hour	0.62	Equation	86	288	374	23%	77%	

Attachment B: TOD Trip Generation Calculations

South Kirkland Park & Ride Trip Generation Summary

PM Peak Hour

Land Use	Size	Units	Rate[1]		Total Trips	% IN	Total Trips		Internal Trips[2]		External Trips		Transit/Affordable Reduction[3]			Diverted/Pass-by Rate[4, 5]		Net New Trips		
							In	Out	In	Out	In	Out	Rate	In	Out	Rate	Trips	In	Out	Total
Apartment (#220)	250	units	EQN	0.62	155	65%	101	54	3	2	98	52	0.40	39	21	-	-	59	31	90
Retail (#820)	12,500	sf	AVG	3.73	47	49%	23	24	3	4	20	20	-	-	-	0.34	14	13	13	26
Park-and-Ride	250	spaces	Ex. Count	0.50	125	27%	34	91	1	0	33	91	-	-	-	0.50	46	33	45	78
																		105	***89***	***194***

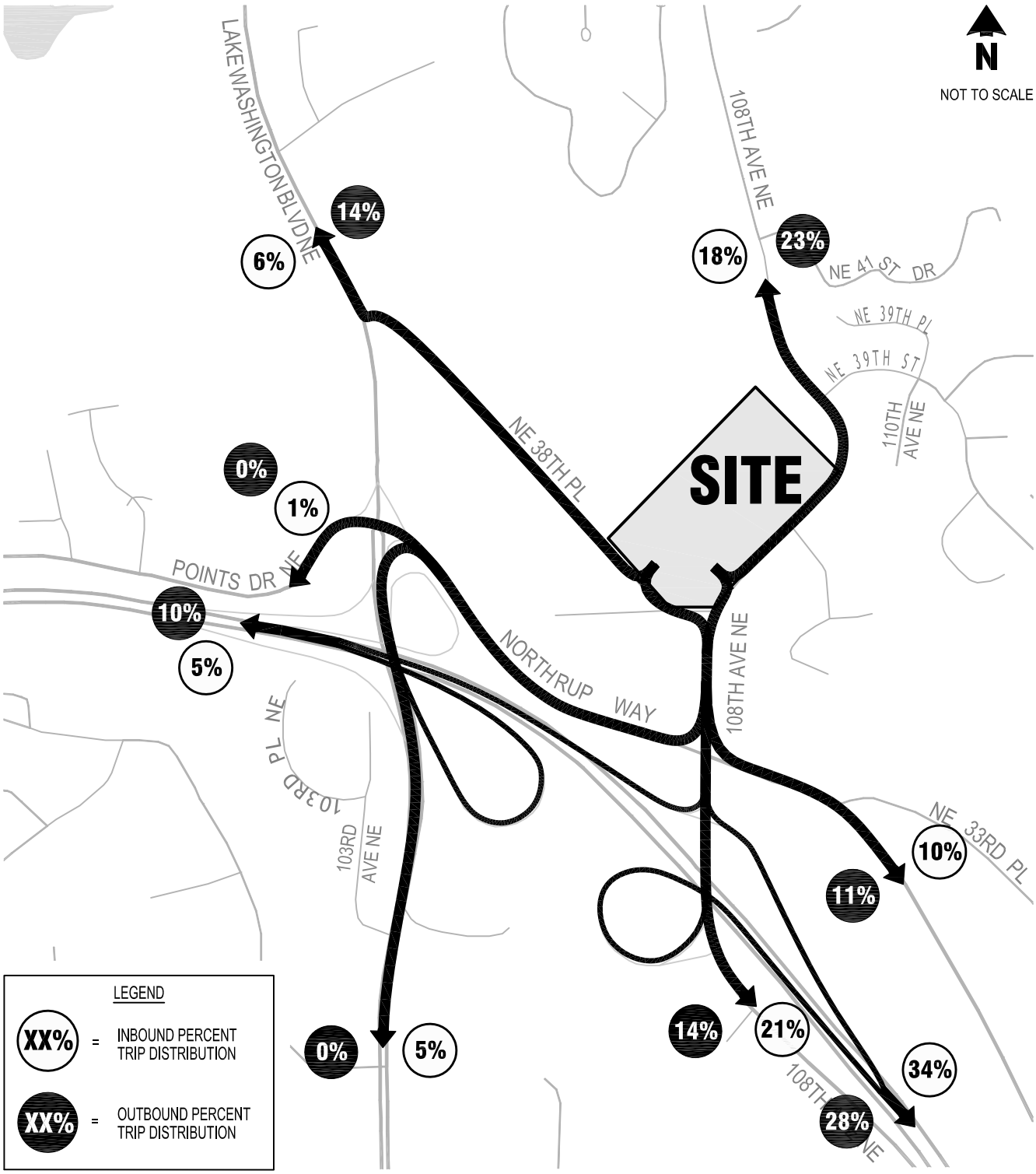
1. Trip generation rate based on ITE Trip Generation, 8th Edition regression equation for apartment land use #220, average trip rate for shopping center (retail) land use #820, and traffic counts conducted at the South Kirkland park-and-ride on December 15, 2010 for the park-and-ride use.

2. Internal trips calculated using ITE *Trip Generation Handbook* , 2nd Edition assuming internal trips only between apartment and retail and retail and park-and-ride. The ITE office data was used for the park-and-ride internal trip rates.

3. Based the Transit Cooperative Research Program (TCRP) Report 128 (2008), N*ew Transit Cooperative Research Program Research Confirms Transit-Oriented Developments Produce Fewer Auto Trips* , ITE Journal, (June 2009), and National Household Travel Survey (2009), a 40 percent reduction was taken to account for residents using transit rather than driving personal vehicles.

4. The pass-by rate 34 percent based on ITE Trip Generation Handbook, 2nd Edition for shopping center land use.

5. Fifty percent of the peak direction trips for the park-and-ride are assumed to be diverted.



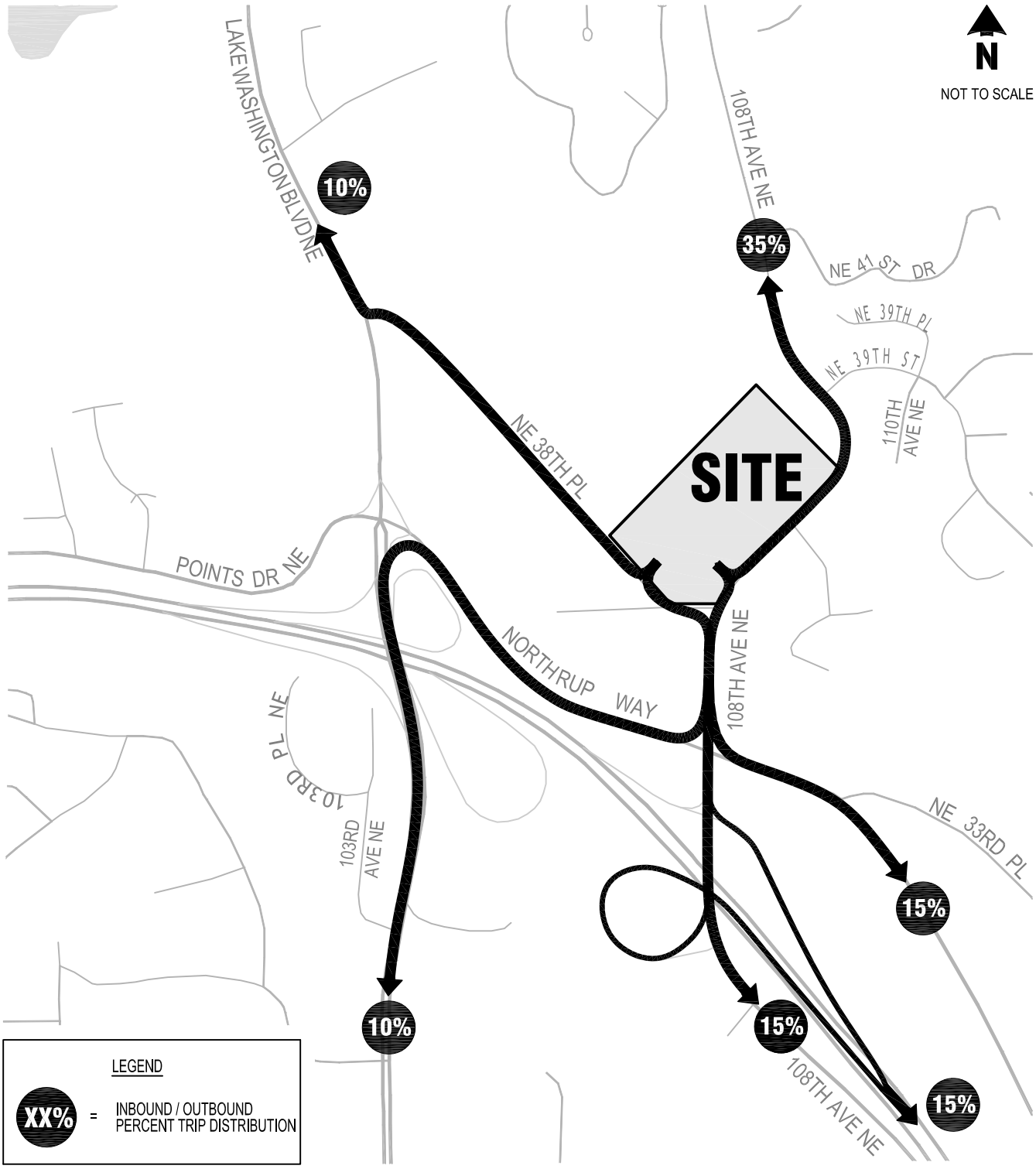
Inbound/Outbound Trip Distribution for TOD Component

