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TO: Robin Shishido, HDOT-Highways, Maui District

FROM: Kevin French, Senior Transportation Engineer
Dexter Eji, Project Manager

DATE: July 28, 2020

SUBJECT: **Piilani Highway/Kihei High School Roundabout Evaluation**

The State of Hawaii Department of Education (DOE) is developing a new high school to be located in Kihei, Hawaii. Primary access to the new school will be across from Kulanihakoi Street along Piilani Highway. A Traffic Impact Study (TIR), an Environmental Impact Statement, multi-modal, and intersection control studies have been completed to determine the most effective means for controlling traffic and maximizing pedestrian safety the main intersection providing access to the high school. The currently approved means for controlling the intersection is a traffic signal coupled with a future grade separation for pedestrians. Other options for controlling the intersection that were studied included a multi-lane roundabout with an at-grade crossing and with a grade separated pedestrian crossing.

The State of Hawaii Transportation Department (DOT) has retained WSP to further develop multi-lane roundabout alternatives that maximizes the traffic calming and traffic safety benefits of roundabouts and provides a safe at-grade pedestrian crossing at the intersection. DOT's primary concerns are that traffic speeds along Piilani Highway need to be reduced and that pedestrians need to be safely accommodated. In addition the DOT is tasked with assuring reasonable long-term traffic operations for mobility along state highways, including Piilani Highway.

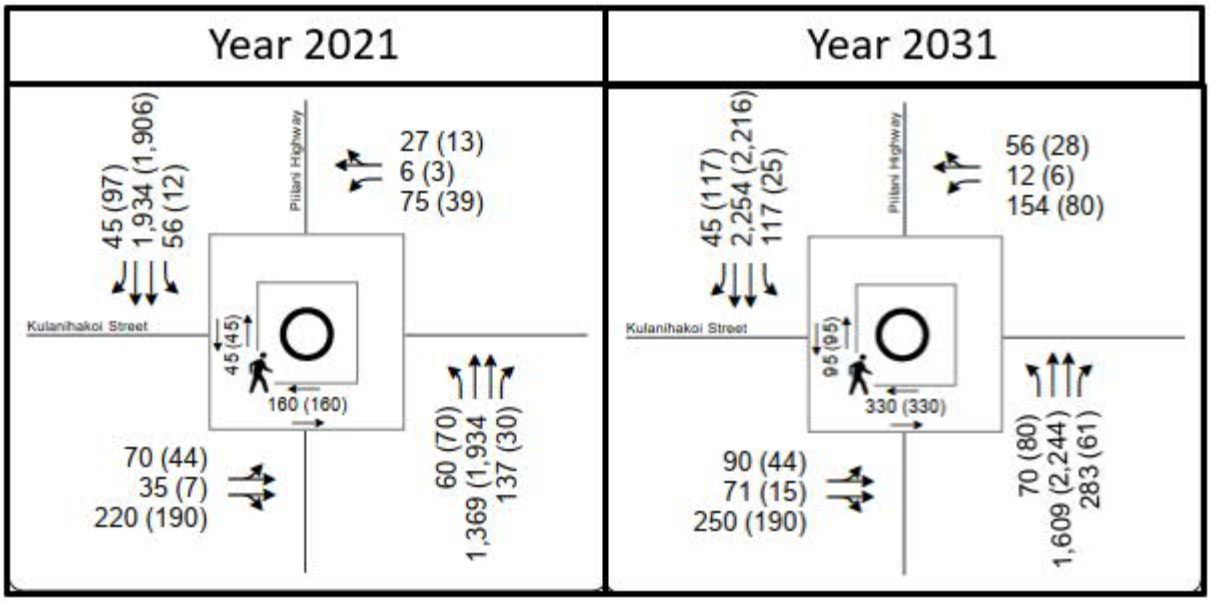
A grade separated pedestrian crossing would require climbing of stairs or extensive out-of-direction travel along accessible ramps in order for pedestrians to use the crossing, and without significant, potentially infeasible pedestrian barriers, the grade separated crossing may be rendered ineffective. Pedestrian barriers are feasible in the raised medians or perhaps along the roadway; however, openings will be required at the intersection to allow vehicular movement. These openings would present an opportunity for pedestrians to illegally cross the highway without benefit of the grade separated crossing or any at-grade pedestrian safety features.

Traffic Analysis:

As stated a significant amount of traffic evaluation work has been completed at the proposed intersection. Traffic volumes for use in evaluating the roundabout options were extracted from the Fehr & Peers Technical Memorandum, *Kihei High School – Multimodal Operations Alternatives Evaluation of the Kulanihakoi Street/Piilani Highway Intersection*, dated August 1, 2019. These volumes are shown in Figure 1, Year 2021 and Year 2031 Traffic and Pedestrian Volumes. For consistency WSP used these traffic volumes and information about how these

were developed is included in the August 2019 technical memorandum. In summary, the Year 2021 traffic volumes were based on 800 students with 20% of trips arriving by walking or bicycling, and Year 2031 traffic volumes were based on 1,650 students with 20% arriving by walking or bicycling.

Figure 1, Year 2021 and Year 2031 Traffic and Pedestrian Volumes



WSP utilized the SIDRA INTERSECTION 9.0 traffic analysis software to evaluate the anticipated traffic operating conditions for the differing roundabout alternatives. SIDRA allows the user to select the traffic analysis methodology to be used in the analysis, and for consistent evalutions completed in the United States, the Highway Capacity Manual (HCM 6) was selected. In addition, the level-of-service (LOS) criteria selected was unsignalized intersections, again consistent with evaluations for unsignalized intersections evaluated in the United States.

Four roundabout options were evaluated and are discussed below.

1. Two-lane roundabout, two-lane approaches on Piilani Highway, one-lane approach on Kulanihakoi Street, and one-lane approach from Kihei HS driveway. In this option the left-turn, through, and right-turn approach volumes would be serviced by one lane on minor approaches.
2. Two-lane roundabout, two-lane approaches on Piilani Highway, two-lane approaches on Kulanihakoi Street and Kihei HS driveway. In this option the left-turn and through approach volumes with be accomodated in one lane and an additional lane would be provided for right-turns.
3. Two-lane roundabout, two-lane approaches on Piilani Highway, two-lane approaches on Kulanihakoi Street and Kihei HS driveway with right-turn bypass lanes on west side of intersection.
4. Two-lane roundabout, two-lane approaches on Piilani Highway, two-lane approaches on Kulanihakoi Street and Kihei HS driveway with right-turn bypass lanes on east side of intersection.

A fifth option was developed deemed the “optimized” option that combined the benefits of the west side bypasses along with a northbound Piilani Highway to Kihei HS bypass. The

westbound Kihei HS to northbound bypass showed incremental benefits but also had additional, potentially unnecessary impacts to the high school site.

The results of the analysis for Year 2021 and Year 2031 are shown in Tables 1 and 2, respectively, and the analysis worksheets are attached.

Table 1, Year 2021, Intersection LOS/Delay (HCM 6)

Piilani Hwy/Kulanihakoi St	Piilani Hwy - South		Kihei HS Drwy		Piilani Hwy - North		Kulanihakoi St		Overall	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Year 2021 - Single Lane - AM	19.8	C	17.2	C	31.8	D	409.9	F	57.2	F
Year 2021 - Single Lane - PM	28.6	D	26.6	D	26.3	D	166.9	F	35.2	E
Year 2021 - Two Lane - AM	22.5	C	15.3	C	31.8	D	142.0	F	36.6	E
Year 2021 - Two Lane - PM	29.2	D	24.2	C	26.3	D	78.4	F	30.5	D
Year 2021 - Two Lane w/ West Bypasses - AM	22.5	C	15.3	C	28.1	D	18.2	C	24.8	C
Year 2021 - Two Lane w/ West Bypasses - PM	29.2	D	24.2	C	20.8	C	9.5	A	24.1	C
Year 2021 - Two Lane w/ East Bypasses - AM	16.4	C	12.6	B	31.8	D	142.0	F	34.2	D
Year 2021 - Two Lane w/ East Bypasses - PM	26.9	D	19.3	C	26.3	D	78.4	F	29.4	D
Year 2021 - Two Lane Optimized - AM	16.4	C	15.3	C	28.1	D	18.2	C	22.4	C
Year 2021 - Two Lane Optimized - PM	26.9	D	24.2	C	20.8	C	9.5	A	23.1	C

As shown Table 1, the single lane approaches on Kulanihakoi Street would experience significant delay with only one approach lane. The delays are significantly improved with two approach lanes, but only improved to LOS C or better with right-turn bypass lanes for right-turn movements to and from Kulanihakoi Street. A minimum of two approach lanes on the minor streets are required for reasonable traffic operations in the Year 2021.

Table 2, Year 2031, Intersection LOS/Delay (HCM 6)

Piilani Hwy/Kulanihakoi St	Piilani Hwy - South		Kihei HS Drwy		Piilani Hwy - North		Kulanihakoi St		Overall	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Year 2031 - Single Lane - AM	86.9	F	39.2	E	118.8	F	671.8	F	148.2	F
Year 2031 - Single Lane - PM	93.3	F	46.9	E	75.6	F	270.0	F	92.7	F
Year 2031 - Two Lane - AM	116.5	F	22.2	C	117.1	F	236.9	F	122.5	F
Year 2031 - Two Lane - PM	100.7	F	32.8	D	75.2	F	120.8	F	88.4	F
Year 2031 - Two Lane w/ West Bypasses - AM	125.6	F	22.0	C	105.9	F	47.3	E	105.1	F
Year 2031 - Two Lane w/ West Bypasses - PM	101.2	F	32.7	D	54.7	F	13.2	B	73.9	F
Year 2031 - Two Lane w/ East Bypasses - AM	50.1	F	29.4	D	121.9	F	228.4	F	98.4	F
Year 2031 - Two Lane w/ East Bypasses - PM	87.1	F	29.3	D	75.9	F	119.9	F	82.2	F
Year 2031 - Two Lane Optimized - AM	54.7	F	33.4	D	110.3	F	45.5	E	79.8	F
Year 2031 - Two Lane Optimized - PM	87.5	F	35.4	E	55.2	F	13.2	B	67.8	F

As noted in Table 2, operating conditions will degrade substantially in the Year 2031 with the increase in traffic expected along Piilani Highway coupled with the full development of the 1,650 student high school. The two-lane approach on Kulanihakoi Street with bypasses is required to provide LOS E in the morning peak hour. The bypasses on the east side for the high school are not as critical; however, the northbound right-turn bypass to the high school improves conditions for northbound Piilani Highway approaching the intersection. The “optimized” alternative provides overall peak hour LOS delays that might be comparable to delays that would be experienced at a very busy intersection with traffic signal control.

As stated earlier, the SIDRA intersection analysis software allows the user to select differing analysis methodology including its own SIDRA methodology. This methodology differs from the HCM 6 and is based on research from areas in which motorists have more experience

navigating roundabouts. For comparison purposes, the Year 2031 with full build out of the high school was evaluated using the SIDRA methodology and is listed in Table 3.

Table 3, Year 2031, Intersection LOS/Delay (SIDRA)

Piilani Hwy/Kulanihakoi St	Piilani Hwy - South		Kihei HS Drwy		Piilani Hwy - North		Kulanihakoi St		Overall	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Year 2031 - Single Lane - AM	53.6	E	31.2	C	89.1	F	589.0	F	113.6	F
Year 2031 - Single Lane - PM	63.1	E	29.6	C	42.1	D	231.9	F	60.9	E
Year 2031 - Two Lane - AM	88.9	F	16.1	B	86.5	F	68.4	E	82.8	F
Year 2031 - Two Lane - PM	70.3	F	19.0	B	41.8	D	32.4	C	54.2	E
Year 2031 - Two Lane w/ West Bypasses - AM	94.3	F	15.9	B	18.6	B	39.6	D	49.8	D
Year 2031 - Two Lane w/ West Bypasses - PM	71.2	F	19.0	B	7.1	A	15.1	B	37.7	D
Year 2031 - Two Lane w/ East Bypasses - AM	8.7	A	13.7	B	89.0	F	66.1	E	52.3	E
Year 2031 - Two Lane w/ East Bypasses - PM	6.0	A	19.9	B	45.1	D	31.4	C	25.6	C
Year 2031 - Two Lane Optimized - AM	9.2	A	15.0	B	19.8	B	40.0	D	17.1	B
Year 2031 - Two Lane Optimized - PM	6.1	A	21.9	C	7.6	A	15.2	B	7.6	A

As noted in Table 3, the anticipated operating conditions using SIDRA methodology appear to be much improved over the conditions calculated by HCM 6 methodology. There is confirmation that the single lane approached on the minor streets will not function effectively with extreme delay on the Kulanihakoi Street approach. The two-lane approaches without bypasses will still operate poorly in the morning peak hour although the delays are much lower and comparable to a very busy intersection with traffic signal control. The addition of the west side bypasses to Kulanihakoi Street and the northbound right-turn bypass to high school appears to operate very favorably with overall operations at LOS B or better in both peak hours.

Based on the traffic evaluation of the roundabout alternatives, two alternatives have been carried forward for preliminary design, the two-lane alternative with no bypasses and the "optimized" alternative with bypasses on the west side and a northbound Piilani Highway to eastbound Kihei High School bypass. The SIDRA conceptual exhibits for these two alternatives are shown in Figures 2 and 3.

Figure 2, SIDRA Conceptual Exhibit, Two-lane without Bypasses

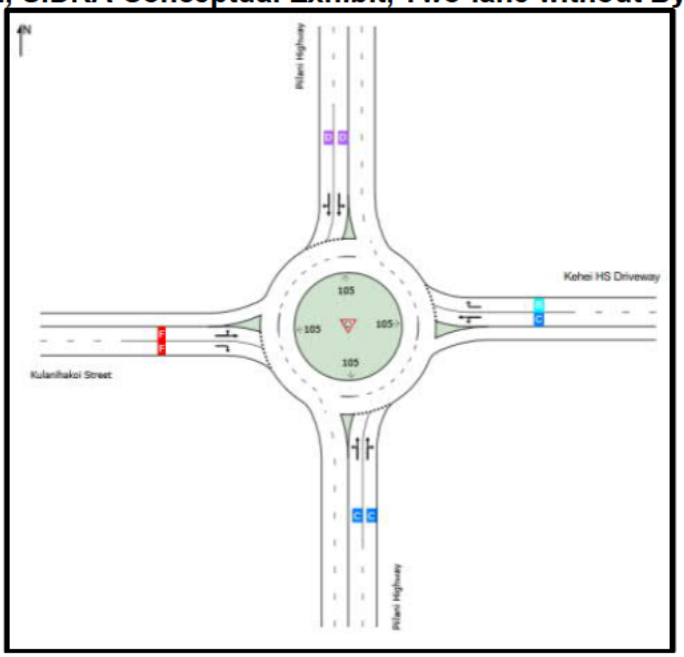
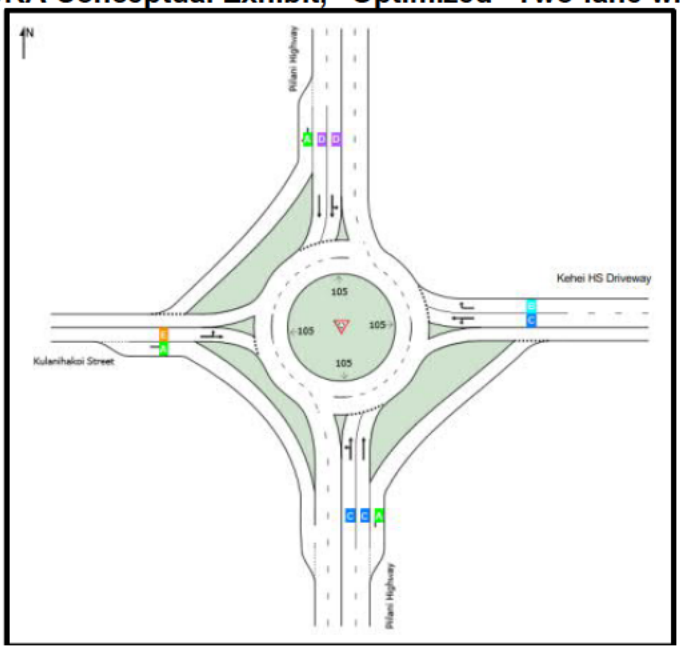


Figure 3, SIDRA Conceptual Exhibit, "Optimized" Two-lane with Bypasses



In addition to delay and level-of-service another measure to be considered in the performance of the roundabout options is the anticipated back of queue (or number of stored vehicles) that might extend back from the roundabout. For the purposes of this analysis it is assumed that the average length between the front of vehicles is 25' which includes the length of the vehicle and a reasonable distance between queued vehicles. As congestion increases, the delay is longer and more vehicles are stored or queued on the approaches. For comparison, the estimated queue lengths for the Years 2021 and 2031 for the two roundabout alternatives are presented in Table 4.

Table 4, Queue Lengths

Piilani Hwy/Kulanihakoi St	Morning Peak Hour				Afternoon Peak Hour			
	South	East	North	West	South	East	North	West
Year 2021 - Two Lane (HCM6)	540'	20'	1,265'	480'	390'	15'	935'	170'
Year 2021 - Two Lane Optimized (HCM6)	325'	20'	1,105'	55'	365'	15'	625'	20'
Year 2031 - Two Lane (HCM6)	2,495'	55'	3,120'	820'	3,690'	40'	2,715'	315'
Year 2031 - Two Lane Optimized (HCM6)	1,450'	75'	2,960'	165'	3,350'	40'	2,260'	30'
Year 2031 - Two Lane (SIDRA)	1,840'	65'	2,240'	290'	2,435'	45'	1,525'	150'
Year 2031 - Two Lane Optimized (SIDRA)	275'	55'	920'	180'	455'	50'	415'	35'

As noted in Table 4, the queue lengths will be reduced with the provision of the bypass lanes included in the "optimized" two-lane roundabout alternative. Without the bypass lanes queue lengths may extend over one half mile from the intersection along Piilani Highway. The Kihei HS driveway on the east leg of the roundabout will not experience significant queuing in either alternative. On the west, Kulanihakoi Street, the queue for left-turning and through vehicles will likely extend back through the adjacent local intersection, while the right-turn lane will flow freely with the eastbound to southbound bypass lane.

Geometric Design:

The preliminary design of the roundabouts is based on the concepts included in NCHRP Report 672, *Roundabouts: An Informational Guide*, 2010. The characteristics or design parameters are discussed below with supporting information.

- The roadway alignment along Piilani Highway will be adjusted to provide deflection on entry to slow motorists at the roundabout and encourage motorists to yield at the entry point. Additionally, raised median and curb/gutter sections will be provided to delineate the entry curves, approaches, circulating lanes, and exits to encourage motorist to stay within designated travel lanes.
- The roundabout will be designed with two circulating lanes for northbound and southbound Piilani Highway with one circulating lane on the north and south sides of the roundabout to accommodate left-turns to and from the minor street approaches.
- For the two-lane alternative with no bypasses, northbound and southbound traffic on Piilani Highway will be accommodated in two lanes, a combined left-turn/through lane, and a combined through/right-turn lane. Eastbound and westbound traffic from the minor streets will be accommodated in one combined left-turn/through lane and a second lane for right-turns. The right-turn bypass options will remove the right-turns from the combined through/right-turn lanes for the respective movements.
- WB-67 trucks will be accommodated at the roundabout with 165' inscribed (outside) diameter. Trucks will be accommodated on the minor streets by utilizing both approach lanes and a truck apron. As much as practical trucks will be accommodated on Piilani Highway without requiring encroachment into adjacent entry, circulating, and exit lanes. This will require trucks in left/through lanes to use the truck apron as they traverse the roundabout.
- Pedestrians will be accommodated on the west, south, and east legs of the intersection. The relatively high numbers of pedestrians associated with the high school coupled with the multiple approach/exit lanes on Piilani Highway will require additional pedestrian safety devices for the south leg of the intersection. The raised median width will be maximized to accommodate a high number of pedestrians waiting to cross the street, and Rectangular Rapid Flashing Beacons (RRFB) or High-Intensity Activated crossWalK (HAWK) traffic signals will be used for the crossing. Raised pedestrian crossings will be added in the right-turn bypass lanes.

The preliminary design for the two-lane roundabout alternative and the "optimized" roundabout alternative are included as Attachments 1 and 2. Note that the single-lane approach option was eliminated due to very poor and unacceptable delays and level-of-service. The bypass options were combined into the "optimized" roundabout due to the improved operations including right-turn bypasses to and from Kulanihakoi Street along with the northbound right-turn bypass to the Kihei High School.

Discussion:

The following operational characteristics are discussed further to determine the roundabout option that best serves the various traffic safety and traffic operational characteristics of the two remaining roundabout options.

- Pedestrian Safety
- Traffic Operations

- Right-of-way/Limits of Construction
- Utility/Infrastructure Impacts
- Construction cost

The primary reason for choosing roundabout control over a traffic signal control was to slow vehicular traffic along Piilani Highway and improve safety for high school aged pedestrians for at-grade crossing from neighborhoods to the high school. Both roundabout options will slow the majority of the traffic approaching the intersection northbound and southbound on Piilani Highway. Pedestrian safety enhancements including rectangular rapid flashing beacons (RRFB) or HAWK signal are would be included for the crossing on south side of the roundabout.

The two-lane roundabout alternative without bypass lanes would be an incrementally better option for pedestrian safety because it would have shorter pedestrian crossing distances and all traffic would be required to slow at the entry to the roundabout. Pedestrians would cross only two lanes of traffic, or approximately 28'-29', with a pedestrian refuge area, then cross the remaining two lanes of traffic. The crossing distances are illustrated in Figure 4.

Figure 4, Two-Lane Roundabout, Pedestrian Crossing Distances

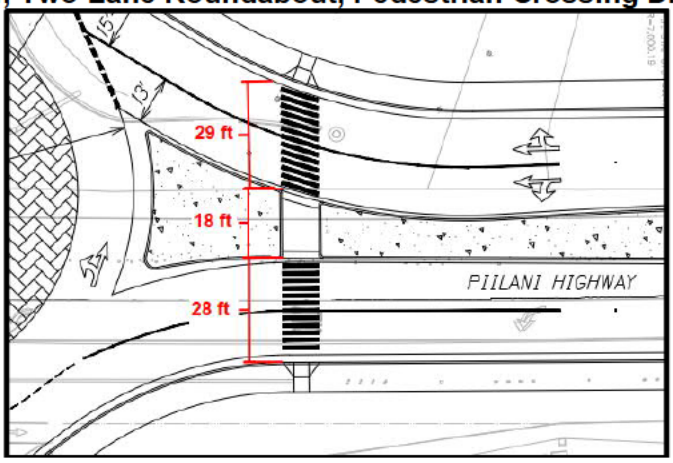
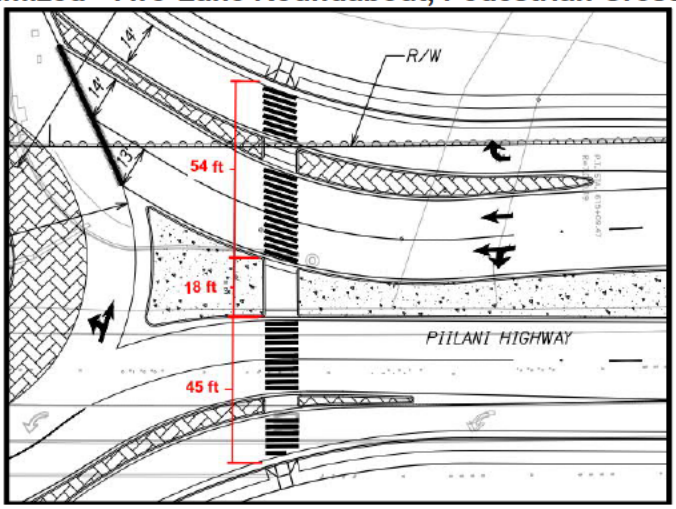


Figure 5, "Optimized" Two-Lane Roundabout, Pedestrian Crossing Distances



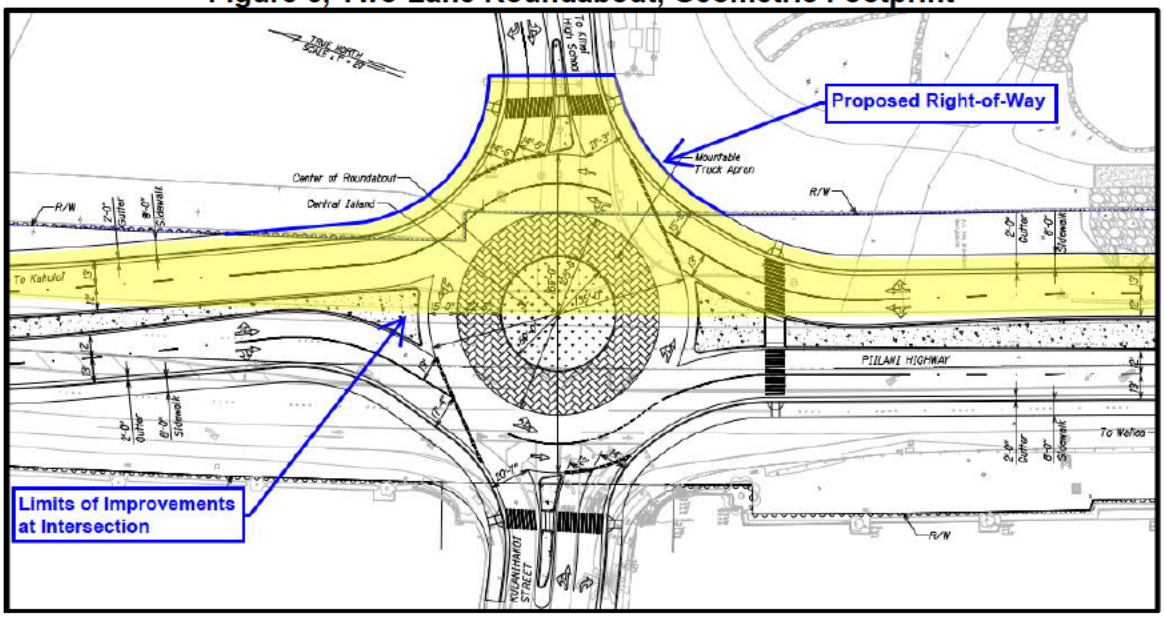
The two-lane roundabout alternative with bypasses would require crossing three lanes of traffic, approximately 45'-54', then traverse the median refuge area, and then cross an additional three lanes of traffic as illustrated in Figure 5. The additional width and exposure to right-turning traffic in the turn lanes can be partially mitigated by providing raised pedestrian crosswalks in the right-turn bypass lanes.

As discussed earlier, the two-lane roundabout without bypass lanes is expected to operate with higher levels of delay and worse levels-of-service during peak hours. The SIDRA methodology indicates that the overall levels of service will be LOS F in the morning peak hour and LOS E in the afternoon peak hour. It should be noted that the Kihei High School approach is expected to operate at good levels of service during both peak hours, and the Kulanihakoi Street approach is expected to operate at LOS E in the morning peak hour and LOS C in the afternoon peak hour. The majority of the traffic delays will be on Piilani Highway.

The "optimized" two-lane roundabout will have improved traffic operations by providing right-turn bypass lanes to acceleration lanes for three of the four right-turn movements at the intersection. The westbound right-turn exit from the high school to northbound Piilani Highway was not included in the "optimized" design as it did not substantially improve operations at the intersection and had additional impacts to the northeast corner of the intersection.

The anticipated limits of construction and resulting right-of-way for the two-lane roundabout are illustrated in Figure 6. The geometric footprint for the two-lane roundabout without bypasses is contained to the intersection along with minor widening along Piilani Highway to provide a raised median. As shown, the additional right-of-way from the high school property is in the immediate vicinity of the intersection. The limits of the improvements on the east side of the intersection are highlighted as compared to the existing edge of pavement.

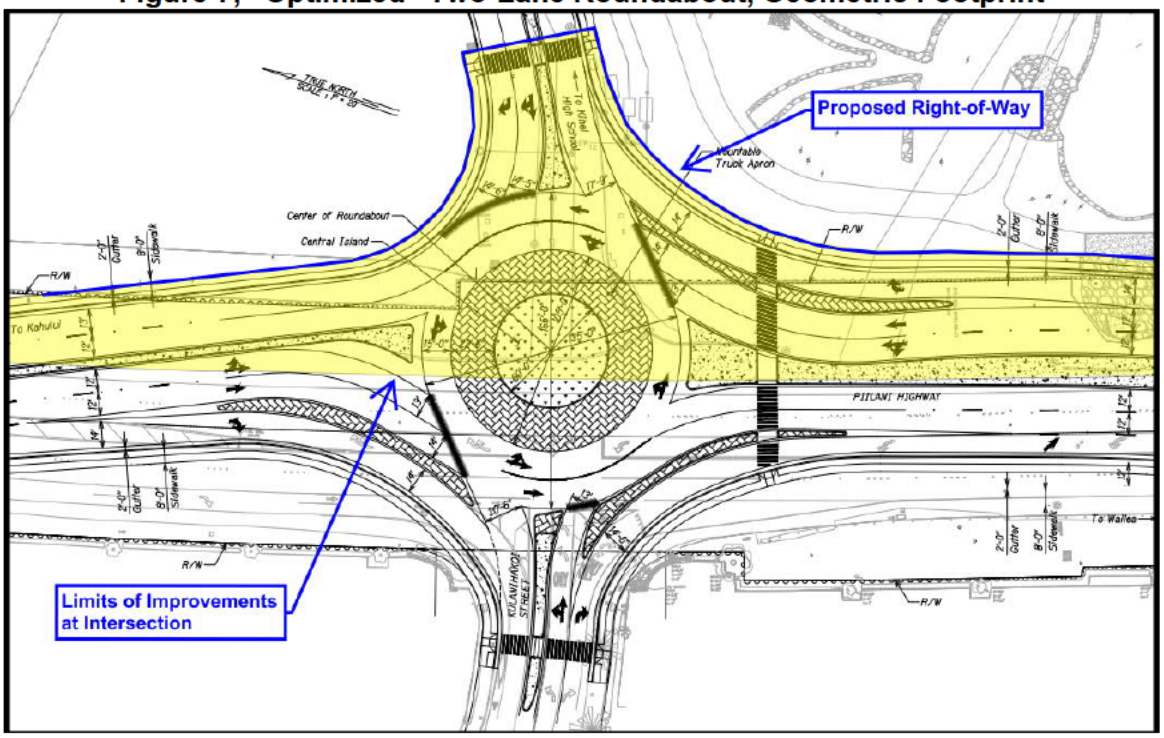
Figure 6, Two-Lane Roundabout, Geometric Footprint



A similar exhibit showing the geometric footprint of the "optimized" roundabout with bypass lanes is shown in Figure 7. As noted the limits of construction and the additional right-of-way pushes farther into the school property and extends further away from the intersection. This is due to holding the west side of the roundabout adjacent to the neighborhood and shifting the

roundabout to the east for the additional lanes. A longer length of Piilani Highway will also require reconstruction to align with the shifted roundabout and provide the acceleration and deceleration lanes.

Figure 7, "Optimized" Two-Lane Roundabout, Geometric Footprint



The Kihei High School development site is currently under construction and a number of utilities and other infrastructure improvements such as drainage facilities and internal circulating roads have been constructed. Both roundabouts will have impacts to these facilities as shown in Figure 8 and Figure 9.

