*7. S. Kamehameha Avenue/Waiko Road**

8. Kūihelani Highway (Highway 380)/Waiko Road

*9. Honoapi'ilani Highway (Highway 30)/Main Street**

*10. Wai`ale Road/Main Street**

*11. Honoapi'ilani Highway/East-West Residential Street**

*12. North-South Residential Street/ Wai`ale Road**

13. Honoapi'ilani Highway (Highway 30)*/Wai`ale Road**

14. Honoapi'ilani Highway (Highway 30)/Kūihelani Highway (Highway 380)

**Future intersection*

Existing Levels of Service (LOS)

The TIAR evaluated operations of the eight existing study intersections during weekday morning (6:00 to 9:00 AM) and evening (3:00 to 6:00 PM) peak-period conditions. Traffic counts were collected during the weekday AM and PM peak periods at the study intersections in September 2013, when local schools were in session. Existing lane configurations and signal controls were obtained through field observations. Figure 3, A-B of the TIAR (Append I) presents the existing AM and PM peak-hour turning movement volumes, corresponding lane configurations and traffic control devices. Traffic count data sheets are provided in Appendix A of the TIAR. Existing peak-hour volumes and lane configurations were used to calculate levels of service for each of the study intersections. The results of the existing LOS analysis are presented in Table 44 ~~39~~ and the corresponding LOS calculation sheets are included in Appendix B of the TIAR.

Table 44 ~~39~~: Existing Intersection Level of Service

Existing Intersection Level-of-Service				
Intersection	**Traffic Control**	**Peak Hour**	**Delay (sec/veh)1**	**LOS2,3**
1. Honoapi'ilani Highway (Highway 30) / Kuikahi Drive	Signalized	AM PM	25.2 23.3	C C
2. Wai`ale Road / Kuikahi Drive	Signalized	AM PM	26.4 24.7	C C
3. S. Kamehameha Avenue / Maui Lani Parkway	AWSC	AM PM	48.3 54.4	E F
4. Kūihelani Highway / Maui Lani Parkway	Signalized	AM	21.4	C

		PM	21.9	C
5. Honoapi'ilani Highway (Highway 30) / Waiko Road	Signalized	AM PM	13.3 11.9	B B
6. Wai`ale Road / Waiko Road	SSSC	AM PM	12.4 10.9	B B
7. S. Kamehameha Avenue / Waiko Road4	N/A	AM PM	Does not exist	
8. Kūihelani Highway (Highway 380) / Waiko Road	Signalized	AM PM	14.5 11.2	B B
9. Honoapi'ilani Highway (Highway 30) / Main Street4	N/A	AM PM	Does not exist	
10. Wai`ale Road / Main Street4	N/A	AM PM	Does not exist	
11. Honoapi'ilani Highway / East-West Residential Street4	N/A	AM PM	Does not exist	
12. North-South Residential Street / Wai`ale Road4	SSSC	AM PM	Does not exist	
13. Honoapi'ilani Highway (Highway 30) / Wai`ale Road4	N/A	AM PM	Does not exist	
14. Honoapi'ilani Highway (Highway 30) / Kūihelani Highway (Highway 380)	Signalized	AM PM	15.2 12.4	B B
Source: Fehr & Peers, 2014.				
Notes:				
** Indicated oversaturated conditions. Delay cannot be calculated				
AWSC = All-way stop-controlled intersection				
SSSC = Side-street stop-controlled intersection				
1 Whole intersection weighted average stopped delay expressed in seconds per vehicle for signalized and all-way stop-controlled intersections. The vehicular delay for the worst movement is reported for side street stop-controlled intersections.				
2 LOS calculations performed using the *2000 Highway Capacity Manual (HCM)* method.				
3 Undesirable LOS highlighted in bold. 4 Future intersection				

The results of the LOS calculations indicate that all of the existing study intersections operate at an overall acceptable service level (LOS D or better), with the exception of the following location:

- Intersection 3: S. Kamehameha Avenue & Maui Lani Parkway. This intersection operates at LOS E – AM peak hour and LOS F – PM peak hour. The poor operating conditions result from the all-way stop-control and high eastbound and westbound volumes traversing through a shared left/through/right configuration. This contributes to the relatively high eastbound and westbound approach delays and overall poor operating peak levels of service at this intersection.

Potential Impacts and Mitigation Measures. Refer to Appendix I, "Traffic Impact Analysis Report", for a complete presentation of the TIAR. To evaluate the potential impact of traffic generated by the proposed project on the surrounding street system, the TIAR developed estimates of future traffic conditions in the area both with and without the project. Future traffic conditions without the proposed project reflect traffic increases due to general regional growth and development, as well as traffic increases generated by other specific developments near the project site. These conditions are referred to as the cumulative base condition (i.e., no project conditions). The sum of the cumulative base and project-generated traffic represents the cumulative plus project conditions. Tables 43 ~~38~~ and 44 ~~39~~ document the LOS conditions for post project conditions in 2022 and 2026. The TIAR identifies counter measures to mitigate the Project's traffic impacts.

