

## F. Transportation

### F.1 Executive Summary

The transportation analysis looked at the impact in 2025 with the King County urban zoning and Maple Valley R-6 zoning. This future-oriented analysis assumes the completion of roadway and intersection improvements identified in the City's Transportation Improvement Program, which would include roadway widening on portions of Maple Valley Highway as well as on Kent-Kangley Road and complete the S 271st Street by-pass. This analysis does not consider the full development of SR 169 to four lanes through the entire City, but does include the widening between SE 264th Street and SE 255th Street.

The proposed King County Comprehensive Plan Amendment would add an estimated 1,271 new trips to the City of Maple Valley Roadways. Under the City R-6 zoning proposal, the 815 new trips would be added to area roadways. The King County zoning proposal has 56 percent more trips than would occur under Maple Valley R-6 zoning. **Table 1** compares the trip generation between the two scenarios.

**Table 1. Trip Generation Comparison for Scenarios 1 and 2**

	<b>Scenario 1: King County Zoning</b>	<b>Scenario 2: City of Maple Valley R-6 Zoning</b>	<b>Difference (Scenario 1 vs. 2)</b>	<b>Percent Difference (Scenario 1 vs. 2)</b>
Entering	844	523	321	
Exiting	527	315	212	
Internal	100	22	78	
Total	1,271	816	455	56%

Delays under the King County scenario would cause 4% to more than 90% greater congestion at intersections studied in this analysis. While many of the same intersections are below the City of Maple Valley transportation level of service standard, the King County scenario would cause greater delay and would require more mitigation to bring the intersection back an acceptable level of operation. **Table 2** shows the difference in LOS and congestion between the two scenarios.

**Table 2. PM Peak Hour Intersection Levels of Service and Delay**

Location	2025 No Action LOS	Scenario 1		Scenario 2		% Increase in Congestion Scenario 1 vs. 2 [2]
		LOS	Meets Standard? [1]	LOS	Meets Standard ? [1]	
Kent-Kangley Rd/216th Ave SE	B	B	Yes	B	Yes	6%
Kent-Kangley Rd/Witte Rd SE	E	F	No	E	No	16%
Kent-Kangley Rd/228th Ave SE	B	C	Yes	B	Yes	93%
SE Kent Kangley Rd/Maple Valley Hwy	D	D	Yes	D	Yes	4%
SE 276th St/Maple Valley Hwy	B	B	Yes	B	Yes	0%
SE 280th St/Maple Valley Hwy	B	B	Yes	B	Yes	0%
SE 268th St/Witte Rd SE	E	F	No	F	No	24%
Kent-Kangley Rd/Site Access	-	F	No	F	No	-
Kent-Kangley Rd/SE 271st St By-Pass	A	E	No	C	Yes	97%
SE 271st St By-Pass/Maple Valley Hwy	C	C	Yes	C	Yes	7%
SE Witte Rd/Maple Valley Hwy	F	F	No	F	No	20%
SE Wax Rd/Maple Valley Hwy	E	E	No	E	No	3%

[1] City of Maple Valley Standard is LOS D for signalized intersections and LOS E for unsignalized intersections on SR 169, Kent-Kangley Road and Witte Road.

[2] Average intersection delay for Scenario 1 and 2.

Both scenarios would add traffic to an already congested roadway system. Addition of the Donut Hole traffic would require mitigation actions at a number of locations for both scenarios in order that the LOS standard would be met. The King County development scenario would require a greater level of mitigation as compared to Maple Valley R-6 zoning scenario. Details of the mitigation actions for each scenario are described in **Section F.15** for Scenario 1 and **Section F.23** for Scenario 2.

The Donut Hole traffic analysis identifies the potential impacts to the City's roadway system. The analysis calculates the number of trips generated by the Donut Hole scenarios, determines the directional distribution of trips and assigns the trips to the future roadway network. The analysis looks at potential traffic impacts on roadways and intersections to determine if development will meet the City's transportation concurrency standard.

## F.2 Methodology

The transportation analysis used the City's transportation model to: forecast the future traffic volumes, reflect the effects of changes to the roadway network, and determine the directional distribution of trips to and from the Donut Hole site.

The model's forecasted volumes were exported to an intersection analysis model that calculates the operation of individual intersections near the study area. The results identify the impact of each development scenario on the transportation system and the improvements (mitigation) necessary to bring affected roadways and intersections back to the City's adopted standard.

## F.3 Traffic Impacts, Explained

An impact occurs when a development's traffic causes the operation of a roadway or intersection to fall below an acceptable standard, requiring improvements or modification to the City's transportation facilities. The study focused on major intersections within the City. However, intersections and roadway in outside of the City limits would be expected to experience impacts related to the Donut Hole's development..

Typically, intersections will fail before a segment of roadway fails. Signals and other traffic controls, turning vehicles, and time needed for pedestrians to cross the roadway all create delays that may affect roadway performance.

