> "Daylighting – The City encourages opening up a stream that is located in a culvert to restore the stream to a more natural and open condition. The purpose is to improve the values and functions of the stream, including maintaining water quality, reducing storm and flooding water flow, and providing wildlife habitat."

These are the ecological benefits that were specifically analyzed in our August 2017 assessment wherein we determined that the benefits of daylighting at this particular location would be either insignificant or detrimental over the next several decades until functions provided by the required removal of mature trees are replaced. See the Shannon & Wilson August 2017 assessment, Table 2.

The City's authority for daylighting the stream is found in KZC 90.145.1 as follows:

> "Requirement to Daylight a Stream - The City may require a stream to be daylighted as part of a Process IIA pursuant to Chapter 150 KZC of IIB permit pursuant to Chapter 152 KZC if the required daylighting is proportionate to the scope and nature of the Process IIA or IIB permit. Where stream daylighting is required, the applicant shall submit a plan as outlined in subsection (3) of this section."

The Peter Kirk project will be processed under a Process IIB permit and has implemented a thorough mitigation sequencing strategy which entirely avoids wetland and stream impacts. Mitigation is being provided for unavoidable buffer impacts.

Through several public records requests we reviewed development applications to the City that triggered critical areas review and contained an onsite culverted stream, to see whether project examples exist where the City has required stream daylighting. In our review of over 30 projects that met the above criteria, we were unable to find any examples where the City required daylighting of a stream except in cases where there were other direct impacts to wetlands or streams. However, even with this criterion the City did not propose or require daylighting for City projects that contained onsite culverted streams. These include the Cross Kirkland Corridor Stormwater Drainage Headwall Repair Project (SEP17-00484) and the City of Kirkland Stream and Beaver Dam Maintenance Project (SEP13-01144). Further, the City issued a Mitigated Determination of Nonsignifigance to allow a private resident to install a new culvert in a perennial, non-salmonid bearing stream (SEP08-00009).

Two known projects that either proposed to or were required to daylight onsite streams are the Lakeview Elementary School Project and Northwest University, respectively. Both projects required in-water work and proposed to permanently impact onsite wetlands and/or streams. The 1999 Lakeview Elementary School Project proposed daylighting an onsite culverted stream as part of the compensatory mitigation to offset permanent wetland impacts (Coughlin Porter Lundeen, 2000; Lake Washington School District, 1999). The Northwest University is currently seeking approval of a 20-year Master Plan that involves the relocation of onsite College Creek. The City has requested that the University daylight the stream as part of the relocation (Gelotte Hommas, 2016 and 2017).

The Peter Kirk project has implemented a thorough mitigation sequencing strategy and, unlike the two projects above, avoids wetland and stream impacts.

RESPONSE TO PEER REVIEW

The Shannon & Wilson's stream assessment analyzed the ecological benefits listed in KZC 90.75.1, and the expected effect of that benefit on the Peter Kirk property stream. The subsequent peer review resulted in the first TWC letter dated March 6, 2018 (Letter #1), followed by a second review letter dated March 14, 2018 (Letter #2) (TWC, 2018a and 2018b).

TWC's Letter #1 concluded that:

> "In summary, our assessment is that daylighting the piped stream section at Peter Kirk Elementary would not be of benefit to fish since none are present in or able to access that stream section now, and the level of downstream infrastructure and development precludes restoring open-channel or otherwise fish-passable conveyances for at least decades to come."

City staff felt that "the code requirements of KZC Section 90.75.1 were not adequately addressed" in Letter #1, and so asked TWC to provide a second review. Letter #2 concluded that the "prospect of returning the piped stream segment to an open channel is an opportunity to improve water quality, storm flow attenuation and habitat quality in Kirkland." These listed functions are the same as those identified in KZC 90.75.1 and addressed in Shannon & Wilson's August 2017 letter. The following table provides a response to TWC's characterization of those

potential benefits in contrast to Shannon & Wilson's characterization. Information already provided in Shannon & Wilson's characterization will not be repeated in full here but included in the Attachment and incorporated by reference. The responses below reference a proposed native meadow, which is a buffer enhancement described in the project's buffer mitigation plan (Shannon & Wilson, 2017b).

TABLE 1
DAYLIGHTING BENEFITS AS APPLIED TO PETER KIRK STREAM

The Watershed Company's Characterization of Potential Ecological Benefits of Daylighting	Response
Opportunity	
[S]hort-term and limited loss of function should be weighed against the potential and significant future benefits of restoring a stream channel and buffer system, which would support many more individual trees, native shrubs and groundcovers.	The proposed buffer enhancement adjacent to the site stream and culvert is planned to occur regardless of stream daylighting. The buffer enhancement will convert existing sand playfield and mowed lawn to a naturalized meadow. As such, with or without a daylighting requirement, the Peter Kirk project will add native habitat and improve water quality and enhance buffer functions. Additionally, culvert removal/stream daylighting would require the loss of several mature coniferous and deciduous trees, including a 42-inch-diameter at breast height western red cedar (Shannon & Wilson, 2017a). The associated functional loss that would occur over the next several decades until the mature trees are replaced would be greater than the minimal benefits derived from daylighting this short segment, as described below in the Water Quality and Storm and Floodwater sections.
Should these [cottonwood] trees pose risks to the new school or its occupants, removal could very well be recommended by arborists.	The cottonwood trees that would be removed with stream daylighting are not located near the existing or proposed school building, or other school infrastructure. As part of the proposed buffer enhancement, this area would be removed from daily school use and incorporated as a naturalized buffer. Should limb failure occur, the limbs would drop into the wetland, stream, or naturalized buffer, contributing to the existing small mammal and passerine habitat.

The Watershed Company's Characterization of Potential Ecological Benefits of Daylighting	Response
[L]arge trees such as these can have root structures that would eventually jeopardize the integrity of the pipe and may need to be removed anyway to prevent pipe failure.	There is no known site information that suggests the trees will harm the culvert. It is an unlikely possibility, and should not be the basis for removing mature native trees.
Water Quality	
This [vegetated] buffer would provide improvements to water quality through biofiltration before stormwater reaches and enters the stream channel. Currently this water likely infiltrates to a limited degree and otherwise flows eventually to the City stormwater system. A stream buffer with properly amended soils and planted with native species would infiltrate at a higher capacity that [sic] the existing grass turf and dirt/gravel playfield. It would also be a [sic] much better at filtering, providing uptake of or adsorbing more pollutants than the current condition.	If the existing upland drainage area to the section of stream that is currently piped included pollution-generating impervious surfaces or other pollutant sources, then conversion of some of that area to vegetated buffer would provide some water quality benefits. However, the only potential source of current onsite pollution is turbidity from the sand playfield, which will be removed and replaced with a meadow and non-pollutant generating surfaces (grasscrete fire lane, gravel walkway, and landscaping) under the proposed project design (Figure 1). The proposed native meadow is better at providing water quality functions than the existing condition. The proposed project does not include any pollutant generating surfaces in the onsite stream's drainage basin.
[T]he elimination of turf also eliminates any fertilizer or pesticide currently used or that would be used in the future since such applications would not be applied to the native vegetation.	Peter Kirk Elementary does not currently and does not plan in the future to apply fertilizers, pesticides, or herbicides to any of its lawn or landscaped areas. The proposed native meadow would not be treated with fertilizers, pesticides, or herbicides.
[If] the channel were to be daylighted, inclusion of a gravel substrate along the daylighted length would provide a high degree of biofiltration due to subsurface flows through the gravel where organic inputs and pollutants would be decomposed by microorganisms and aquatic insects.	Assessment of biofiltration potential requires stream channel and hydrologic information that has not been collected. However, TWC's statement that a "high degree" of biofiltration will occur in the stream is unlikely. The King County Surface Water Design Manual states that designed biofiltration swales "do not remove dissolved pollutants effectively, although some infiltration to underlying soils may occur depending on the type of soil…" (King County Department of Natural Resources and Parks [King County], 2016). The King County manual also identifies the primary pollutant removal mechanism as sedimentation, which is enhanced by grass, or in backwater areas. A gravel stream channel bed is expected to have an even lesser degree of biofiltration than that of an engineered bioswale due to increased porosity in the gravel stream.

The Watershed Company's Characterization of Potential Ecological Benefits of Daylighting	Response
	Also, the majority of the Peter Kirk property geology is mapped as transitional beds consisting of clay, silt, and fine to very fine sand (Minard, 1983; Washington State Department of Natural Resources [WDNR], 2018), which would further reduce biofiltration potential.
	As noted in the August 2017 assessment, the unnamed stream is not identified by the Washington State Department of Ecology's surface water quality database as having any degree of impaired water quality throughout its entirety. Yet, a daylighting requirement and removal of the mature trees will reduce shade, may reduce bank stability, and reduce organic matter inputs until the mature trees are replaced in a 30 to 50 year timeframe. Removal of stream from the pipe will increase water temperature in the short term until the tree canopy can re-establish. Furthermore, there is no evidence that the Peter Kirk project itself has potential to impair or degrade water quality. In fact, the buffer enhancement will *improve* present circumstances. The existing site conditions, proposed buffer mitigation improvements, and the potential detrimental effects of tree removal do not seem to fit the code purpose to require daylighting to "maintain" water quality.
Reducing Storm and Flooding Water Flow	
[S]torm and floodwater flow reduction would be improved by increasing roughness, infiltration and evapotranspiration compared to turf and unvegetated dirt/gravel.	The reviewers indicate that removal of the culvert could reduce downstream flooding due to changes in roughness, infiltration, and evapotranspiration. For the reasons described below, these beneficial effects are likely unmeasurable. First, the increases in channel roughness (large woody debris, rocks, and stream vegetation) along a short daylight section would not likely have more flood hydraulic resistance than is currently present with the existing culvert entrance and exits. Increases in roughness may attenuate (store) flood flows in a stream reach, thereby decreasing downstream flow rates, but have the potential to increase localized and upstream flooding. In the case of the daylight channel versus culvert, it is likely that the existing culvert attenuates more flow (holds more water upstream) than would a daylight channel. Therefore, the existing culvert likely

The Watershed Company's Characterization of Potential Ecological Benefits of Daylighting	Response
	would increase flood storage and contribute less flow downstream than the daylighted stream. For infiltration along the daylight channel, the culvert area is mapped as geologic transitional beds consisting of clay, silt, and fine to very fine sand (Minard, 1983; WDNR, 2018). These soil types offer very little infiltration capacity. Although the infiltration capacity of the soils would be incrementally more than if the water was flowing through the pipe, the infiltration through the soils for the daylighted stream would still be near zero, particularly where the soils are clay or silt. Infiltration, based on the mapped soil types, would not provide a significant improvement in storm and floodwater flow reduction. Despite this, the project's proposed naturalized meadow vegetation and shallow compost amendments will improve shallow surface water infiltration, and reduce stormwater runoff, compared to the current functions. Evapotranspiration would be at its lowest during winter and early spring, when risk of flooding is the greatest. In addition, the removal of the western red cedar and the cottonwoods necessary to remove the culvert would significantly decrease evapotranspiration for decades before new trees had an opportunity to grow and mature in the construction zone.
[A] mapped floodplain is identified in Peter Kirk Park in the Kirkland GIS system and therefore could be damaged during flooding events.	The mapped floodplain is more than 1 mile downstream from the Peter Kirk site. From the project site, to Peter Kirk Park, and beyond to Lake Washington, the entire stream flows in a culvert system. The floodplain shown on the City's GIS system in Peter Kirk Park encompasses a small area of tennis court, a playground, lawn play areas, and ball fields. In the City's 2014 *Surface Water Master Plan*, Peter Kirk Park is not included in the short list of flood problems identified by City staff (Kirkland, 2014). Based on communications with Jenny Gaus, City Surface Water Engineering Supervisor, the mapped floodplain at Peter Kirk Park is a designed stormwater facility used by the City for floodplain storage. In fact, the City recently increased the size of the stormwater pipes along Central Way and designed the upgrades to

The Watershed Company's Characterization of Potential Ecological Benefits of Daylighting	Response
	specifically include flood water storage in the park (Kirkland, 2015; Gaus, 2018). Flooding at the park is not viewed as detrimental, but is a component of the City's surface water management plan. Even considering this, allowing the culvert to remain in place, as compared with the daylight channel, will have no additional impacts on the downstream Peter Kirk Park floodplain for the reasons described above in the previous comment section.
[T]he pipe may currently be sufficient to carry the existing flows but there are at least twelve undeveloped lots and two unopened rights of way in the immediate upstream basin. Future development in these lots and the basin overall could result in larger future flows that exceed the capacity of the pipe.	The potential effects of speculative future development on other properties by other owners should be considered by the City when it receives land use and building permit applications. The City should require these future developments to mitigate for their impacts as required in Kirkland Municipal Code 15.52, rather than requiring the School District to mitigate for another property owner's potential future development.
	As noted in the August 2017 assessment and above, daylighting would have minimal benefit to storm and flood flow. Flooding of the downstream mapped floodplain would not be measurably affected by daylighting of the stream. The present circumstances do not fit the code purpose to require daylighting to "reduce" storm and floodwater flow.
Wildlife Habitat	
A suitable buffer restoration plan would provide additional food, cover, nest and perching resources by elevating the diversity of plants, increasing habitat complexity, incorporating woody debris and adding additional vegetation layers.	The site already contains a diverse native forest with sources of food and cover, and opportunities for nesting and perching. The proposed meadow will add an additional native habitat type, thus increasing the overall diversity of vegetation and associated wildlife opportunity on the site.
Macroinvertebrates and other benthic organisms, including insects falling into the channel, would provide food for terrestrial species using the buffer and feeding along the stream.	The proposed native meadow restoration in the wetland/stream buffer will provide an insect-rich food source for terrestrial species, including birds, amphibians, bats, and other small mammals; these insects may also enter the stream system.
Accumulation of organic material, primarily leaves and litter but also including insects and other benthos, also has downstream beneficial	As suggested by the comment, any organic material or insect life that enters the system on the site would have no practical ecological benefit until that material enters

The Watershed Company's Characterization of Potential Ecological Benefits of Daylighting	Response
effects that are exported downstream in Lake Washington.	Lake Washington. Trash racks and culvert sizes limit the size of any material that would migrate downstream.
Finally, an opened channel and buffer would provide a missing link in a habitat corridor that would connect at least two mapped wetlands (located to the north and south), a currently separated stream channel, and their buffers.	Site observations and review of aerial photos show that the existing habitat areas (two wetlands and open sections of stream) are currently connected via their buffers at the tree canopy level. Since the stream has been acknowledged in both TWC Letters #1 and #2 to contain no fish, the habitat corridor is primarily utilized by terrestrial wildlife, including birds, small mammals, and amphibians. Larger wildlife is prevented from using the current corridor by existing chain link fence at the school boundaries. For school security reasons, that fencing would be retained. The buffer condition of the wetlands and open sections of stream, and thus the habitat corridor, will also be improved as part of the current proposed project, creating native meadow vegetation in an area with intensively used existing mowed grass and sand playfield (Figure 2). The native meadow will also provide habitat for small mammals and birds.
	As noted in the August 2017 assessment and above, no fish have been observed or documented in the stream and, given that the downstream culverted 1.4 miles of stream running through the Kirkland urban corridor is unlikely to be daylighted, future fish access to this portion of the stream is extremely unlikely. In addition, removal of mature trees will be detrimental over the next several decades by reducing available wildlife forage, refuge and nesting habitat. Furthermore, the proposed meadow will add an additional native habitat type. The present circumstances and potential detrimental effects of daylighting do not fit the code purpose to require daylighting to "provide" habitat.
Conclusion	
The prospect of returning the piped stream segment to an open channel is an opportunity to improve water quality, storm flow attenuation and habitat quality in Kirkland.	The potential benefits of daylighting 150 feet of pipe channel in a nonfish-bearing piped system are not significant or measurable. Spending substantial public funds for limited ecological benefit is not a wise use of limited School District and taxpayer resources.
Additionally, it could benefit the School District as an educational feature that the	The proposed native meadow and the existing native forest and existing open stream channel sections

The Watershed Company's Characterization of Potential Ecological Benefits of Daylighting	Response
students, parents and community could participate in.	provide significant educational features at this site. Further, while societal and educational opportunities are associated with the natural environment, these factors are not identified in the KZC as reason for encouraging or requiring stream daylighting.

CONCLUSIONS

The ecological benefits that typically accompany a stream daylighting project can be present in varying degrees and can depend on the existing health and condition of the subject stream. Daylighting the short segment of the stream on the Peter Kirk property would result in largely insignificant benefits to the stream system at a tremendous cost to the District and taxpayers. That the City's consultant first peer review found little benefit to daylighting the stream underscores this finding. The insignificant benefits (and potential detrimental impacts) that could be provided by daylighting in the present circumstances do not meet the stated purpose of KZC 90.75(1). Furthermore, based on the City's documented history of projects with required daylighting, applying the daylighting requirements here would not be proportional to the scope and nature of the Process IIB permit as required by KZC 90.75(4). The Peter Kirk project, unlike other projects where daylighting has been required, avoids any wetland and stream impacts and in fact proposes beneficial wetland buffer enhancements.

LIMITATIONS

The findings and conclusions documented in this letter have been prepared for specific application to this project and have been developed in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area, and in accordance with the terms and conditions set forth in our agreement. The conclusions presented in this letter are professional opinions based on interpretation of information currently available to us and are made within the operational scope, budget, and schedule constraints of this project. No warranty, express or implied, is made.

SHANNON & WILSON, INC.

We appreciate the opportunity to be of service to you. If you have any questions or would like clarification of the information provided herein, please contact me at scc@shanwil.com or (206) 695-6674.

Sincerely,

SHANNON & WILSON, INC.

Sarah Corbin, PWS
Senior Biologist

Chris Allen, LHG
Senior Hydrogeologist

Digitally signed by David Cline
DN: cn=David Cline, o=Shannon & Wilson, ou=Seattle, email=drc@shanwil.com, c=US
Date: 2018.04.24 13:36:00 -07'00'

Dave Cline, PE, CFM
Vice President, Hydraulic Engineer

SCC:DRC:CWA:KLW/scc

Enc: References (2 pages)
Figure 1 – Proposed Project Site Drainage Basins
Figure 2 – Buffer Functional Habitat Connectivity
Shannon & Wilson Stream Daylighting Assessment, Peter Kirk Elementary Replacement Project, August 10, 2017.

REFERENCES

Coughlin Porter Lundeen, 2000, Engineering report, preliminary drainage analysis, Lakeview Elementary School: Report prepared by Coughlin Porter Lundeen, Seattle, Wash., C990030-02, for Lake Washington School District, Kirkland, Wash., August 26.

Gaus, Jenny, 2018, Floodplain question – Peter Kirk Park: Personal communication (email) between Jenny Gaus, City of Kirkland, Kirkland, Wash., and Sarah Corbin, Shannon & Wilson, Inc., Seattle, Wash., April 23.

Gelotte Hommas, 2016, Northwest University master plan [draft]: Bellevue, Wash., Gelotte Hommas, July, 107 p.

Gelotte Hommas, 2017, Northwest University master plan comment response letter ON16-02063: Letter prepared by Gelotte Hommas, Bellevue, Wash., for City of Kirkland Planning and Building Department, February 28.

King County Department of Natural Resources and Parks (King County), 2016, King County surface water design manual: King County, Wash., April 24, 115 p.

Kirkland, Wash., (Kirkland), 2014, Surface water master plan, chapter 3, City of Kirkland, Wash., available: http://www.kirklandwa.gov/assets/public+works/public+works+pdfs/surface+water/swmp/swmp+chapter+3.pdf

Kirkland, Wash., (Kirkland), 2015, Surface water master plan, adopted November 2014, amended November 2015, Appendix F basin characterization summaries: City of Kirkland, Wash., November, 137 p.

Kirkland, Wash., (Kirkland), 2016, Critical areas – wetlands, streams, minor lakes, fish wildlife habitat areas, and frequently flooded areas: Kirkland Zoning Code (KZC) Chapter 90, available: http://www.codepublishing.com/WA/Kirkland/.

Lake Washington School District, 1999, Determination of non-significance for proposal to modernize the existing Lakeview Elementary School: Redmond, Wash., Lake Washington School District, September 13, 15 p.

Minard, J.P., 1983, Geologic Map of the Kirkland Quadrangle, Washington: U.S. Geological Survey Map MF-1543, scale 1:24,000.

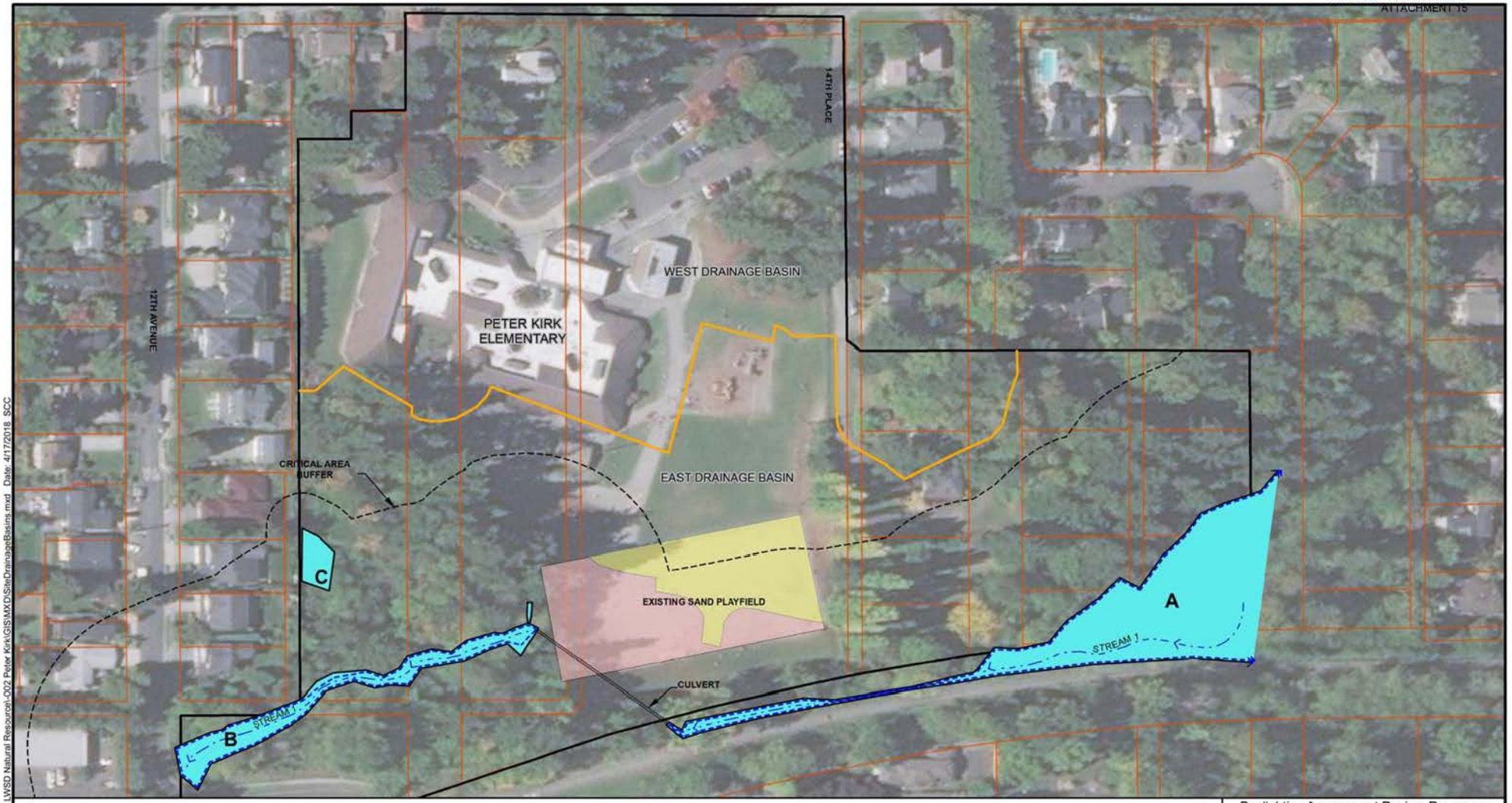
Shannon & Wilson, Inc. 2017a, Stream daylighting assessment, Peter Kirk Elementary Replacement Project, Kirkland, Washington: Report prepared by Shannon & Wilson, Inc., Seattle Wash. 21-1-12553-207, for Lake Washington School District, Redmond, Wash., August, 10 p.

Shannon & Wilson, Inc., 2017b, Buffer mitigation plan, Peter Kirk Elementary Replacement Project, Kirkland, Washington: Report prepared by Shannon & Wilson, Inc., Seattle Wash. 21-1-12553-205, for Lake Washington School District, Redmond, Wash., August, 23 p.

The Watershed Company (TWC), 2018a, Peer review assessment of stream daylighting habitat effects, stream and Peter Kirk Elementary (#WRIA 8-0246): Letter prepared by The Watershed Company, Kirkland, Wash., 170622.22, for City of Kirkland Planning and Building Department, Kirkland, Wash., March 6, 3 p.

The Watershed Company (TWC), 2018b, Peer review assessment of stream daylighting habitat effects, stream and Peter Kirk Elementary (#WRIA 8-0246): Letter prepared by The Watershed Company, Kirkland, Wash., 170622.22, for City of Kirkland Planning and Building Department, Kirkland, Wash., March 14, 3 p.

Washington State Department of Natural Resources, 2018, Washington geologic information portal: Available: https://www.dnr.wa.gov/geologyportal.



LEGEND

Proposed East/West Site Basin Boundary

Stream Ordinary High Water Mark

Existing Sand Playfield

To be converted to native meadow

To be converted to non-pollutant generating surface (grasscrete fire lane, landscaping, and gravel walkways).

Wetland

Project Area

Notes:
The proposed east/west basin boundary derived from the Peter Kirk Elementary School Technical Information Report, by LPD Engineering, dated December 8, 2017.

Buffer impacts and proposed buffer mitigation strategy are described in the project's Buffer Mitigation Plan, by Shannon & Wilson, dated August 31, 2017.

N

0 100 200
Feet

Daylighting Assessment Review Response
Peter Kirk Elementary School
City of Kirkland, Washington

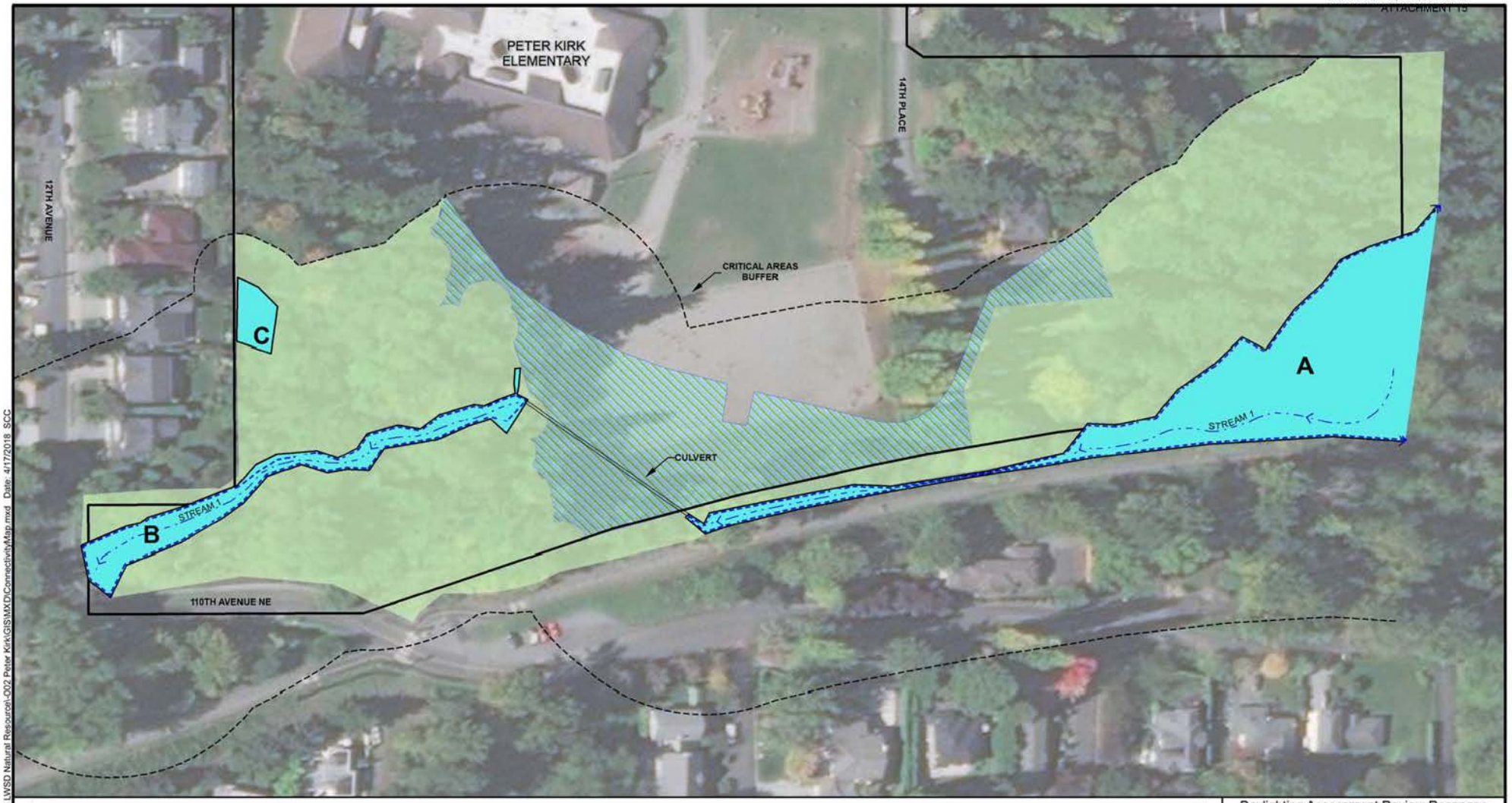
PROPOSED PROJECT SITE DRAINAGE BASINS

April 2018 | 21-1-12553-207

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 1

Filename: I:\EF\21-1 SEA\12500s\12553 LWSD Natural Resource\-002 Peter Kirk\GIS\MXD\SiteDrainageBasins.mxd Date: 4/17/2018 SCC



LEGEND

- A — Wetland
- Stream
- Project Area
- Existing Connected Functional Habitat
- Additional Connected Functional Habitat Under Proposed Project

N

0 100 200
Feet

Daylighting Assessment Review Response
Peter Kirk Elementary School
City of Kirkland, Washington

BUFFER FUNCTIONAL HABITAT CONNECTIVITY

April 2017 | 21-1-12553-207

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 2

Filename: I:\EF\21-1 SEA\12500s\12553 LWSD Natural Resource\-002 Peter Kirk\GIS\MXD\ConnectivityMap.mxd Date: 4/17/2018 SCC

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

August 10, 2017

Lake Washington School District
15212 NE 95th Street
Redmond, WA 98052

Attn: Mr. Jon Shepherd

RE: STREAM DAYLIGHTING ASSESSMENT, PETER KIRK ELEMENTARY REPLACEMENT PROJECT, KIRKLAND, WASHINGTON

Shannon & Wilson, Inc. (S&W) was contracted by the Lake Washington School District to perform a stream daylighting assessment for the Peter Kirk Elementary School (Peter Kirk) Project in the City of Kirkland (City), Washington. The school is located at 1312 6th Street in the NE quarter of Section 25, Township 25N, and Range 5E, Willamette Meridian. S&W was asked to assess the ecological benefits of daylighting an approximately 150-foot-long portion of an un-named, piped stream that crosses through the southeast corner of the school property.

BACKGROUND

The Lake Washington School District is currently coordinating with the City on the submittal of the Master Use Permit as part of the Peter Kirk Project permitting process. The Peter Kirk property is highly encumbered with critical areas and the associated buffers; however, the project does not currently include any impacts to onsite wetlands or to the onsite stream. The project is implementing mitigation sequencing to avoid and minimize impacts to buffer to the extent possible. As part of the permit coordination, the City has requested that the project provide an ecological assessment of daylighting the site stream, per Kirkland Zoning Code (KZC) 90.75.4 (Kirkland, Wash., [Kirkland], 2016).

EXISTING STREAM CONDITIONS

The small, perennial stream flows through defined and undefined channel segments within the school property. The stream enters the site at the northeast corner of the property in an undefined channel associated with a depressional wetland, and then narrows to an open, straight

400 NORTH 34TH STREET, SUITE 100
P.O. BOX 300303
SEATTLE, WASHINGTON 98103
206-632-8020 FAX 206-695-6777
TDD 1-800-833-6388
www.shannonwilson.com

ditch between the Cross Kirkland Corridor and the Peter Kirk playfield along the east property boundary. The stream then flows through an approximately 150-foot-long, 30-inch-diameter corrugated metal pipe (CMP) culvert and enters a conifer-dominated forested area in the southeast corner of the property. Within the forest, the stream channel is well defined with short stretches of riffle and small pools and contains large woody debris. After leaving the school property, the stream flows south through approximately 1.4 miles of a continuous series of culverts until it outlets into Lake Washington at Marina Park (Kirkland, 2017).

The portion of the onsite stream under review for daylighting is the stretch within the onsite 30-inch CMP culvert. The 30-inch CMP was constructed with a concrete headwall and concrete wing walls on both the inlet and outlet, and woody vegetation surrounds both culvert ends (Photo 1). The culvert inlet is surrounded by a cluster of large, mature, black cottonwood (*Populus balsamifera trichocarpa*) trees and smaller Douglas-fir (*Pseudotsuga menziesii*) overstory with a Himalayan blackberry (*Rubus armeniacus*) shrub understory (Photos 2 and 3). The culvert outlet is shaded by a mature red alder (*Alnus rubra*) and surrounded by Himalayan blackberry, mature red-osier dogwood (*Cornus sericea*), salmon berry (*Rubus spectabilis*), and cherry trees (*Prunus* sp.). With the exception of a large western red cedar (*Thuja plicata*) and two smaller cedars growing immediately adjacent to the culvert's mid-span, the majority of the culvert alignment is covered with a grassed slope (Photo 4).

The onsite stream, including the culvert inlet and outlet, does not exhibit detrimental channel erosion, such as scour, downcutting, or incision.

Based on Washington State Department of Ecology's surface water quality database, the unnamed stream is not identified as having any degree of impaired water quality throughout its entirety. Near the stream's outlet at Marina Park into Lake Washington, the lake is listed as impaired for bacteria.

Fish were not observed in the stream during our site visits. The Washington Department of Fish and Wildlife (WDFW) SalmonScape mapping application has no documented presence and no modeled potential presence for salmonids within the stream system (WDFW, 2017). The stream is unlikely to ever provide salmonid habitat given the continuous system of culverts between the school property and Lake Washington (Photo 5). However, Stream 1 is rated as Type F (fish-bearing) based on KZC 90.65 due to presence of potential fish habitat (Kirkland, 2016).

STREAM DAYLIGHTING ASSESSMENT

Stream daylighting can provide many ecological benefits to impaired stream systems, including increased flood control, slowing of water velocity and associated erosion, improved water quality and riparian habitat conditions, and habitat connectivity (Pinkham, 2000). Daylighting is frequently used for restoring historic salmonid spawning and rearing habitat and migration corridors. However, stream daylighting is not a one-size-fits-all solution and may not be an ecologically preferable choice for all culverted streams.

Removal of the onsite culvert would require the removal of several mature coniferous and deciduous trees from around the culvert inlet and outlet. The trees currently provide numerous ecological benefits, including refuge for passerines and other wildlife; shade of the open-air sections of stream, which cools water temperatures and helps retain dissolved oxygen; contribution of allochthonous, or external, organic material to the stream, which is used by macroinvertebrates; and stabilization of the stream bank to prevent erosion. Table 1 below summarizes the species and associated diameter at breast height of trees that would be removed or harmed (to the point of removal) by the culvert removal. This list was prepared utilizing the site survey of the culvert alignment and surveyed tree locations, as well as ground truthing in the field.

TABLE 1
TREE REMOVAL ASSOCIATED WITH CULVERT REMOVAL

Species	Approximate Location	Diameter at Breast Height (inches)
Western red cedar (*Thuja plicata*)	Mid-span culvert alignment	42
Western red cedar	Mid-span culvert alignment	6
Western red cedar	Mid-span culvert alignment	6
Black cottonwood (*Populus balsamifera trichocarpa*)	Culvert inlet	40
Black cottonwood	Culvert inlet	34
Black cottonwood	Culvert inlet	20
Black cottonwood	Culvert inlet	28
Black cottonwood	Culvert inlet	10
Douglas fir (*Pseudotsuga menziesii*)	Culvert inlet	8
Douglas fir	Culvert inlet	8

Species	Approximate Location	Diameter at Breast Height (inches)
Douglas fir	Culvert inlet	6
Douglas fir	Culvert inlet	5
Douglas fir	Culvert inlet	4
Red alder (*Alnus rubra*)	Culvert outlet	8
Red alder	Culvert inlet	5

The ecological benefits that typically accompany a stream daylighting project can be present in varying degrees and can depend on the existing health and condition of the subject stream. Table 2 below summarizes typical benefits of stream daylighting and the expected effect of that benefit on the Peter Kirk property stream.

TABLE 2
DAYLIGHTING BENEFITS AS APPLIED TO PETER KIRK STREAM

Potential Ecological Benefit of Daylighting	Impact to Site Stream	Rationale
Flood control	Insignificant	▪ Flooding is not a known problem in or downstream of the site stream. ▪ Water staining on culvert indicates that culvert is approximately 30 percent full at typical high flows.
Velocity control to reduce downstream erosion	Insignificant	▪ No observed scour or incision observed at culvert inlet/outlet or along open portions of stream. ▪ Downstream of school property, stream is entirely underground; erosion is not a problem.
Water quality improvement	Detrimental over the next several decades, until functions provided by mature trees are replaced	▪ Removal of mature trees associated with daylighting will reduce shade, bank stability, and organic matter inputs. ▪ Water quality is not currently a known problem within the stream. ▪ Removal of stream from pipe will increase water temperature, even more so until a mature canopy can establish.
Riparian habitat	Detrimental over the next several decades, until functions provided by mature trees are replaced	▪ Removal of mature trees will temporarily reduce available wildlife forage, refuge, and nesting habitat.

Potential Ecological Benefit of Daylighting	Impact to Site Stream	Rationale
Connectivity to downstream habitat	Insignificant	▪ Entire corridor downstream from the Peter Kirk property is underground and continues to be redeveloped without requirements of daylighting. As an example, Park Place Center is being redeveloped currently and was not required to mitigate or daylight its 850-foot-long portion of the corridor.
Fish Passage	Insignificant	▪ No fish have been observed or have been documented in site stream. ▪ The downstream culverted 1.4 miles of stream through the heart of the Kirkland urban corridor and the potential for daylighting any of the corridor is remote. Therefore, future fish access to this portion of the stream is extremely unlikely.

CONCLUSIONS

While daylighting provides many environmental benefits to impaired stream systems, daylighting the short segment of the un-named stream on the Peter Kirk property would result in largely insignificant benefits to the stream system and would result in a temporal decrease in water quality and habitat function until the mature canopy at the culvert inlet and outlet are replaced. If the onsite culverted stream were required to be daylighted, new plantings could be used to replace the damaged riparian cover. However, many of the impacted trees are estimated to be between 20 and 30 years old and the associated functional loss over the next several decades would be greater than the potential benefits derived from daylighting the short segment of stream. Therefore, the project does not include stream daylighting.

LIMITATIONS

The findings and conclusions documented in this report have been prepared for specific application to this project and have been developed in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area, and in accordance with the terms and conditions set forth in our agreement. The conclusions presented in this report are professional opinions based on interpretation of information currently available to us and are made within the operational scope, budget, and schedule constraints of this project. No warranty, express or implied, is made.

SHANNON & WILSON, INC.

We appreciate the opportunity to be of service to you. If you have any questions or would like clarification of the information provided herein, please contact me at scc@shanwil.com or (206) 695-6674.

Sincerely,

SHANNON & WILSON, INC.

Sarah L. Corbin

Sarah Corbin, PWS
Senior Biologist

SCC:KLW/scc

Enc: References
Site Photos

REFERENCES

Kirkland, Wash., (Kirkland), 2016, Critical areas – wetlands, streams, minor lakes, fish wildlife habitat areas, and frequently flooded areas: Kirkland Zoning Code (KZC) Chapter 90, available: http://www.codepublishing.com/WA/Kirkland/.

Kirkland, Wash. (Kirkland), 2017, Kirkland sensitive areas map: City of Kirkland, Wash., IT/GIS department, 2017/CityESAMap, January 17, available: http://www.kirklandwa.gov/Assets/IT/GIS/Sensitive+Areas+Map.pdf.

Pinkham, Richard, 2000, Daylighting - new life for buried streams: Snowmass, Colo., Rocky Mountain Institute, 63 p., available: https://d231jw5ce53gcq.cloudfront.net/wp-content/uploads/2017/05/RMI_Document_Repository_Public-Reprts_W00-32_Daylighting.pdf.

Washington State Department of Fish and Wildlife (WDFW), 2017, SalmonScape web application: Olympia, Wash., Washington State Dept. of Fish and Wildlife, available: http://apps.wdfw.wa.gov/salmonscape/, accessed July 2017.

SHANNON & WILSON, INC.

Photo 1: Downstream outlet of culverted section of onsite stream, viewing northeast, taken on July 11, 2017.

Photo 2: Mature trees surrounding culvert inlet, viewing west, taken on July 11, 2017.

SHANNON & WILSON, INC.