2022 Post Phase I LOS Conditions

As shown in Table 45 ~~40~~, the proposed project will contribute to cumulative impacts (LOS E or F conditions) during one or both peak hours at five study intersections:

- Intersection 1: Honoapi'ilani Highway (Highway 30) & Kuikahi Drive will operate at LOS F during the AM peak hour.
- Intersection 2: Wai`ale Road & Kuikahi Drive will operate at LOS F during the AM peak hour and LOS E during the PM peak hour.
- Intersection 3: S. Kamehameha Avenue & Maui Lani Parkway will operate at LOS F during the AM peak hour and PM peak hour.
- Intersection 4: Kūihelani Highway (Highway 380) & Maui Lani Parkway will operate at LOS F during the AM peak hour and LOS E during the PM peak hour.
- Intersection 7: S. Kamehameha Avenue & Waiko Road will operate at LOS F during the AM peak hour and PM peak hour.

In addition, a project-specific impact has been identified at Intersection 1: Honoapi'ilani Highway & Kuikahi Drive during the PM peak hour. At Intersection 1, the addition of project-generated traffic would cause the overall intersection operations to degrade from LOS D to LOS E.

2026 Post Phase II LOS Conditions

Table 45: Year 2022 Levels of Service – Phase I

Intersection	Traffic Control	Peak Hour	Year 2022 No Project Conditions		Year 2022 with Partial Development (Phase 1) Conditions		Delay Change	Mitigation Required?	Mitigated to:			
			Del/Veh1	LOS2,3	Del/Veh1	LOS2,3			Pre-Project or Better Conditions (≤ LOS D)		LOS D or Better Conditions	
									Del/Veh1	LOS2,3	Del/Veh1	LOS2,3
1. Honoapiilani Highway / Kuikahi Drive	Signal	AM	67.3	**E**	92.5	**F**	25.2	**YES**	43.2	D	Same as Pre-Project Mitigation	
		PM	38.6	D	66.1	**E**	27.5	**YES**	35.2	D		
2. Waiale Road / Kuikahi Drive	Signal	AM	73.5	**E**	108.2	**F**	34.7	**YES**	61.9	**E**	39.8	D
		PM	48.6	D	73.6	**E**	25.0	**YES**	34.8	C	31.3	C
3. S. Kamehameha Avenue / Maui Lani Parkway6	AWSC	AM	> 180	**F**	> 180	**F**	**	**YES**	131.5	**F**	30.5	C
		PM	> 180	**F**	> 180	**F**	**	**YES**	133.1	**F**	36.0	D
4. Kuihelani Highway / Maui Lani Parkway	Signal	AM	78.0	**E**	101.6	**F**	23.6	**YES**	22.7	C	Same as Pre-Project Mitigation	
		PM	57.9	**E**	79.9	**E**	22.0	**YES**	26.4	C		
5. Honoapiilani Highway / Waiko Road	Signal	AM	18.6	B	34.5	C	15.9	NO	No Mitigation Required			
		PM	17.5	B	29.8	C	12.3	NO				
6. Waiale Road / Waiko Road4,9	Signal	AM	8.1	A	8.8	A	0.7	NO	No Mitigation Required			
		PM	7.3	A	7.5	A	0.2	NO				
7. S. Kamehameha Avenue / Waiko Road6,7	SSSC	AM	> 180	**F**	> 180	**F**	**	**YES**	8.1	A	Same as Pre-Project Mitigation	
		PM	169.9	**F**	> 180	**F**	**	**YES**	7.4	A		
8. Kuihelani Highway / Waiko Road	Signal	AM	38.7	D	43.2	D	4.5	NO	No Mitigation Required			
		PM	17.9	B	18.6	B	0.7	NO				
9. Honoapiilani Highway / Main Street5,8	Signal	AM	Only built with project		9.0	A	9.0	NO	No Mitigation Required			
		AM			10.4	B	10.4	NO				
10. Waiale Road / Main Street5	Roundabout	AM	Only built with project		6.6	A	6.6	NO	No Mitigation Required			
		PM			7.1	A	7.1	NO				
11. Honoapiilani Highway / East-West Residential Street	N/A	AM	Only built with Phase 2 of project									
		PM										
12. North-South Residential Street /Waiale Road	N/A	AM	Only built with Phase 2 of project									
		PM										
13. Honoapiilani Highway / Waiale Road9	Signal	AM	5.9	A	7.4	A	1.5	NO	No Mitigation Required			
		PM	12.9	B	17.9	B	5.0	NO				
14. Honoapiilani Highway / Kuihelani Highway	Signal	AM	22.2	C	23.1	C	0.9	NO	No Mitigation Required			
		PM	20.3	C	22.2	C	1.9	NO				

Source: Fehr & Peers, 2014

** Indicated oversaturated conditions. Delay cannot be calculated.

AWSC = All-way stop-controlled intersection

SSSC = Side-street stop-controlled intersection

1 Whole intersection weighted average stopped delay expressed in seconds per vehicle for signalized and all-way stop-controlled intersections. The vehicular delay for the worst movement is reported for side street stop-controlled intersections.

2 LOS calculations performed using the 2000 Highway Capacity Manual (HCM) method.

3 Unacceptable LOS highlighted in **bold.**

4 With the construction of the Waiale Bypass under future conditions, the intersection will include a fourth (south) leg and is assumed to be signalized.