ATTACHMENT **C**

South Kirkland Park-and-Ride Rezone Transportation Assesment

M:\10\10222 South Kirkland Park and Ride TOD\Graphics\CAD\10222_Graphic01 <TOD_Distribution> robertm 01/31/11 16:38

transpoGROUP



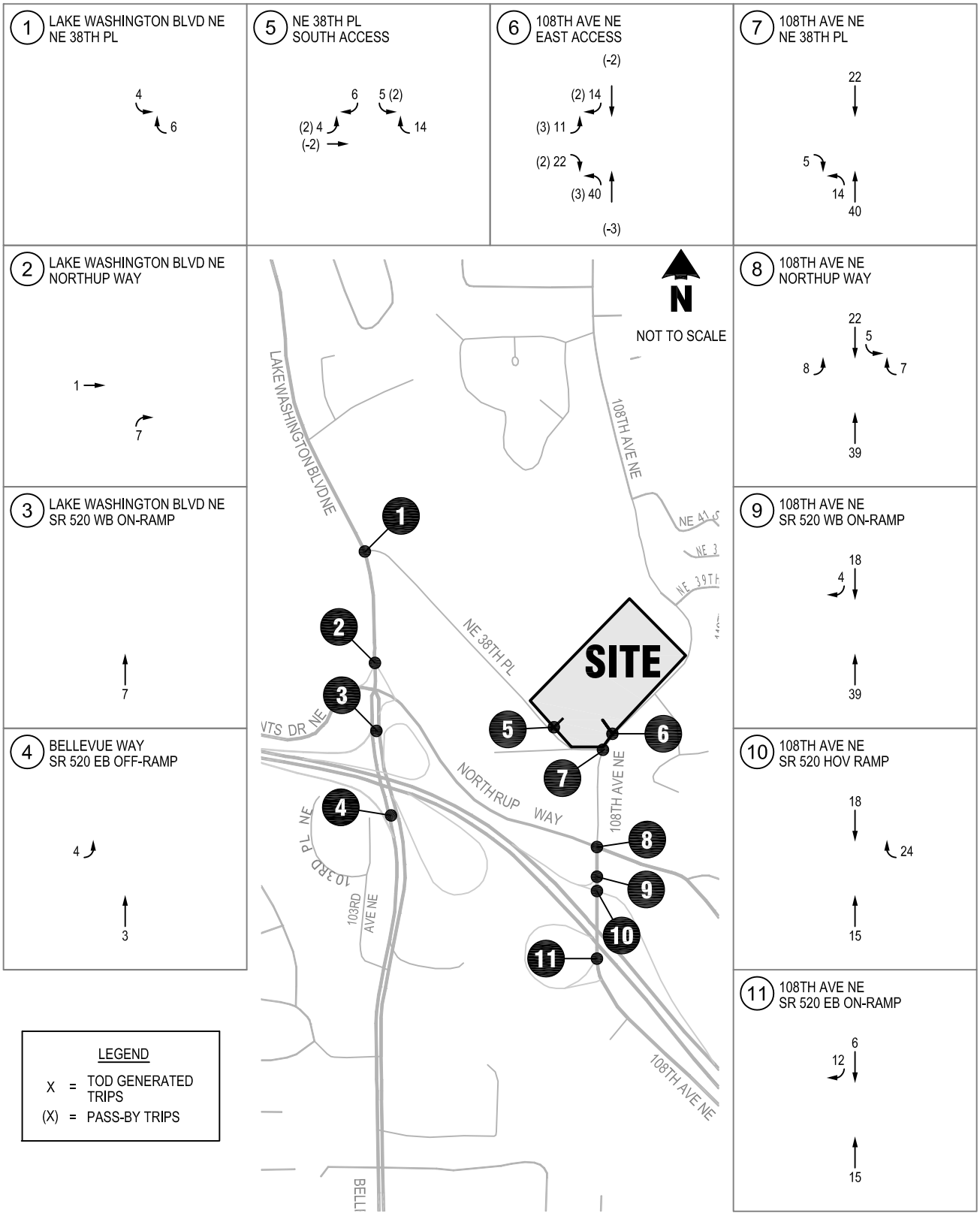
Inbound/Outbound Trip Distribution for Park & Ride Component

ATTACHMENT **D**

South Kirkland Park-and-Ride Rezone Transportation Assesment

M:\10\10222 South Kirkland Park and Ride TOD\Graphics\CAD\10222_Graphic01 <PR_Distribution> robertm 01/31/11 16:40

transpoGROUP



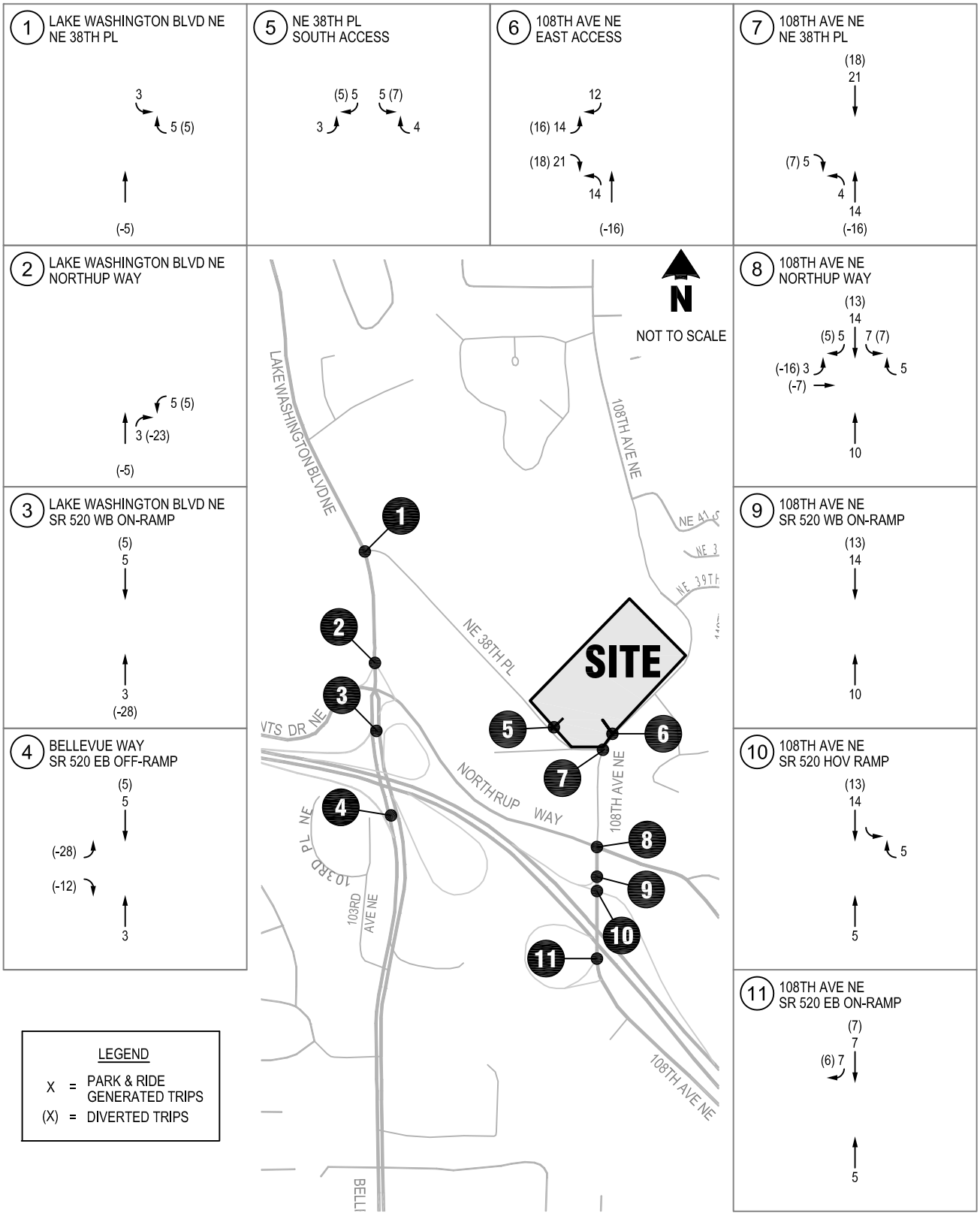
2030 PM Peak Hour Trip Assignment for TOD Component