Photo 3: Mature black cottonwood trees adjacent to culvert inlet, viewing south, taken July 11, 2017.

Photo 4: Mature Western red cedar adjacent to culvert alignment, viewing northeast, taken July 11, 2017.

SHANNON & WILSON, INC.

Photo 5: Downstream of the Peter Kirk School property, the stream flows south in a culvert along 8th Street, viewing south, taken on July 11, 2017.

Gibson Traffic Consultants, Inc.
2813 Rockefeller Avenue
Suite B
Everett, WA 98201
425.339.8266

Peter Kirk Elementary School
Traffic Impact Analysis

Prepared for: Lake Washington School District No. 414
Jurisdiction: City of Kirkland

August 2017

GTC #16-096

TABLE OF CONTENTS

1. INTRODUCTION 3
2. PROPOSED SITE DEVELOPMENT & ACCESS 3
3. METHODOLOGY & ANALYSIS SCOPING 5
4. EXISTING CONDITIONS 7
   4.1 Collision Data 7
   4.2 Existing Parking Utilization 8
   4.3 Existing Volumes and Level of Service 8
5. FUTURE CONDITIONS 11
   5.1 Trip Generation 11
   5.2 Trip Distribution 11
   5.3 2019 Baseline Volumes and Level of Service 15
   5.4 2019 Future with School Volumes and Level of Service 15
   5.5 Future Queuing 17
   5.6 Future Parking Demand 17
6. ACCESS EVALUATION 18
   6.1 Access Separation 18
   6.2 Sight Distance Analysis 18
7. CONCLUSIONS 23

LIST OF FIGURES

Figure 1: Site Vicinity Map 4
Figure 2: Existing AM Peak-Hour Turning Movements 9
Figure 3: Existing School/PM Peak-Hour Turning Movements 10
Figure 4: Trip Distribution – AM Peak-Hour 12
Figure 5: Trip Distribution – School PM Peak-Hour 13
Figure 6: Trip Distribution – PM Peak-Hour 14
Figure 7: 2019 Baseline Traffic Volumes – AM Peak-Hour 19
Figure 8: 2019 Baseline Traffic Volumes – School PM Peak-Hour 20
Figure 9: 2019 Future with School Traffic Volumes – AM Peak-Hour 21
Figure 10: 2019 Future with School Traffic Volumes – School/PM Peak-Hour 22

LIST OF TABLES

Table 1: Level of Service Criteria for Intersections 6
Table 2: Collision Summary 7
Table 3: 6-Year Collision Rate Calculation 7
Table 4: Existing Level of Service Summary – AM Peak-Hour 8
Table 5: Existing Level of Service Summary – School/PM Peak-Hour 8
Table 6: Elementary School Trip Generation Summary 11
Table 7: 2019 Baseline Level of Service Summary – AM Peak-Hour 15
Table 8: 2019 Baseline Level of Service Summary – School/PM Peak-Hour 15
Table 9: 2019 Future Level of Service Summary – AM Peak-Hour 16
Table 10: 2019 Future Level of Service Summary – School/PM Peak-Hour 16
Table 11: Expected Drop-off/pick-up Queuing 17

ATTACHMENTS

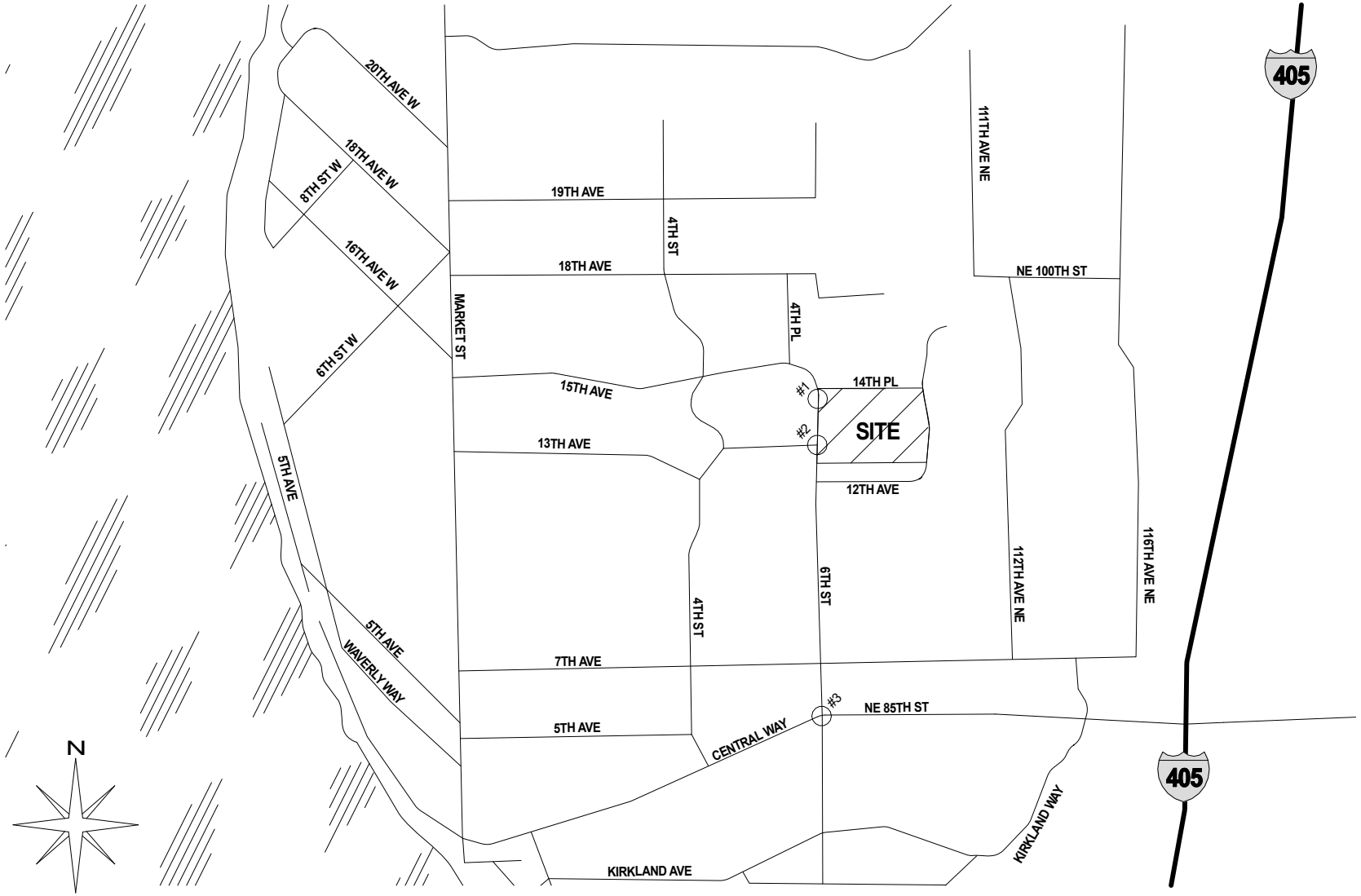
Trip Generation Calculations ..... A
Count Data ..... B
AM Turning Movement Calculations C
School PM Turning Movement Calculations ..... D
Existing AM Peak-Hour Level of Service Analysis ..... E
Existing School/PM Peak-Hour Level of Service Analysis ..... F
2019 Baseline AM Peak-Hour Level of Service Analysis ..... G
2019 Baseline School/PM Peak-Hour Level of Service Analysis ..... H
2019 Future With School AM Peak-Hour Level of Service Analysis I
2019 Future With School, School/PM Peak-Hour Level of Service Analysis ..... J
Concurrency Test ..... K
Queuing Analysis L
Collision Data ..... M
Site Layout ..... N

1. INTRODUCTION

Gibson Traffic Consultants, Inc. (GTC) has been retained to complete a traffic impact analysis (TIA) for the Peter Kirk Elementary School reconstruction. Lake Washington School District (LWSD) is proposing to reconstruct Peter Kirk Elementary School, which is located on the east side of 6th Street between 12th Avenue and 14th Place in the City of Kirkland. A site vicinity map is included in Figure 1. The school will continue to be an elementary school serving grades kindergarten through 5th grade with school hours from 8:45 AM and to 3:15 PM. For this analysis, the school is anticipated to have a master plan capacity of 665 students. A similar ratio of volunteers and staff currently serving the school was assumed for future conditions as well. The school's current district boundary extends from Lake Washington to I-405 and from Forbes Creek Drive to NE 85th Street.

2. PROPOSED SITE DEVELOPMENT & ACCESS

Peter Kirk Elementary School is being reconstructed with a capacity of 665 students. Bus traffic will be separated from staff and parent drop-off/pick-up traffic. The number of buses servicing the school is not anticipated to change; however, there will be room in the new bus loop for 3 buses. The school's south access opposite 13th Avenue will be used for parent drop-off/pick-up and staff/visitor parking while the north access will be used for buses and additional staff parking. Additionally, the parent drop-off/pick-up area will expand to allow for additional drop-off/pick-up of simultaneous vehicles while allowing other vehicles to bypass the stopped vehicles. The number of available parking spaces on-site will also increase to 73 parking stalls plus 3 bus spaces. The proposed school is scheduled for full facility build-out and occupancy by the 2019-2020 school year; therefore, 2019 was used for the horizon year.



GIBSON TRAFFIC CONSULTANTS

TRAFFIC IMPACT STUDY
GTC #16-096

PETER KIRK ELEMENTARY SCHOOL (665 STUDENTS)

CITY OF KIRKLAND

LEGEND

SCHOOL SITE

STUDY INTERSECTION

FIGURE 1

SITE VICINITY MAP

PETER KIRK ES MASTER PLAN
ZON17-00578, SAR17-00579
ATTACHMENT 16

3. METHODOLOGY & ANALYSIS SCOPING

Peak-hour level of service (LOS) is determined using the methodology described in the 2010 *Highway Capacity Manual* (HCM) and *Synchro 9.1* software developed by Trafficware. There are currently 532 students enrolled at Peter Kirk Elementary School according to the Office of Superintendent of Public Instruction in May of 2016. The turning movement counts were performed during the school year in June 2016. To analyze "worst case" traffic conditions at the school site, GTC has utilized existing driveway count data to estimate future peak-hour traffic volumes and peak-hour LOS conditions at the site accesses.

Traffic congestion on roadways is generally measured in terms of LOS at critical intersections. In accordance with the 2010 *Highway Capacity Manual*, roadway facilities and intersections are rated between LOS A and F, with LOS A being free flow and LOS F being forced flow or over-capacity conditions. The LOS at signalized intersections and all-way stop-controlled intersections are based on the average stopped delay for all entering vehicles. The LOS at two-way stop-controlled intersections is based on stopped delay times for the critical approach or movement(s). Geometric characteristics and conflicting traffic movements are taken into consideration when determining LOS values. A summary of the level of service criteria has been included in Table 1.

GTC utilized a 2.0-percent annual compounding growth rate to account for background traffic growth in the site vicinity. The street network surrounding the school is primarily comprised of stop-controlled intersections (all-way and two-way) and primarily serves single family-residential homes.

Matthew Palmer, responsible for the traffic analysis and report, is a licensed professional engineer (Civil) in the State of Washington and a current member of the Washington State section of ITE.

Table 1: Level of Service Criteria for Intersections

Level of Service[1]	Expected Delay	Intersection Control Delay (Seconds per Vehicle)	
		Unsignalized Intersections	**Signalized** Intersections
A	Little/No Delay	≤10	≤10
B	Short Delays	>10 and ≤15	>10 and ≤20
C	Average Delays	>15 and ≤25	>20 and ≤35
D	Long Delays	>25 and ≤35	>35 and ≤55
E	Very Long Delays	>35 and ≤50	>55 and ≤80
F	Extreme Delays[2]	>50	>80

The City of Kirkland ran a concurrency test and the proposed reconstruction passed traffic concurrency. Based on the concurrency test and the anticipated increase in traffic volumes the following concurrency intersections are required to be analyzed:

1. 6th Street at North Access - Unsignalized
2. 6th Street at 13th Avenue/South Access - Unsignalized
3. 6th Street at NE 85th Street - Signalized

[1] **Source:** *Highway Capacity Manual* 2010.

LOS A: Free-flow traffic conditions, with minimal delay to stopped vehicles (no vehicle is delayed longer than one cycle at signalized intersection).
LOS B: Generally stable traffic flow conditions.
LOS C: Occasional back-ups may develop, but delay to vehicles is short term and still tolerable.
LOS D: During short periods of the peak hour, delays to approaching vehicles may be substantial but are tolerable during times of less demand (i.e. vehicles delayed one cycle or less at signal).
LOS E: Intersections operate at or near capacity, with long queues developing on all approaches and long delays.
LOS F: Jammed conditions on all approaches with excessively long delays and vehicles unable to move at times.

[2] When demand volume exceeds the capacity of the lane, extreme delays will be encountered with queuing which may cause severe congestion affecting other traffic movements in the intersection.

4. EXISTING CONDITIONS

4.1 Collision Data

Collision data was provided by WSDOT for 5-years from January 1, 2012 through December 31, 2016 for the entire City of Kirkland. The collision data at the intersections is summarized in Table 2 and Table 3.

Table 2: Collision Summary

Intersection	Collision Type							Total Collisions	Collisions Per Year
	Rear-end	Entering at Angle	Opp. Dir.	Sideswipe	Same Dir. Other	Ped./Cyclist Involved	Fixed Object		
6th Street at 14th Place	0	1	0	0	0	0	0	1	0.2
6th Street at 13th Avenue	0	0	0	0	0	0	1	1	0.2
6th Street at NE 85th Street	12	2	2	2	2	0	1	21	4.2

Table 3: 6-Year Collision Rate Calculation

Intersection	Peak-Hour Intersection Vol.	K-Factor	Total Collisions	Collision Rate[3]
6th Street at 14th Place	481	10	1	0.11
6th Street at 13th Avenue	523	10	1	0.10
6th Street at NE 85th Street	2,539	10	21	0.45

None of the collisions resulted in a fatality and none of the collisions involved pedestrians or bicycles.

[3] The collision rate is based on Million Entering Vehicles.

4.2 Existing Parking Utilization

A parking survey was completed by Traffic Data Gathering after the morning peak period at 9:00 AM and prior to school dismissal at 3:00 PM on June 2, 2016. Currently on site there are a total of 72 spaces (52 in the main lot and approximately 20 in the gravel lot). In the morning, there were a total of 44 vehicles parked for the site. Prior to the school dismissal/arrival of parent pick-up traffic, there were a total of 46 parked vehicles for the school, not including the 5 waiting in the drop-off/pick-up lane. The parking generation per student based on 532 existing students is 0.08 vehicles per student for the AM and 0.09 vehicles per student at School PM peak-hours, this includes all vehicles parked on-site (staff and visitor).

4.3 Existing Volumes and Level of Service

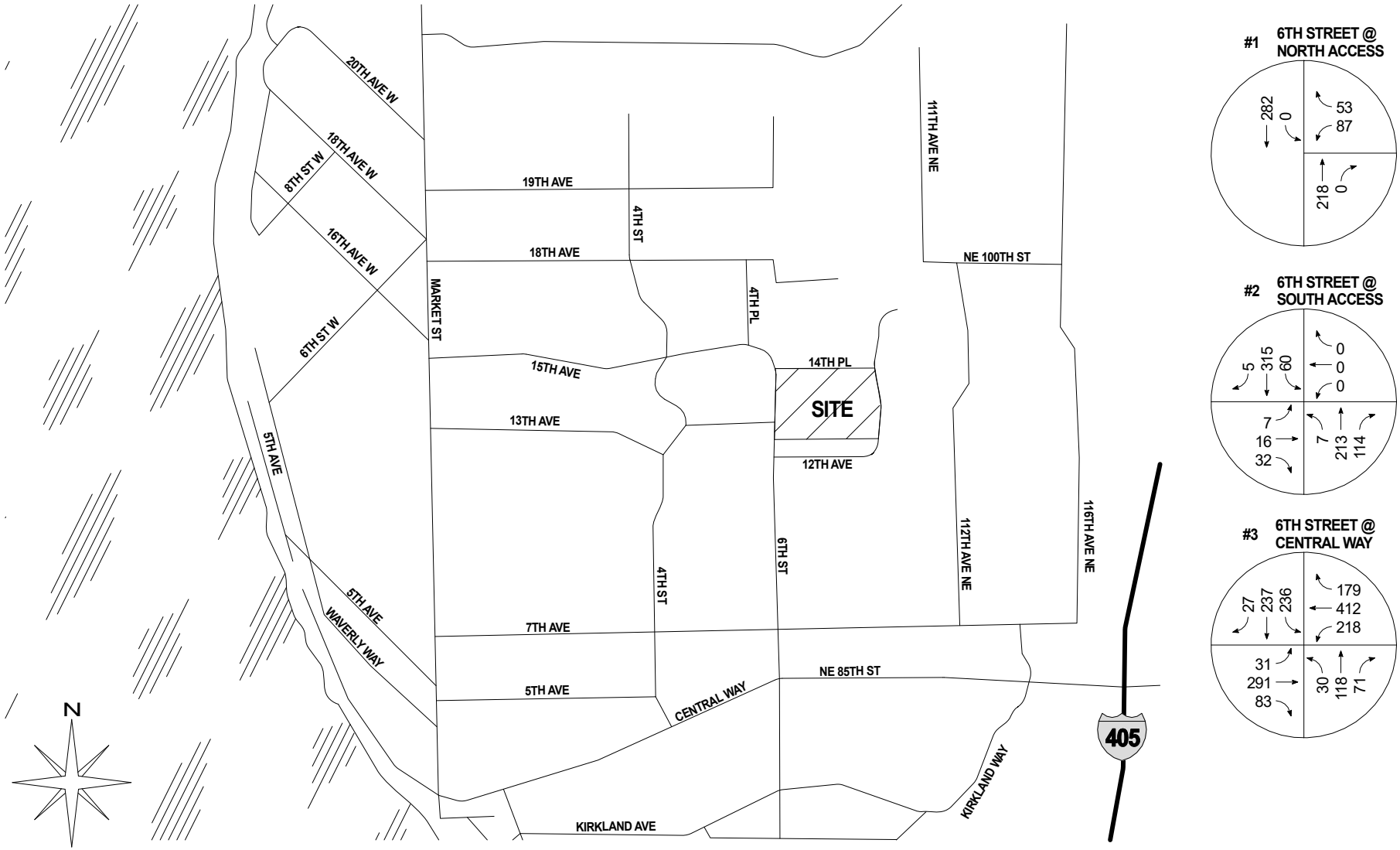
Existing turning movement counts at all the study intersections were obtained by the independent count firm, Traffic Data Gathering (TDG) on Thursday, June 2, 2016. The existing peak-hour turning movement volumes are shown at the study intersections during the AM peak-hour (7:45-8:45 AM) for all three intersections and School PM peak-hour (2:45-3:45 PM) for the accesses and from 4:30-5:30 for the intersection of 6th Street at NE 85th Street in Figure 2 and Figure 3 respectively. For the accesses, the School PM peak-hour volumes 2:45-3:45 PM are higher than the PM peak-hour between 4-6 PM. Based on the existing counts, channelization and intersection control; the study intersections will operate at LOS D or better during AM peak-hour and School PM peak-hour. The existing level of service for the AM peak-hour and School PM peak-hour is summarized in Table 4 and Table 5 respectively. The existing level of service calculations are included in the attachments.

Table 4: Existing Level of Service Summary – AM Peak-Hour

Intersections	Existing Conditions		
	LOS	Delay	Critical Approach
1. 6th Street at North Access	D	33.7 sec	Westbound
2. 6th Street at 13th Avenue/South Access	C	17.8 sec	Eastbound
3. 6th Street at NE 85th Street	C	31.7 sec	---

Table 5: Existing Level of Service Summary – School/PM Peak-Hour

Intersections	Existing Conditions		
	LOS	Delay	Critical Approach
1. 6th Street at North Access	B	11.8 sec	Westbound
2. 6th Street at 13th Avenue/South Access	C	15.1 sec	Eastbound
3. 6th Street at NE 85th Street	C	31.9 sec	---



GIBSON TRAFFIC CONSULTANTS

TRAFFIC IMPACT STUDY
GTC #16-096

PETER KIRK ELEMENTARY SCHOOL (665 STUDENTS)

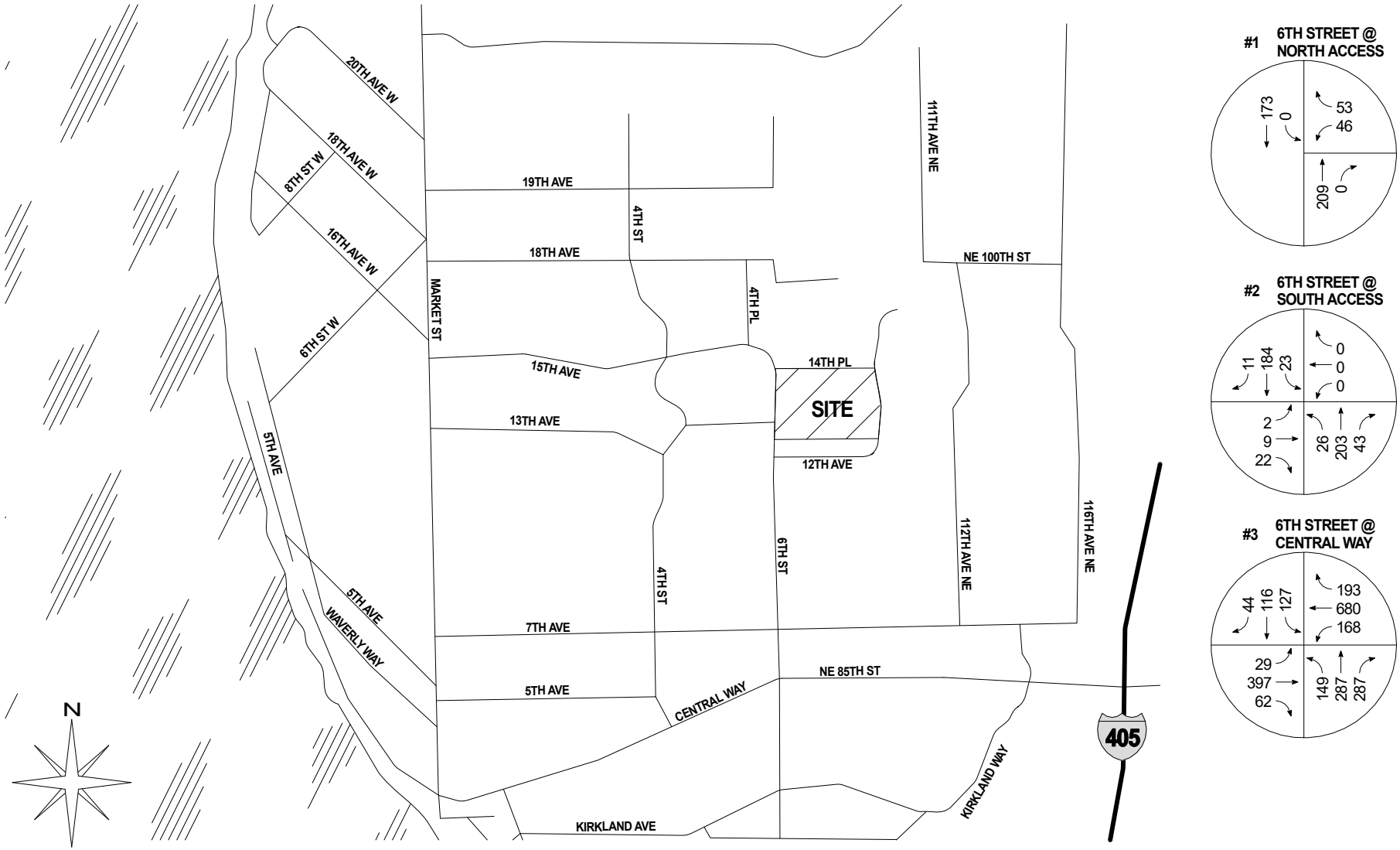
CITY OF KIRKLAND

LEGEND

XXX → EXISTING TURNING MOVEMENT VOLUMES

FIGURE 2

EXISTING AM TURNING MOVEMENT VOLUMES



GIBSON TRAFFIC CONSULTANTS

TRAFFIC IMPACT STUDY
GTC #16-096

PETER KIRK ELEMENTARY SCHOOL (665 STUDENTS)

CITY OF KIRKLAND

LEGEND

XXX → EXISTING TURNING MOVEMENT VOLUMES

FIGURE 3

EXISTING SCHOOL/PM TURNING MOVEMENT VOLUMES

5. FUTURE CONDITIONS

5.1 Trip Generation

According to the Office of Superintendent of Public Instruction, there were 532 students enrolled in May of the 2015-2016 school year. Per ITE *Trip Generation* (9th Edition, 2012) Land Use Code: 520, Elementary School, was used to determine the new number of trips added to the site with the potential increase in capacity from 532 students to 665 students.

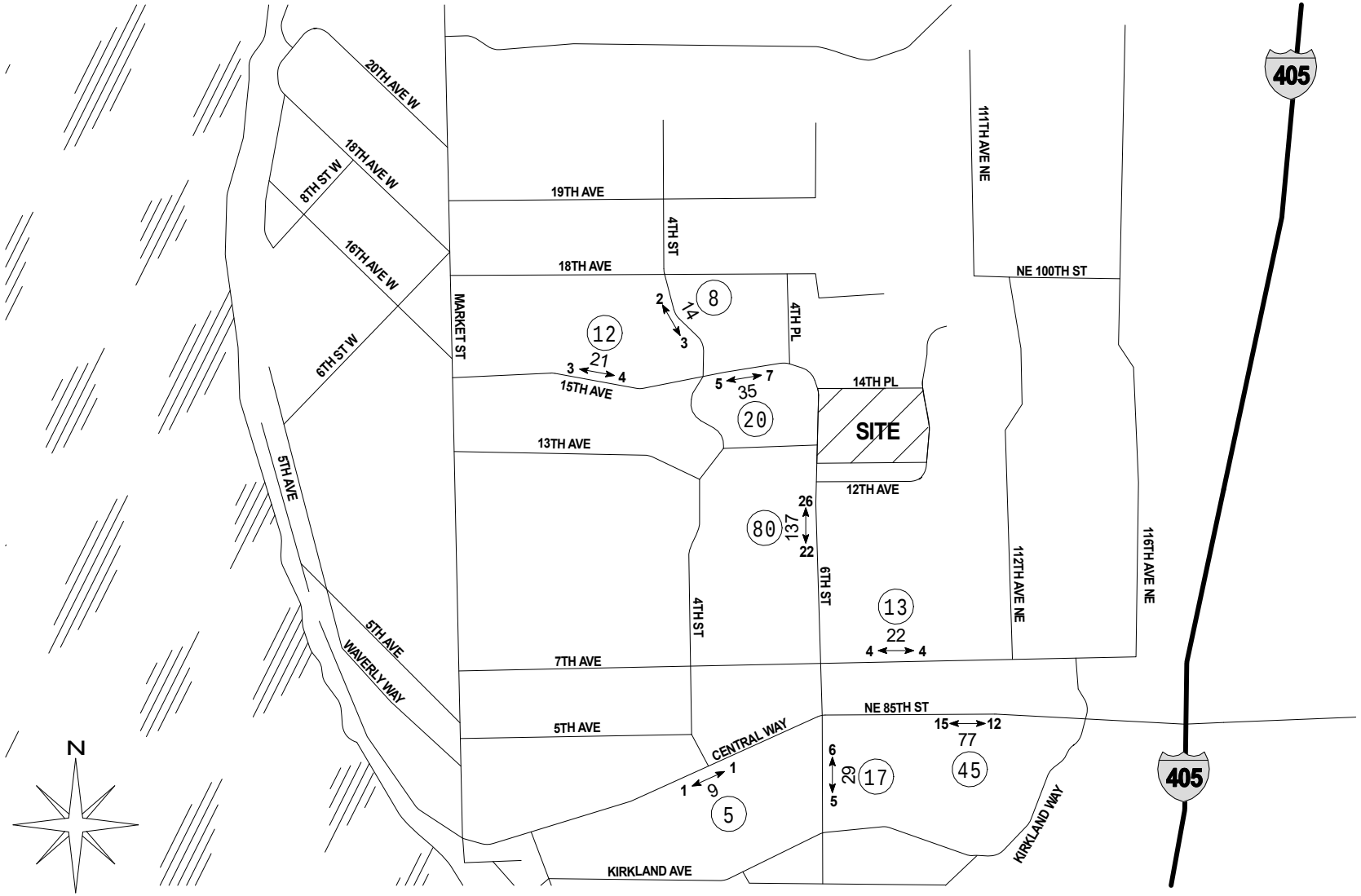
Based on the current number of students attending Peter Kirk Elementary School, a maximum student population of 665 would result in an increase of 133 students. The proposed increase in students is anticipated to generate 172 average daily trips (ADT) with 60 AM peak-hour trips (33 Inbound/27 Outbound), 37 School PM peak-hour trips (17 Inbound/20 Outbound), and 20 Street PM peak-hour trips (10 Inbound/10 Outbound). A summary of the trip generation is included in Table 6.

Table 6: Elementary School Trip Generation Summary

Students	Average Daily Trips	AM Peak-Hour			School PM Peak-Hour			PM Peak-Hour		
		Inbound	Outbound	Total	Inbound	Outbound	Total	Inbound	Outbound	Total
133	172	33	27	60	17	20	37	10	10	20

5.2 Trip Distribution

Trip distribution is based on the existing traffic counts in the site vicinity and the concurrency test conducted by the City of Kirkland. It's anticipated that 80% of the site traffic will head to and from the south on 6th Street. The remaining 20% of the site traffic will travel to and from the north along 6th Street. Detailed trip distributions are shown in Figure 4 for the AM peak-hour, Figure 5 for the School PM peak-hour, and Figure 6 for the PM peak-hour.



GIBSON TRAFFIC CONSULTANTS

TRAFFIC IMPACT STUDY
GTC #16-096

PETER KIRK ELEMENTARY SCHOOL (665 STUDENTS)

CITY OF KIRKLAND

LEGEND

AWDT

AM ↔ PEAK

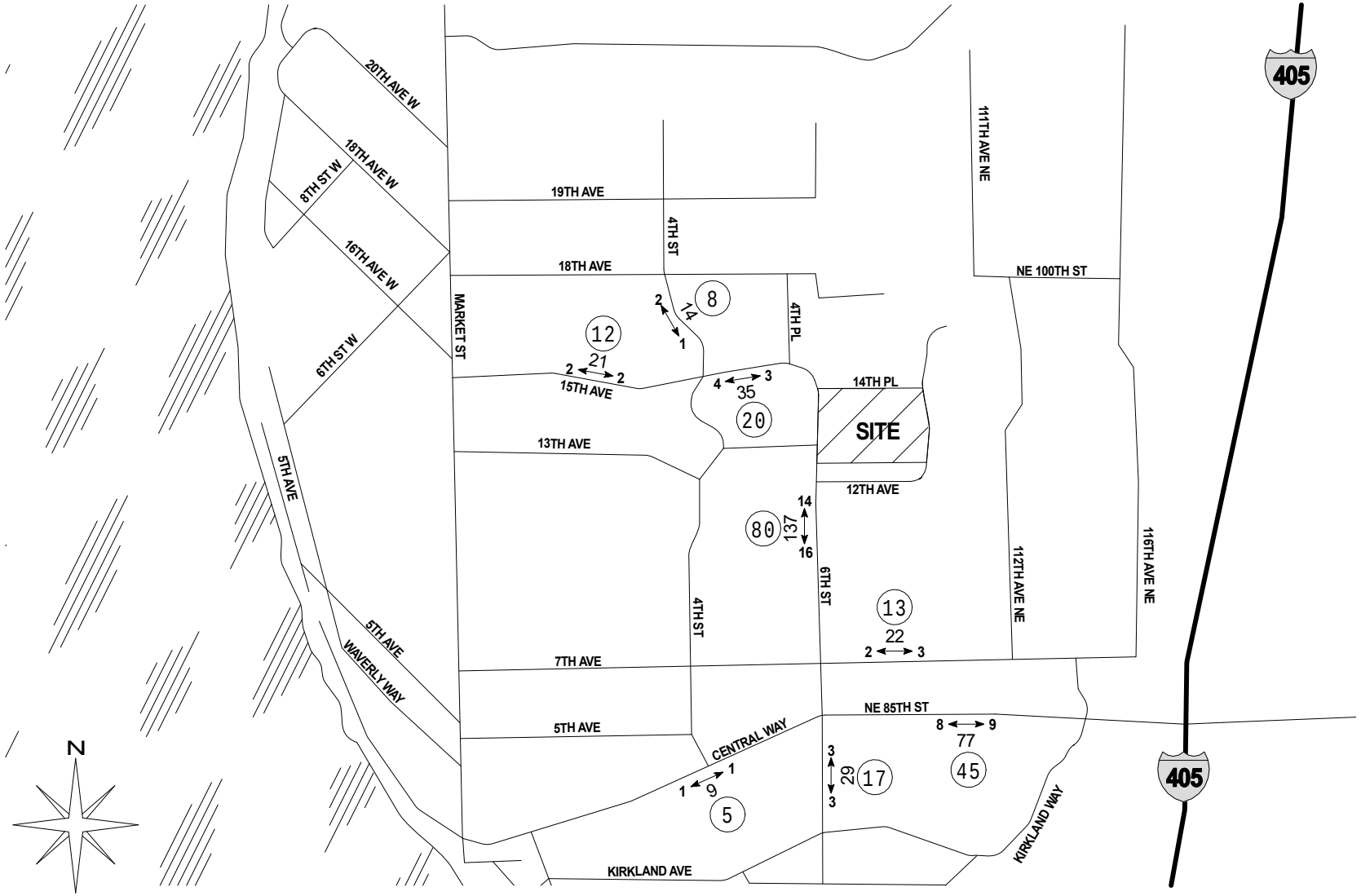
25

NEW SITE TRAFFIC (DAILY/PEAK HOUR)

TRIP DISTRIBUTION %

FIGURE 4

AM PEAK-HOUR TRIP DISTRIBUTION



GIBSON TRAFFIC CONSULTANTS

TRAFFIC IMPACT STUDY
GTC #16-096

PETER KIRK ELEMENTARY SCHOOL (665 STUDENTS)

CITY OF KIRKLAND

LEGEND

AWDT
SCHOOL PM ↔ PEAK
25

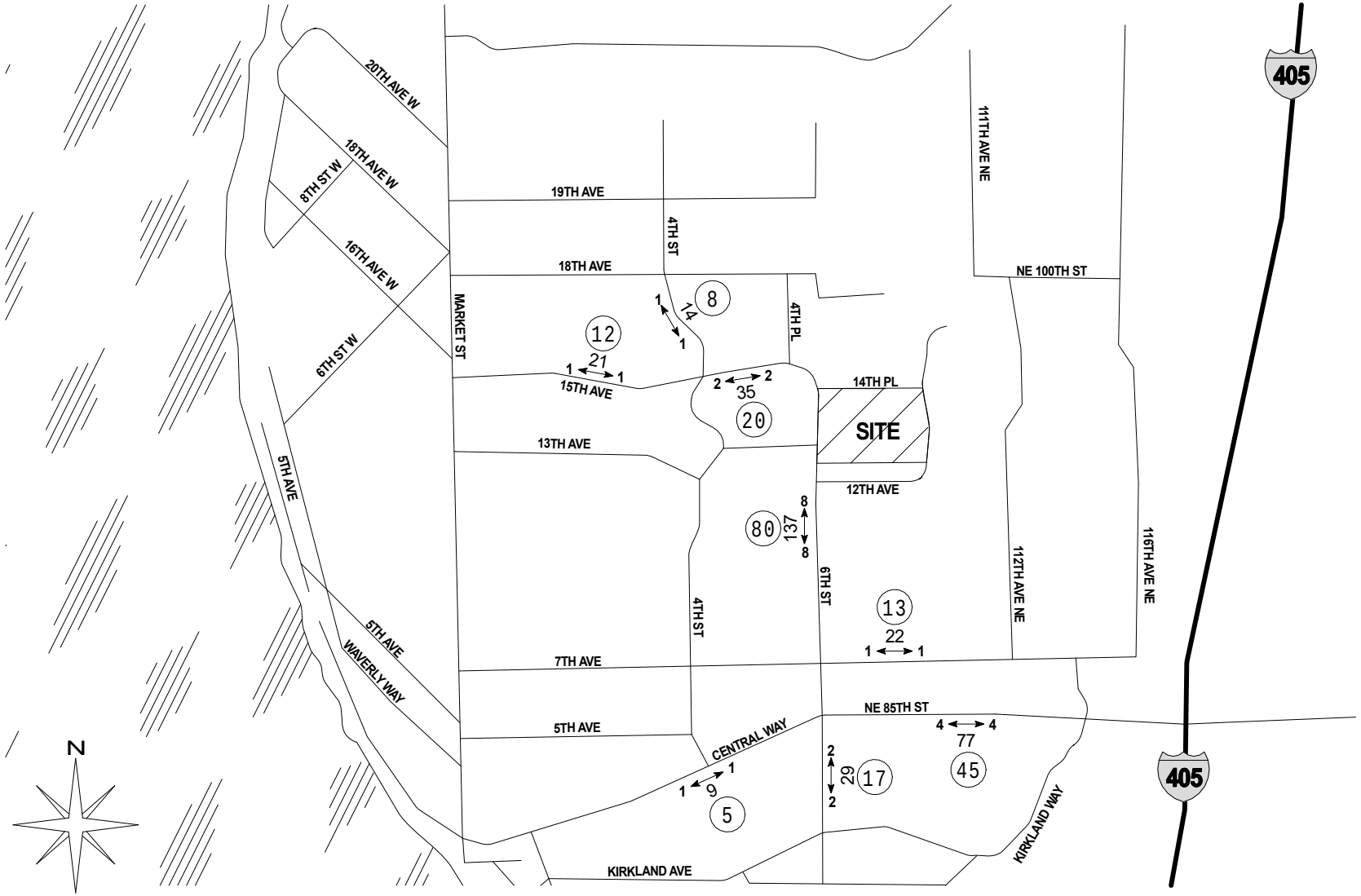
NEW SITE TRAFFIC (DAILY/PEAK HOUR)

TRIP DISTRIBUTION %

FIGURE 5

SCHOOL PM PEAK-HOUR TRIP DISTRIBUTION

PETER KIRK ES MASTER PLAN
ZON17-00578, SAR17-00579
ATTACHMENT 16



GIBSON TRAFFIC CONSULTANTS

TRAFFIC IMPACT STUDY
GTC #16-096

PETER KIRK ELEMENTARY SCHOOL (665 STUDENTS)

CITY OF KIRKLAND

LEGEND

AWDT
PM ↔ PEAK
25

NEW SITE TRAFFIC (DAILY/PEAK HOUR)

TRIP DISTRIBUTION %

FIGURE 6

PM PEAK-HOUR TRIP DISTRIBUTION

PETER KIRK ES MASTER PLAN
ZON17-00578, SAR17-00579
ATTACHMENT 16

5.3 2019 Baseline Volumes and Level of Service

The 2019 baseline (future without school reconstruction) turning movement volumes are estimated by applying a 2.0% annual compounding growth rate to the existing turning movement volumes. The 2019 baseline turning movement volumes for the AM peak-hour and School PM peak-hour are shown in Figure 7 and Figure 8.

With the addition of baseline growth, all the study intersections will continue to operate at LOS E or better during the AM and School PM peak-hours. The 2019 baseline level of service results for the AM peak-hour and School PM peak-hour are summarized in Table 7 and Table 8. The baseline level of service calculations are included in the attachments.

Table 7: 2019 Baseline Level of Service Summary – AM Peak-Hour

Intersection	Existing Conditions			2019 Baseline Conditions		
	LOS	Delay	Critical Approach	LOS	Delay	Critical Approach
1. 6th Street at North Access	D	33.7 sec	Westbound	E	45.2 sec	Westbound
2. 6th Street at 13th Avenue/South Access	C	17.8 sec	Eastbound	C	18.7 sec	Eastbound
3. 6th Street at NE 85th Street	C	31.7 sec	---	C	33.0 sec	---

Table 8: 2019 Baseline Level of Service Summary – School/PM Peak-Hour

Intersection	Existing Conditions			2019 Baseline Conditions		
	LOS	Delay	Critical Approach	LOS	Delay	Critical Approach
1. 6th Street at North Access	B	11.8 sec	Westbound	B	12.2 sec	Westbound
2. 6th Street at 13th Avenue/South Access	C	15.1 sec	Eastbound	C	15.5 sec	Eastbound
3. 6th Street at NE 85th Street	C	31.9 sec	---	C	33.5 sec	---

5.4 2019 Future with School Volumes and Level of Service

The 2019 future with school turning movement volumes are calculated by adding all the school traffic based on the trip distribution to the 2019 baseline turning movement volumes. It was assumed that the number of buses did not change with the reconstruction based on the low increase in student population. Additionally, all the traffic was rerouted so that the bus traffic and 28 staff vehicles were utilizing the north driveway while the parent traffic was utilizing the south driveway. The 2019 future with school turning movement volumes for the AM peak-hour and School PM peak-hour in Figure 9 and Figure 10.