5 Intersection provides access to the project site.

6 The proposed mitigation measure at this location is signalization and the delay and LOS displayed under this condition is based on the average control delay for the intersection as a whole.

7 Intersection is or is assumed to be controlled by stop signs on the minor approach(es).

8 The project intersection is assumed to be signalized in 2022.

9 Intersection assumed to be signalized as part of the Waiale Bypass project.

Table 46: Year 2026 Levels of Service – Phases I and 2

Intersection	Traffic Control	Peak Hour	Year 2026 No Project Conditions		Year 2026 with Phase 1 & 2 Conditions		Delay Change	Mitigation Required?	Mitigated to:			
			Del/Veh1	LOS2,3	Del/Veh1	LOS2,3			Pre-Project or Better Conditions (≤ LOS D)		LOS D or Better Conditions	
									Del/Veh1	LOS2,3	Del/Veh1	LOS2,3
1. Honoapiilani Highway / Kuikahi Drive	Signal	AM	75.3	**E**	111.1	**F**	35.8	**YES**	50.3	D	Same as Pre-Project Mitigation	
		PM	46.3	D	77.0	**E**	30.7	**YES**	37.7	D		
2. Waiale Road / Kuikahi Drive	Signal	AM	87.8	**F**	149.2	**F**	61.4	**YES**	81.8	**F**	46.6	D
		PM	55.3	**E**	99.4	**F**	44.1	**YES**	41.5	D	33.3	C
3. S. Kamehameha Avenue / Maui Lani Parkway 6	AWSC	AM	> 180	**F**	> 180	**F**	**	**YES**	> 180	**F**	30.2	C
		PM	> 180	**F**	> 180	**F**	**	**YES**	167.9	**F**	19.4	B
4. Kuihelani Highway / Maui Lani Parkway	Signal	AM	105.0	**F**	139.5	**F**	34.5	**YES**	27.2	C	Same as Pre-Project Mitigation	
		PM	75.9	**E**	100.1	**F**	24.2	**YES**	31.2	C		
5. Honoapiilani Highway / Waiko Road	Signal	AM	18.6	B	46.9	D	28.3	NO	No Mitigation Required			
		PM	18.5	B	37.8	D	19.3	NO				
6. Waiale Road / Waiko Road4,9	Signal	AM	9.0	A	15.0	B	6.0	NO	No Mitigation Required			
		PM	7.5	A	8.9	A	1.4	NO				
7. S. Kamehameha Avenue / Waiko Road6,7	SSSC	AM	**	**F**	**	**F**	**	**YES**	10.1	B	Same as Pre-Project Mitigation	
		PM	> 180	**F**	**	**F**	**	**YES**	8.1	A		
8. Kuihelani Highway / Waiko Road	Signal	AM	41.6	D	58.2	**E**	16.6	**YES**	25.2	C	Same as Pre-Project Mitigation	
		PM	17.1	B	19.7	B	2.6	NO	15.6	B		
9. Honoapiilani Highway / Main Street5,8	Signal	AM	Only built with project		9.8	A	9.8	NO	No Mitigation Required			
		AM			11.6	B	11.6	NO				
10. Waiale Road / Main Street5	Roundabout	AM	Only built with project		9.9	A	9.9	NO	No Mitigation Required			
		PM			10.3	B	10.3	NO				
11. Honoapiilani Highway / East-West Residential Street	Signal	AM	Only built with project		8.3	A	8.3	NO	No Mitigation Required			
		PM			6.1	A	6.1	NO				
12. North-South Residential Street /Waiale Road	SSSC	AM	Only built with project		17.4	C	17.4	NO	No Mitigation Required			
		PM			19.2	C	19.2	NO				
13. Honoapiilani Highway / Waiale Road9	Signal	AM	6.0	A	12.9	B	6.9	NO	No Mitigation Required			
		PM	15.5	B	30.2	C	14.7	NO				
14. Honoapiilani Highway / Kuihelani Highway	Signal	AM	22.5	C	24.0	C	1.5	NO	No Mitigation Required			
		PM	22.4	C	25.2	C	2.8	NO				

Source: Fehr & Peers, 2014

Notes:

** Indicated oversaturated conditions. Delay cannot be calculated. AWSC = All-way stop-controlled intersection; sssc = Side-street stop-controlled intersection.

1 Whole intersection weighted average stopped delay expressed in seconds per vehicle for signalized and all-way stop-controlled intersections. The vehicular delay for the worst movement is reported for side street stop-controlled intersections.

2 LOS calculations performed using the 2000 Highway Capacity Manual (HCM) method.

3 Unacceptable LOS highlighted in **bold.**

4 With the construction of the Waiale Bypass under future conditions, the intersection will include a fourth (south) leg and is assumed to be signalized.

5 Intersection provides access to the project site.

6 The proposed mitigation measure at this location is signalization and the delay and LOS displayed under this condition is based on the average control delay for the intersection as a whole.