A measure of intersection operation is level of service (LOS). Level of service describes the operational conditions within a traffic flow and the perception of these conditions by drivers or passengers. These conditions include factors such as speed, delay, travel time, freedom to maneuver, traffic interruptions, comfort, convenience and safety. Levels of service have letter designations, from A to F, with LOS A representing the best operating conditions (free flow, little delay) and LOS F the worst (congestion, long delays). **Table 3** shows the corresponding range of control delay for each level of service.

**Table 3. Level of Service and Delay**

LOS	Type of Intersection	
	Signalized (seconds)	Stop Sign Control (seconds)
A	< 10	< 10
B	> 10 and < 20	> 10 and < 15
C	> 20 and < 35	> 15 and < 25
D	> 35 and < 55	> 25 and < 35
E	> 55 and < 80	> 35 and < 50
F	> 80	> 50

Source: Highway Capacity Manual 2000

The City of Maple Valley defines LOS D or better as its standard for signalized intersections. The City allows LOS E for unsignalized intersections on SR 169, Kent-Kangley Road and Witte Road. The analysis calculated the LOS for the study intersections using the procedures in the Transportation Research Board *Highway Capacity Manual 2000*.

#### F.4 Existing Conditions

The current land uses of the Donut Hole site create limited traffic and few impacts on the transportation system. The principal land uses include a portion of the Elk Run golf course, sand and gravel operations and a King County roads maintenance facility. Access to the site is primarily on 228th Avenue NE, except for a maintenance driveway on Kent-Kangley Road. All intersections meet the City's level of service standard. **Table 4** shows the existing levels of service and delay for each intersection during the PM peak hour.

**Table 4. Existing PM Peak Hour Intersection Levels of Service and Delay**

Location	Control Type	LOS	Delay (sec)
Kent-Kangley Rd/216th Ave SE	Signal	B	13
Kent-Kangley Rd/Witte Rd SE	Signal	D	45
Kent-Kangley Rd/228th Ave SE	Signal	A	7
SE Kent Kangley Rd/Maple Valley Hwy	Signal	D	37
SE 276th St/Maple Valley Hwy	Signal	A	9
SE 280th St/Maple Valley Hwy	Signal	A	8
SE 268th St/Witte Rd SE	Minor Stop [1]	C	17[2]
SE Witte Rd/Maple Valley Hwy	Signal	D	36
SE Wax Rd/Maple Valley Hwy	Signal	D	40

[1] Stop Control on Minor Leg of intersection

[2] Worst approach delay on Minor Leg

#### F.5 2025 No Action Baseline

The analysis uses a 2025 No Action baseline to identify the traffic impacts associated with the Donut Hole land use scenarios. The No Action baseline assumes that the Donut Hole keeps its existing land use. The scenario includes planned roadway improvements that would keep area roadways and intersections above the City's minimum operating standards.

The City has identified near-term projects in its Transportation Improvement Program (TIP) which guide the development of the transportation system between 2008 and 2013. All of the TIP projects are assumed to be completed in the 2025 No Action Baseline. The TIP projects within the study area include:

- Project T7 - Maple Valley Highway right turn lane from and Witte Road to SE 240th Street.
- Project T12 – Witte Road SE and SE 248th Street roundabout.
- Project T15 - Kent-Kangley Road (SR 516) widening to three lanes between 213th Place SE and 218th Avenue SE. Project includes construction of an eastbound right turn lane at 216th Street SE.
- Project T29 – SE 271st Street By-pass construction from 232nd Avenue SE to SR 169. A signal was assumed at either side of the intersection and an eastbound left turn pocket.
- Project T31 – Widening of Maple Valley Highway (SR 169) between SE 264th Street and SE 255th Street to four lanes with a continuous left turn lane.

The analysis assumes that a SR 169 is not widened to four lanes between Witte Road and SE 251st Street. A previous analysis found that all intersections would operate LOS D with the widening under 2025 No Action. Without the widening of Maple Valley Highway from SR 18 to the southern city limits, more traffic is diverted to alternate corridors including SE Witte Road. This also creates a failing (LOS F) condition at SE Witte Road/Maple Valley Highway and a LOS E at SE Wax Road/Maple Valley Highway.

**Table 5** shows the intersection levels of service for the existing conditions and No Action Baseline.

**Table 5. PM Peak Hour Intersection Levels of Service and Delay**

Location	Control Type	Existing		No Action	
		LOS	Delay (sec)	LOS	Delay (sec)
Kent-Kangley Rd/216th Ave SE	Signal	B	13	B	17
Kent-Kangley Rd/Witte Rd SE	Signal	D	45	E	58
Kent-Kangley Rd/228th Ave SE	Signal	A	7	B	11
SE Kent Kangley Rd/Maple Valley Hwy	Signal	D	37	D	42
SE 276th St/Maple Valley Hwy	Signal	A	9	B	11
SE 280th St/Maple Valley Hwy	Signal	A	8	B	14
SE 268th St/Witte Rd SE	Minor Stop [1]	C	17[2]	E	48[2]
Kent-Kangley Rd/SE 271st St By-Pass	Signal	-	-	A	8
SE 271st St By-Pass/Maple Valley Hwy	Signal	-	-	C	27
SE Witte Rd/Maple Valley Hwy	Signal	D	36	F	113
SE Wax Rd/Maple Valley Hwy	Signal	D	40	E	57

[1] Stop Control on Minor Leg of intersection

[2] Worst approach delay on Minor Leg

## F.6 Development Scenarios

Two development scenarios were evaluated in this study:

- Scenario 1 (proposed by King County) assumes development under King County proposed zoning for the site and assumes a mix of residential densities (averaging 12 units per acre) and approximately 95,900 gross square feet of commercial retail.
- Scenario 2 (Maple Valley R-6 Zoning) assumes development using Maple Valley R-6 zoning, which is more compatible with the zoning of the surrounding residential neighborhoods.