With the addition of school traffic, all the study intersections will continue to operate at LOS C or better during the AM peak-hour and School PM peak-hour except for the south access. With the on-site pedestrian improvements, the crosswalk crossing of 6th Street will be moved to the north side of the intersection, this will help reduce the conflicts with left-turning vehicles. In addition, there will be a 110 foot right-turn lane for exiting traffic which will allow left-turn and right-turn vehicles to make maneuvers simultaneously. It's anticipated that the intersection will operate better than LOS F as crossing pedestrians will create a gap in the northbound/southbound traffic that is not accounted for in the software. To achieve an acceptable level of service the south access could be turned into an all-way stop controlled intersection which would get the intersection to LOS C with 21.1 seconds of delay. An all-way stop controlled intersection would also act like traffic calming helping to reduce speeds and cut-through traffic along 6th Street. Another possible improvement if there become issues with the access would be to restrict the access to right-out only like the school exit is currently restricted today, the left-turn channelization would reduce blocking conflicts.

The north access will be approximately 80 feet south of 14th Place. 14th Place will be upgraded to a 20-foot right-of-way for fire truck and service vehicles only. A curb will be added on the south side with "No Parking" signs and fencing behind it. Buses and staff vehicles will not be allowed on 14th Place. With 5 single-family houses on 14th Place it's anticipated that those homes would generate 3 outbound trips during the AM peak-hour and 2 outbound trips during the PM peak-hour. Qualitatively it's anticipated this low number of trips would have minimal conflict with the school access as the school access exists today. The 2019 future with school level of service results for the AM peak-hour and School PM peak-hour are summarized in Table 9 and Table 10. The 2019 future with school level of service calculations are included in the attachments.

Table 9: 2019 Future Level of Service Summary – AM Peak-Hour

Intersection	2019 Baseline Conditions			2019 Future Conditions		
	LOS	Delay	Critical Approach	LOS	Delay	Critical Approach
1. 6th Street at North Access	E	45.2 sec	Westbound	C	20.0 sec	Westbound
2. 6th Street at 13th Avenue/South Access	C	18.7 sec	Eastbound	F	71.6 sec	Westbound
3. 6th Street at NE 85th Street	C	33.0 sec	---	C	33.4 sec	---

Table 10: 2019 Future Level of Service Summary – School/PM Peak-Hour

Intersection	2019 Baseline Conditions			2019 Future Conditions		
	LOS	Delay	Critical Approach	LOS	Delay	Critical Approach
1. 6th Street at North Access	B	12.2 sec	Westbound	B	13.6 sec	Westbound
2. 6th Street at 13th Avenue/South Access	C	15.5 sec	Eastbound	C	20.1 sec	Westbound
3. 6th Street at NE 85th Street	C	33.5 sec	---	C	34.0 sec	---

5.5 Future Queuing

Table 11 below shows a comparison of vehicle queue lengths depending on the number of vehicles picking-up/dropping-off at one time. The proposed loop will provide about 725 feet of service and queueing space before impacting 6th Street (only 365 feet available today). This provides space for about 33 vehicles (between 20-22 feet per vehicle) which would satisfy the requirement if only 4 vehicles could be serviced simultaneously. With increased drop-off/pick-up efficiency due to increased service area and additional parking on-site the proposed parent loop would provide adequate queuing space to limit impacts to the City street system.

Table 11: Expected Drop-off/pick-up Queuing

Vehicles Served Simultaneously	50% Queue [vehicles]	95% Queue [vehicles]	Queuing Required [feet]	Total Loop Length Required
4	**1**	**7**	**154**	**308**
5	**0**	**4**	**88**	**286**
6	**0**	**3**	**66**	**308**

This projected queuing is based on 166 vehicles (anticipated future parent traffic to the site) arriving in a 15-minute period and having a service rate of 15 seconds to drop-off a student. The 15 seconds is the measured time for a vehicle to stop, drop-off the student, start moving again based on video observations. The queue identified as the additional queue beyond the area required for the vehicles being served simultaneously. It was assumed that the length required to service X vehicles was 22 feet multiplied by (2*X-1). It was assumed that there will be enough width for vehicles to by-pass those dropping off.

5.6 Future Parking Demand

For the parking assessment, GTC assumed that the student enrollment would increase from 532 existing students (latest student data on OSPI) to the master plan capacity of 665 students projected by the Lake Washington School District. The City of Kirkland doesn't have a required number of parking spaces per code for the proposed use, instead the planning official bases parking on actual parking demand. A parking study performed by TDG in June of 2016 shows that Peter Kirk Elementary School has a parking demand of 0.09 vehicles per student or 60 spaces. Assuming 85% represents a lot nearing capacity, the school would have a total parking demand of 71 parking spaces. Peter Kirk Elementary School is proposing to have a total of 73 parking spaces (44 spaces in the parent loop, 27 spaces in the bus loop, and 2 spaces in the service area) plus room for an additional 3 buses.

The parent and bus loops would have sufficient off-street space to load and unload students on-site. The 73 spaces plus parking provided in the loops on campus along with the additional on-street parking spaces in the surrounding neighborhoods would provide additional event parking.

6. ACCESS EVALUATION

The site accesses have been analyzed to determine if there is adequate sight distance and ensure the access operates acceptably, the accesses are existing today and are not moving significantly with the reconstruction. The posted speed limit along 6th Street, a collector arterial street, is 25 mph with 20 mph inside the school zone.

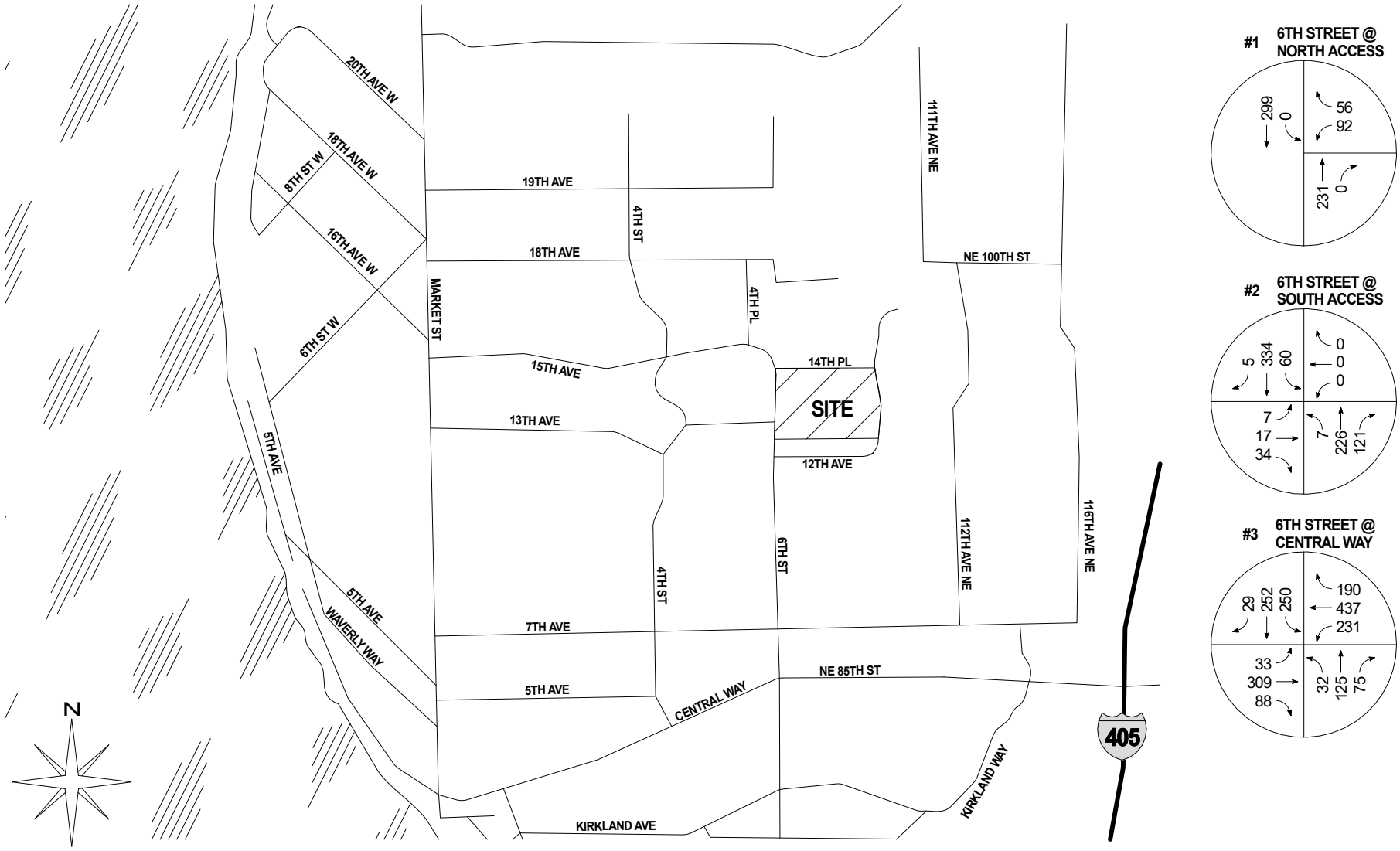
6.1 Access Separation

The City of Kirkland identifies intersection spacing requirements in the *Department of Public Works Pre-Approved Plans Policy R-4* (January 2015). The City is the reviewing agency when determining access points along 6th Street (Collector). The City policy identifies that a Multi-Family/Non-Residential driveway requires 50 feet of spacing on 6th Street measured edge-to-edge from other driveways and curb return to edge for intersections. The existing accesses will have more than the required spacing requirements along the site frontage except for the single-family house driveway directly south of the existing/proposed south access which aligns directly opposite 13th Avenue.

6.2 Sight Distance Analysis

The City of Kirkland identifies intersection sight distance requirements in the *Department of Public Works Pre-Approved Plans Policy R-13* (January 2014). Driveways are classified based on the driveway PM peak volume and the major street Average Daily Traffic (ADT). The site will generate between 5 and 200 PM peak-hour trips; and it was assumed the major street ADT volume is less than 6,000 trips. This identifies that the driveway type should be E3 for both; the recommended sight distance is 150 feet for 25 mph.

The sight distance is measured from a point in the middle of the outbound lane, 14 feet on-site from the edge of traveled way to a point 150 feet away in the middle of the major roadway approach lane. Both driveways will have more than 200 feet of sight distance in both directions with the frontage improvements and maintenance of trees in the right-of-way, therefore satisfying the City of Kirkland standards.



GIBSON TRAFFIC CONSULTANTS

TRAFFIC IMPACT STUDY
GTC #16-096

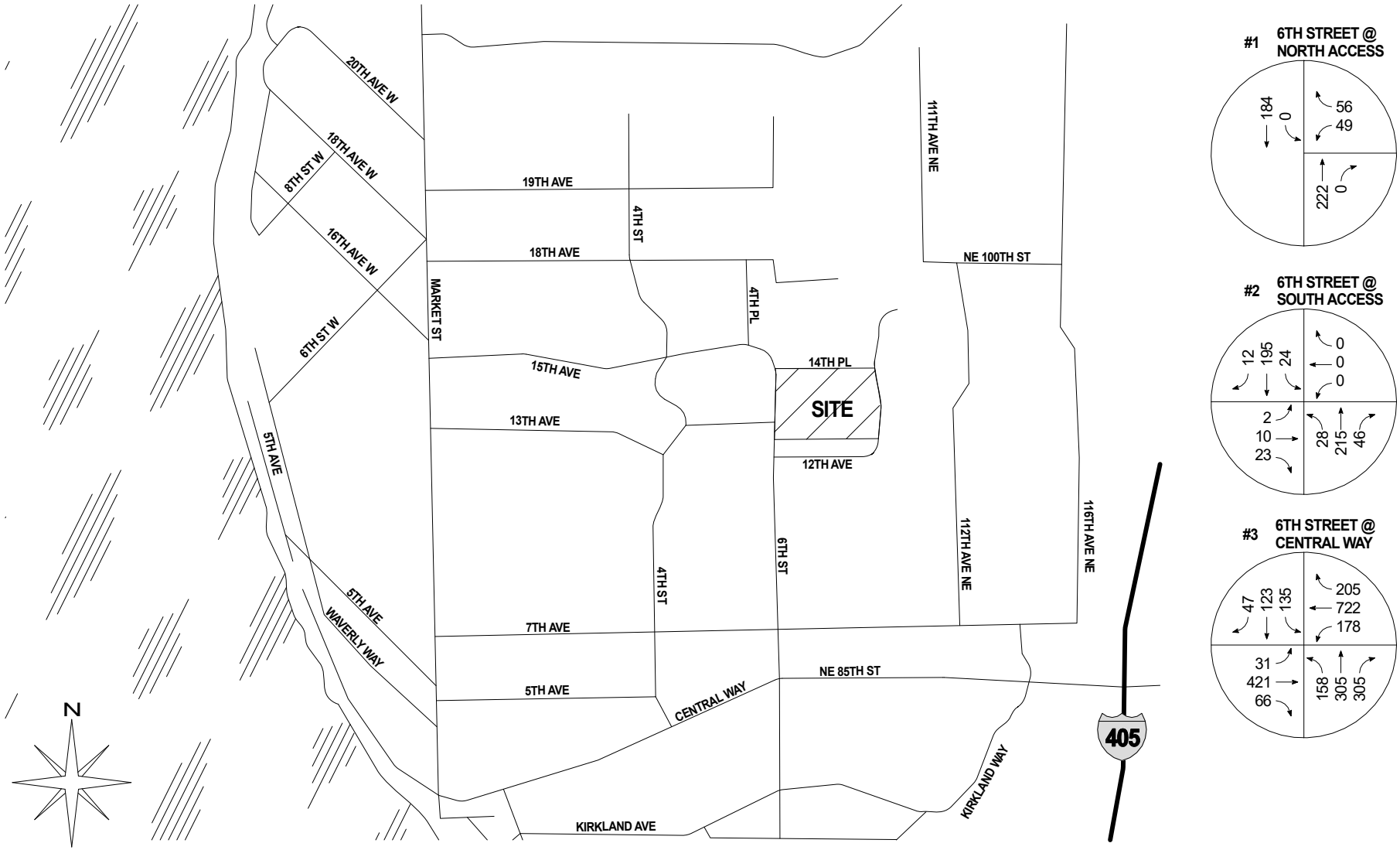
PETER KIRK ELEMENTARY SCHOOL (665 STUDENTS)

CITY OF KIRKLAND

LEGEND

XXX → BASELINE TURNING MOVEMENT VOLUMES

FIGURE 7
2019 BASELINE AM TURNING MOVEMENT VOLUMES



GIBSON TRAFFIC CONSULTANTS

TRAFFIC IMPACT STUDY
GTC #16-096

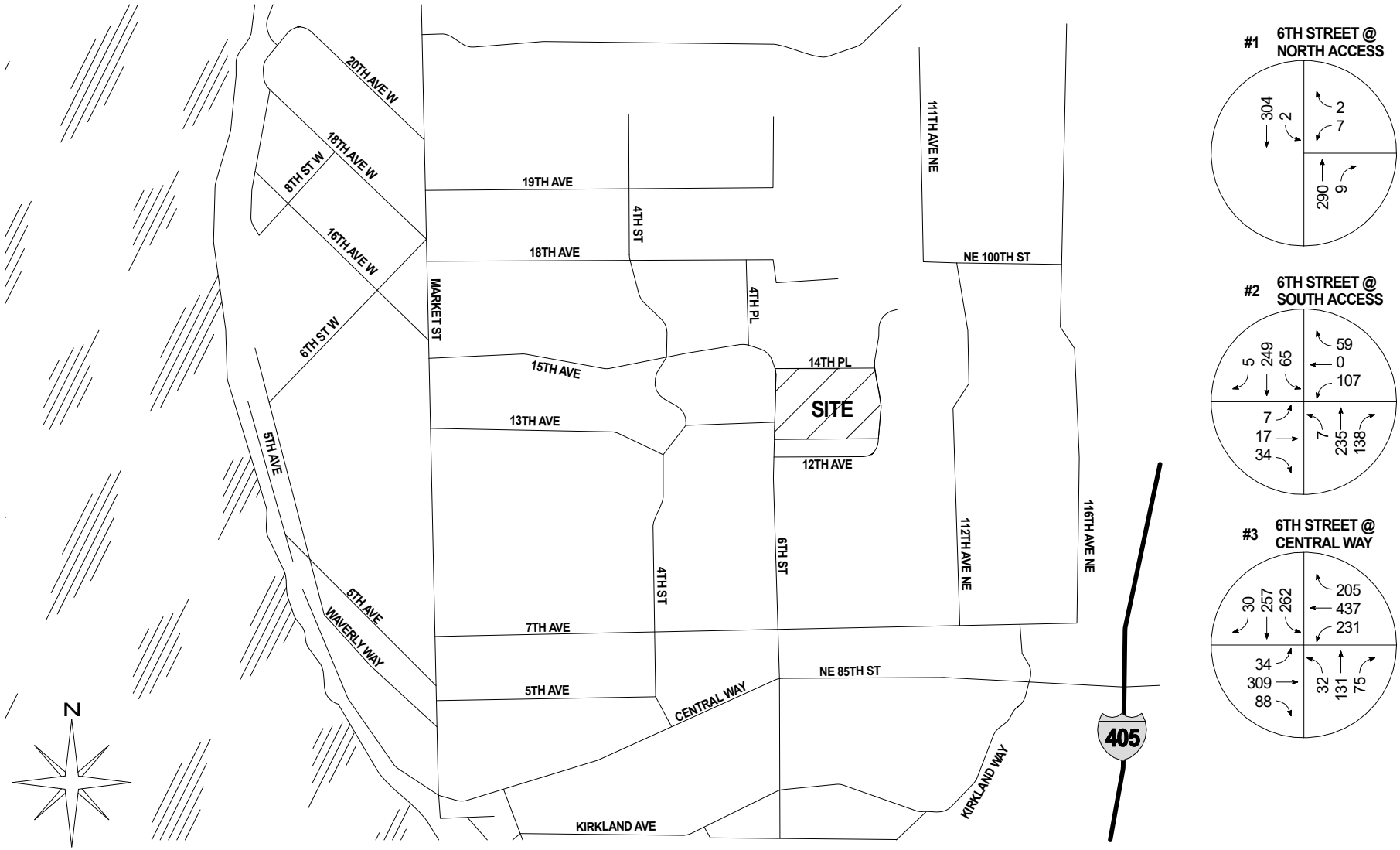
PETER KIRK ELEMENTARY SCHOOL (665 STUDENTS)

CITY OF KIRKLAND

LEGEND

XXX → BASELINE TURNING MOVEMENT VOLUMES

FIGURE 8
2019 BASELINE SCHOOL/PM TURNING MOVEMENT VOLUMES



GIBSON TRAFFIC CONSULTANTS

TRAFFIC IMPACT STUDY
GTC #16-096

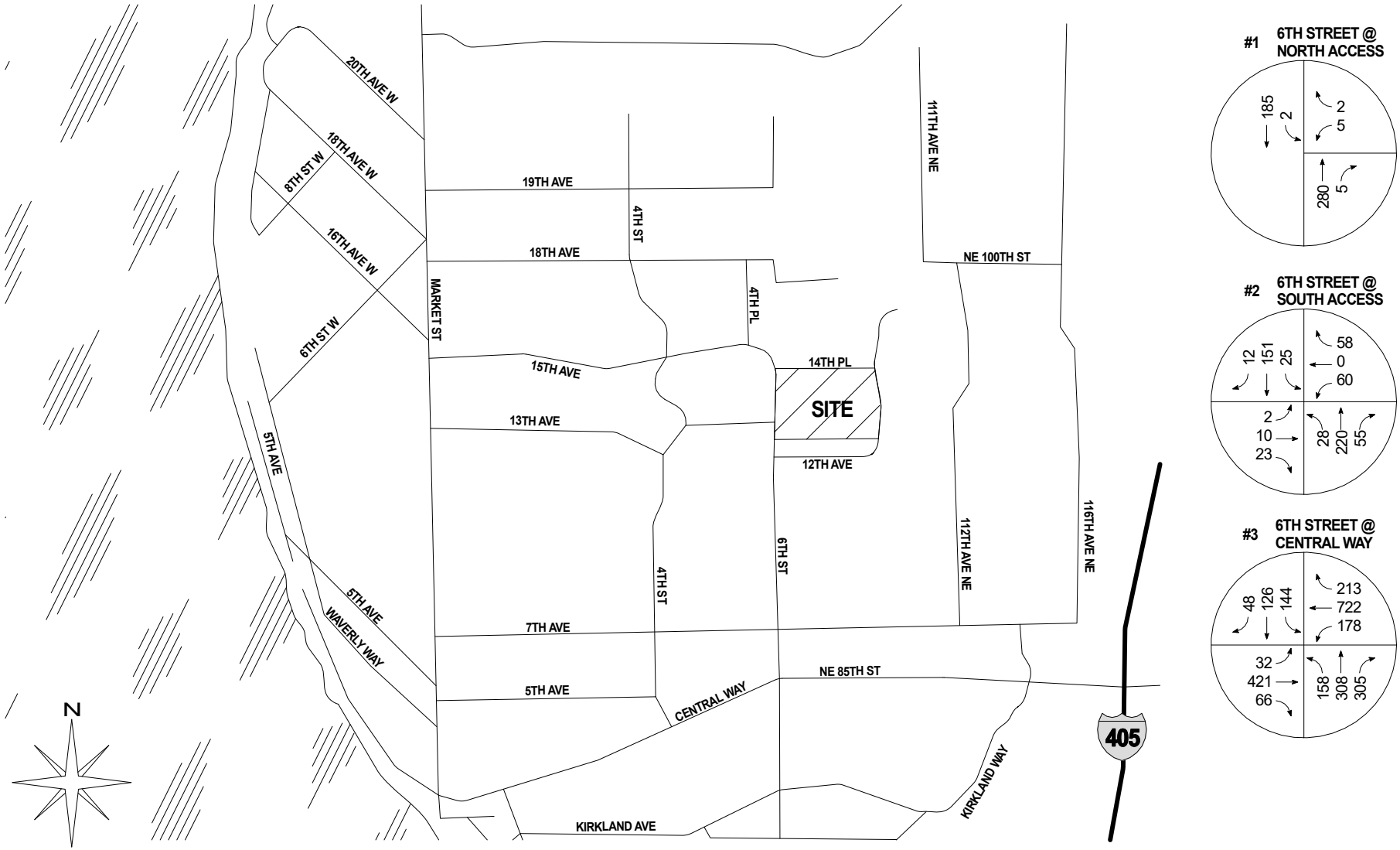
PETER KIRK ELEMENTARY SCHOOL (665 STUDENTS)

CITY OF KIRKLAND

LEGEND

XXX → FUTURE WITH PROJECT TURNING MOVEMENT VOLUMES

FIGURE 9
2019 FUTURE WITH PROJECT AM TURNING MOVEMENT VOLUMES



GIBSON TRAFFIC CONSULTANTS

TRAFFIC IMPACT STUDY
GTC #16-096

PETER KIRK ELEMENTARY SCHOOL (665 STUDENTS)

CITY OF KIRKLAND

LEGEND

XXX → FUTURE WITH PROJECT TURNING MOVEMENT VOLUMES

FIGURE 10
2019 FUTURE WITH PROJECT SCHOOL/PM TURNING MOVEMENT VOLUMES

7. CONCLUSIONS

Peter Kirk Elementary School will continue to serve grades kindergarten through 5th grade with a capacity of 665 students. The school hours are from 8:45 AM and to 3:15 PM.

The reconstruction of Peter Kirk Elementary School is estimated to generate a total of 172 new average daily trips with 60 trips (33 inbound/27 outbound) during the AM peak-hour and 37 trips (17 inbound/20 outbound) during the School PM peak-hour. During the street peak-hour between 4 and 6 PM it is anticipated that there would be an increase of 20 PM peak-hour trips (10 inbound/10 outbound).

In the 2019 future with the reconstruction analysis all off-site study intersections will continue to operate at LOS C or better during the AM peak-hour and School PM peak-hour. The main parent access for the school, the south driveway, will operate at LOS F during the AM peak-hour and LOS C during the School PM peak-hour with the westbound leg (school driveway) operating as the critical approach. As either an all-way stop controlled intersection or right-turn only the south driveway will operate at LOS D. The split left-turn and right-turn channelization will reduce the potential for blocking conflicts. The bus loop, utilizing the north driveway, is anticipated to operate at acceptable LOS C during the AM peak-hour and LOS B in the school PM peak-hour.

The site is expected to have sufficient parking to satisfy the long-term parking needs. Additionally, the site will have sufficient queuing space to satisfy the drop-off and pick-up queuing needs with limiting impacts to 6th Street.

Trip Generation Calculations

Peter Kirk Elementary School
GTC #16-096

Trip Generation for: Weekday
(a.k.a.): Average Weekday Daily Trips (AWDT)

									NET EXTERNAL TRIPS BY TYPE											
										IN BOTH DIRECTIONS					DIRECTIONAL ASSIGNMENTS					
			Gross Trips				Internal Crossover		TOTAL	PASS-BY		DIVERTED LINK		NEW	PASS-BY		DIVERTED LINK		NEW	
LAND USES	VARIABLE	ITE LU code	Trip Rate	% IN	% OUT	In+Out (Total)	% of Gross Trips	Trips In+Out (Total)	In+Out (Total)	% of Ext. Trips	In+Out (Total)	% of Ext. Trips	In+Out (Total)	In+Out (Total)	In	Out	In	Out	In	Out
Elementary School	133 Student	520	1.29	50%	50%	172	0%	0	172	0%	0	0%	0	172	0	0	0	0	86	86
Totals						172		0	172		0		0	172	0	0	0	0	86	86

Peter Kirk Elementary School
GTC #16-096

Trip Generation for: Weekday, Peak Hour of Adjacent Street Traffic, One Hour between 7 and 9 AM
(a.k.a.): Weekday AM Peak Hour

									NET EXTERNAL TRIPS BY TYPE											
									IN BOTH DIRECTIONS						DIRECTIONAL ASSIGNMENTS					
			Gross Trips				Internal Crossover		TOTAL	PASS-BY		DIVERTED LINK		NEW	PASS-BY		DIVERTED LINK		NEW	
LAND USES	VARIABLE	ITE LU code	Trip Rate	% IN	% OUT	In+Out (Total)	% of Gross Trips	Trips In+Out (Total)	In+Out (Total)	% of Ext. Trips	In+Out (Total)	% of Ext. Trips	In+Out (Total)	In+Out (Total)	In	Out	In	Out	In	Out
Elementary School	133 Student	520	0.45	55%	45%	60	0%	0	60	0%	0	0%	0	60	0	0	0	0	33	27
Totals						60		0	60		0		0	60	0	0	0	0	33	27

PETER KIRK ES MASTER PLAN
ZON17-00578, SAR17-00579
ATTACHMENT 16

Peter Kirk Elementary School
GTC #16-096

Trip Generation for: Weekday, School PM Peak Hour of Generator

									NET EXTERNAL TRIPS BY TYPE											
									IN BOTH DIRECTIONS						DIRECTIONAL ASSIGNMENTS					
			Gross Trips				Internal Crossover		TOTAL	PASS-BY		DIVERTED LINK		NEW	PASS-BY		DIVERTED LINK		NEW	
LAND USES	VARIABLE	ITE LU code	Trip Rate	% IN	% OUT	In+Out (Total)	% of Gross Trips	Trips In+Out (Total)	In+Out (Total)	% of Ext. Trips	In+Out (Total)	% of Ext. Trips	In+Out (Total)	In+Out (Total)	In	Out	In	Out	In	Out
Elementary School	133 Student	520	0.28	45%	55%	37	0%	0	37	0%	0	0%	0	37	0	0	0	0	17	20
Totals						37		0	37		0		0	37	0	0	0	0	17	20

PETER KIRK ES MASTER PLAN
ZON17-00578, SAR17-00579
ATTACHMENT 16

Peter Kirk Elementary School
GTC #16-096

Trip Generation for: Weekday, Peak Hour of Adjacent Street Traffic, One Hour between 4 and 6 PM
(a.k.a.): Weekday PM Peak Hour

									NET EXTERNAL TRIPS BY TYPE											
									IN BOTH DIRECTIONS						DIRECTIONAL ASSIGNMENTS					
			Gross Trips				Internal Crossover		TOTAL	PASS-BY		DIVERTED LINK		NEW	PASS-BY		DIVERTED LINK		NEW	
LAND USES	VARIABLE	ITE LU code	Trip Rate	% IN	% OUT	In+Out (Total)	% of Gross Trips	Trips In+Out (Total)	In+Out (Total)	% of Ext. Trips	In+Out (Total)	% of Ext. Trips	In+Out (Total)	In+Out (Total)	In	Out	In	Out	In	Out
Elementary School	133 Student	520	0.15	49%	51%	20	0%	0	20	0%	0	0%	0	20	0	0	0	0	10	10
Totals						20		0	20		0		0	20	0	0	0	0	10	10

Peter Kirk Elementary School

GTC #16-096

AM Peak-Hour

%	New ADT	New AM Peak Hour Trips			%	New ADT	New AM Peak Hour Trips		
		In	Out	Total			In	Out	Total
100%	172	33	27	60	100%	172	33	27	60
1%	1.72	0.33	0.27	0.60	51%	87.50	16.83	13.77	30.60
2%	3.43	0.66	0.54	1.20	52%	89.22	17.16	14.04	31.20
3%	5.15	0.99	0.81	1.80	53%	90.93	17.49	14.31	31.80
4%	6.86	1.32	1.08	2.40	54%	92.65	17.82	14.58	32.40
5%	**8.58**	**1.65**	**1.35**	**3.00**	**55%**	**94.36**	**18.15**	**14.85**	**33.00**
6%	10.29	1.98	1.62	3.60	56%	96.08	18.48	15.12	33.60
7%	12.01	2.31	1.89	4.20	57%	97.79	18.81	15.39	34.20
8%	13.73	2.64	2.16	4.80	58%	99.51	19.14	15.66	34.80
9%	15.44	2.97	2.43	5.40	59%	101.23	19.47	15.93	35.40
10%	**17.16**	**3.30**	**2.70**	**6.00**	**60%**	**102.94**	**19.80**	**16.20**	**36.00**
11%	18.87	3.63	2.97	6.60	61%	104.66	20.13	16.47	36.60
12%	20.59	3.96	3.24	7.20	62%	106.37	20.46	16.74	37.20
13%	22.30	4.29	3.51	7.80	63%	108.09	20.79	17.01	37.80
14%	24.02	4.62	3.78	8.40	64%	109.80	21.12	17.28	38.40
15%	**25.74**	**4.95**	**4.05**	**9.00**	**65%**	**111.52**	**21.45**	**17.55**	**39.00**
16%	27.45	5.28	4.32	9.60	66%	113.24	21.78	17.82	39.60
17%	29.17	5.61	4.59	10.20	67%	114.95	22.11	18.09	40.20
18%	30.88	5.94	4.86	10.80	68%	116.67	22.44	18.36	40.80
19%	32.60	6.27	5.13	11.40	69%	118.38	22.77	18.63	41.40
20%	**34.31**	**6.60**	**5.40**	**12.00**	**70%**	**120.10**	**23.10**	**18.90**	**42.00**
21%	36.03	6.93	5.67	12.60	71%	121.81	23.43	19.17	42.60
22%	37.75	7.26	5.94	13.20	72%	123.53	23.76	19.44	43.20
23%	39.46	7.59	6.21	13.80	73%	125.25	24.09	19.71	43.80
24%	41.18	7.92	6.48	14.40	74%	126.96	24.42	19.98	44.40
25%	**42.89**	**8.25**	**6.75**	**15.00**	**75%**	**128.68**	**24.75**	**20.25**	**45.00**
26%	44.61	8.58	7.02	15.60	76%	130.39	25.08	20.52	45.60
27%	46.32	8.91	7.29	16.20	77%	132.11	25.41	20.79	46.20
28%	48.04	9.24	7.56	16.80	78%	133.82	25.74	21.06	46.80
29%	49.76	9.57	7.83	17.40	79%	135.54	26.07	21.33	47.40
30%	**51.47**	**9.90**	**8.10**	**18.00**	**80%**	**137.26**	**26.40**	**21.60**	**48.00**
31%	53.19	10.23	8.37	18.60	81%	138.97	26.73	21.87	48.60
32%	54.90	10.56	8.64	19.20	82%	140.69	27.06	22.14	49.20
33%	56.62	10.89	8.91	19.80	83%	142.40	27.39	22.41	49.80
34%	58.33	11.22	9.18	20.40	84%	144.12	27.72	22.68	50.40
35%	**60.05**	**11.55**	**9.45**	**21.00**	**85%**	**145.83**	**28.05**	**22.95**	**51.00**
36%	61.77	11.88	9.72	21.60	86%	147.55	28.38	23.22	51.60
37%	63.48	12.21	9.99	22.20	87%	149.27	28.71	23.49	52.20
38%	65.20	12.54	10.26	22.80	88%	150.98	29.04	23.76	52.80
39%	66.91	12.87	10.53	23.40	89%	152.70	29.37	24.03	53.40
40%	**68.63**	**13.20**	**10.80**	**24.00**	**90%**	**154.41**	**29.70**	**24.30**	**54.00**
41%	70.34	13.53	11.07	24.60	91%	156.13	30.03	24.57	54.60
42%	72.06	13.86	11.34	25.20	92%	157.84	30.36	24.84	55.20
43%	73.78	14.19	11.61	25.80	93%	159.56	30.69	25.11	55.80
44%	75.49	14.52	11.88	26.40	94%	161.28	31.02	25.38	56.40
45%	**77.21**	**14.85**	**12.15**	**27.00**	**95%**	**162.99**	**31.35**	**25.65**	**57.00**
46%	78.92	15.18	12.42	27.60	96%	164.71	31.68	25.92	57.60
47%	80.64	15.51	12.69	28.20	97%	166.42	32.01	26.19	58.20
48%	82.35	15.84	12.96	28.80	98%	168.14	32.34	26.46	58.80
49%	84.07	16.17	13.23	29.40	99%	169.85	32.67	26.73	59.40
50%	**85.79**	**16.50**	**13.50**	**30.00**	**100%**	**171.57**	**33.00**	**27.00**	**60.00**

Peter Kirk Elementary School

GTC #16-096

School PM Peak-Hour

%	New ADT	New School PM Peak Trips		
		In	Out	Total
100%	172	17	20	37
1%	1.72	0.17	0.20	0.37
2%	3.43	0.34	0.40	0.74
3%	5.15	0.51	0.60	1.11
4%	6.86	0.68	0.80	1.48
5%	**8.58**	**0.85**	**1.00**	**1.85**
6%	10.29	1.02	1.20	2.22
7%	12.01	1.19	1.40	2.59
8%	13.73	1.36	1.60	2.96
9%	15.44	1.53	1.80	3.33
10%	**17.16**	**1.70**	**2.00**	**3.70**
11%	18.87	1.87	2.20	4.07
12%	20.59	2.04	2.40	4.44
13%	22.30	2.21	2.60	4.81
14%	24.02	2.38	2.80	5.18
15%	**25.74**	**2.55**	**3.00**	**5.55**
16%	27.45	2.72	3.20	5.92
17%	29.17	2.89	3.40	6.29
18%	30.88	3.06	3.60	6.66
19%	32.60	3.23	3.80	7.03
20%	**34.31**	**3.40**	**4.00**	**7.40**
21%	36.03	3.57	4.20	7.77
22%	37.75	3.74	4.40	8.14
23%	39.46	3.91	4.60	8.51
24%	41.18	4.08	4.80	8.88
25%	**42.89**	**4.25**	**5.00**	**9.25**
26%	44.61	4.42	5.20	9.62
27%	46.32	4.59	5.40	9.99
28%	48.04	4.76	5.60	10.36
29%	49.76	4.93	5.80	10.73
30%	**51.47**	**5.10**	**6.00**	**11.10**
31%	53.19	5.27	6.20	11.47
32%	54.90	5.44	6.40	11.84
33%	56.62	5.61	6.60	12.21
34%	58.33	5.78	6.80	12.58
35%	**60.05**	**5.95**	**7.00**	**12.95**
36%	61.77	6.12	7.20	13.32
37%	63.48	6.29	7.40	13.69
38%	65.20	6.46	7.60	14.06
39%	66.91	6.63	7.80	14.43
40%	**68.63**	**6.80**	**8.00**	**14.80**
41%	70.34	6.97	8.20	15.17
42%	72.06	7.14	8.40	15.54
43%	73.78	7.31	8.60	15.91
44%	75.49	7.48	8.80	16.28
45%	**77.21**	**7.65**	**9.00**	**16.65**
46%	78.92	7.82	9.20	17.02
47%	80.64	7.99	9.40	17.39
48%	82.35	8.16	9.60	17.76
49%	84.07	8.33	9.80	18.13
50%	**85.79**	**8.50**	**10.00**	**18.50**

%	New ADT	New School PM Peak Trips		
		In	Out	Total
100%	172	17	20	37
51%	87.50	8.67	10.20	18.87
52%	89.22	8.84	10.40	19.24
53%	90.93	9.01	10.60	19.61
54%	92.65	9.18	10.80	19.98
55%	**94.36**	**9.35**	**11.00**	**20.35**
56%	96.08	9.52	11.20	20.72
57%	97.79	9.69	11.40	21.09
58%	99.51	9.86	11.60	21.46
59%	101.23	10.03	11.80	21.83
60%	**102.94**	**10.20**	**12.00**	**22.20**
61%	104.66	10.37	12.20	22.57
62%	106.37	10.54	12.40	22.94
63%	108.09	10.71	12.60	23.31
64%	109.80	10.88	12.80	23.68
65%	**111.52**	**11.05**	**13.00**	**24.05**
66%	113.24	11.22	13.20	24.42
67%	114.95	11.39	13.40	24.79
68%	116.67	11.56	13.60	25.16
69%	118.38	11.73	13.80	25.53
70%	**120.10**	**11.90**	**14.00**	**25.90**
71%	121.81	12.07	14.20	26.27
72%	123.53	12.24	14.40	26.64
73%	125.25	12.41	14.60	27.01
74%	126.96	12.58	14.80	27.38
75%	**128.68**	**12.75**	**15.00**	**27.75**
76%	130.39	12.92	15.20	28.12
77%	132.11	13.09	15.40	28.49
78%	133.82	13.26	15.60	28.86
79%	135.54	13.43	15.80	29.23
80%	**137.26**	**13.60**	**16.00**	**29.60**
81%	138.97	13.77	16.20	29.97
82%	140.69	13.94	16.40	30.34
83%	142.40	14.11	16.60	30.71
84%	144.12	14.28	16.80	31.08
85%	**145.83**	**14.45**	**17.00**	**31.45**
86%	147.55	14.62	17.20	31.82
87%	149.27	14.79	17.40	32.19
88%	150.98	14.96	17.60	32.56
89%	152.70	15.13	17.80	32.93
90%	**154.41**	**15.30**	**18.00**	**33.30**
91%	156.13	15.47	18.20	33.67
92%	157.84	15.64	18.40	34.04
93%	159.56	15.81	18.60	34.41
94%	161.28	15.98	18.80	34.78
95%	**162.99**	**16.15**	**19.00**	**35.15**
96%	164.71	16.32	19.20	35.52
97%	166.42	16.49	19.40	35.89
98%	168.14	16.66	19.60	36.26
99%	169.85	16.83	19.80	36.63
100%	**171.57**	**17.00**	**20.00**	**37.00**