7 Intersection is or is assumed to be controlled by stop signs on the minor approach(es).

8 The project intersection is assumed to be signalized in 2022.

9 Intersection assumed to be signalized as part of the Waiale Bypass project.

As shown in Table 46 ~~41~~, the proposed project would contribute to cumulative impacts (LOS E or F conditions) during one or both peak hours at six study intersections:

- Intersection 1: Honoapi'ilani Highway (Highway 30) & Kuikahi Drive will operate at LOS F during the AM peak hour.
- Intersection 2: Wai`ale Road & Kuikahi Drive will operate at LOS F during the AM peak hour and PM peak hour.
- Intersection 3: S. Kamehameha Avenue & Maui Lani Parkway will operate at LOS F during the AM peak hour and PM peak hour.
- Intersection 4: Kūihelani Highway (Highway 380) & Maui Lani Parkway will operate at LOS F during the AM peak hour and PM peak hour.
- Intersection 7: S. Kamehameha Avenue & Waiko Road will operate at LOS F during the AM peak hour and PM peak hour.

In addition, project-specific impacts have been identified at intersections where the addition of project-generated traffic would cause their overall intersection operations to degrade below LOS D in the peak hours. The project-related impacts identified are:

- Intersection 1: Honoapi'ilani Highway (Highway 30) & Kuikahi Drive, which would experience a cumulative and project-specific impact.
- Intersection 8: Kūihelani Highway (Highway 380) & Waiko Road which would operate at LOS E during the AM peak hour.

Potential Traffic Improvements to Mitigate Project Impacts

Potential traffic improvements were developed to increase the capacity and/or efficiency of the roadway system at the locations where the addition of project-related traffic would cause or contribute to poor operating conditions. The emphasis was to identify physical and/or operational improvements that could be implemented within the existing or planned roadway rights-of-way. The potential intersection improvement measures are illustrated in Appendix L ~~I~~ of the TIAR (See Appendix I). Tables 43 ~~38~~ and 44 ~~39~~ summarize the projected LOS in 2022/2026 at the impacted locations with these proposed measures in place.

With implementation of the proposed improvements, each of the identified impacts would be reduced such that future operations would be at the minimum desired LOS (LOS D) for the overall intersection with the project in place. Although HDOT also strives to maintain LOS D or better conditions at the movement level, measures to improve turning movement conditions would only be proposed where feasible and appropriate from a traffic engineering perspective since adding lanes just to achieve the desired LOS for a particular movement also has secondary negative impacts to the environment and to active transportation modes.

Moreover, the scope of corresponding improvements for this type of mitigation process can be well beyond the project's actual impact, and could effectively eliminate existing or cumulative deficiencies, which should not be the project's responsibility consistent with State of Hawai'i law.

Therefore, in addition to developing improvements that will result in LOS D or better operations, measures that only return operations to pre-project levels have also been identified (i.e., under Year 2022 No Project Conditions and Year 2026 No Project Conditions). This is especially important where the addition of project traffic alone would not degrade operations below LOS D, but would contribute to projected poor levels of service caused by the addition of traffic from other cumulative developments (e.g., Pu'unani Residences, Wai`ale Development, etc.).

The full-range of improvements that address both project-related and/or cumulative traffic impacts for each impacted intersection is discussed in detail in the TIAR (See Appendix L ~~I~~). The following only describes the specific improvements that are proposed to be fully addressed by the WCT.

Proposed Project Improvements

WCT improvements are proposed at intersections identified as significantly impacted under Year 2026 with Project Conditions. In the past, development projects would make a fair share financial contribution for each mitigation measure to the appropriate governing agency (i.e., the County or HDOT). However, providing just partial funds for a variety of different improvements does not ensure construction of any individual improvement.

More recently, HDOT has indicated a preference for development projects like WCT to fully design and build improvements at a select set of locations to ensure their implementation. Accordingly, a mitigation program for WCT was developed that would require construction of improvements at intersections closer to the project site where the project contributes to, but does not directly cause a significant impact. Note that the mitigation program described below is a preliminary recommendation based on project proximity to intersections and without planning level cost estimates. As such, it is subject to change as the planning process continues.

The project proposes to fully fund mitigation measures that would return operations to pre-project levels at the following intersections:

- **Intersection 1: Honoapi`ilani Highway & Kuikahi Drive**

  The impact at Intersection 1 could be reduced by widening the westbound approach from a shared through/left- turn lane and right-turn lane to a left-turn lane, a through lane, and a right-turn lane, and widening the southbound approach from a left-turn lane, a through lane, and a right-turn lane to two left-turn lanes, a through lane, and a right-turn lane. Additionally, to complement the addition of a second southbound left-turn lane, the east leg would need to be widened to provide a second departure lane and the northbound and southbound left-turn phasing would need to be converted to protected left turns. This improvement would result in LOS D operations, and no other measure is feasible that would only mitigate the operations to pre-project levels.