Both of these scenarios assume the roadway improvements identified in the 2025 No Action Baseline.

## F.7 Scenario 1: King County Proposal

Scenario 1 proposes an increase in the density of development from one dwelling unit per five acres to eight dwelling units per acre, with provisions to allow a maximum density of 12 dwelling units per acre. **Figure A.11** shows the conceptual land use site for Scenario 1. The scenario as depicted in Figure A.11 includes a mix of single-family and multi-family residential development along with approximately 95,000 square feet of retail development. The site plan

shows mixed-use apartments and commercial retail in the northwest quadrant of the site with a driveway on Kent-Kangley Road and 228th Avenue SE. Along the north central portion of the site, the plan shows development of condominiums and town homes; and in the portion south of the BPA corridor, single-family detached homes. Within the BPA corridor, an open space corridor, trail and potential park and recreational facility could be incorporated.

## F.8 Site Access and Circulation

As depicted in Figure A.11, the development would be integrated with the existing street system. An internal roadway system would provide a north-south roadway that would connect Kent-Kangley Road to SE 280th Street at 231st Place SE. An east-west roadway would connect 228th Avenue SE at SE 277th Place to SE 276th Place east of the site. The analysis also assumes access points at SE 279th Street on 228th Avenue SE and at 230th Avenue, 234th Avenue and 236th Avenue SE on SE 280th Street. These connections would tie the proposed development into the City's roadway system and provide access to and from the site at a variety of points.

A driveway on Kent-Kangley Road from the apartment's parking area would be limited to right-in and right-out access because of its proximity to the 228th Avenue SE/Kent-Kangley Road intersection.

Options for other access points may be considered, this proposal is just one scenario that represents a traffic circulation pattern based on the maximum land use capacity.

## F.9 Trip Generation

Trip generation is an estimate of all the new trips entering and exiting a site. A vehicle trip is defined as a single or one-direction vehicle movement with either the origin or destination (exiting or entering) inside the study site.

The analysis of Scenario 1 assumes the following land uses:

- Single Family Detached Units: 564 (8 dwelling units an acre)
- Town homes/Condominiums: 606 (14 dwelling units an acre)
- Apartments: 702 (18 units an acre)
- Commercial Retail: 95,900 gross square feet

The City of Maple Valley Transportation Model was used to estimate the number of new trips generated by the site. The City's model estimated a total of 1,111 PM peak hour trips would be generated under this scenario, consisting of 647 entering trips, 402 exiting trips and 62 internal trips.

For comparison, the trip generation rate from the Institute for Transportation Engineers (ITE) *Trip Generation* (7th Edition) was calculated using the Residential Planned Unit Development category (Land Use 270) and the Specialty Retail Center category (Land Use 814). Based on the ITE rates, the development would generate 1,406 PM peak hour trips or approximately 27 percent greater than the number estimated by the City's model. For a conservative estimate an average of the two rates was used, to arrive at 1,228 PM peak hour trips. **Table 6** compares the City's model and ITE trip generation rates and calculates the entering and exiting trips based on an average of the two rates.