Peter Kirk Elementary School

GTC #16-096

PM Peak-Hour

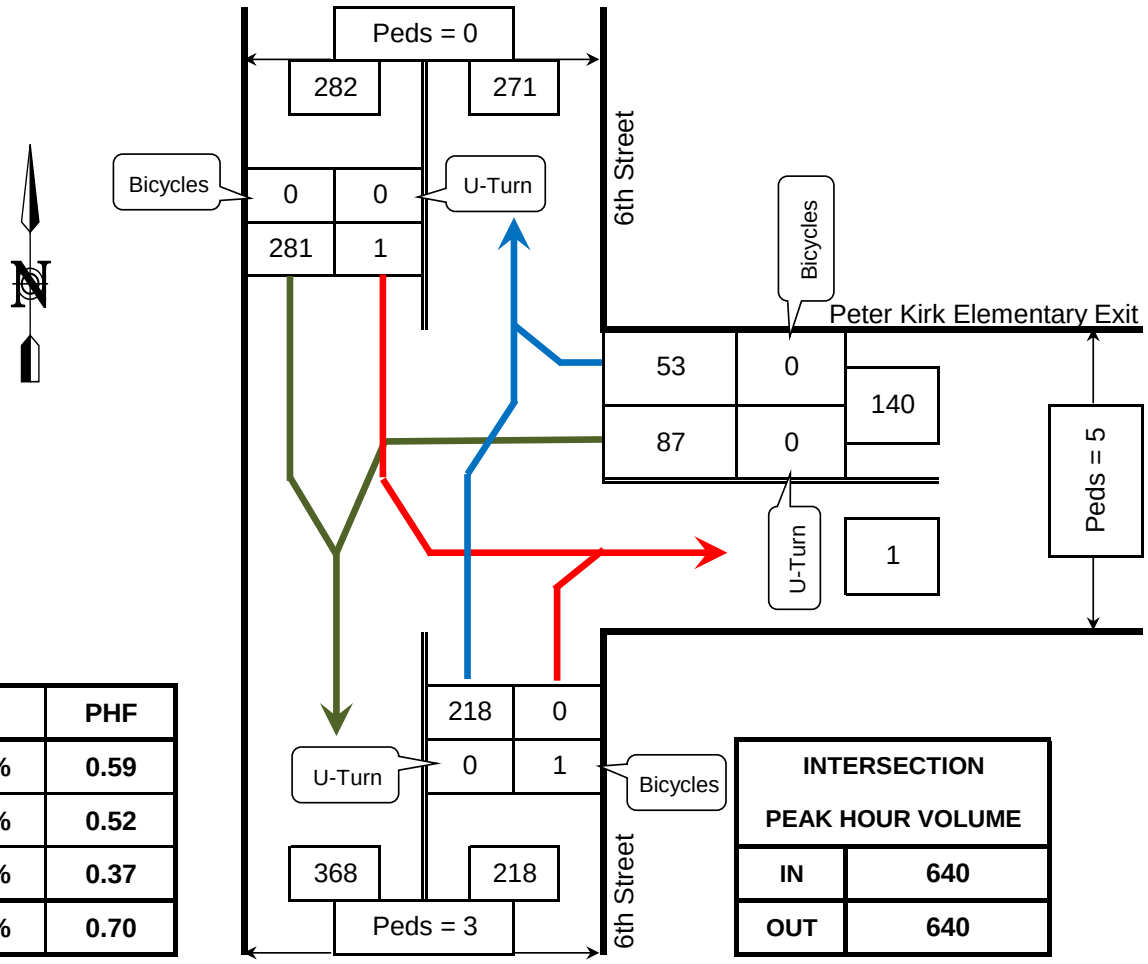
%	New ADT	New PM Peak Hour Trips			%	New ADT	New PM Peak Hour Trips		
		In	Out	Total			In	Out	Total
100%	172	10	10	20	100%	172	10	10	20
1%	1.72	0.10	0.10	0.20	51%	87.50	5.10	5.10	10.20
2%	3.43	0.20	0.20	0.40	52%	89.22	5.20	5.20	10.40
3%	5.15	0.30	0.30	0.60	53%	90.93	5.30	5.30	10.60
4%	6.86	0.40	0.40	0.80	54%	92.65	5.40	5.40	10.80
5%	**8.58**	**0.50**	**0.50**	**1.00**	**55%**	**94.36**	**5.50**	**5.50**	**11.00**
6%	10.29	0.60	0.60	1.20	56%	96.08	5.60	5.60	11.20
7%	12.01	0.70	0.70	1.40	57%	97.79	5.70	5.70	11.40
8%	13.73	0.80	0.80	1.60	58%	99.51	5.80	5.80	11.60
9%	15.44	0.90	0.90	1.80	59%	101.23	5.90	5.90	11.80
10%	**17.16**	**1.00**	**1.00**	**2.00**	**60%**	**102.94**	**6.00**	**6.00**	**12.00**
11%	18.87	1.10	1.10	2.20	61%	104.66	6.10	6.10	12.20
12%	20.59	1.20	1.20	2.40	62%	106.37	6.20	6.20	12.40
13%	22.30	1.30	1.30	2.60	63%	108.09	6.30	6.30	12.60
14%	24.02	1.40	1.40	2.80	64%	109.80	6.40	6.40	12.80
15%	**25.74**	**1.50**	**1.50**	**3.00**	**65%**	**111.52**	**6.50**	**6.50**	**13.00**
16%	27.45	1.60	1.60	3.20	66%	113.24	6.60	6.60	13.20
17%	29.17	1.70	1.70	3.40	67%	114.95	6.70	6.70	13.40
18%	30.88	1.80	1.80	3.60	68%	116.67	6.80	6.80	13.60
19%	32.60	1.90	1.90	3.80	69%	118.38	6.90	6.90	13.80
20%	**34.31**	**2.00**	**2.00**	**4.00**	**70%**	**120.10**	**7.00**	**7.00**	**14.00**
21%	36.03	2.10	2.10	4.20	71%	121.81	7.10	7.10	14.20
22%	37.75	2.20	2.20	4.40	72%	123.53	7.20	7.20	14.40
23%	39.46	2.30	2.30	4.60	73%	125.25	7.30	7.30	14.60
24%	41.18	2.40	2.40	4.80	74%	126.96	7.40	7.40	14.80
25%	**42.89**	**2.50**	**2.50**	**5.00**	**75%**	**128.68**	**7.50**	**7.50**	**15.00**
26%	44.61	2.60	2.60	5.20	76%	130.39	7.60	7.60	15.20
27%	46.32	2.70	2.70	5.40	77%	132.11	7.70	7.70	15.40
28%	48.04	2.80	2.80	5.60	78%	133.82	7.80	7.80	15.60
29%	49.76	2.90	2.90	5.80	79%	135.54	7.90	7.90	15.80
30%	**51.47**	**3.00**	**3.00**	**6.00**	**80%**	**137.26**	**8.00**	**8.00**	**16.00**
31%	53.19	3.10	3.10	6.20	81%	138.97	8.10	8.10	16.20
32%	54.90	3.20	3.20	6.40	82%	140.69	8.20	8.20	16.40
33%	56.62	3.30	3.30	6.60	83%	142.40	8.30	8.30	16.60
34%	58.33	3.40	3.40	6.80	84%	144.12	8.40	8.40	16.80
35%	**60.05**	**3.50**	**3.50**	**7.00**	**85%**	**145.83**	**8.50**	**8.50**	**17.00**
36%	61.77	3.60	3.60	7.20	86%	147.55	8.60	8.60	17.20
37%	63.48	3.70	3.70	7.40	87%	149.27	8.70	8.70	17.40
38%	65.20	3.80	3.80	7.60	88%	150.98	8.80	8.80	17.60
39%	66.91	3.90	3.90	7.80	89%	152.70	8.90	8.90	17.80
40%	**68.63**	**4.00**	**4.00**	**8.00**	**90%**	**154.41**	**9.00**	**9.00**	**18.00**
41%	70.34	4.10	4.10	8.20	91%	156.13	9.10	9.10	18.20
42%	72.06	4.20	4.20	8.40	92%	157.84	9.20	9.20	18.40
43%	73.78	4.30	4.30	8.60	93%	159.56	9.30	9.30	18.60
44%	75.49	4.40	4.40	8.80	94%	161.28	9.40	9.40	18.80
45%	**77.21**	**4.50**	**4.50**	**9.00**	**95%**	**162.99**	**9.50**	**9.50**	**19.00**
46%	78.92	4.60	4.60	9.20	96%	164.71	9.60	9.60	19.20
47%	80.64	4.70	4.70	9.40	97%	166.42	9.70	9.70	19.40
48%	82.35	4.80	4.80	9.60	98%	168.14	9.80	9.80	19.60
49%	84.07	4.90	4.90	9.80	99%	169.85	9.90	9.90	19.80
50%	**85.79**	**5.00**	**5.00**	**10.00**	**100%**	**171.57**	**10.00**	**10.00**	**20.00**

Count Data

TRAFFIC DATA GATHERING

TURNING MOVEMENTS DIAGRAM

7:00 AM - 9:00 AM PEAK HOUR: 7:45 AM TO 8:45 AM



	HV	PHF
SB	1.1%	0.59
NB	6.4%	0.52
WB	2.9%	0.37
INTRS.	3.3%	0.70

INTERSECTION PEAK HOUR VOLUME	
IN	640
OUT	640

HV = Heavy Vehicles
PHF = Peak Hour Factor

Peter Kirk Elementary School Exit @ 6th Street

Kirkland, WA

COUNTED BY: VT

DATE OF COUNT: Thu. 6/2/16

REDUCED BY: CN

TIME OF COUNT: 7:00 AM - 9:00 AM

REDUCTION DATE: Fri. 6/3/16

WEATHER: Overcast

TRAFFIC DATA GATHERING

INTERSECTION TURNING MOVEMENTS REDUCTION SHEET

LOCATION: Peter Kirk Elementary School Exit @ 6th Street
Kirkland, WA

DATE OF COUNT: Thu. 6/2/16
TIME OF COUNT: 7:00 AM - 9:00 AM

COUNTED BY: VT
WEATHER: Overcast

TIME INTERVAL ENDING AT	FROM NORTH ON 6th Street							FROM SOUTH ON 6th Street							FROM EAST ON Peter Kirk Elementary Exit							FROM WEST ON							INTERVAL TOTALS
	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	
05:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	41	0	0	0	0	0	0	19	0	0	0	1	0	2	0	1	0	0	0	0	0	0	0	63
07:30 AM	0	0	0	0	0	44	0	0	0	0	0	0	12	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	58
07:45 AM	0	0	0	0	0	52	0	0	0	0	0	0	30	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	83
08:00 AM	0	0	0	0	1	72	0	0	0	3	0	0	80	0	1	0	0	0	3	0	1	0	0	0	0	0	0	0	157
08:15 AM	0	0	1	0	0	119	0	0	0	5	0	0	104	0	0	0	0	0	3	0	1	0	0	0	0	0	0	0	227
08:30 AM	0	0	1	0	0	45	0	2	0	2	0	0	13	0	2	0	1	0	25	0	13	0	0	0	0	0	0	0	96
08:45 AM	0	0	1	0	0	45	0	1	1	4	0	0	21	0	2	0	3	0	56	0	38	0	0	0	0	0	0	0	160
09:00 AM	0	0	3	0	0	38	0	0	0	2	0	0	27	0	0	0	2	0	14	0	14	0	0	0	0	0	0	0	93
PEAK HOUR TOTALS	0	0	3	0	1	281	0	3	1	14	0	0	218	0	5	0	4	0	87	0	53	0	0	0	0	0	0	0	INTERSECTION
ALL MOVEMENTS				282							218							140							0				640
% HV			1.1%							6.4%							2.9%							#N/A				3.3%
PEAK HOUR FACTOR				0.59							0.52							0.37							#N/A				0.70

HV = Heavy Vehicle
PHF = Peak Hour Factor

7:00 AM - 9:00 AM PEAK HOUR: 7:45 AM TO 8:45 AM

REDUCED BY: CN

DATE OF REDUCTION: 6/3/2016

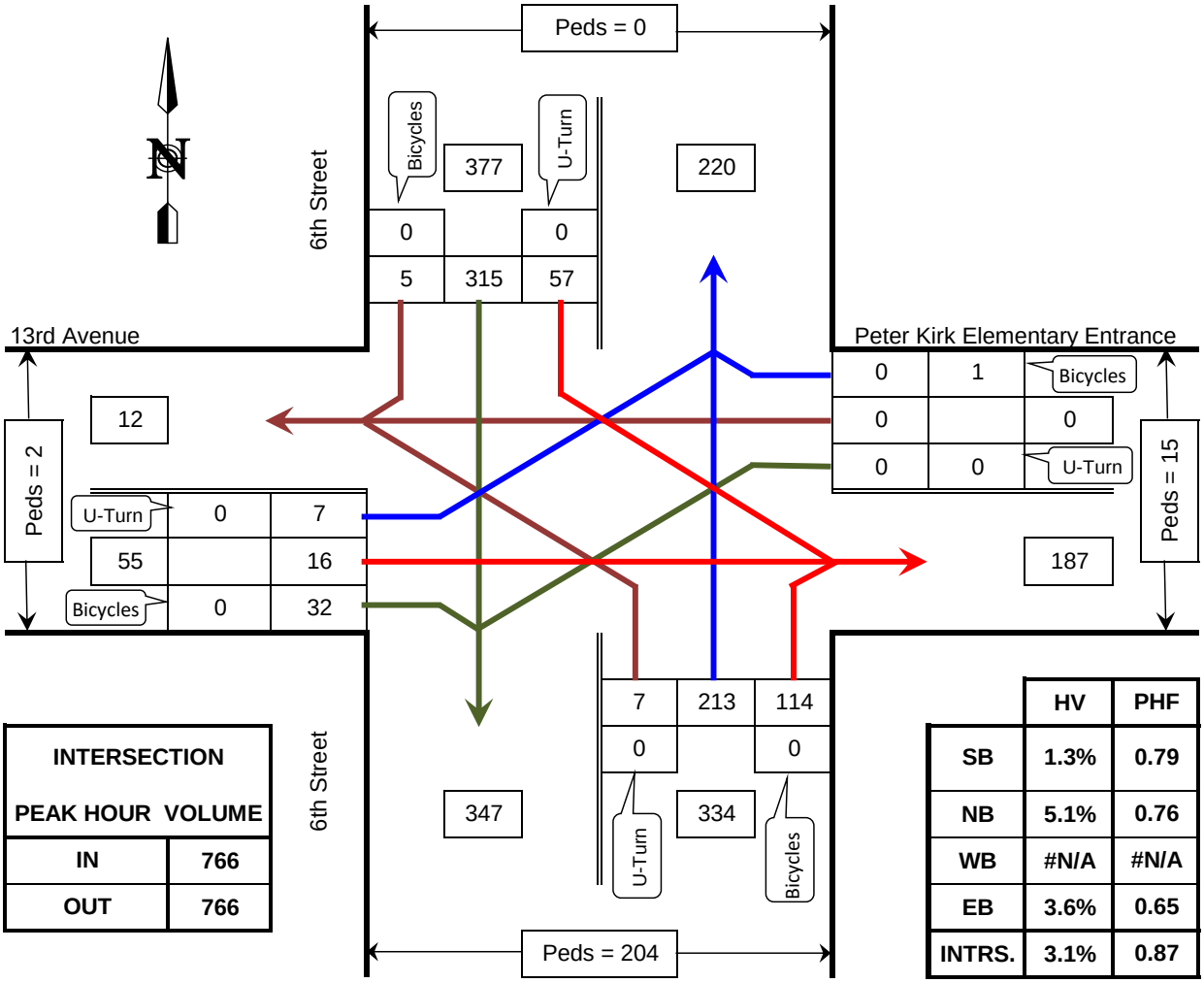
ROLLING HOUR COUNT

	FROM NORTH ON 6th Street							FROM SOUTH ON 6th Street							FROM EAST ON Peter Kirk Elementary Exit							FROM WEST ON							INTERVAL TOTALS
TIME INTERVAL	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	
5:00 AM - 6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 AM - 6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 AM - 6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 AM - 6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 AM - 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM - 7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM - 7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM - 7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM - 8:00 AM	0	0	0	0	1	209	0	0	0	3	0	0	141	0	5	0	1	0	8	0	2	0	0	0	0	0	0	0	361
7:15 AM - 8:15 AM	0	0	1	0	1	287	0	0	0	8	0	0	226	0	5	0	0	0	9	0	2	0	0	0	0	0	0	0	525
7:30 AM - 8:30 AM	0	0	2	0	1	288	0	2	0	10	0	0	227	0	5	0	1	0	32	0	15	0	0	0	0	0	0	0	563
7:45 AM - 8:45 AM	0	0	3	0	1	281	0	3	1	14	0	0	218	0	5	0	4	0	87	0	53	0	0	0	0	0	0	0	640
8:00 AM - 9:00 AM	0	0	6	0	0	247	0	3	1	13	0	0	165	0	4	0	6	0	98	0	66	0	0	0	0	0	0	0	576

TRAFFIC DATA GATHERING

TURNING MOVEMENTS DIAGRAM

7:00 AM - 9:00 AM PEAK HOUR: 7:45 AM TO 8:45 AM



INTERSECTION PEAK HOUR VOLUME	
IN	766
OUT	766

	HV	PHF
SB	1.3%	0.79
NB	5.1%	0.76
WB	#N/A	#N/A
EB	3.6%	0.65
INTRS.	3.1%	0.87

PHF = Peak Hour Factor
HV = Heavy Vehicle

Peter Kirk Elementary School Entrance/3rd Avenue @ 6th Street

Kirkland, WA

COUNTED BY: VT

DATE OF COUNT: Thu. 6/2/16

REDUCED BY: CN

TIME OF COUNT: 7:00 AM - 9:00 AM

REDUCTION DATE: Thu. 6/2/16

WEATHER: Overcast

TRAFFIC DATA GATHERING

INTERSECTION TURNING MOVEMENTS REDUCTION SHEET

LOCATION: Peter Kirk Elementary School Entrance/3rd Avenue @ 6th Street
Kirkland, WA

DATE OF COUNT: Thu. 6/2/16
TIME OF COUNT: 7:00 AM - 9:00 AM

COUNTED BY: VT
WEATHER: Overcast

TIME INTERVAL ENDING AT	FROM NORTH ON 6th Street							FROM SOUTH ON 6th Street							FROM EAST ON Peter Kirk Elementary Entrance							FROM WEST ON 3rd Avenue							INTERVAL TOTALS
	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	
05:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	46	0	2	0	0	1	2	20	1	1	0	0	0	0	0	0	0	0	0	0	0	1	2	73
07:30 AM	0	0	0	0	1	43	0	0	0	1	0	2	14	1	1	0	0	0	0	0	0	0	0	0	0	1	1	4	67
07:45 AM	0	0	0	0	1	52	0	0	0	0	0	1	34	5	1	0	0	0	0	0	0	0	0	0	0	0	1	4	98
08:00 AM	0	0	0	0	5	81	1	1	0	4	0	0	97	13	1	0	0	0	0	0	0	0	0	0	0	1	0	7	205
08:15 AM	0	0	1	0	11	107	1	3	0	5	0	3	81	9	0	0	0	0	0	0	0	0	0	0	0	2	0	6	220
08:30 AM	0	0	2	0	16	48	1	21	0	3	0	1	15	38	3	0	0	0	0	0	0	0	0	0	0	1	7	10	137
08:45 AM	0	0	2	0	25	79	2	179	0	5	0	3	20	54	11	1	0	0	0	0	0	2	0	2	0	3	9	9	204
09:00 AM	0	0	3	0	3	33	0	0	0	2	1	0	21	7	0	0	0	0	0	0	0	2	0	0	0	3	0	10	78
PEAK HOUR TOTALS	0	0	5	0	57	315	5	204	0	17	0	7	213	114	15	1	0	0	0	0	0	2	0	2	0	7	16	32	INTERSECTION
ALL MOVEMENTS				377							334							0							55				766
% HV			1.3%							5.1%							#N/A							3.6%					3.1%
PEAK HOUR FACTOR				0.79							0.76							#N/A							0.65				0.87

HV = Heavy Vehicle
PHF = Peak Hour Factor

7:00 AM - 9:00 AM PEAK HOUR: 7:45 AM TO 8:45 AM

REDUCED BY: CN

DATE OF REDUCTION: 6/2/2016

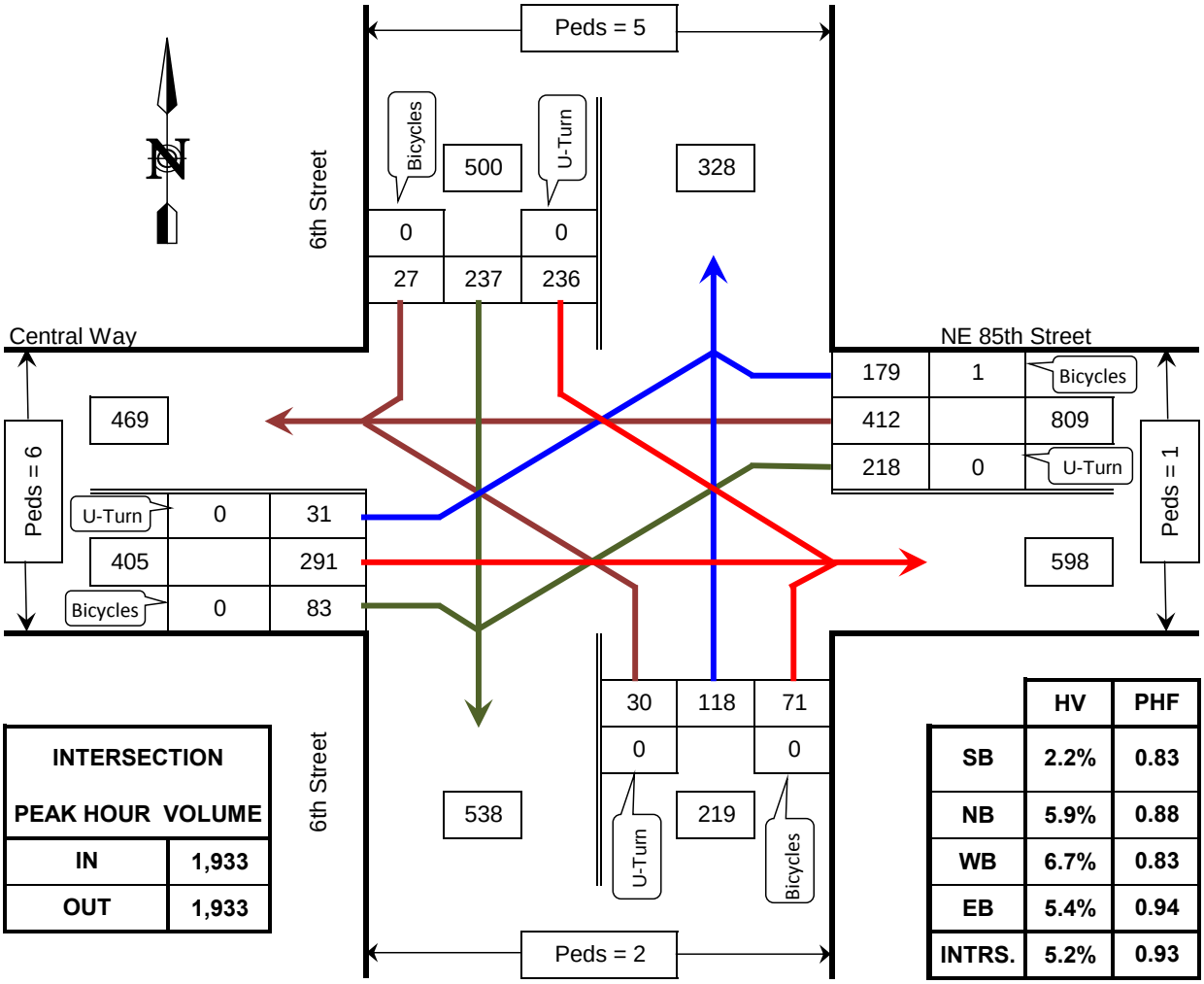
ROLLING HOUR COUNT

	FROM NORTH ON 6th Street							FROM SOUTH ON 6th Street							FROM EAST ON Peter Kirk Elementary Entrance							FROM WEST ON 3rd Avenue							INTERVAL TOTALS
TIME INTERVAL	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	
5:00 AM - 6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 AM - 6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 AM - 6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 AM - 6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 AM - 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM - 7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM - 7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM - 7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM - 8:00 AM	0	0	0	0	7	222	1	3	0	5	1	5	165	20	4	0	0	0	0	0	0	0	0	0	0	2	3	17	443
7:15 AM - 8:15 AM	0	0	1	0	18	283	2	4	0	10	0	6	226	28	3	0	0	0	0	0	0	0	0	0	0	4	2	21	590
7:30 AM - 8:30 AM	0	0	3	0	33	288	3	25	0	12	0	5	227	65	5	0	0	0	0	0	0	0	0	0	0	4	8	27	660
7:45 AM - 8:45 AM	0	0	5	0	57	315	5	204	0	17	0	7	213	114	15	1	0	0	0	0	0	2	0	2	0	7	16	32	766
8:00 AM - 9:00 AM	0	0	8	0	55	267	4	203	0	15	1	7	137	108	14	1	0	0	0	0	0	4	0	2	0	9	16	35	639

TRAFFIC DATA GATHERING

TURNING MOVEMENTS DIAGRAM

7:00 AM - 9:00 AM PEAK HOUR: 7:45 AM TO 8:45 AM



INTERSECTION PEAK HOUR VOLUME	
IN	1,933
OUT	1,933

	HV	PHF
SB	2.2%	0.83
NB	5.9%	0.88
WB	6.7%	0.83
EB	5.4%	0.94
INTRS.	5.2%	0.93

PHF = Peak Hour Factor
HV = Heavy Vehicle

NE 85th Street/Central Way @ 6th Street

Kirkland, WA

COUNTED BY: CN

DATE OF COUNT: Thu. 6/2/16

REDUCED BY: CN

TIME OF COUNT: 7:00 AM - 9:00 AM

REDUCTION DATE: Thu. 6/2/16

WEATHER: Overcast

TRAFFIC DATA GATHERING

INTERSECTION TURNING MOVEMENTS REDUCTION SHEET

LOCATION: NE 85th Street/Central Way @ 6th Street
Kirkland, WA

DATE OF COUNT: Thu. 6/2/16
TIME OF COUNT: 7:00 AM - 9:00 AM

COUNTED BY: CN
WEATHER: Overcast

TIME INTERVAL ENDING AT	FROM NORTH ON 6th Street							FROM SOUTH ON 6th Street							FROM EAST ON NE 85th Street							FROM WEST ON Central Way							INTERVAL TOTALS
	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	
05:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	5	0	34	40	9	0	0	3	0	4	10	11	1	0	11	0	53	88	19	3	0	5	0	3	89	14	374
07:30 AM	1	0	3	0	36	36	2	1	0	3	0	3	10	16	1	0	11	0	39	81	24	5	0	5	0	1	74	17	339
07:45 AM	0	2	2	0	66	51	6	1	0	3	0	6	12	10	0	0	10	0	48	78	28	1	0	3	0	3	83	16	407
08:00 AM	2	0	3	0	56	60	3	1	0	4	0	6	42	14	1	0	14	0	68	108	68	3	0	0	0	10	65	18	518
08:15 AM	2	0	1	0	73	72	5	0	0	0	0	6	24	23	0	0	13	0	59	91	45	2	0	10	0	9	72	21	500
08:30 AM	0	0	4	0	43	48	5	1	0	4	0	10	13	19	0	1	15	0	55	105	38	1	0	9	0	9	76	23	444
08:45 AM	1	0	3	0	64	57	14	0	0	5	0	8	39	15	0	0	12	0	36	108	28	0	0	3	0	3	78	21	471
09:00 AM	0	2	6	0	49	53	13	0	0	3	0	18	20	20	0	0	6	0	61	95	31	2	0	6	0	5	107	23	495
PEAK HOUR TOTALS	5	0	11	0	236	237	27	2	0	13	0	30	118	71	1	1	54	0	218	412	179	6	0	22	0	31	291	83	INTERSECTION
ALL MOVEMENTS				500							219							809							405				1933
% HV			2.2%							5.9%							6.7%							5.4%					5.2%
PEAK HOUR FACTOR				0.83							0.88							0.83							0.94				0.93

HV = Heavy Vehicle
PHF = Peak Hour Factor

7:00 AM - 9:00 AM PEAK HOUR: 7:45 AM TO 8:45 AM

REDUCED BY: CN

DATE OF REDUCTION: 6/2/2016

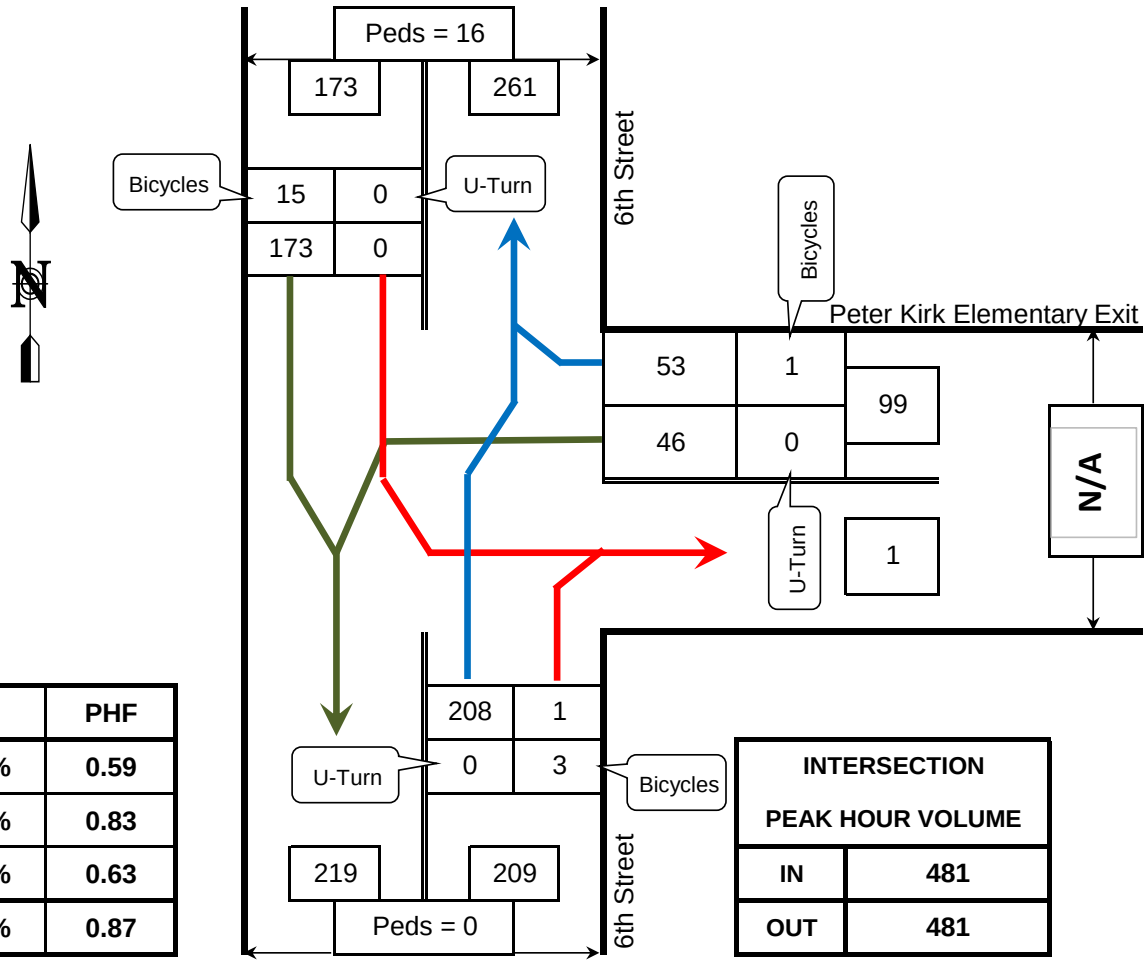
ROLLING HOUR COUNT

	FROM NORTH ON 6th Street							FROM SOUTH ON 6th Street							FROM EAST ON NE 85th Street							FROM WEST ON Central Way							INTERVAL TOTALS
TIME INTERVAL	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	
5:00 AM - 6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 AM - 6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 AM - 6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 AM - 6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 AM - 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM - 7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM - 7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM - 7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM - 8:00 AM	3	2	13	0	192	187	20	3	0	13	0	19	74	51	3	0	46	0	208	355	139	12	0	13	0	17	311	65	1638
7:15 AM - 8:15 AM	5	2	9	0	231	219	16	3	0	10	0	21	88	63	2	0	48	0	214	358	165	11	0	18	0	23	294	72	1764
7:30 AM - 8:30 AM	4	2	10	0	238	231	19	3	0	11	0	28	91	66	1	1	52	0	230	382	179	7	0	22	0	31	296	78	1869
7:45 AM - 8:45 AM	5	0	11	0	236	237	27	2	0	13	0	30	118	71	1	1	54	0	218	412	179	6	0	22	0	31	291	83	1933
8:00 AM - 9:00 AM	3	2	14	0	229	230	37	1	0	12	0	42	96	77	0	1	46	0	211	399	142	5	0	28	0	26	333	88	1910

TRAFFIC DATA GATHERING

TURNING MOVEMENTS DIAGRAM

2:45 PM - 3:45 PM PEAK HOUR: 2:45 PM TO 3:45 PM



	HV	PHF
SB	4.0%	0.59
NB	2.4%	0.83
WB	4.0%	0.63
INTRS.	3.3%	0.87

INTERSECTION PEAK HOUR VOLUME	
IN	481
OUT	481

HV = Heavy Vehicles
PHF = Peak Hour Factor

Peter Kirk Elementary School Exit @ 6th Street

Kirkland, WA

COUNTED BY: WW

DATE OF COUNT: Thu. 6/2/16

REDUCED BY: CN

TIME OF COUNT: 2:45 PM - 3:45 PM

REDUCTION DATE: Fri. 6/3/16

WEATHER: Sunny

TRAFFIC DATA GATHERING

INTERSECTION TURNING MOVEMENTS REDUCTION SHEET

LOCATION: Peter Kirk Elementary School Exit @ 6th Street
Kirkland, WA

DATE OF COUNT: Thu. 6/2/16
TIME OF COUNT: 2:45 PM - 3:45 PM

COUNTED BY: WW
WEATHER: Sunny

TIME INTERVAL ENDING AT	FROM NORTH ON 6th Street							FROM SOUTH ON 6th Street							FROM EAST ON Peter Kirk Elementary Exit							FROM WEST ON							INTERVAL TOTALS
	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00 PM	10	9	3	0	0	73	0	0	1	1	0	0	62	1	0	0	0	0	1	0	2	0	0	0	0	0	0	0	139
03:15 PM	1	2	2	0	0	34	0	0	2	3	0	0	38	0	N/A	0	1	0	10	0	13	0	0	0	0	0	0	0	95
03:30 PM	3	0	2	0	0	38	0	0	0	1	0	0	51	0		0	3	0	17	0	22	0	0	0	0	0	0	0	128
03:45 PM	2	4	0	0	0	28	0	0	0	0	0	0	57	0	0	1	0	0	18	0	16	0	0	0	0	0	0	0	119
PEAK HOUR TOTALS	16	15	7	0	0	173	0	0	3	5	0	0	208	1	0	1	4	0	46	0	53	0	0	0	0	0	0	0	INTERSECTION
ALL MOVEMENTS				173							209							99							0				481
% HV			4.0%							2.4%							4.0%							#N/A					3.3%
PEAK HOUR FACTOR				0.59							0.83							0.63							#N/A				0.87

HV = Heavy Vehicle
PHF = Peak Hour Factor

2:45 PM - 3:45 PM PEAK HOUR: 2:45 PM TO 3:45 PM

REDUCED BY: CN

DATE OF REDUCTION: 6/3/2016

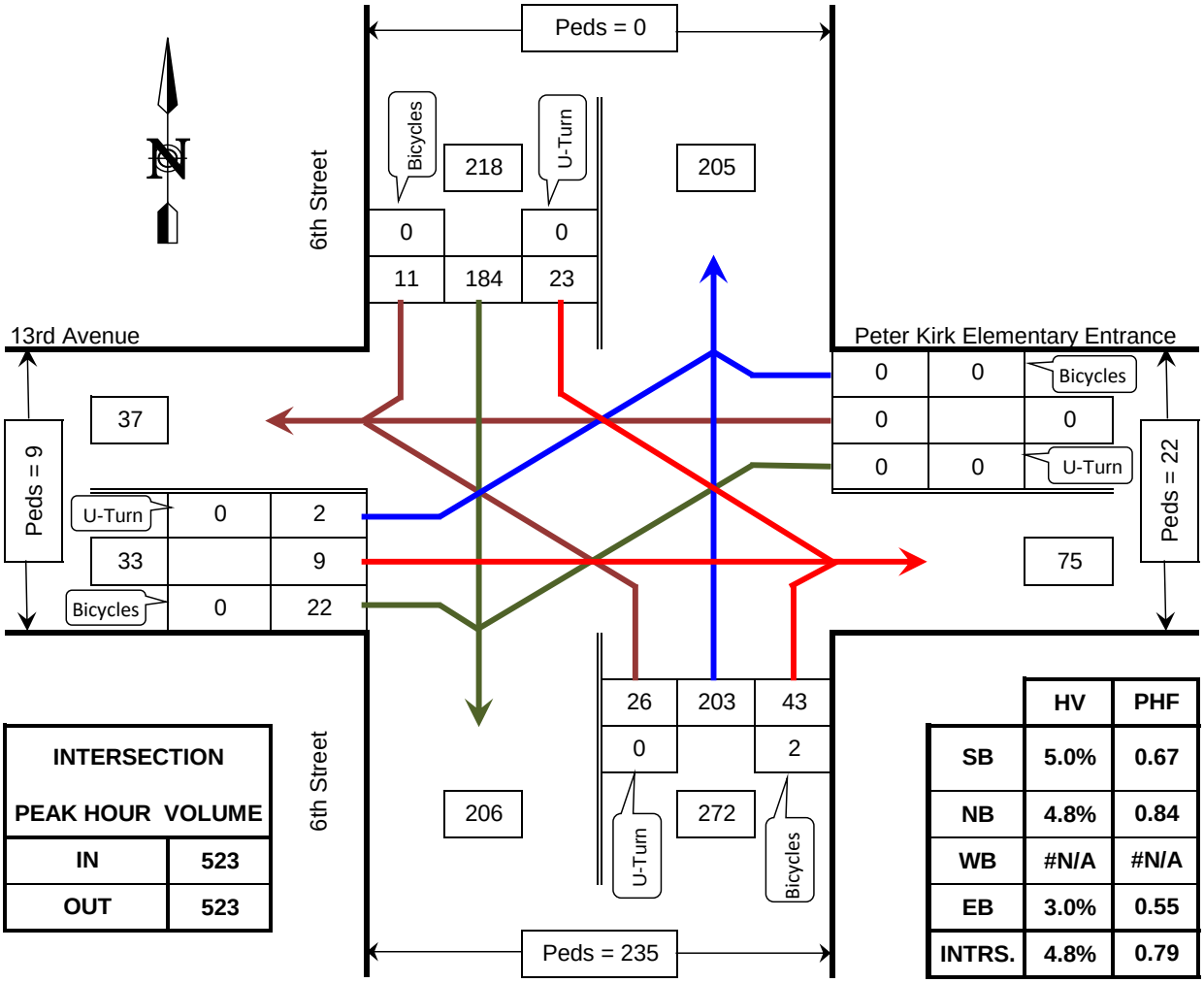
ROLLING HOUR COUNT

TIME INTERVAL	FROM NORTH ON 6th Street							FROM SOUTH ON 6th Street							FROM EAST ON Peter Kirk Elementary Exit							FROM WEST ON							INTERVAL TOTALS
	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	
11:45 AM - 12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM - 1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM - 1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM - 1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM - 1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 PM - 2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:15 PM - 2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 PM - 2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 PM - 2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 PM - 3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM - 3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 PM - 3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM - 3:45 PM	16	15	7	0	0	173	0	0	3	5	0	0	208	1	0	1	4	0	46	0	53	0	0	0	0	0	0	0	481

TRAFFIC DATA GATHERING

TURNING MOVEMENTS DIAGRAM

2:45 PM - 3:45 PM PEAK HOUR: 2:45 PM TO 3:45 PM



INTERSECTION PEAK HOUR VOLUME	
IN	523
OUT	523

	HV	PHF
SB	5.0%	0.67
NB	4.8%	0.84
WB	#N/A	#N/A
EB	3.0%	0.55
INTRS.	4.8%	0.79

PHF = Peak Hour Factor
HV = Heavy Vehicle

Peter Kirk Elementary School Entrance/3rd Avenue @ 6th Street

Kirkland, WA

COUNTED BY: SW

DATE OF COUNT: Thu. 6/2/16

REDUCED BY: CN

TIME OF COUNT: 2:45 PM - 3:45 PM

REDUCTION DATE: Fri. 6/3/16

WEATHER: Sunny

TRAFFIC DATA GATHERING

INTERSECTION TURNING MOVEMENTS REDUCTION SHEET

LOCATION: Peter Kirk Elementary School Entrance/3rd Avenue @ 6th Street
Kirkland, WA

DATE OF COUNT: Thu. 6/2/16
TIME OF COUNT: 2:45 PM - 3:45 PM

COUNTED BY: SW
WEATHER: Sunny

TIME INTERVAL ENDING AT	FROM NORTH ON 6th Street							FROM SOUTH ON 6th Street							FROM EAST ON Peter Kirk Elementary Entrance							FROM WEST ON 3rd Avenue							INTERVAL TOTALS
	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00 PM	0	0	4	0	6	73	2	15	0	1	0	2	61	13	17	0	0	0	0	0	0	1	0	0	0	1	1	6	165
03:15 PM	0	0	2	0	7	26	2	42	0	9	0	18	42	21	0	0	0	0	0	0	0	8	0	1	0	0	1	2	119
03:30 PM	0	0	4	0	9	46	5	169	2	2	0	5	49	5	1	0	0	0	0	0	0	0	0	0	0	1	5	9	134
03:45 PM	0	0	1	0	1	39	2	9	0	1	0	1	51	4	4	0	0	0	0	0	0	0	0	0	0	0	2	5	105
PEAK HOUR TOTALS	0	0	11	0	23	184	11	235	2	13	0	26	203	43	22	0	0	0	0	0	0	9	0	1	0	2	9	22	INTERSECTION
ALL MOVEMENTS				218							272							0							33				523
% HV			5.0%							4.8%							#N/A							3.0%					4.8%
PEAK HOUR FACTOR				0.67							0.84							#N/A							0.55				0.79