Figure 8, Two-Lane Roundabout, Utility/Infrastructure Impacts

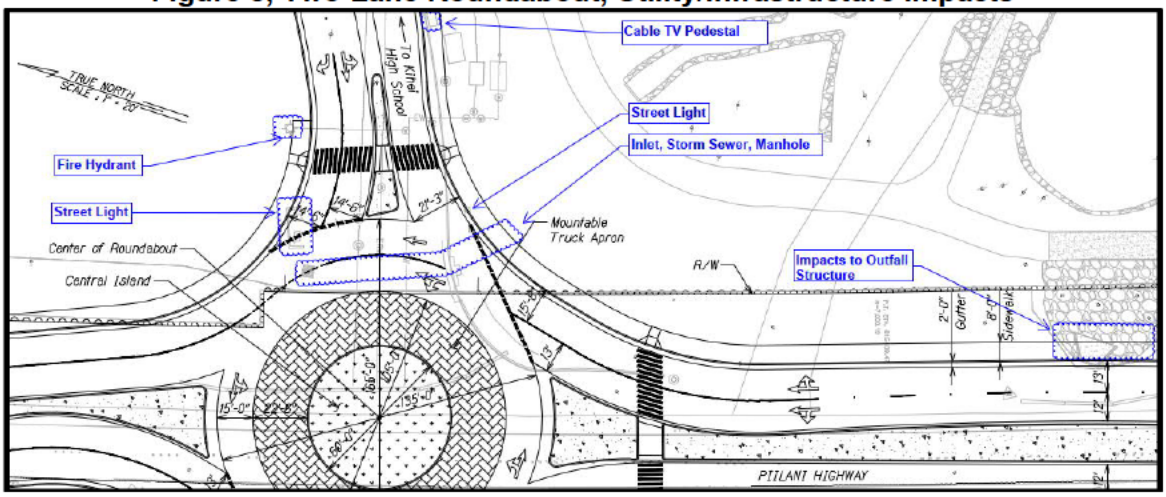
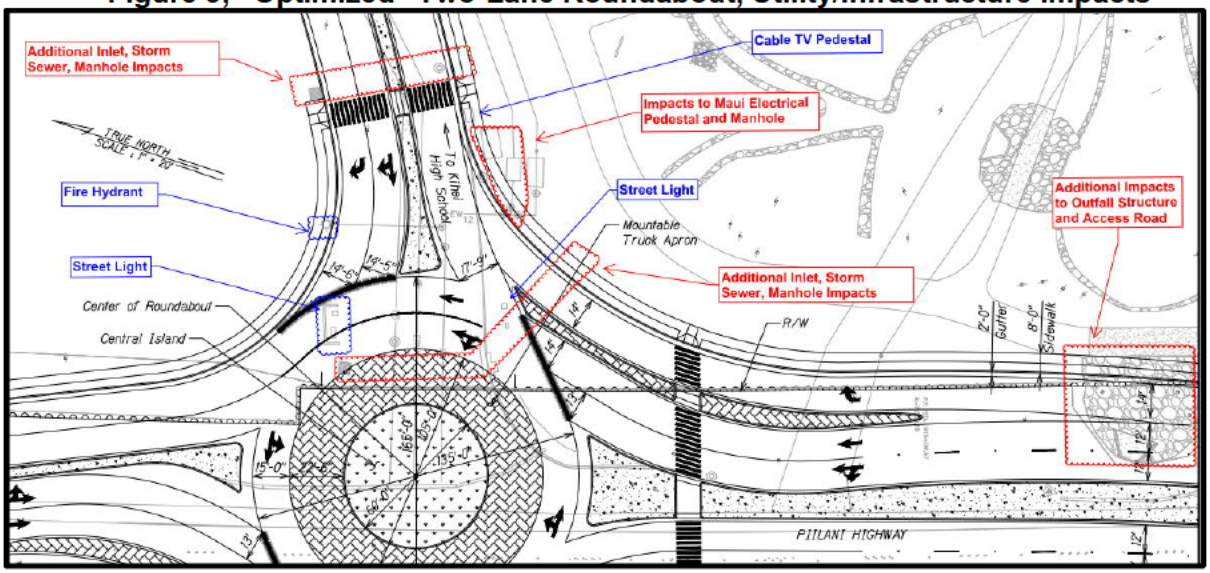


Figure 9, "Optimized" Two-Lane Roundabout, Utility/Infrastructure Impacts



As noted in the figures there will be similar impacts to the electrical service pedestals and the overhead street lights. The "optimized" two-lane roundabout would affect additional utilities in the southeast corner of the roundabout as well as the access road and outfall structure on east side of Piilani Highway.

Quantitative information regarding the cost estimates for both roundabout options are not available at this time. Qualitatively, the "optimized" option will have a higher construction cost due to the realignment of the Piilani Highway approaches, the additional lanes of travel and the additional infrastructure impacts.

Table 5 shows a comparison of the characteristics of the two roundabout options.

Table 5, Roundabout Option Summary Table

Characteristic	Rating: Two-Lane Roundabout	Rating: Two-lane Roundabout with Bypasses	Notes
Pedestrian Safety	◓	◓	- Piilani Highway traffic slowed in both alternatives - Pedestrian crossing distances shorter without bypass lanes
Traffic Operations	○	●	- Peak hour delays and extensive queues on Piilani Highway - Traffic operations improved with bypass lanes
ROW/Construction Limits	◓	◓	- Additional ROW required on school site for bypass lanes
Utility/Infrastructure Impacts	◒	◒	- Additional utilities and infrastructure impacts with bypass lanes
Construction Cost	◒	◒	- Construction costs higher with bypass lanes and utility/infrastructure relocation costs

Rating		
Excellent	●	More Favorable
Good	◓	
Acceptable	◒	
Poor	○	Less Favorable

As shown in Table 5, the table the two-lane roundabout without bypasses is somewhat safer for pedestrians because of the shorter pedestrian crossing distances. Both roundabout options would provide the slowing of traffic and the reduced chance of high speed crashes involving pedestrians and vehicles.

The addition of bypass lanes will provide a more efficient intersection for carrying vehicular traffic leading to improved traffic operations especially during peak school access periods.

Without the bypass lanes there will be significant delays and extensive queuing during peak hours. It should be noted that the Year 2031 traffic volumes were used for this analysis. Additional development and growth on the west side of the island will likely increase traffic beyond Year 2031, potentially exacerbating poor operating conditions. The "optimized" roundabout with the bypass lanes will provided additional capacity and accommodate traffic growth past the Year 2031 time horizon.

The remaining characteristics favor the two-lane roundabout for the reduced overall footprint, including less right-of-way requirement, less impact to the Kihei High School site, and reduced construction costs.

Recommendation:

The "optimized" two-lane roundabout with bypass lanes should be carried forward as the preferred two-lane roundabout alternative. The roundabout will slow higher speed traffic along Piilani Highway and the provision of RRFB or HAWK signal will further improve safety for the southerly pedestrian crossing at the intersection. Raised pedestrian crossings should be provided in the right-turn lane bypass lanes to assure that motorists using these lanes slow and are prepared to yield to pedestrians.

Attachments:

- Attachment 1: Kihei Roundabout Concept
- Attachment 2: Kihei Roundabout (Optimized) Concept
- Attachment 3: SIDRA Analysis Worksheets
    - 2021 HCM6 Methodology
    - 2031 HCM6 Methodology
    - 2031 SIDRA Methodology

Piilani Highway/Kihei High School Roundabout Evaluation

July 28, 2020

Attachment 1 – Kihei Roundabout Concept

TRUE NORTH
SCALE : 1" = 20'

To Kihei
High School

Center of Roundabout
Central Island

Mountable
Truck Apron

R/W

2'-0" Gutter

8'-0" Sidewalk

14'-6"

14'-6"

21'-3"

15'-8"

13'

12'

To Kahului

15'-0"

22'-6"

165'-0"

105'-0"

135'-0"

60'-0"

17'-4"

20'-7"

12'

14'

PIILANI HIGHWAY

To Wailea

KULANIHAKOI
STREET

R/W

1" = 20'

20 0 20 40

SCALE IN FEET

ORIGINAL PLAN	SURVEY PLOTTED BY		DATE
	DRAWN BY		
NOTE BOOK	TRACED BY		
	DESIGNED BY		
	QUANTITIES BY		
	CHECKED BY		
No.			

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

KIHEI ROUNDABOUT CONCEPT

SHEET 1

Piilani Highway/Kihei High School Roundabout Evaluation

July 28, 2020

Attachment 2 – Kihei Roundabout (Optimized) Concept

TRUE NORTH
SCALE : 1" = 20'

To Kihei
High School

Mountable
Truck Apron

Center of Roundabout

Central Island

R/W

2'-0"
Gutter

8'-0"
Sidewalk

To Kahului

13'

12'

12'

14'

15'-0"

22'-6"

165'-0"

105'-0"

135'-0"

60'-0"

13'

14'

14'

20'-6"

14'-6"

14'-5"

17'-9"

14'

14'

13'

R/W

2'-0"
Gutter

8'-0"
Sidewalk

14'

12'

12'

PIILANI HIGHWAY

12'

12'

2'-0"
Gutter

8'-0"
Sidewalk

To Wailea

R/W

KULANIHAKOI
STREET

ONLY

ONLY

1" = 20'

20 0 20 40

SCALE IN FEET

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

KIHEI ROUNDABOUT (OPTIMIZED)
CONCEPT

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAFN BY	
NOTE BOOK	TRACED BY	
	DESIGNED BY	
	QUANTITIES BY	
No.	CHECKED BY	

SHEET 2

Piilani Highway/Kihei High School Roundabout Evaluation

July 28, 2020

Attachment 3 – SIDRA Analysis Worksheets

2021 HCM6 Methodology

Summary Table, Delay/LOS, Year 2021 HCM6

Piilani Hwy/Kulanihakoi St	Piilani Hwy - South		Kihei HS Drwy		Piilani Hwy - North		Kulanihakoi St		Overall	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Year 2021 - Single Lane - AM	19.8	C	17.2	C	31.8	D	409.9	F	57.2	F
Year 2021 - Single Lane - PM	28.6	D	26.6	D	26.3	D	166.9	F	35.2	E
Year 2021 - Two Lane - AM	22.5	C	15.3	C	31.8	D	142.0	F	36.6	E
Year 2021 - Two Lane - PM	29.2	D	24.2	C	26.3	D	78.4	F	30.5	D
Year 2021 - Two Lane w/ West Bypasses - AM	22.5	C	15.3	C	28.1	D	18.2	C	24.8	C
Year 2021 - Two Lane w/ West Bypasses - PM	29.2	D	24.2	C	20.8	C	9.5	A	24.1	C
Year 2021 - Two Lane w/ East Bypasses - AM	16.4	C	12.6	B	31.8	D	142.0	F	34.2	D
Year 2021 - Two Lane w/ East Bypasses - PM	26.9	D	19.3	C	26.3	D	78.4	F	29.4	D
Year 2021 - Two Lane Optimized - AM	16.4	C	15.3	C	28.1	D	18.2	C	22.4	C
Year 2021 - Two Lane Optimized - PM	26.9	D	24.2	C	20.8	C	9.5	A	23.1	C

Notes:
1) Model results from SYDRA with HCM 6 Delay, v/c, and LOS method
2) HCM 6 Unsignalized intersection delays for LOS.
3) All options have two approach lanes on Piilani Highway and two circulating lanes in roundabout.
4) Single Lane is one combined approach lane on Kulanihakoi St and Kihei HS approaches.
5) Two Lane is two approaches, one for left turn and through, and second for right-turns.
6) Two lane with west bypass has right-turn lanes with bypass on to neighborhood.
7) Two lane with east bypass has right-turn lanes with bypass to the highschool.
8) Two lane optimized, has right-turn bypasses to neighborhood and northbound right-turn to highschool.

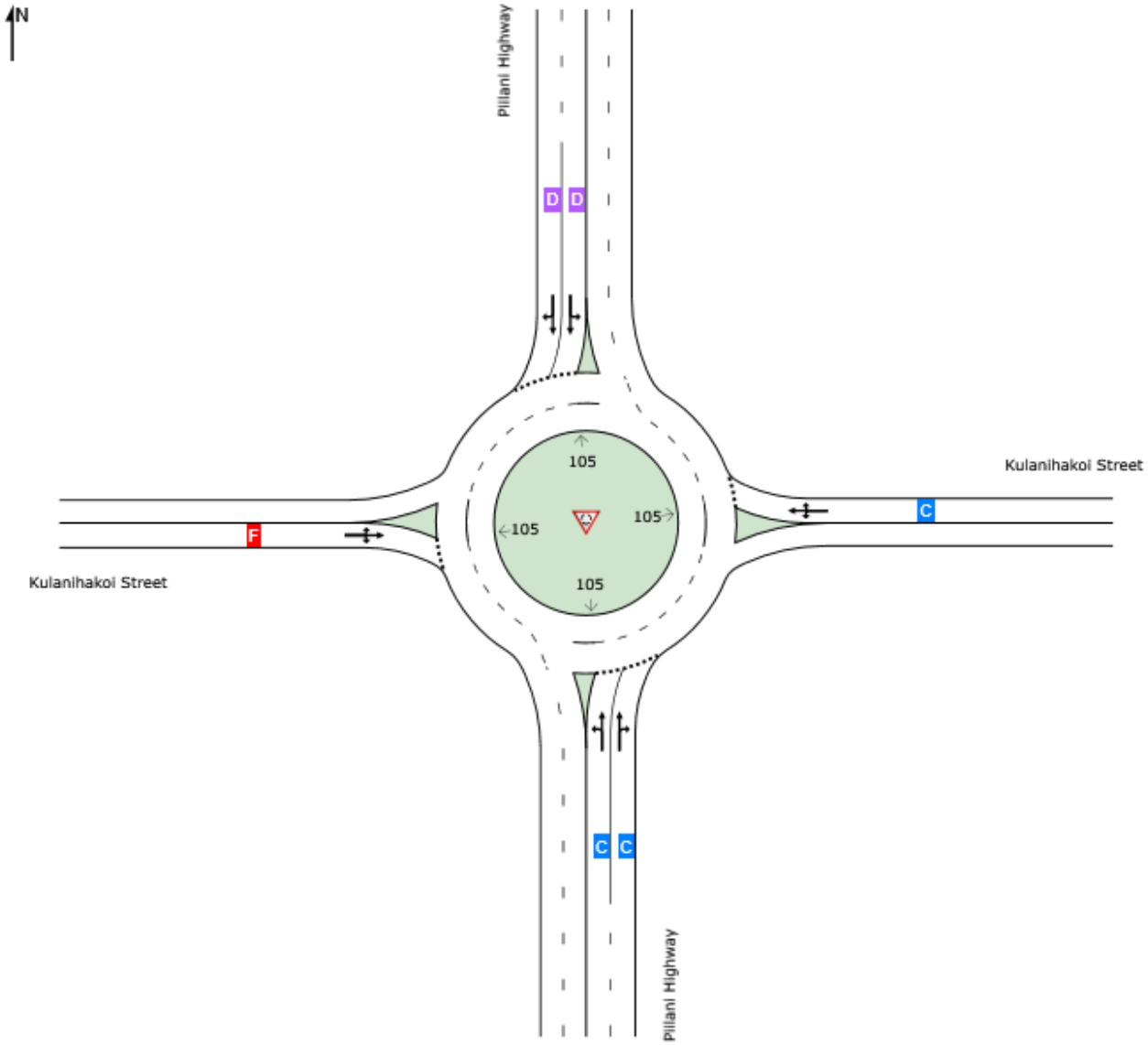
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 102 [1-Lane 2021 - AM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	C	C	D	F	F



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Geometric Delay is not included).

LANE SUMMARY

Site: 102 [1-Lane 2021 - AM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Piilani Highway													
Lane 1	826	2.0	1025	0.805	100	20.2	LOS C	11.3	288.2	Full	1600	0.0	0.0
Lane 2[d]	877	2.0	1088	0.805	100	19.4	LOS C	9.0	229.3	Full	1600	0.0	0.0
Approach	1702	2.0		0.805		19.8	LOS C	11.3	288.2				
East: Kulanihakoi Street													
Lane 1[d]	117	2.0	348	0.338	100	17.2	LOS C	1.2	30.6	Full	1600	0.0	0.0
Approach	117	2.0		0.338		17.2	LOS C	1.2	30.6				
North: Piilani Highway													
Lane 1	1072	2.0	1146	0.935	100	32.4	LOS D	49.0	1245.8	Full	1600	0.0	0.0
Lane 2[d]	1140	2.0	1219	0.935	100	31.2	LOS D	49.9	1267.4	Full	1600	0.0	0.0
Approach	2212	2.0		0.935		31.8	LOS D	49.9	1267.4				
West: Kulanihakoi Street													
Lane 1[d]	353	2.0	199	1.776	100	409.9	LOS F	55.1	1399.9	Full	1600	0.0	1.2
Approach	353	2.0		1.776		409.9	LOS F	55.1	1399.9				
Intersection	4385	2.0		1.776		57.2	LOS F	55.1	1399.9				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Piilani Highway

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	65	760	-	826	2.0	1025	0.805	100	NA	NA
Lane 2	-	728	149	877	2.0	1088	0.805	100	NA	NA
Approach	65	1488	149	1702	2.0		0.805			

East: Kulanihakoi Street

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	82	7	29	117	2.0	348	0.338	100	NA	NA
Approach	82	7	29	117	2.0		0.338			

North: Piilani Highway

Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	61	1011	-	1072	2.0	1146	0.935	100	NA	NA
Lane 2	-	1091	49	1140	2.0	1219	0.935	100	NA	NA
Approach	61	2102	49	2212	2.0		0.935			

West: Kulanihakoi Street

Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	76	38	239	353	2.0	199	1.776	100	NA	NA
Approach	76	38	239	353	2.0		1.776			

	Total	%HV	Deg.Satn (v/c)
Intersection	4385	2.0	1.776

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
East Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
West Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

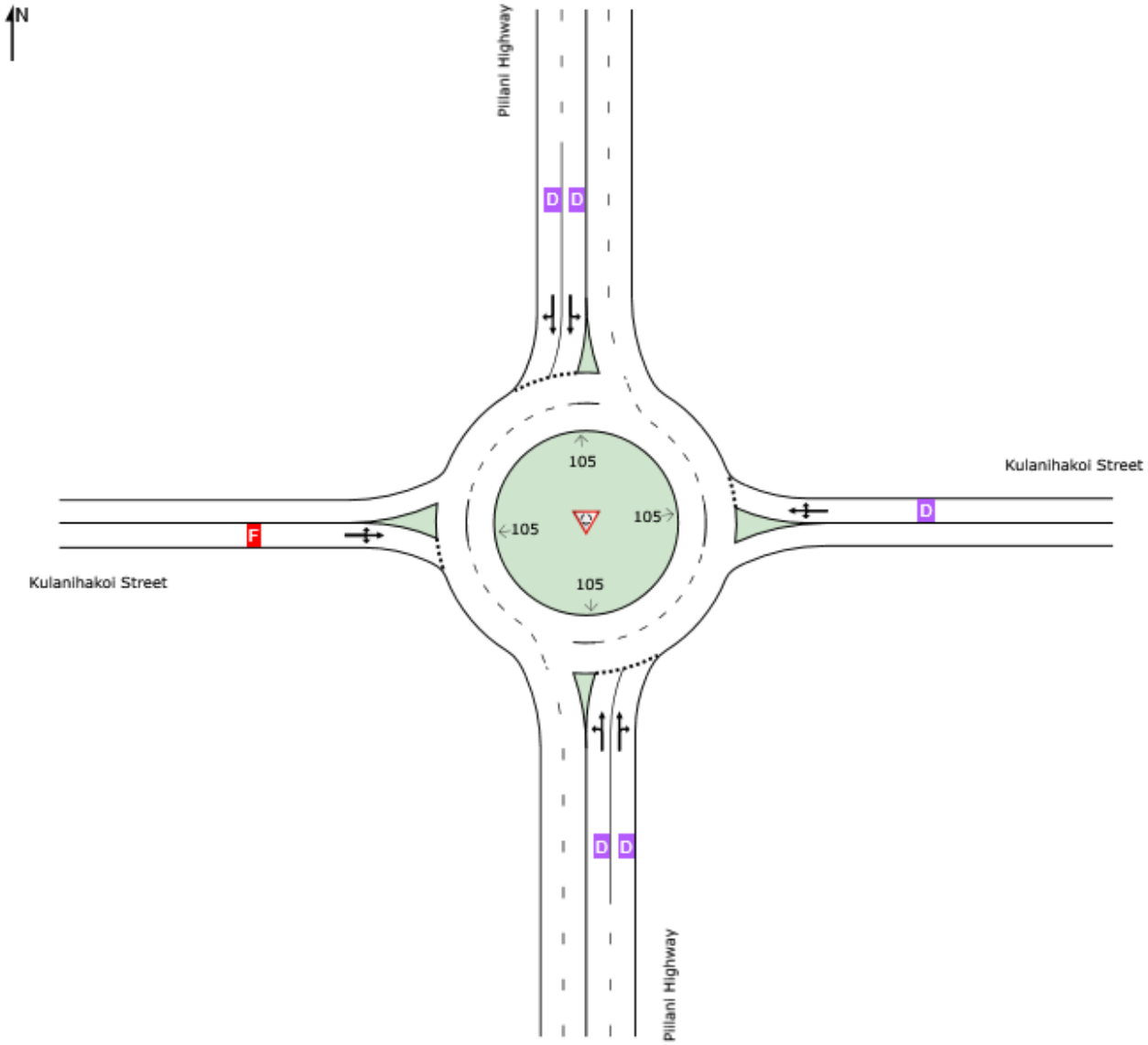
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 102 [1-Lane 2021 - PM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	D	D	D	F	E



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Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Geometric Delay is not included).

LANE SUMMARY

Site: 102 [1-Lane 2021 - PM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Piilani Highway													
Lane 1	1075	2.0	1173	0.917	100	29.1	LOS D	15.2	386.7	Full	1600	0.0	0.0
Lane 2[d]	1136	2.0	1239	0.917	100	28.1	LOS D	15.1	383.2	Full	1600	0.0	0.0
Approach	2211	2.0		0.917		28.6	LOS D	15.2	386.7				
East: Kulanihakoi Street													
Lane 1[d]	60	2.0	203	0.295	100	26.6	LOS D	0.9	23.2	Full	1600	0.0	0.0
Approach	60	2.0		0.295		26.6	LOS D	0.9	23.2				
North: Piilani Highway													
Lane 1	1063	2.0	1181	0.900	100	26.8	LOS D	36.8	933.5	Full	1600	0.0	0.0
Lane 2[d]	1128	2.0	1253	0.900	100	25.8	LOS D	35.2	894.2	Full	1600	0.0	0.0
Approach	2190	2.0		0.900		26.3	LOS D	36.8	933.5				
West: Kulanihakoi Street													
Lane 1[d]	262	2.0	220	1.190	100	166.9	LOS F	19.7	500.0	Full	1600	0.0	0.0
Approach	262	2.0		1.190		166.9	LOS F	19.7	500.0				
Intersection	4723	2.0		1.190		35.2	LOS E	36.8	933.5				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Piilani Highway

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	76	999	-	1075	2.0	1173	0.917	100	NA	NA
Lane 2	-	1103	33	1136	2.0	1239	0.917	100	NA	NA
Approach	76	2102	33	2211	2.0		0.917			

East: Kulanihakoi Street

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	42	3	14	60	2.0	203	0.295	100	NA	NA
Approach	42	3	14	60	2.0		0.295			

North: Piilani Highway

Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	13	1050	-	1063	2.0	1181	0.900	100	NA	NA
Lane 2	-	1022	105	1128	2.0	1253	0.900	100	NA	NA
Approach	13	2072	105	2190	2.0		0.900			

West: Kulanihakoi Street

Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	48	8	207	262	2.0	220	1.190	100	NA	NA
Approach	48	8	207	262	2.0		1.190			

	Total	%HV	Deg.Satn (v/c)
Intersection	4723	2.0	1.190

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
East Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
West Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

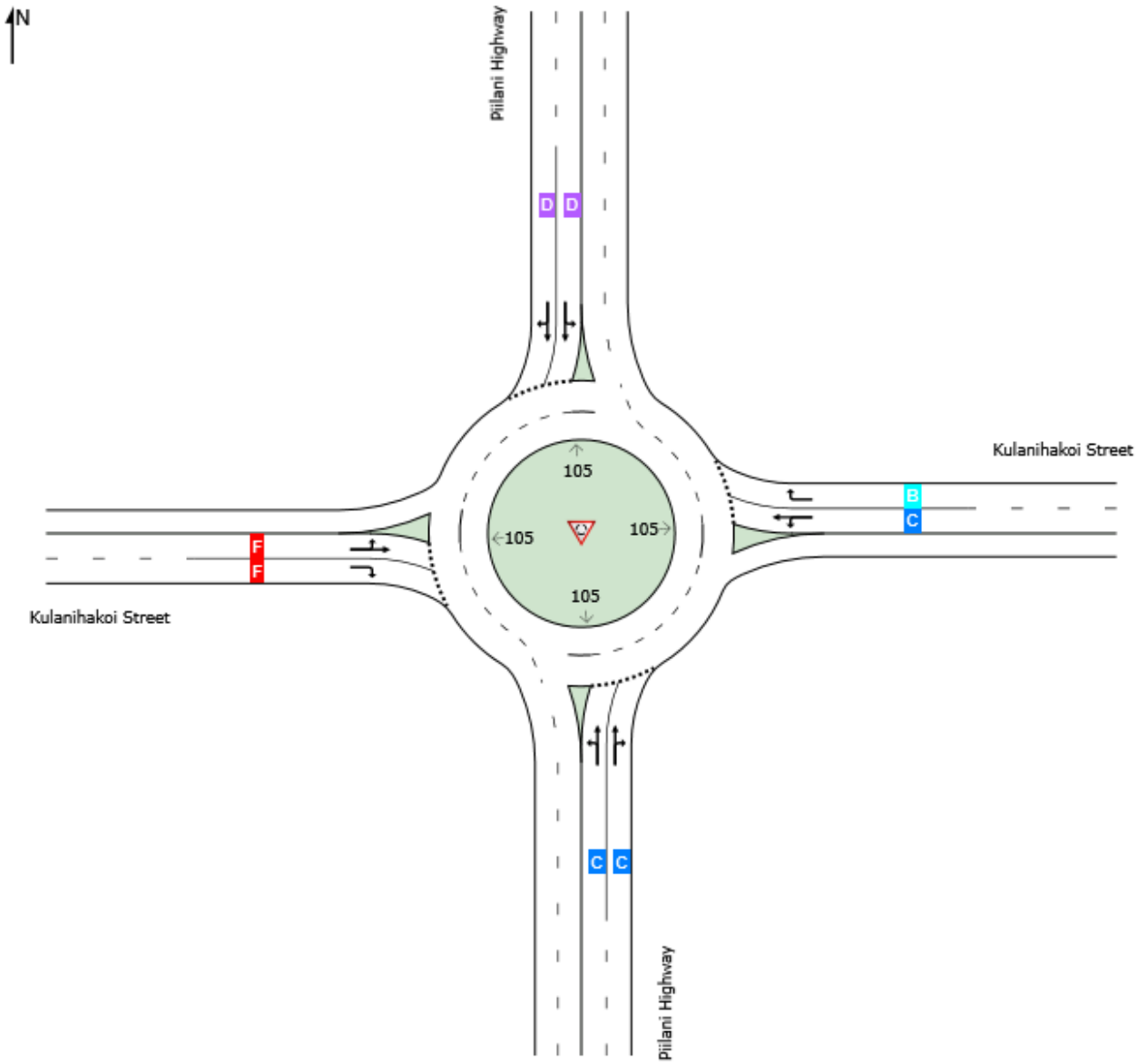
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 102 [2-Lane 2021 - AM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	C	C	D	F	E



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Delay Model: HCM Delay Formula (Geometric Delay is not included).

LANE SUMMARY

Site: 102 [2-Lane 2021 - AM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Piilani Highway													
Lane 1	824	2.0	988	0.834	100	23.0	LOS C	21.3	540.3	Full	1600	0.0	0.0
Lane 2[d]	878	2.0	1052	0.834	100	22.0	LOS C	21.1	536.9	Full	1600	0.0	0.0
Approach	1702	2.0		0.834		22.5	LOS C	21.3	540.3				
East: Kulanihakoi Street													
Lane 1[d]	88	2.0	339	0.260	100	15.6	LOS C	0.9	21.8	Full	1600	0.0	0.0
Lane 2	29	2.0	287	0.102	100	14.5	LOS B	0.3	8.0	Full	1600	0.0	0.0
Approach	117	2.0		0.260		15.3	LOS C	0.9	21.8				
North: Piilani Highway													
Lane 1	1072	2.0	1146	0.935	100	32.4	LOS D	49.0	1245.8	Full	1600	0.0	0.0
Lane 2[d]	1140	2.0	1219	0.935	100	31.2	LOS D	49.9	1267.4	Full	1600	0.0	0.0
Approach	2212	2.0		0.935		31.8	LOS D	49.9	1267.4				
West: Kulanihakoi Street													
Lane 1	114	2.0	161	0.709	100	67.2	LOS F	2.9	73.0	Full	1600	0.0	0.0
Lane 2[d]	239	2.0	199	1.203	100	177.6	LOS F	18.8	478.6	Full	1600	0.0	0.0
Approach	353	2.0		1.203		142.0	LOS F	18.8	478.6				
Intersection	4385	2.0		1.203		36.6	LOS E	49.9	1267.4				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
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Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Piilani Highway

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	65	759	-	824	2.0	988	0.834	100	NA	NA
Lane 2	-	729	149	878	2.0	1052	0.834	100	NA	NA
Approach	65	1488	149	1702	2.0		0.834			

East: Kulanihakoi Street

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	82	7	-	88	2.0	339	0.260	100	NA	NA

Lane 2	-	-	29	29	2.0	287	0.102	100	NA	NA
Approach	82	7	29	117	2.0		0.260			
North: Piilani Highway										
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	61	1011	-	1072	2.0	1146	0.935	100	NA	NA
Lane 2	-	1091	49	1140	2.0	1219	0.935	100	NA	NA
Approach	61	2102	49	2212	2.0		0.935			
West: Kulanihakoi Street										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	76	38	-	114	2.0	161	0.709	100	NA	NA
Lane 2	-	-	239	239	2.0	199	1.203	100	NA	NA
Approach	76	38	239	353	2.0		1.203			
	Total	%HV	Deg.Satn (v/c)							
Intersection	4385	2.0	1.203							

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
East Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
West Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

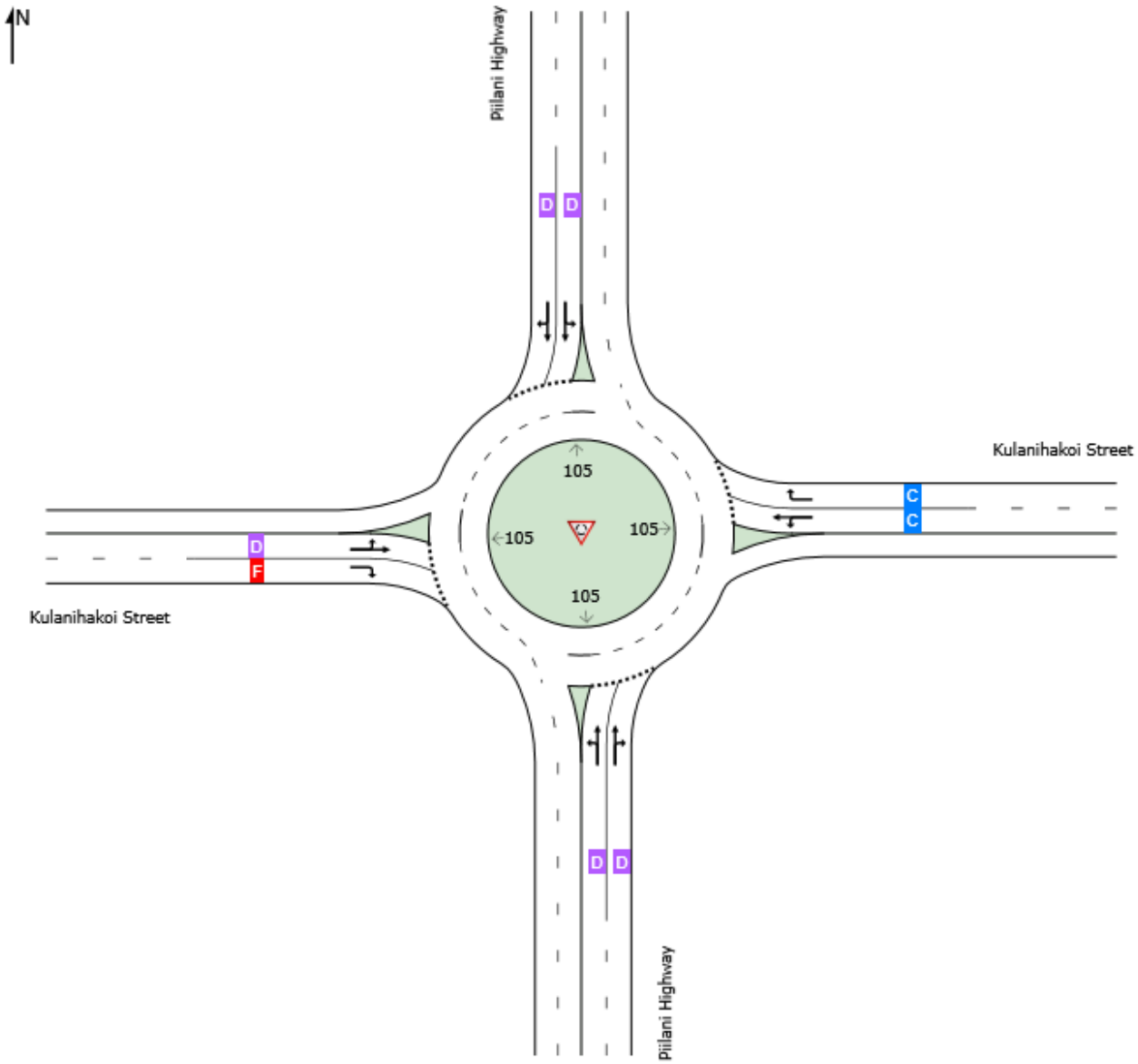
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 102 [2-Lane 2021 - PM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	D	C	D	F	D



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LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Geometric Delay is not included).