  Although the measures described above would improve the Year 2022 AM and PM peak hour impacts at the overall intersection level, half of the left-turn movements are projected to continue to operate at LOS E or F in both peak hours. The volumes and V/C ratios for the left-turn movements are as follows:

  - AM Peak Hour
    - Westbound: single left-turn lane with 330 vehicles and a V/C ratio of 1.09
    - Southbound: dual left-turn lanes with 440 vehicles and a V/C ratio of 0.98
  - PM Peak Hour
    - Westbound: single left-turn lane with 384 vehicles and a V/C ratio of 0.98
    - Southbound: dual left-turn lanes with 370 vehicles and a V/C ratio of 0.94

- **Intersection 8: Kūihelani Highway & Waiko Road**

  The impact at Intersection 8 could be reduced by widening and restriping the eastbound approach to provide a left-turn lane and a right-turn lane. No changes are proposed to the signal timing. No other improvement is feasible that would only mitigate operations to pre-project levels.

  The measure described above would improve the Year 2026 PM peak hour impact so that the overall intersection and intersection movements or approaches would operate at acceptable LOS D or better. For the Year 2026 AM peak hour impacts, however, the measure would only mitigate the impact at the overall intersection level. During the AM peak hour, the northbound left-turn movement is projected to operate at LOS E with 90 vehicles and a V/C ratio of 0.80. Based on HCM provisions for double left-turn lanes, the northbound left-turn movement does not warrant the provision of a second left-turn lane from a volume standpoint and the V/C ratio is within the acceptable range. Therefore, no further improvements are proposed for this approach.

- **Intersection 13: Honoapi'ilani Highway & Wai`ale Road**

  Although this intersection is not significantly impacted under Year 2026 with Project Conditions, the project may also be responsible for funding intersection improvements necessary to provide access to the project site (i.e., a fourth/west leg).

For the remaining impacted intersections listed below, it is assumed that other development projects adjacent or in closer proximity to these impacted locations would be responsible for implementing the necessary intersection improvements as described in the TIAR (Appendix L ~~I~~).

- Intersection 2: Wai`ale Road & Kuikahi Drive
- Intersection 3: S. Kamehameha Avenue & Maui Lani Parkway
- Intersection 4: Kūihelani Highway & Maui Lani Parkway
- Intersection 7: S. Kamehameha Avenue & Waiko Road

Mitigation Funding

For a project such as WCT that will be constructed in phases over an extended period of time, it is appropriate to identify the proposed project's share for the cost of the intersection

improvements. Fair-share calculations for developer contributions were made for the intersections impacted by project-generated traffic. The estimates were developed by calculating the increase in traffic volumes from existing conditions to the Year 2026 with Project conditions. The increase establishes the total amount of projected growth at each location. Next, the WCT project-only volumes are divided by the total volume increase at each impacted intersection. This step determines the amount of traffic that the WCT project is contributing to the intersection and the approximate proportional contribution towards funding each potential proposed improvement.

The fair share calculations were performed for both the AM and PM peak hours, as shown in Table 45 ~~40~~, Year 2026 Fair Share Intersection Traffic Contribution. For all but one location, the range of maximum project contribution is between 15.4% and 33.8%. At one location, the calculated maximum fair share does not accurately reflect the cause of the impacts at the intersection (i.e., the WCT causes the intersections to degrade from LOS D or better to LOS E or F). Based on the intersection analysis, the impact at Intersection 8, Kūihelani Highway & Waiko Road, is project- specific (rather than a cumulative impact to which the project would make a fair-share contribution), and therefore WCT should make a 100% contribution at this location. As noted, while the project's fair-share contributions and the planning-level cost estimates for each element of the recommended mitigation program has not yet been finalized, the project proposes to fully fund mitigation measures as described above.

No Wai'ale Bypass Mitigation Analysis

When preparing the TIAR, the Applicant assumed that the Wai'ale Bypass would be constructed by 2022. This assumption was predicated upon extensive pre-consultation with the County Department of Public Works (DPW) as well as review of the Final Environmental Assessment prepared for the Wai'ale Road Extension and East Waiko Road Improvements, and review of the County's 2016 6-year Capital Improvement Program, which had included funding for the improvement. However, in response to the DEIS, DPW informed the Applicant by letter dated May 23, 2016 (**See**: Appendix S, DEIS Agency and Community Comment and Response Letters) that the timing of the Wai'ale Bypass is uncertain and that the Applicant should assume that the roadway may not be constructed.

Table 47: Year 2026 Project Fair Share Intersection Traffic Contribution

	AM Peak Hour					PM Peak Hour					
Impacted Intersection	Existing Traffic	2026 Projected Traffic	Total New Traffic	Project Only Traffic	Project % of New Traffic	Existing Traffic	2026 Projected Traffic	Total New Traffic	Project Only Traffic	Project % of New Traffic	Maximum Contribution
1. Honoapiilani Highway/ Kuikahi Drive **	2,073	3,238	318	1,156	27.3%	1,928	3,184	424	1,256	33.8%	33.8%
2. Waiale Road/Kuikahi Drive*	1,935	3,786	436	1,851	23.6%	1,849	3,627	507	1,778	28.5%	28.5%
3. S. Kamehameha Avenue / Maui Lani Parkway**	1,700	3,428	298	1,728	17.2%	1,593	3,173	353	1,580	22.3%	22.3%
4. Kuihelani Highway / Maui Lani Parkway**	1,856	4,013	273	2,157	12.7%	2,011	4,150	330	2,139	15.4%	15.4%
5. S. Kamehameha Avenue / Waiko Road*	0	1,709	229	1,709	13.4%	0	1,629	289	1,929	17.7%	17.7%
6. Kuihelani Highway/Waiko Road**	1,336	2,258	105	949	11.1%	1,407	2,242	122	835	14.6%	**100%1/**

Source: Fehr & Peers, 2014
*County of Maui jurisdiction
**State HDOT jurisdiction
1/ Based on Table 17, the impact of the intersection is directly attributable to the project. Therefore, the maximum contribution is assumed for this intersection.