HV = Heavy Vehicle
PHF = Peak Hour Factor

2:45 PM - 3:45 PM PEAK HOUR: 2:45 PM TO 3:45 PM

REDUCED BY: CN

DATE OF REDUCTION: 6/3/2016

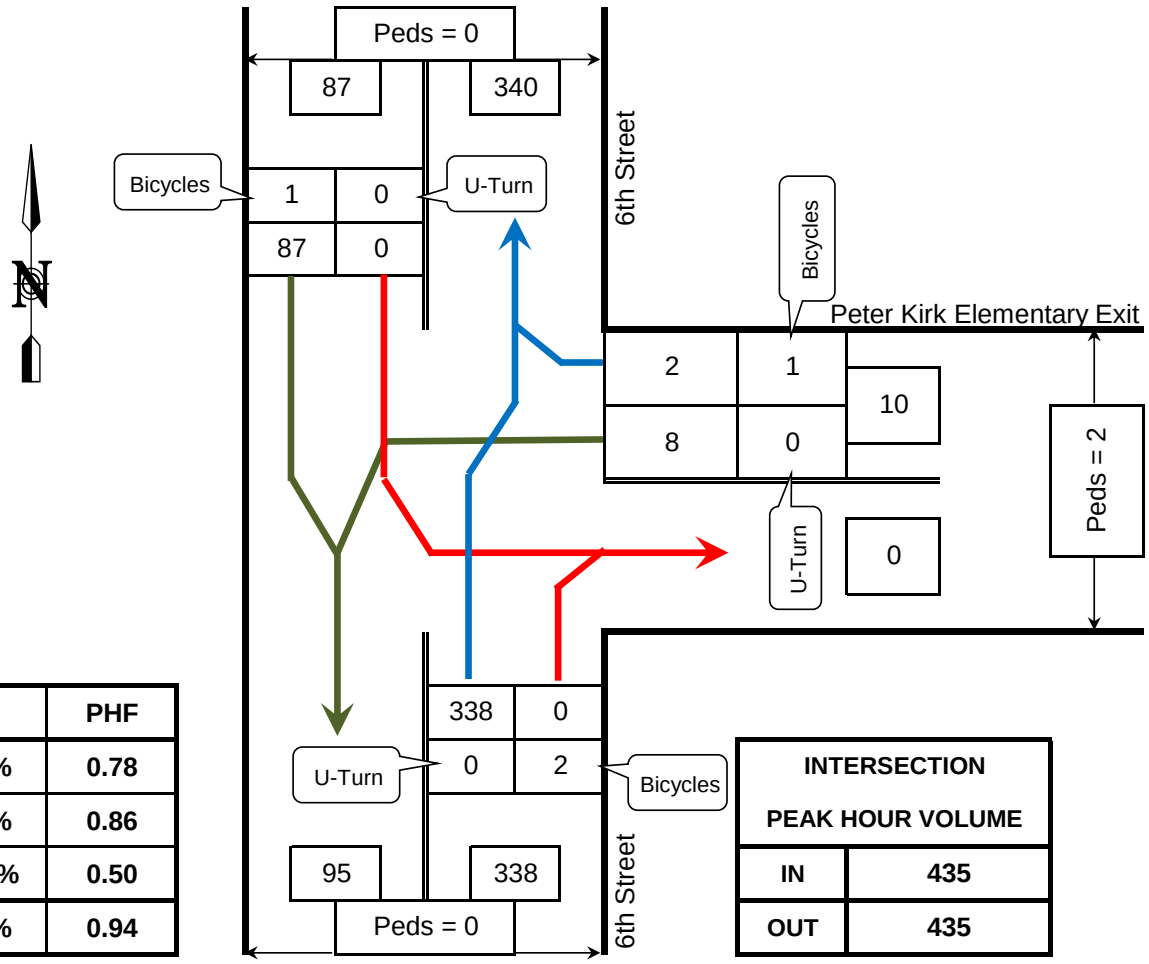
ROLLING HOUR COUNT

	FROM NORTH ON 6th Street							FROM SOUTH ON 6th Street							FROM EAST ON Peter Kirk Elementary Entrance							FROM WEST ON 3rd Avenue							INTERVAL TOTALS
TIME INTERVAL	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	
11:45 AM - 12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM - 1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM - 1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM - 1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM - 1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 PM - 2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:15 PM - 2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 PM - 2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 PM - 2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 PM - 3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM - 3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 PM - 3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM - 3:45 PM	0	0	11	0	23	184	11	235	2	13	0	26	203	43	22	0	0	0	0	0	0	9	0	1	0	2	9	22	523

TRAFFIC DATA GATHERING

TURNING MOVEMENTS DIAGRAM

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



	HV	PHF
SB	3.4%	0.78
NB	0.9%	0.86
WB	10.0%	0.50
INTRS.	1.6%	0.94

INTERSECTION PEAK HOUR VOLUME	
IN	435
OUT	435

HV = Heavy Vehicles
PHF = Peak Hour Factor

Peter Kirk Elementary School Exit @ 6th Street

Kirkland, WA

COUNTED BY: WW

DATE OF COUNT: Thu. 6/2/16

REDUCED BY: CN

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

REDUCTION DATE: Fri. 6/3/16

WEATHER: Sunny

TRAFFIC DATA GATHERING

INTERSECTION TURNING MOVEMENTS REDUCTION SHEET

LOCATION: Peter Kirk Elementary School Exit @ 6th Street
Kirkland, WA

DATE OF COUNT: Thu. 6/2/16
TIME OF COUNT: 4:00 PM - 6:00 PM

COUNTED BY: WW
WEATHER: Sunny

TIME INTERVAL ENDING AT	FROM NORTH ON 6th Street							FROM SOUTH ON 6th Street							FROM EAST ON Peter Kirk Elementary Exit							FROM WEST ON							INTERVAL TOTALS
	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	1	0	0	28	0	0	0	0	0	0	50	0	4	0	3	0	9	0	3	0	0	0	0	0	0	0	90
04:30 PM	0	0	2	0	0	23	0	0	0	1	0	0	77	0	2	0	0	0	10	0	8	0	0	0	0	0	0	0	118
04:45 PM	0	1	0	0	0	36	0	0	0	1	0	0	62	0	1	0	0	0	9	0	5	0	0	0	0	0	0	0	112
05:00 PM	0	0	2	0	0	36	0	0	0	2	0	0	65	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	105
05:15 PM	0	0	2	0	0	28	0	0	1	0	0	0	65	0	0	1	0	0	3	0	2	0	0	0	0	0	0	0	98
05:30 PM	0	1	0	0	0	14	0	0	1	1	0	0	98	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	113
05:45 PM	0	0	1	0	0	20	0	0	0	2	0	0	94	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	116
06:00 PM	0	0	0	0	0	25	0	0	0	0	0	0	81	0	2	0	1	0	2	0	0	0	0	0	0	0	0	0	108
PEAK HOUR TOTALS	0	1	3	0	0	87	0	0	2	3	0	0	338	0	2	1	1	0	8	0	2	0	0	0	0	0	0	0	INTERSECTION
ALL MOVEMENTS				87							338							10							0				435
% HV			3.4%							0.9%							10.0%							#N/A					1.6%
PEAK HOUR FACTOR				0.78							0.86							0.50							#N/A				0.94

HV = Heavy Vehicle
PHF = Peak Hour Factor

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

REDUCED BY: CN

DATE OF REDUCTION: 6/3/2016

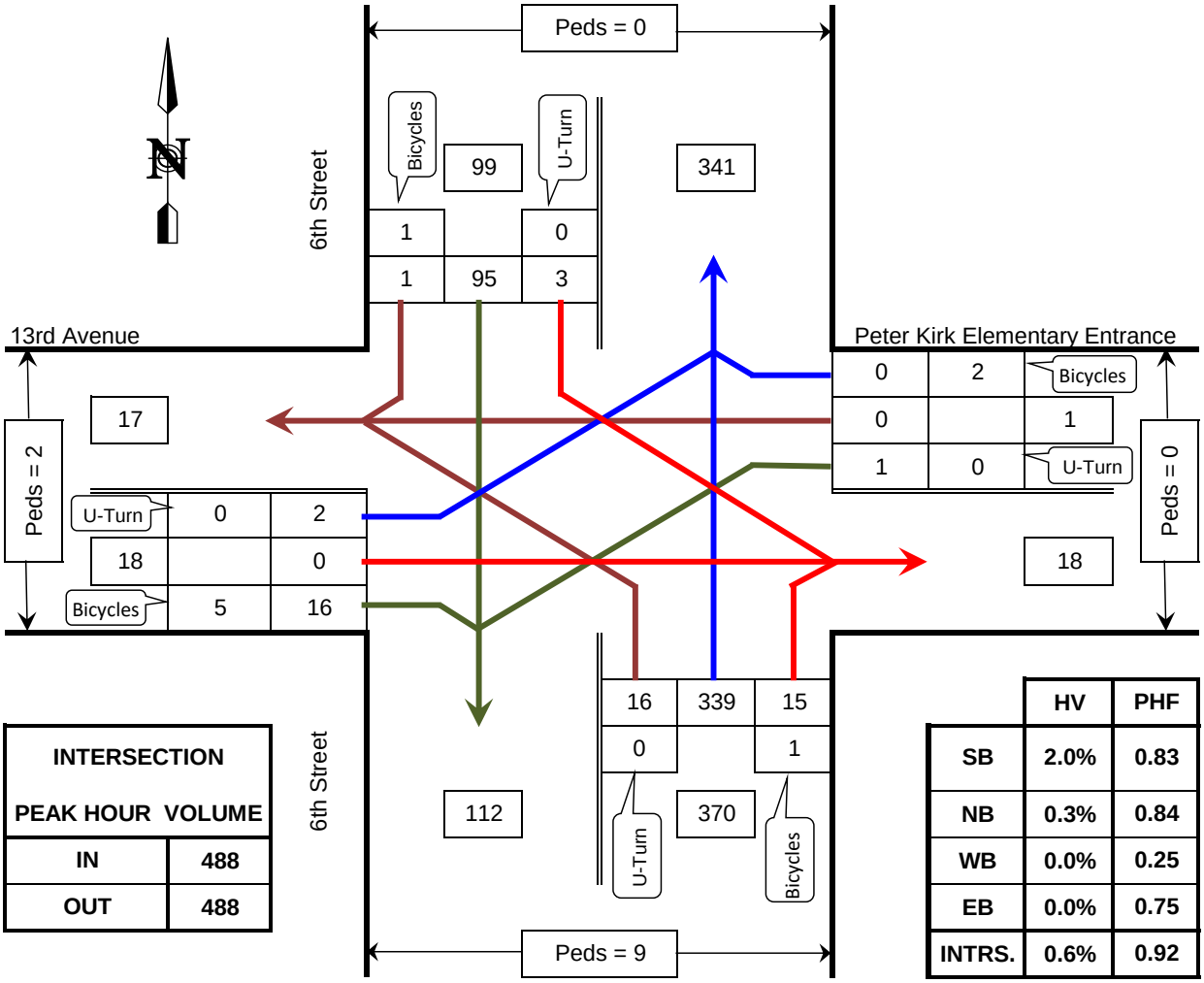
ROLLING HOUR COUNT

	FROM NORTH ON 6th Street							FROM SOUTH ON 6th Street							FROM EAST ON Peter Kirk Elementary Exit							FROM WEST ON							INTERVAL TOTALS
TIME INTERVAL	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	
2:00 PM - 3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM - 3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 PM - 3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM - 3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM - 4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM - 4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM - 4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM - 4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM - 5:00 PM	0	1	5	0	0	123	0	0	0	4	0	0	254	0	7	0	3	0	32	0	16	0	0	0	0	0	0	0	425
4:15 PM - 5:15 PM	0	1	6	0	0	123	0	0	1	4	0	0	269	0	3	1	0	0	26	0	15	0	0	0	0	0	0	0	433
4:30 PM - 5:30 PM	0	2	4	0	0	114	0	0	2	4	0	0	290	0	1	1	0	0	17	0	7	0	0	0	0	0	0	0	428
4:45 PM - 5:45 PM	0	1	5	0	0	98	0	0	2	5	0	0	322	0	0	1	0	0	10	0	2	0	0	0	0	0	0	0	432
5:00 PM - 6:00 PM	0	1	3	0	0	87	0	0	2	3	0	0	338	0	2	1	1	0	8	0	2	0	0	0	0	0	0	0	435

TRAFFIC DATA GATHERING

TURNING MOVEMENTS DIAGRAM

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



INTERSECTION PEAK HOUR VOLUME	
IN	488
OUT	488

	HV	PHF
SB	2.0%	0.83
NB	0.3%	0.84
WB	0.0%	0.25
EB	0.0%	0.75
INTRS.	0.6%	0.92

PHF = Peak Hour Factor
HV = Heavy Vehicle

Peter Kirk Elementary School Entrance/3rd Avenue @ 6th Street

Kirkland, WA

COUNTED BY: SW

DATE OF COUNT: Thu. 6/2/16

REDUCED BY: CN

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

REDUCTION DATE: Fri. 6/3/16

WEATHER: Sunny

TRAFFIC DATA GATHERING

INTERSECTION TURNING MOVEMENTS REDUCTION SHEET

LOCATION: Peter Kirk Elementary School Entrance/3rd Avenue @ 6th Street
Kirkland, WA

DATE OF COUNT: Thu. 6/2/16
TIME OF COUNT: 4:00 PM - 6:00 PM

COUNTED BY: SW
WEATHER: Sunny

TIME INTERVAL ENDING AT	FROM NORTH ON 6th Street							FROM SOUTH ON 6th Street							FROM EAST ON Peter Kirk Elementary Entrance							FROM WEST ON 3rd Avenue							INTERVAL TOTALS
	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	1	3	0	4	33	0	6	0	1	0	6	49	4	0	0	0	0	0	0	0	0	0	0	0	0	1	8	105
04:30 PM	0	0	0	0	0	28	3	12	0	1	0	3	76	8	0	0	0	0	0	0	0	0	0	0	0	0	2	1	121
04:45 PM	0	0	1	0	1	42	1	3	0	2	0	4	62	3	0	0	0	0	0	0	0	1	0	0	0	0	0	6	119
05:00 PM	0	0	2	0	1	41	1	4	1	2	0	1	66	2	0	0	0	0	0	0	0	1	0	0	0	0	0	4	116
05:15 PM	0	1	1	0	0	28	0	0	0	0	0	3	63	2	0	0	0	0	1	0	0	0	1	0	0	0	0	4	101
05:30 PM	0	0	1	0	0	18	0	0	1	1	0	7	99	4	0	2	0	0	0	0	0	1	4	0	0	0	0	4	132
05:45 PM	0	0	0	0	0	22	1	1	0	0	0	1	98	2	0	0	0	0	0	0	0	1	0	0	0	1	0	3	128
06:00 PM	0	0	0	0	3	27	0	8	0	0	0	5	79	7	0	0	0	0	0	0	0	0	0	0	0	1	0	5	127
PEAK HOUR TOTALS	0	1	2	0	3	95	1	9	1	1	0	16	339	15	0	2	0	0	1	0	0	2	5	0	0	2	0	16	INTERSECTION
ALL MOVEMENTS				99							370							1							18				488
% HV			2.0%							0.3%							0.0%							0.0%					0.6%
PEAK HOUR FACTOR				0.83							0.84							0.25							0.75				0.92

HV = Heavy Vehicle
PHF = Peak Hour Factor

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

REDUCED BY: CN

DATE OF REDUCTION: 6/3/2016

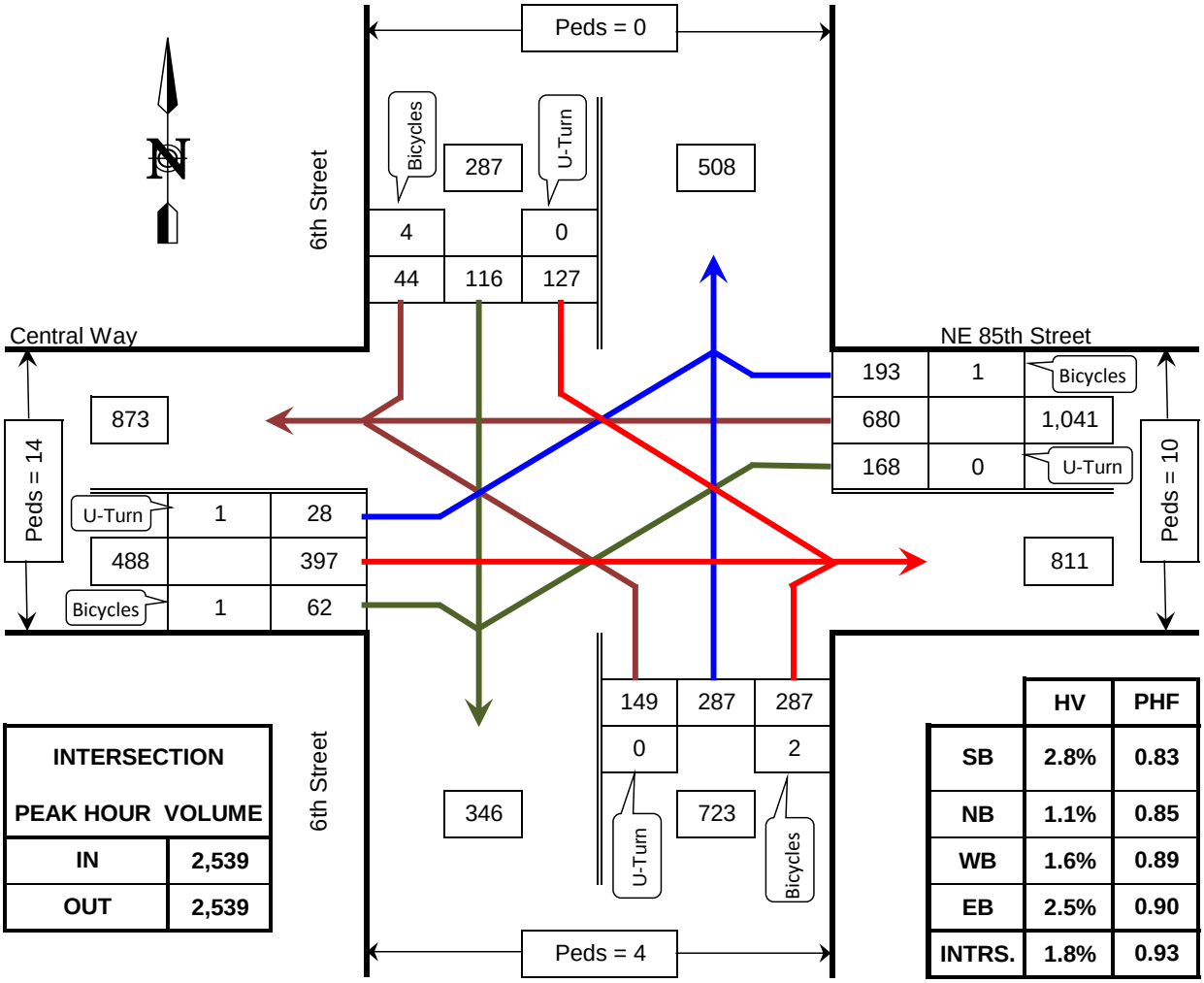
ROLLING HOUR COUNT

	FROM NORTH ON 6th Street							FROM SOUTH ON 6th Street							FROM EAST ON Peter Kirk Elementary Entrance							FROM WEST ON 3rd Avenue							INTERVAL TOTALS
TIME INTERVAL	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	
2:00 PM - 3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM - 3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 PM - 3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM - 3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM - 4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM - 4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM - 4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM - 4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM - 5:00 PM	0	1	6	0	6	144	5	25	1	6	0	14	253	17	0	0	0	0	0	0	0	2	0	0	0	0	3	19	461
4:15 PM - 5:15 PM	0	1	4	0	2	139	5	19	1	5	0	11	267	15	0	0	0	0	1	0	0	2	1	0	0	0	2	15	457
4:30 PM - 5:30 PM	0	1	5	0	2	129	2	7	2	5	0	15	290	11	0	2	0	0	1	0	0	3	5	0	0	0	0	18	468
4:45 PM - 5:45 PM	0	1	4	0	1	109	2	5	2	3	0	12	326	10	0	2	0	0	1	0	0	3	5	0	0	1	0	15	477
5:00 PM - 6:00 PM	0	1	2	0	3	95	1	9	1	1	0	16	339	15	0	2	0	0	1	0	0	2	5	0	0	2	0	16	488

TRAFFIC DATA GATHERING

TURNING MOVEMENTS DIAGRAM

3:00 PM - 6:00 PM PEAK HOUR: 4:30 PM TO 5:30 PM



INTERSECTION PEAK HOUR VOLUME	
IN	2,539
OUT	2,539

	HV	PHF
SB	2.8%	0.83
NB	1.1%	0.85
WB	1.6%	0.89
EB	2.5%	0.90
INTRS.	1.8%	0.93

PHF = Peak Hour Factor
HV = Heavy Vehicle

NE 85th Street/Central Way @ 6th Street

Kirkland, WA

COUNTED BY: CN

DATE OF COUNT: Thu. 6/2/16

REDUCED BY: CN

TIME OF COUNT: 3:00 PM - 6:00 PM

REDUCTION DATE: Fri. 6/3/16

WEATHER: Sunny

TRAFFIC DATA GATHERING

INTERSECTION TURNING MOVEMENTS REDUCTION SHEET

LOCATION: NE 85th Street/Central Way @ 6th Street
Kirkland, WA

DATE OF COUNT: Thu. 6/2/16
TIME OF COUNT: 3:00 PM - 6:00 PM

COUNTED BY: CN
WEATHER: Sunny

TIME INTERVAL ENDING AT	FROM NORTH ON 6th Street							FROM SOUTH ON 6th Street							FROM EAST ON NE 85th Street							FROM WEST ON Central Way							INTERVAL TOTALS
	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
03:15 PM	4	0	3	0	42	21	8	1	0	3	0	24	39	58	0	0	14	0	32	132	47	2	0	6	1	9	105	11	**529**
03:30 PM	2	0	3	0	35	30	8	0	1	5	0	36	46	45	1	0	6	0	32	98	31	1	2	9	0	3	103	14	**481**
03:45 PM	0	0	3	0	38	32	6	3	0	2	0	38	63	44	0	0	4	0	45	105	32	1	0	4	0	6	83	21	**513**
04:00 PM	0	0	1	0	27	20	14	0	0	5	0	33	55	31	1	0	10	0	41	119	48	3	0	4	0	8	75	7	**478**
04:15 PM	2	0	4	0	48	26	9	0	0	1	0	28	50	63	1	0	6	0	46	120	29	2	0	3	0	4	107	17	**547**
04:30 PM	0	0	0	0	31	21	13	2	0	6	0	28	68	63	1	0	3	0	38	129	46	0	0	6	0	5	92	12	**546**
04:45 PM	0	0	2	0	41	35	10	1	1	5	0	44	58	75	3	0	8	0	48	186	59	1	0	3	1	6	102	15	**680**
05:00 PM	0	1	2	0	39	16	12	0	0	2	0	34	75	56	3	0	1	0	51	155	45	4	0	4	0	8	104	24	**619**
05:15 PM	0	1	1	0	27	27	13	3	0	0	0	39	74	99	3	0	4	0	33	173	46	1	1	2	0	5	99	11	**646**
05:30 PM	0	2	3	0	20	38	9	0	1	1	0	32	80	57	1	1	4	0	36	166	43	8	0	3	0	9	92	12	**594**
05:45 PM	0	0	3	0	24	27	6	2	2	1	0	18	76	61	5	1	3	0	38	161	60	3	0	1	0	5	79	19	**574**
06:00 PM	6	0	1	0	24	24	14	0	0	1	0	36	64	60	0	0	1	0	19	191	60	10	0	2	0	10	90	15	**607**
PEAK HOUR TOTALS	**0**	**4**	**8**	**0**	**127**	**116**	**44**	**4**	**2**	**8**	**0**	**149**	**287**	**287**	**10**	**1**	**17**	**0**	**168**	**680**	**193**	**14**	**1**	**12**	**1**	**28**	**397**	**62**	**INTERSECTION**
ALL MOVEMENTS				**287**							**723**							**1041**							**488**				**2539**
% HV			**2.8%**							**1.1%**							**1.6%**							**2.5%**				**1.8%**
PEAK HOUR FACTOR				**0.83**							**0.85**							**0.89**							**0.90**				**0.93**

HV = Heavy Vehicle
PHF = Peak Hour Factor

3:00 PM - 6:00 PM PEAK HOUR: **4:30 PM TO 5:30 PM**

REDUCED BY: CN

DATE OF REDUCTION: 6/3/2016

ROLLING HOUR COUNT

	FROM NORTH ON 6th Street							FROM SOUTH ON 6th Street							FROM EAST ON NE 85th Street							FROM WEST ON Central Way							INTERVAL TOTALS
TIME INTERVAL	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	
2:00 PM - 3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM - 3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 PM - 3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM - 3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM - 4:00 PM	6	0	10	0	142	103	36	4	1	15	0	131	203	178	2	0	34	0	150	454	158	7	2	23	1	26	366	53	2001
3:15 PM - 4:15 PM	4	0	11	0	148	108	37	3	1	13	0	135	214	183	3	0	26	0	164	442	140	7	2	20	0	21	368	59	2019
3:30 PM - 4:30 PM	2	0	8	0	144	99	42	5	0	14	0	127	236	201	3	0	23	0	170	473	155	6	0	17	0	23	357	57	2084
3:45 PM - 4:45 PM	2	0	7	0	147	102	46	3	1	17	0	133	231	232	6	0	27	0	173	554	182	6	0	16	1	23	376	51	2251
4:00 PM - 5:00 PM	2	1	8	0	159	98	44	3	1	14	0	134	251	257	8	0	18	0	183	590	179	7	0	16	1	23	405	68	2392
4:15 PM - 5:15 PM	0	2	5	0	138	99	48	6	1	13	0	145	275	293	10	0	16	0	170	643	196	6	1	15	1	24	397	62	2491
4:30 PM - 5:30 PM	0	4	8	0	127	116	44	4	2	8	0	149	287	287	10	1	17	0	168	680	193	14	1	12	1	28	397	62	2539
4:45 PM - 5:45 PM	0	4	9	0	110	108	40	5	3	4	0	123	305	273	12	2	12	0	158	655	194	16	1	10	0	27	374	66	2433
5:00 PM - 6:00 PM	6	3	8	0	95	116	42	5	3	3	0	125	294	277	9	2	12	0	126	691	209	22	1	8	0	29	360	57	2421

AM Turning Movement Calculations

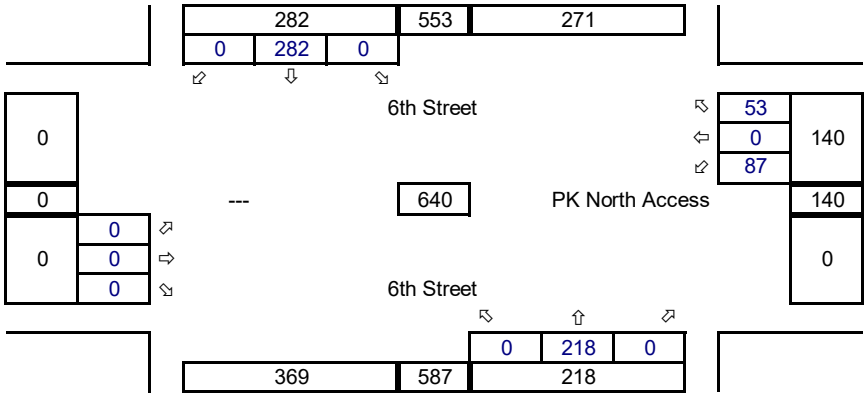
1 6th Street @ PK North Access

Synchro ID: 1

Existing
Average Weekday
AM Peak Hour

Year: **6/2/16**

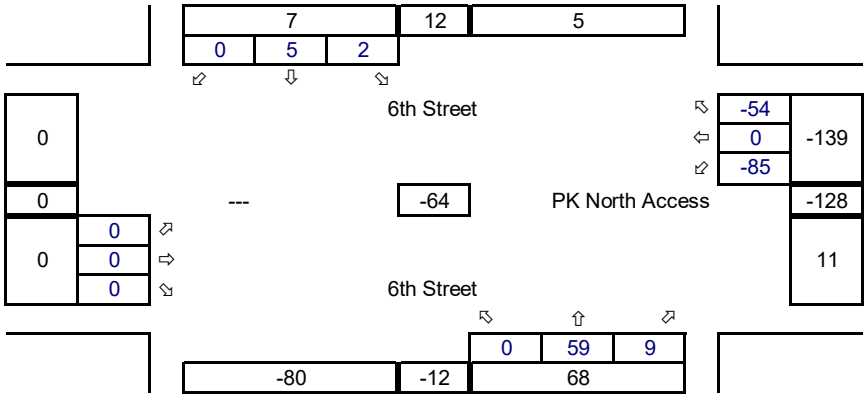
Data Source: TDG



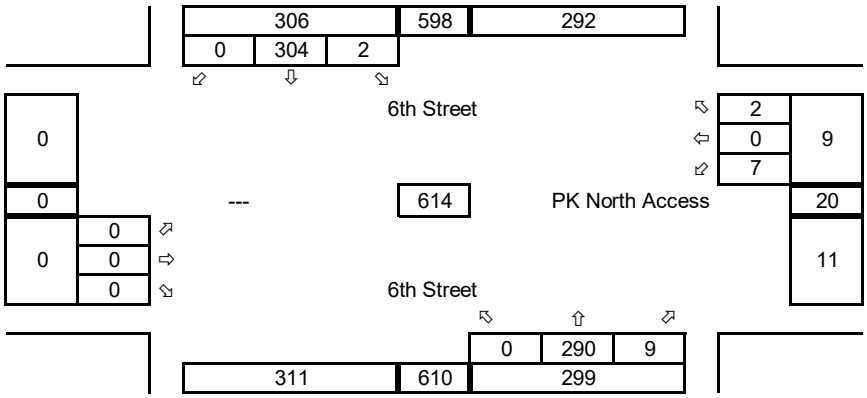
Future without Project
Average Weekday
AM Peak Hour

Year: 2019
Growth Rate = 2.0%
Years of Growth = 3
Total Growth = 1.0612

Total Project Trips
Average Weekday
AM Peak Hour



Future with Project
Average Weekday
AM Peak Hour



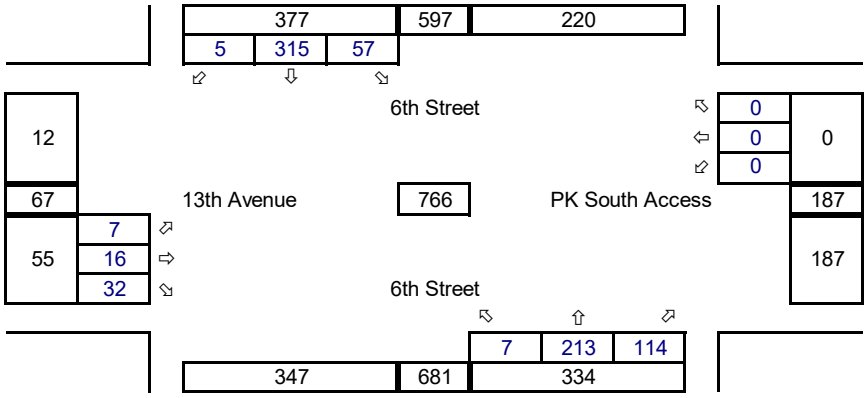
2 6th Street @ PK South Access

Synchro ID: 2

Existing
Average Weekday
AM Peak Hour

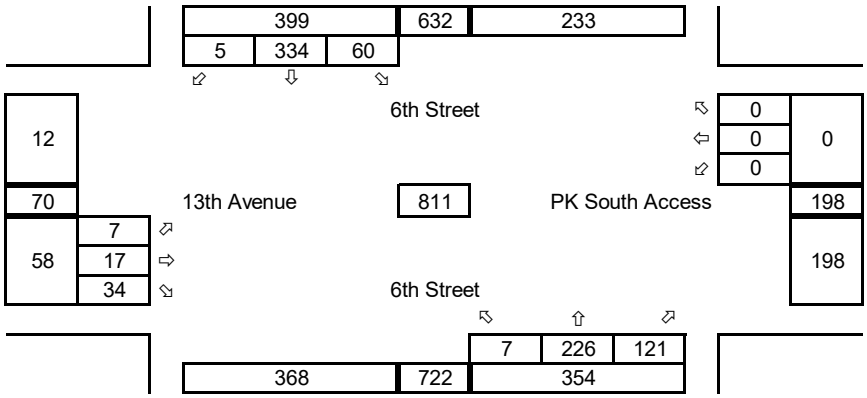
Year: **6/2/16**

Data Source: TDG

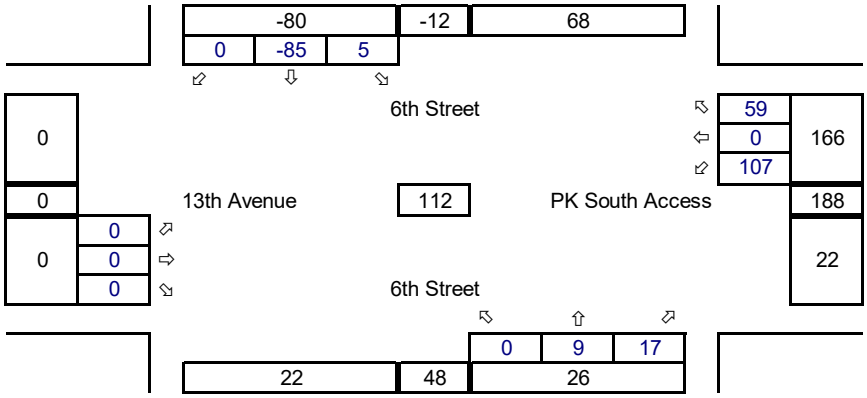


Future without Project
Average Weekday
AM Peak Hour

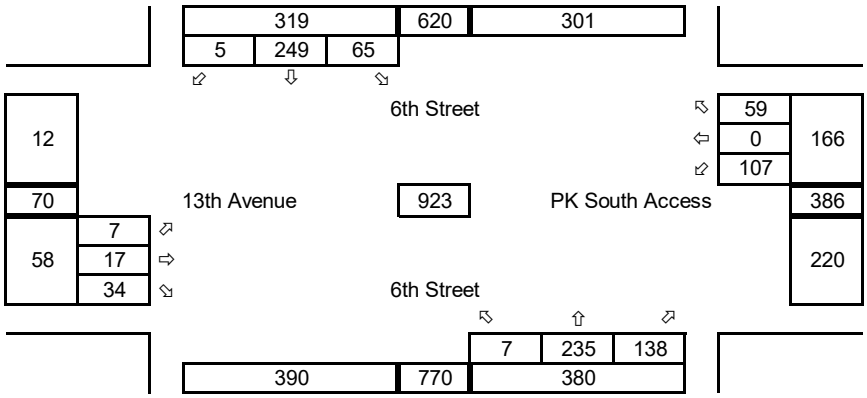
Year: 2019
Growth Rate = 2.0%
Years of Growth = 3
Total Growth = 1.0612



Total Project Trips
Average Weekday
AM Peak Hour



Future with Project
Average Weekday
AM Peak Hour



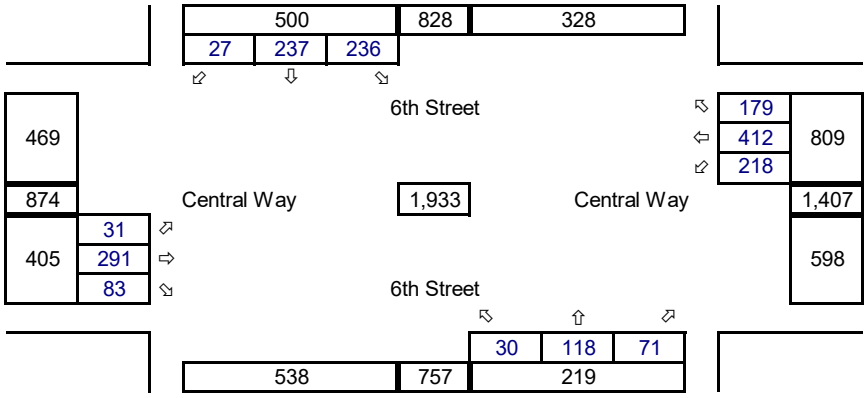
3 6th Street @ Central Way

Synchro ID: 3

Existing
Average Weekday
AM Peak Hour

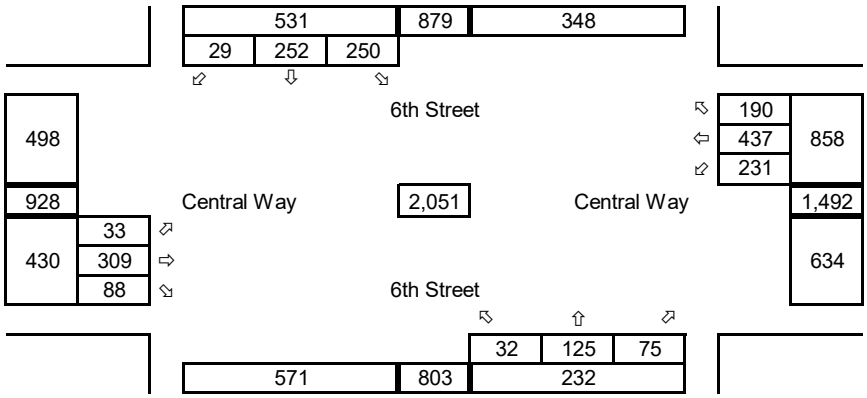
Year: **6/2/16**

Data Source: TDG

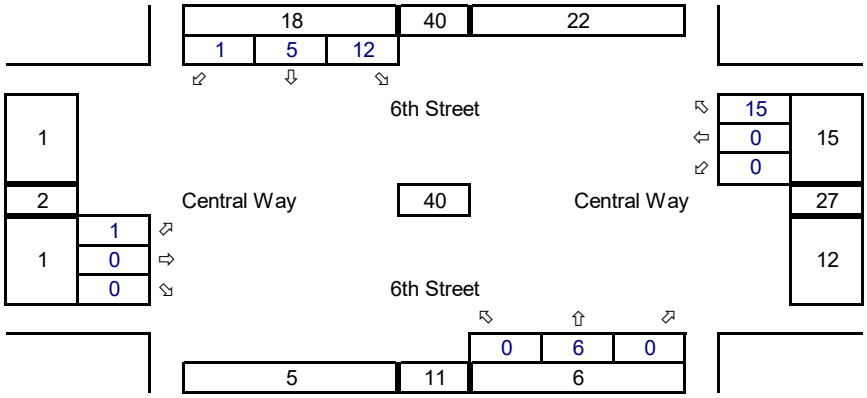


Future without Project
Average Weekday
AM Peak Hour

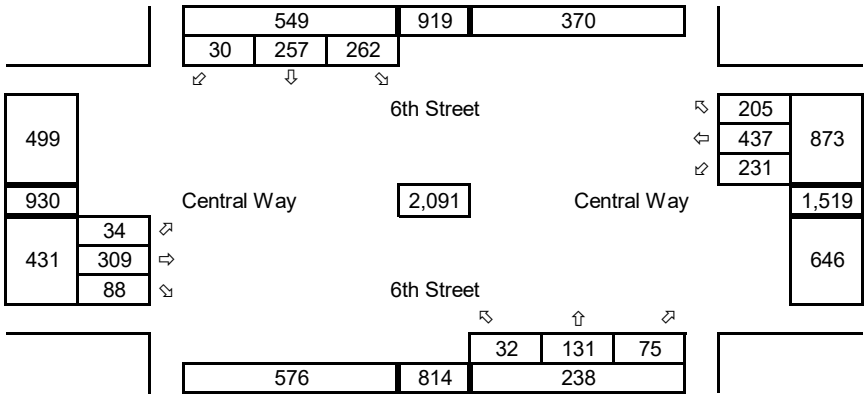
Year: 2019
Growth Rate = 2.0%
Years of Growth = 3
Total Growth = 1.0612