ATTACHMENT **E**

South Kirkland Park-and-Ride Rezone Transportation Assesment

M:\10\10222 South Kirkland Park and Ride TOD\Graphics\CAD\10222_Graphic01 <TOD_Assignment> robertm 01/31/11 16:41

transpoGROUP



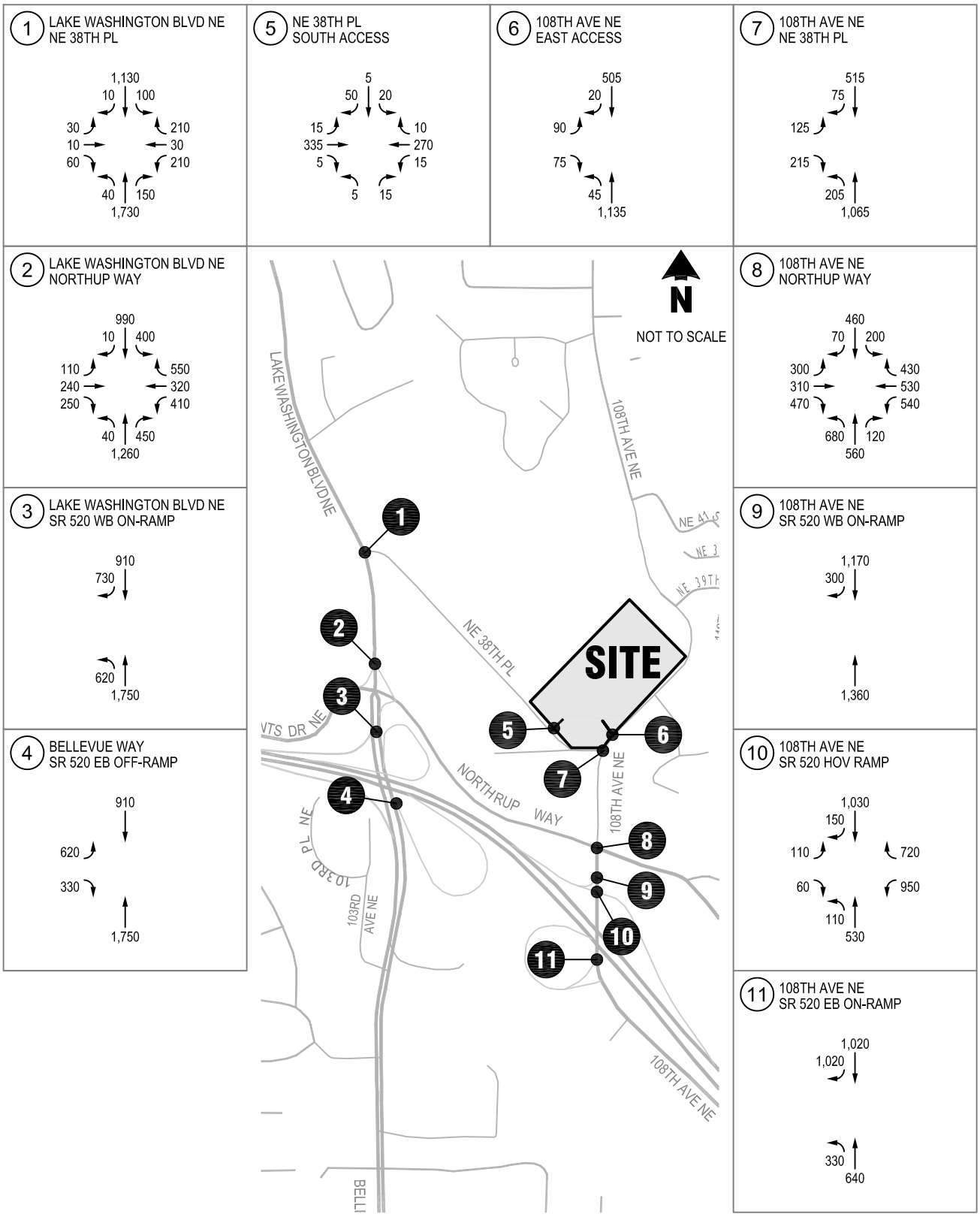
2030 PM Peak Hour Trip Assignment for Park & Ride Component

ATTACHMENT **F**

South Kirkland Park-and-Ride Rezone Transportation Assesment

M:\10\10222 South Kirkland Park and Ride TOD\Graphics\CAD\10222_Graphic01 <PR_Assignment> robertm 01/31/11 16:42

transpoGROUP



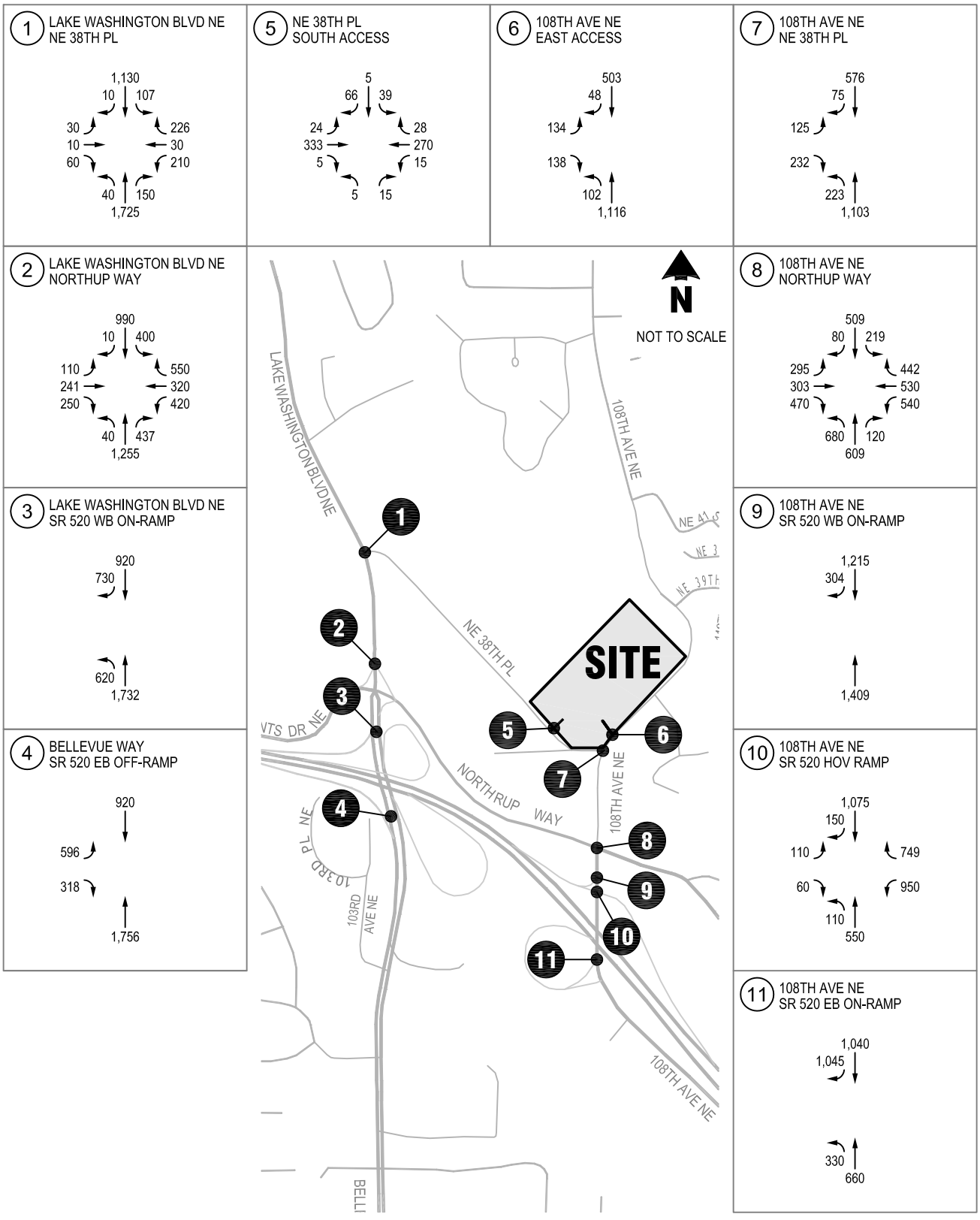
2030 Baseline PM Peak Hour Traffic Volumes