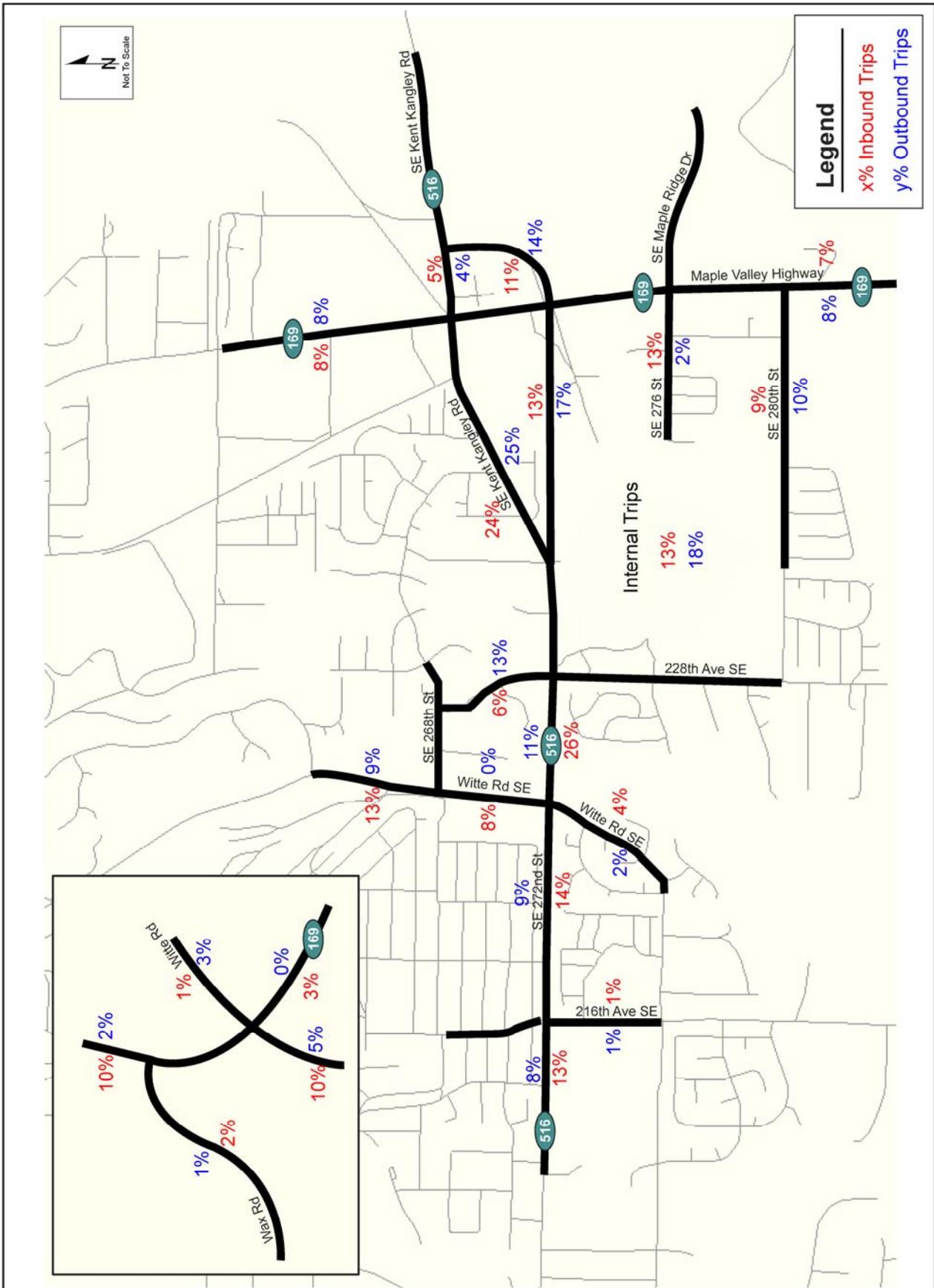
**Table 6. Trip Generation Comparison for Scenario 1**

	<b>City of Maple Valley Model</b>	<b>ITE Trip Generation</b>	<b>Average</b>
Entering	797	891	844
Exiting	539	515	527
Internal	100	[1]	100
Total	1,236	1,406	1,271

[1] ITE Trip Generation Rate includes internal trips within rates.

### **F.10 Trip Distribution and Assignment**

Scenario 1 would add trips on local and regional roadways. The analysis used the City's Transportation Model to distribute the traffic generated from the site. The distribution was based on the characteristics of the road network, existing traffic volume patterns, expected travel times and the location of likely trip origins and destinations. The vehicle trips from the trip generation estimate were assigned to the network following the trip distribution patterns. For example, during the PM peak hour, Scenario 1 would add 240 trips at the intersection of Kent-Kangley Road/Witte Road but 276 trips to the Kent-Kangley Road/SR 169 intersection. The highest level of trip impact would occur at SE 272nd Street and the north driveway which would have more than 745 additional trips during the PM peak hour. **Figure F.1** shows the PM peak hour directional trip distribution for Scenario 1.



SHEET TITLE: Trip Distribution for Scenario 1		NOT TO SCALE		<b>ISSUED:</b> Drawn By: Brad Dain Checked By: John Davies Approved By: John Davies Date: 04/25/2008		<b>SOURCES:</b> UNKNOWN		
	<b>DEVELOPMENT FEASIBILITY REPORT</b>		705 2 <sup>nd</sup> Ave. Suite 710 Seattle, WA 98104 Telephone: 206/624-6239 Fax: 206/625-0930 planning@rwta.com http://www.rwta.com		16030 Juanita-Woodinville Way NE Bothell, WA 98011 Telephone: 425/775-4581 Fax: 206/362-3819 http://www.grp4.com		11410 NE 122 <sup>nd</sup> Way Suite 320 Kirkland, WA 98034 Telephone: 425/821-1750 Fax: 425/821-1750 info@miraassociates.com www.miraassociates.com	
	<b>FIGURE F.1</b>							

## F.12 Local Impacts

The development of the Donut Hole site will create traffic impacts on the local street system. When the development connects with the street system, neighboring roadways may experience increases in traffic volumes and cause impacts to the character of the residential neighborhoods. During the PM peak hour, traffic level will increase by 63 percent (239 trips) on 228th Avenue SE, 71 percent (142 trips) on SE 276th Street and 11 percent (86 trips) on SE 280th Street.