Total Project Trips
Average Weekday
AM Peak Hour



Future with Project
Average Weekday
AM Peak Hour



School PM Turning Movement Calculations

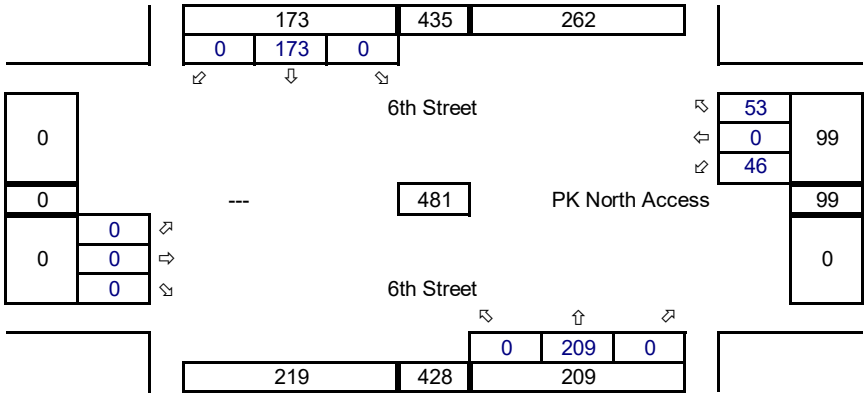
1 6th Street @ PK North Access

Synchro ID: 1

Existing
Average Weekday
School/PM Peak Hour

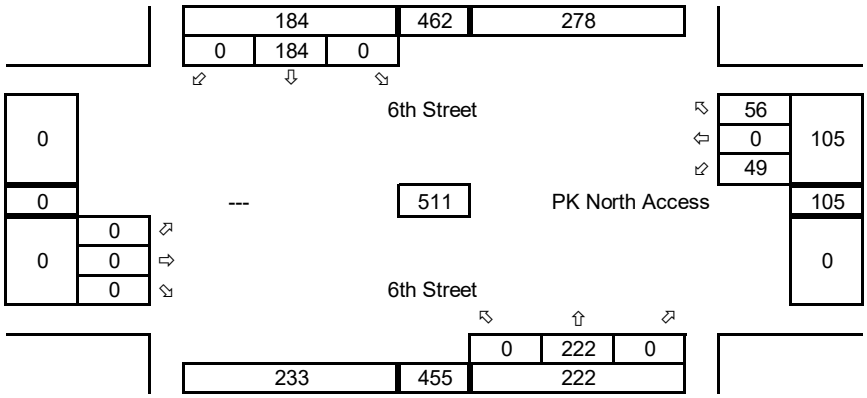
Year: **6/2/16**

Data Source: TDG

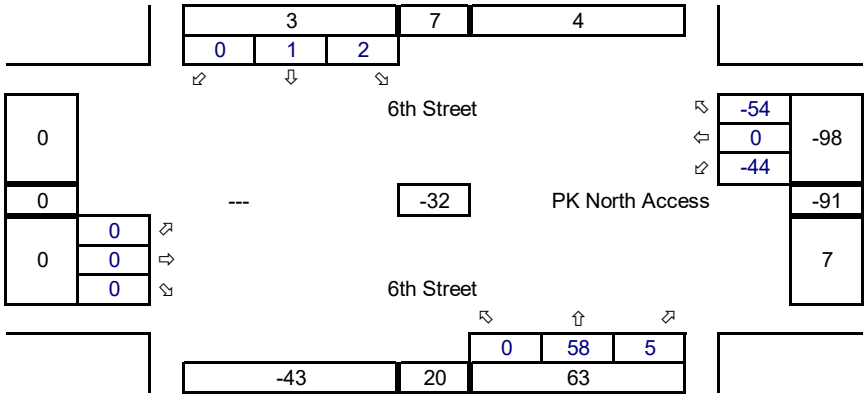


Future without Project
Average Weekday
School/PM Peak Hour

Year: 2019
Growth Rate = 2.0%
Years of Growth = 3
Total Growth = 1.0612



Total Project Trips
Average Weekday
School/PM Peak Hour



Future with Project
Average Weekday
School/PM Peak Hour

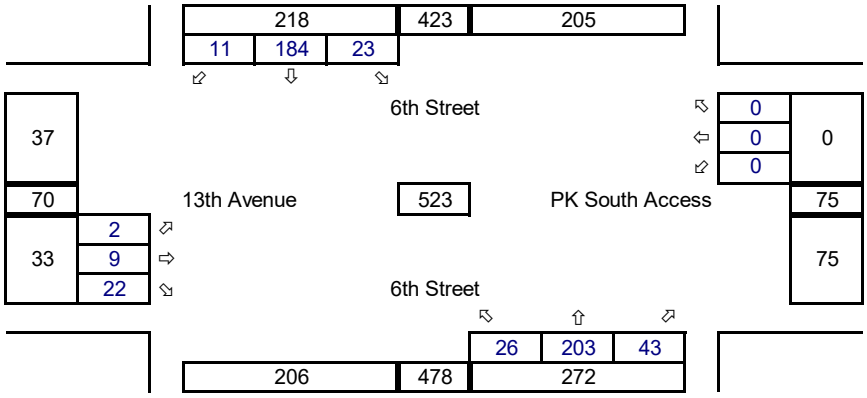
2 6th Street @ PK South Access

Synchro ID: 2

Existing
Average Weekday
School/PM Peak Hour

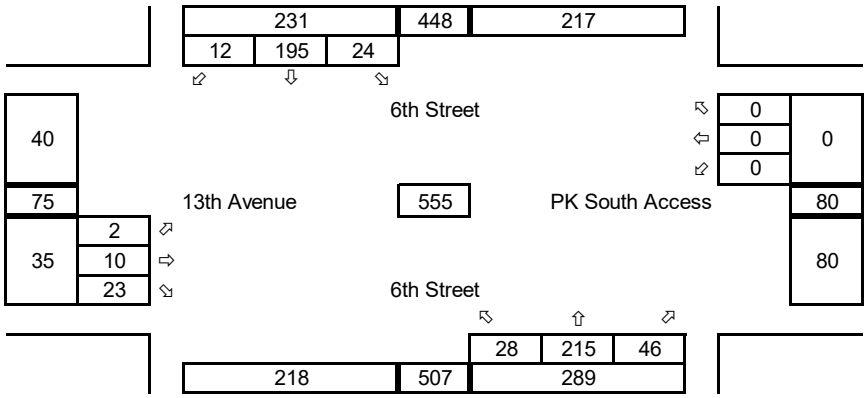
Year: **6/2/16**

Data Source: TDG

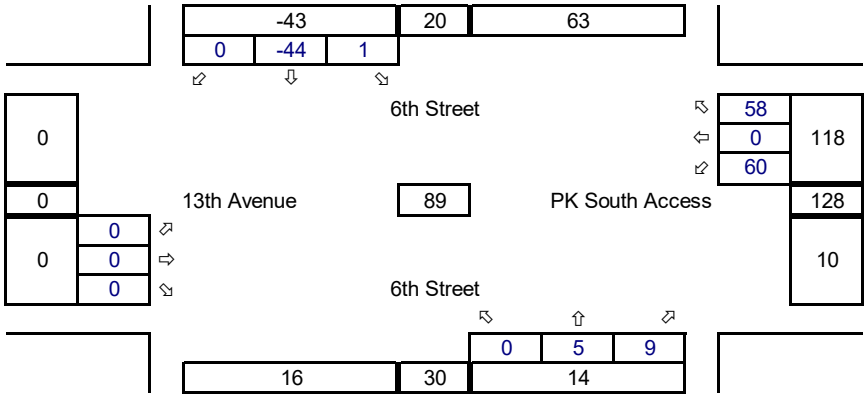


Future without Project
Average Weekday
School/PM Peak Hour

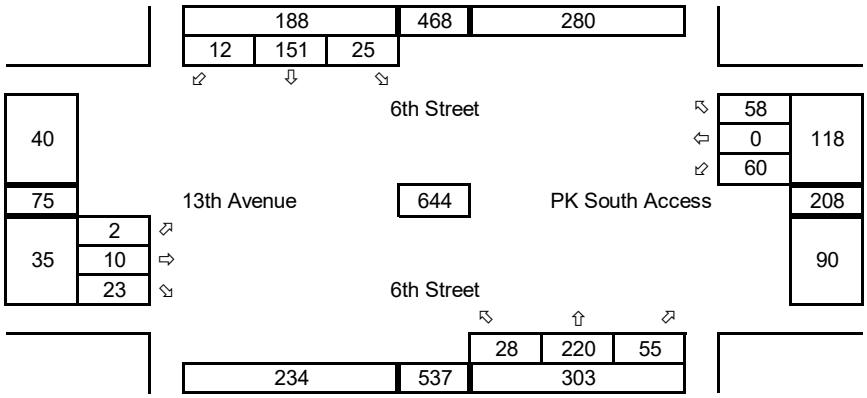
Year: 2019
Growth Rate = 2.0%
Years of Growth = 3
Total Growth = 1.0612



Total Project Trips
Average Weekday
School/PM Peak Hour



Future with Project
Average Weekday
School/PM Peak Hour



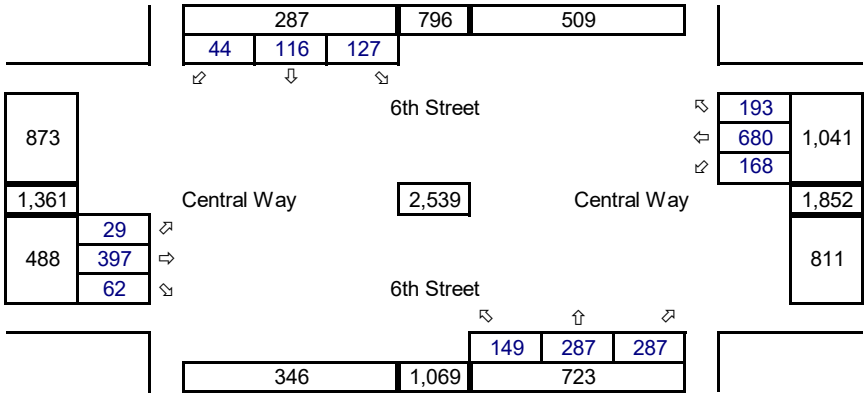
3 6th Street @ Central Way

Synchro ID: 3

Existing
Average Weekday
School/PM Peak Hour

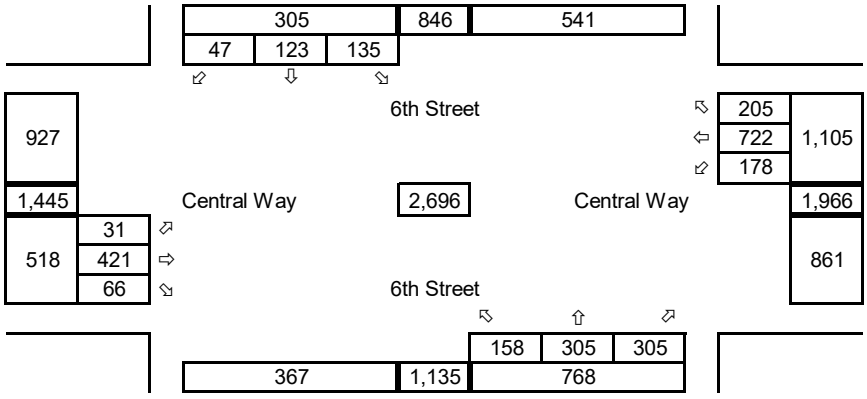
Year: **6/2/16**

Data Source: TDG

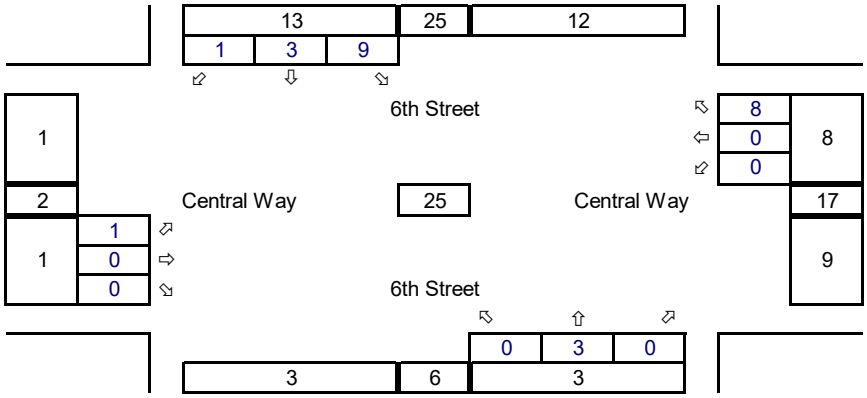


Future without Project
Average Weekday
School/PM Peak Hour

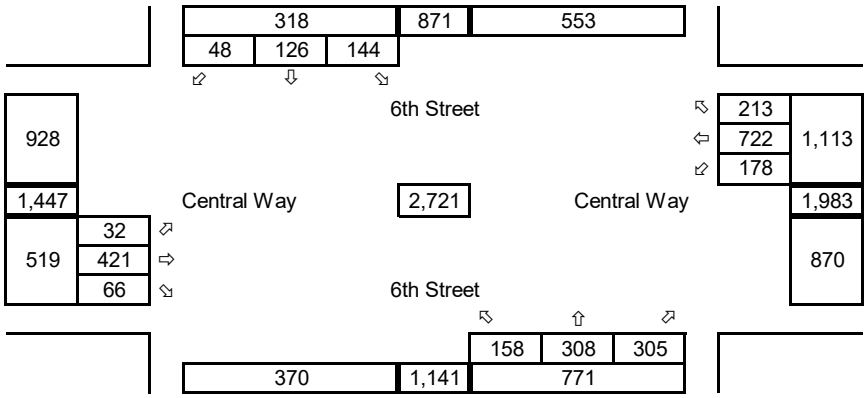
Year: 2019
Growth Rate = 2.0%
Years of Growth = 3
Total Growth = 1.0612



Total Project Trips
Average Weekday
School/PM Peak Hour



Future with Project
Average Weekday
School/PM Peak Hour



Existing AM Peak-Hour Level of Service Analysis

H:\2016\16-096\Synchro\Existing AM.syn
1: 6th Street & School Exit

Peter Kirk Elementary School (16-096)

Intersection	
Int Delay, s/veh	10

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	87	53	218	0	0	282
Future Vol, veh/h	87	53	218	0	0	282
Conflicting Peds, #/hr	3	0	0	5	5	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	37	37	52	52	59	59
Heavy Vehicles, %	3	3	6	6	1	1
Mvmt Flow	235	143	419	0	0	478

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	900	419	0	-	-	-
Stage 1	419	-	-	-	-	-
Stage 2	481	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	-	-
Pot Cap-1 Maneuver	308	632	-	0	0	-
Stage 1	661	-	-	0	0	-
Stage 2	620	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	307	632	-	-	-	-
Mov Cap-2 Maneuver	307	-	-	-	-	-
Stage 1	661	-	-	-	-	-
Stage 2	618	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	33.7	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBT
Capacity (veh/h)	-	307	632	-
HCM Lane V/C Ratio	-	0.766	0.227	-
HCM Control Delay (s)	-	46.6	12.4	-
HCM Lane LOS	-	E	B	-
HCM 95th %tile Q(veh)	-	5.9	0.9	-

H:\2016\16-096\Synchro\Existing AM.syn
2: 6th Street & 13th Ave/School Entrance

Peter Kirk Elementary School (16-096)

Intersection												
Int Delay, s/veh	2.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	16	32	0	0	0	7	213	114	57	315	5
Future Vol, veh/h	7	16	32	0	0	0	7	213	114	57	315	5
Conflicting Peds, #/hr	0	0	204	204	0	0	2	0	15	15	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	65	65	65	65	65	65	76	76	76	79	79	79
Heavy Vehicles, %	4	4	4	2	2	2	5	5	5	1	1	1
Mvmt Flow	11	25	49	0	0	0	9	280	150	72	399	6

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	922	1012	608	407	0	0	445	0	0
Stage 1	548	548	-	-	-	-	-	-	-
Stage 2	374	464	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	6.24	4.15	-	-	4.11	-	-
Critical Hdwy Stg 1	5.44	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.44	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	2.245	-	-	2.209	-	-
Pot Cap-1 Maneuver	297	237	492	1136	-	-	1121	-	-
Stage 1	575	514	-	-	-	-	-	-	-
Stage 2	691	560	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	268	0	396	915	-	-	1121	-	-
Mov Cap-2 Maneuver	268	0	-	-	-	-	-	-	-
Stage 1	526	0	-	-	-	-	-	-	-
Stage 2	681	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17.8	0.2	1.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	915	-	-	365	1121	-	-
HCM Lane V/C Ratio	0.01	-	-	0.232	0.064	-	-
HCM Control Delay (s)	9	0	-	17.8	8.4	0	-
HCM Lane LOS	A	A	-	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.9	0.2	-	-

H:\2016\16-096\Synchro\Existing AM.syn

3: 6th Street & Central Way/NE 85th Street

Peter Kirk Elementary School (16-096)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	291	83	218	412	179	30	118	71	236	237	27
Future Volume (vph)	31	291	83	218	412	179	30	118	71	236	237	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	350		0	50		130	70		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		1.00	0.99		0.99		0.99	1.00	1.00	
Frt		0.967			0.955				0.850		0.985	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1719	3306	0	1719	3251	0	1719	1810	1538	1719	1779	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1710	3306	0	1714	3251	0	1709	1810	1517	1717	1779	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		36			79				127		7	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		612			757			280			2349	
Travel Time (s)		13.9			17.2			6.4			53.4	
Confl. Peds. (#/hr)	5		2	2		5	6		1	1		6
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Adj. Flow (vph)	33	313	89	234	443	192	32	127	76	254	255	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	33	402	0	234	635	0	32	127	76	254	284	0
Turn Type	Prot	NA		Prot	NA		Prot	NA	pm+ov	Prot	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases									2			
Detector Phase	7	4		3	8		5	2	3	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5	9.5	9.5	22.5	
Total Split (s)	10.6	22.5		21.0	32.9		10.5	23.5	21.0	23.0	36.0	
Total Split (%)	11.8%	25.0%		23.3%	36.6%		11.7%	26.1%	23.3%	25.6%	40.0%	
Maximum Green (s)	6.1	18.0		16.5	28.4		6.0	19.0	16.5	18.5	31.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	None	None	Max	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	6.0	14.4		14.7	27.7		5.9	19.3	34.0	16.0	33.9	
Actuated g/C Ratio	0.07	0.17		0.18	0.34		0.07	0.23	0.41	0.19	0.41	
v/c Ratio	0.26	0.66		0.77	0.56		0.26	0.30	0.11	0.76	0.39	

H:\2016\16-096\Synchro\Existing AM.syn
3: 6th Street & Central Way/NE 85th Street

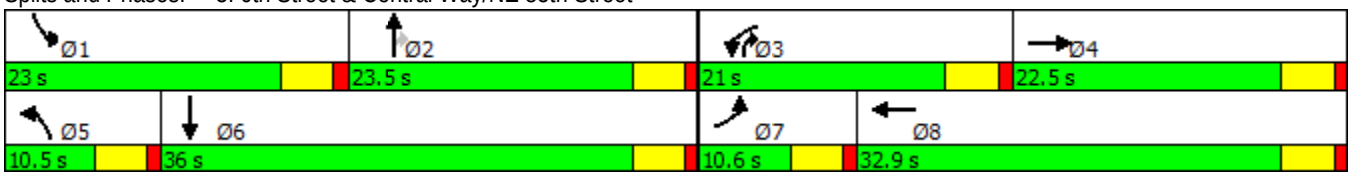
Peter Kirk Elementary School (16-096)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	44.8	35.2		51.2	22.8		44.8	30.9	1.1	48.6	21.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	44.8	35.2		51.2	22.8		44.8	30.9	1.1	48.6	21.2	
LOS	D	D		D	C		D	C	A	D	C	
Approach Delay		36.0			30.5			23.2			34.1	
Approach LOS		D			C			C			C	
Queue Length 50th (ft)	18	99		121	138		17	58	0	130	113	
Queue Length 95th (ft)	48	147		#235	194		47	113	7	#241	192	
Internal Link Dist (ft)		532			677			200			2269	
Turn Bay Length (ft)	100			350			50		130	70		
Base Capacity (vph)	128	757		347	1205		126	422	737	390	736	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.26	0.53		0.67	0.53		0.25	0.30	0.10	0.65	0.39	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 82.5
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 31.7 Intersection LOS: C
Intersection Capacity Utilization 59.3% ICU Level of Service B
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: 6th Street & Central Way/NE 85th Street



Existing School/PM Peak-Hour Level of Service Analysis

H:\2016\16-096\Synchro\Existing School PM.syn
1: 6th Street & School Exit

Intersection						
Int Delay, s/veh	2.6					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	46	53	209	0	0	173
Future Vol, veh/h	46	53	209	0	0	173
Conflicting Peds, #/hr	0	16	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	63	63	83	83	59	59
Heavy Vehicles, %	4	4	2	2	4	4
Mvmt Flow	73	84	252	0	0	293

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	545	268	0	-	-	-
Stage 1	252	-	-	-	-	-
Stage 2	293	-	-	-	-	-
Critical Hdwy	6.44	6.24	-	-	-	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.336	-	-	-	-
Pot Cap-1 Maneuver	496	766	-	0	0	-
Stage 1	785	-	-	0	0	-
Stage 2	752	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	496	754	-	-	-	-
Mov Cap-2 Maneuver	496	-	-	-	-	-
Stage 1	785	-	-	-	-	-
Stage 2	752	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBT
Capacity (veh/h)	-	496	754	-
HCM Lane V/C Ratio	-	0.147	0.112	-
HCM Control Delay (s)	-	13.5	10.4	-
HCM Lane LOS	-	B	B	-
HCM 95th %tile Q(veh)	-	0.5	0.4	-

H:\2016\16-096\Synchro\Existing School PM.syn
2: 6th Street & 13th Ave/School Entrance

Peter Kirk Elementary School (16-096)

Intersection												
Int Delay, s/veh	2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	9	22	0	0	0	26	203	43	23	184	11
Future Vol, veh/h	2	9	22	0	0	0	26	203	43	23	184	11
Conflicting Peds, #/hr	0	0	235	235	0	0	9	0	22	22	0	9
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	55	55	55	65	65	65	84	84	84	67	67	67
Heavy Vehicles, %	3	3	3	2	2	2	5	5	5	5	5	5
Mvmt Flow	4	16	40	0	0	0	31	242	51	34	275	16

Major/Minor	Minor2						Major1			Major2		
Conflicting Flow All	689	737	527				300	0	0	315	0	0
Stage 1	360	360	-				-	-	-	-	-	-
Stage 2	329	377	-				-	-	-	-	-	-
Critical Hdwy	6.43	6.53	6.23				4.15	-	-	4.15	-	-
Critical Hdwy Stg 1	5.43	5.53	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.43	5.53	-				-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327				2.245	-	-	2.245	-	-
Pot Cap-1 Maneuver	410	345	549				1244	-	-	1228	-	-
Stage 1	704	625	-				-	-	-	-	-	-
Stage 2	727	614	-				-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	375	0	422				966	-	-	1228	-	-
Mov Cap-2 Maneuver	375	0	-				-	-	-	-	-	-
Stage 1	675	0	-				-	-	-	-	-	-
Stage 2	693	0	-				-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.1	0.8	0.8
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	966	-	-	418	1228	-	-
HCM Lane V/C Ratio	0.032	-	-	0.144	0.028	-	-
HCM Control Delay (s)	8.8	0	-	15.1	8	0	-
HCM Lane LOS	A	A	-	C	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.5	0.1	-	-

H:\2016\16-096\Synchro\Existing School PM.syn

3: 6th Street & Central Way/NE 85th Street

Peter Kirk Elementary School (16-096)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	397	62	168	680	193	149	287	287	127	116	44
Future Volume (vph)	29	397	62	168	680	193	149	287	287	127	116	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	350		0	50		130	70		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00		0.99	1.00		0.98		0.97	0.99	0.99	
Frt		0.980			0.967				0.850		0.959	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3454	0	1770	3406	0	1770	1863	1583	1770	1769	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3454	0	1761	3406	0	1740	1863	1540	1752	1769	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			43				147		20	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		612			757			280			2349	
Travel Time (s)		13.9			17.2			6.4			53.4	
Confl. Peds. (#/hr)			4	4			14		10	10		14
Confl. Bikes (#/hr)			1			1			2			4
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	31	427	67	181	731	208	160	309	309	137	125	47
Shared Lane Traffic (%)												
Lane Group Flow (vph)	31	494	0	181	939	0	160	309	309	137	172	0
Turn Type	Prot	NA		Prot	NA		Prot	NA	pm+ov	Prot	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases									2			
Detector Phase	7	4		3	8		5	2	3	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5	9.5	9.5	22.5	
Total Split (s)	10.0	24.0		20.0	34.0		18.0	30.0	20.0	16.0	28.0	
Total Split (%)	11.1%	26.7%		22.2%	37.8%		20.0%	33.3%	22.2%	17.8%	31.1%	
Maximum Green (s)	5.5	19.5		15.5	29.5		13.5	25.5	15.5	11.5	23.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	None	None	Max	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	5.6	16.9		12.8	28.7		11.6	25.8	38.6	10.2	24.4	
Actuated g/C Ratio	0.07	0.20		0.15	0.34		0.14	0.31	0.46	0.12	0.29	
v/c Ratio	0.26	0.70		0.67	0.79		0.66	0.54	0.39	0.63	0.33	

H:\2016\16-096\Synchro\Existing School PM.syn

3: 6th Street & Central Way/NE 85th Street

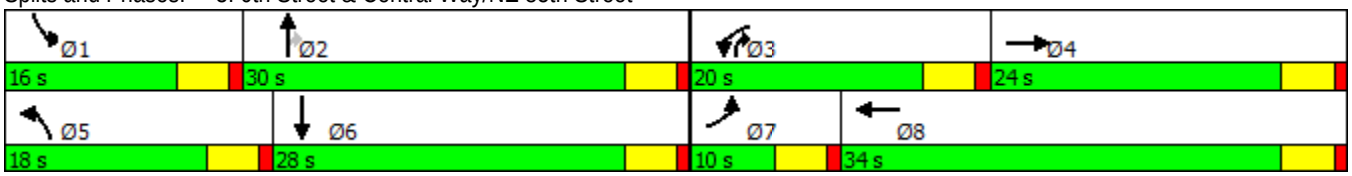
Peter Kirk Elementary School (16-096)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	46.1	36.1		47.3	30.3		48.8	30.2	8.2	50.6	24.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	46.1	36.1		47.3	30.3		48.8	30.2	8.2	50.6	24.8	
LOS	D	D		D	C		D	C	A	D	C	
Approach Delay		36.7			33.0			25.3			36.2	
Approach LOS		D			C			C			D	
Queue Length 50th (ft)	17	128		97	245		86	151	50	75	70	
Queue Length 95th (ft)	46	184		164	323		151	236	102	#143	127	
Internal Link Dist (ft)		532			677			200			2269	
Turn Bay Length (ft)	100			350			50		130	70		
Base Capacity (vph)	117	833		330	1245		287	571	842	245	528	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.26	0.59		0.55	0.75		0.56	0.54	0.37	0.56	0.33	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 83.9
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.79
Intersection Signal Delay: 31.9 — Intersection LOS: C
Intersection Capacity Utilization 67.4% — ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: 6th Street & Central Way/NE 85th Street



2019 Baseline AM Peak-Hour Level of Service Analysis

H:\2016\16-096\Synchro\Baseline AM.syn
1: 6th Street & School Exit

Peter Kirk Elementary School (16-096)

Intersection	
Int Delay, s/veh	13.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑			↑
Traffic Vol, veh/h	92	56	231	0	0	299
Future Vol, veh/h	92	56	231	0	0	299
Conflicting Peds, #/hr	3	0	0	5	5	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	37	37	52	52	59	59
Heavy Vehicles, %	3	3	6	6	1	1
Mvmt Flow	249	151	444	0	0	507

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	954	444	0	-	-	-
Stage 1	444	-	-	-	-	-
Stage 2	510	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	-	-
Pot Cap-1 Maneuver	286	612	-	0	0	-
Stage 1	644	-	-	0	0	-
Stage 2	601	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	285	612	-	-	-	-
Mov Cap-2 Maneuver	285	-	-	-	-	-
Stage 1	644	-	-	-	-	-
Stage 2	599	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	45.2	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBT
Capacity (veh/h)	-	285	612	-
HCM Lane V/C Ratio	-	0.872	0.247	-
HCM Control Delay (s)	-	65	12.8	-
HCM Lane LOS	-	F	B	-
HCM 95th %tile Q(veh)	-	7.6	1	-

H:\2016\16-096\Synchro\Baseline AM.syn
2: 6th Street & 13th Ave/School Entrance

Peter Kirk Elementary School (16-096)

Intersection												
Int Delay, s/veh	2.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	17	34	0	0	0	7	226	121	60	334	5
Future Vol, veh/h	7	17	34	0	0	0	7	226	121	60	334	5
Conflicting Peds, #/hr	0	0	204	204	0	0	2	0	15	15	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	65	65	65	65	65	65	76	76	76	79	79	79
Heavy Vehicles, %	4	4	4	2	2	2	5	5	5	1	1	1
Mvmt Flow	11	26	52	0	0	0	9	297	159	76	423	6

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	975	1070	632	431	0	0	472	0	0
Stage 1	580	580	-	-	-	-	-	-	-
Stage 2	395	490	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	6.24	4.15	-	-	4.11	-	-
Critical Hdwy Stg 1	5.44	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.44	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	2.245	-	-	2.209	-	-
Pot Cap-1 Maneuver	277	219	477	1113	-	-	1095	-	-
Stage 1	556	497	-	-	-	-	-	-	-
Stage 2	676	545	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	247	0	384	897	-	-	1095	-	-
Mov Cap-2 Maneuver	247	0	-	-	-	-	-	-	-
Stage 1	504	0	-	-	-	-	-	-	-
Stage 2	665	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.7	0.2	1.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	897	-	-	351	1095	-	-
HCM Lane V/C Ratio	0.01	-	-	0.254	0.069	-	-
HCM Control Delay (s)	9.1	0	-	18.7	8.5	0	-
HCM Lane LOS	A	A	-	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1	0.2	-	-

H:\2016\16-096\Synchro\Baseline AM.syn

3: 6th Street & Central Way/NE 85th Street

Peter Kirk Elementary School (16-096)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	309	88	231	437	190	32	125	75	250	252	29
Future Volume (vph)	33	309	88	231	437	190	32	125	75	250	252	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	350		0	50		130	70		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		1.00	0.99		0.99		0.99	1.00	1.00	
Frt		0.967			0.955				0.850		0.985	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1719	3306	0	1719	3251	0	1719	1810	1538	1719	1779	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1710	3306	0	1714	3251	0	1709	1810	1517	1717	1779	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		37			79				127		7	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		612			757			280			2349	
Travel Time (s)		13.9			17.2			6.4			53.4	
Confl. Peds. (#/hr)	5		2	2		5	6		1	1		6
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Adj. Flow (vph)	35	332	95	248	470	204	34	134	81	269	271	31
Shared Lane Traffic (%)												
Lane Group Flow (vph)	35	427	0	248	674	0	34	134	81	269	302	0
Turn Type	Prot	NA		Prot	NA		Prot	NA	pm+ov	Prot	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases									2			
Detector Phase	7	4		3	8		5	2	3	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5	9.5	9.5	22.5	
Total Split (s)	10.6	22.5		21.0	32.9		10.5	23.5	21.0	23.0	36.0	
Total Split (%)	11.8%	25.0%		23.3%	36.6%		11.7%	26.1%	23.3%	25.6%	40.0%	
Maximum Green (s)	6.1	18.0		16.5	28.4		6.0	19.0	16.5	18.5	31.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	None	None	Max	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	6.0	14.8		15.1	28.5		5.9	19.2	34.3	16.5	34.3	
Actuated g/C Ratio	0.07	0.18		0.18	0.34		0.07	0.23	0.41	0.20	0.41	
v/c Ratio	0.28	0.69		0.80	0.58		0.28	0.32	0.12	0.80	0.41	

H:\2016\16-096\Synchro\Baseline AM.syn

3: 6th Street & Central Way/NE 85th Street

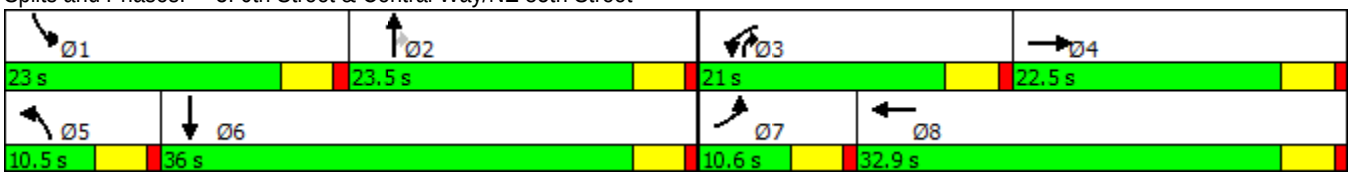
Peter Kirk Elementary School (16-096)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	45.7	36.4		54.5	23.5		45.7	31.7	1.3	51.4	21.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	45.7	36.4		54.5	23.5		45.7	31.7	1.3	51.4	21.8	
LOS	D	D		D	C		D	C	A	D	C	
Approach Delay		37.1			31.8			23.7			35.7	
Approach LOS		D			C			C			D	
Queue Length 50th (ft)	19	106		131	150		18	63	0	140	123	
Queue Length 95th (ft)	50	157		#255	210		49	118	10	#262	206	
Internal Link Dist (ft)		532			677			200			2269	
Turn Bay Length (ft)	100			350			50		130	70		
Base Capacity (vph)	126	745		341	1201		124	414	725	383	732	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.28	0.57		0.73	0.56		0.27	0.32	0.11	0.70	0.41	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 83.8
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.80
Intersection Signal Delay: 33.0 — Intersection LOS: C
Intersection Capacity Utilization 68.3% — ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: 6th Street & Central Way/NE 85th Street



2019 Baseline School/PM Peak-Hour Level of Service Analysis

H:\2016\16-096\Synchro\Baseline School PM.syn
1: 6th Street & School Exit

Peter Kirk Elementary School (16-096)

Intersection	
Int Delay, s/veh	2.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑			↑
Traffic Vol, veh/h	49	56	222	0	0	184
Future Vol, veh/h	49	56	222	0	0	184
Conflicting Peds, #/hr	0	16	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	63	63	83	83	59	59
Heavy Vehicles, %	4	4	2	2	4	4
Mvmt Flow	78	89	267	0	0	312

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	579	283	0	-	-	-
Stage 1	267	-	-	-	-	-
Stage 2	312	-	-	-	-	-
Critical Hdwy	6.44	6.24	-	-	-	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.336	-	-	-	-
Pot Cap-1 Maneuver	474	751	-	0	0	-
Stage 1	773	-	-	0	0	-
Stage 2	738	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	474	740	-	-	-	-
Mov Cap-2 Maneuver	474	-	-	-	-	-
Stage 1	773	-	-	-	-	-
Stage 2	738	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBT
Capacity (veh/h)	-	474	740	-
HCM Lane V/C Ratio	-	0.164	0.12	-
HCM Control Delay (s)	-	14.1	10.5	-
HCM Lane LOS	-	B	B	-
HCM 95th %tile Q(veh)	-	0.6	0.4	-

H:\2016\16-096\Synchro\Baseline School PM.syn
2: 6th Street & 13th Ave/School Entrance

Peter Kirk Elementary School (16-096)

Intersection												
Int Delay, s/veh	2.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	10	23	0	0	0	28	215	46	24	195	12
Future Vol, veh/h	2	10	23	0	0	0	28	215	46	24	195	12
Conflicting Peds, #/hr	0	0	235	235	0	0	9	0	22	22	0	9
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	55	55	55	65	65	65	84	84	84	67	67	67
Heavy Vehicles, %	3	3	3	2	2	2	5	5	5	5	5	5
Mvmt Flow	4	18	42	0	0	0	33	256	55	36	291	18

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	731	780	544	318	0	0	333	0	0
Stage 1	381	381	-	-	-	-	-	-	-
Stage 2	350	399	-	-	-	-	-	-	-
Critical Hdwy	6.43	6.53	6.23	4.15	-	-	4.15	-	-
Critical Hdwy Stg 1	5.43	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.43	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	2.245	-	-	2.245	-	-
Pot Cap-1 Maneuver	387	326	537	1225	-	-	1210	-	-
Stage 1	688	612	-	-	-	-	-	-	-
Stage 2	711	600	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	351	0	413	951	-	-	1210	-	-
Mov Cap-2 Maneuver	351	0	-	-	-	-	-	-	-
Stage 1	658	0	-	-	-	-	-	-	-
Stage 2	675	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.5	0.9	0.8
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	951	-	-	407	1210	-	-
HCM Lane V/C Ratio	0.035	-	-	0.156	0.03	-	-
HCM Control Delay (s)	8.9	0	-	15.5	8.1	0	-
HCM Lane LOS	A	A	-	C	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.5	0.1	-	-

H:\2016\16-096\Synchro\Baseline School PM.syn

3: 6th Street & Central Way/NE 85th Street

Peter Kirk Elementary School (16-096)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	421	66	178	722	205	158	305	305	135	123	47
Future Volume (vph)	31	421	66	178	722	205	158	305	305	135	123	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	350		0	50		130	70		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00		1.00	1.00		0.98		0.97	0.99	0.99	
Frt		0.980			0.967				0.850		0.958	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3454	0	1770	3406	0	1770	1863	1583	1770	1767	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3454	0	1761	3406	0	1740	1863	1540	1753	1767	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			43				132		21	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		612			757			280			2349	
Travel Time (s)		13.9			17.2			6.4			53.4	
Confl. Peds. (#/hr)			4	4			14		10	10		14
Confl. Bikes (#/hr)			1			1			2			4
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	33	453	71	191	776	220	170	328	328	145	132	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	33	524	0	191	996	0	170	328	328	145	183	0
Turn Type	Prot	NA		Prot	NA		Prot	NA	pm+ov	Prot	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases									2			
Detector Phase	7	4		3	8		5	2	3	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5	9.5	9.5	22.5	
Total Split (s)	10.0	24.0		20.0	34.0		18.0	30.0	20.0	16.0	28.0	
Total Split (%)	11.1%	26.7%		22.2%	37.8%		20.0%	33.3%	22.2%	17.8%	31.1%	
Maximum Green (s)	5.5	19.5		15.5	29.5		13.5	25.5	15.5	11.5	23.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	None	None	Max	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	5.5	17.1		13.1	29.1		11.9	25.7	38.8	10.4	24.3	
Actuated g/C Ratio	0.07	0.20		0.16	0.34		0.14	0.30	0.46	0.12	0.29	
v/c Ratio	0.28	0.73		0.70	0.83		0.69	0.58	0.42	0.67	0.35	

H:\2016\16-096\Synchro\Baseline School PM.syn

3: 6th Street & Central Way/NE 85th Street

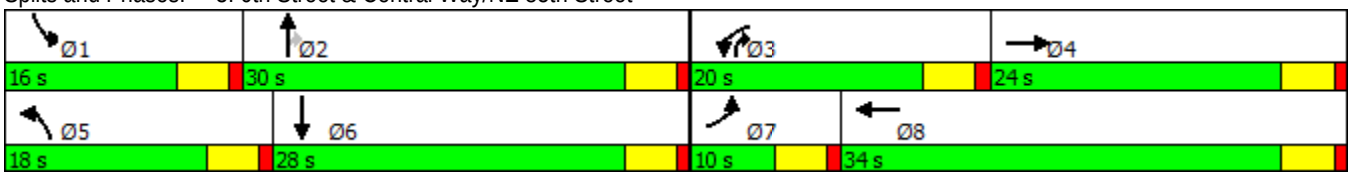
Peter Kirk Elementary School (16-096)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	46.7	37.6		48.7	32.5		50.6	31.3	9.5	52.6	25.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	46.7	37.6		48.7	32.5		50.6	31.3	9.5	52.6	25.3	
LOS	D	D		D	C		D	C	A	D	C	
Approach Delay		38.1			35.1			26.6			37.4	
Approach LOS		D			D			C			D	
Queue Length 50th (ft)	18	138		103	266		92	162	61	80	75	
Queue Length 95th (ft)	48	196		173	#380		#170	251	118	#155	135	
Internal Link Dist (ft)		532			677			200			2269	
Turn Bay Length (ft)	100			350			50		130	70		
Base Capacity (vph)	116	822		327	1244		285	566	828	242	521	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.28	0.64		0.58	0.80		0.60	0.58	0.40	0.60	0.35	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 84.5
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 33.5 — Intersection LOS: C
Intersection Capacity Utilization 69.4% — ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: 6th Street & Central Way/NE 85th Street



2019 Future With School AM Peak-Hour Level of Service Analysis

H:\2016\16-096\Synchro\FutureW AM.syn
1: 6th Street & School Exit

Peter Kirk Elementary School (16-096)

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	2	290	9	2	304
Future Vol, veh/h	7	2	290	9	2	304
Conflicting Peds, #/hr	3	0	0	5	5	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	37	37	52	52	59	59
Heavy Vehicles, %	3	3	6	6	1	1
Mvmt Flow	19	5	558	17	3	515

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1096	571	0	0	580	0
Stage 1	571	-	-	-	-	-
Stage 2	525	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.11	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.209	-
Pot Cap-1 Maneuver	235	518	-	-	999	-
Stage 1	563	-	-	-	-	-
Stage 2	591	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	232	516	-	-	999	-
Mov Cap-2 Maneuver	232	-	-	-	-	-
Stage 1	560	-	-	-	-	-
Stage 2	587	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	264	999	-
HCM Lane V/C Ratio	-	-	0.092	0.003	-
HCM Control Delay (s)	-	-	20	8.6	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0	-

H:\2016\16-096\Synchro\FutureW AM.syn
2: 6th Street & 13th Ave/School Entrance

Peter Kirk Elementary School (16-096)

Intersection	
Int Delay, s/veh	16.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	17	34	107	0	59	7	235	138	65	249	5
Future Vol, veh/h	7	17	34	107	0	59	7	235	138	65	249	5
Conflicting Peds, #/hr	204	0	0	0	0	204	2	0	15	15	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	65	65	65	65	65	65	76	76	76	79	79	79
Heavy Vehicles, %	4	4	4	2	2	2	5	5	5	1	1	1
Mvmt Flow	11	26	52	165	0	91	9	309	182	82	315	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1107	1009	320	955	-	619	324	0	0	506	0	0
Stage 1	485	485	-	433	-	-	-	-	-	-	-	-
Stage 2	622	524	-	522	-	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.54	6.24	7.12	-	6.22	4.15	-	-	4.11	-	-
Critical Hdwy Stg 1	6.14	5.54	-	6.12	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.54	-	6.12	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	3.518	-	3.318	2.245	-	-	2.209	-	-
Pot Cap-1 Maneuver	186	238	716	238	0	489	1219	-	-	1064	-	-
Stage 1	560	548	-	601	0	-	-	-	-	-	-	-
Stage 2	471	527	-	538	0	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	104	205	715	178	-	388	1219	-	-	857	-	-
Mov Cap-2 Maneuver	104	205	-	178	-	-	-	-	-	-	-	-
Stage 1	553	483	-	586	-	-	-	-	-	-	-	-
Stage 2	288	514	-	416	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	22.6	71.6	0.1	2
HCM LOS	C	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1219	-	-	293	178	388	857	-	-
HCM Lane V/C Ratio	0.008	-	-	0.305	0.925	0.234	0.096	-	-
HCM Control Delay (s)	8	0	-	22.6	101.6	17.1	9.6	0	-
HCM Lane LOS	A	A	-	C	F	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1.3	7.1	0.9	0.3	-	-