ATTACHMENT **G**

South Kirkland Park-and-Ride Rezone Transportation Assesment

M:\10\10222 South Kirkland Park and Ride TOD\Graphics\CAD\10222_Graphic01 <Baseline> robertm 01/31/11 16:43

transpoGROUP



2030 With-Project PM Peak Hour Traffic Volumes

ATTACHMENT **H**

South Kirkland Park-and-Ride Rezone Transportation Assesment

M:\10\10222 South Kirkland Park and Ride TOD\Graphics\CAD\10222_Graphic01 <2030 With Project> robertm 01/31/11 16:44

transpoGROUP

Attachment I: LOS Worksheets

HCM Signalized Intersection Capacity Analysis
1: NE 38th Pl. & Lk. Wash Blvd

South Kirkland Park & Ride Rezone
Baseline 2030 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	10	60	210	30	210	40	1730	150	100	1130	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			-2%			2%			-2%	
Total Lost time (s)	5.0	5.0		5.0	5.0		4.0	5.0	5.0	4.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	0.95	
Frt	1.00	0.87		1.00	0.87		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1625		1787	1635		1752	1844	1542	1787	3570	
Flt Permitted	0.26	1.00		0.71	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	476	1625		1334	1635		1752	1844	1542	1787	3570	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	11	63	221	32	221	42	1821	158	105	1189	11
RTOR Reduction (vph)	0	52	0	0	73	0	0	0	27	0	0	0
Lane Group Flow (vph)	32	22	0	221	180	0	42	1821	131	105	1200	0
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	4
Turn Type	Perm			Perm			Prot		Perm	Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			
Actuated Green, G (s)	22.0	22.0		22.0	22.0		5.9	87.2	87.2	6.8	88.1	
Effective Green, g (s)	22.0	22.0		22.0	22.0		5.9	87.2	87.2	6.8	88.1	
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.05	0.67	0.67	0.05	0.68	
Clearance Time (s)	5.0	5.0		5.0	5.0		4.0	5.0	5.0	4.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	81	275		226	277		80	1237	1034	93	2419	
v/s Ratio Prot		0.01			0.11		0.02	c0.99		c0.06	0.34	
v/s Ratio Perm	0.07			c0.17					0.08			
v/c Ratio	0.40	0.08		0.98	0.65		0.52	1.47	0.13	1.13	0.50	
Uniform Delay, d1	48.1	45.5		53.8	50.4		60.7	21.4	7.7	61.6	10.2	
Progression Factor	1.00	1.00		1.03	1.05		1.05	1.02	0.23	1.00	1.00	
Incremental Delay, d2	1.2	0.0		50.8	3.6		1.0	214.1	0.1	132.4	0.7	
Delay (s)	49.2	45.5		106.3	56.5		64.9	235.8	1.9	194.0	10.9	
Level of Service	D	D		F	E		E	F	A	F	B	
Approach Delay (s)		46.6			79.7			214.0			25.6	
Approach LOS		D			E			F			C	

Intersection Summary				
HCM Average Control Delay	130.2	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.36			
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.0	
Intersection Capacity Utilization	123.1%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
2: NE Points Dr & Lake Washington Boulevard

South Kirkland Park & Ride Rezone
Baseline 2030 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	110	240	250	410	320	550	40	1260	450	400	990	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	12	11	11	12	12	11	11	13
Grade (%)		0%			0%			-5%			0%	
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1900	1615	3351	1881	1546	1788	3700	1655	1711	3421	1636
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1805	1900	1615	3351	1881	1546	1788	3700	1655	1711	3421	1636
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	116	253	263	432	337	579	42	1326	474	421	1042	11
RTOR Reduction (vph)	0	0	41	0	0	22	0	0	22	0	0	1
Lane Group Flow (vph)	116	253	222	432	337	557	42	1326	452	421	1042	10
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	0%	0%	0%	2%	2%	2%
Turn Type	Prot		pt+ov	Prot		pt+ov	Prot		pt+ov	Prot		Prot
Protected Phases	3	8	8 5	7	4	4 1	5	2	2 7	1	6	6
Permitted Phases												
Actuated Green, G (s)	11.3	14.0	40.3	25.4	28.1	58.1	21.3	45.6	76.0	25.0	49.3	49.3
Effective Green, g (s)	11.3	14.0	40.3	25.4	28.1	58.1	21.3	45.6	76.0	25.0	49.3	49.3
Actuated g/C Ratio	0.09	0.11	0.31	0.20	0.22	0.45	0.16	0.35	0.58	0.19	0.38	0.38
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		2.0	3.0		2.0	3.0		2.0	3.0	3.0
Lane Grp Cap (vph)	157	205	501	655	407	691	293	1298	968	329	1297	620
v/s Ratio Prot	0.06	c0.13	0.14	c0.13	c0.18	0.36	0.02	c0.36	0.27	c0.25	0.30	0.01
v/s Ratio Perm												
v/c Ratio	0.74	1.23	0.44	0.66	0.83	0.81	0.14	1.02	0.47	1.28	0.80	0.02
Uniform Delay, d1	57.9	58.0	35.9	48.3	48.6	31.1	46.5	42.2	15.4	52.5	36.0	25.2
Progression Factor	1.00	1.00	1.00	0.58	0.48	0.40	0.87	0.85	0.85	0.95	0.82	0.76
Incremental Delay, d2	16.5	140.2	0.6	0.5	3.8	1.9	0.1	29.0	0.1	144.2	4.5	0.0
Delay (s)	74.5	198.2	36.5	28.5	27.2	14.3	40.4	64.9	13.3	194.3	33.9	19.2
Level of Service	E	F	D	C	C	B	D	E	B	F	C	B
Approach Delay (s)		108.2			22.1			51.0			79.6	
Approach LOS		F			C			D			E	

Intersection Summary				
HCM Average Control Delay	58.4	HCM Level of Service	E	
HCM Volume to Capacity ratio	1.00			
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	98.0%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
3: WB On-Ramp & Lake Washington Boulevard

South Kirkland Park & Ride Rezone
Baseline 2030 PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	620	1750	910	730
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-3%			-8%	6%	
Total Lost time (s)			5.0	5.0	5.0	4.0
Lane Util. Factor			0.97	0.95	0.91	0.91
Frt			1.00	1.00	0.94	0.85
Flt Protected			0.95	1.00	1.00	1.00
Satd. Flow (prot)			3570	3681	3082	1398
Flt Permitted			0.95	1.00	1.00	1.00
Satd. Flow (perm)			3570	3681	3082	1398
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	653	1842	958	768
RTOR Reduction (vph)	0	0	0	0	10	0
Lane Group Flow (vph)	0	0	653	1842	1639	77
Turn Type			Prot			Free
Protected Phases			5	2	6	
Permitted Phases						Free
Actuated Green, G (s)			27.7	130.0	92.3	130.0
Effective Green, g (s)			27.7	130.0	92.3	130.0
Actuated g/C Ratio			0.21	1.00	0.71	1.00
Clearance Time (s)			5.0	5.0	5.0	
Vehicle Extension (s)			2.0	2.0	2.0	
Lane Grp Cap (vph)			761	3681	2188	1398
v/s Ratio Prot			c0.18	0.50	c0.53	
v/s Ratio Perm						0.06
v/c Ratio			0.86	0.50	0.75	0.06
Uniform Delay, d1			49.3	0.0	11.7	0.0
Progression Factor			0.81	1.00	0.68	1.00
Incremental Delay, d2			8.1	0.4	1.9	0.1
Delay (s)			48.2	0.4	9.9	0.1
Level of Service			D	A	A	A
Approach Delay (s)	0.0			12.9	9.4	
Approach LOS	A			B	A	

Intersection Summary			
HCM Average Control Delay	11.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	99.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
4: EB Off-Ramp & Bellevue Way NE

South Kirkland Park & Ride Rezone
Baseline 2030 PM Peak Hour

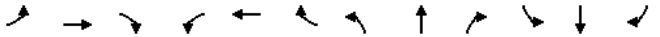
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	620	330	0	1750	910	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-2%			-6%	5%	
Total Lost time (s)	5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	1.00		0.91	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3467	1599		5238	3451	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3467	1599		5238	3451	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	653	347	0	1842	958	0
RTOR Reduction (vph)	0	80	0	0	0	0
Lane Group Flow (vph)	653	267	0	1842	958	0
Confl. Peds. (#/hr)			20			20
Turn Type		Perm				
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	29.5	29.5		90.5	90.5	
Effective Green, g (s)	29.5	29.5		90.5	90.5	
Actuated g/C Ratio	0.23	0.23		0.70	0.70	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	787	363		3646	2402	
v/s Ratio Prot	c0.19			c0.35	0.28	
v/s Ratio Perm		0.17				
v/c Ratio	0.83	0.74		0.51	0.40	
Uniform Delay, d1	47.9	46.6		9.3	8.3	
Progression Factor	1.00	1.00		1.00	1.02	
Incremental Delay, d2	6.9	6.6		0.5	0.3	
Delay (s)	54.8	53.2		9.8	8.8	
Level of Service	D	D		A	A	
Approach Delay (s)	54.2			9.8	8.8	
Approach LOS	D			A	A	

Intersection Summary			
HCM Average Control Delay	21.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	99.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
5: NE 38th Place & South Access