As such, the Applicant contracted with Fehr and Peers to conduct an analysis of the Project's traffic impacts at full buildout in 2026 without the Wai'ale Bypass Road. Fehr & Peers completed the analysis in October 2016 (**See**: Exhibit M, Fehr & Peers Memorandum dated October 17, 2016).

Fehr & Peers estimates of the future traffic conditions were derived using the Maui Travel Demand Forecasting Model. Particularly, the same 2026 model developed for the TIAR; however, the Wai'ale Bypass (north of the intersection of the Project's planned north-south residential [Study Intersection #12]) was excluded from the roadway network. A comparison of the 2026 No Project peak hour volumes with and without the Wai'ale Bypass showed that the traffic projected to use the Wai'ale Bypass would shift to use Honoapi'ilani Highway and Kuihelani Highway.

Using the same trip generation and overall trip distribution pattern presented in the TIAR, the project trips were assigned to the 2026 roadway network without the bypass. The trip assignment differs from the TIAR as trips to/from land uses on the makai side that were originally using Wai'ale Road were re-routed to use the site's internal roadways (i.e., Main Street, E-W Residential Road, and N-S Residential Road) and Honoapi'ilani Highway. The Project generated traffic volumes were then added to the 2026 base traffic projection to develop 2026 with Project traffic forecasts for the no-bypass scenario.

The intersection operations analysis compares the projected levels of service at each study intersection under cumulative conditions for 2026 with and without the proposed project and without the Wai'ale Bypass to determine the potential impacts. Results of this analysis are presented in Table 48. The Project would contribute to cumulative impacts (LOS E or LOS F conditions) during one or both of the peak hours at the seven study intersections. In addition, project-specific impacts have been identified at intersections where the addition of project-generated traffic would cause their overall intersection operations to degrade below LOS D in one or both peak hours. The project-related impacts identified are:

- Intersection 1: Honoapi'ilani Highway & Kuikahi Drive (cumulative and project-specific impact)
- Intersection 2: Wai'ale Road & Kuikahi Drive (cumulative and project-specific impact)

Table 48: Traffic Impact With and Without the Project and Without the Wai`ale Bypass

Intersection	Traffic Control	Peak Hour	Year 2026 No Project, No Bypass Conditions		Year 2026 with Project Without Bypass Conditions		Delay Change	Mitigation Required?	Impacted in the DEIS?	Mitigated to: Pre-Project or Better Conditions (≤ LOS D)		Mitigated to: LOS D or Better Conditions	
			Del/Veh[1]	LOS[2,3]	Del/Veh[1]	LOS[2,3]				Del/Veh[1]	LOS[2,3]	Del/Veh[1]	LOS[2,3]
1. Honoapi'ilani Highway & Kuikahi Drive	Signal	AM	85.5	**F**	116.5	**F**	31.0	**YES**	**YES**	51.2	D	Same as Pre-Project Mitigation	
		PM	35.1	D	86.2	**F**	51.1	**YES**	**YES**	37.7	D		
2. Waiale Road & Kuikahi Drive	Signal	AM	62.1	**E**	86.7	**F**	24.6	**YES**	**YES**	46.7	D	Same as Pre-Project Mitigation	
		PM	51.0	D	85.4	**F**	34.4	**YES**	**YES**	36.4	D		
3. S. Kamehameha Avenue & Maui Lani Parkway	Roundabout	AM	> 180	**F**	> 180	**F**	**	**YES**	**YES**	167.4[4]	**F**[4]	23.8	C
		PM	> 180	**F**	> 180	**F**	**	**YES**	**YES**	163.4[4]	**F**[4]	15.7	B
4. Kuihelani Highway & Maui Lani Parkway	Signal	AM	112.0	**F**	125.5	**F**	13.5	**YES**	**YES**	25.8	C	Same as Pre-Project Mitigation	
		PM	86.4	**F**	92.8	**F**	6.4	**YES**	**YES**	33.4	C		
5. Honoapi'ilani Highway & Waiko Road	Signal	AM	40.6	D	> 180	**F**	**	**YES**	NO	33.3	C	Same as Pre-Project Mitigation	
		PM	22.8	C	156.0	**F**	133.2	**YES**	NO	51.3	D		
6. Waiale Road & Waiko Road	SSSC	AM	> 180	**F**	>180	**F**	**	**YES**	NO	23.9	C	Same as Pre-Project Mitigation	
		PM	48.5	**E**	>180	**F**	**	**YES**	NO	16.3	B		
7. S. Kamehameha Avenue & Waiko Road	SSSC	AM	> 180	**F**	**	**F**	**	**YES**	**YES**	10.9	B	Same as Pre-Project Mitigation	
		PM	80.1	**F**	**	**F**	**	**YES**	**YES**	8.3	A		
8. Kuihelani Highway & Waiko Road	Signal	AM	70.5	**E**	113.1	**F**	42.6	**YES**	**YES**	32.3	C	Same as Pre-Project Mitigation	
		PM	21.0	C	26.6	C	5.6	NO	NO	18.6	B		
9. Honoapi'ilani Highway & Main Street	Signal	AM	Only built with project		46.3	D	46.3	NO	NO	No Mitigation Required			
		AM			44.9	D	44.9	NO	NO				
10. Waiale Road & Main Street	Roundabout	AM	Does not exist without the Waiale Bypass										
		PM											
11. Honoapi'ilani Highway & East-West Residential Street	Signal	AM	Only built with project		13.1	B	13.1	NO	NO	No Mitigation Required			
		PM			9.2	A	9.2	NO	NO				
12. North-South Residential Street & Waiale Road	SSSC	AM	Only built with project		8.9	A	8.9	NO	NO	No Mitigation Required			
		PM			8.6	A	8.6	NO	NO				
13. Honoapi'ilani Highway & Waiale Road	SSSC	AM	Only built with project		>180	F	>180	**YES**	NO	14.9	B	Same as Pre-Project Mitigation	
		PM			>180	F	>180	**YES**	NO	9.7	A		
14. Honoapi'ilani Highway & Kuihelani Highway	Signal	AM	21.3	C	22.8	C	1.5	NO	NO	No Mitigation Required			
		PM	23.4	C	26.7	C	3.3	NO	NO				