LANE SUMMARY

Site: 102 [2-Lane 2021 - PM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Piilani Highway													
Lane 1	1075	2.0	1168	0.920	100	29.7	LOS D	15.3	389.3	Full	1600	0.0	0.0
Lane 2[d]	1136	2.0	1235	0.920	100	28.7	LOS D	15.2	386.2	Full	1600	0.0	0.0
Approach	2211	2.0		0.920		29.2	LOS D	15.3	389.3				
East: Kulanihakoi Street													
Lane 1[d]	46	2.0	202	0.226	100	24.1	LOS C	0.7	17.0	Full	1600	0.0	0.0
Lane 2	14	2.0	164	0.086	100	24.5	LOS C	0.2	6.2	Full	1600	0.0	0.0
Approach	60	2.0		0.226		24.2	LOS C	0.7	17.0				
North: Piilani Highway													
Lane 1	1063	2.0	1181	0.900	100	26.8	LOS D	36.8	933.5	Full	1600	0.0	0.0
Lane 2[d]	1128	2.0	1253	0.900	100	25.8	LOS D	35.2	894.2	Full	1600	0.0	0.0
Approach	2190	2.0		0.900		26.3	LOS D	36.8	933.5				
West: Kulanihakoi Street													
Lane 1	55	2.0	180	0.308	100	30.2	LOS D	1.0	24.5	Full	1600	0.0	0.0
Lane 2[d]	207	2.0	220	0.938	100	91.3	LOS F	6.7	171.4	Full	1600	0.0	0.0
Approach	262	2.0		0.938		78.4	LOS F	6.7	171.4				
Intersection	4723	2.0		0.938		30.5	LOS D	36.8	933.5				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Piilani Highway

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	76	999	-	1075	2.0	1168	0.920	100	NA	NA
Lane 2	-	1103	33	1136	2.0	1235	0.920	100	NA	NA
Approach	76	2102	33	2211	2.0		0.920			

East: Kulanihakoi Street

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	42	3	-	46	2.0	202	0.226	100	NA	NA

Lane 2	-	-	14	14	2.0	164	0.086	100	NA	NA
Approach	42	3	14	60	2.0		0.226			
North: Piilani Highway										
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	13	1050	-	1063	2.0	1181	0.900	100	NA	NA
Lane 2	-	1022	105	1128	2.0	1253	0.900	100	NA	NA
Approach	13	2072	105	2190	2.0		0.900			
West: Kulanihakoi Street										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	48	8	-	55	2.0	180	0.308	100	NA	NA
Lane 2	-	-	207	207	2.0	220	0.938	100	NA	NA
Approach	48	8	207	262	2.0		0.938			
	Total	%HV	Deg.Satn (v/c)							
Intersection	4723	2.0	0.938							

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
East Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
West Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

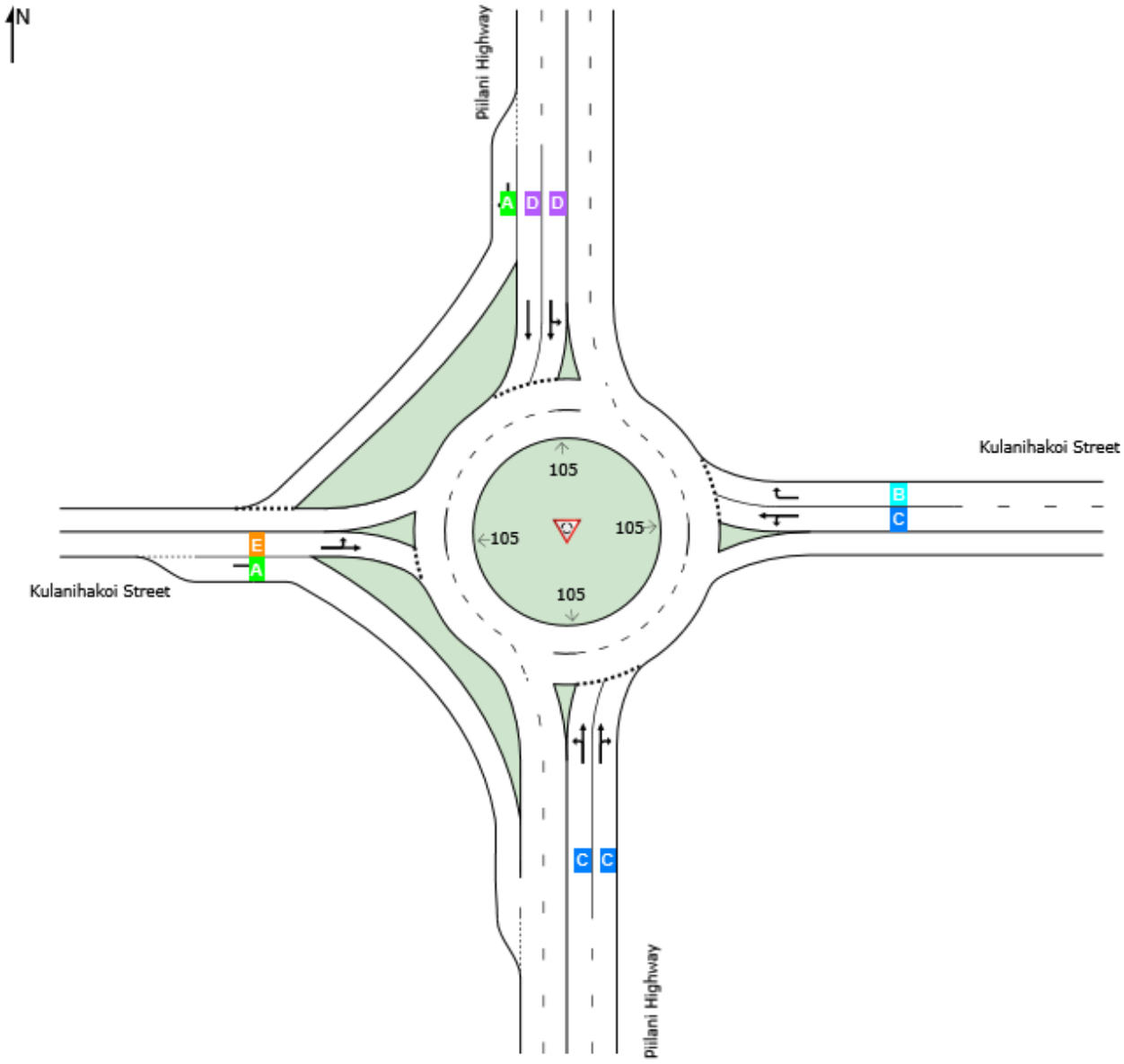
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 102 [2-Lane 2021 West Bypass - AM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	C	C	D	C	C



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Geometric Delay is not included).

LANE SUMMARY

Site: 102 [2-Lane 2021 West Bypass - AM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Piilani Highway													
Lane 1	824	2.0	988	0.834	100	23.0	LOS C	21.3	540.3	Full	1600	0.0	0.0
Lane 2[d]	878	2.0	1052	0.834	100	22.0	LOS C	21.1	536.9	Full	1600	0.0	0.0
Approach	1702	2.0		0.834		22.5	LOS C	21.3	540.3				
East: Kulanihakoi Street													
Lane 1[d]	88	2.0	339	0.260	100	15.6	LOS C	0.9	21.8	Full	1600	0.0	0.0
Lane 2	29	2.0	287	0.102	100	14.5	LOS B	0.3	8.0	Full	1600	0.0	0.0
Approach	117	2.0		0.260		15.3	LOS C	0.9	21.8				
North: Piilani Highway													
Lane 1	1048	2.0	1146	0.915	100	29.3	LOS D	43.0	1092.9	Full	1600	0.0	0.0
Lane 2[d]	1115	2.0	1219	0.915	100	28.1	LOS D	43.5	1104.2	Full	1600	0.0	0.0
Lane 3	49	2.0	1308	0.037	100	3.0	LOS A	0.1	3.5	Short	200	0.0	NA
Approach	2212	2.0		0.915		28.1	LOS D	43.5	1104.2				
West: Kulanihakoi Street													
Lane 1[d]	114	2.0	199	0.574	100	42.9	LOS E	2.1	54.0	Full	1600	0.0	0.0
Lane 2	239	2.0	1642	0.146	100	6.5	LOS A	0.0	0.0	Short	200	0.0	NA
Approach	353	2.0		0.574		18.2	LOS C	2.1	54.0				
Intersection	4385	2.0		0.915		24.8	LOS C	43.5	1104.2				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Piilani Highway

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	65	759	-	824	2.0	988	0.834	100	NA	NA
Lane 2	-	729	149	878	2.0	1052	0.834	100	NA	NA
Approach	65	1488	149	1702	2.0		0.834			

East: Kulanihakoi Street

Mov. From E	L2	T1	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

To Exit:	S	W	N							
Lane 1	82	7	-	88	2.0	339	0.260	100	NA	NA
Lane 2	-	-	29	29	2.0	287	0.102	100	NA	NA
Approach	82	7	29	117	2.0		0.260			

North: Piilani Highway

Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	61	987	-	1048	2.0	1146	0.915	100	NA	NA
Lane 2	-	1115	-	1115	2.0	1219	0.915	100	NA	NA
Lane 3	-	-	49	49	2.0	1308	0.037	100	0.0	2
Approach	61	2102	49	2212	2.0		0.915			

West: Kulanihakoi Street

Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	76	38	-	114	2.0	199	0.574	100	NA	NA
Lane 2	-	-	239	239	2.0	1642	0.146	100	0.0	1
Approach	76	38	239	353	2.0		0.574			

	Total	%HV	Deg.Satn (v/c)
Intersection	4385	2.0	0.915

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Piilani Highway Merge Type: **Priority**												
Exit Short Lane	3	500	0.0	1115	1137	3.00	2.00	239	941	0.254	3.8	6.4
Merge Lane	2	-	100.0	Merge Lane is not Opposed				1115	1800	0.619	0.0	0.0
East Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
West Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

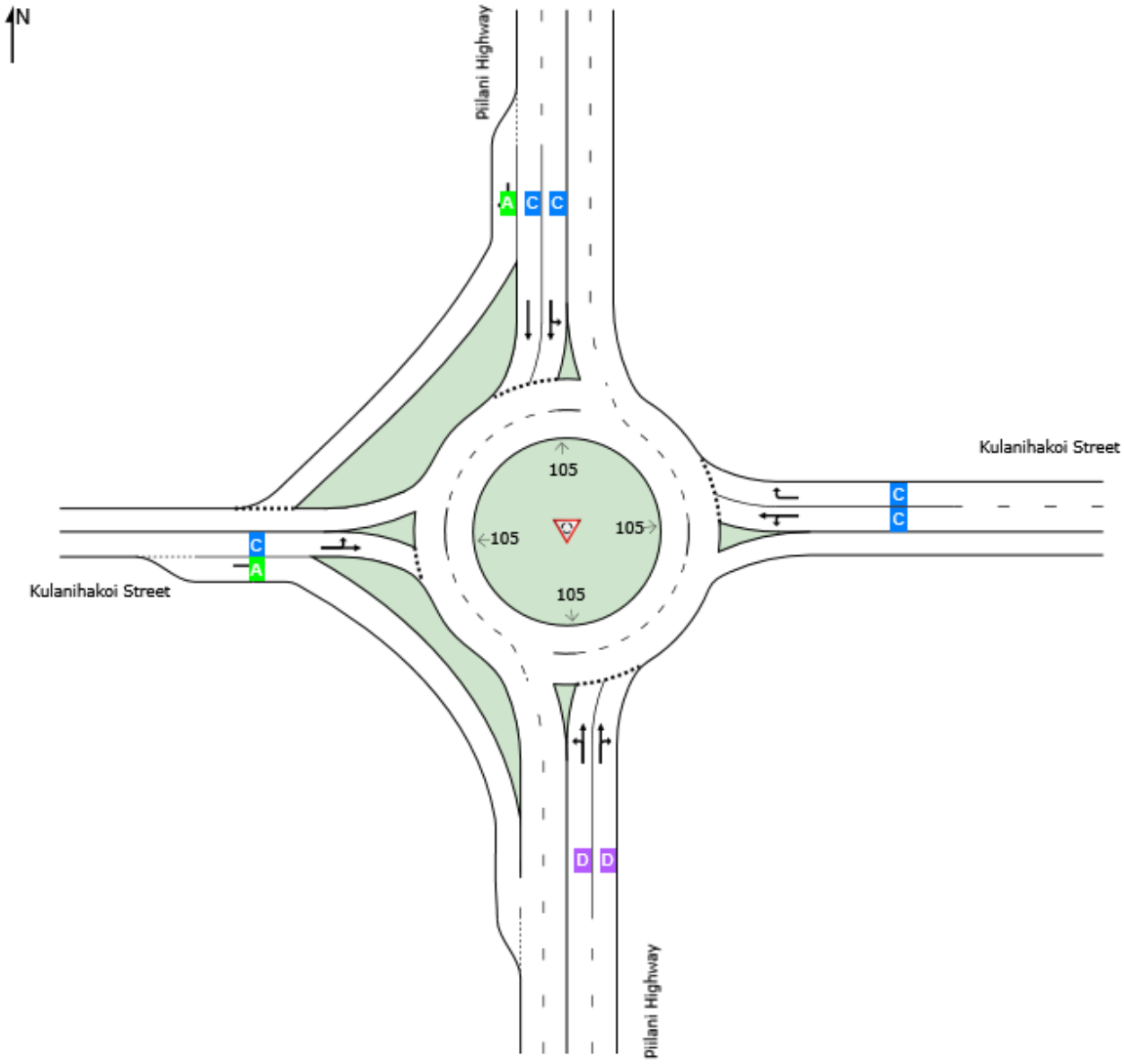
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 102 [2-Lane 2021 West Bypass - PM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	D	C	C	A	C



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Geometric Delay is not included).

LANE SUMMARY

Site: 102 [2-Lane 2021 West Bypass - PM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Piilani Highway													
Lane 1	1075	2.0	1168	0.920	100	29.7	LOS D	15.3	389.3	Full	1600	0.0	0.0
Lane 2[d]	1136	2.0	1235	0.920	100	28.7	LOS D	15.2	386.2	Full	1600	0.0	0.0
Approach	2211	2.0		0.920		29.2	LOS D	15.3	389.3				
East: Kulanihakoi Street													
Lane 1[d]	46	2.0	202	0.226	100	24.1	LOS C	0.7	17.0	Full	1600	0.0	0.0
Lane 2	14	2.0	164	0.086	100	24.5	LOS C	0.2	6.2	Full	1600	0.0	0.0
Approach	60	2.0		0.226		24.2	LOS C	0.7	17.0				
North: Piilani Highway													
Lane 1	1012	2.0	1181	0.857	100	22.2	LOS C	24.7	627.4	Full	1600	0.0	0.0
Lane 2[d]	1073	2.0	1253	0.857	100	21.3	LOS C	22.4	568.6	Full	1600	0.0	0.0
Lane 3	105	2.0	1300	0.081	100	3.4	LOS A	0.3	7.8	Short	200	0.0	NA
Approach	2190	2.0		0.857		20.8	LOS C	24.7	627.4				
West: Kulanihakoi Street													
Lane 1[d]	55	2.0	220	0.252	100	23.0	LOS C	0.8	19.5	Full	1600	0.0	0.0
Lane 2	207	2.0	1642	0.126	100	5.9	LOS A	0.0	0.0	Short	200	0.0	NA
Approach	262	2.0		0.252		9.5	LOS A	0.8	19.5				
Intersection	4723	2.0		0.920		24.1	LOS C	24.7	627.4				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Piilani Highway

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	76	999	-	1075	2.0	1168	0.920	100	NA	NA
Lane 2	-	1103	33	1136	2.0	1235	0.920	100	NA	NA
Approach	76	2102	33	2211	2.0		0.920			

East: Kulanihakoi Street

Mov. From E	L2	T1	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

To Exit:	S	W	N							
Lane 1	42	3	-	46	2.0	202	0.226	100	NA	NA
Lane 2	-	-	14	14	2.0	164	0.086	100	NA	NA
Approach	42	3	14	60	2.0		0.226			

North: Piilani Highway

Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	13	998	-	1012	2.0	1181	0.857	100	NA	NA
Lane 2	-	1073	-	1073	2.0	1253	0.857	100	NA	NA
Lane 3	-	-	105	105	2.0	1300	0.081	100	0.0	2
Approach	13	2072	105	2190	2.0		0.857			

West: Kulanihakoi Street

Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	48	8	-	55	2.0	220	0.252	100	NA	NA
Lane 2	-	-	207	207	2.0	1642	0.126	100	0.0	1
Approach	48	8	207	262	2.0		0.252			

	Total	%HV	Deg.Satn (v/c)
Intersection	4723	2.0	0.920

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Piilani Highway Merge Type: **Priority**												
Exit Short Lane	3	500	0.0	1073	1095	3.00	2.00	207	965	0.214	3.7	5.8
Merge Lane	2	-	100.0	Merge Lane is not Opposed				1073	1800	0.596	0.0	0.0
East Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
West Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

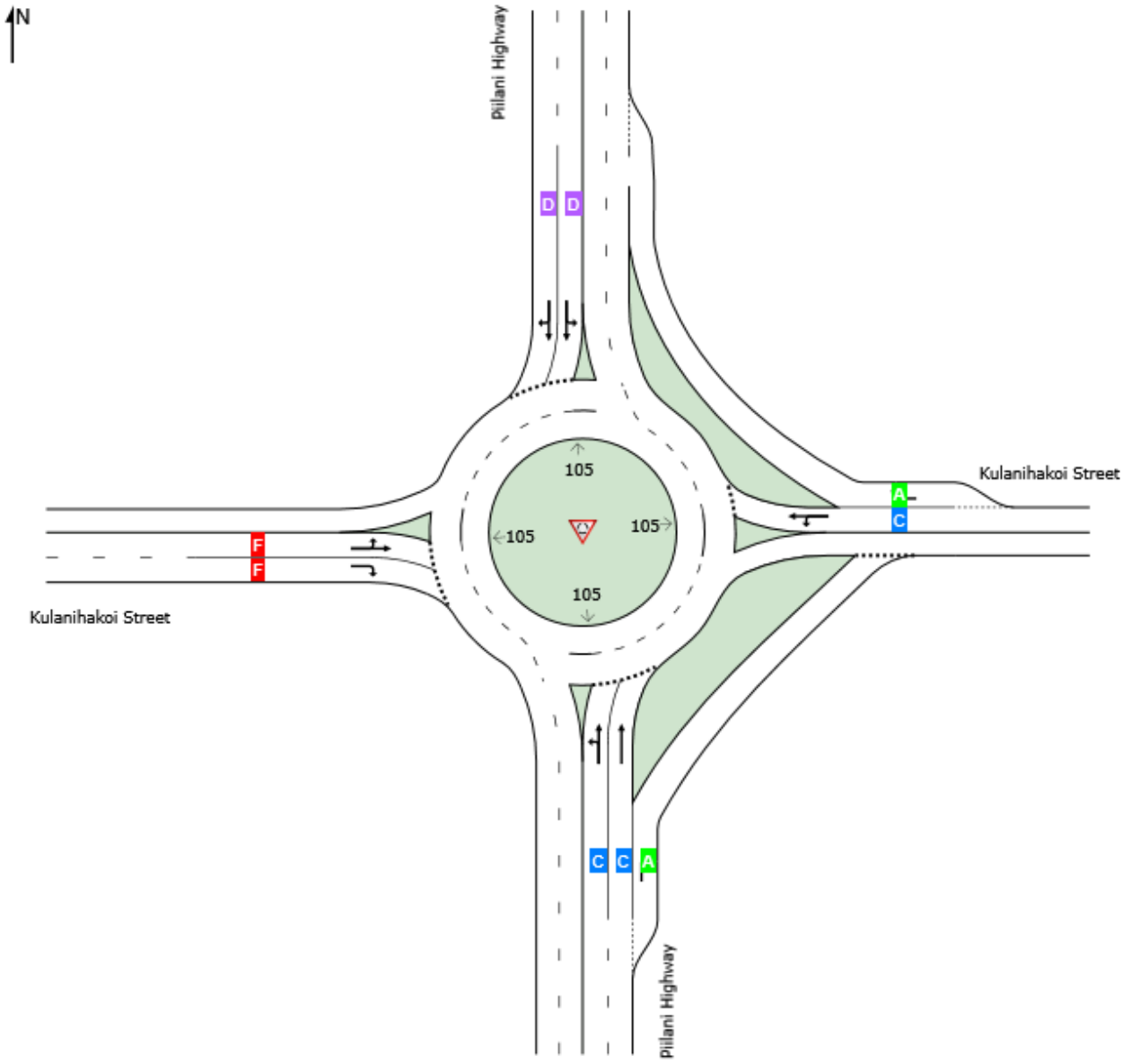
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 102 [2-Lane East Bypass 2021 - AM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	C	B	D	F	D



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Geometric Delay is not included).

LANE SUMMARY

Site: 102 [2-Lane East Bypass 2021 - AM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Piilani Highway													
Lane 1	752	2.0	988	0.761	100	18.0	LOS C	12.7	323.0	Full	1600	0.0	0.0
Lane 2[d]	801	2.0	1052	0.761	100	17.2	LOS C	12.2	309.8	Full	1600	0.0	0.0
Lane 3	149	2.0	1116	0.133	100	4.4	LOS A	0.5	11.6	Short	200	0.0	NA
Approach	1702	2.0		0.761		16.4	LOS C	12.7	323.0				
East: Kulanihakoi Street													
Lane 1[d]	88	2.0	339	0.260	100	15.6	LOS C	0.9	21.8	Full	1600	0.0	0.0
Lane 2	29	2.0	1642	0.018	100	3.4	LOS A	0.0	0.0	Short	200	0.0	NA
Approach	117	2.0		0.260		12.6	LOS B	0.9	21.8				
North: Piilani Highway													
Lane 1	1072	2.0	1146	0.935	100	32.4	LOS D	49.0	1245.8	Full	1600	0.0	0.0
Lane 2[d]	1140	2.0	1219	0.935	100	31.2	LOS D	49.9	1267.4	Full	1600	0.0	0.0
Approach	2212	2.0		0.935		31.8	LOS D	49.9	1267.4				
West: Kulanihakoi Street													
Lane 1	114	2.0	161	0.709	100	67.2	LOS F	2.9	73.0	Full	1600	0.0	0.0
Lane 2[d]	239	2.0	199	1.203	100	177.6	LOS F	18.8	478.6	Full	1600	0.0	0.0
Approach	353	2.0		1.203		142.0	LOS F	18.8	478.6				
Intersection	4385	2.0		1.203		34.2	LOS D	49.9	1267.4				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Piilani Highway

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	65	687	-	752	2.0	988	0.761	100	NA	NA
Lane 2	-	801	-	801	2.0	1052	0.761	100	NA	NA
Lane 3	-	-	149	149	2.0	1116	0.133	100	0.0	2
Approach	65	1488	149	1702	2.0		0.761			

East: Kulanihakoi Street

Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.

From E To Exit:	S	W	N			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	82	7	-	88	2.0	339	0.260	100	NA	NA
Lane 2	-	-	29	29	2.0	1642	0.018	100	0.0	1
Approach	82	7	29	117	2.0		0.260			
North: Piilani Highway										
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	61	1011	-	1072	2.0	1146	0.935	100	NA	NA
Lane 2	-	1091	49	1140	2.0	1219	0.935	100	NA	NA
Approach	61	2102	49	2212	2.0		0.935			
West: Kulanihakoi Street										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	76	38	-	114	2.0	161	0.709	100	NA	NA
Lane 2	-	-	239	239	2.0	199	1.203	100	NA	NA
Approach	76	38	239	353	2.0		1.203			

	Total	%HV	Deg.Satn (v/c)
Intersection	4385	2.0	1.203

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
East Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Piilani Highway Merge Type: **Priority**												
Exit Short Lane	3	500	0.0	801	817	3.00	2.00	29	1133	0.026	3.2	3.4
Merge Lane	2	-	100.0	Merge Lane is not Opposed				801	1800	0.445	0.0	0.0
West Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

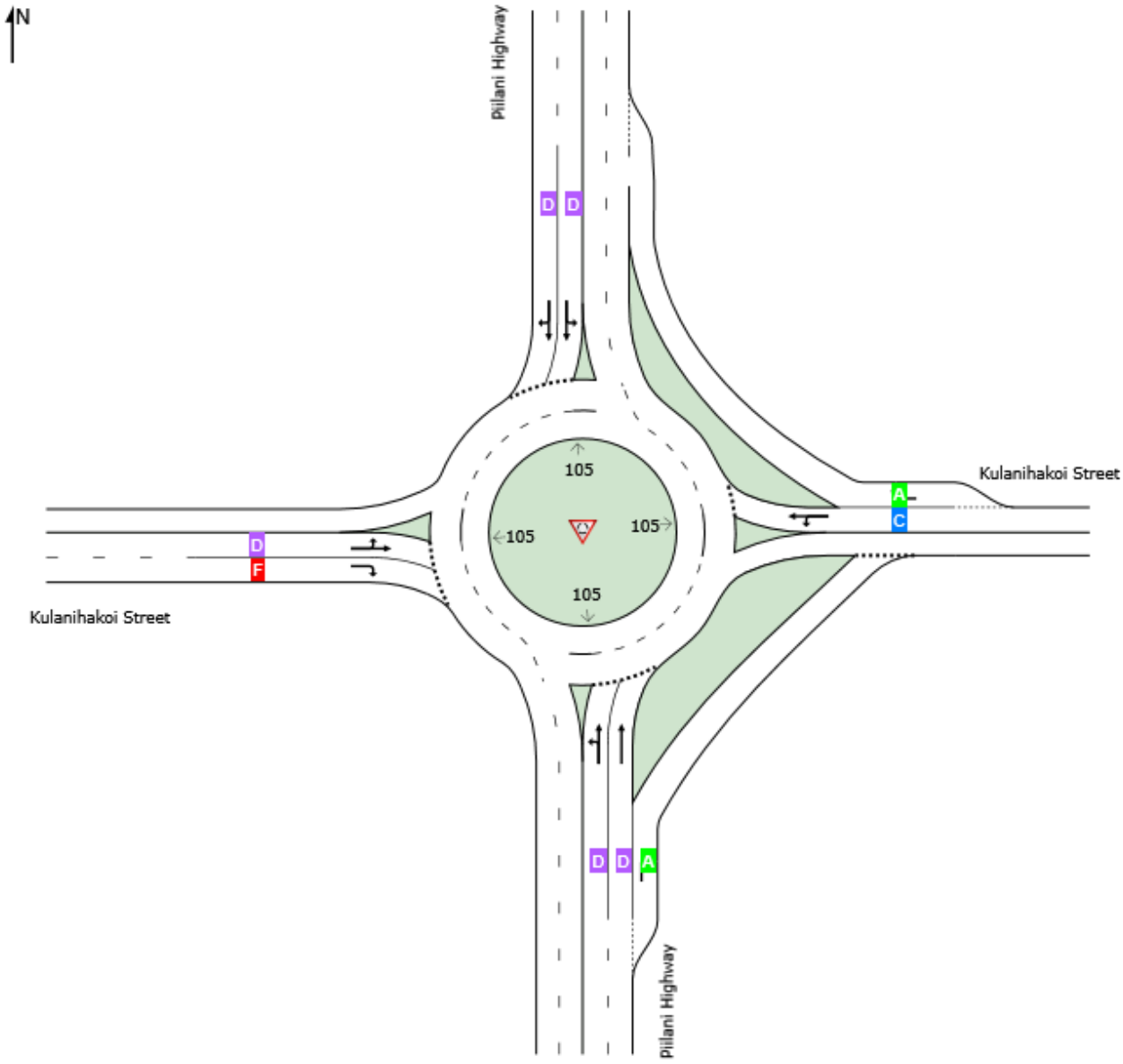
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 102 [2-Lane East Bypass 2021 - PM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	D	C	D	F	D



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Geometric Delay is not included).

LANE SUMMARY

Site: 102 [2-Lane East Bypass 2021 - PM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Piilani Highway													
Lane 1	1059	2.0	1168	0.907	100	27.8	LOS D	14.3	362.7	Full	1600	0.0	0.0
Lane 2[d]	1119	2.0	1235	0.907	100	26.8	LOS D	14.1	359.3	Full	1600	0.0	0.0
Lane 3	33	2.0	1284	0.025	100	3.0	LOS A	0.1	2.2	Short	200	0.0	NA
Approach	2211	2.0		0.907		26.9	LOS D	14.3	362.7				
East: Kulanihakoi Street													
Lane 1[d]	46	2.0	202	0.226	100	24.1	LOS C	0.7	17.0	Full	1600	0.0	0.0
Lane 2	14	2.0	1642	0.009	100	4.0	LOS A	0.0	0.0	Short	200	0.0	NA
Approach	60	2.0		0.226		19.3	LOS C	0.7	17.0				
North: Piilani Highway													
Lane 1	1063	2.0	1181	0.900	100	26.8	LOS D	36.8	933.5	Full	1600	0.0	0.0
Lane 2[d]	1128	2.0	1253	0.900	100	25.8	LOS D	35.2	894.2	Full	1600	0.0	0.0
Approach	2190	2.0		0.900		26.3	LOS D	36.8	933.5				
West: Kulanihakoi Street													
Lane 1	55	2.0	180	0.308	100	30.2	LOS D	1.0	24.5	Full	1600	0.0	0.0
Lane 2[d]	207	2.0	220	0.938	100	91.3	LOS F	6.7	171.4	Full	1600	0.0	0.0
Approach	262	2.0		0.938		78.4	LOS F	6.7	171.4				
Intersection	4723	2.0		0.938		29.4	LOS D	36.8	933.5				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Piilani Highway

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	76	983	-	1059	2.0	1168	0.907	100	NA	NA
Lane 2	-	1119	-	1119	2.0	1235	0.907	100	NA	NA
Lane 3	-	-	33	33	2.0	1284	0.025	100	0.0	2
Approach	76	2102	33	2211	2.0		0.907			

East: Kulanihakoi Street

Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.