## F.13 Intersection Impacts

The analysis calculates the LOS for the study intersections using the procedures in the Transportation Research Board *Highway Capacity Manual 2000*. **Table 7** shows the PM peak hour LOS and average delay and the percent increase in delay related to Scenario 1 for the Existing 2007, 2025 No Action Baseline (without Scenario 1) and 2025 with Scenario 1, the King County rezone. Although similar traffic impacts may occur at intersections at SE 240th Street/Maple Valley Highway and SE 231st Street/Maple Valley Highway, the study of these intersections fell outside the scope of this analysis.

**Table 7. PM Peak Hour Intersection Levels of Service and Delay**

Location	Control Type	Existing		No Action		Scenario 1		% Increase in Congestion (Scenario 1 vs. No Action)
		LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	
Kent-Kangley Rd/216th Ave SE	Signal	B	13	B	17	B	19	12%
Kent-Kangley Rd/Witte Rd SE	Signal	D	45	E	58	F	86	48%
Kent-Kangley Rd/228th Ave SE	Signal	A	7	B	11	C	27	145%
SE Kent Kangley Rd/Maple Valley Hwy	Signal	D	37	D	42	D	47	12%
SE 276th St/Maple Valley Hwy	Signal	A	9	B	11	B	11	0%
SE 280th St/Maple Valley Hwy	Signal	A	8	B	14	B	14	0%
SE 268th St/Witte Rd SE	Minor Stop [1]	C	17[2]	E	48[2]	F	88[2]	83%
Kent-Kangley Rd/Site Access	Minor Stop [1]	-	-	-	-	F	*	-
Kent-Kangley Rd/SE 271st St By-Pass	Signal	-	-	A	8	E	57	613%
SE 271st St By-Pass/Maple Valley Hwy	Signal	-	-	C	27	C	30	11%
SE Witte Rd/Maple Valley Hwy	Signal	D	36	F	113	F	142	26%
SE Wax Rd/Maple Valley Hwy	Signal	D	40	E	57	E	66	16%

[1] Stop Control on Minor Leg of intersection

[2] Worst approach delay on Minor Leg

\* Model delay estimates exceeds capacity

Based on these results, Scenario 1 would impact the following intersections:

- Kent-Kangley Road and the north Site Access. This intersection would operate at LOS F with extremely long delays for the northbound left turn movement.
- Witte Road /Maple Valley Highway. This signalized intersection would operate at LOS F with 142 seconds of delay.
- SE Wax Rd/Maple Valley Hwy. This intersection would operate at LOS E with 66 seconds of delay.
- Kent-Kangley Rd/Witte Rd SE. This intersection would operate at LOS F with 86 seconds of delay.
- SE 268th St/Witte Rd SE. The minor leg of this intersection (SE 268th Street) would operate at LOS F.
- Kent-Kangley Rd/SE 271st St By-Pass. Additional traffic would degrade this intersection to LOS E.

## F.14 Concurrency

Transportation concurrency is required by the Washington Growth Management Act (ch. 36.70A RCW). Concurrency, as applied to project level development, is the concept that impacts to roadways caused by development must be mitigated at the time of development or within six years, or the development may not be approved. The City of Maple Valley has adopted a concurrency code, consistent with the requirements of the Growth Management Act (ch. 16.30 MVMC).

Following the City's methods described ch. 16.30 MVMC, the analysis assessed whether the Donut Hole development at Scenario 1 levels would meet concurrency at the study intersections. Three intersections would fall below the concurrency threshold, meaning that funding for improvements would be required at these intersections. **Table 8** summarizes the concurrency evaluation.

**Table 8. Concurrency Evaluation – Scenario 1**

Location	Control Type	2025 LOS	Concurrency Standard	Measure	Concurrency Met?
Kent-Kangley Rd/216th Ave SE	Signal	B	D	Intersection Average	Yes
Kent-Kangley Rd/Witte Rd SE	Signal	F	D	Intersection Average	No
Kent-Kangley Rd/228th Ave SE	Signal	C	D	Intersection Average	Yes
SE Kent Kangley Rd/Maple Valley Hwy	Signal	D	D	Intersection Average	Yes
SE 276th St/Maple Valley Hwy	Signal	B	D	Intersection Average	Yes
SE 280th St/Maple Valley Hwy	Signal	B	D	Intersection Average	Yes
SE 268th St/Witte Rd SE	Minor Stop <sup>3</sup>	F	E [1]	Access Legs	No
Kent-Kangley Rd/Site Access	Minor Stop <sup>3</sup>	F	E[1]	Access Legs	No
Kent-Kangley Rd/SE 271st St By-Pass	Signal	E	D	Intersection Average	No
SE 271st St By-Pass/Maple Valley Hwy	Signal	C	D	Intersection Average	Yes
SE Witte Rd/Maple Valley Hwy	Signal	F	D	Intersection Average	No
SE Wax Rd/Maple Valley Hwy	Signal	E	D	Intersection Average	No

[1] Unsignalized intersections on Witte Road and Kent-Kangley Road and Maple Valley Highway have a standard of LOS E for the stop-controlled approach.

## F.15 Mitigation

Mitigation for Scenario 1 addresses the transportation impacts that the Donut Hole development will create, above and beyond the future No Action alternative. The following provides an indication of the types of potential mitigation strategies that could be required for Scenario 1.