H:\2016\16-096\Synchro\FutureW AM.syn

3: 6th Street & Central Way/NE 85th Street

Peter Kirk Elementary School (16-096)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	309	88	231	437	205	32	131	75	262	257	30
Future Volume (vph)	34	309	88	231	437	205	32	131	75	262	257	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	350		0	50		130	70		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99		1.00	0.99		0.99		0.99	1.00	1.00	
Frt		0.967			0.952				0.850		0.984	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1719	3306	0	1719	3239	0	1719	1810	1538	1719	1777	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1711	3306	0	1714	3239	0	1709	1810	1517	1717	1777	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		37			90				127		7	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		612			757			280			2349	
Travel Time (s)		13.9			17.2			6.4			53.4	
Confl. Peds. (#/hr)	5		2	2		5	6		1	1		6
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Adj. Flow (vph)	37	332	95	248	470	220	34	141	81	282	276	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	37	427	0	248	690	0	34	141	81	282	308	0
Turn Type	Prot	NA		Prot	NA		Prot	NA	pm+ov	Prot	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases									2			
Detector Phase	7	4		3	8		5	2	3	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5	9.5	9.5	22.5	
Total Split (s)	10.6	22.5		21.0	32.9		10.5	23.5	21.0	23.0	36.0	
Total Split (%)	11.8%	25.0%		23.3%	36.6%		11.7%	26.1%	23.3%	25.6%	40.0%	
Maximum Green (s)	6.1	18.0		16.5	28.4		6.0	19.0	16.5	18.5	31.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	None	None	Max	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	6.0	14.9		15.2	28.6		5.9	19.2	34.3	16.8	34.6	
Actuated g/C Ratio	0.07	0.18		0.18	0.34		0.07	0.23	0.41	0.20	0.41	
v/c Ratio	0.30	0.70		0.80	0.60		0.28	0.34	0.12	0.82	0.42	

H:\2016\16-096\Synchro\FutureW AM.syn

3: 6th Street & Central Way/NE 85th Street

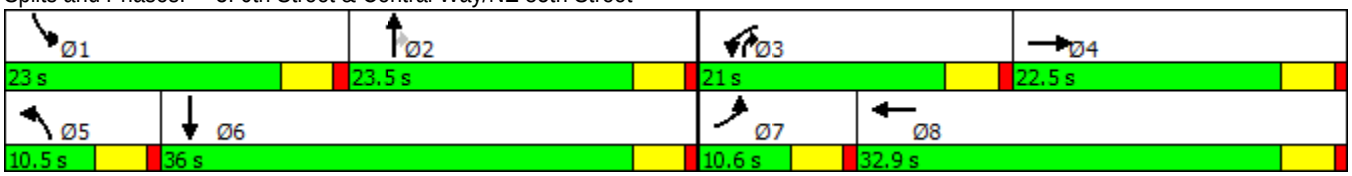
Peter Kirk Elementary School (16-096)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	46.3	36.5		54.8	23.4		45.8	32.0	1.3	53.8	21.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	46.3	36.5		54.8	23.4		45.8	32.0	1.3	53.8	21.9	
LOS	D	D		D	C		D	C	A	D	C	
Approach Delay		37.3			31.7			24.1			37.1	
Approach LOS		D			C			C			D	
Queue Length 50th (ft)	20	106		131	152		18	66	0	148	126	
Queue Length 95th (ft)	51	157		#255	212		49	124	10	#280	211	
Internal Link Dist (ft)		532			677			200			2269	
Turn Bay Length (ft)	100			350			50		130	70		
Base Capacity (vph)	125	741		340	1199		123	412	722	381	734	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.30	0.58		0.73	0.58		0.28	0.34	0.11	0.74	0.42	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 84.2
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 33.4 — Intersection LOS: C
Intersection Capacity Utilization 68.9% — ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: 6th Street & Central Way/NE 85th Street



H:\2016\16-096\Synchro\FutureW AM + AWSC.syn
2: 6th Street & 13th Ave/School Entrance

Peter Kirk Elementary School (16-096)

Intersection	
Intersection Delay, s/veh	21.4
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	7	17	34	0	107	0	59	0	7	235	138
Future Vol, veh/h	0	7	17	34	0	107	0	59	0	7	235	138
Peak Hour Factor	0.92	0.65	0.65	0.65	0.92	0.65	0.65	0.65	0.92	0.76	0.76	0.76
Heavy Vehicles, %	2	4	4	4	2	2	2	2	2	5	5	5
Mvmt Flow	0	11	26	52	0	165	0	91	0	9	309	182
Number of Lanes	0	0	1	0	0	1	0	1	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	2
HCM Control Delay	11.7	13.4	27.6
HCM LOS	B	B	D

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	2%	12%	100%	0%	20%
Vol Thru, %	62%	29%	0%	0%	78%
Vol Right, %	36%	59%	0%	100%	2%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	380	58	107	59	319
LT Vol	7	7	107	0	65
Through Vol	235	17	0	0	249
RT Vol	138	34	0	59	5
Lane Flow Rate	500	89	165	91	404
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.797	0.177	0.358	0.167	0.679
Departure Headway (Hd)	5.737	7.136	7.836	6.604	6.057
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	630	501	459	543	598
Service Time	3.775	5.201	5.585	4.353	4.098
HCM Lane V/C Ratio	0.794	0.178	0.359	0.168	0.676
HCM Control Delay	27.6	11.7	14.9	10.7	21
HCM Lane LOS	D	B	B	B	C
HCM 95th-tile Q	7.9	0.6	1.6	0.6	5.2

H:\2016\16-096\Synchro\FutureW AM + AWSC.syn
2: 6th Street & 13th Ave/School Entrance

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Traffic Vol, veh/h	0	65	249	5
Future Vol, veh/h	0	65	249	5
Peak Hour Factor	0.92	0.79	0.79	0.79
Heavy Vehicles, %	2	1	1	1
Mvmt Flow	0	82	315	6
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	21
HCM LOS	C

2019 Future With School, School/PM Peak-Hour Level of Service Analysis

H:\2016\16-096\Synchro\FutureW School PM.syn
1: 6th Street & School Exit

Peter Kirk Elementary School (16-096)

Intersection						
Int Delay, s/veh	0.3					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	2	280	5	2	185
Future Vol, veh/h	5	2	280	5	2	185
Conflicting Peds, #/hr	0	16	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	63	63	83	83	59	59
Heavy Vehicles, %	4	4	2	2	4	4
Mvmt Flow	8	3	337	6	3	314

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	660	356	0	0	343	0
Stage 1	340	-	-	-	-	-
Stage 2	320	-	-	-	-	-
Critical Hdwy	7.14	6.24	-	-	4.14	-
Critical Hdwy Stg 1	6.14	-	-	-	-	-
Critical Hdwy Stg 2	6.14	-	-	-	-	-
Follow-up Hdwy	3.536	3.336	-	-	2.236	-
Pot Cap-1 Maneuver	374	684	-	-	1205	-
Stage 1	671	-	-	-	-	-
Stage 2	687	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	373	674	-	-	1187	-
Mov Cap-2 Maneuver	373	-	-	-	-	-
Stage 1	671	-	-	-	-	-
Stage 2	685	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.6	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	428	1187	-
HCM Lane V/C Ratio	-	-	0.026	0.003	-
HCM Control Delay (s)	-	-	13.6	8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

H:\2016\16-096\Synchro\FutureW School PM.syn
2: 6th Street & 13th Ave/School Entrance

Peter Kirk Elementary School (16-096)

Intersection												
Int Delay, s/veh	5.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	10	23	60	0	58	28	220	55	25	151	12
Future Vol, veh/h	2	10	23	60	0	58	28	220	55	25	151	12
Conflicting Peds, #/hr	235	0	0	0	0	235	9	0	22	22	0	9
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	55	55	55	65	65	65	84	84	84	67	67	67
Heavy Vehicles, %	3	3	3	2	2	2	5	5	5	5	5	5
Mvmt Flow	4	18	42	92	0	89	33	262	65	37	225	18

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	914	734	243	722	-	552	252	0	0	349	0	0
Stage 1	318	318	-	383	-	-	-	-	-	-	-	-
Stage 2	596	416	-	339	-	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.12	-	6.22	4.15	-	-	4.15	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.12	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.12	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.518	-	3.318	2.245	-	-	2.245	-	-
Pot Cap-1 Maneuver	253	346	793	342	0	533	1296	-	-	1193	-	-
Stage 1	691	652	-	640	0	-	-	-	-	-	-	-
Stage 2	488	590	-	676	0	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	143	310	786	285	-	405	1296	-	-	926	-	-
Mov Cap-2 Maneuver	143	310	-	285	-	-	-	-	-	-	-	-
Stage 1	664	617	-	607	-	-	-	-	-	-	-	-
Stage 2	286	560	-	593	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14	20.1	0.7	1.2
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1296	-	-	464	285	405	926	-	-
HCM Lane V/C Ratio	0.026	-	-	0.137	0.324	0.22	0.04	-	-
HCM Control Delay (s)	7.9	0	-	14	23.6	16.4	9.1	0	-
HCM Lane LOS	A	A	-	B	C	C	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.5	1.4	0.8	0.1	-	-

H:\2016\16-096\Synchro\FutureW School PM.syn

3: 6th Street & Central Way/NE 85th Street

Peter Kirk Elementary School (16-096)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	421	66	178	722	213	158	308	305	144	126	48
Future Volume (vph)	32	421	66	178	722	213	158	308	305	144	126	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	350		0	50		130	70		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00		1.00	1.00		0.98		0.97	0.99	0.99	
Frt		0.980			0.966				0.850		0.958	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3454	0	1770	3402	0	1770	1863	1583	1770	1767	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3454	0	1761	3402	0	1741	1863	1540	1753	1767	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			45				123		21	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		612			757			280			2349	
Travel Time (s)		13.9			17.2			6.4			53.4	
Confl. Peds. (#/hr)			4	4			14		10	10		14
Confl. Bikes (#/hr)			1			1			2			4
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	34	453	71	191	776	229	170	331	328	155	135	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	34	524	0	191	1005	0	170	331	328	155	187	0
Turn Type	Prot	NA		Prot	NA		Prot	NA	pm+ov	Prot	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases									2			
Detector Phase	7	4		3	8		5	2	3	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5	9.5	9.5	22.5	
Total Split (s)	10.0	24.0		20.0	34.0		18.0	30.0	20.0	16.0	28.0	
Total Split (%)	11.1%	26.7%		22.2%	37.8%		20.0%	33.3%	22.2%	17.8%	31.1%	
Maximum Green (s)	5.5	19.5		15.5	29.5		13.5	25.5	15.5	11.5	23.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	None	None	Max	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	5.5	17.2		13.1	29.2		11.9	25.7	38.8	10.7	24.5	
Actuated g/C Ratio	0.06	0.20		0.15	0.34		0.14	0.30	0.46	0.13	0.29	
v/c Ratio	0.30	0.73		0.70	0.84		0.69	0.59	0.42	0.70	0.36	

H:\2016\16-096\Synchro\FutureW School PM.syn

3: 6th Street & Central Way/NE 85th Street

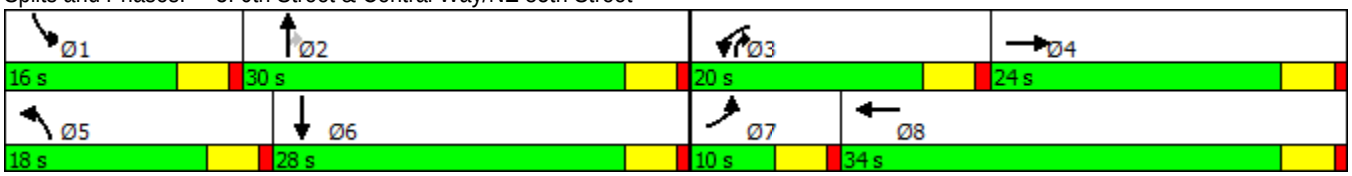
Peter Kirk Elementary School (16-096)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	47.1	37.7		48.8	33.0		50.8	31.6	10.0	54.6	25.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	47.1	37.7		48.8	33.0		50.8	31.6	10.0	54.6	25.4	
LOS	D	D		D	C		D	C	A	D	C	
Approach Delay		38.3			35.5			27.0			38.7	
Approach LOS		D			D			C			D	
Queue Length 50th (ft)	19	138		103	270		92	164	64	86	77	
Queue Length 95th (ft)	49	196		173	#386		#170	254	122	#172	138	
Internal Link Dist (ft)		532			677			200			2269	
Turn Bay Length (ft)	100			350			50		130	70		
Base Capacity (vph)	115	819		325	1241		283	564	821	242	524	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.30	0.64		0.59	0.81		0.60	0.59	0.40	0.64	0.36	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 84.8
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 34.0 — Intersection LOS: C
Intersection Capacity Utilization 70.1% — ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: 6th Street & Central Way/NE 85th Street



Concurrency Test

CITY OF KIRKLAND
Department of Public Works
123 Fifth Avenue, Kirkland, WA 98033 425.587.3800
www.kirklandwa.gov

MEMORANDUM

To: Tony Leavitt, Senior Planner

From: Thang Nguyen, Transportation Engineer

Date: July 18, 2017

Subject: Peter Kirk Elementary Traffic Concurrency Test Notice, Tran17-00192.

The applicant has requested an extension to the concurrency test notice in order to have additional time to complete the traffic report. The purpose of this memo is to inform you that I have approved the request and this memorandum is the updated concurrency test notice. A new 90-day expiration date is October 17, 2017. However, the 1-year expiration date remains the same (April 18, 2018).

Project Description

The applicant proposed to demolish the existing building and replace it with a larger building to accommodate 133 additional students.

The proposed development is forecasted to generate 172 daily trips, 60 net new AM peak hour trip, 37 net new PM peak hour trips and 24 PM peak person trips.

The proposed project passed traffic concurrency. This memo will serve as the concurrency test notice for the proposed project. Per *Section 25.10.020 Procedures* of the KMC, this Concurrency Test Notice will expire in one year (April 18, 2018) unless a development permit and certificate of concurrency are issued or an extension is granted.

EXPIRATION

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

1. A complete SEPA checklist, traffic impact analysis and all required documentation are submitted to the City within 90 calendar days (October 17, 2017) of the concurrency test notice.

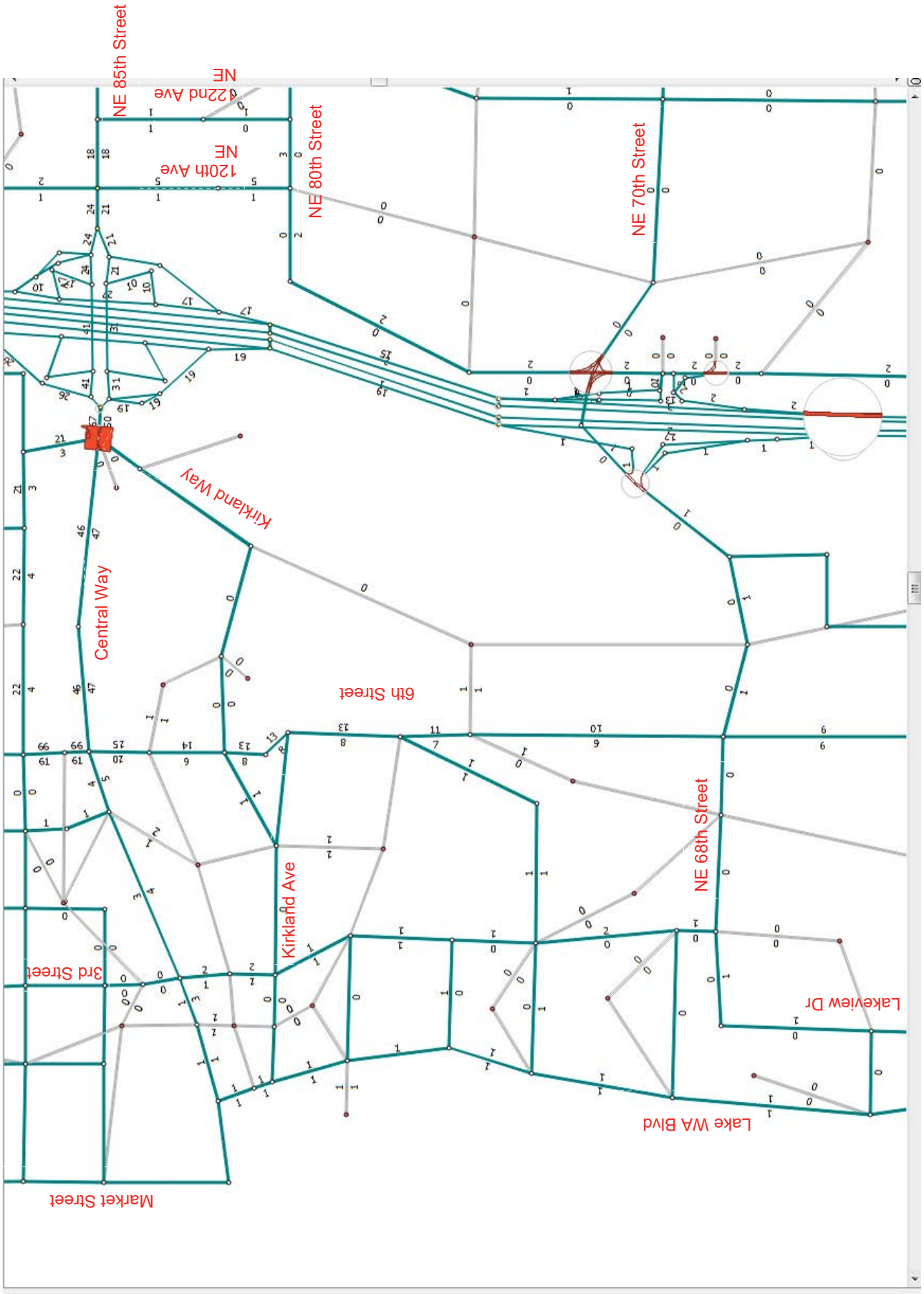
2. A Certificate of Concurrency is issued or an extension is requested and granted by the Public Works Department within one year of issuance of the concurrency test notice. (A Certificate of Concurrency is issued at the same time a development permit or building permit is issued if the applicant holds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

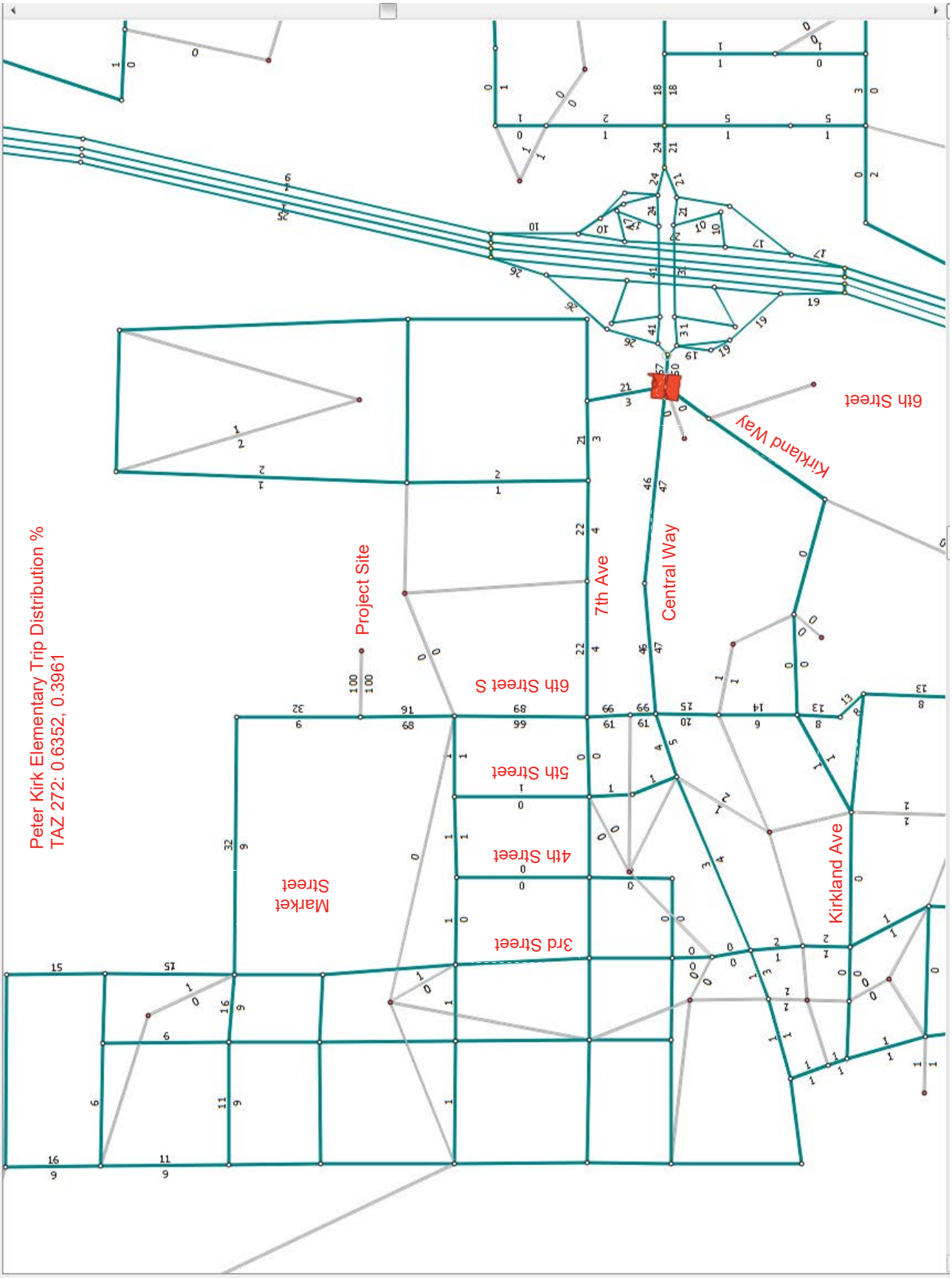
3. A Certificate of Concurrency shall expire six years from the date of issuance of the concurrency test notice unless all building permits are issued for buildings approved under the concurrency test notice.

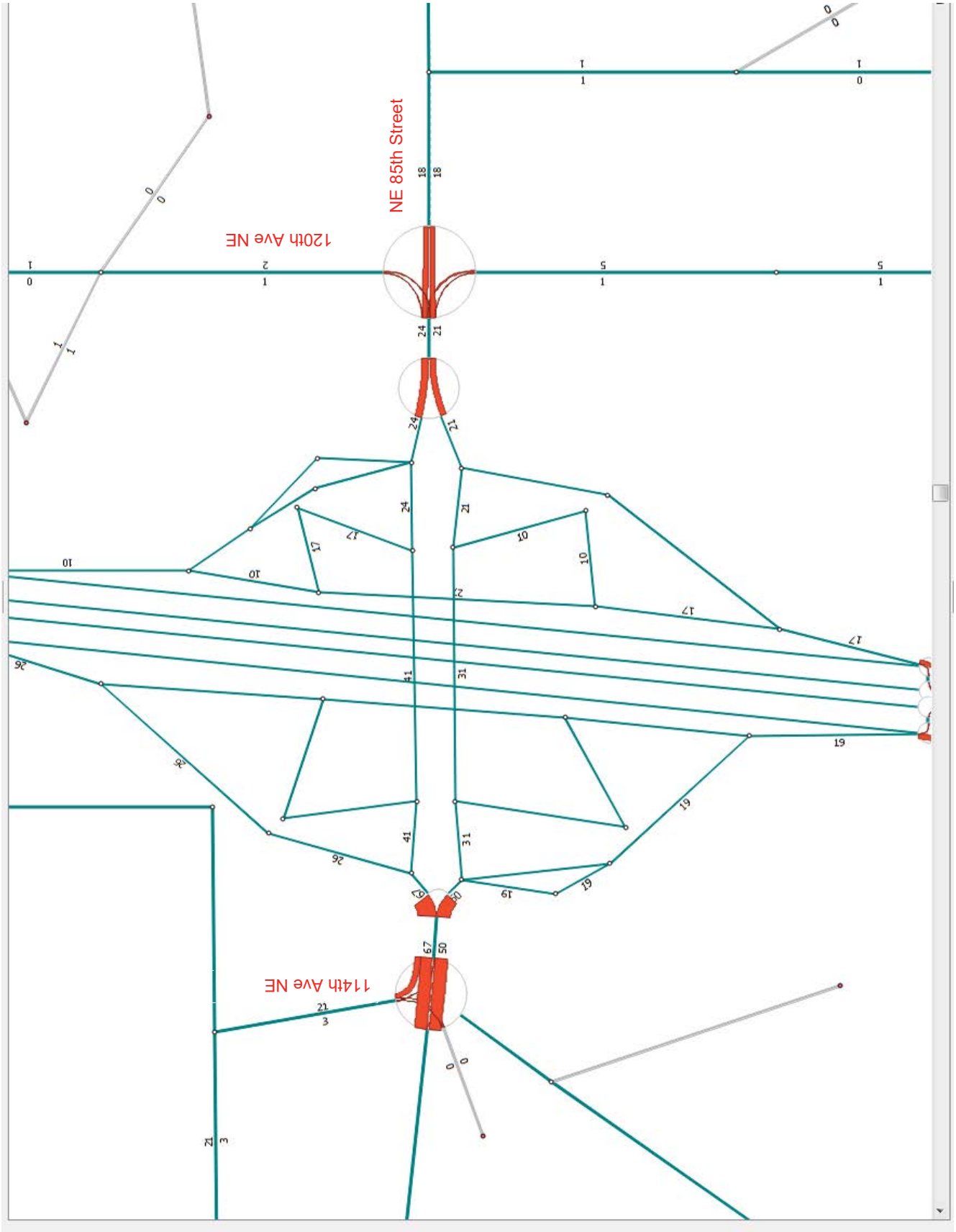
APPEALS

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

Cc: Matt Palmer, GTC
John Burkhalter, Senior Development Engineer


Market Street
3rd Street
Kirkland Ave
Central Way
Kirkland Way
6th Street
Lake WA Blvd
NE 68th Street
Lakeview Dr
NE 70th Street
NE 80th Street
120th Ave NE
122nd Ave NE
NE 85th Street


Peter Kirk Elementary Trip Distribution %
TAZ 272: 0.6352, 0.3961
Project Site
Market Street
3rd Street
4th Street
5th Street
6th Street S
7th Ave
Central Way
Kirkland Ave
Kirkland Way
6th Street


114th Ave NE
120th Ave NE
NE 85th Street

Proportional Share Impact Worksheet

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

Input appropriate information in green cells

			Through Lanes[1]
Project Name:	Peter Kirk ES		
Major Street[1]	Central Way	# of Lanes*=	2
Minor Street[1]	6th Street	# of Lanes*=	1

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

DATE:
5/8/2017

Daily Project Traffic Entering the Intersection

		Daily Volumes	*Entering Leg Volumes* *		
(Total of both approaches divided by two)	Major Street Volume V_1 =	43.86	79.12	8.6	***Major***
(Total of both approaches divided by two)	Minor Street Volume V_2 =	65.36	25.8	104.92	***Minor***

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

Determine Geometric Factors

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

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

Calculate Base Percentages

$P_1=V_1/(10{,}000 \times f_1)$ =	0.44%
$P_2=V_2/(5{,}000 \times f_2)$ =	1.31%
$P_3=V_1/(15{,}000 \times f_3)$ =	0.29%
$P_4=V_2/(2{,}500 \times f_4)$ =	2.61%

Calculate Proportional Share

$S_1=(P_1+P_2)/2$=	0.87%
$S_2=(P_3+P_4)/2$=	1.45%

Intersection Proportional Share = Maximum of S1 and S2 = 1.45%

Significant Intersection? **yes**

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

Computed By: MJP
Company: Gibson Traffic Consultants

Queuing Analysis

4 Vehicles

Peter Kirk Elementary School
GTC #16-096

Single Channel Queuing Analysis

Arrivals	166 / 15 mins	λ
Service	240 / 15 mins	μ

Average number of cars in the system	$\lambda/(\mu-\lambda)$	2.243243		2.243243	vehicles
Average waiting time in the system	$1/(\mu-\lambda)$	0.013514	180	2.432432	minutes
Average number of cars in the queue	$\lambda\sim 2/\mu(\mu-\lambda)$	1.551577		1.551577	vehicles
Average waiting time in the queue	$\lambda/\mu(\mu-\lambda)$	0.009347	180	1.682432	minutes
Average system utilization	λ/μ	0.691667		69%	
Probability of no cars in system	$1-\lambda/\mu$	0.308333		31%	
Probability of n cars in system	$(1-\lambda/\mu)(\lambda/\mu)\sim$n				
- max queue available					

		$(1-\lambda/\mu)$	(λ/μ)^n	P(n)	
P(0)	0	0.308333333	1	0.308333	
P(1)	1	0.308333333	0.691666667	0.213264	
P(2)	2	0.308333333	0.478402778	0.147508	
P(3)	3	0.308333333	0.330895255	0.102026	
P(4)	4	0.308333333	0.228869218	0.070568	
P(5)	5	0.308333333	0.158301209	0.04881	
P(6)	6	0.308333333	0.10949167	0.03376	
P(7)	7	0.308333333	0.075731738	0.023351	94.8%
P(8)	8	0.308333333	0.052381119	0.016151	
P(9)	9	0.308333333	0.036230274	0.011171	
P(10)	10	0.308333333	0.025059273	0.007727	
P(11)	11	0.308333333	0.017332664	0.005344	
P(12)	12	0.308333333	0.011988426	0.003696	

Probability of 12 or fewer Cars	99.17%
Probability of more than 12 Cars	0.83%

5 Vehicles

Peter Kirk Elementary School
GTC #16-096

Single Channel Queuing Analysis

Arrivals	166 / 15 mins	λ
Service	300 / 15 mins	μ

Average number of cars in the system	$\lambda/(\mu-\lambda)$	1.238806		1.238806	vehicles
Average waiting time in the system	$1/(\mu-\lambda)$	0.007463	180	1.343284	minutes
Average number of cars in the queue	$\lambda\sim 2/\mu(\mu-\lambda)$	0.685473		0.685473	vehicles
Average waiting time in the queue	$\lambda/\mu(\mu-\lambda)$	0.004129	180	0.743284	minutes
Average system utilization	λ/μ	0.553333		55%	
Probability of no cars in system	$1-\lambda/\mu$	0.446667		45%	
Probability of n cars in system	$(1-\lambda/\mu)(\lambda/\mu)\sim$n				
- max queue available					

		$(1-\lambda/\mu)$	(λ/μ)^n	P(n)	
P(0)	0	0.446666667	1	0.446667	
P(1)	1	0.446666667	0.553333333	0.247156	
P(2)	2	0.446666667	0.306177778	0.136759	
P(3)	3	0.446666667	0.16941837	0.075674	
P(4)	4	0.446666667	0.093744832	0.041873	94.8%
P(5)	5	0.446666667	0.05187214	0.02317	
P(6)	6	0.446666667	0.028702584	0.01282	
P(7)	7	0.446666667	0.015882097	0.007094	
P(8)	8	0.446666667	0.008788093	0.003925	

Probability of 8 or fewer Cars	99.51%
Probability of more than 8 Cars	0.49%

6 Vehicles

Peter Kirk Elementary School
GTC #16-096

Single Channel Queuing Analysis

Arrivals	166 / 15 mins	λ
Service	360 / 15 mins	μ

Average number of cars in the system	$\lambda/(\mu-\lambda)$	0.85567		0.85567	vehicles
Average waiting time in the system	$1/(\mu-\lambda)$	0.005155	180	0.927835	minutes
Average number of cars in the queue	$\lambda\sim 2/\mu(\mu-\lambda)$	0.394559		0.394559	vehicles
Average waiting time in the queue	$\lambda/\mu(\mu-\lambda)$	0.002377	180	0.427835	minutes
Average system utilization	λ/μ	0.461111		46%	
Probability of no cars in system	$1-\lambda/\mu$	0.538889		54%	
Probability of n cars in system	$(1-\lambda/\mu)(\lambda/\mu)\sim$n				
- max queue available					

		$(1-\lambda/\mu)$	(λ/μ)^n	P(n)	
P(0)	0	0.538888889	1	0.538889	
P(1)	1	0.538888889	0.461111111	0.248488	
P(2)	2	0.538888889	0.212623457	0.11458	
P(3)	3	0.538888889	0.098043038	0.052834	95.5%
P(4)	4	0.538888889	0.045208734	0.024362	

Probability of 5 or fewer Cars	97.92%
Probability of more than 5 Cars	2.08%

Collision Data

Washington State Department of Transportation

Transportation Data, GIS & Modeling Office
7345 Linderson Way Sw, Fl 1
Tumwater, WA 98501

360-570-2464 / Fax 360-570-2449
TTY: 1-800-833-6388
www.wsdot.wa.gov

March 30, 2017

Sarunas Farler
Gibson Traffic Consultants
2813 Rockefeller Ave, Suite B
Everett WA 98201

Dear Mr. Farler:

In accordance with the Public Records Act, RCW 42.56, this letter acknowledges receipt of your request for records dated March 24, 2017 (Request Number PDR-17-0834).

We have prepared a history of officer reported crashes that occurred on all roads in the City of Kirkland for the period of 1/1/2012 – 12/31/2016.

Federal law 23 United States Code Section 409 governs use of the data you requested. Under this law, data maintained for purposes of evaluating potential highway safety enhancements:

"*. . . shall not be subject to discovery or admitted into evidence in a federal or state court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.*" [Emphasis added.]

The Washington State Department of Transportation (WSDOT) is releasing this data to you with the understanding that you will not use this data contrary to the restrictions in Section 409, which means you will not use this data in discovery or as evidence at trial in any action for damages against the WSDOT, the State of Washington, or any other jurisdiction involved in the locations mentioned in the data. If you should attempt to use this data in an action for damages against WSDOT, the State of Washington, or any other jurisdiction involved in the locations mentioned in the data, these entities expressly reserve the right, under Section 409, to object to the use of the data, including any opinions drawn from the data.

With this package, your request for records is complete and closed.

If you have any further questions, you may contact me at 360-570-2464.

Sincerely,

Julie Brown

Julie Brown
Transportation Planning Technician 3
Transportation Data, GIS & Modeling Office

cc: w/enclosures
Nafisa Peshtaz & Lauretta Lew, WSDOT Northwest Region

OFFICER REPORTED CRASHES THAT OCCURRED ON ALL ROADS IN THE CITY OF KIRKLAND

01/01/2012 - 12/31/2016

Under 23 U.S. Code § 409 and 23 U.S. Code § 148, safety data, reports, surveys, schedules, lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location

JURISDICTION	PRIMARY TRAFFICWAY	BLOCK NUMBER	INTERSECTING TRAFFICWAY	DIST FROM REF POINT	MI or FT	COMP DIR FROM REF POINT	REFERENCE POINT NAME	REPORT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	# FAT	# VEH	# PEDS	# BIKES	VEHICLE 1 TYPE	VEHICLE 2 TYPE
City Street	6TH ST	1300	13TH AVE					E155555	02/23/2012	15:48	Possible Injury	2	0	2	0	0	Passenger Car	Passenger Car
City Street	6TH ST	1300	14TH PL					E604963	11/05/2016	23:15	No Injury	0	0	1	0	0	Passenger Car	
City Street	6TH ST	500	CENTRAL WAY					E422578	05/07/2015	14:10	No Injury	0	0	2	0	0	Passenger Car	Passenger Car
City Street	6TH ST	9900	CENTRAL WAY					E555056	06/19/2016	10:30	No Injury	0	0	2	0	0	Passenger Car	Passenger Car
City Street	6TH ST	9900	CENTRAL WAY					E604852	11/03/2016	09:05	No Injury	0	0	2	0	0	Truck (Flatbad,Van,etc)	Pickup,Panel Truck or Vanette under 10,000 lb
City Street	6TH ST	8300	NE 85TH ST					E149945	01/12/2012	17:51	No Injury	0	0	2	0	0	Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car
City Street	6TH ST	600	NE 85TH ST					E296979	12/31/2013	17:10	Possible Injury	1	0	2	0	0	Passenger Car	Passenger Car
City Street	CENTRAL WAY					SW	6TH ST	E187977	08/23/2012	10:46	Possible Injury	1	0	2	0	0	Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car
City Street	CENTRAL WAY	500		40	F	W	6TH ST	E456309	08/17/2015	11:00	No Injury	0	0	2	0	0	Passenger Car	Pickup,Panel Truck or Vanette under 10,000 lb
City Street	CENTRAL WAY		6TH ST					E162410	04/02/2012	13:20	No Injury	0	0	2	0	0	Passenger Car	Passenger Car
City Street	CENTRAL WAY		6TH ST					E222817	01/24/2013	19:50	No Injury	0	0	2	0	0	Passenger Car	Passenger Car
City Street	CENTRAL WAY	600	6TH ST					E229669	02/18/2013	01:45	Unknown	0	0	1	0	0	Passenger Car	
City Street	CENTRAL WAY	0	6TH ST					E243048	05/10/2013	14:40	Possible Injury	1	0	2	0	0	Truck (Flatbad,Van,etc)	Passenger Car
City Street	CENTRAL WAY	500	6TH ST					E320038	04/10/2014	10:00	No Injury	0	0	2	0	0	Passenger Car	Passenger Car
City Street	CENTRAL WAY	600	6TH ST					E349398	08/13/2014	09:27	No Injury	0	0	2	0	0	Passenger Car	Pickup,Panel Truck or Vanette under 10,000 lb
City Street	CENTRAL WAY	600	6TH ST					E358102	09/10/2014	15:39	No Injury	0	0	2	0	0	Passenger Car	Passenger Car
City Street	NE 85TH ST	600	6TH ST					E146747	01/04/2012	11:55	No Injury	0	0	2	0	0	Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car
City Street	NE 85TH ST		6TH ST					E185319	08/09/2012	14:44	Evident Injury	3	0	2	0	0	Passenger Car	Passenger Car
City Street	NE 85TH ST		6TH ST					E241324	05/01/2013	11:15	Possible Injury	1	0	2	0	0	Truck (Flatbad,Van,etc)	Pickup,Panel Truck or Vanette under 10,000 lb
City Street	NE 85TH ST		6TH ST					E312039	03/04/2014	15:00	No Injury	0	0	3	0	0	Passenger Car	Passenger Car
City Street	NE 85TH ST	600	6TH ST					E401441	02/16/2015	13:18	No Injury	0	0	2	0	0	Passenger Car	Passenger Car
City Street	NE 85TH ST	600	6TH ST					E403297	02/23/2015	10:06	No Injury	0	0	2	0	0	Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car
City Street	NE 85TH ST	600	6TH ST					E536513	04/22/2016	11:53	No Injury	0	0	3	0	0	Passenger Car	Passenger Car