From E To Exit:	S	W	N			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	42	3	-	46	2.0	202	0.226	100	NA	NA
Lane 2	-	-	14	14	2.0	1642	0.009	100	0.0	1
Approach	42	3	14	60	2.0		0.226			
North: Piilani Highway										
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	13	1050	-	1063	2.0	1181	0.900	100	NA	NA
Lane 2	-	1022	105	1128	2.0	1253	0.900	100	NA	NA
Approach	13	2072	105	2190	2.0		0.900			
West: Kulanihakoi Street										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	48	8	-	55	2.0	180	0.308	100	NA	NA
Lane 2	-	-	207	207	2.0	220	0.938	100	NA	NA
Approach	48	8	207	262	2.0		0.938			

	Total	%HV	Deg.Satn (v/c)
Intersection	4723	2.0	0.938

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
East Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Piilani Highway Merge Type: **Priority**												
Exit Short Lane	3	500	0.0	1119	1142	3.00	2.00	14	939	0.015	3.8	4.0
Merge Lane	2	-	100.0	Merge Lane is not Opposed				1119	1800	0.622	0.0	0.0
West Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

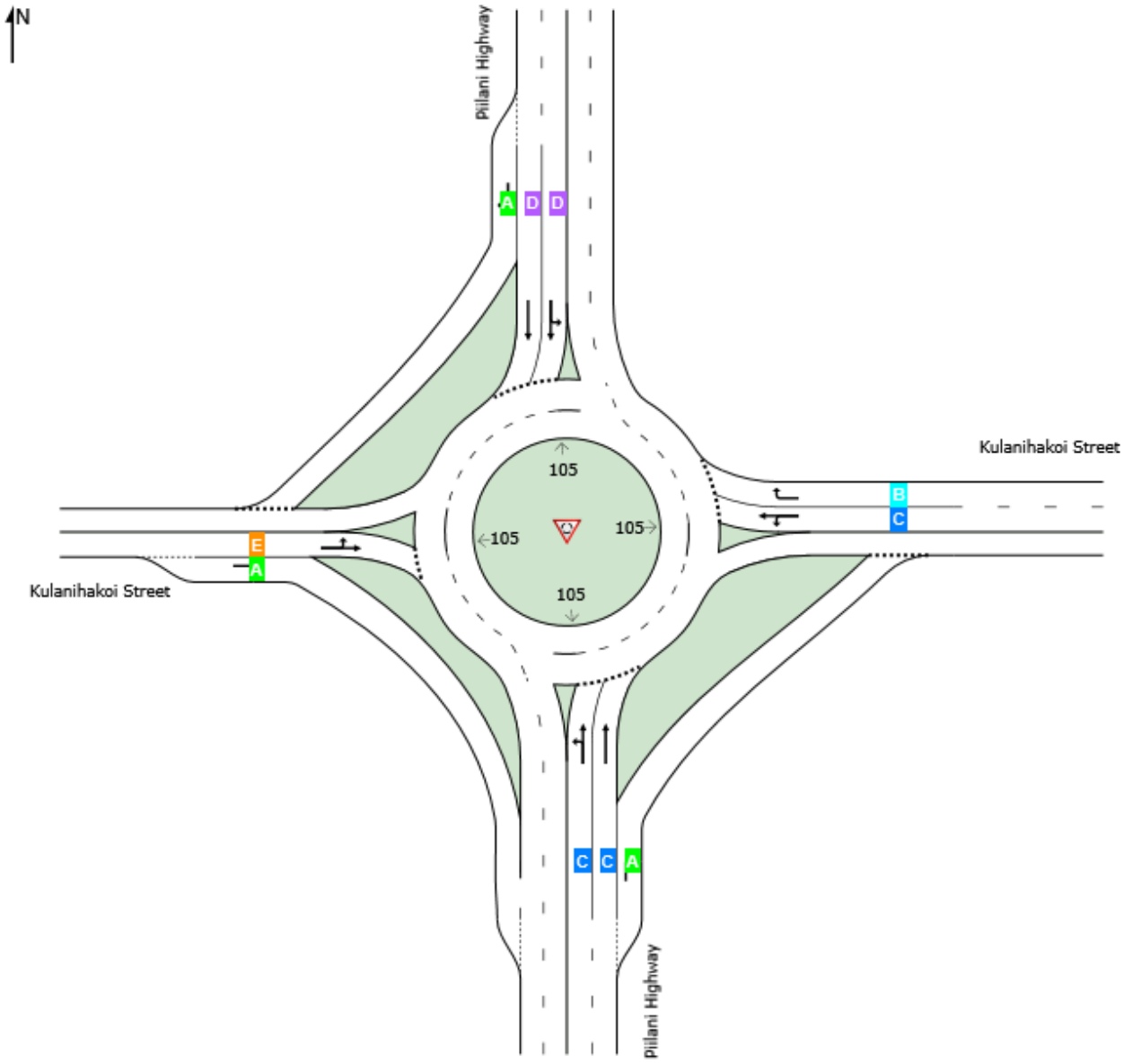
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 102 [RTL NES 2021 - AM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	C	C	D	C	C



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Geometric Delay is not included).

LANE SUMMARY

Site: 102 [RTL NES 2021 - AM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Piilani Highway													
Lane 1	752	2.0	988	0.761	100	18.0	LOS C	12.7	323.0	Full	1600	0.0	0.0
Lane 2[d]	801	2.0	1052	0.761	100	17.2	LOS C	12.2	309.8	Full	1600	0.0	0.0
Lane 3	149	2.0	1116	0.133	100	4.4	LOS A	0.5	11.6	Short	200	0.0	NA
Approach	1702	2.0		0.761		16.4	LOS C	12.7	323.0				
East: Kulanihakoi Street													
Lane 1[d]	88	2.0	339	0.260	100	15.6	LOS C	0.9	21.8	Full	1600	0.0	0.0
Lane 2	29	2.0	287	0.102	100	14.5	LOS B	0.3	8.0	Full	1600	0.0	0.0
Approach	117	2.0		0.260		15.3	LOS C	0.9	21.8				
North: Piilani Highway													
Lane 1	1048	2.0	1146	0.915	100	29.3	LOS D	43.0	1092.9	Full	1600	0.0	0.0
Lane 2[d]	1115	2.0	1219	0.915	100	28.1	LOS D	43.5	1104.2	Full	1600	0.0	0.0
Lane 3	49	2.0	1308	0.037	100	3.0	LOS A	0.1	3.5	Short	200	0.0	NA
Approach	2212	2.0		0.915		28.1	LOS D	43.5	1104.2				
West: Kulanihakoi Street													
Lane 1[d]	114	2.0	199	0.574	100	42.9	LOS E	2.1	54.0	Full	1600	0.0	0.0
Lane 2	239	2.0	1642	0.146	100	6.5	LOS A	0.0	0.0	Short	200	0.0	NA
Approach	353	2.0		0.574		18.2	LOS C	2.1	54.0				
Intersection	4385	2.0		0.915		22.4	LOS C	43.5	1104.2				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Piilani Highway

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	65	687	-	752	2.0	988	0.761	100	NA	NA
Lane 2	-	801	-	801	2.0	1052	0.761	100	NA	NA
Lane 3	-	-	149	149	2.0	1116	0.133	100	0.0	2
Approach	65	1488	149	1702	2.0		0.761			

East: Kulanihakoi Street

Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.

From E To Exit:	S	W	N			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	82	7	-	88	2.0	339	0.260	100	NA	NA
Lane 2	-	-	29	29	2.0	287	0.102	100	NA	NA
Approach	82	7	29	117	2.0		0.260			
North: Piilani Highway										
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	61	987	-	1048	2.0	1146	0.915	100	NA	NA
Lane 2	-	1115	-	1115	2.0	1219	0.915	100	NA	NA
Lane 3	-	-	49	49	2.0	1308	0.037	100	0.0	2
Approach	61	2102	49	2212	2.0		0.915			
West: Kulanihakoi Street										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	76	38	-	114	2.0	199	0.574	100	NA	NA
Lane 2	-	-	239	239	2.0	1642	0.146	100	0.0	1
Approach	76	38	239	353	2.0		0.574			

	Total	%HV	Deg.Satn (v/c)
Intersection	4385	2.0	0.915

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Piilani Highway Merge Type: **Priority**												
Exit Short Lane	3	500	0.0	1115	1137	3.00	2.00	239	941	0.254	3.8	6.4
Merge Lane	2	-	100.0	Merge Lane is not Opposed				1115	1800	0.619	0.0	0.0
East Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
West Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

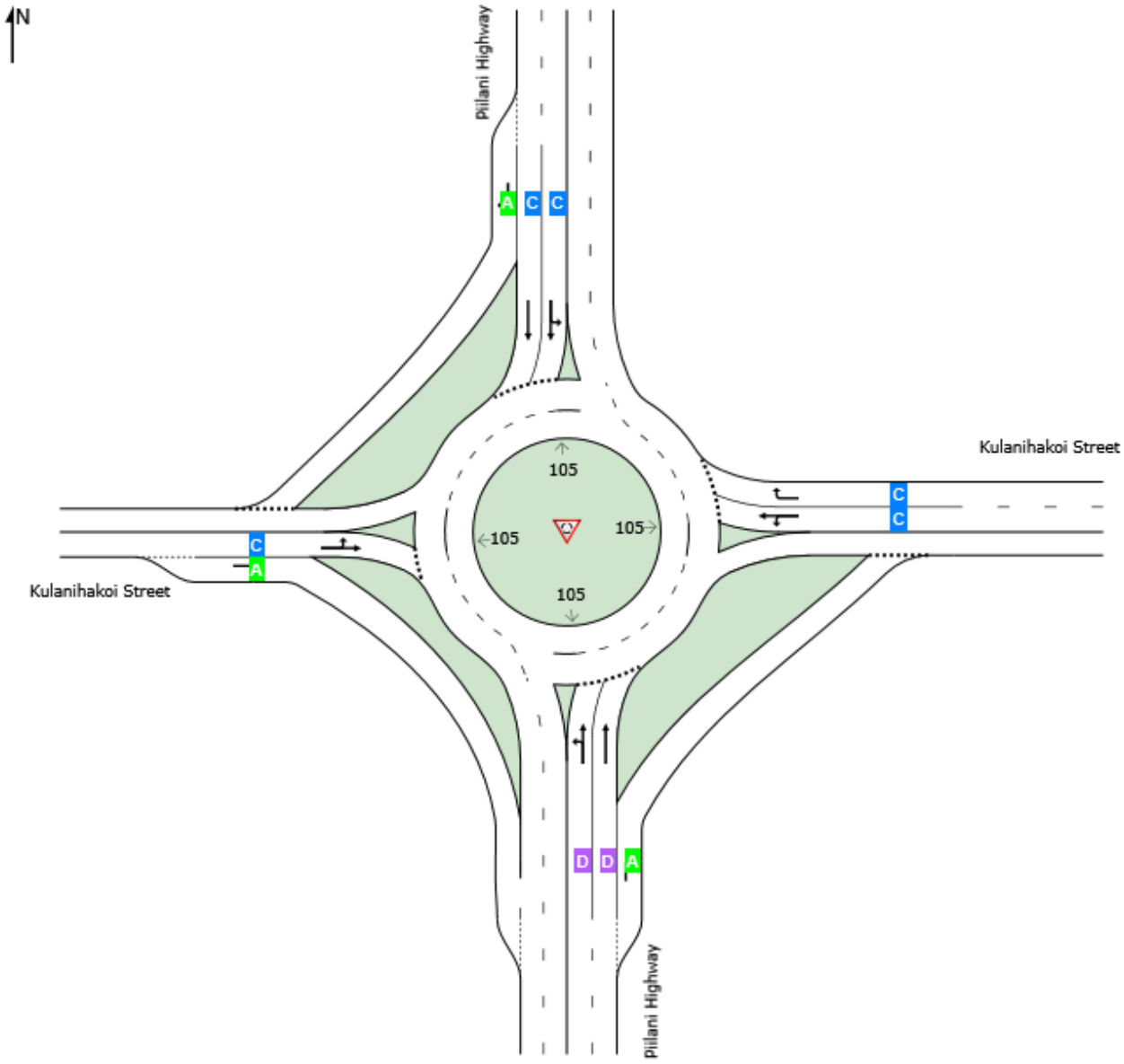
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 102 [RTL NES 2021 - PM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	D	C	C	A	C



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Geometric Delay is not included).

LANE SUMMARY

Site: 102 [RTL NES 2021 - PM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Piilani Highway													
Lane 1	1059	2.0	1168	0.907	100	27.8	LOS D	14.3	362.7	Full	1600	0.0	0.0
Lane 2[d]	1119	2.0	1235	0.907	100	26.8	LOS D	14.1	359.3	Full	1600	0.0	0.0
Lane 3	33	2.0	1284	0.025	100	3.0	LOS A	0.1	2.2	Short	200	0.0	NA
Approach	2211	2.0		0.907		26.9	LOS D	14.3	362.7				
East: Kulanihakoi Street													
Lane 1[d]	46	2.0	202	0.226	100	24.1	LOS C	0.7	17.0	Full	1600	0.0	0.0
Lane 2	14	2.0	164	0.086	100	24.5	LOS C	0.2	6.2	Full	1600	0.0	0.0
Approach	60	2.0		0.226		24.2	LOS C	0.7	17.0				
North: Piilani Highway													
Lane 1	1012	2.0	1181	0.857	100	22.2	LOS C	24.7	627.4	Full	1600	0.0	0.0
Lane 2[d]	1073	2.0	1253	0.857	100	21.3	LOS C	22.4	568.6	Full	1600	0.0	0.0
Lane 3	105	2.0	1300	0.081	100	3.4	LOS A	0.3	7.8	Short	200	0.0	NA
Approach	2190	2.0		0.857		20.8	LOS C	24.7	627.4				
West: Kulanihakoi Street													
Lane 1[d]	55	2.0	220	0.252	100	23.0	LOS C	0.8	19.5	Full	1600	0.0	0.0
Lane 2	207	2.0	1642	0.126	100	5.9	LOS A	0.0	0.0	Short	200	0.0	NA
Approach	262	2.0		0.252		9.5	LOS A	0.8	19.5				
Intersection	4723	2.0		0.907		23.1	LOS C	24.7	627.4				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Piilani Highway

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	76	983	-	1059	2.0	1168	0.907	100	NA	NA
Lane 2	-	1119	-	1119	2.0	1235	0.907	100	NA	NA
Lane 3	-	-	33	33	2.0	1284	0.025	100	0.0	2
Approach	76	2102	33	2211	2.0		0.907			

East: Kulanihakoi Street

Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.

From E To Exit:	S	W	N			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	42	3	-	46	2.0	202	0.226	100	NA	NA
Lane 2	-	-	14	14	2.0	164	0.086	100	NA	NA
Approach	42	3	14	60	2.0		0.226			
North: Piilani Highway										
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	13	998	-	1012	2.0	1181	0.857	100	NA	NA
Lane 2	-	1073	-	1073	2.0	1253	0.857	100	NA	NA
Lane 3	-	-	105	105	2.0	1300	0.081	100	0.0	2
Approach	13	2072	105	2190	2.0		0.857			
West: Kulanihakoi Street										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	48	8	-	55	2.0	220	0.252	100	NA	NA
Lane 2	-	-	207	207	2.0	1642	0.126	100	0.0	1
Approach	48	8	207	262	2.0		0.252			

	Total	%HV	Deg.Satn (v/c)
Intersection	4723	2.0	0.907

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Piilani Highway Merge Type: **Priority**												
Exit Short Lane	3	500	0.0	1073	1095	3.00	2.00	207	965	0.214	3.7	5.8
Merge Lane	2	-	100.0	Merge Lane is not Opposed				1073	1800	0.596	0.0	0.0
East Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
West Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

Piilani Highway/Kihei High School Roundabout Evaluation

July 28, 2020

Attachment 3 – SIDRA Analysis Worksheets

2031 HCM6 Methodology

Summary Table, Delay/LOS, Year 2031 HCM6

Piilani Hwy/Kulanihakoi St	Piilani Hwy - South		Kihei HS Drwy		Piilani Hwy - North		Kulanihakoi St		Overall	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Year 2031 - Single Lane - AM	86.9	F	39.2	E	118.8	F	671.8	F	148.2	F
Year 2031 - Single Lane - PM	93.3	F	46.9	E	75.6	F	270.0	F	92.7	F
Year 2031 - Two Lane - AM	116.5	F	22.2	C	117.1	F	236.9	F	122.5	F
Year 2031 - Two Lane - PM	100.7	F	32.8	D	75.2	F	120.8	F	88.4	F
Year 2031 - Two Lane w/ West Bypasses - AM	125.6	F	22.0	C	105.9	F	47.3	E	105.1	F
Year 2031 - Two Lane w/ West Bypasses - PM	101.2	F	32.7	D	54.7	F	13.2	B	73.9	F
Year 2031 - Two Lane w/ East Bypasses - AM	50.1	F	29.4	D	121.9	F	228.4	F	98.4	F
Year 2031 - Two Lane w/ East Bypasses - PM	87.1	F	29.3	D	75.9	F	119.9	F	82.2	F
Year 2031 - Two Lane Optimized - AM	54.7	F	33.4	D	110.3	F	45.5	E	79.8	F
Year 2031 - Two Lane Optimized - PM	87.5	F	35.4	E	55.2	F	13.2	B	67.8	F

Notes:
1) Model results from SYDRA with HCM 6 Delay, v/c, and LOS method
2) HCM 6 Unsignalized intersection delays for LOS.
3) All options have two approach lanes on Piilani Highway and two circulating lanes in roundabout.
4) Single Lane is one combined approach lane on Kulanihakoi St and Kihei HS approaches.
5) Two Lane is two approaches, one for left turn and through, and second for right-turns.
6) Two lane with west bypass has right-turn lanes with bypass on to neighborhood.
7) Two lane with east bypass has right-turn lanes with bypass to the highschool.
8) Two lane optimized, has right-turn bypasses to neighborhood and northbound right-turn to highschool.

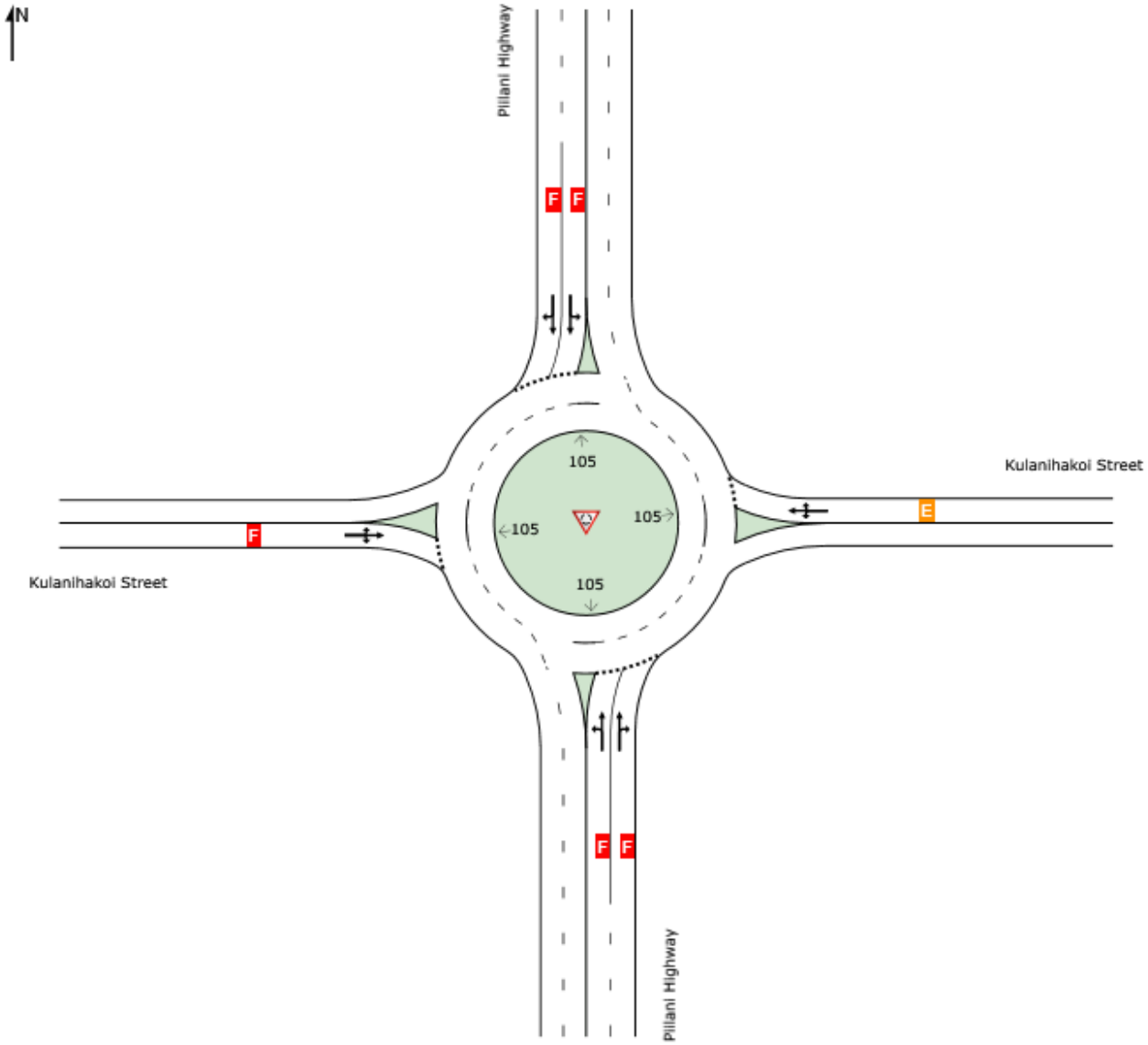
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 102 [1-Lane 2031 - AM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	F	E	F	F	F



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Geometric Delay is not included).

LANE SUMMARY

Site: 102 [1-Lane 2031 - AM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Piilani Highway													
Lane 1	1032	2.0	922	1.120	100	87.7	LOS F	89.3	2269.1	Full	1600	0.0	16.5
Lane 2[d]	1100	2.0	983	1.120	100	86.2	LOS F	94.1	2391.4	Full	1600	0.0	18.5
Approach	2133	2.0		1.120		86.9	LOS F	94.1	2391.4				
East: Kulanihakoi Street													
Lane 1[d]	241	2.0	330	0.731	100	39.2	LOS E	4.0	101.4	Full	1600	0.0	0.0
Approach	241	2.0		0.731		39.2	LOS E	4.0	101.4				
North: Piilani Highway													
Lane 1	1268	2.0	1049	1.209	100	119.4	LOS F	115.9	2942.9	Full	1600	0.0	27.7
Lane 2[d]	1358	2.0	1123	1.209	100	118.2	LOS F	123.2	3128.5	Full	1600	0.0	31.0
Approach	2626	2.0		1.209		118.8	LOS F	123.2	3128.5				
West: Kulanihakoi Street													
Lane 1[d]	447	2.0	189	2.370	100	671.8	LOS F	89.0	2259.6	Full	1600	0.0	16.3
Approach	447	2.0		2.370		671.8	LOS F	89.0	2259.6				
Intersection	5447	2.0		2.370		148.2	LOS F	123.2	3128.5				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Piilani Highway

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	76	956	-	1032	2.0	922	1.120	100	NA	NA
Lane 2	-	793	308	1100	2.0	983	1.120	100	NA	NA
Approach	76	1749	308	2133	2.0		1.120			

East: Kulanihakoi Street

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	167	13	61	241	2.0	330	0.731	100	NA	NA
Approach	167	13	61	241	2.0		0.731			

North: Piilani Highway

Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	127	1141	-	1268	2.0	1049	1.209	100	NA	NA
Lane 2	-	1309	49	1358	2.0	1123	1.209	100	NA	NA
Approach	127	2450	49	2626	2.0		1.209			

West: Kulanihakoi Street

Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	98	77	272	447	2.0	189	2.370	100	NA	NA
Approach	98	77	272	447	2.0		2.370			

	Total	%HV	Deg.Satn (v/c)
Intersection	5447	2.0	2.370

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
East Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
West Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

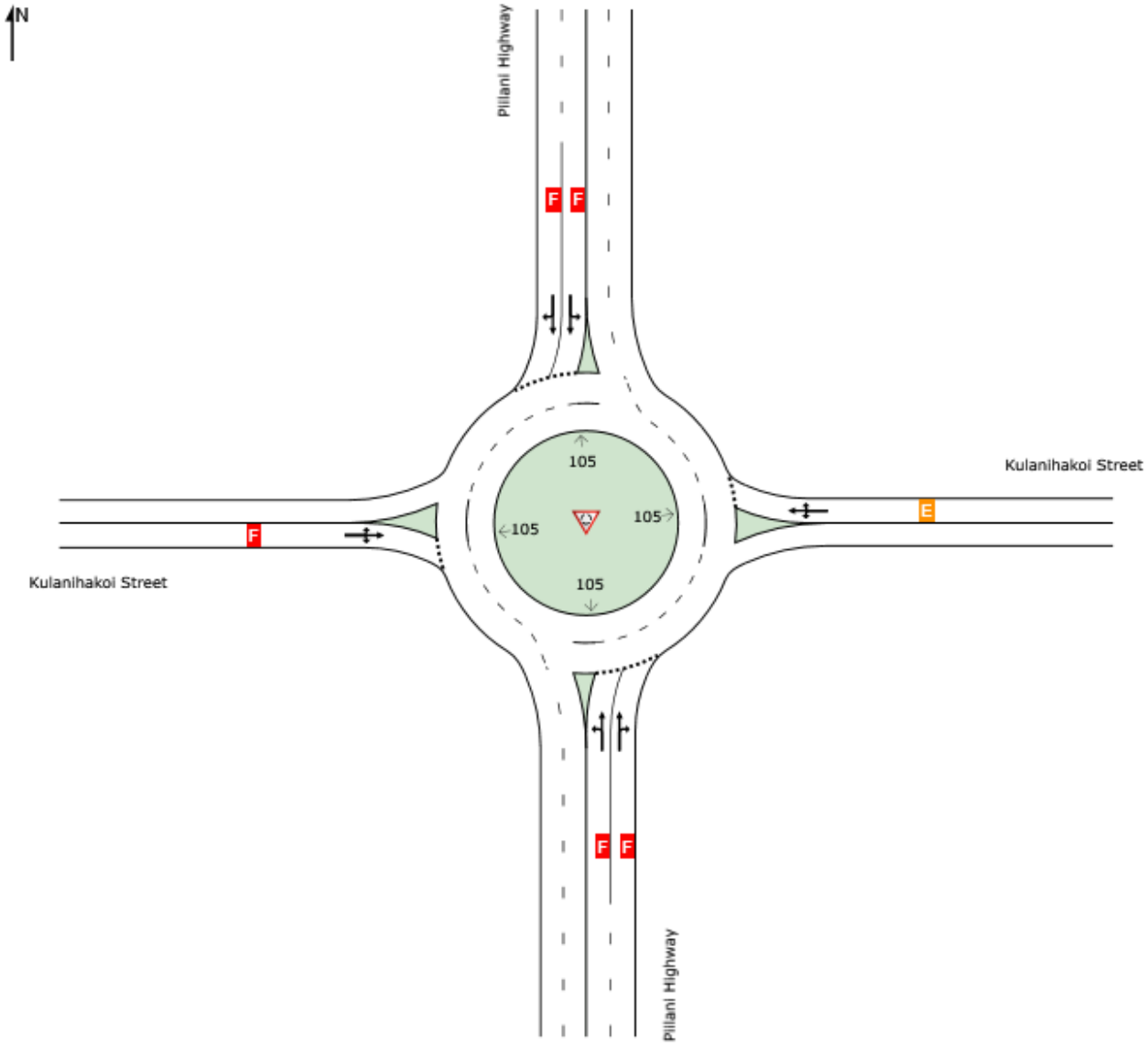
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 102 [1-Lane 2031 - PM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	F	E	F	F	F



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Geometric Delay is not included).

LANE SUMMARY

Site: 102 [1-Lane 2031 - PM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Piilani Highway													
Lane 1	1260	2.0	1099	1.146	100	93.9	LOS F	152.7	3877.4	Full	1600	0.0	47.1
Lane 2[d]	1332	2.0	1162	1.146	100	92.8	LOS F	161.5	4101.6	Full	1600	0.0	53.9
Approach	2592	2.0		1.146		93.3	LOS F	161.5	4101.6				
East: Kulanihakoi Street													
Lane 1[d]	124	2.0	199	0.622	100	46.9	LOS E	2.4	60.8	Full	1600	0.0	0.0
Approach	124	2.0		0.622		46.9	LOS E	2.4	60.8				
North: Piilani Highway													
Lane 1	1241	2.0	1129	1.100	100	76.3	LOS F	101.7	2582.9	Full	1600	0.0	21.7
Lane 2[d]	1322	2.0	1202	1.100	100	75.0	LOS F	106.9	2716.3	Full	1600	0.0	23.9
Approach	2563	2.0		1.100		75.6	LOS F	106.9	2716.3				
West: Kulanihakoi Street													
Lane 1[d]	271	2.0	189	1.435	100	270.0	LOS F	31.7	805.1	Full	1600	0.0	0.0
Approach	271	2.0		1.435		270.0	LOS F	31.7	805.1				
Intersection	5550	2.0		1.435		92.7	LOS F	161.5	4101.6				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Piilani Highway

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	87	1173	-	1260	2.0	1099	1.146	100	NA	NA
Lane 2	-	1266	66	1332	2.0	1162	1.146	100	NA	NA
Approach	87	2439	66	2592	2.0		1.146			

East: Kulanihakoi Street

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	87	7	30	124	2.0	199	0.622	100	NA	NA
Approach	87	7	30	124	2.0		0.622			

North: Piilani Highway

Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	27	1214	-	1241	2.0	1129	1.100	100	NA	NA
Lane 2	-	1194	127	1322	2.0	1202	1.100	100	NA	NA
Approach	27	2409	127	2563	2.0		1.100			

West: Kulanihakoi Street

Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	48	16	207	271	2.0	189	1.435	100	NA	NA
Approach	48	16	207	271	2.0		1.435			

	Total	%HV	Deg.Satn (v/c)
Intersection	5550	2.0	1.435

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
East Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
West Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

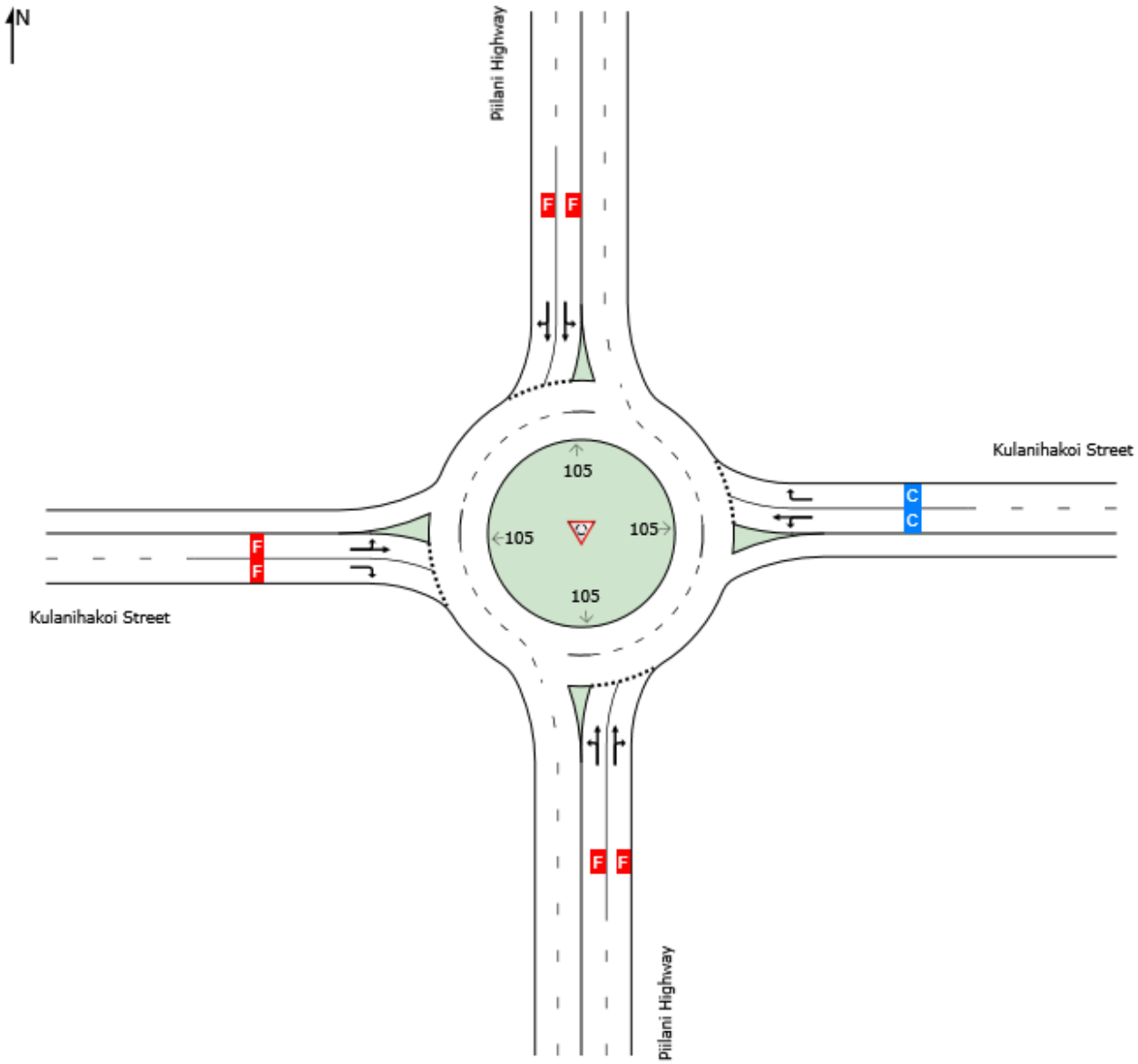
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 102 [2-Lane 2031 - AM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	F	C	F	F	F



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Geometric Delay is not included).