**Frontage Mitigation** - Infrastructure improvements will be needed to improve area roadways adjacent to the development. A review of the City’s Comprehensive Plan found that 228th Avenue SE and SE 280th Street are classified as “Boulevard Collectors” and would require construction to meet City roadway standards including bike lanes, medians, sidewalks, curb and gutters and a landscaped median. Improvements along the property’s frontage would also be required on Kent-Kangley Road.

**Internal Roadway Mitigation** - The internal roadway system would serve the mobility needs of both the development and surrounding neighborhoods. Roadways within the development should be built to the City of Maple Valley road standards and reflect the functional classification shown in the City’s Comprehensive Plan.

**Intersection Mitigation** - The roadway analysis found that Scenario 1 would impact several intersections. These impacts would require mitigation to ensure the proper operation of the future transportation system.

The following identifies the mitigation measures for Scenario 1:

- **Kent-Kangley Road and the North Site Access and 271st Street By-Pass.** The North Site Access would operate at LOS F without mitigation and Kent-Kangley and 271st Street intersection would operate at LOS E, exceeding the LOS D standard for signalized intersections. For Scenario 1, the City should consider and study the relocation of the North Site Access to align with 232nd Avenue SE and create a roundabout including Kent-Kangley Road and the 271st Street By-Pass.
- **Kent-Kangley Road and SE Witte Road.** This intersection would operate at LOS F without mitigation, exceeding the LOS D standard for signalized intersections. High southbound left turning volumes to Kent-Kangley Road result in delays at the intersection. To meet the LOS standard, a separate southbound long left turn lane would be needed on SE Witte Road. In addition, Scenario 1 would require Permitted+Protected phasing for eastbound and westbound left turn movements. However, the Permitted+Protected left turn phasing may increase the likelihood of traffic collisions at this location. These actions would improve the SE Witte Road and Kent-Kangley Road intersection from LOS F to LOS D, meeting City LOS and concurrency requirements.
- **SE Witte Road and Maple Valley Highway.** This intersection would operate at LOS F without mitigation, exceeding the LOS D standard for signalized intersections. The City's 2025 plan for this intersection creates a southbound through-right turn lane in order to provide a second through lane for SR 169 traffic. The proposed Donut Hole mitigation shall require the development of an exclusive southbound right turn lane to accommodate the high right turn volumes to Witte Road. This action would only improve the intersection to LOS E. Elimination of southbound left turn would also improve LOS of this intersection. Additional mitigation such as connections between Witte Road and Wax Road and the by-pass road between SE Witte Road and SE 240th Street will need additional study to alleviate traffic congestion at this intersection.
- **SE Wax Road and Maple Valley Highway.** This intersection would operate at LOS E without mitigation, exceeding the LOS D standard for signalized intersections. The City needs to explore connections between Witte Road and Wax Road to alleviate traffic congestion at this intersection.
- **SE 268th St and SE Witte Road.** This intersection would operate at LOS F without mitigation, exceeding the LOS E standard for unsignalized intersections on Witte Road. The addition of a southbound left turn lane and the channelization of westbound left and right turn movements in conjunction with the additional of a southbound left lane at the Witte Road and Kent-Kangley intersection would improve the intersection to LOS E, meeting the standard. However, this improvement must be balanced with the potential for increased traffic on SE 268th Street, a neighborhood collector. In addition, traffic calming measures on SE 268th Street and SE 227th Street/SE 228th Street (north of Kent-Kangley Road) may be pursued to reduce cut-through traffic on this street.

## F.16 Scenario 2: Maple Valley R-6 Zoning

Scenario 2 assumes development of the Donut Hole using Maple Valley R-6 zoning, which is more compatible with the zoning of the surrounding residential neighborhoods. A conceptual land use site plan was developed for Scenario 2 that includes single-family detached homes and an open space corridor, trail and potential park within the BPA corridor. **Figure A.16** shows the site plan for Scenario 2.

## F.17 Site Access and Circulation

The development's roadways would be developed within the existing street system. Consistent with the conceptual site plan, the analysis assumes an internal roadway system that provides a north-south roadway connecting Kent-Kangley Road (SR 516) to SE 280th Street at 231st Place SE and an east-west roadway connecting 228th Avenue SE at SE 277th Place to SE 276th Place east of the site. An additional access point at SE 280th Street/236th Avenue SE would provide access to the southeast portion of the site. These connections would tie the proposed development into the City's roadway system and provide access to and from the site at a variety of points.

## F.18 Trip Generation

Trip generation is an estimate of all the new trips entering and exiting a site. A vehicle trip is defined as a single or one-direction vehicle movement with either the origin or destination (exiting or entering) inside the study site. The City of Maple Valley Transportation Model was used to estimate the number of new trips generated by the land uses described by Scenario 2. The proposed development assumes the development of 936 single-family residential homes. A total of 576 trips were estimated by the model.