Source: Fehr & Peers, 2016

Notes:

** Indicated oversaturated conditions. Delay cannot be calculated. AWSC = All-way stop-controlled intersection; SSSC = Side-street stop-controlled intersection.

[1] Whole intersection weighted average stopped delay expressed in seconds per vehicle for signalized and all-way stop control intersections. The vehicular delay for the worst movement is reported for side street stop-controlled intersections.

[2] LOS calculations performed using the 2000 Highway Capacity Manual (HCM) method.

[3] Unacceptable LOS highlighted in **bold.**

[4] The mitigation needed to have the intersection operate better than pre-project conditions is installing signal control and having the existing intersection configuration (i.e., a shared left/through/right lane on the eastbound and westbound approaches and a left-turn lane and a shared through/right-turn lane on the northbound and southbound approaches) in place.

- Intersection 5: Honoapi'ilani Highway & Waiko Road (LOS F in the AM and PM peak hour)
- The results of the no-bypass analysis shows that Intersection 5: Honoapi'ilani Highway & Waiko Road and Intersection 6: Wai'ale Road & Waiko Road are new impacts not identified in the in the December 2014 TIAR. Additionally, when comparing these results to the 2026 intersection operations analysis results presented in the TIAR, the impact type at the following locations change:
- Intersection 2: Wai'ale Road & Kuikahi Drive would also have a project-specific impact in the PM peak hour.
- Intersection 8: Kuihelani Highway & Waiko Road would be identified as a cumulative impact instead of a project-specific impact under the 2026 with Project without Bypass Condition.
- Intersection 13: Honoapi'ilani Highway & Wai'ale Road would have a project-specific impact in the AM and PM peak hours.

Potential Traffic Improvements

Physical mitigation measures developed in the in the December 2014 TIAR were first applied to the impacted locations and others were investigated as necessary. The emphasis was to identify physical and/or operational improvements that could be implemented within the existing or planned roadway rights-of-way. Table 48 summarizes the projected LOS in 2026 at the impacted locations with these proposed measures in place.

While three more study intersections would be significantly impacted under this scenario than in the "with Bypass" scenario analyzed in the December 2014 TIAR, LOS D can be achieved at the impacted locations with an expanded program of roadway improvements as mitigation. The full range of improvements that address both project-related and/or cumulative traffic impacts are discussed in detail below.

Intersection 1: Honoapi`ilani Highway & Kuikahi Drive – The mitigation presented in the TIAR is not sufficient to mitigate the impact under the no-bypass scenario. Thus, the impact at this intersection could be reduced by widening the northbound approach from a left-turn lane, a through lane, and a right-turn to a left-turn lane, a through lane, and two right-turn lanes,

widening the southbound approach from a left-turn lane, a through lane, and a right-turn lane to two left-turn lanes, a through lane, and a right-turn lane, and widening the westbound approach from a left-turn lane, a through lane, and a right-turn lane to two left-turn lanes, a through lane, and two right-turn lanes. Additionally, to complement the addition of a second southbound left- turn lane and a second westbound left-turn lane, the east and south legs of the intersection would each need to be widened to provide a second departure lane. Signal modifications at this intersection would include protected phasing on all approaches and right-turn overlap phasing on the westbound and northbound approaches. Additional right-of-way would be needed on both Honoapi'ilani Highway and on Kuikahi Drive to fully implement this improvement, which would result in LOS D operations at an overall intersection level.

Intersection 2: Wai'ale Road & Kuikahi Drive – The impact at this intersection could be mitigated using a reduced version of the improvements proposed in the TIAR for this location. The improvements needed to mitigate the impacts identified under the no-bypass scenario include widening the eastbound and westbound approaches to provide a left-turn lane, two through lanes, and a right-turn lane. To complement the widening of the eastbound and westbound approaches, both the eastbound and westbound departures would also need to be widened to each provide a second receiving lane. This improvement would result in LOS D operations at an overall intersection level.