LANE SUMMARY

Site: 102 [2-Lane 2031 - AM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Piilani Highway													
Lane 1	1029	2.0	862	1.194	100	117.2	LOS F	92.4	2348.0	Full	1600	0.0	17.8
Lane 2[d]	1103	2.0	924	1.194	100	115.8	LOS F	98.3	2497.0	Full	1600	0.0	20.2
Approach	2133	2.0		1.194		116.5	LOS F	98.3	2497.0				
East: Kulanihakoi Street													
Lane 1[d]	180	2.0	343	0.526	100	24.1	LOS C	2.2	56.8	Full	1600	0.0	0.0
Lane 2	61	2.0	291	0.209	100	16.6	LOS C	0.7	16.7	Full	1600	0.0	0.0
Approach	241	2.0		0.526		22.2	LOS C	2.2	56.8				
North: Piilani Highway													
Lane 1	1268	2.0	1052	1.205	100	117.8	LOS F	115.5	2934.3	Full	1600	0.0	27.6
Lane 2[d]	1358	2.0	1126	1.205	100	116.6	LOS F	122.8	3118.3	Full	1600	0.0	30.8
Approach	2626	2.0		1.205		117.1	LOS F	122.8	3118.3				
West: Kulanihakoi Street													
Lane 1	175	2.0	152	1.149	100	177.6	LOS F	13.0	330.2	Full	1600	0.0	0.0
Lane 2[d]	272	2.0	188	1.447	100	275.1	LOS F	32.3	820.1	Full	1600	0.0	0.0
Approach	447	2.0		1.447		236.9	LOS F	32.3	820.1				
Intersection	5447	2.0		1.447		122.5	LOS F	122.8	3118.3				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Piilani Highway

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	76	953	-	1029	2.0	862	1.194	100	NA	NA
Lane 2	-	796	308	1103	2.0	924	1.194	100	NA	NA
Approach	76	1749	308	2133	2.0		1.194			

East: Kulanihakoi Street

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	167	13	-	180	2.0	343	0.526	100	NA	NA

Lane 2	-	-	61	61	2.0	291	0.209	100	NA	NA
Approach	167	13	61	241	2.0		0.526			
North: Piilani Highway										
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	127	1141	-	1268	2.0	1052	1.205	100	NA	NA
Lane 2	-	1309	49	1358	2.0	1126	1.205	100	NA	NA
Approach	127	2450	49	2626	2.0		1.205			
West: Kulanihakoi Street										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	98	77	-	175	2.0	152	1.149	100	NA	NA
Lane 2	-	-	272	272	2.0	188	1.447	100	NA	NA
Approach	98	77	272	447	2.0		1.447			
	Total	%HV	Deg.Satn (v/c)							
Intersection	5447	2.0	1.447							

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
East Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
West Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

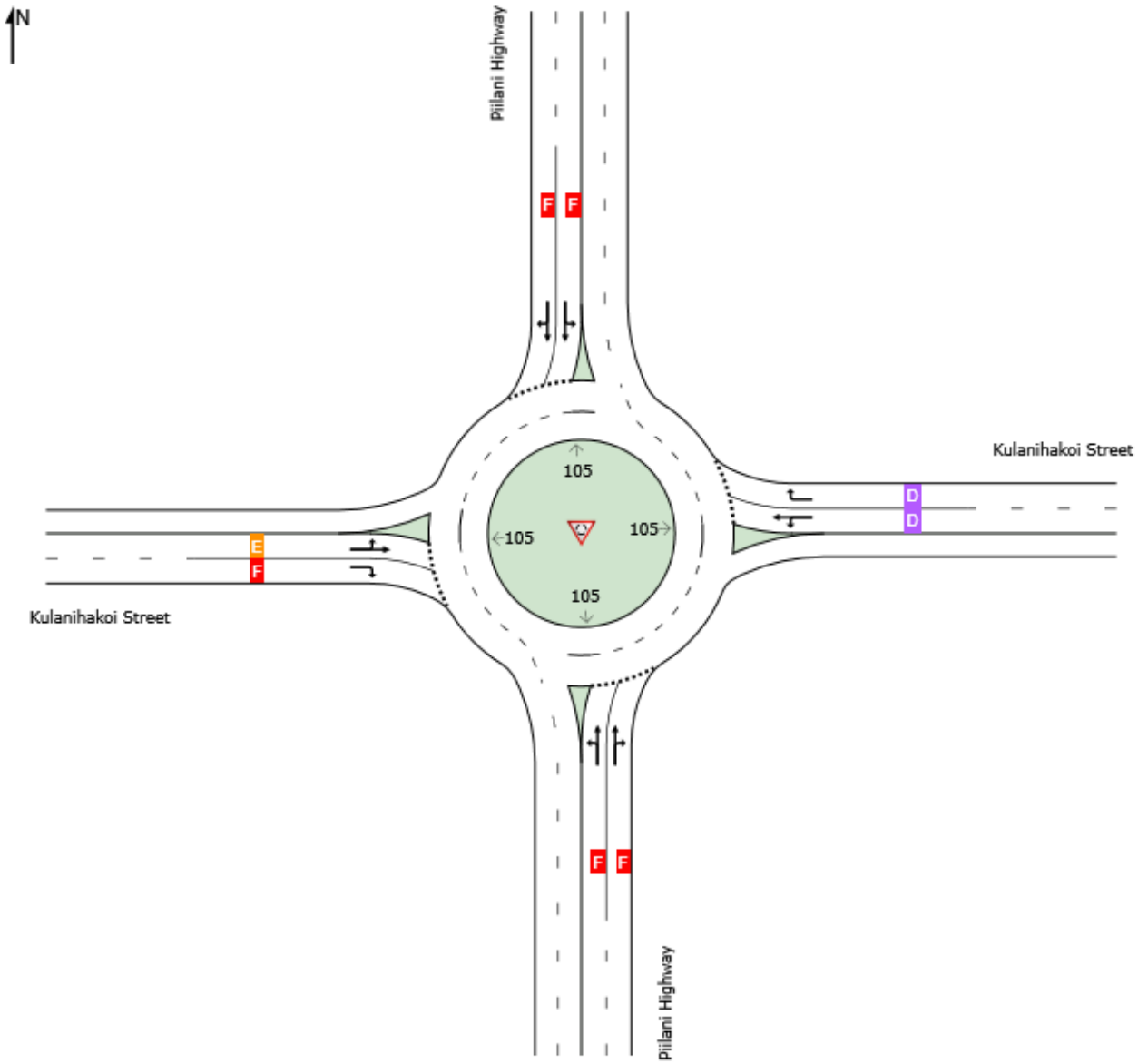
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 102 [2-Lane 2031 - PM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	F	D	F	F	F



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Geometric Delay is not included).

LANE SUMMARY

Site: 102 [2-Lane 2031 - PM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Piilani Highway													
Lane 1	1259	2.0	1081	1.165	100	101.2	LOS F	139.7	3549.3	Full	1600	0.0	39.3
Lane 2[d]	1333	2.0	1145	1.165	100	100.2	LOS F	145.2	3689.3	Full	1600	0.0	42.4
Approach	2592	2.0		1.165		100.7	LOS F	145.2	3689.3				
East: Kulanihakoi Street													
Lane 1[d]	93	2.0	202	0.463	100	34.4	LOS D	1.6	40.1	Full	1600	0.0	0.0
Lane 2	30	2.0	164	0.186	100	27.6	LOS D	0.5	13.4	Full	1600	0.0	0.0
Approach	124	2.0		0.463		32.8	LOS D	1.6	40.1				
North: Piilani Highway													
Lane 1	1241	2.0	1130	1.099	100	75.9	LOS F	101.7	2582.5	Full	1600	0.0	21.7
Lane 2[d]	1322	2.0	1203	1.099	100	74.6	LOS F	106.9	2715.4	Full	1600	0.0	23.9
Approach	2563	2.0		1.099		75.2	LOS F	106.9	2715.4				
West: Kulanihakoi Street													
Lane 1	64	2.0	152	0.422	100	42.0	LOS E	1.4	34.5	Full	1600	0.0	0.0
Lane 2[d]	207	2.0	188	1.097	100	145.3	LOS F	12.3	313.5	Full	1600	0.0	0.0
Approach	271	2.0		1.097		120.8	LOS F	12.3	313.5				
Intersection	5550	2.0		1.165		88.4	LOS F	145.2	3689.3				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Piilani Highway

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	87	1172	-	1259	2.0	1081	1.165	100	NA	NA
Lane 2	-	1267	66	1333	2.0	1145	1.165	100	NA	NA
Approach	87	2439	66	2592	2.0		1.165			

East: Kulanihakoi Street

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	87	7	-	93	2.0	202	0.463	100	NA	NA

Lane 2	-	-	30	30	2.0	164	0.186	100	NA	NA
Approach	87	7	30	124	2.0		0.463			
North: Piilani Highway										
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	27	1214	-	1241	2.0	1130	1.099	100	NA	NA
Lane 2	-	1194	127	1322	2.0	1203	1.099	100	NA	NA
Approach	27	2409	127	2563	2.0		1.099			
West: Kulanihakoi Street										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	48	16	-	64	2.0	152	0.422	100	NA	NA
Lane 2	-	-	207	207	2.0	188	1.097	100	NA	NA
Approach	48	16	207	271	2.0		1.097			
	Total	%HV	Deg.Satn (v/c)							
Intersection	5550	2.0		1.165						

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
East Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
West Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

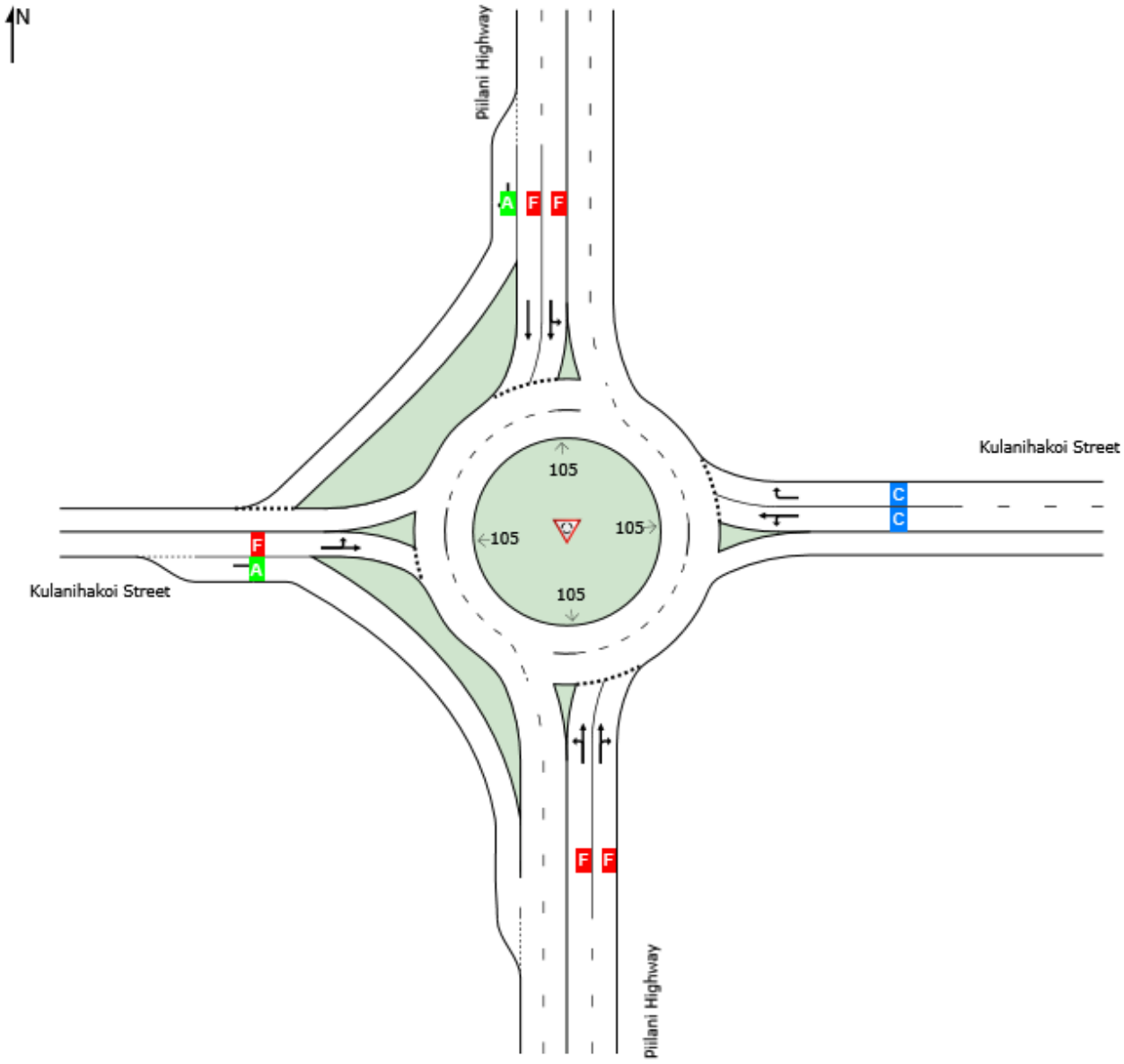
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 102 [2-Lane 2031 West Bypass - AM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	F	C	F	E	F



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Geometric Delay is not included).

LANE SUMMARY

Site: 102 [2-Lane 2031 West Bypass - AM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Piilani Highway													
Lane 1	1029	2.0	846	1.216	100	126.3	LOS F	94.0	2387.5	Full	1600	0.0	18.4
Lane 2[d]	1104	2.0	908	1.216	100	124.9	LOS F	100.2	2544.1	Full	1600	0.0	21.0
Approach	2133	2.0		1.216		125.6	LOS F	100.2	2544.1				
East: Kulanihakoi Street													
Lane 1[d]	180	2.0	345	0.523	100	23.8	LOS C	2.2	56.2	Full	1600	0.0	0.0
Lane 2	61	2.0	293	0.208	100	16.5	LOS C	0.7	16.6	Full	1600	0.0	0.0
Approach	241	2.0		0.523		22.0	LOS C	2.2	56.2				
North: Piilani Highway													
Lane 1	1245	2.0	1053	1.182	100	108.5	LOS F	108.6	2758.1	Full	1600	0.0	24.6
Lane 2[d]	1332	2.0	1127	1.182	100	107.2	LOS F	115.3	2929.2	Full	1600	0.0	27.5
Lane 3	49	2.0	1303	0.038	100	3.1	LOS A	0.1	3.5	Short	200	0.0	NA
Approach	2626	2.0		1.182		105.9	LOS F	115.3	2929.2				
West: Kulanihakoi Street													
Lane 1[d]	175	2.0	181	0.965	100	109.9	LOS F	6.8	172.0	Full	1600	0.0	0.0
Lane 2	272	2.0	1642	0.166	100	6.9	LOS A	0.0	0.0	Short	200	0.0	NA
Approach	447	2.0		0.965		47.3	LOS E	6.8	172.0				
Intersection	5447	2.0		1.216		105.1	LOS F	115.3	2929.2				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Piilani Highway

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	76	953	-	1029	2.0	846	1.216	100	NA	NA
Lane 2	-	796	308	1104	2.0	908	1.216	100	NA	NA
Approach	76	1749	308	2133	2.0		1.216			

East: Kulanihakoi Street

Mov. From E	L2	T1	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

To Exit:	S	W	N							
Lane 1	167	13	-	180	2.0	345	0.523	100	NA	NA
Lane 2	-	-	61	61	2.0	293	0.208	100	NA	NA
Approach	167	13	61	241	2.0		0.523			

North: Piilani Highway

Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	127	1118	-	1245	2.0	1053	1.182	100	NA	NA
Lane 2	-	1332	-	1332	2.0	1127	1.182	100	NA	NA
Lane 3	-	-	49	49	2.0	1303	0.038	100	0.0	2
Approach	127	2450	49	2626	2.0		1.182			

West: Kulanihakoi Street

Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	98	77	-	175	2.0	181	0.965	100	NA	NA
Lane 2	-	-	272	272	2.0	1642	0.166	100	0.0	1
Approach	98	77	272	447	2.0		0.965			

	Total	%HV	Deg.Satn (v/c)
Intersection	5447	2.0	1.216

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Piilani Highway Merge Type: **Priority**												
Exit Short Lane	3	500	0.0	1127	1150	3.00	2.00	272	934	0.291	3.9	6.9
Merge Lane	2	-	100.0	Merge Lane is not Opposed				1127	1800	0.626	0.0	0.0
East Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
West Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

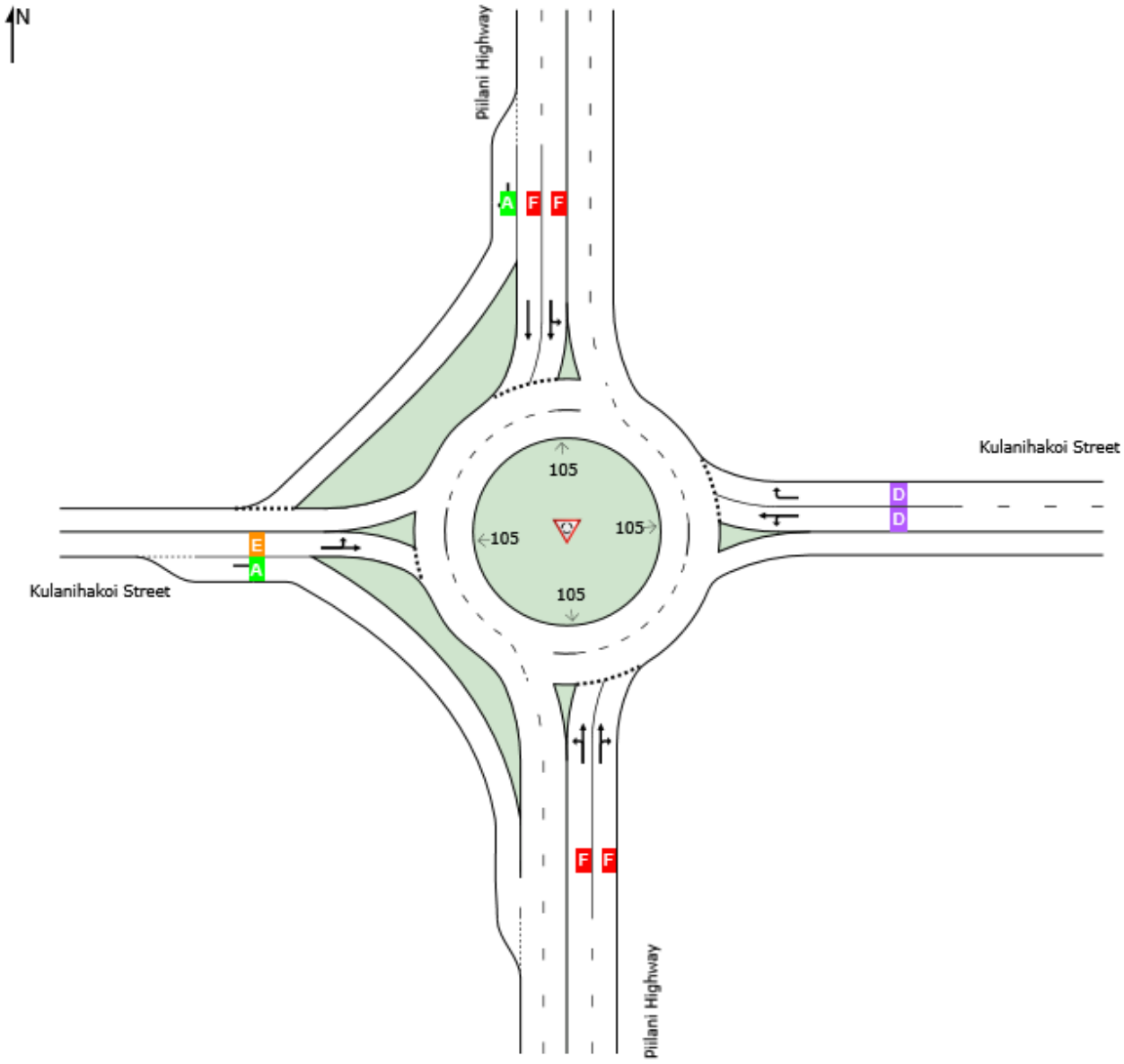
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 102 [2-Lane 2031 - West Bypass - PM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	F	D	F	B	F



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Geometric Delay is not included).

LANE SUMMARY

Site: 102 [2-Lane 2031 - West Bypass - PM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Piilani Highway													
Lane 1	1259	2.0	1080	1.166	100	101.7	LOS F	139.8	3551.6	Full	1600	0.0	39.3
Lane 2[d]	1333	2.0	1143	1.166	100	100.6	LOS F	144.7	3676.0	Full	1600	0.0	42.1
Approach	2592	2.0		1.166		101.2	LOS F	144.7	3676.0				
East: Kulanihakoi Street													
Lane 1[d]	93	2.0	202	0.462	100	34.3	LOS D	1.6	40.0	Full	1600	0.0	0.0
Lane 2	30	2.0	164	0.185	100	27.6	LOS D	0.5	13.4	Full	1600	0.0	0.0
Approach	124	2.0		0.462		32.7	LOS D	1.6	40.0				
North: Piilani Highway													
Lane 1	1180	2.0	1130	1.044	100	58.0	LOS F	84.8	2153.3	Full	1600	0.0	14.6
Lane 2[d]	1256	2.0	1203	1.044	100	56.7	LOS F	88.8	2255.9	Full	1600	0.0	16.3
Lane 3	127	2.0	1297	0.098	100	3.6	LOS A	0.4	9.6	Short	200	0.0	NA
Approach	2563	2.0		1.044		54.7	LOS F	88.8	2255.9				
West: Kulanihakoi Street													
Lane 1[d]	64	2.0	171	0.375	100	35.1	LOS E	1.2	30.0	Full	1600	0.0	0.0
Lane 2	207	2.0	1642	0.126	100	6.4	LOS A	0.0	0.0	Short	200	0.0	NA
Approach	271	2.0		0.375		13.2	LOS B	1.2	30.0				
Intersection	5550	2.0		1.166		73.9	LOS F	144.7	3676.0				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Piilani Highway

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	87	1172	-	1259	2.0	1080	1.166	100	NA	NA
Lane 2	-	1267	66	1333	2.0	1143	1.166	100	NA	NA
Approach	87	2439	66	2592	2.0		1.166			

East: Kulanihakoi Street

Mov. From E	L2	T1	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

To Exit:	S	W	N							
Lane 1	87	7	-	93	2.0	202	0.462	100	NA	NA
Lane 2	-	-	30	30	2.0	164	0.185	100	NA	NA
Approach	87	7	30	124	2.0		0.462			

North: Piilani Highway

Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL %	Ov. Lane No.
Lane 1	27	1153	-	1180	2.0	1130	1.044	100	NA	NA
Lane 2	-	1256	-	1256	2.0	1203	1.044	100	NA	NA
Lane 3	-	-	127	127	2.0	1297	0.098	100	0.0	2
Approach	27	2409	127	2563	2.0		1.044			

West: Kulanihakoi Street

Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL %	Ov. Lane No.
Lane 1	48	16	-	64	2.0	171	0.375	100	NA	NA
Lane 2	-	-	207	207	2.0	1642	0.126	100	0.0	1
Approach	48	16	207	271	2.0		0.375			

	Total	%HV	Deg.Satn (v/c)
Intersection	5550	2.0	1.166

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Piilani Highway Merge Type: **Priority**												
Exit Short Lane	3	500	0.0	1203	1227	3.00	2.00	207	893	0.231	4.0	6.4
Merge Lane	2	-	100.0	Merge Lane is not Opposed				1203	1800	0.668	0.0	0.0
East Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
West Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

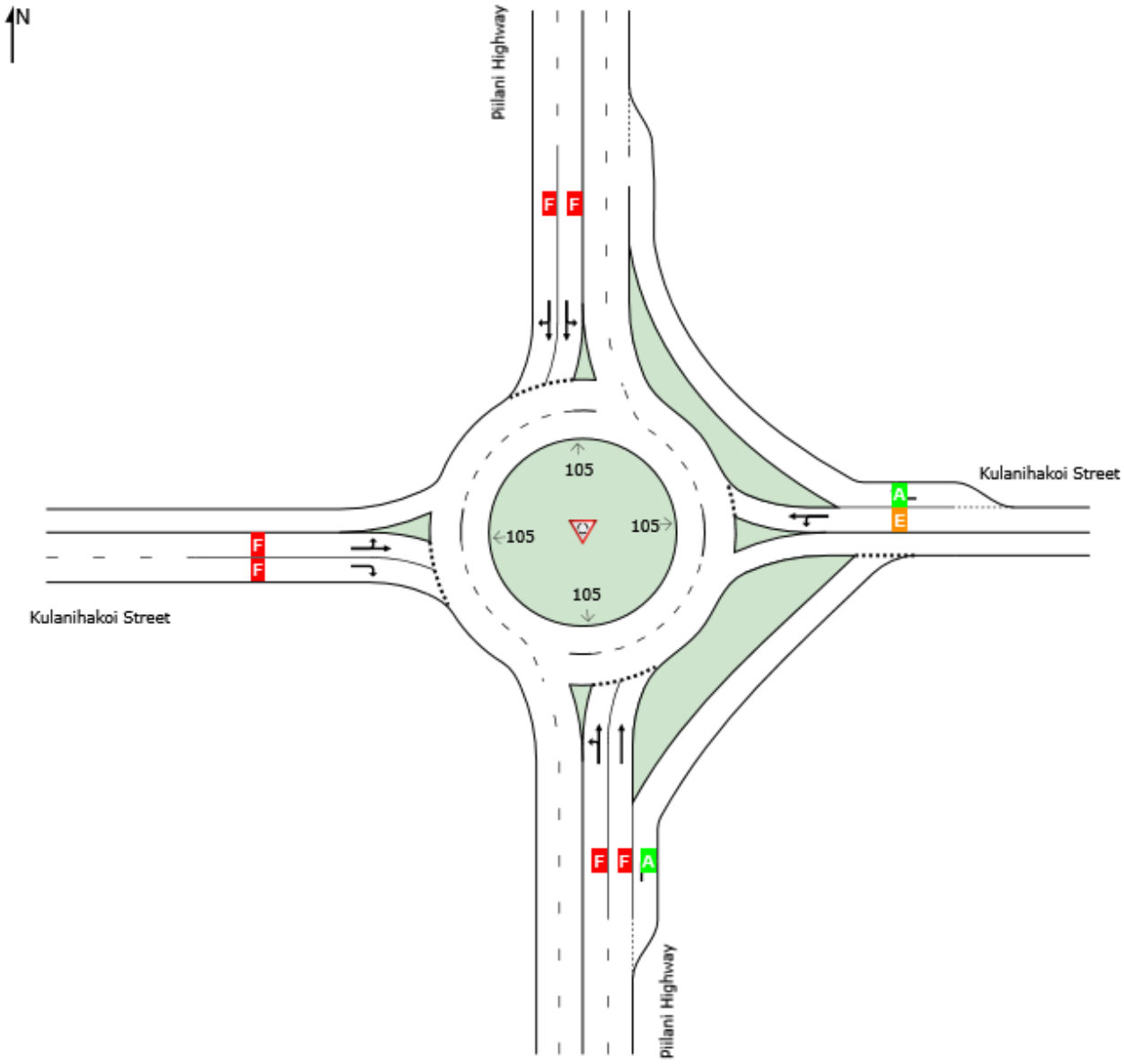
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 102 [2-Lane East Bypass 2031 - AM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	F	D	F	F	F



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Geometric Delay is not included).

LANE SUMMARY

Site: 102 [2-Lane East Bypass 2031 - AM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Piilani Highway													
Lane 1	881	2.0	862	1.022	100	58.3	LOS F	53.0	1345.4	Full	1600	0.0	0.1
Lane 2[d]	944	2.0	923	1.022	100	56.5	LOS F	55.9	1421.0	Full	1600	0.0	1.6
Lane 3	308	2.0	988	0.311	100	6.8	LOS A	1.1	29.0	Short	200	0.0	NA
Approach	2133	2.0		1.022		50.1	LOS F	55.9	1421.0				
East: Kulanihakoi Street													
Lane 1[d]	180	2.0	276	0.654	100	37.9	LOS E	2.9	74.7	Full	1600	0.0	0.0
Lane 2	61	2.0	1642	0.037	100	3.9	LOS A	0.0	0.0	Short	200	0.0	NA
Approach	241	2.0		0.654		29.4	LOS D	2.9	74.7				
North: Piilani Highway													
Lane 1	1268	2.0	1042	1.217	100	122.5	LOS F	116.6	2962.2	Full	1600	0.0	28.1
Lane 2[d]	1358	2.0	1116	1.217	100	121.3	LOS F	124.1	3151.0	Full	1600	0.0	31.4
Approach	2626	2.0		1.217		121.9	LOS F	124.1	3151.0				
West: Kulanihakoi Street													
Lane 1	175	2.0	155	1.131	100	170.4	LOS F	12.4	314.2	Full	1600	0.0	0.0
Lane 2[d]	272	2.0	191	1.426	100	265.8	LOS F	31.4	798.4	Full	1600	0.0	0.0
Approach	447	2.0		1.426		228.4	LOS F	31.4	798.4				
Intersection	5447	2.0		1.426		98.4	LOS F	124.1	3151.0				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Piilani Highway

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	76	805	-	881	2.0	862	1.022	100	NA	NA
Lane 2	-	944	-	944	2.0	923	1.022	100	NA	NA
Lane 3	-	-	308	308	2.0	988	0.311	100	0.0	2
Approach	76	1749	308	2133	2.0		1.022			

East: Kulanihakoi Street

Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.