For comparison, the trip generation rate from the Institute for Transportation Engineers (ITE) *Trip Generation* (7th Edition) was calculated using the Single Family Residential Category (Land Use 210). Based on the ITE rate, the development would generate 802 PM peak hour trips, compared to 850 trips estimated by the model. The average of the two rates was used to arrive at 815 PM peak hour trips. **Table 9** compares the City's model and ITE trip generation rates and calculates the entering and exiting trips based on an average of the two rates.

**Table 9. Trip Generation Comparison for Scenario 2**

	City of Maple Valley Model	ITE Trip Generation	Average
Entering	540	505	523
Exiting	332	297	315
Internal	22	--	22
Total	850	802	815

## F.19 Trip Distribution and Assignment

The proposed scenario would add trips on local and regional roadways. The analysis used the City's Transportation Model to distribute the traffic generated from the site. The distribution was based on the characteristics of the road network, existing traffic volume patterns, expected travel times and the location of likely trip origins and destinations. The vehicle trips from the trip

generation estimate were assigned to the network following the trip distribution patterns. For example, during the PM peak hour, Scenario 2 would add 220 trips at the intersection of SE 271st Street By-Pass/SR-169 and 165 trips to the Kent-Kangley Road/Witte Road intersection. The highest level of trip impact would occur at SE 272nd Street/north driveway which would have more than 485 additional trips during the PM peak hour. **Figure F.2** shows the PM peak hour directional trip distribution for Scenario 2.

## **F.20 Local Impacts**

Development of the Donut Hole site under Scenario 2 will create traffic impacts on the local street system. Where the development connects with the existing street system, neighboring roadways may experience increases in traffic volumes and impact the character of the residential neighborhoods. During the PM peak hour, traffic levels will increase by 47 percent (127 trips) on 228th Avenue SE, 14 percent (15 trips) on SE 276th Street and 11 percent (85 trips) on SE 280th Street as a result of Scenario 2.

## **F.21 Intersection Impacts**

The analysis calculates the LOS for the study intersections using the procedures in the Transportation Research Board *Highway Capacity Manual 2000*. **Table 10** shows the PM peak hour LOS and average delay and the percent increase in delay related to Scenario 2 for the Existing 2007, 2025 No Action Baseline (without Scenario 2) and 2025 with Scenario 2, Maple Valley R-6 zoning.

**Table 10. PM Peak Hour Intersection Levels of Service and Delay**

Location	Control Type	Existing		No Action		Scenario 2		% Increase in Congestion (Scenario 2 vs. No Action)
		LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	
Kent-Kangley Rd/216th Ave SE	Signal	B	13	B	17	B	18	6%
Kent-Kangley Rd/Witte Rd SE	Signal	D	45	E	58	E	74	28%
Kent-Kangley Rd/228th Ave SE	Signal	A	7	B	11	B	14	27%
SE Kent Kangley Rd/Maple Valley Hwy	Signal	D	37	D	42	D	45	7%
SE 276th St/Maple Valley Hwy	Signal	A	9	B	11	B	11	0%
SE 280th St/Maple Valley Hwy	Signal	A	8	B	14	B	14	0%
SE 268th St/Witte Rd SE	Minor Stop [1]	C	17[2]	E	48[2]	F	71[2]	48%
Kent-Kangley Rd/Site Access	Minor Stop [1]	-	-	-	-	F	*	-
Kent-Kangley Rd/SE 271st St By-Pass	Signal	-	-	A	8	C	29	263%
SE 271st St By-Pass/Maple Valley Hwy	Signal	-	-	C	27	C	28	4%
SE Witte Rd/Maple Valley Hwy	Signal	D	36	F	113	F	<b>118</b>	4%
SE Wax Rd/Maple Valley Hwy	Signal	D	40	E	57	E	64	12%

[1] Stop Control on Minor Leg of intersection

[2] Worst approach delay on Minor Leg

\* Model delay estimates exceeds capacity



Based on these results, Scenario 2 would impact the following intersections:

- Kent-Kangley Rd/Witte Rd SE. This intersection would operate at LOS E with 74 seconds of delay.
- Witte Road/Maple Valley Highway. This signalized intersection would operate at LOS F with an average delay of 118 seconds.
- Witte Road/Maple Valley Highway. This signalized intersection would operate at LOS E with an average delay of 64 seconds.
- Kent-Kangley Road and the north Site Access. This intersection would operate at LOS F with extremely long delays for the northbound left turn movement.

## F.22 Concurrency

Transportation concurrency as required by the Washington State Growth Management Act (RCW 36.70A), is the concept that roadway projects must be funded to occur along with or concurrent with new development. If a City does not have the committed funds to provide for the transportation facilities necessary to support new development, then a City may not approve that development.

Following the City's methods described in the Maple Valley City Code (Chapter 16.30), the analysis assessed whether the Donut Hole development at Scenario 2 levels would meet the concurrency at the study intersections. Two intersections would fall below the concurrency threshold, meaning that funding for improvements would be required at these intersections. **Table 11** summarizes the concurrency evaluation.