South Kirkland Park & Ride Rezone
Baseline 2030 PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	15	335	5	10	270	15	5	0	15	20	5	50
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	17	390	6	12	314	17	6	0	17	23	6	58
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (ft)		985										
pX, platoon unblocked												
vC, conflicting volume	331			395			826	782	392	788	776	323
vC1, stage 1 conf vol							427	427		346	346	
vC2, stage 2 conf vol							398	355		442	430	
vCu, unblocked vol	331			395			826	782	392	788	776	323
tC, single (s)	4.2			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			99	100	97	95	99	92
cM capacity (veh/h)	1164			1163			456	487	656	484	489	716

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	17	395	12	331	23	87
Volume Left	17	0	12	0	6	23
Volume Right	0	6	0	17	17	58
cSH	1164	1700	1163	1700	591	618
Volume to Capacity	0.01	0.23	0.01	0.19	0.04	0.14
Queue Length 95th (ft)	1	0	1	0	3	12
Control Delay (s)	8.1	0.0	8.1	0.0	11.3	11.8
Lane LOS	A		A		B	B
Approach Delay (s)	0.3		0.3		11.3	11.8
Approach LOS					B	B

Intersection Summary				
Average Delay	1.8			
Intersection Capacity Utilization	30.7%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
6: East Access & 108th Avenue NE

South Kirkland Park & Ride Rezone
Baseline 2030 PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	90	75	45	1135	505	20
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	96	80	48	1207	537	21
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	TWLTL	
Median storage veh)					2	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1851	548	559			
vC1, stage 1 conf vol	548					
vC2, stage 2 conf vol	1303					
vCu, unblocked vol	1851	548	559			
tC, single (s)	6.5	6.3	4.1			
tC, 2 stage (s)	5.5					
tF (s)	3.6	3.4	2.2			
p0 queue free %	55	84	95			
cM capacity (veh/h)	212	514	1007			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1
Volume Total	96	80	48	1207	559
Volume Left	96	0	48	0	0
Volume Right	0	80	0	0	21
cSH	212	514	1007	1700	1700
Volume to Capacity	0.45	0.16	0.05	0.71	0.33
Queue Length 95th (ft)	54	14	4	0	0
Control Delay (s)	35.3	13.3	8.8	0.0	0.0
Lane LOS	E	B	A		
Approach Delay (s)	25.3		0.3		0.0
Approach LOS	D				

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	71.4%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — South Kirkland Park & Ride Rezone
7: NE 38th Place & 108th Avenue NE — Baseline 2030 PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	125	215	205	1065	515	75
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	132	226	216	1121	542	79
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	2134	582	621			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2134	582	621			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	56	78			
cM capacity (veh/h)	43	517	960			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1
Volume Total	132	226	216	1121	621
Volume Left	132	0	216	0	0
Volume Right	0	226	0	0	79
cSH	43	517	960	1700	1700
Volume to Capacity	3.09	0.44	0.22	0.66	0.37
Queue Length 95th (ft)	Err	55	22	0	0
Control Delay (s)	Err	17.3	9.8	0.0	0.0
Lane LOS	F	C	A		
Approach Delay (s)	3687.0		1.6		0.0
Approach LOS	F				

Intersection Summary			
Average Delay	570.7		
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis — South Kirkland Park & Ride Rezone
8: Northup Way & 108th Avenue NE — Baseline 2030 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	300	310	470	540	530	430	680	560	120	200	460	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	11	12	12	12	12	12	12
Grade (%)		0%			0%			1%			-6%	
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.98		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	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	0.93		1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1559	3467	3265		3416	3397		1823	3573	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1863	1559	3467	3265		3416	3397		1823	3573	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	316	326	495	568	558	453	716	589	126	211	484	74
RTOR Reduction (vph)	0	0	13	0	112	0	0	14	0	0	9	0
Lane Group Flow (vph)	316	326	482	568	899	0	716	701	0	211	549	0
Confl. Peds. (#/hr)	10		10	10		10			10	10		
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Turn Type	Prot		pm+ov	Prot			Split			Split		
Protected Phases	1	6	4	5	2		4	4		3	3	
Permitted Phases			6									
Actuated Green, G (s)	24.1	27.6	55.6	32.3	35.8		28.0	28.0		22.1	22.1	
Effective Green, g (s)	24.1	27.6	55.6	32.3	35.8		28.0	28.0		22.1	22.1	
Actuated g/C Ratio	0.19	0.21	0.43	0.25	0.28		0.22	0.22		0.17	0.17	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	328	396	667	861	899		736	732		310	607	
v/s Ratio Prot	c0.18	0.18	0.16	0.16	c0.28		c0.21	0.21		0.12	c0.15	
v/s Ratio Perm			0.15									
v/c Ratio	0.96	0.82	0.72	0.66	1.00		0.97	0.96		0.68	0.90	
Uniform Delay, d1	52.5	48.9	30.8	43.9	47.1		50.6	50.4		50.6	52.9	
Progression Factor	0.81	0.78	1.22	1.00	1.00		1.05	1.05		1.00	1.00	
Incremental Delay, d2	20.5	6.7	1.1	1.4	29.9		22.7	19.5		4.8	16.6	
Delay (s)	63.0	44.6	38.7	45.3	77.0		76.0	72.7		55.5	69.5	
Level of Service	E	D	D	D	E		E	E		E	E	
Approach Delay (s)		47.2			65.6			74.3			65.6	
Approach LOS		D			E			E			E	

Intersection Summary			
HCM Average Control Delay	63.9	HCM Level of Service	E
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	96.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
9: WB On-Ramp & 108th Avenue NE

South Kirkland Park & Ride Rezone
Baseline 2030 PM Peak Hour

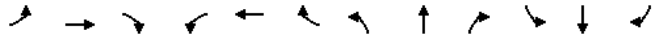
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	0	1360	1170	300
Sign Control	Stop			Free	Free	
Grade	0%			0%	-1%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	1432	1232	316
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				159	266	
pX, platoon unblocked	0.87	0.87	0.87			
vC, conflicting volume	1709	616	1232			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1521	269	975			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	95	636	614			

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	477	477	477	616	616	316
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	316
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.28	0.28	0.28	0.36	0.36	0.19
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS						
Approach Delay (s)	0.0			0.0		
Approach LOS						

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization		35.7%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Signalized Intersection Capacity Analysis
10: Transit and HOV Ramp & 108th Avenue NE

South Kirkland Park & Ride Rezone
Baseline 2030 PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	110	0	60	950	0	720	110	530	0	0	1030	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	14
Grade (%)		0%			2%			2%			-2%	
Total Lost time (s)	5.0		5.0	5.0	5.0	5.0	5.0	5.0			5.0	
Lane Util. Factor	1.00		1.00	0.97	0.95	0.95	1.00	1.00			0.95	
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00	1.00	1.00			1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00	1.00	1.00			1.00	
Frt	1.00		0.85	1.00	0.85	0.85	1.00	1.00			0.98	
Flt Protected	0.95		1.00	0.95	1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	1805		1615	3432	1504	1504	1769	1862			3506	
Flt Permitted	0.95		1.00	0.95	1.00	1.00	0.95	1.00			1.00	
Satd. Flow (perm)	1805		1615	3432	1504	1504	1769	1862			3506	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	116	0	63	1000	0	758	116	558	0	0	1084	158
RTOR Reduction (vph)	0	0	0	0	175	175	0	0	0	0	0	0
Lane Group Flow (vph)	116	0	63	1000	204	204	116	558	0	0	1242	0
Confl. Peds. (#/hr)									20	20		
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	Prot		custom	Split		Prot	Prot					
Protected Phases	3		3 5	4	4	4	5	2			6	
Permitted Phases												
Actuated Green, G (s)	9.6		27.0	36.4	36.4	36.4	12.4	69.0			51.6	
Effective Green, g (s)	9.6		27.0	36.4	36.4	36.4	12.4	69.0			51.6	
Actuated g/C Ratio	0.07		0.21	0.28	0.28	0.28	0.10	0.53			0.40	
Clearance Time (s)	5.0			5.0	5.0	5.0	5.0	5.0			5.0	
Vehicle Extension (s)	2.0			3.0	3.0	3.0	2.0	2.0			2.0	
Lane Grp Cap (vph)	133		335	961	421	421	169	988			1392	
v/s Ratio Prot	c0.06		0.04	c0.29	0.14	0.14	c0.07	0.30			c0.35	
v/s Ratio Perm												
v/c Ratio	0.87		0.19	1.04	0.48	0.48	0.69	0.56			0.89	
Uniform Delay, d1	59.6		42.5	46.8	39.0	39.0	56.9	20.4			36.6	
Progression Factor	1.00		1.00	1.00	1.00	1.00	1.00	1.00			0.68	
Incremental Delay, d2	41.2		0.1	40.1	0.9	0.9	8.5	2.2			6.2	
Delay (s)	100.8		42.6	86.9	39.9	39.9	65.4	22.7			31.2	
Level of Service	F		D	F	D	D	E	C			C	
Approach Delay (s)		80.3			66.6			30.0			31.2	
Approach LOS		F			E			C			C	