From E To Exit:	S	W	N			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	167	13	-	180	2.0	276	0.654	100	NA	NA
Lane 2	-	-	61	61	2.0	1642	0.037	100	0.0	1
Approach	167	13	61	241	2.0		0.654			
North: Piilani Highway										
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	127	1141	-	1268	2.0	1042	1.217	100	NA	NA
Lane 2	-	1309	49	1358	2.0	1116	1.217	100	NA	NA
Approach	127	2450	49	2626	2.0		1.217			
West: Kulanihakoi Street										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	98	77	-	175	2.0	155	1.131	100	NA	NA
Lane 2	-	-	272	272	2.0	191	1.426	100	NA	NA
Approach	98	77	272	447	2.0		1.426			

	Total	%HV	Deg.Satn (v/c)
Intersection	5447	2.0	1.426

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
East Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Piilani Highway Merge Type: **Priority**												
Exit Short Lane	3	500	0.0	923	942	3.00	2.00	61	1055	0.058	3.4	3.9
Merge Lane	2	-	100.0	Merge Lane is not Opposed				923	1800	0.513	0.0	0.0
West Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

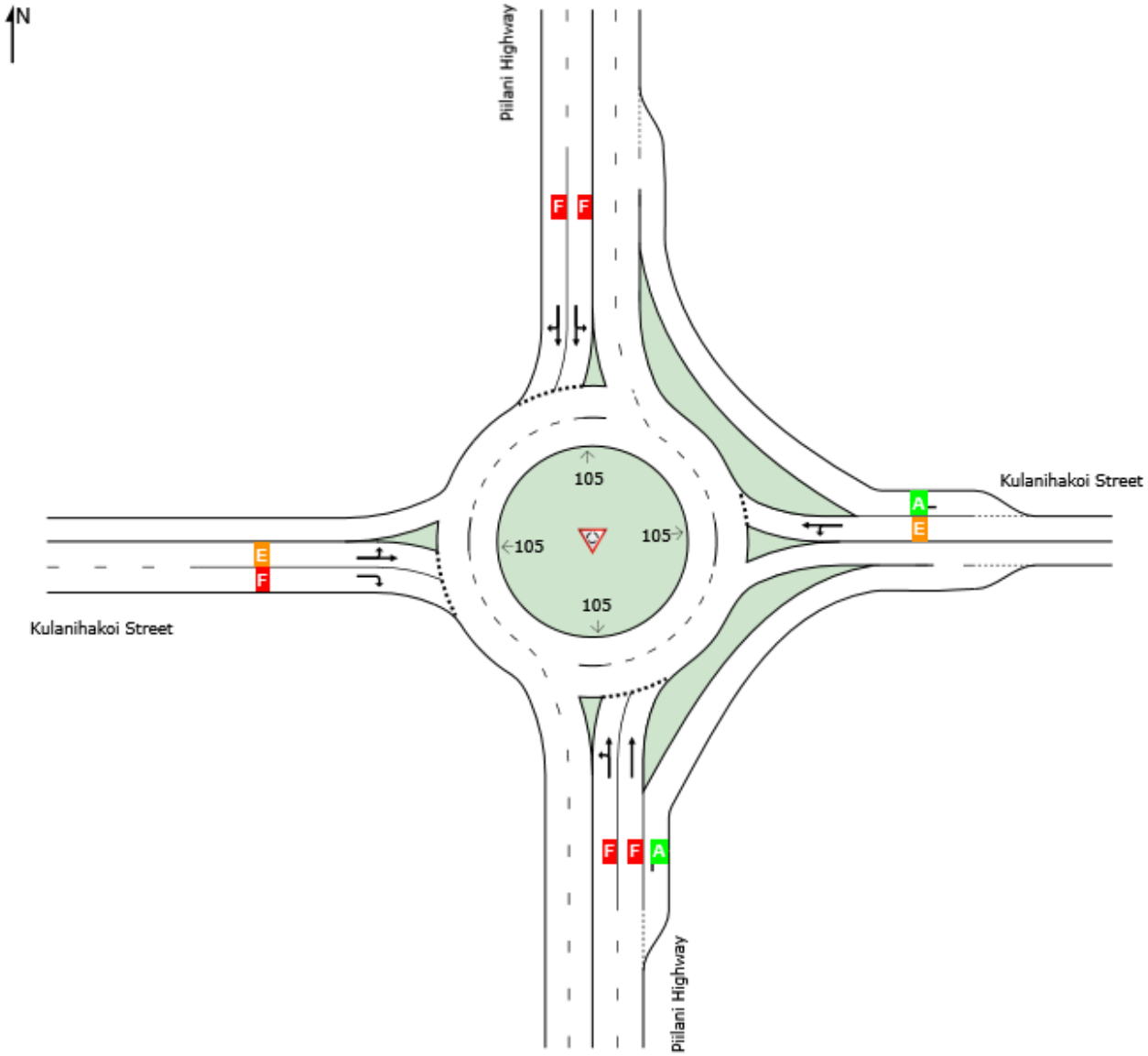
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 102 [2-Lane East Bypass 2031 - PM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	F	D	F	F	F



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Geometric Delay is not included).

LANE SUMMARY

Site: 102 [2-Lane East Bypass 2031 - PM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Piilani Highway													
Lane 1	1227	2.0	1081	1.135	100	89.9	LOS F	127.7	3244.1	Full	1600	0.0	33.2
Lane 2[d]	1299	2.0	1145	1.135	100	88.8	LOS F	132.3	3360.6	Full	1600	0.0	35.4
Lane 3	66	2.0	1642	0.040	100	2.3	LOS A	0.0	0.0	Short	200	0.0	NA
Approach	2592	2.0		1.135		87.1	LOS F	132.3	3360.6				
East: Kulanihakoi Street													
Lane 1[d]	93	2.0	193	0.485	100	37.4	LOS E	1.7	42.2	Full	1600	0.0	0.0
Lane 2	30	2.0	1642	0.019	100	4.2	LOS A	0.0	0.0	Short	200	0.0	NA
Approach	124	2.0		0.485		29.3	LOS D	1.7	42.2				
North: Piilani Highway													
Lane 1	1241	2.0	1128	1.101	100	76.6	LOS F	101.7	2583.8	Full	1600	0.0	21.7
Lane 2[d]	1322	2.0	1201	1.101	100	75.3	LOS F	107.0	2717.7	Full	1600	0.0	23.9
Approach	2563	2.0		1.101		75.9	LOS F	107.0	2717.7				
West: Kulanihakoi Street													
Lane 1	64	2.0	152	0.421	100	41.8	LOS E	1.4	34.4	Full	1600	0.0	0.0
Lane 2[d]	207	2.0	189	1.094	100	144.1	LOS F	12.2	310.3	Full	1600	0.0	0.0
Approach	271	2.0		1.094		119.9	LOS F	12.2	310.3				
Intersection	5550	2.0		1.135		82.2	LOS F	132.3	3360.6				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Piilani Highway

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	87	1140	-	1227	2.0	1081	1.135	100	NA	NA
Lane 2	-	1299	-	1299	2.0	1145	1.135	100	NA	NA
Lane 3	-	-	66	66	2.0	1642	0.040	100	0.0	2
Approach	87	2439	66	2592	2.0		1.135			

East: Kulanihakoi Street

Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.

From E To Exit:	S	W	N			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	87	7	-	93	2.0	193	0.485	100	NA	NA
Lane 2	-	-	30	30	2.0	1642	0.019	100	0.0	1
Approach	87	7	30	124	2.0		0.485			
North: Piilani Highway										
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	27	1214	-	1241	2.0	1128	1.101	100	NA	NA
Lane 2	-	1195	127	1322	2.0	1201	1.101	100	NA	NA
Approach	27	2409	127	2563	2.0		1.101			
West: Kulanihakoi Street										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	48	16	-	64	2.0	152	0.421	100	NA	NA
Lane 2	-	-	207	207	2.0	189	1.094	100	NA	NA
Approach	48	16	207	271	2.0		1.094			

	Total	%HV	Deg.Satn (v/c)
Intersection	5550	2.0	1.135

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
East Exit: Kulanihakoi Street Merge Type: **Priority**												
Exit Short Lane	2	500	0.0	41	42	3.00	2.00	66	1759	0.038	2.0	2.3
Merge Lane	1	-	100.0	Merge Lane is not Opposed				41	1800	0.023	0.0	0.0
North Exit: Piilani Highway Merge Type: **Priority**												
Exit Short Lane	3	200	0.0	1145	1167	3.00	2.00	30	925	0.033	3.9	4.2
Merge Lane	2	-	100.0	Merge Lane is not Opposed				1145	1800	0.636	0.0	0.0
West Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

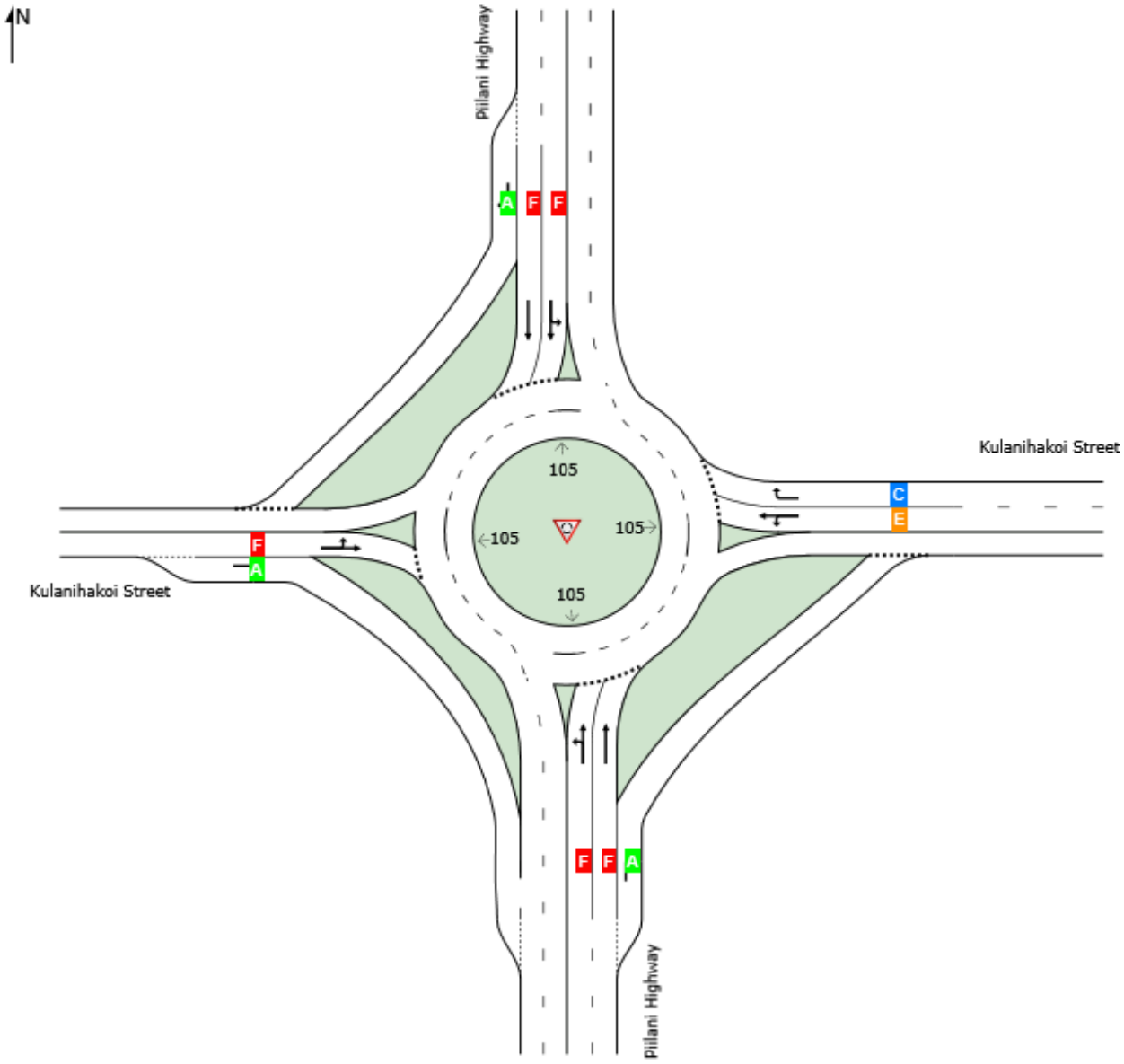
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 102 [RTL NES 2031 - AM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	F	D	F	E	F



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Geometric Delay is not included).

LANE SUMMARY

Site: 102 [RTL NES 2031 - AM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Piilani Highway													
Lane 1	880	2.0	847	1.040	100	63.7	LOS F	53.9	1369.3	Full	1600	0.0	0.6
Lane 2[d]	945	2.0	908	1.040	100	61.9	LOS F	57.1	1449.8	Full	1600	0.0	2.2
Lane 3	308	2.0	980	0.314	100	6.9	LOS A	1.2	29.2	Short	200	0.0	NA
Approach	2133	2.0		1.040		54.7	LOS F	57.1	1449.8				
East: Kulanihakoi Street													
Lane 1[d]	180	2.0	279	0.647	100	37.1	LOS E	2.9	73.5	Full	1600	0.0	0.0
Lane 2	61	2.0	232	0.262	100	22.3	LOS C	0.8	21.2	Full	1600	0.0	0.0
Approach	241	2.0		0.647		33.4	LOS D	2.9	73.5				
North: Piilani Highway													
Lane 1	1244	2.0	1043	1.193	100	113.0	LOS F	109.6	2784.9	Full	1600	0.0	25.0
Lane 2[d]	1333	2.0	1117	1.193	100	111.8	LOS F	116.6	2960.6	Full	1600	0.0	28.0
Lane 3	49	2.0	1292	0.038	100	3.1	LOS A	0.1	3.5	Short	200	0.0	NA
Approach	2626	2.0		1.193		110.3	LOS F	116.6	2960.6				
West: Kulanihakoi Street													
Lane 1[d]	175	2.0	184	0.951	100	105.3	LOS F	6.4	163.0	Full	1600	0.0	0.0
Lane 2	272	2.0	1642	0.166	100	6.9	LOS A	0.0	0.0	Short	200	0.0	NA
Approach	447	2.0		0.951		45.5	LOS E	6.4	163.0				
Intersection	5447	2.0		1.193		79.8	LOS F	116.6	2960.6				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Piilani Highway

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	76	804	-	880	2.0	847	1.040	100	NA	NA
Lane 2	-	945	-	945	2.0	908	1.040	100	NA	NA
Lane 3	-	-	308	308	2.0	980	0.314	100	0.0	2
Approach	76	1749	308	2133	2.0		1.040			

East: Kulanihakoi Street

Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.

From E To Exit:	S	W	N			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	167	13	-	180	2.0	279	0.647	100	NA	NA
Lane 2	-	-	61	61	2.0	232	0.262	100	NA	NA
Approach	167	13	61	241	2.0		0.647			
North: Piilani Highway										
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	127	1117	-	1244	2.0	1043	1.193	100	NA	NA
Lane 2	-	1333	-	1333	2.0	1117	1.193	100	NA	NA
Lane 3	-	-	49	49	2.0	1292	0.038	100	0.0	2
Approach	127	2450	49	2626	2.0		1.193			
West: Kulanihakoi Street										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	98	77	-	175	2.0	184	0.951	100	NA	NA
Lane 2	-	-	272	272	2.0	1642	0.166	100	0.0	1
Approach	98	77	272	447	2.0		0.951			

	Total	%HV	Deg.Satn (v/c)
Intersection	5447	2.0	1.193

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Piilani Highway Merge Type: **Priority**												
Exit Short Lane	3	500	0.0	1117	1140	3.00	2.00	272	940	0.289	3.8	6.8
Merge Lane	2	-	100.0	Merge Lane is not Opposed				1117	1800	0.621	0.0	0.0
East Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
West Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

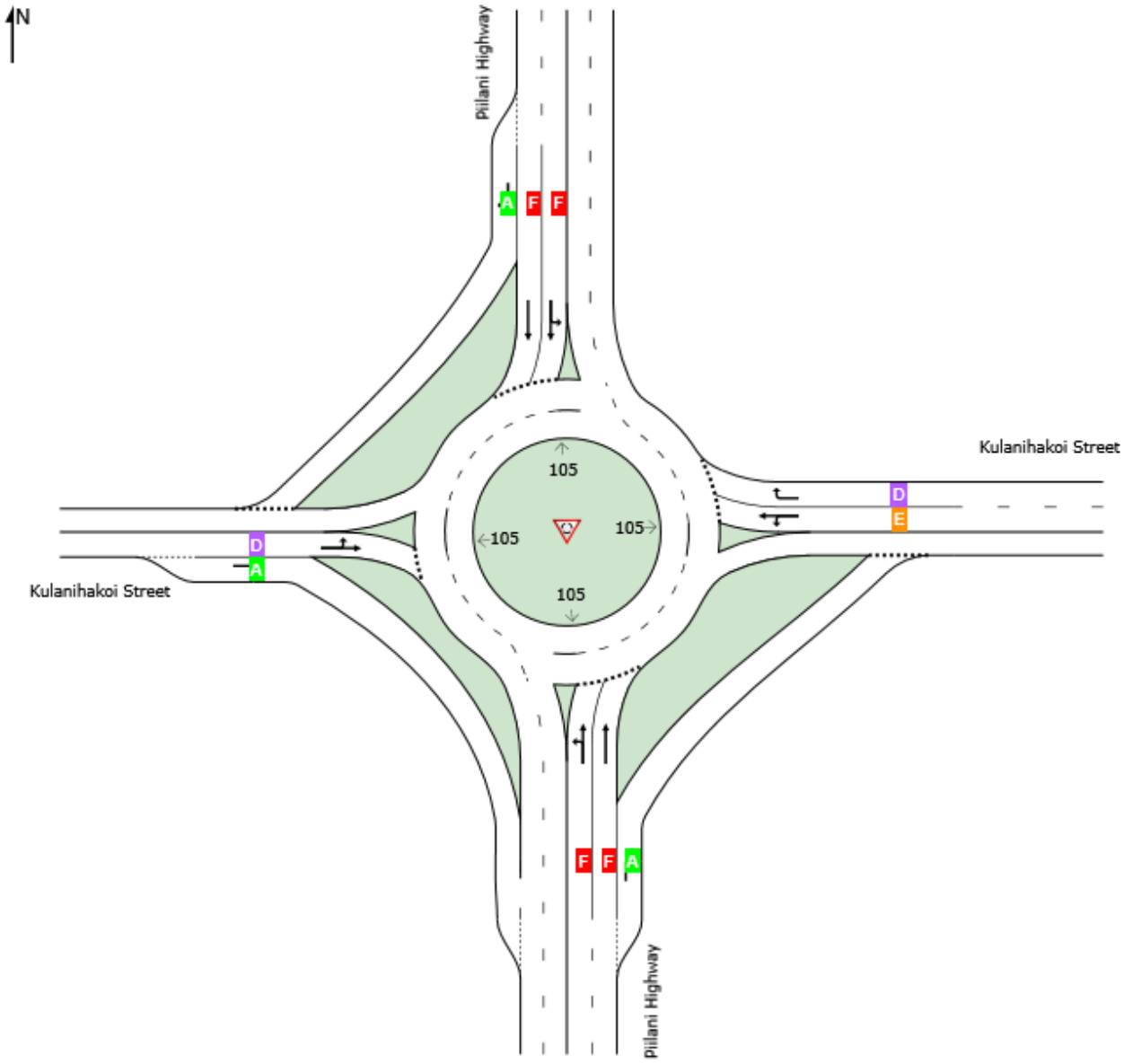
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 102 [RTL NES 2031 - PM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	F	E	F	B	F



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Geometric Delay is not included).

LANE SUMMARY

Site: 102 [RTL NES 2031 - PM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Piilani Highway													
Lane 1	1227	2.0	1080	1.136	100	90.3	LOS F	127.9	3249.4	Full	1600	0.0	33.3
Lane 2[d]	1299	2.0	1143	1.136	100	89.2	LOS F	131.8	3348.3	Full	1600	0.0	35.2
Lane 3	66	2.0	1186	0.056	100	3.5	LOS A	0.2	4.6	Short	200	0.0	NA
Approach	2592	2.0		1.136		87.5	LOS F	131.8	3348.3				
East: Kulanihakoi Street													
Lane 1[d]	93	2.0	193	0.485	100	37.3	LOS E	1.7	42.2	Full	1600	0.0	0.0
Lane 2	30	2.0	156	0.195	100	29.4	LOS D	0.6	14.1	Full	1600	0.0	0.0
Approach	124	2.0		0.485		35.4	LOS E	1.7	42.2				
North: Piilani Highway													
Lane 1	1180	2.0	1128	1.046	100	58.6	LOS F	84.8	2154.8	Full	1600	0.0	14.6
Lane 2[d]	1256	2.0	1201	1.046	100	57.3	LOS F	88.9	2258.5	Full	1600	0.0	16.3
Lane 3	127	2.0	1295	0.098	100	3.6	LOS A	0.4	9.6	Short	200	0.0	NA
Approach	2563	2.0		1.046		55.2	LOS F	88.9	2258.5				
West: Kulanihakoi Street													
Lane 1[d]	64	2.0	171	0.374	100	34.9	LOS D	1.2	29.9	Full	1600	0.0	0.0
Lane 2	207	2.0	1642	0.126	100	6.4	LOS A	0.0	0.0	Short	200	0.0	NA
Approach	271	2.0		0.374		13.2	LOS B	1.2	29.9				
Intersection	5550	2.0		1.136		67.8	LOS F	131.8	3348.3				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Piilani Highway

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	87	1140	-	1227	2.0	1080	1.136	100	NA	NA
Lane 2	-	1299	-	1299	2.0	1143	1.136	100	NA	NA
Lane 3	-	-	66	66	2.0	1186	0.056	100	0.0	2
Approach	87	2439	66	2592	2.0		1.136			

East: Kulanihakoi Street

Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.

From E To Exit:	S	W	N			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	87	7	-	93	2.0	193	0.485	100	NA	NA
Lane 2	-	-	30	30	2.0	156	0.195	100	NA	NA
Approach	87	7	30	124	2.0		0.485			
North: Piilani Highway										
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	27	1153	-	1180	2.0	1128	1.046	100	NA	NA
Lane 2	-	1256	-	1256	2.0	1201	1.046	100	NA	NA
Lane 3	-	-	127	127	2.0	1295	0.098	100	0.0	2
Approach	27	2409	127	2563	2.0		1.046			
West: Kulanihakoi Street										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	48	16	-	64	2.0	171	0.374	100	NA	NA
Lane 2	-	-	207	207	2.0	1642	0.126	100	0.0	1
Approach	48	16	207	271	2.0		0.374			

	Total	%HV	Deg.Satn (v/c)
Intersection	5550	2.0	1.136

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Piilani Highway Merge Type: **Priority**												
Exit Short Lane	3	500	0.0	1201	1225	3.00	2.00	207	894	0.231	4.0	6.4
Merge Lane	2	-	100.0	Merge Lane is not Opposed				1201	1800	0.667	0.0	0.0
East Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
West Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

Piilani Highway/Kihei High School Roundabout Evaluation

July 28, 2020

Attachment 3 – SIDRA Analysis Worksheets

2031 SIDRA Methodology

Summary Table, Delay/LOS, Year 2031 SIDRA

Piilani Hwy/Kulanihakoi St	Piilani Hwy - South		Kihei HS Drwy		Piilani Hwy - North		Kulanihakoi St		Overall	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Year 2031 - Single Lane - AM	53.6	E	31.2	C	89.1	F	589.0	F	113.6	F
Year 2031 - Single Lane - PM	63.1	E	29.6	C	42.1	D	231.9	F	60.9	E
Year 2031 - Two Lane - AM	88.9	F	16.1	B	86.5	F	68.4	E	82.8	F
Year 2031 - Two Lane - PM	70.3	F	19.0	B	41.8	D	32.4	C	54.2	E
Year 2031 - Two Lane w/ West Bypasses - AM	94.3	F	15.9	B	18.6	B	39.6	D	49.8	D
Year 2031 - Two Lane w/ West Bypasses - PM	71.2	F	19.0	B	7.1	A	15.1	B	37.7	D
Year 2031 - Two Lane w/ East Bypasses - AM	8.7	A	13.7	B	89.0	F	66.1	E	52.3	E
Year 2031 - Two Lane w/ East Bypasses - PM	6.0	A	19.9	B	45.1	D	31.4	C	25.6	C
Year 2031 - Two Lane Optimized - AM	9.2	A	15.0	B	19.8	B	40.0	D	17.1	B
Year 2031 - Two Lane Optimized - PM	6.1	A	21.9	C	7.6	A	15.2	B	7.6	A

Notes:
1) Model results from SIDRA Standard with SIDRA Delay and LOS method
2) SIDRA Roundabout LOS delays for roundabout LOS.
3) All options have two approach lanes on Piilani Highway and two circulating lanes in roundabout.
4) Single Lane is one combined approach lane on Kulanihakoi St and Kihei HS approaches.
5) Two Lane is two approaches, one for left turn and through, and second for right-turns.
6) Two lane with west bypass has right-turn lanes with bypass on to neighborhood.
7) Two lane with east bypass has right-turn lanes with bypass to the highschool.
8) Two lane optimized, has right-turn bypasses to neighborhood and northbound right-turn to highschool.

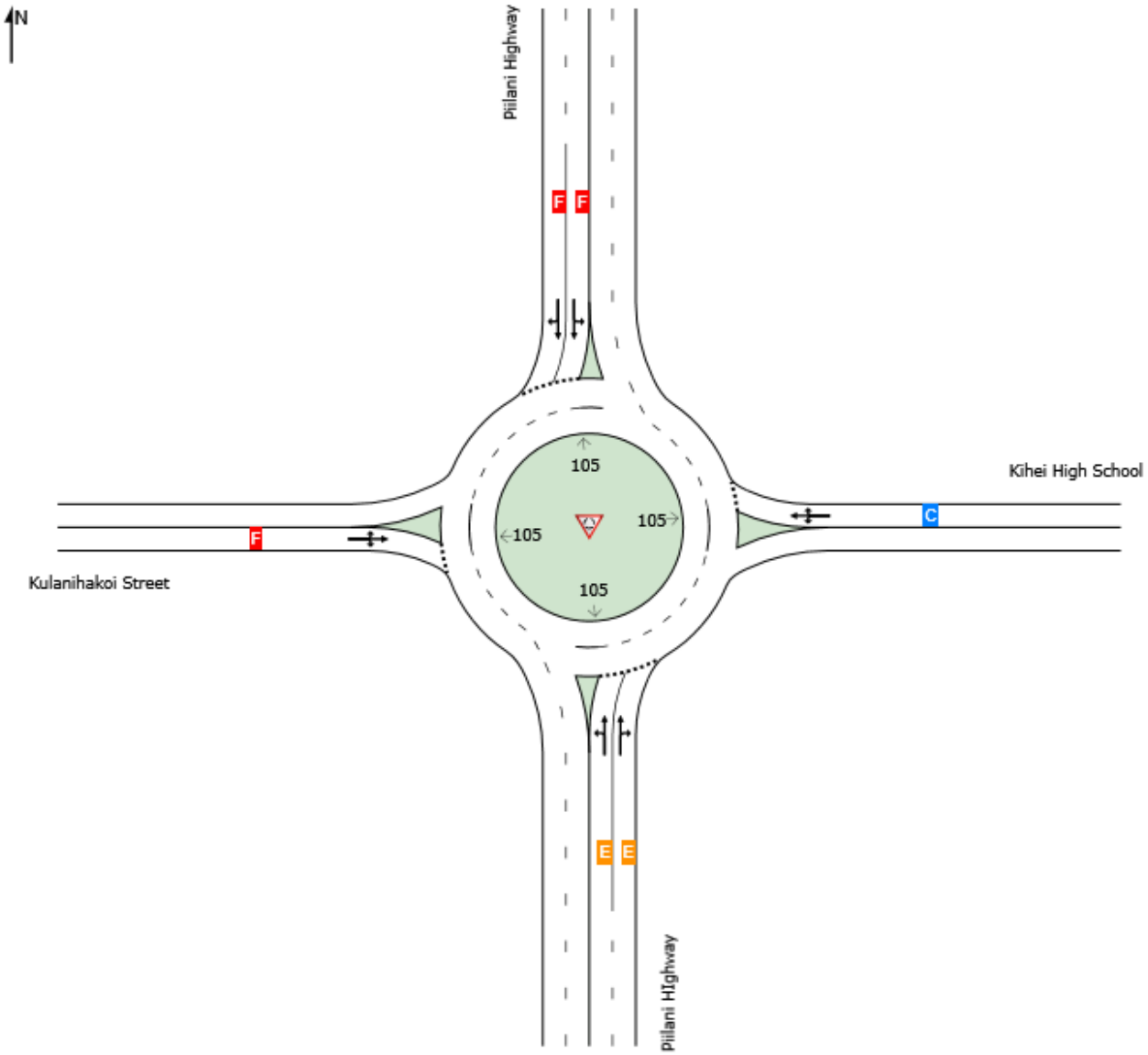
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [1-Lane WW 2031 - AM (Site Folder: Standard)]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	E	C	F	F	F



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).

LANE SUMMARY

Site: 101 [1-Lane WW 2031 - AM (Site Folder: Standard)]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Piilani HIghway													
Lane 1	1036	2.0	954	1.086	100	54.2	LOS E	54.3	1379.7	Full	1600	0.0	0.8
Lane 2[d]	1096	2.0	1009	1.086	100	53.0	LOS E	56.3	1430.9	Full	1600	0.0	1.8
Approach	2133	2.0		1.086		53.6	LOS E	56.3	1430.9				
East: Kihei High School													
Lane 1[d]	241	2.0	299	0.807	100	31.2	LOS C	6.0	152.1	Full	1600	0.0	0.0
Approach	241	2.0		0.807		31.2	LOS C	6.0	152.1				
North: Piilani Highway													
Lane 1	1271	2.0	1086	1.170	100	89.7	LOS F	85.3	2167.6	Full	1600	0.0	14.8
Lane 2[d]	1356	2.0	1158	1.170	100	88.4	LOS F	89.8	2280.4	Full	1600	0.0	16.7
Approach	2626	2.0		1.170		89.1	LOS F	89.8	2280.4				
West: Kulanihakoi Street													
Lane 1[d]	447	2.0	198	2.256	100	589.0	LOS F	90.7	2304.1	Full	1600	0.0	17.1
Approach	447	2.0		2.256		589.0	LOS F	90.7	2304.1				
Intersection	5447	2.0		2.256		113.6	LOS F	90.7	2304.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Piilani HIghway

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	76	960	-	1036	2.0	954	1.086	100	NA	NA
Lane 2	-	789	308	1096	2.0	1009	1.086	100	NA	NA
Approach	76	1749	308	2133	2.0		1.086			

East: Kihei High School

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	167	13	61	241	2.0	299	0.807	100	NA	NA
Approach	167	13	61	241	2.0		0.807			

North: Piilani Highway

Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.