PETER KIRK ES MASTER PLAN
ZON17-00578, SAR17-00579
ATTACHMENT 16

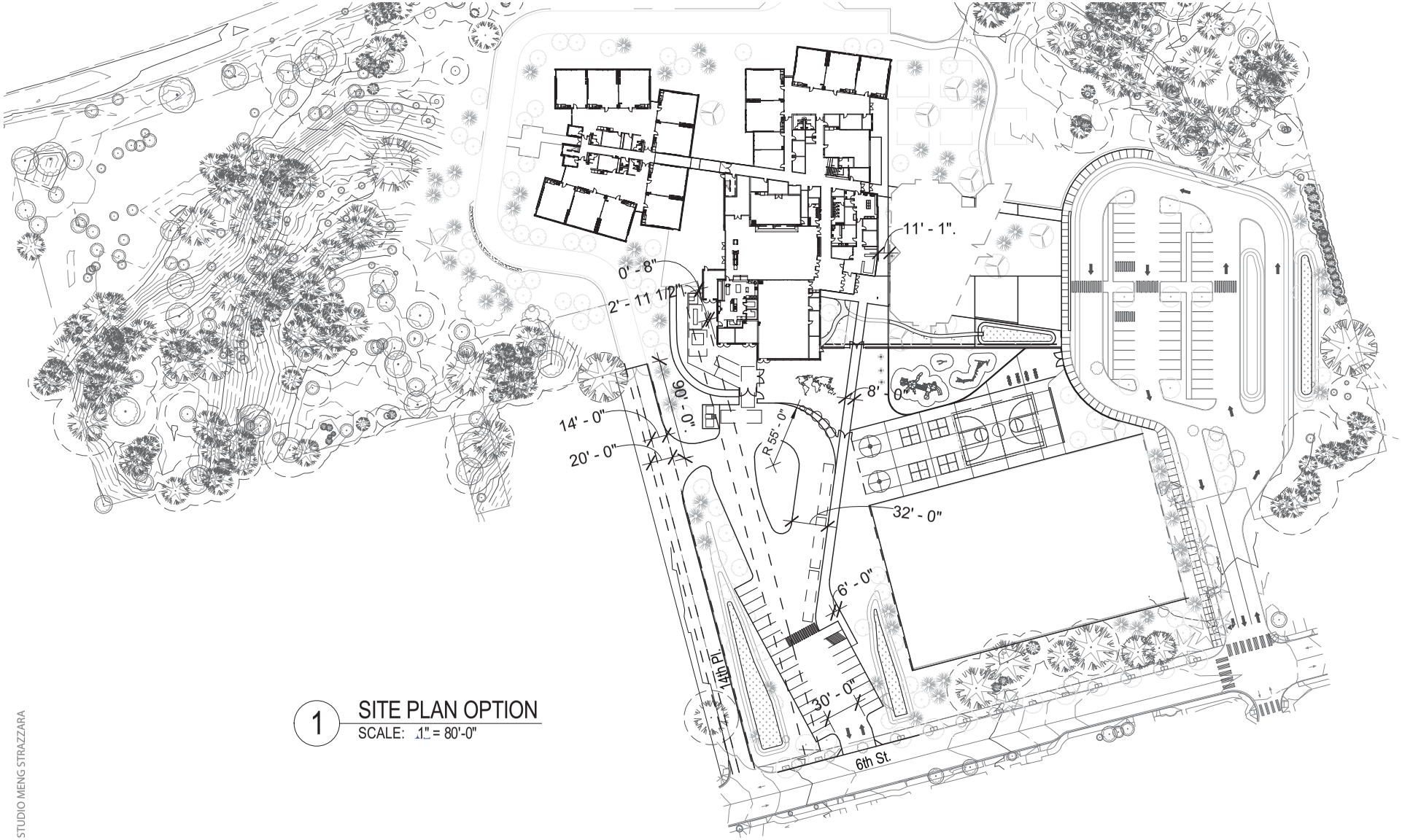
M - 9

JUNCTION RELATIONSHIP	ROADWAY SURFACE CONDITION	LIGHTING CONDITION	FIRST COLLISION TYPE / OBJECT STRUCK	VEHICLE 1 ACTION	VEHICLE 2 ACTION	VEHICLE 1 COMPASS DIRECTION FROM
At Driveway within Major Intersection	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Going Straight Ahead	Stopped for Traffic	North
At Intersection and Not Related	Wet	Dark-Street Lights On	Wood Sign Post	Going Straight Ahead		West
At Intersection and Related	Dry	Daylight	From opposite direction - one left turn - one right turn	Making Left Turn	Making Right Turn	North
At Intersection and Related	Dry	Daylight	Entering at angle	Going Straight Ahead	Going Straight Ahead	West
At Intersection and Related	Wet	Daylight	From same direction - both going straight - both moving - sideswipe	Changing Lanes	Going Straight Ahead	East
At Intersection and Related	Dry	Dark-Street Lights On	From same direction - all others	Backing	Stopped for Traffic	South
At Intersection and Related	Wet	Dark-Street Lights On	From same direction - both going straight - one stopped - rear-end	Going Straight Ahead	Stopped at Signal or Stop Sign	South
Intersection Related but Not at Intersection	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Going Straight Ahead	Slowing	Southwest
Not at Intersection and Not Related	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Going Straight Ahead	Going Straight Ahead	West
At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Going Straight Ahead	Stopped for Traffic	West
At Intersection and Related	Wet	Dark-Street Lights On	From same direction - both going straight - both moving - sideswipe	Changing Lanes	Going Straight Ahead	West
At Intersection and Related	Dry	Dark-Street Lights On	Tree or Stump (stationary)	Making Right Turn		West
At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Going Straight Ahead	Stopped at Signal or Stop Sign	West
At Intersection and Related	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Going Straight Ahead	Starting in Traffic Lane	West
At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Going Straight Ahead	Stopped at Signal or Stop Sign	West
At Intersection and Related	Dry	Daylight	Entering at angle	Making Left Turn	Going Straight Ahead	South
At Intersection and Related	Wet	Daylight	From same direction - both going straight - one stopped - rear-end	Going Straight Ahead	Stopped at Signal or Stop Sign	East
At Intersection and Related	Dry	Daylight	From same direction - one right turn - one straight	Going Straight Ahead	Making Right Turn	East
At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Slowing	Stopped at Signal or Stop Sign	East
At Intersection and Related	Wet	Daylight	From same direction - both going straight - both moving - rear-end	Going Straight Ahead	Going Straight Ahead	East
At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Going Straight Ahead	Stopped at Signal or Stop Sign	East
At Intersection and Related	Dry	Daylight	From opposite direction - one left turn - one straight	Going Straight Ahead	Making Left Turn	West
At Intersection and Related	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Going Straight Ahead	Slowing	East

VEHICLE 1 COMPASS DIRECTION TO	VEHICLE 2 COMPASS DIRECTION FROM	VEHICLE 2 COMPASS DIRECTION TO	MV DRIVER CONTRIBUTING CIRCUMSTANCE 1 (UNIT 1)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 1 (UNIT 2)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 2 (UNIT 2)	FIRST IMPACT LOCATION (City, County & Misc Trafficways - 2010 forward)	WA STATE PLANE SOUTH - X 2010 - FORWARD	WA STATE PLANE SOUTH - Y 2010 - FORWARD
South	North	Vehicle Stopped	Follow Too Closely	None	Driver Operating Other Electronic Device	Lane of Primary Trafficway	1222342.59	862395.089
South			Operating Defective Equipment		Exceeding Reas. Safe Speed	Past the Outside Shoulder of Primary Trafficway	1222346.62	862855.55
East	South	East	Improper Turn	None		Lane of Primary Trafficway	1222348.35	860235.719
East	South	North	Disregard Stop and Go Light	None		Lane of Primary Trafficway	1222347.34	860037.39
West	East	West	Driver Not Distracted	None		Lane of Primary Trafficway	1222346.6	860075.42
North	South	Vehicle Stopped	Other Driver Distractions Inside Vehicle	None		Lane of Primary Trafficway	1222348.149	860029.91
North	Vehicle Stopped	Vehicle Stopped	Inattention	None		Lane of Primary Trafficway	1222347.35	860036.76
Northeast	Southwest	Northeast	Driver Operating Handheld Telecommunicat	None		Lane of Primary Trafficway	1221995.179	859914.229
East	West	East	Follow Too Closely	None		Lane of Primary Trafficway	1222308.11	860234.979
East	West	Vehicle Stopped	Exceeding Reas. Safe Speed	None	Follow Too Closely	Lane of Primary Trafficway	1222343.46	860037.53
East	West	East	Did Not Grant RW to Vehicle	None		Lane of Primary Trafficway	1222347.33	860038.41
South			Other			Past the Outside Shoulder of Primary Trafficway	1222346.139	860231.239
East	West	Vehicle Stopped	Follow Too Closely	None		Lane of Primary Trafficway	1222347.33	860038.41
East	West	East	Exceeding Reas. Safe Speed	None		Lane of Primary Trafficway	1222346.6	860075.43
East	Vehicle Stopped	Vehicle Stopped	Follow Too Closely	None		Lane of Primary Trafficway	1222346.149	860231.239
West	North	South	Inattention	None		Lane of Primary Trafficway	1222348.36	860235.719
West	East	Vehicle Stopped	Inattention	None		Lane of Primary Trafficway	1222348.149	860029.91
West	East	North	Operating Defective Equipment	None		Lane of Primary Trafficway	1222347.35	860038.41
West	East	Vehicle Stopped	Operating Defective Equipment	None	Exceeding Reas. Safe Speed	Lane of Primary Trafficway	1222346.62	860075.43
West	East	West	Inattention	None		Lane of Primary Trafficway	1222346.62	860075.43
West	Vehicle Stopped	Vehicle Stopped	Inattention	None		Lane of Primary Trafficway	1222346.62	860075.43
East	East	South	Inattention	None	Unknown Driver Distraction	Lane of Primary Trafficway	1222346.62	860075.43
West	East	West	Inattention	None	Exceeding Reas. Safe Speed	Lane of Primary Trafficway	1222346.61	860075.42

Site Layout

N



1 SITE PLAN OPTION
SCALE: 1" = 80'-0"

© 2017 STUDIO MENG STRAZZARA

Lake Washington School District

PETER KIRK ELEMENTARY SCHOOL | DESIGN DEVELOPMENT| JULY 27, 2017

studio MENG STRAZZARA

PETER KIRK ES MASTER PLAN
ZON17-00578, SAR17-00579
ATTACHMENT 16

CITY OF KIRKLAND
Department of Public Works
123 Fifth Avenue, Kirkland, WA 98033 425.587.3800
www.kirklandwa.gov

MEMORANDUM

To: Tony Leavitt, Senior Planner

From: Thang Nguyen, Transportation Engineer

Date: April 18, 2017

Subject: Peter Kirk Elementary Traffic Concurrency Test Notice, Tran17-00192.

The purpose of this memo is to inform you that the proposed redevelopment of the Peter Kirk Elementary school has passed traffic concurrency.

Project Description

The applicant proposed to demolish the existing building and replace it with a larger building to accommodate 133 additional students.

The proposed development is forecasted to generate 172 daily trips, 60 net new AM peak hour trip, 37 net new PM peak hour trips and 24 PM peak person trips.

The proposed project passed traffic concurrency. This memo will serve as the concurrency test notice for the proposed project. Per *Section 25.10.020 Procedures* of the KMC, this Concurrency Test Notice will expire in one year (April 18, 2018) unless a development permit and certificate of concurrency are issued or an extension is granted.

EXPIRATION

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

1. A complete SEPA checklist, traffic impact analysis and all required documentation are submitted to the City within 90 calendar days (July 17, 2017) of the concurrency test notice.

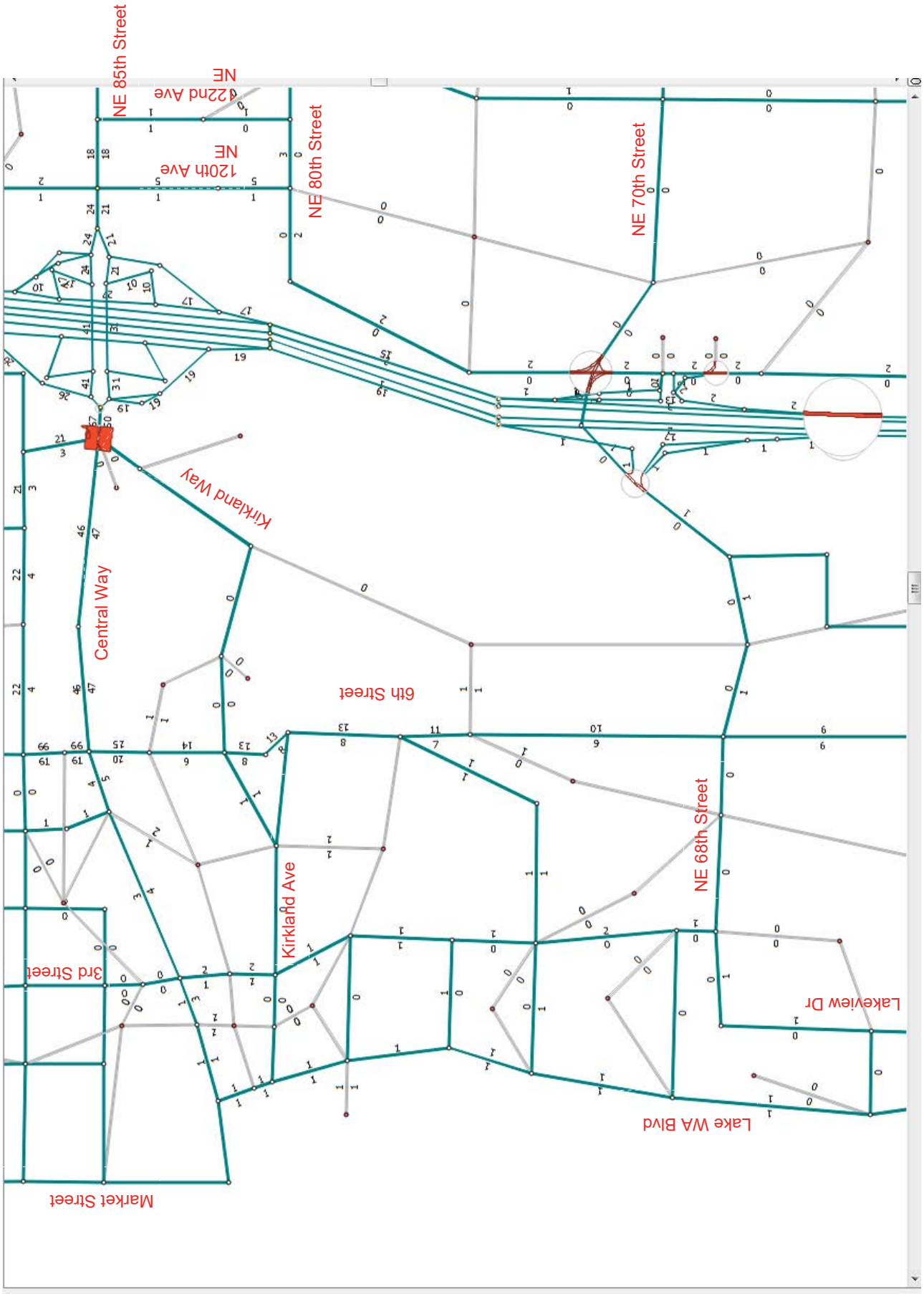
2. A Certificate of Concurrency is issued or an extension is requested and granted by the Public Works Department within one year of issuance of the concurrency test notice. (A Certificate of Concurrency is issued at the same time a development permit or building permit is issued if the applicant holds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

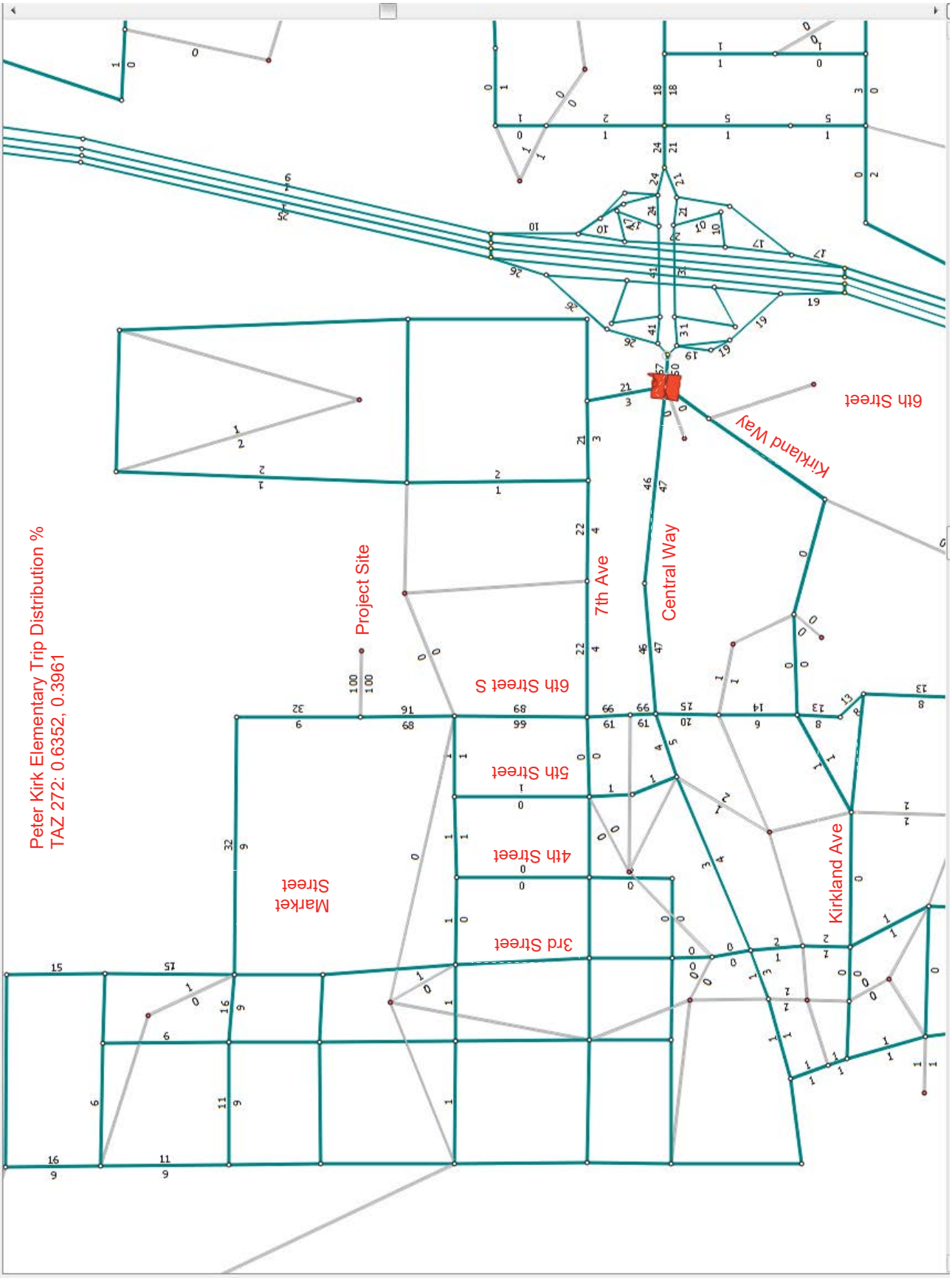
3. A Certificate of Concurrency shall expire six years from the date of issuance of the concurrency test notice unless all building permits are issued for buildings approved under the concurrency test notice.

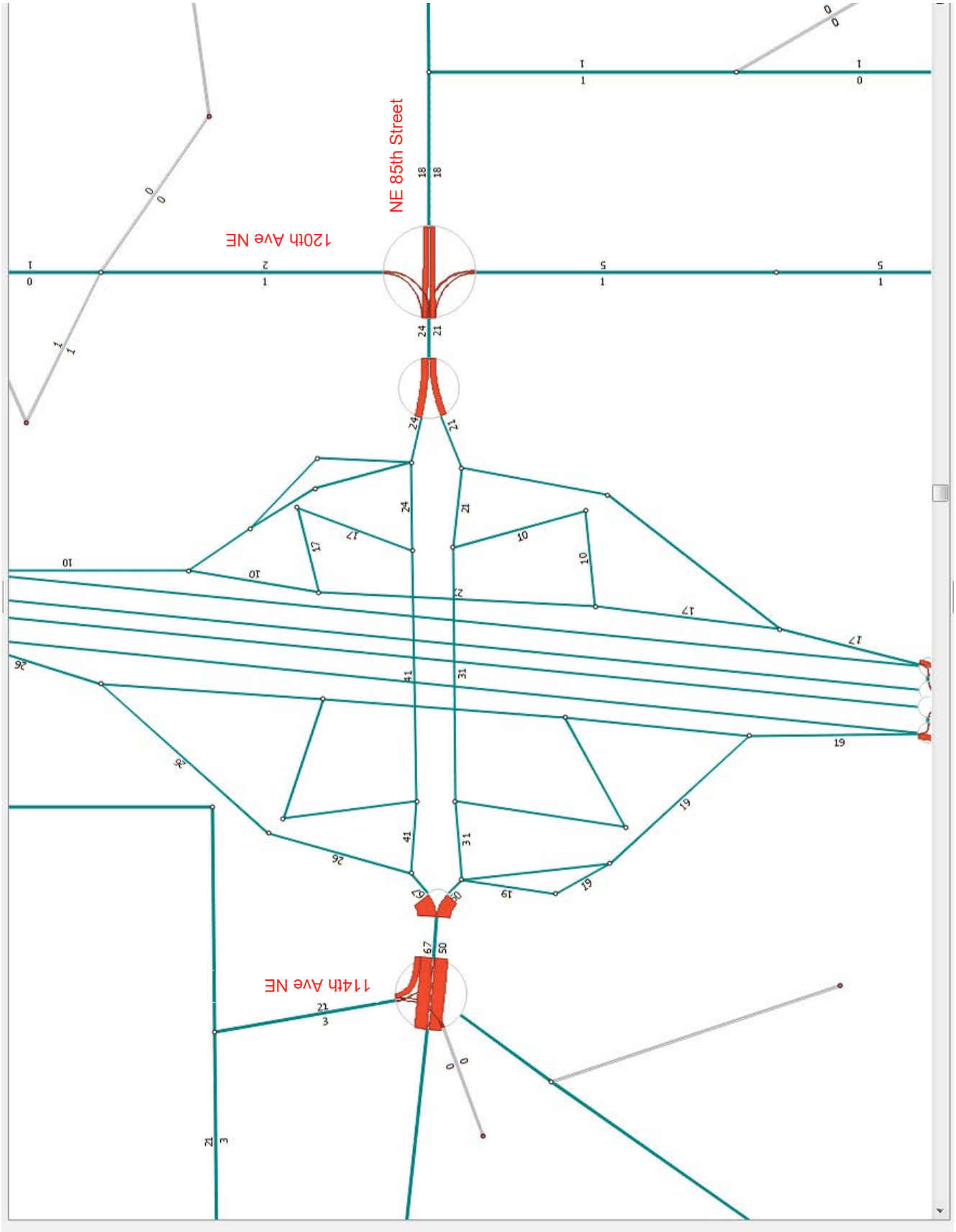
APPEALS

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

Cc: Matt Palmer, GTC
John Burkhalter, Senior Development Engineer


Market Street
3rd Street
Kirkland Ave
Central Way
Kirkland Way
6th Street
Lake WA Blvd
NE 68th Street
Lakeview Dr
NE 70th Street
NE 80th Street
120th Ave NE
122nd Ave NE
NE 85th Street


Peter Kirk Elementary Trip Distribution %
TAZ 272: 0.6352, 0.3961
Project Site
Market Street
3rd Street
4th Street
5th Street
6th Street S
7th Ave
Central Way
Kirkland Ave
Kirkland Way
6th Street


114th Ave NE
120th Ave NE
NE 85th Street

Proportional Share Impact Worksheet

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

Input appropriate information in green cells

			Through Lanes[1]
Project Name:	Peter Kirk ES		
Major Street[1]	Central Way	# of Lanes*=	2
Minor Street[1]	6th Street	# of Lanes*=	1

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

DATE:
5/8/2017

Daily Project Traffic Entering the Intersection

		Daily Volumes	*Entering Leg Volumes* *		
(Total of both approaches divided by two)	Major Street Volume V_1 =	43.86	79.12	8.6	***Major***
(Total of both approaches divided by two)	Minor Street Volume V_2 =	65.36	25.8	104.92	***Minor***

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

Determine Geometric Factors

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

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

Calculate Base Percentages

$P_1=V_1/(10{,}000 \times f_1)$ =	0.44%
$P_2=V_2/(5{,}000 \times f_2)$ =	1.31%
$P_3=V_1/(15{,}000 \times f_3)$ =	0.29%
$P_4=V_2/(2{,}500 \times f_4)$ =	2.61%

Calculate Proportional Share

$S_1=(P_1+P_2)/2$=	0.87%
$S_2=(P_3+P_4)/2$=	1.45%

Intersection Proportional Share = Maximum of S1 and S2 = 1.45%

Significant Intersection? **yes**

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

Computed By: MJP
Company: Gibson Traffic Consultants

CITY OF KIRKLAND
Department of Public Works
123 Fifth Avenue, Kirkland, WA 98033 425.587.3800
www.kirklandwa.gov

MEMORANDUM

To: Tony Leavitt, Senior Planner

From: Thang Nguyen, Transportation Engineer

Date: July 18, 2017

Subject: Peter Kirk Elementary Traffic Concurrency Test Notice, Tran17-00192.

The applicant has requested an extension to the concurrency test notice in order to have additional time to complete the traffic report. The purpose of this memo is to inform you that I have approved the request and this memorandum is the updated concurrency test notice. A new 90-day expiration date is October 17, 2017. However, the 1-year expiration date remains the same (April 18, 2018).

Project Description

The applicant proposed to demolish the existing building and replace it with a larger building to accommodate 133 additional students.

The proposed development is forecasted to generate 172 daily trips, 60 net new AM peak hour trip, 37 net new PM peak hour trips and 24 PM peak person trips.

The proposed project passed traffic concurrency. This memo will serve as the concurrency test notice for the proposed project. Per *Section 25.10.020 Procedures* of the KMC, this Concurrency Test Notice will expire in one year (April 18, 2018) unless a development permit and certificate of concurrency are issued or an extension is granted.

EXPIRATION

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

1. A complete SEPA checklist, traffic impact analysis and all required documentation are submitted to the City within 90 calendar days (October 17, 2017) of the concurrency test notice.

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

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

APPEALS

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

Cc: Matt Palmer, GTC
John Burkhalter, Senior Development Engineer

CITY OF KIRKLAND
Department of Public Works
123 Fifth Avenue, Kirkland, WA 98033 425.587.3800
www.kirklandwa.gov

MEMORANDUM

To: John Burkhalter, Senior Development Engineer

From: Thang Nguyen, Transportation Engineer

Date: May 3, 2018

Subject: Peter Kirk Elementary Transportation Review, Tran17-00192.

This memorandum summarizes staff's review of the transportation impact of the proposed development.

Project Description

The applicant proposed to demolish the existing building and replace it with a larger building to accommodate 133 additional students.

The proposed development is forecasted to generate 172 daily trips, 60 net new AM peak hour trip, 37 net new PM peak hour trips and 24 PM peak person trips.

SEPA Impact

Based on the daily, AM and PM peak hour trip generation, the project's trips would not impact off-site intersection impact significantly to trigger SEPA mitigation. All of the off-site intersections are calculated to be impacted by less than 1% proportional share impact; therefore, the impacts will not trigger level of service mitigation.

Frontage Impact

The applicant is proposing crosswalks on the north and east leg of the intersection of 6th Street/13th Avenue. Staff will allow the proposed crosswalks with the requirement that the existing crosswalks on the south and west legs remain.

The applicant is proposing a driveway for off of 14th Place and a bus turnaround in the north parking lot. Since there is a turnaround for buses, an exit driveway onto 14th Place is not necessary. Unless the driveway is a requirement from the Fire Department, the driveway should be removed from the plans. The minimal amount of project traffic from the school's north parking lot does not warrant a secondary access.

Parking

The proposed project will provide 73 parking spaces. The current parking utilization rate is 0.09 parking space per student. The future capacity of 665 students will require approximately 60 parking spaces. A parking lot is often found to be nearing capacity at 85% utilization when drivers began to look for parking elsewhere. Therefore, it is typical to provide a 15% surplus adjustment to prevent drivers from impacting the surrounding neighborhood and also to accommodate the fluctuation in parking demand. Therefore an adequate parking supply would be 71 parking spaces (60 parking spaces utilization / 0.85). The proposed parking supply of 73 spaces is adequate to meet a typical daily demand.

Access to the Cross Kirkland Corridor Trail

Since the public pathway to the Cross Kirkland Corridor (CKC) trail will go through the school campus, the applicant will be required to install directional signs along the frontage and on the campus to clear provide directions to the public. The applicant shall submit a signage plan for Public Works review and approval.

Transportation Impact Fee

Per City's Ordinance 3685, Transportation Impact Fees are required for all developments and are calculated based on the most updated Transportation Impact Fee Schedule, January 1, 2018. Transportation impact fees are used to construct transportation capacity improvements throughout the City to help the City maintain transportation concurrency. The calculated transportation impact fee for the proposed project is $42,457.59 (133 students x $319.23). The final road impact fee will be determined at final building permit.

Cc: Matt Palmer, GTC
Tony Leavitt, Senior Planner

AFM
American Forest Management
11415 NE 128th St Suite 110 Kirkland WA 98034 • (425)820-3420 • FAX (425)820-3437
www.americanforestmanagement.com

ARBORIST REPORT
FOR
Peter Kirk Elementary School
Kirkland, WA

March 29th, 2017

Table of Contents

1. Introduction.....1
2. Description.....1
3. Methodology.....1
4. Observations.....2
5. Discussion.....4
6. Tree Protection Measures.....4
7. Tree Replacement.....5

Appendix

Site/Tree Photos – pages 6 - 19

Tree Summary Tables - attached

Tree Locator Maps (with Risk Rating) - attached

1. Introduction

American Forest Management, Inc. was contacted by James Harper of Bush, Roed and Hitchings, Inc., and was asked to perform a tree inventory and condition assessment of significant trees at Peter Kirk Elementary School in Kirkland, WA.

Our assignment is to prepare a written report on present tree conditions to aid in the development design phase for the redevelopment of the school campus.

The significant tree data is summarized on the attached tree tables. This information will allow the design team to make informed decisions about which trees warrant retention and where they are located.

Dates of Field Examination: Multiple days in August 2016, September 2016 and March 2017

2. Description

Over 700 significant trees were individually assessed on the property. Neighboring trees with driplines that extend over the property line were also assessed. A significant trees is any tree greater than six inches DBH (diameter at breast height, measured 4 ½' above ground). Subject trees can be identified in the field by a numbered aluminum tag or numbered piece of orange flagging attached to the lower trunk. These numbers correspond with the numbers on the attached Tree Summary Tables and maps.

The majority of trees exist in the forested portion of the property on the east and north side. There is also a large tree grouping on the north perimeter and rows of trees along most perimeters. The subject trees are comprised primarily of native species, both coniferous and deciduous. There are small streams on the east side of the property. Trees within the wetland in the southeast corner of the site were not individually surveyed or assessed.

3. Methodology

Each tree in this report was visited. Tree diameters were measured by tape. The tree heights were measured using a Spiegel Relaskop. Each tree was visually examined for defects and vigor. The tree assessment procedure involves the examination of many factors:

- The crown of the tree is examined for current vigor. This is comprised of inspecting the crown (foliage, buds and branches) for color, density, form, and annual shoot growth, limb dieback and disease. The percentage of live crown is estimated for coniferous species only and scored appropriately.

- The bole or main stem of the tree is inspected for decay, which includes cavities, wounds, fruiting bodies of decay (conks or mushrooms), seams, insects, bleeding, callus development, broken or dead tops, structural defects and unnatural leans. Structural defects include crooks, forks with V-shaped crotches, multiple attachments, and excessive sweep.

- The root collar and roots are inspected for the presence of decay, insects and/or damage, as well as if they have been injured, undermined or exposed, or original grade has been altered.

Based on these factors a determination of condition and viability is made. A 'viable' tree, as defined by the City of Kirkland is *"A <u>significant tree</u> that a qualified professional has determined to be in good health, with a low risk of failure due to structural defects, is wind firm if isolated or remains as part of a grove, and is a species that is suitable for its location."* Trees considered 'non-viable' are trees that are in poor condition due to disease and/or pests, age related decline, have significant decay issues and/or cumulative structural defects, which exacerbate failure potential.

The four condition categories are described below:

Excellent (E) – free of structural defects, no disease or pest problems, no root issues, excellent structure/form with uniform crown or canopy, foliage of normal color and density, above average vigor, it will be wind firm if isolated, suitable for its location

Good (G) – free of significant structural defects, no disease concerns, minor pest issues, no significant root issues, good structure/form with uniform crown or canopy, foliage of normal color and density, average or normal vigor, will be wind firm if isolated or left as part of a grouping or grove of trees, suitable for its location

Fair (F) – minor to moderate structural defects not expected to contribute to a failure in near future, no disease concerns, moderate pest issues, no significant root issues, asymmetric or unbalanced crown or canopy, average or normal vigor, foliage of normal color, moderate foliage density, will be wind firm if left as part of a grouping or grove of trees, cannot be isolated, suitable for its location

Poor (P) – major structural defects expected to cause fail in near future, disease or significant pest concerns, decline due to old age, significant root issues, asymmetric or unbalanced crown or canopy, sparse or abnormally small foliage, poor vigor, not suitable for its location

The attached Tree Summary Tables provide specific information on tree sizes, drip-line measurements and rated condition, as well as assessed risk of failure, tree preservation value and treatment recommendations.

Risk of failure or the hazard rating of low to high is assessed based on structure and defect. Trees expected to fail in the near-term (less than one year) are rated as “high” (H). Trees with defined issues but are not expected to be a problem within the next 5 years are rated as “moderate” (M). Trees not expected to be a problem for another 10 years or more are rated as “low” (L). The attached tree locator maps indicate the ‘Risk of Failure’ of the subject trees – High (pink), Moderate (yellow) and Low (green).

A preservation value is assigned based on health, vigor, age, species suitability to the site, longevity of the species, tolerance of impacts and growing characteristics. Long-lived species that are currently young to semi-mature and in good condition are rated as “high” (H). Long-lived species that are mature or have well defined issues that may jeopardize longevity are rated as “moderate” (M). Short-lived or pioneer species or trees with significant problems are rated as “low” (L). Trees with significant structural defects with a high probability of failure are rated as “low” (L).

Recommendations are provided for trees where warranted. A recommendation of “remove” is given for trees in poor condition, high-risk trees and trees not expected to positively contribute to the landscape for the foreseeable future. Some trees are recommended for corrective pruning to remove a co-dominant (equal diameter) forked stem preventing a future failure. Pruning recommendations are provided for landscape trees where appropriate, as well as an estimate of maintenance time to perform the recommendation. Pruning recommendations include CC-crown clean, RC- reduce crown, DW-remove deadwood, RD-remove defective part and EW-remove end-weight.

4. Observations

The observations are grouped by area. For information on specific trees, please refer to the attached tree summary tables.

The trees in the parking lot area are mostly native Douglas-fir, planted Norway maples, native big leaf maples and planted oak trees. The majority of these trees are in good condition and pose a low risk.

There is a grouping of native trees in the middle of the property. The dominant species in this grouping is mature Douglas-fir trees. There is also a significant amount of big leaf maple, bitter cherry and Pacific madrone. Many of the bitter cherry trees have strong leans, signs of decay and are not viable for retention. There is ivy covering the trunks of many of these trees. Some of the ivy has been killed or removed from tree trunks but most remains. There is a significant amount of non-native blackberry in the understory. Blackberry is inhibiting

the regeneration of native tree and shrub establishment. Some of the younger trees in this stand exhibit signs of stress and suppression from the more dominant trees. Overall, this area has many mature, native trees that are in good condition and have a high retention or preservation value.

There are mature Douglas-fir and western red cedar trees in the southwest corner of the property. These are healthy and viable with some noted structural defects. There are additionally some deciduous trees in this area of low retention value.

The neighboring trees to the south are comprised of a row of young shore pine and arborvitae. These trees are growing closely together and have small, narrow crowns as a result. All of these are considered viable.

There is a row of Lombardy poplar trees on the north property line, some of which are neighboring trees. These trees vary in size and age. The most notable defect is dead limbs or past dieback. Lombardy poplars are not considered a high value species for retention.

The neighboring trees to the east side are primarily native species. The northern portion is mainly young Douglas-fir trees. The south portion is semi-mature black cottonwood and red alder trees. The black cottonwood trees have noteworthy defects such as leaning trunks and poor trunk taper. Some of the red alders are also in decline.

The southeast corner of the property is second-growth native forest. The vast majority of the trees on the property are located in this area. The red alder trees in this area have a range of issues. Many of the alders have co-dominant stems with poor attachments and included bark at the point of attachment. Trees have poor trunk taper. Several past stem failures were observed on the property. Top dieback and broken tops were commonly observed. The majority of the red alders are not viable long term.

The big leaf maple trees range in age and condition. Many are in decline. *Kretzchmaria deusta*, a soft rot fungus, was observed on some of the mature big leaf maple trees. A large percentage of the big leaf maples in this area have small leaves. *Xylella fastidiosa*, a bacterial disease, and drought stress are suspected to be the cause of this. Structural issues were frequently observed. The most common structural issue is co-dominant stems with poor attachments and significant included bark. Many of the maple trees have significant dead wood.

The Douglas-fir trees in this are semi-mature to mature for an urban environment. Signs of stress and decline was observed in many trees. A fruiting body of *Phaeolus schweinitzii*, a root and butt rot fungus, was found adjacent to two of the Douglas-fir trees. This disease is native and common in our region. This disease is suspected to be affecting many of the Douglas-fir trees on the property. Flat trunk sides, thin crowns and broken tops were noted on many trees. The majority of the Douglas-fir trees are viable.

The wetter regions of the southeast portion is comprised of native willow trees. Poor form and decay was frequently noted but the size and location of these trees makes them unlikely to be classified as hazardous. English ivy is covering the trunks of many of the trees. In most cases it is not currently compromising tree health. There is a grove of black locust trees in the southeast area. Many of these trees are leaning which is typical development for the species. Interior trees have small live crowns. Condition and viability vary.

The northeast area of the property is wet, with streams and wetlands. Red alder and black cottonwood are the dominant species in this area. Western red cedar and big leaf maples exist in small numbers. Many of the red alders are over mature and in natural decline. Many of the red alder trees have strong leans, signs of decay and are not viable for retention. Top dieback and broken tops were commonly observed. Blackberry is inhibiting the regeneration of native tree and shrub establishment.

The north portion of the property is a mixed age native forest. The dominant species is Douglas-fir followed by western red cedar and big leaf maple. There is a small wetland in the northwest corner. There are many large, healthy and mature trees. The most common defects observed in the Douglas-fir trees were low live crown ratios and poor trunk taper. The understory is primarily native species such as salmonberry, sword fern and Indian plum. Overall, this area has many mature, native trees that are in good condition and have a high retention or preservation value.

5. Discussion

The extent of affected drip-lines (farthest reaching branches) for the subject trees can be found on the tree summary tables at the back of this report. Drip-line measurements are provided for trees on the perimeter edge closest to the parking lot or access drive in the direction that assumed impacts may take place. For interior trees, drip-line measurements in all four cardinal directions are provided.

The highest density of tree cover is found on the north and east sides of the site. The east area has walking trails throughout. These areas have the highest concentration of native trees and ground cover and therefore should be the main priority areas for tree retention.

The extent of English ivy on the property is concerning. It is covering the trunks of many native trees and encroaching into tree crowns. As the ivy climbs into the tree crowns, the leaves of the ivy suppress tree growth and vigor as well as add a significant amount of weight to the top of the tree which can contribute to failure, particularly in hardwood species. The removal of the ivy from subject trees is recommended to maintain vigor and reduce the risks of premature failure caused by ivy overload.

Lombardy poplars are a fast growing species. Their form is columnar with many upright stems and smaller branches. Frequent branch drop is typical for the species. Because the stems grow fast, they are usually poorly tapered and are susceptible to stem breakage. These trees will continually drop branches but the risk of whole tree failure or a major stem failure that would cause significant damage is low. Additionally, Lombardy poplars have aggressive roots and are not suitable adjacent to sidewalks. If impacts will occur near these trees, new tree plantings would be preferred over retention efforts.

The decline of the big leaf maple trees on the property is suspected to be the result of a bacterial infection caused by *Xyella fastidiosa*, prolonged drought and gradual advancement of *Kretzchmaria deusta*, a soft rot fungus. The fruiting bodies of this soft rot fungus were observed on many maple trees. Upper crown dieback and the presence of unusually small leaves was also observed on several trees. Many of the adjacent maple trees on the park property have significant crown dieback as well. The dieback or decline of big leaf maple is occurring across our region.

Some of the Douglas-fir on the property are likely infected with *Phaelous schweinitzii*, a native root and butt rot pathogen. This fungus causes decay of the root and lower trunk of infected trees. Decay slowly advanced from the roots into the lower trunk. Trees with advanced infections develop a swelled lowered trunk. This fungus is typically found in older Pacific Northwest coniferous forests.

Several trees with a high potential for failure were identified on the property. These primarily involve pioneer species of red alder and bitter cherry. There are also several maples in vast decline with significant decay and/or structural defects. The trees identified as part of this assessment as high-risk are recommended for removal in the near future to maintain risks at acceptable levels.

6. Tree Protection Measures

The following general guidelines are recommended to ensure that the designated space set aside for the preserved trees are protected and construction impacts are kept to a minimum.

1. Tree protection fencing should be erected around retained trees and positioned at the 5-foot drip-line setback prior to moving any heavy equipment on site. Doing this will set clearing limits and avoid compaction of soils within root zones of retained trees.

2. Excavation limits should be laid out in paint on the ground to avoid over excavating.

3. If pre-approved and allowable, excavations within the drip-lines shall be monitored by a qualified tree professional so necessary precautions can be taken to decrease impacts to tree parts.

4. To establish sub grade for foundations, curbs and pavement sections near the trees, soil should be removed parallel to the roots and not at 90 degree angles to avoid breaking and tearing roots that lead back to the trunk

within the drip-line. Any roots damaged during these excavations should be exposed to sound tissue and cut cleanly with a saw. Cutting tools should be sterilized with alcohol.

5. Areas excavated within the drip-line of retained trees should be thoroughly irrigated weekly during dry periods.

6. Preparations for final landscaping shall be accomplished by hand within the drip-lines of retained trees. Large equipment shall be kept outside of the tree protection zones at all times. Simply finish landscape within 10' of retained trees with a 2" to 4" layer of organic mulch.

7. Tree Replacement

It is assumed that the number of significant trees retained adjacent to critical areas and their buffers will satisfy the tree density requirement for the property. No new trees will likely be required although several will likely be planted to enhance new landscaping. New trees shall be given the appropriate space for the species and their growing characteristics. Refer to the *Kirkland Plant List* on the City's website for a list of desirable species.

Minimum size for replacement trees are 2 ½" caliper for deciduous species and 6' in height for coniferous species. Replacement trees shall be primarily native species in order to restore and enhance the site as close as possible to its pre-development condition.

There is no warranty suggested for any of the trees subject to this report. Weather, latent tree conditions, and future man-caused activities could cause physiologic changes and deteriorating tree condition. Over time, deteriorating tree conditions may appear and there may be conditions, which are not now visible which, could cause tree failure. This report or the verbal comments made at the site in no way warrant the structural stability or long term condition of any tree, but represent my opinion based on the observations made.

Nearly all trees in any condition standing within reach of improvements or human use areas represent hazards that could lead to damage or injury.

Please call if you have any questions or if we can be of further assistance.

Sincerely,

Kelly Wilkinson
ISA Certified Arborist #PN-7673A
ISA Tree Risk Assessment Qualified

Bob Layton
ISA Certified Arborist #PN-2714A
ISA Tree Risk Assessment Qualified

Photos

Norway maples and Douglas-fir trees adjacent to parking lot

Grouping of trees in middle of property

Tree #159 – Pacific madrone with Nattrassia canker

Tree #1494 – Douglas-fir with minor forked stem-not concerning