Intersection Summary				
HCM Average Control Delay	49.4	HCM Level of Service		D
HCM Volume to Capacity ratio	0.92			
Actuated Cycle Length (s)	130.0	Sum of lost time (s)		20.0
Intersection Capacity Utilization	78.9%	ICU Level of Service		D
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — South Kirkland Park & Ride Rezone
11: EB On-Ramp & 108th Avenue NE — Baseline 2030 PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	330	640	1020	1020
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	14	12	12	15
Grade (%)	2%			-6%	6%	
Total Lost time (s)			5.0	5.0	5.0	5.0
Lane Util. Factor			1.00	1.00	0.91	0.91
Frpb, ped/bikes			1.00	1.00	1.00	1.00
Flpb, ped/bikes			1.00	1.00	1.00	1.00
Frt			1.00	1.00	0.96	0.85
Flt Protected			0.95	1.00	1.00	1.00
Satd. Flow (prot)			1983	1957	3216	1568
Flt Permitted			0.95	1.00	1.00	1.00
Satd. Flow (perm)			1983	1957	3216	1568
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	347	674	1074	1074
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	347	674	1482	666
Confl. Peds. (#/hr)		50				
Heavy Vehicles (%)	2%	2%	0%	0%	0%	0%
Turn Type			Prot			Prot
Protected Phases			5	2	6	6
Permitted Phases						
Actuated Green, G (s)			26.8	130.0	93.2	93.2
Effective Green, g (s)			26.8	130.0	93.2	93.2
Actuated g/C Ratio			0.21	1.00	0.72	0.72
Clearance Time (s)			5.0	5.0	5.0	5.0
Vehicle Extension (s)			2.0	2.0	2.0	2.0
Lane Grp Cap (vph)			409	1957	2306	1124
v/s Ratio Prot			c0.17	0.34	c0.46	0.42
v/s Ratio Perm						
v/c Ratio			0.85	0.34	0.64	0.59
Uniform Delay, d1			49.6	0.0	9.7	9.1
Progression Factor			1.00	1.00	1.15	2.16
Incremental Delay, d2			14.5	0.5	0.1	1.6
Delay (s)			64.1	0.5	11.2	21.1
Level of Service			E	A	B	C
Approach Delay (s)	0.0			22.1	14.3	
Approach LOS	A			C	B	

Intersection Summary			
HCM Average Control Delay	16.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1: NE 38th Pl. & Lk. Wash Blvd

South Kirkland Park & Ride Rezone
With-Project 2030 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	10	60	210	30	226	40	1725	150	107	1130	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			-2%			2%			-2%	
Total Lost time (s)	5.0	5.0		5.0	5.0		4.0	5.0	5.0	4.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	0.95	
Frt	1.00	0.87		1.00	0.87		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1625		1787	1633		1752	1844	1542	1787	3570	
Flt Permitted	0.21	1.00		0.71	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	399	1625		1334	1633		1752	1844	1542	1787	3570	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	11	63	221	32	238	42	1816	158	113	1189	11
RTOR Reduction (vph)	0	52	0	0	74	0	0	0	27	0	0	0
Lane Group Flow (vph)	32	22	0	221	196	0	42	1816	131	113	1200	0
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	4
Turn Type	Perm			Perm			Prot		Perm	Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			
Actuated Green, G (s)	22.0	22.0		22.0	22.0		5.9	87.2	87.2	6.8	88.1	
Effective Green, g (s)	22.0	22.0		22.0	22.0		5.9	87.2	87.2	6.8	88.1	
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.05	0.67	0.67	0.05	0.68	
Clearance Time (s)	5.0	5.0		5.0	5.0		4.0	5.0	5.0	4.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	68	275		226	276		80	1237	1034	93	2419	
v/s Ratio Prot		0.01			0.12		0.02	c0.98		c0.06	0.34	
v/s Ratio Perm	0.08			c0.17					0.08			
v/c Ratio	0.47	0.08		0.98	0.71		0.52	1.47	0.13	1.22	0.50	
Uniform Delay, d1	48.7	45.5		53.8	51.0		60.7	21.4	7.7	61.6	10.2	
Progression Factor	1.00	1.00		1.04	1.06		1.05	1.02	0.23	1.00	1.00	
Incremental Delay, d2	1.9	0.0		50.6	6.5		1.0	212.3	0.1	162.1	0.7	
Delay (s)	50.6	45.5		106.4	60.3		65.0	234.0	1.9	223.7	10.9	
Level of Service	D	D		F	E		E	F	A	F	B	
Approach Delay (s)		47.1			81.1			212.3			29.2	
Approach LOS		D			F			F			C	

Intersection Summary				
HCM Average Control Delay	130.2	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.36			
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.0	
Intersection Capacity Utilization	123.8%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
2: NE Points Dr & Lake Washington Boulevard

South Kirkland Park & Ride Rezone
With-Project 2030 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	110	241	250	420	320	550	40	1255	437	400	990	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	12	11	11	12	12	11	11	13
Grade (%)		0%			0%			-5%			0%	
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1900	1615	3351	1881	1546	1788	3700	1655	1711	3421	1636
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1805	1900	1615	3351	1881	1546	1788	3700	1655	1711	3421	1636
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	116	254	263	442	337	579	42	1321	460	421	1042	11
RTOR Reduction (vph)	0	0	41	0	0	23	0	0	22	0	0	1
Lane Group Flow (vph)	116	254	222	442	337	556	42	1321	438	421	1042	10
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	0%	0%	0%	2%	2%	2%
Turn Type	Prot		pt+ov	Prot		pt+ov	Prot		pt+ov	Prot		Prot
Protected Phases	3	8	8 5	7	4	4 1	5	2	2 7	1	6	6
Permitted Phases												
Actuated Green, G (s)	11.3	14.0	40.3	25.4	28.1	58.1	21.3	45.6	76.0	25.0	49.3	49.3
Effective Green, g (s)	11.3	14.0	40.3	25.4	28.1	58.1	21.3	45.6	76.0	25.0	49.3	49.3
Actuated g/C Ratio	0.09	0.11	0.31	0.20	0.22	0.45	0.16	0.35	0.58	0.19	0.38	0.38
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		2.0	3.0		2.0	3.0		2.0	3.0	3.0
Lane Grp Cap (vph)	157	205	501	655	407	691	293	1298	968	329	1297	620
v/s Ratio Prot	0.06	c0.13	0.14	c0.13	c0.18	0.36	0.02	c0.36	0.26	c0.25	0.30	0.01
v/s Ratio Perm												
v/c Ratio	0.74	1.24	0.44	0.67	0.83	0.81	0.14	1.02	0.45	1.28	0.80	0.02
Uniform Delay, d1	57.9	58.0	35.9	48.5	48.6	31.1	46.5	42.2	15.2	52.5	36.0	25.2
Progression Factor	1.00	1.00	1.00	0.59	0.49	0.41	0.88	0.85	0.84	0.95	0.82	0.76
Incremental Delay, d2	16.5	142.0	0.6	0.5	3.5	1.7	0.1	28.0	0.1	144.2	4.5	0.0
Delay (s)	74.5	200.0	36.5	29.0	27.2	14.3	41.0	63.7	12.9	194.3	34.0	19.2
Level of Service	E	F	D	C	C	B	D	E	B	F	C	B
Approach Delay (s)		109.1			22.3			50.4			79.6	
Approach LOS		F			C			D			E	

Intersection Summary				
HCM Average Control Delay	58.3	HCM Level of Service	E	
HCM Volume to Capacity ratio	1.00			
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	98.2%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
3: WB On-Ramp & Lake Washington Boulevard

South Kirkland Park & Ride Rezone
With-Project 2030 PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	620	1732	920	730
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-3%			-8%	6%	
Total Lost time (s)			5.0	5.0	5.0	4.0
Lane Util. Factor			0.97	0.95	0.91	0.91
Frt			1.00	1.00	0.94	0.85
Flt Protected			0.95	1.00	1.00	1.00
Satd. Flow (prot)			3570	3681	3083	1398
Flt Permitted			0.95	1.00	1.00	1.00
Satd. Flow (perm)			3570	3681	3083	1398
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	653	1823	968	768
RTOR Reduction (vph)	0	0	0	0	10	0
Lane Group Flow (vph)	0	0	653	1823	1649	77
Turn Type			Prot			Free
Protected Phases			5	2	6	
Permitted Phases						Free
Actuated Green, G (s)			27.7	130.0	92.3	130.0
Effective Green, g (s)			27.7	130.0	92.3	130.0
Actuated g/C Ratio			0.21	1.00	0.71	1.00
Clearance Time (s)			5.0	5.0	5.0	
Vehicle Extension (s)			2.0	2.0	2.0	
Lane Grp Cap (vph)			761	3681	2189	1398
v/s Ratio Prot			c0.18	0.50	c0.53	
v/s Ratio Perm						0.06
v/c Ratio			0.86	0.50	0.75	0.06
Uniform Delay, d1			49.3	0.0	11.8	0.0
Progression Factor			0.83	1.00	0.68	1.00
Incremental Delay, d2			8.1	0.4	1.9	0.1
Delay (s)			49.2	0.4	9.9	0.1
Level of Service			D	A	A	A
Approach Delay (s)	0.0			13.3	9.5	
Approach LOS	A			B	A	