From N To Exit:	E	S	W			Cap. veh/h	Satn v/c	Util. %	SL %	Ov. %	Lane No.
Lane 1	127	1143	-	1271	2.0	1086	1.170	100	NA		NA
Lane 2	-	1307	49	1356	2.0	1158	1.170	100	NA		NA
Approach	127	2450	49	2626	2.0		1.170				
West: Kulanihakoi Street											
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL %	Ov. Ov. Lane No.	
Lane 1	98	77	272	447	2.0	198	2.256	100	NA		NA
Approach	98	77	272	447	2.0		2.256				

	Total	%HV	Deg.Satn (v/c)
Intersection	5447	2.0	2.256

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Piilani HIghway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
East Exit: Kihei High School Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
West Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

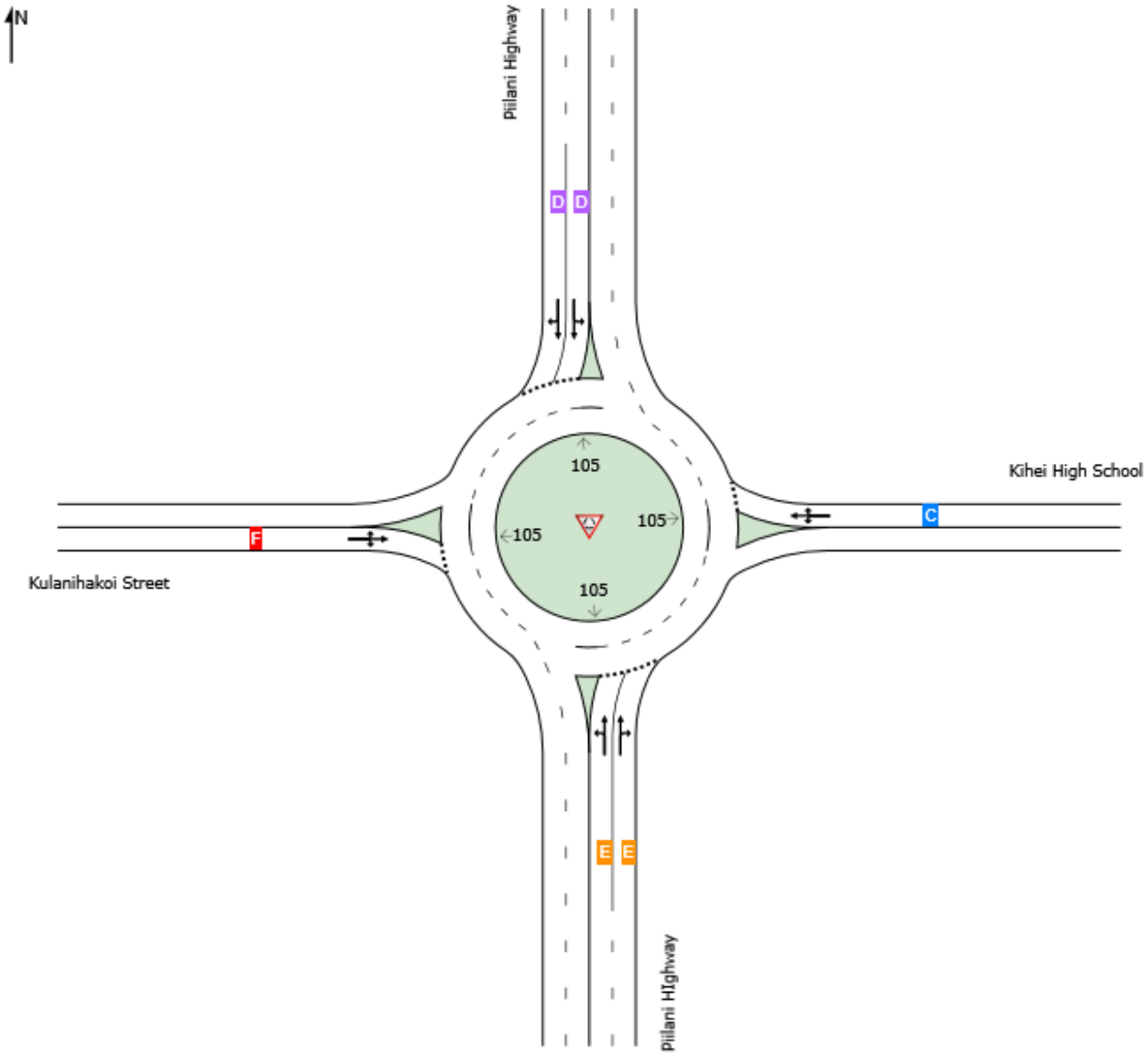
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [1-Lane WW 2031 - PM (Site Folder: Standard)]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	E	C	D	F	E



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).

LANE SUMMARY

Site: 101 [1-Lane WW 2031 - PM (Site Folder: Standard)]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Piilani HIghway													
Lane 1	1270	2.0	1134	1.120	100	63.5	LOS E	96.9	2461.0	Full	1600	0.0	19.6
Lane 2[d]	1322	2.0	1181	1.120	100	62.8	LOS E	100.5	2552.9	Full	1600	0.0	21.2
Approach	2592	2.0		1.120		63.1	LOS E	100.5	2552.9				
East: Kihei High School													
Lane 1[d]	124	2.0	211	0.587	100	29.6	LOS C	3.4	85.7	Full	1600	0.0	0.0
Approach	124	2.0		0.587		29.6	LOS C	3.4	85.7				
North: Piilani Highway													
Lane 1	1247	2.0	1175	1.061	100	42.6	LOS D	58.1	1476.2	Full	1600	0.0	2.7
Lane 2[d]	1316	2.0	1240	1.061	100	41.6	LOS D	60.1	1527.5	Full	1600	0.0	3.6
Approach	2563	2.0		1.061		42.1	LOS D	60.1	1527.5				
West: Kulanihakoi Street													
Lane 1[d]	271	2.0	190	1.427	100	231.9	LOS F	34.5	877.2	Full	1600	0.0	0.0
Approach	271	2.0		1.427		231.9	LOS F	34.5	877.2				
Intersection	5550	2.0		1.427		60.9	LOS E	100.5	2552.9				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Piilani HIghway

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	87	1183	-	1270	2.0	1134	1.120	100	NA	NA
Lane 2	-	1256	66	1322	2.0	1181	1.120	100	NA	NA
Approach	87	2439	66	2592	2.0		1.120			

East: Kihei High School

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	87	7	30	124	2.0	211	0.587	100	NA	NA
Approach	87	7	30	124	2.0		0.587			

North: Piilani Highway

Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.

From N To Exit:	E	S	W			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	27	1220	-	1247	2.0	1175	1.061	100	NA	NA
Lane 2	-	1189	127	1316	2.0	1240	1.061	100	NA	NA
Approach	27	2409	127	2563	2.0		1.061			

West: Kulanihakoi Street

Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	48	16	207	271	2.0	190	1.427	100	NA	NA
Approach	48	16	207	271	2.0		1.427			

	Total	%HV	Deg.Satn (v/c)
Intersection	5550	2.0	1.427

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Piilani HIghway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
East Exit: Kihei High School Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
West Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

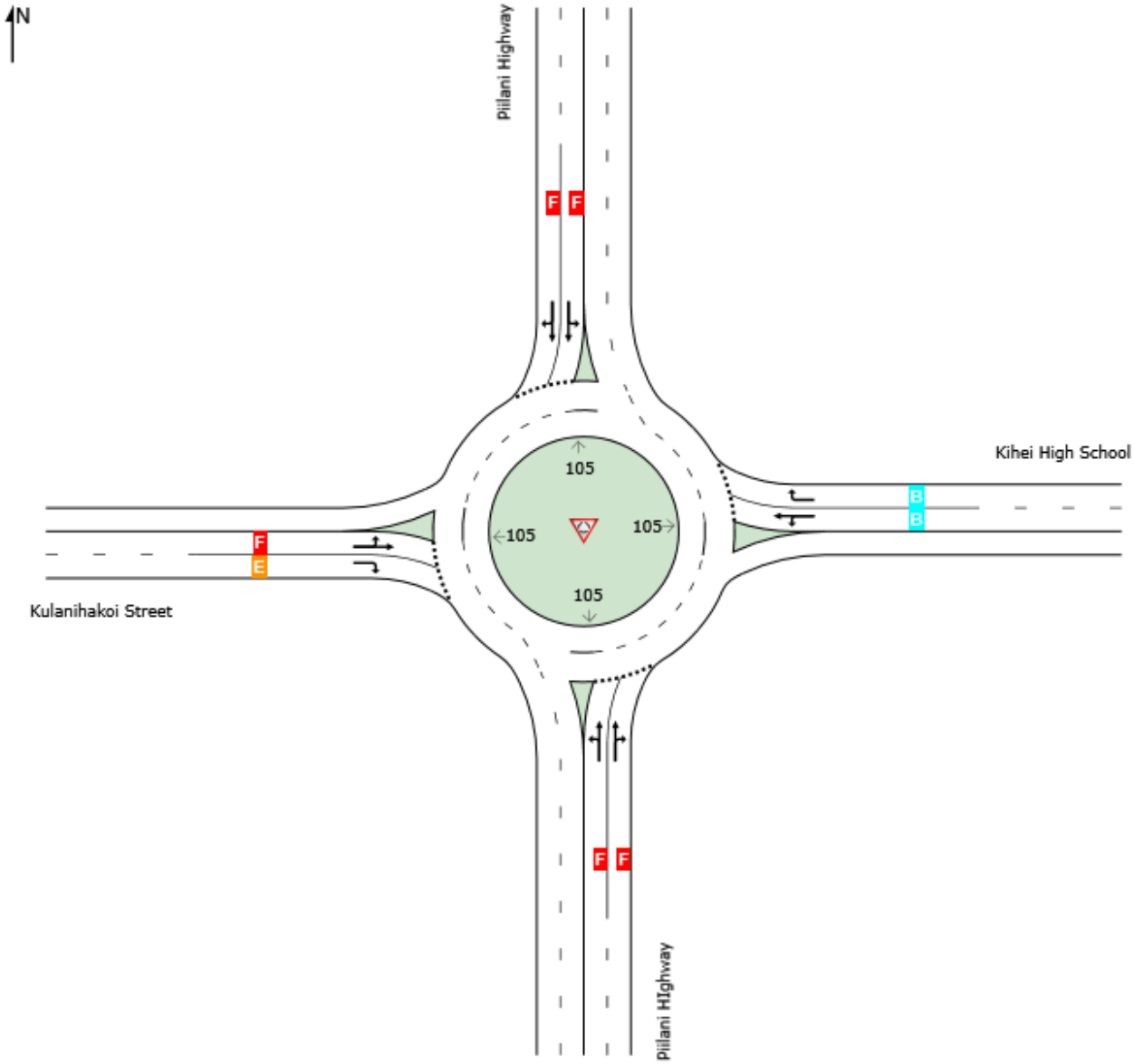
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2-Lane WW 2031 - AM (Site Folder: Standard)]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	F	B	F	E	F



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).

LANE SUMMARY

Site: 101 [2-Lane WW 2031 - AM (Site Folder: Standard)]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Piilani HIghway													
Lane 1	1029	2.0	882	1.167	100	89.5	LOS F	68.5	1739.6	Full	1600	0.0	7.5
Lane 2[d]	1103	2.0	946	1.167	100	88.3	LOS F	72.4	1839.7	Full	1600	0.0	9.3
Approach	2133	2.0		1.167		88.9	LOS F	72.4	1839.7				
East: Kihei High School													
Lane 1[d]	180	2.0	428	0.422	100	17.4	LOS B	2.6	66.8	Full	1600	0.0	0.0
Lane 2	61	2.0	288	0.211	100	12.3	LOS B	1.0	26.1	Full	1600	0.0	0.0
Approach	241	2.0		0.422		16.1	LOS B	2.6	66.8				
North: Piilani Highway													
Lane 1	1271	2.0	1091	1.165	100	87.2	LOS F	84.0	2133.1	Full	1600	0.0	14.2
Lane 2[d]	1355	2.0	1164	1.165	100	85.9	LOS F	88.3	2242.7	Full	1600	0.0	16.1
Approach	2626	2.0		1.165		86.5	LOS F	88.3	2242.7				
West: Kulanihakoi Street													
Lane 1	175	2.0	182	0.962	100	76.1	LOS F	8.6	218.0	Full	1600	0.0	0.0
Lane 2[d]	272	2.0	282	0.963	100	63.3	LOS E	11.5	291.0	Full	1600	0.0	0.0
Approach	447	2.0		0.963		68.4	LOS E	11.5	291.0				
Intersection	5447	2.0		1.167		82.8	LOS F	88.3	2242.7				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Piilani HIghway

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	76	953	-	1029	2.0	882	1.167	100	NA	NA
Lane 2	-	796	308	1103	2.0	946	1.167	100	NA	NA
Approach	76	1749	308	2133	2.0		1.167			

East: Kihei High School

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	167	13	-	180	2.0	428	0.422	100	NA	NA
Lane 2	-	-	61	61	2.0	288	0.211	100	NA	NA

Approach	167	13	61	241	2.0		0.422				
North: Piilani Highway											
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	127	1144	-	1271	2.0	1091	1.165	100	NA	NA	
Lane 2	-	1306	49	1355	2.0	1164	1.165	100	NA	NA	
Approach	127	2450	49	2626	2.0		1.165				
West: Kulanihakoi Street											
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	98	77	-	175	2.0	182	0.962	100	NA	NA	
Lane 2	-	-	272	272	2.0	282	0.963	100	NA	NA	
Approach	98	77	272	447	2.0		0.963				
	Total	%HV	Deg.Satn (v/c)								
Intersection	5447	2.0	1.167								

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Piilani HIghway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
East Exit: Kihei High School Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
West Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

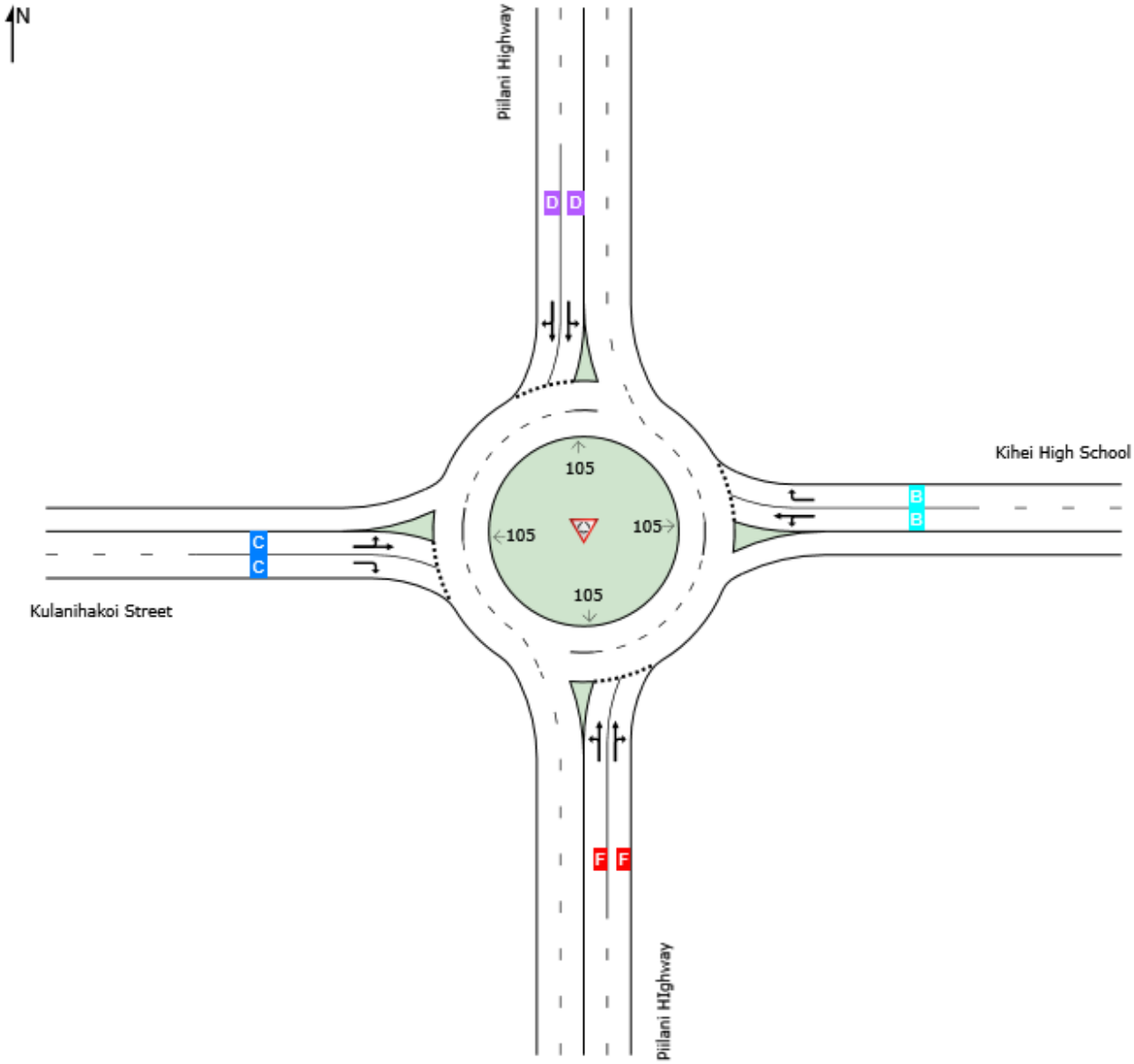
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2-Lane WW 2031 - PM (Site Folder: Standard)]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	F	B	D	C	E



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).

LANE SUMMARY

Site: 101 [2-Lane WW 2031 - PM (Site Folder: Standard)]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Piilani HIghway													
Lane 1	1269	2.0	1117	1.136	100	70.7	LOS F	92.3	2345.3	Full	1600	0.0	17.7
Lane 2[d]	1324	2.0	1165	1.136	100	70.0	LOS F	95.9	2435.5	Full	1600	0.0	19.2
Approach	2592	2.0		1.136		70.3	LOS F	95.9	2435.5				
East: Kihei High School													
Lane 1[d]	93	2.0	305	0.306	100	19.9	LOS B	1.8	45.8	Full	1600	0.0	0.0
Lane 2	30	2.0	212	0.143	100	16.4	LOS B	0.7	18.1	Full	1600	0.0	0.0
Approach	124	2.0		0.306		19.0	LOS B	1.8	45.8				
North: Piilani Highway													
Lane 1	1247	2.0	1176	1.061	100	42.3	LOS D	58.0	1473.5	Full	1600	0.0	2.6
Lane 2[d]	1316	2.0	1241	1.061	100	41.3	LOS D	60.0	1524.2	Full	1600	0.0	3.6
Approach	2563	2.0		1.061		41.8	LOS D	60.0	1524.2				
West: Kulanihakoi Street													
Lane 1	64	2.0	194	0.330	100	24.8	LOS C	1.8	44.7	Full	1600	0.0	0.0
Lane 2[d]	207	2.0	274	0.755	100	34.8	LOS C	6.0	152.0	Full	1600	0.0	0.0
Approach	271	2.0		0.755		32.4	LOS C	6.0	152.0				
Intersection	5550	2.0		1.136		54.2	LOS E	95.9	2435.5				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Piilani HIghway

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	87	1182	-	1269	2.0	1117	1.136	100	NA	NA
Lane 2	-	1257	66	1324	2.0	1165	1.136	100	NA	NA
Approach	87	2439	66	2592	2.0		1.136			

East: Kihei High School

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	87	7	-	93	2.0	305	0.306	100	NA	NA
Lane 2	-	-	30	30	2.0	212	0.143	100	NA	NA

Approach	87	7	30	124	2.0		0.306			
North: Piilani Highway										
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	27	1220	-	1247	2.0	1176	1.061	100	NA	NA
Lane 2	-	1188	127	1316	2.0	1241	1.061	100	NA	NA
Approach	27	2409	127	2563	2.0		1.061			
West: Kulanihakoi Street										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	48	16	-	64	2.0	194	0.330	100	NA	NA
Lane 2	-	-	207	207	2.0	274	0.755	100	NA	NA
Approach	48	16	207	271	2.0		0.755			
	Total	%HV	Deg.Satn (v/c)							
Intersection	5550	2.0		1.136						

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Piilani HIghway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
East Exit: Kihei High School Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
West Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

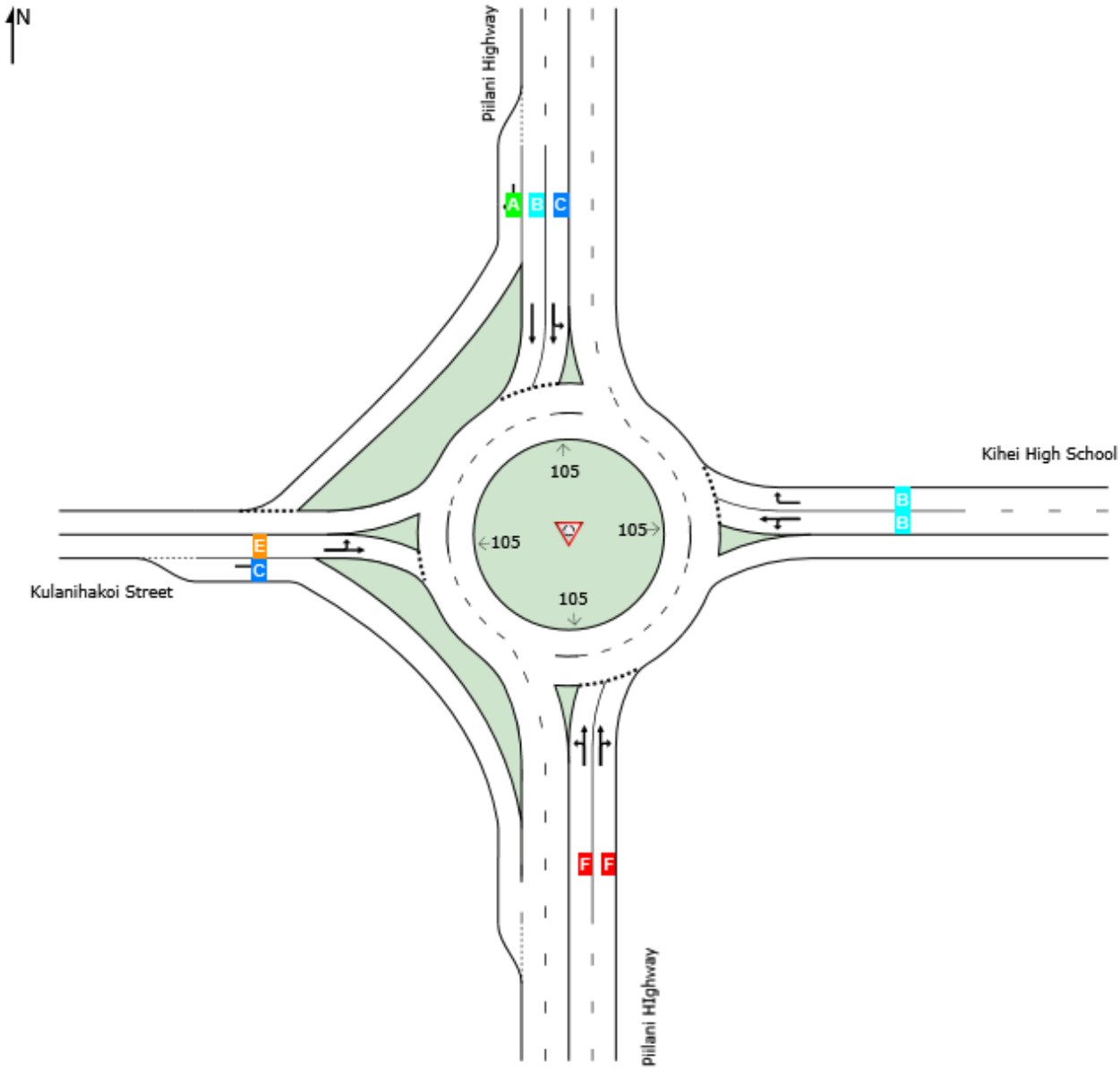
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2-Lane WW W Bypass 2031 - AM (Site Folder: Standard)]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	F	B	B	D	D



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).

LANE SUMMARY

Site: 101 [2-Lane WW W Bypass 2031 - AM (Site Folder: Standard)]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Piilani HIghway													
Lane 1	1028	2.0	872	1.178	100	94.9	LOS F	70.6	1792.0	Full	1600	0.0	8.4
Lane 2[d]	1105	2.0	937	1.178	100	93.7	LOS F	74.8	1901.1	Full	1600	0.0	10.3
Approach	2133	2.0		1.178		94.3	LOS F	74.8	1901.1				
East: Kihei High School													
Lane 1[d]	180	2.0	432	0.418	100	17.2	LOS B	2.6	65.7	Full	1600	0.0	0.0
Lane 2	61	2.0	290	0.210	100	12.1	LOS B	1.0	25.8	Full	1600	0.0	0.0
Approach	241	2.0		0.418		15.9	LOS B	2.6	65.7				
North: Piilani Highway													
Lane 1	1176	2.0	1198	0.982	100	21.0	LOS C	33.2	842.2	Full	1600	0.0	0.0
Lane 2[d]	1401	2.0	1427[1]	0.982	100	17.1	LOS B	35.2	894.5	Full	1600	0.0	0.0
Lane 3	49	2.0	1583	0.031	100	4.1	LOS A	0.2	4.1	Short	200	0.0	NA
Approach	2626	2.0		0.982		18.6	LOS B	35.2	894.5				
West: Kulanihakoi Street													
Lane 1[d]	175	2.0	215	0.815	100	61.9	LOS E	7.1	180.1	Full	1600	0.0	0.0
Lane 2	272	2.0	1642	0.166	100	25.2	LOS C	0.0	0.0	Short	200	0.0	NA
Approach	447	2.0		0.815		39.6	LOS D	7.1	180.1				
Intersection	5447	2.0		1.178		49.8	LOS D	74.8	1901.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.
d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Piilani HIghway

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	76	952	-	1028	2.0	872	1.178	100	NA	NA
Lane 2	-	797	308	1105	2.0	937	1.178	100	NA	NA
Approach	76	1749	308	2133	2.0		1.178			

East: Kihei High School

Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.

From E To Exit:	S	W	N			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	167	13	-	180	2.0	432	0.418	100	NA	NA
Lane 2	-	-	61	61	2.0	290	0.210	100	NA	NA
Approach	167	13	61	241	2.0		0.418			
North: Piilani Highway										
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	127	1049	-	1176	2.0	1198	0.982	100	NA	NA
Lane 2	-	1401	-	1401	2.0	1427[1]	0.982	100	NA	NA
Lane 3	-	-	49	49	2.0	1583	0.031	100	0.0	2
Approach	127	2450	49	2626	2.0		0.982			
West: Kulanihakoi Street										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	98	77	-	175	2.0	215	0.815	100	NA	NA
Lane 2	-	-	272	272	2.0	1642	0.166	100	0.0	1
Approach	98	77	272	447	2.0		0.815			
	Total	%HV	Deg.Satn (v/c)							
Intersection	5447	2.0	1.178							

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Piilani HIghway Merge Type: **Priority**												
Exit Short Lane	3	500	0.0	1401	1429	3.00	2.00	272	326	0.834	7.8	21.6
Merge Lane	2	-	100.0	Merge Lane is not Opposed				1401	1800	0.778	0.0	0.0
East Exit: Kihei High School Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
West Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

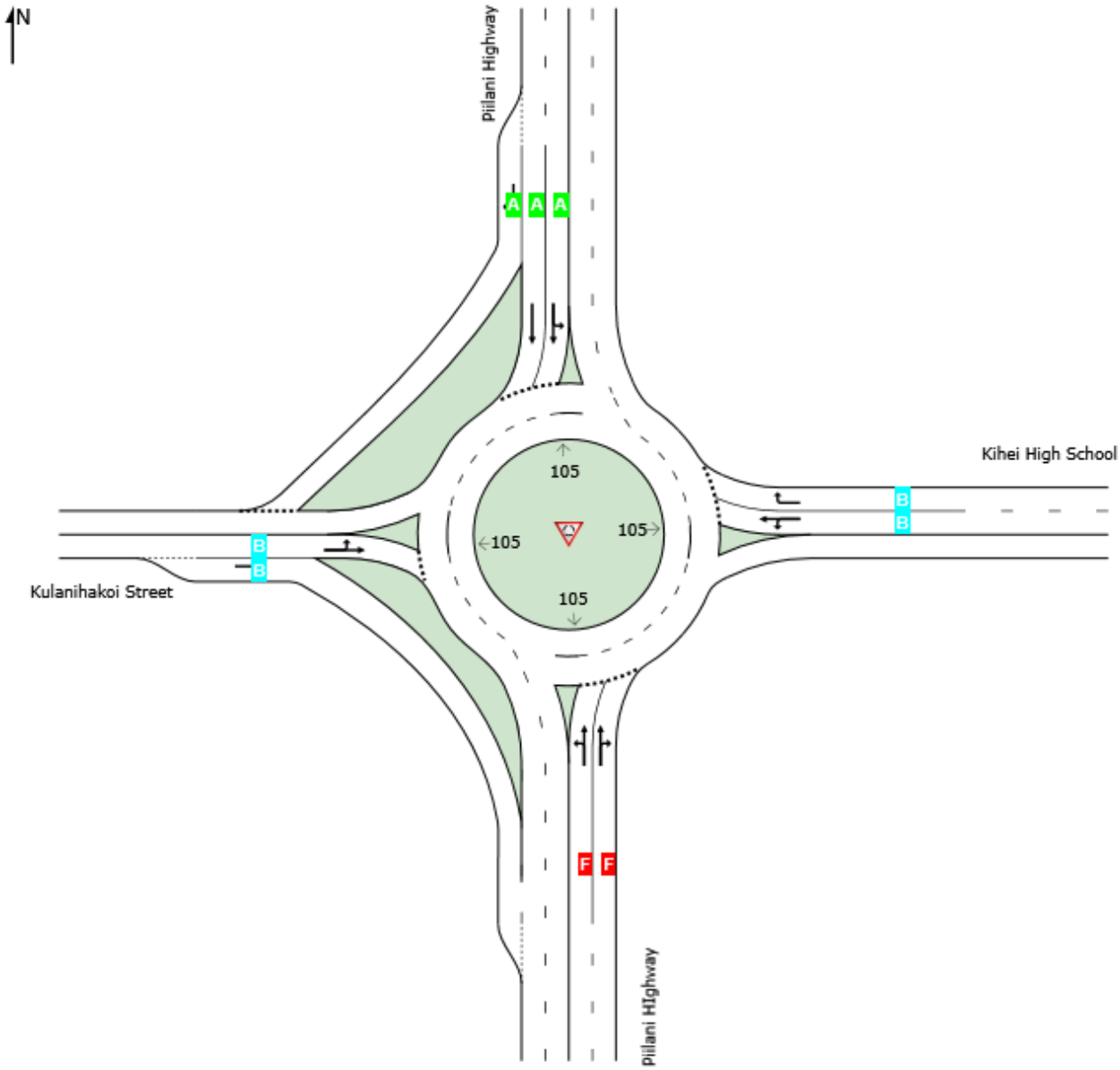
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2-Lane WW W Bypass 2031 - PM (Site Folder: Standard)]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	F	B	A	B	D



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).