**Table 11. Concurrency Evaluation – Scenario 2**

Location	Control Type	2025 LOS	Concurrency Standard	Measure	Concurrency Met?
Kent-Kangley Rd/216th Ave SE	Signal	B	D	Intersection Average	Yes
Kent-Kangley Rd/Witte Rd SE	Signal	E	D	Intersection Average	No
Kent-Kangley Rd/228th Ave SE	Signal	B	D	Intersection Average	Yes
SE Kent Kangley Rd/Maple Valley Hwy	Signal	D	D	Intersection Average	Yes
SE 276th St/Maple Valley Hwy	Signal	B	D	Intersection Average	Yes
SE 280th St/Maple Valley Hwy	Signal	B	D	Intersection Average	Yes
SE 268th St/Witte Rd SE	Minor Stop <sup>3</sup>	F	E [1]	Access Legs	No
Kent-Kangley Rd/Site Access	Minor Stop <sup>3</sup>	F	E [1]	Access Legs	No
Kent-Kangley Rd/SE 271st St Bypass	Signal	C	D	Intersection Average	Yes
SE 271st St Bypass/Maple Valley Hwy	Signal	C	D	Intersection Average	Yes
SE Witte Rd/Maple Valley Hwy	Signal	F	D	Intersection Average	No
SE Wax Rd/Maple Valley Hwy	Signal	E	D	Intersection Average	No

[1] Unsignalized intersections on Witte Road and Kent-Kangley Road and Maple Valley Highway have a standard of LOS E for the stop-controlled approach.

## F.23 Mitigation

Mitigation for Scenario 2 addresses the transportation impacts that the development will create, above and beyond the future No Action alternative. The following provides an indication of the types of mitigation that would be required for Scenario 2.

**Frontage Mitigation** - Infrastructure improvements will be needed to improve area roadways adjacent to the development. A review of the City’s Comprehensive Plan found that 228th Avenue SE and SE 280th Street are classified as “Boulevard Collectors” and would require construction to meet City roadway standards including bike lanes medians, sidewalk, curb and gutters and a landscaped median. Improvements along the property’s frontage would also be required on Kent-Kangley Road.

**Internal Roadway Mitigation**- The internal roadway system would serve the mobility needs of both the development and surrounding neighborhoods. Roadways within the development should be built to the City of Maple Valley road standards and reflect the functional classification shown in the Comprehensive Plan.

**Intersection Mitigation** - Trips from the development would primarily affect the unsignalized intersection formed at the internal roadway and Kent-Kangley Road. To meet the LOS standard, Kent-Kangley Road would need to be widened to three lanes to provide a westbound left turn pocket for traffic entering the Donut Hole and a westbound acceleration lane for traffic exiting

the site (northbound to westbound). This action would improve the Kent-Kangley Road /Site Access intersection from LOS F to LOS D, meeting City LOS standards and concurrency requirements.

**Intersection Mitigation** - The roadway analysis found that Scenario 2 would impact the same two intersections identified in Scenario 1. Scenario 2 would require a lesser degree of mitigation at these locations.

The following identifies the mitigation measures for Scenario 2:

- **Kent-Kangley Road and the North Site Access.** This intersection would operate at LOS F without mitigation, above the LOS E standard for unsignalized intersections on Kent-Kangley Road. The North Site Access would not provide desirable intersection spacing resulting in additional delay along the corridor. For Scenario 2, this driveway should be relocated to 232nd Avenue SE, where Kent-Kangley and the 271st Street bypass meet. This action would consolidate the number of signals on the corridor and provide an acceptable LOS for the intersection.
- **Kent-Kangley Road and SE Witte Road.** Under Scenario 2, this intersection would operate at LOS E without mitigation, exceeding the LOS D standard for signalized intersections. To meet the LOS standard, a separate southbound left turn lane would be needed on SE Witte Road. These actions would improve the SE Witte Road and Kent-Kangley Road intersection from LOS E to LOS D, meeting City LOS and concurrency requirements.
- **SE Witte Road and Maple Valley Highway.** (Same as Scenario 1) This intersection would operate at LOS F without mitigation, exceeding the LOS D standard for signalized intersections. The City's 2025 plan for this intersection creates a southbound through-right turn lane in order to provide a second through lane for SR 169 traffic. The proposed Donut Hole mitigation shall require the development of an exclusive southbound right turn lane to accommodate the high right turn volumes to Witte Road. This action would only improve the intersection to LOS E. Additional mitigation such as connections between Witte Road and Wax Road and the by-pass road between SE Witte Road and SE 240th Street will need additional study to alleviate traffic congestion at this intersection.
- **SE Wax Road and Maple Valley Highway.** (Same as Scenario 1) This intersection would operate at LOS E without mitigation, exceeding the LOS D standard for signalized intersections. The City needs to explore connections between Witte Road and Wax Road to alleviate traffic congestion at this intersection.
- **SE 268th St and SE Witte Road.** (Same as Scenario 1) This intersection would operate at LOS F without mitigation, exceeding the LOS E standard for unsignalized intersections on Witte Road. The addition of a southbound left turn lane and the channelization of westbound left and right turn movements in conjunction with the additional of a southbound left lane at the Witte Road and Kent-Kangley intersection would improve the intersection to LOS E, meeting the standard. However, this improvement must be balanced with the potential for increased traffic on SE 268th Street, a neighborhood collector.