Intersection Summary			
HCM Average Control Delay	11.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	99.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
4: EB Off-Ramp & Bellevue Way NE

South Kirkland Park & Ride Rezone
With-Project 2030 PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	596	318	0	1756	920	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-2%			-6%	5%	
Total Lost time (s)	5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	1.00		0.91	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3467	1599		5238	3451	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3467	1599		5238	3451	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	627	335	0	1848	968	0
RTOR Reduction (vph)	0	79	0	0	0	0
Lane Group Flow (vph)	627	256	0	1848	968	0
Confl. Peds. (#/hr)			20			20
Turn Type		Perm				
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	28.5	28.5		91.5	91.5	
Effective Green, g (s)	28.5	28.5		91.5	91.5	
Actuated g/C Ratio	0.22	0.22		0.70	0.70	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	760	351		3687	2429	
v/s Ratio Prot	c0.18			c0.35	0.28	
v/s Ratio Perm		0.16				
v/c Ratio	0.82	0.73		0.50	0.40	
Uniform Delay, d1	48.4	47.2		8.8	7.9	
Progression Factor	1.00	1.00		1.00	0.96	
Incremental Delay, d2	6.9	6.3		0.5	0.3	
Delay (s)	55.3	53.5		9.3	7.9	
Level of Service	E	D		A	A	
Approach Delay (s)	54.7			9.3	7.9	
Approach LOS	D			A	A	

Intersection Summary			
HCM Average Control Delay	20.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	99.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
5: NE 38th Place & South Access

South Kirkland Park & Ride Rezone
With-Project 2030 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	24	333	5	15	270	28	5	0	15	39	5	66
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	28	387	6	17	314	33	6	0	17	45	6	77
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (ft)		985										
pX, platoon unblocked												
vC, conflicting volume	347			393			874	827	390	826	814	330
vC1, stage 1 conf vol							446	446		365	365	
vC2, stage 2 conf vol							428	381		460	449	
vCu, unblocked vol	347			393			874	827	390	826	814	330
tC, single (s)	4.2			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			99	100	97	90	99	89
cM capacity (veh/h)	1149			1166			421	465	658	463	469	709

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	28	393	17	347	23	128
Volume Left	28	0	17	0	6	45
Volume Right	0	6	0	33	17	77
cSH	1149	1700	1166	1700	577	585
Volume to Capacity	0.02	0.23	0.01	0.20	0.04	0.22
Queue Length 95th (ft)	2	0	1	0	3	21
Control Delay (s)	8.2	0.0	8.1	0.0	11.5	12.9
Lane LOS	A		A		B	B
Approach Delay (s)	0.5		0.4		11.5	12.9
Approach LOS					B	B

Intersection Summary				
Average Delay	2.4			
Intersection Capacity Utilization	36.6%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
6: East Access & 108th Avenue NE

South Kirkland Park & Ride Rezone
With-Project 2030 PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	134	138	102	1116	503	48
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	143	147	109	1187	535	51
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	TWLTL	
Median storage veh)					2	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1965	561	586			
vC1, stage 1 conf vol	561					
vC2, stage 2 conf vol	1404					
vCu, unblocked vol	1965	561	586			
tC, single (s)	6.5	6.3	4.1			
tC, 2 stage (s)	5.5					
tF (s)	3.6	3.4	2.2			
p0 queue free %	20	71	89			
cM capacity (veh/h)	179	505	984			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1
Volume Total	143	147	109	1187	586
Volume Left	143	0	109	0	0
Volume Right	0	147	0	0	51
cSH	179	505	984	1700	1700
Volume to Capacity	0.80	0.29	0.11	0.70	0.34
Queue Length 95th (ft)	135	30	9	0	0
Control Delay (s)	76.2	15.0	9.1	0.0	0.0
Lane LOS	F	C	A		
Approach Delay (s)	45.2		0.8		0.0
Approach LOS	E				

Intersection Summary			
Average Delay	6.5		
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
7: NE 38th Place & 108th Avenue NE

South Kirkland Park & Ride Rezone
With-Project 2030 PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	125	232	223	1103	576	75
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	132	244	235	1161	606	79
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	2276	646	685			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2276	646	685			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	49	74			
cM capacity (veh/h)	33	475	908			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1
Volume Total	132	244	235	1161	685
Volume Left	132	0	235	0	0
Volume Right	0	244	0	0	79
cSH	33	475	908	1700	1700
Volume to Capacity	3.97	0.51	0.26	0.68	0.40
Queue Length 95th (ft)	Err	72	26	0	0
Control Delay (s)	Err	20.3	10.3	0.0	0.0
Lane LOS	F	C	B		
Approach Delay (s)	3514.2		1.7		0.0
Approach LOS	F				

Intersection Summary			
Average Delay	538.5		
Intersection Capacity Utilization	71.6%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
8: Northup Way & 108th Avenue NE

South Kirkland Park & Ride Rezone
With-Project 2030 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	295	303	470	540	530	442	680	609	120	219	509	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	11	12	12	12	12	12	12
Grade (%)		0%			0%			1%			-6%	
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.98		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	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	0.93		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1559	3467	3260		3416	3405		1823	3571	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1863	1559	3467	3260		3416	3405		1823	3571	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	311	319	495	568	558	465	716	641	126	231	536	84
RTOR Reduction (vph)	0	0	11	0	116	0	0	13	0	0	10	0
Lane Group Flow (vph)	311	319	484	568	907	0	716	754	0	231	610	0
Confl. Peds. (#/hr)	10		10	10		10			10	10		
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Turn Type	Prot		pm+ov	Prot			Split			Split		
Protected Phases	1	6	4	5	2		4	4		3	3	
Permitted Phases			6									
Actuated Green, G (s)	23.8	26.5	54.5	32.5	35.2		28.0	28.0		23.0	23.0	
Effective Green, g (s)	23.8	26.5	54.5	32.5	35.2		28.0	28.0		23.0	23.0	
Actuated g/C Ratio	0.18	0.20	0.42	0.25	0.27		0.22	0.22		0.18	0.18	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	324	380	654	867	883		736	733		323	632	
v/s Ratio Prot	c0.18	0.17	0.16	0.16	c0.28		0.21	c0.22		0.13	c0.17	
v/s Ratio Perm			0.15									
v/c Ratio	0.96	0.84	0.74	0.66	1.03		0.97	1.03		0.72	0.97	
Uniform Delay, d1	52.6	49.7	31.8	43.7	47.4		50.6	51.0		50.4	53.1	
Progression Factor	0.81	0.77	1.25	1.00	1.00		1.08	1.08		1.00	1.00	
Incremental Delay, d2	19.7	7.7	1.4	1.4	37.4		22.2	36.6		6.1	27.0	
Delay (s)	62.1	45.8	41.2	45.1	84.8		76.7	91.5		56.6	80.1	
Level of Service	E	D	D	D	F		E	F		E	F	
Approach Delay (s)		48.3			70.6			84.4			73.7	
Approach LOS		D			E			F			E	

Intersection Summary					
HCM Average Control Delay	70.2	HCM Level of Service		E	
HCM Volume to Capacity ratio	1.00				
Actuated Cycle Length (s)	130.0	Sum of lost time (s)		20.0	
Intersection Capacity Utilization	98.3%	ICU Level of Service		F	
Analysis Period (min)	15				
c Critical Lane Group					

HCM Unsignalized Intersection Capacity Analysis
9: WB On-Ramp & 108th Avenue NE

South Kirkland Park & Ride Rezone
With-Project 2030 PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	0	1409	1215	304
Sign Control	Stop			Free	Free	
Grade	0%			0%	-1%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	1483	1279	320
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				159	266	
pX, platoon unblocked	0.85	0.85	0.85			
vC, conflicting volume	1773	639	1279			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1563	235	984			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	87	654	595			

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	494	494	494	639	639	320
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	320
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.29	0.29	0.29	0.38	0.38	0.19
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS						
Approach Delay (s)	0.0			0.0		
Approach LOS						

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization	36.9%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
10: Transit and HOV Ramp & 108th Avenue NE