LANE SUMMARY

Site: 101 [2-Lane WW W Bypass 2031 - PM (Site Folder: Standard)]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Piilani HIghway													
Lane 1	1269	2.0	1115	1.138	100	71.5	LOS F	92.3	2345.0	Full	1600	0.0	17.7
Lane 2[d]	1324	2.0	1164	1.138	100	70.8	LOS F	95.9	2435.3	Full	1600	0.0	19.2
Approach	2592	2.0		1.138		71.2	LOS F	95.9	2435.3				
East: Kihei High School													
Lane 1[d]	93	2.0	305	0.307	100	19.8	LOS B	1.8	45.7	Full	1600	0.0	0.0
Lane 2	30	2.0	212	0.144	100	16.4	LOS B	0.7	18.0	Full	1600	0.0	0.0
Approach	124	2.0		0.307		19.0	LOS B	1.8	45.7				
North: Piilani Highway													
Lane 1	1120	2.0	1284	0.873	100	8.1	LOS A	15.8	400.3	Full	1600	0.0	0.0
Lane 2[d]	1315	2.0	1507	0.873	100	6.6	LOS A	15.7	397.6	Full	1600	0.0	0.0
Lane 3	127	2.0	1573	0.081	100	4.1	LOS A	0.4	11.4	Short	200	0.0	NA
Approach	2563	2.0		0.873		7.1	LOS A	15.8	400.3				
West: Kulanihakoi Street													
Lane 1[d]	64	2.0	287	0.223	100	19.4	LOS B	1.3	33.6	Full	1600	0.0	0.0
Lane 2	207	2.0	1642	0.126	100	13.7	LOS B	0.0	0.0	Short	200	0.0	NA
Approach	271	2.0		0.223		15.1	LOS B	1.3	33.6				
Intersection	5550	2.0		1.138		37.7	LOS D	95.9	2435.3				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Piilani HIghway

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	87	1182	-	1269	2.0	1115	1.138	100	NA	NA
Lane 2	-	1258	66	1324	2.0	1164	1.138	100	NA	NA
Approach	87	2439	66	2592	2.0		1.138			

East: Kihei High School

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	87	7	-	93	2.0	305	0.307	100	NA	NA
Lane 2	-	-	30	30	2.0	212	0.144	100	NA	NA
Approach	87	7	30	124	2.0		0.307			

North: Piilani Highway

Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	27	1093	-	1120	2.0	1284	0.873	100	NA	NA
Lane 2	-	1315	-	1315	2.0	1507	0.873	100	NA	NA
Lane 3	-	-	127	127	2.0	1573	0.081	100	0.0	2
Approach	27	2409	127	2563	2.0		0.873			

West: Kulanihakoi Street

Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	48	16	-	64	2.0	287	0.223	100	NA	NA
Lane 2	-	-	207	207	2.0	1642	0.126	100	0.0	1
Approach	48	16	207	271	2.0		0.223			

	Total	%HV	Deg.Satn (v/c)
Intersection	5550	2.0	1.138

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Piilani HIghway Merge Type: **Priority**												
Exit Short Lane	3	500	0.0	1315	1342	3.00	2.00	207	407	0.507	6.0	10.2
Merge Lane	2	-	100.0	Merge Lane is not Opposed				1315	1800	0.731	0.0	0.0
East Exit: Kihei High School Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
West Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

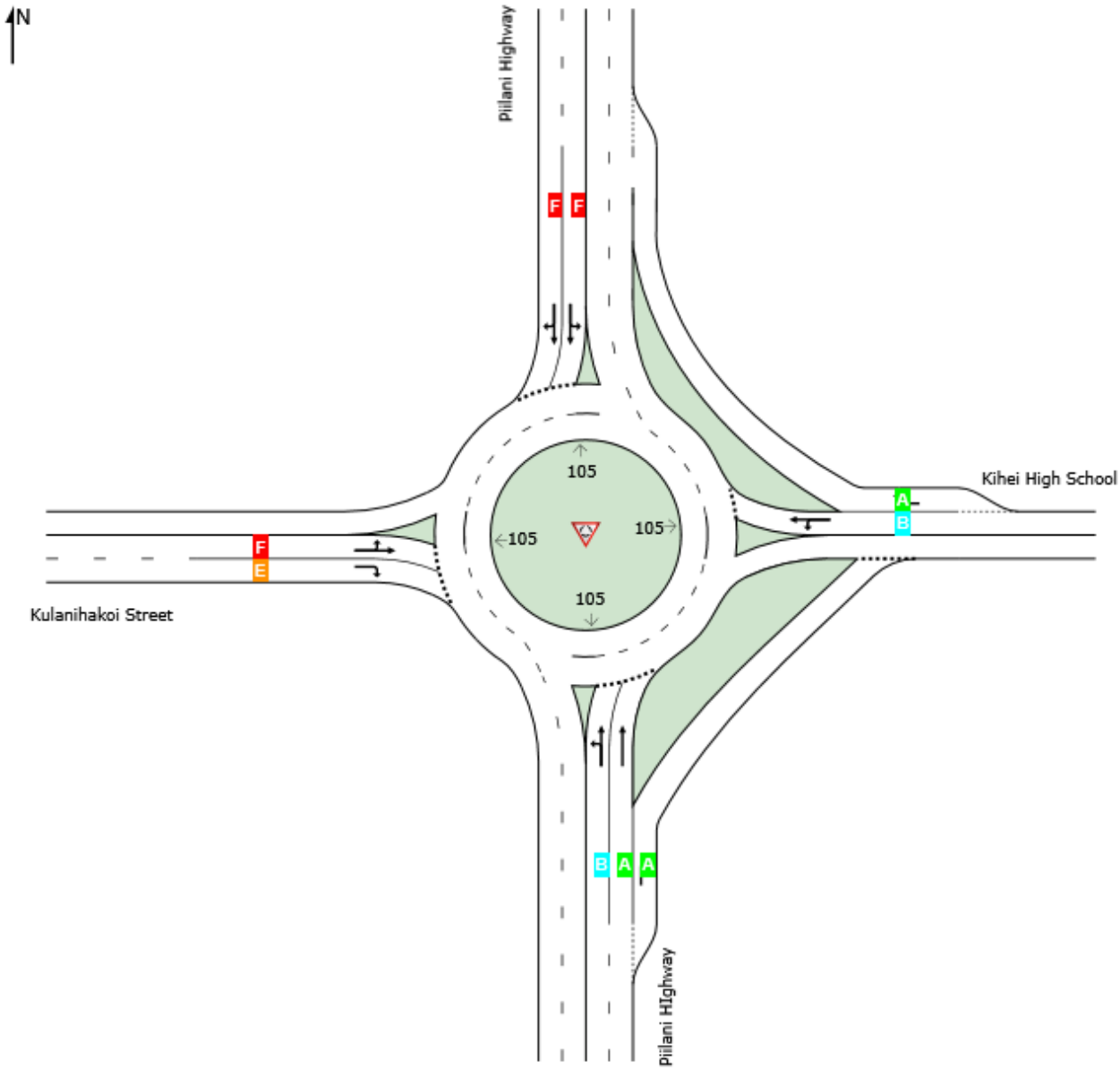
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2-Lane WW 2031 E Bypass - AM (Site Folder: Standard)]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	B	F	E	E



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).

LANE SUMMARY

Site: 101 [2-Lane WW 2031 E Bypass - AM (Site Folder: Standard)]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Piilani HIghway													
Lane 1	829	2.0	971	0.854	100	10.5	LOS B	10.3	262.4	Full	1600	0.0	0.0
Lane 2[d]	996	2.0	1166	0.854	100	8.5	LOS A	10.3	262.5	Full	1600	0.0	0.0
Lane 3	308	2.0	1229	0.250	100	4.5	LOS A	1.1	29.2	Short	200	0.0	NA
Approach	2133	2.0		0.854		8.7	LOS A	10.3	262.5				
East: Kihei High School													
Lane 1[d]	180	2.0	484	0.373	100	16.1	LOS B	2.1	54.2	Full	1600	0.0	0.0
Lane 2	61	2.0	1642	0.037	100	6.8	LOS A	0.0	0.0	Short	200	0.0	NA
Approach	241	2.0		0.373		13.7	LOS B	2.1	54.2				
North: Piilani Highway													
Lane 1	1270	2.0	1086	1.170	100	89.7	LOS F	84.9	2156.1	Full	1600	0.0	14.6
Lane 2[d]	1356	2.0	1159	1.170	100	88.3	LOS F	89.4	2269.6	Full	1600	0.0	16.5
Approach	2626	2.0		1.170		89.0	LOS F	89.4	2269.6				
West: Kulanihakoi Street													
Lane 1	175	2.0	183	0.954	100	73.7	LOS F	8.3	211.7	Full	1600	0.0	0.0
Lane 2[d]	272	2.0	284	0.956	100	61.3	LOS E	11.1	282.9	Full	1600	0.0	0.0
Approach	447	2.0		0.956		66.1	LOS E	11.1	282.9				
Intersection	5447	2.0		1.170		52.3	LOS E	89.4	2269.6				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Piilani HIghway

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	76	753	-	829	2.0	971	0.854	100	NA	NA
Lane 2	-	996	-	996	2.0	1166	0.854	100	NA	NA
Lane 3	-	-	308	308	2.0	1229	0.250	100	0.0	2
Approach	76	1749	308	2133	2.0		0.854			

East: Kihei High School

Mov. From E	L2	T1	R2	Total	%HV	Cap. veh/h	Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane

To Exit:	S	W	N				v/c	%	%	No.
Lane 1	167	13	-	180	2.0	484	0.373	100	NA	NA
Lane 2	-	-	61	61	2.0	1642	0.037	100	0.0	1
Approach	167	13	61	241	2.0		0.373			

North: Piilani Highway

Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	127	1143	-	1270	2.0	1086	1.170	100	NA	NA
Lane 2	-	1307	49	1356	2.0	1159	1.170	100	NA	NA
Approach	127	2450	49	2626	2.0		1.170			

West: Kulanihakoi Street

Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	98	77	-	175	2.0	183	0.954	100	NA	NA
Lane 2	-	-	272	272	2.0	284	0.956	100	NA	NA
Approach	98	77	272	447	2.0		0.956			

	Total	%HV	Deg.Satn (v/c)
Intersection	5447	2.0	1.170

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Piilani HIghway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
East Exit: Kihei High School Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Piilani Highway Merge Type: **Priority**												
Exit Short Lane	3	500	0.0	996	1015	3.00	2.00	61	739	0.082	2.7	3.3
Merge Lane	2	-	100.0	Merge Lane is not Opposed				996	1800	0.553	0.0	0.0
West Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

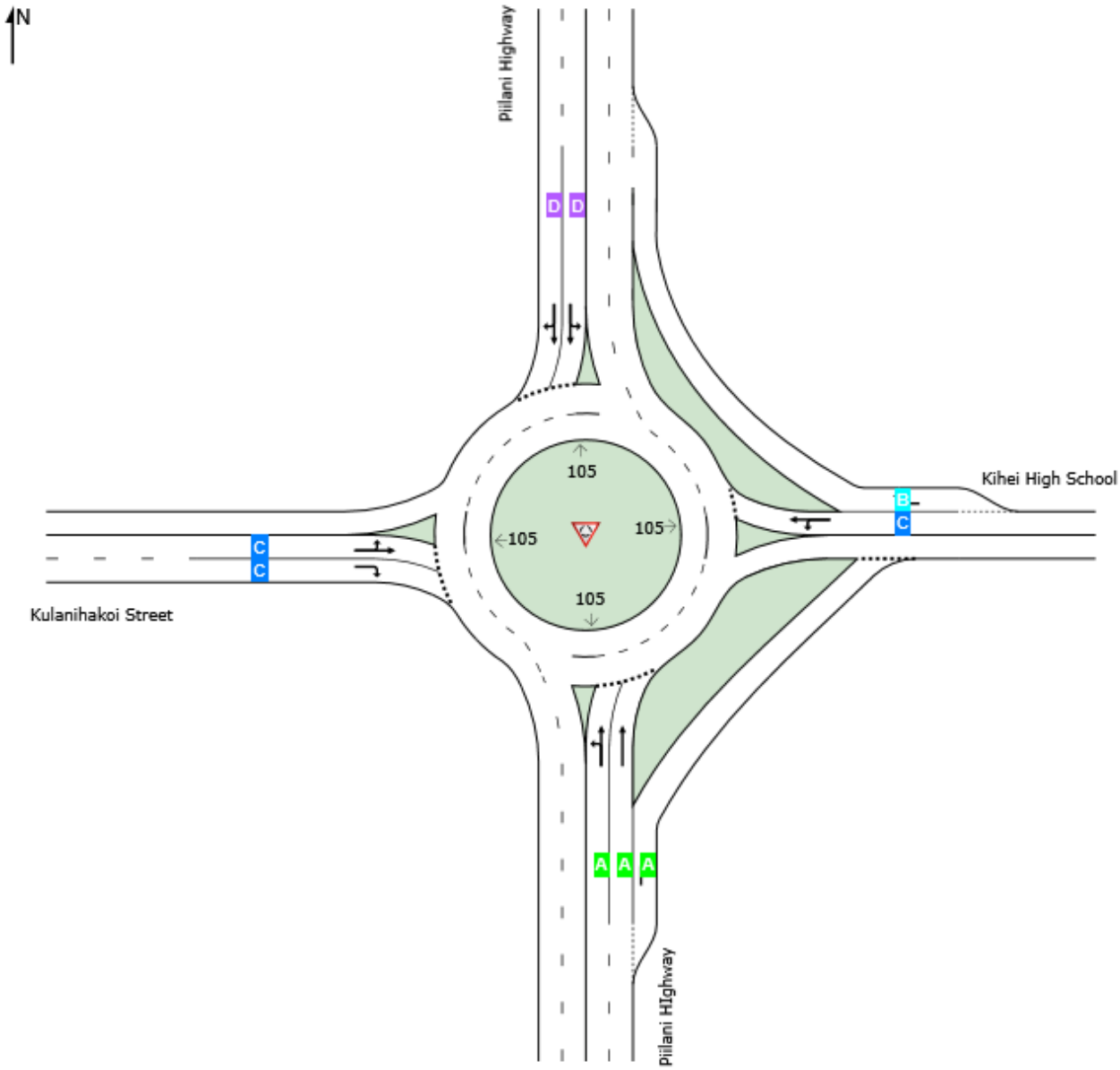
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2-Lane WW 2031 E Bypass- PM (Site Folder: Standard)]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	B	D	C	C



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).

LANE SUMMARY

Site: 101 [2-Lane WW 2031 E Bypass- PM (Site Folder: Standard)]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Piilani HIghway													
Lane 1	1172	2.0	1212	0.967	100	6.5	LOS A	16.6	422.5	Full	1600	0.0	0.0
Lane 2[d]	1354	2.0	1400	0.967	100	5.7	LOS A	17.7	449.3	Full	1600	0.0	0.0
Lane 3	66	2.0	1442	0.046	100	4.0	LOS A	0.2	5.0	Short	200	0.0	NA
Approach	2592	2.0		0.967		6.0	LOS A	17.7	449.3				
East: Kihei High School													
Lane 1[d]	93	2.0	299	0.312	100	22.7	LOS C	1.9	48.1	Full	1600	0.0	0.0
Lane 2	30	2.0	1642	0.019	100	11.3	LOS B	0.0	0.0	Short	200	0.0	NA
Approach	124	2.0		0.312		19.9	LOS B	1.9	48.1				
North: Piilani Highway													
Lane 1	1246	2.0	1167	1.068	100	45.6	LOS D	59.4	1507.7	Full	1600	0.0	3.3
Lane 2[d]	1317	2.0	1233	1.068	100	44.6	LOS D	61.5	1563.2	Full	1600	0.0	4.3
Approach	2563	2.0		1.068		45.1	LOS D	61.5	1563.2				
West: Kulanihakoi Street													
Lane 1	64	2.0	196	0.328	100	24.4	LOS C	1.7	43.9	Full	1600	0.0	0.0
Lane 2[d]	207	2.0	276	0.748	100	33.6	LOS C	5.8	148.4	Full	1600	0.0	0.0
Approach	271	2.0		0.748		31.4	LOS C	5.8	148.4				
Intersection	5550	2.0		1.068		25.6	LOS C	61.5	1563.2				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Piilani HIghway

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	87	1085	-	1172	2.0	1212	0.967	100	NA	NA
Lane 2	-	1354	-	1354	2.0	1400	0.967	100	NA	NA
Lane 3	-	-	66	66	2.0	1442	0.046	100	0.0	2
Approach	87	2439	66	2592	2.0		0.967			

East: Kihei High School

Mov. From E	L2	T1	R2	Total	%HV	Cap. veh/h	Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane

To Exit:	S	W	N				v/c	%	%	No.
Lane 1	87	7	-	93	2.0	299	0.312	100	NA	NA
Lane 2	-	-	30	30	2.0	1642	0.019	100	0.0	1
Approach	87	7	30	124	2.0		0.312			

North: Piilani Highway

Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	27	1219	-	1246	2.0	1167	1.068	100	NA	NA
Lane 2	-	1189	127	1317	2.0	1233	1.068	100	NA	NA
Approach	27	2409	127	2563	2.0		1.068			

West: Kulanihakoi Street

Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	48	16	-	64	2.0	196	0.328	100	NA	NA
Lane 2	-	-	207	207	2.0	276	0.748	100	NA	NA
Approach	48	16	207	271	2.0		0.748			

	Total	%HV	Deg.Satn (v/c)
Intersection	5550	2.0	1.068

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Piilani HIghway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
East Exit: Kihei High School Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Piilani Highway Merge Type: **Priority**												
Exit Short Lane	3	500	0.0	1354	1381	3.00	2.00	30	370	0.082	6.8	7.8
Merge Lane	2	-	100.0	Merge Lane is not Opposed				1354	1800	0.752	0.0	0.0
West Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

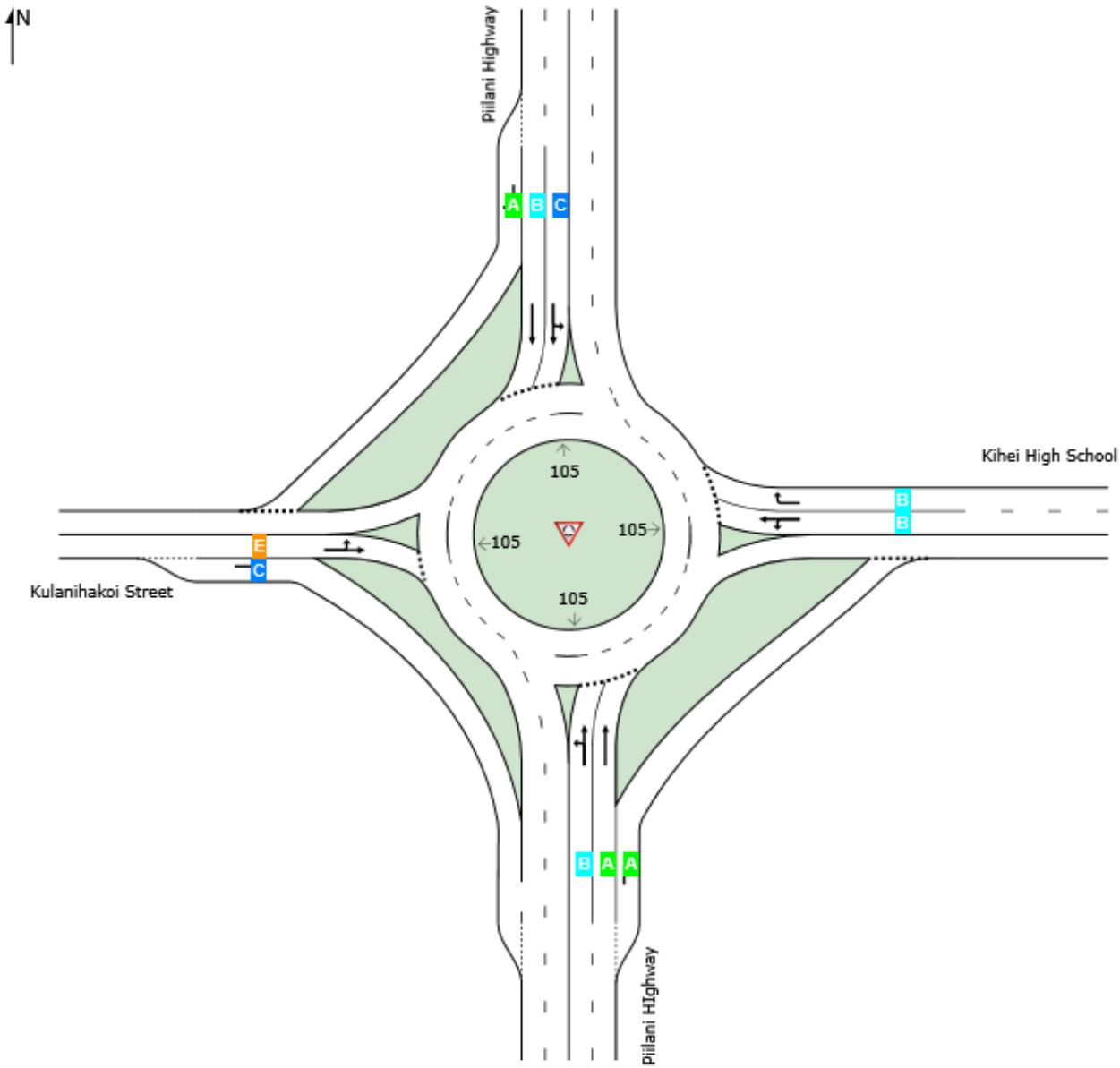
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2-Lane WW 2031 NES RTL- AM (Site Folder: Standard)]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	B	B	D	B



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).

LANE SUMMARY

Site: 101 [2-Lane WW 2031 NES RTL- AM (Site Folder: Standard)]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Piilani HIghway													
Lane 1	828	2.0	961	0.862	100	11.2	LOS B	10.8	274.3	Full	1600	0.0	0.0
Lane 2[d]	997	2.0	1157	0.862	100	9.1	LOS A	10.9	276.6	Full	1600	0.0	0.0
Lane 3	308	2.0	1215	0.253	100	4.5	LOS A	1.2	30.1	Short	200	0.0	NA
Approach	2133	2.0		0.862		9.2	LOS A	10.9	276.6				
East: Kihei High School													
Lane 1[d]	180	2.0	476	0.379	100	16.2	LOS B	2.2	55.3	Full	1600	0.0	0.0
Lane 2	61	2.0	322	0.189	100	11.6	LOS B	0.9	22.0	Full	1600	0.0	0.0
Approach	241	2.0		0.379		15.0	LOS B	2.2	55.3				
North: Piilani Highway													
Lane 1	1175	2.0	1191	0.986	100	22.3	LOS C	33.9	860.3	Full	1600	0.0	0.0
Lane 2[d]	1403	2.0	1423	0.986	100	18.3	LOS B	36.2	919.4	Full	1600	0.0	0.0
Lane 3	49	2.0	1578	0.031	100	4.1	LOS A	0.2	3.8	Short	200	0.0	NA
Approach	2626	2.0		0.986		19.8	LOS B	36.2	919.4				
West: Kulanihakoi Street													
Lane 1[d]	175	2.0	214	0.817	100	62.4	LOS E	7.1	181.2	Full	1600	0.0	0.0
Lane 2	272	2.0	1642	0.166	100	25.5	LOS C	0.0	0.0	Short	200	0.0	NA
Approach	447	2.0		0.817		40.0	LOS D	7.1	181.2				
Intersection	5447	2.0		0.986		17.1	LOS B	36.2	919.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Piilani HIghway

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	76	752	-	828	2.0	961	0.862	100	NA	NA
Lane 2	-	997	-	997	2.0	1157	0.862	100	NA	NA
Lane 3	-	-	308	308	2.0	1215	0.253	100	0.0	2
Approach	76	1749	308	2133	2.0		0.862			

East: Kihei High School

Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.

From E To Exit:	S	W	N			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	167	13	-	180	2.0	476	0.379	100	NA	NA
Lane 2	-	-	61	61	2.0	322	0.189	100	NA	NA
Approach	167	13	61	241	2.0		0.379			
North: Piilani Highway										
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	127	1047	-	1175	2.0	1191	0.986	100	NA	NA
Lane 2	-	1403	-	1403	2.0	1423	0.986	100	NA	NA
Lane 3	-	-	49	49	2.0	1578	0.031	100	0.0	2
Approach	127	2450	49	2626	2.0		0.986			
West: Kulanihakoi Street										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	98	77	-	175	2.0	214	0.817	100	NA	NA
Lane 2	-	-	272	272	2.0	1642	0.166	100	0.0	1
Approach	98	77	272	447	2.0		0.817			

	Total	%HV	Deg.Satn (v/c)
Intersection	5447	2.0	0.986

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Piilani HIghway Merge Type: **Priority**												
Exit Short Lane	3	500	0.0	1403	1431	3.00	2.00	272	324	0.838	7.8	22.0
Merge Lane	2	-	100.0	Merge Lane is not Opposed				1403	1800	0.779	0.0	0.0
East Exit: Kihei High School Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
West Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

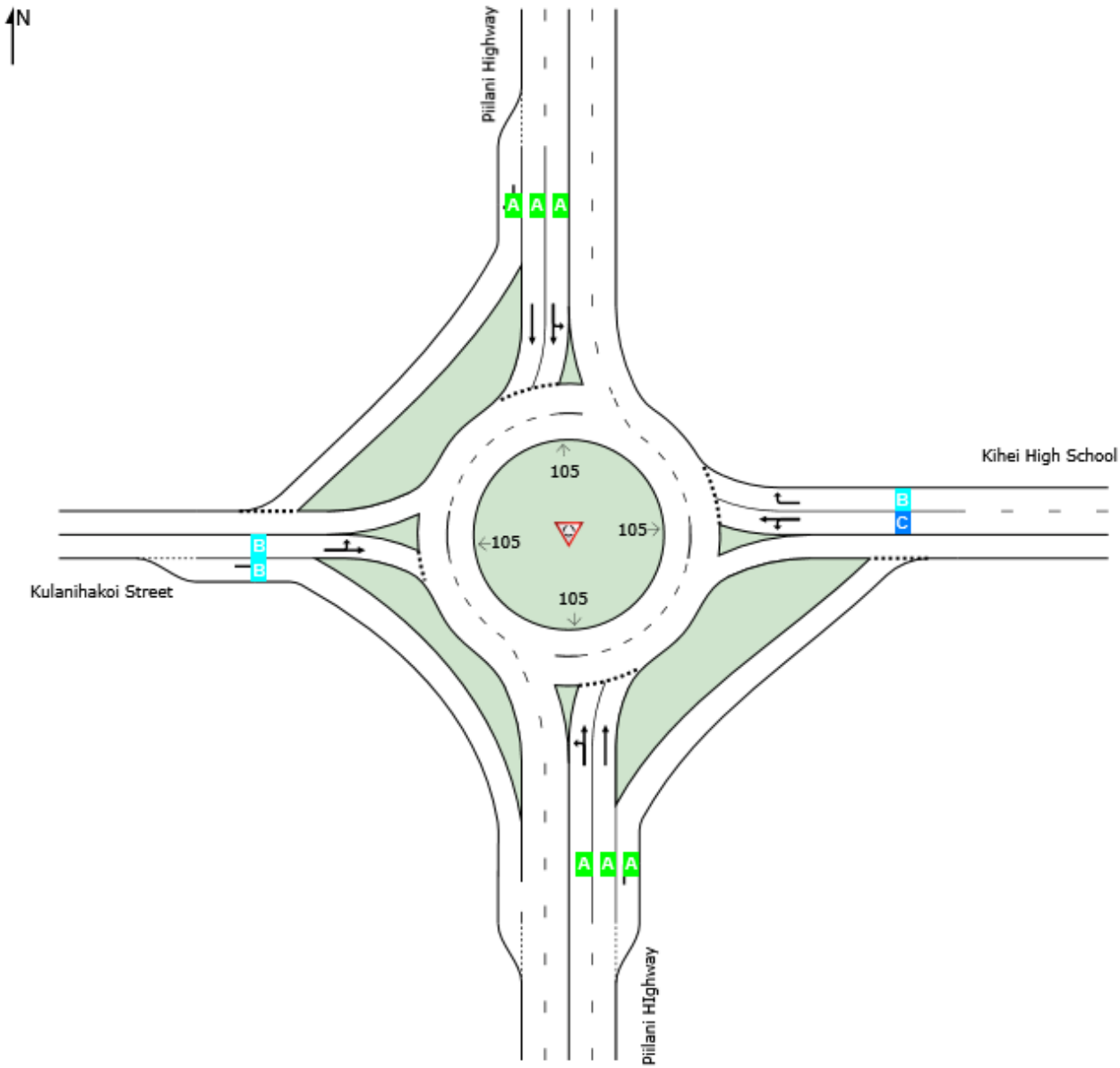
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2-Lane WW 2031 NES RTL - PM (Site Folder: Standard)]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	C	A	B	A



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Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).

LANE SUMMARY

Site: 101 [2-Lane WW 2031 NES RTL - PM (Site Folder: Standard)]

New Site
Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Piilani HIghway													
Lane 1	1172	2.0	1210	0.968	100	6.6	LOS A	16.8	427.7	Full	1600	0.0	0.0
Lane 2[d]	1354	2.0	1399	0.968	100	5.8	LOS A	17.9	455.1	Full	1600	0.0	0.0
Lane 3	66	2.0	1441	0.046	100	4.0	LOS A	0.2	4.9	Short	200	0.0	NA
Approach	2592	2.0		0.968		6.1	LOS A	17.9	455.1				
East: Kihei High School													
Lane 1[d]	93	2.0	297	0.315	100	22.8	LOS C	1.9	48.6	Full	1600	0.0	0.0
Lane 2	30	2.0	213	0.143	100	19.1	LOS B	0.7	18.7	Full	1600	0.0	0.0
Approach	124	2.0		0.315		21.9	LOS C	1.9	48.6				
North: Piilani Highway													
Lane 1	1119	2.0	1275	0.878	100	8.6	LOS A	16.3	414.7	Full	1600	0.0	0.0
Lane 2[d]	1317	2.0	1500	0.878	100	7.1	LOS A	16.3	413.8	Full	1600	0.0	0.0
Lane 3	127	2.0	1570	0.081	100	4.2	LOS A	0.4	10.7	Short	200	0.0	NA
Approach	2563	2.0		0.878		7.6	LOS A	16.3	414.7				
West: Kulanihakoi Street													
Lane 1[d]	64	2.0	282	0.227	100	19.7	LOS B	1.4	34.4	Full	1600	0.0	0.0
Lane 2	207	2.0	1642	0.126	100	13.8	LOS B	0.0	0.0	Short	200	0.0	NA
Approach	271	2.0		0.227		15.2	LOS B	1.4	34.4				
Intersection	5550	2.0		0.968		7.6	LOS A	17.9	455.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Piilani HIghway

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	87	1085	-	1172	2.0	1210	0.968	100	NA	NA
Lane 2	-	1354	-	1354	2.0	1399	0.968	100	NA	NA
Lane 3	-	-	66	66	2.0	1441	0.046	100	0.0	2
Approach	87	2439	66	2592	2.0		0.968			

East: Kihei High School

Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.

From E To Exit:	S	W	N			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	87	7	-	93	2.0	297	0.315	100	NA	NA
Lane 2	-	-	30	30	2.0	213	0.143	100	NA	NA
Approach	87	7	30	124	2.0		0.315			
North: Piilani Highway										
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	27	1092	-	1119	2.0	1275	0.878	100	NA	NA
Lane 2	-	1317	-	1317	2.0	1500	0.878	100	NA	NA
Lane 3	-	-	127	127	2.0	1570	0.081	100	0.0	2
Approach	27	2409	127	2563	2.0		0.878			
West: Kulanihakoi Street										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	48	16	-	64	2.0	282	0.227	100	NA	NA
Lane 2	-	-	207	207	2.0	1642	0.126	100	0.0	1
Approach	48	16	207	271	2.0		0.227			

	Total	%HV	Deg.Satn (v/c)
Intersection	5550	2.0	0.968

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Piilani HIghway Merge Type: **Priority**												
Exit Short Lane	3	500	0.0	1317	1343	3.00	2.00	207	406	0.509	6.1	10.2
Merge Lane	2	-	100.0	Merge Lane is not Opposed				1317	1800	0.731	0.0	0.0
East Exit: Kihei High School Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Piilani Highway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
Full Length Lane	2	Merge Analysis not applied.										
West Exit: Kulanihakoi Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										