South Kirkland Park & Ride Rezone
With-Project 2030 PM Peak Hour

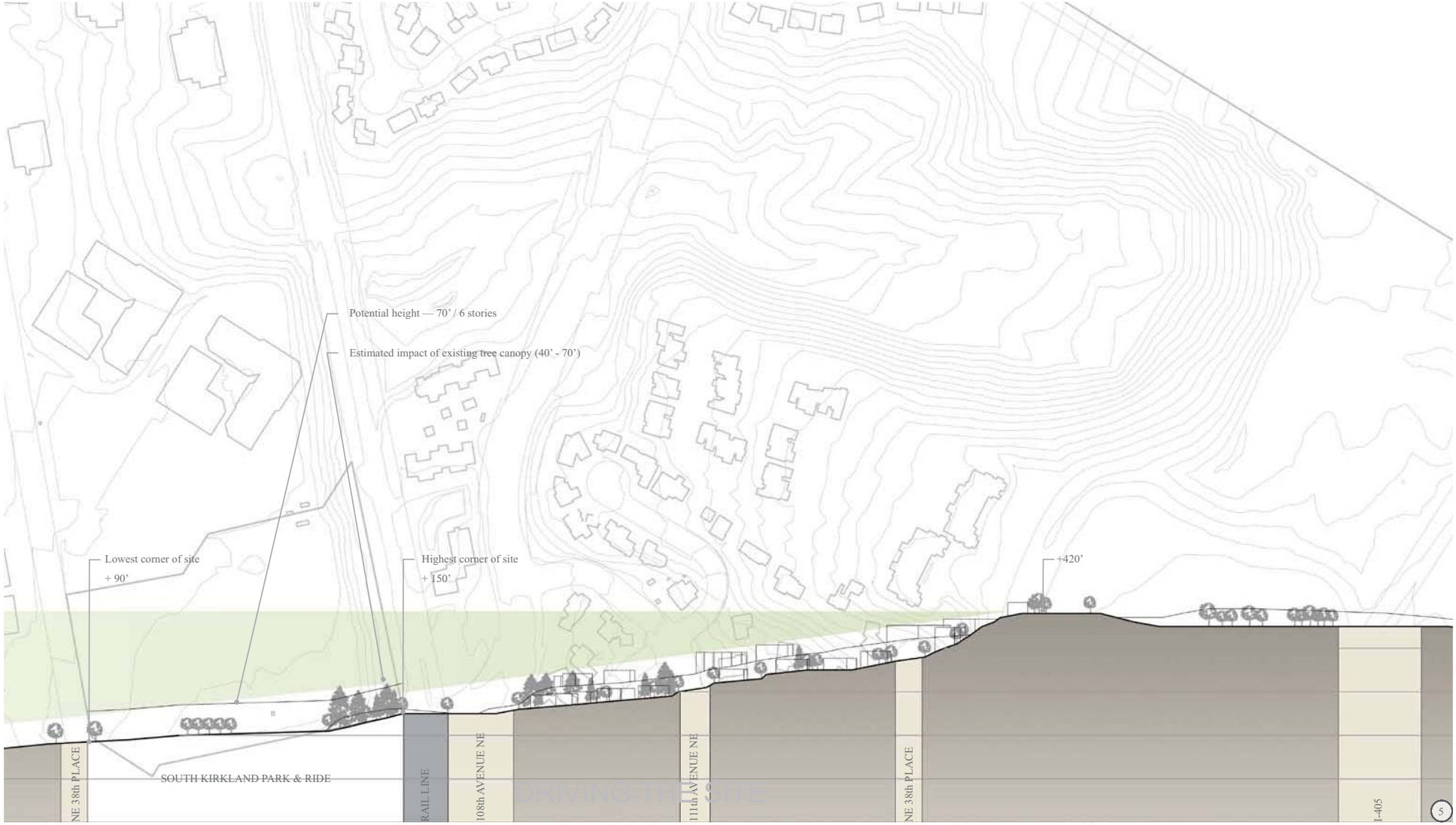
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	110	0	60	950	0	749	110	550	0	0	1075	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	14
Grade (%)		0%			2%			2%			-2%	
Total Lost time (s)	5.0		5.0	5.0	5.0	5.0	5.0	5.0			5.0	
Lane Util. Factor	1.00		1.00	0.97	0.95	0.95	1.00	1.00			0.95	
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00	1.00	1.00			1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00	1.00	1.00			1.00	
Frt	1.00		0.85	1.00	0.85	0.85	1.00	1.00			0.98	
Flt Protected	0.95		1.00	0.95	1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	1805		1615	3432	1504	1504	1769	1862			3509	
Flt Permitted	0.95		1.00	0.95	1.00	1.00	0.95	1.00			1.00	
Satd. Flow (perm)	1805		1615	3432	1504	1504	1769	1862			3509	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	116	0	63	1000	0	788	116	579	0	0	1132	158
RTOR Reduction (vph)	0	0	0	0	168	168	0	0	0	0	0	0
Lane Group Flow (vph)	116	0	63	1000	226	226	116	579	0	0	1290	0
Confl. Peds. (#/hr)									20	20		
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	Prot		custom	Split		Prot	Prot					
Protected Phases	3		3 5	4	4	4	5	2			6	
Permitted Phases												
Actuated Green, G (s)	9.3		26.1	36.1	36.1	36.1	11.8	69.6			52.8	
Effective Green, g (s)	9.3		26.1	36.1	36.1	36.1	11.8	69.6			52.8	
Actuated g/C Ratio	0.07		0.20	0.28	0.28	0.28	0.09	0.54			0.41	
Clearance Time (s)	5.0			5.0	5.0	5.0	5.0	5.0			5.0	
Vehicle Extension (s)	2.0			3.0	3.0	3.0	2.0	2.0			2.0	
Lane Grp Cap (vph)	129		324	953	418	418	161	997			1425	
v/s Ratio Prot	c0.06		0.04	c0.29	0.15	0.15	c0.07	0.31			c0.37	
v/s Ratio Perm												
v/c Ratio	0.90		0.19	1.05	0.54	0.54	0.72	0.58			0.91	
Uniform Delay, d1	59.9		43.2	47.0	39.9	39.9	57.5	20.4			36.3	
Progression Factor	1.00		1.00	1.00	1.00	1.00	1.00	1.00			0.71	
Incremental Delay, d2	48.3		0.1	43.0	1.4	1.4	12.0	2.4			6.3	
Delay (s)	108.2		43.3	89.9	41.4	41.4	69.5	22.7			32.2	
Level of Service	F		D	F	D	D	E	C			C	
Approach Delay (s)		85.4			68.5			30.5			32.2	
Approach LOS		F			E			C			C	

Intersection Summary				
HCM Average Control Delay	50.7	HCM Level of Service		D
HCM Volume to Capacity ratio	0.93			
Actuated Cycle Length (s)	130.0	Sum of lost time (s)		20.0
Intersection Capacity Utilization	80.2%	ICU Level of Service		D
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — South Kirkland Park & Ride Rezone
11: EB On-Ramp & 108th Avenue NE — With-Project 2030 PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	330	660	1040	1045
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	14	12	12	15
Grade (%)	2%			-6%	6%	
Total Lost time (s)			5.0	5.0	5.0	5.0
Lane Util. Factor			1.00	1.00	0.91	0.91
Frpb, ped/bikes			1.00	1.00	1.00	1.00
Flpb, ped/bikes			1.00	1.00	1.00	1.00
Frt			1.00	1.00	0.96	0.85
Flt Protected			0.95	1.00	1.00	1.00
Satd. Flow (prot)			1983	1957	3213	1568
Flt Permitted			0.95	1.00	1.00	1.00
Satd. Flow (perm)			1983	1957	3213	1568
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	347	695	1095	1100
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	347	695	1524	671
Confl. Peds. (#/hr)		50				
Heavy Vehicles (%)	2%	2%	0%	0%	0%	0%
Turn Type			Prot			Prot
Protected Phases			5	2	6	6
Permitted Phases						
Actuated Green, G (s)			26.8	130.0	93.2	93.2
Effective Green, g (s)			26.8	130.0	93.2	93.2
Actuated g/C Ratio			0.21	1.00	0.72	0.72
Clearance Time (s)			5.0	5.0	5.0	5.0
Vehicle Extension (s)			2.0	2.0	2.0	2.0
Lane Grp Cap (vph)			409	1957	2303	1124
v/s Ratio Prot			c0.17	0.36	c0.47	0.43
v/s Ratio Perm						
v/c Ratio			0.85	0.36	0.66	0.60
Uniform Delay, d1			49.6	0.0	9.9	9.1
Progression Factor			1.00	1.00	1.22	2.01
Incremental Delay, d2			14.5	0.5	0.1	1.5
Delay (s)			64.1	0.5	12.2	19.8
Level of Service			E	A	B	B
Approach Delay (s)	0.0			21.7	14.5	
Approach LOS	A			C	B	

Intersection Summary			
HCM Average Control Delay	16.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	81.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



- **View impact to existing residences is from existing tree canopy**
- **No Impact to existing residences views from 70’ high building**

SEATTLE / Pier 56, 1201 Alaskan Way, #200 / Seattle, WA 98101 / 206.623.3344
SAN FRANCISCO / 660 Market Street, #300 / San Francisco, CA 94104 / 415.956.0688