Intersection 3: S. Kamehameha Avenue & Maui Lani Parkway – The impact at this intersection could be mitigated by implementing the improvements presented in the TIAR, which is signalization of the intersection and maintaining the existing lane configuration (i.e., a shared left/through/right lane on the eastbound and westbound approaches and a left-turn lane and a shared through/right-turn lane on the northbound and southbound approaches). It should be noted, however, that the updated 2026 No Project Condition now assumes that the intersection would be configured as a single-lane roundabout.

As discussed in the TIAR, the pre-project improvement is install a traffic control signal with permitted phasing at all approaches. For LOS D or better operations at an overall intersection level, not only would a traffic signal need to be installed, but the eastbound and northbound approaches would need to provide a left-turn lane and a shared through/right-turn lane and the

westbound and southbound approaches to provide a left-turn lane, a through lane, and a right-turn lane.

Intersection 4: Kuihelani Highway & Maui Lani Parkway – The impact at this intersection could be mitigated by implementing the improvements presented in the TIAR, which is to widen the eastbound approach to provide a left-turn lane, a shared through/left-turn lane, and a right-turn lane. In addition to the change in configuration, the eastbound and westbound left-turn phasing would need to be modified to split phasing. This improvement would result in LOS D operations at an overall intersection level.

Intersection 5: Honoapi`ilani Highway & Waiko Road – This intersection is a new impact not previously identified in the TIAR. Thus, the impact at this intersection could be reduced by widening the northbound approach from a left-turn lane and a shared through/right-turn lane to provide a left-turn lane, a through lane, and a shared through/right-turn lane, and widening the eastbound and westbound approaches to provide a left-turn lane and a shared through/right- turn lane. The northbound departure of the highway would require widening for a minimum of approximately 250 feet to provide a second receiving lane, which would transition back into the existing single northbound lane. Additional right-of-way may be needed on both Honoapi'ilani Drive and Waiko Road to fully implement this improvement, which would result in LOS D operations at an overall intersection level.

Intersection 6: Wai'ale Road & Waiko Road – The impact at this intersection is a new impact not previously identified in the TIAR. It could be mitigated with the installation of a traffic signal, which was assumed to be in place in the Cumulative, pre-project condition in the TIAR due to its key location on the planned Wai'ale Bypass. This improvement would result in LOS D operations at an overall intersection level and the turning movement level.

Intersection 7: S. Kamehameha Avenue & Waiko Road – The impact at this intersection could be mitigated using the improvement presented in the TIAR, which is installing a traffic signal with permitted phasing at all approaches. This improvement would result in LOS D or better operations at both the overall intersection level and the turning movement level.

Intersection 8: Kuihelani Highway & Waiko Road – The impact at this intersection could be mitigated using the improvement presented in the TIAR, which is widening and restriping the eastbound approach to provide a left-turn lane and a right-turn lane. This improvement would result in LOS D or better operations at an overall intersection level.

Intersection 13: Honoapi'ilani Highway & Wai'ale Road – The impact at this intersection is a new impact not previously identified in the TIAR. It could be mitigated with the installation of a traffic signal, which was assumed to be in place in the Cumulative, pre-project condition in the TIAR due to its key location on the planned Wai'ale Bypass. This improvement would result in LOS D or better operations at an overall intersection level and the turning movement level.

Construction Phase Traffic Mitigation

During the construction phase operating conditions along Honoapi'ilani Highway could be impacted by heavy equipment and other construction vehicles turning into and existing from the Project site. To address this concern, the Applicant will prepare and implement a construction phase traffic management plan to ensure safe vehicular ingress and egress from the Honoapi'ilani Highway.

2. Electric, Telephone and Cable TV

Existing Conditions. Electric, telephone and cable TV service for the MTP is brought in underground from the overhead utilities along Honoapi'ilani Highway. There is an existing overhead 69 kv utility line which traverses through the property along the Waihe'e Ditch.

Potential Impacts and Mitigation Measures. Electric, telephone and cable TV service will be provided by the existing facilities in the area. The project's electrical engineering consultant will coordinate the required improvements with the utility companies to determine the required onsite and offsite improvements to support the project. If approved by MECO, it is anticipated that the power poles will be relocated underground fronting the project site along Honoapi'ilani Highway. Within the WCT, utility poles will be placed underground within the road right-of-way. It is expected that the project will create a total demand of about 10 megawatts of electricity. The WCT intends to promote the use of renewable energy. The installation of photovoltaic systems will be encouraged on residential and commercial buildings. If forty

percent of residential and commercial buildings install photovoltaic systems (generating approximately 11.9 GWh per year), demand for carbon-based fuels could be reduced by roughly 50 percent. Moreover, the WCT desires to install a limited number of solar farms in appropriate locations within the agricultural lands. If two solar farms of approximately 5-acres (0.75 MW each) each are developed, the electricity generated would be about 2.6 GWh per year, which could service approximately 236 residential units. Thus, the WCT could potentially generate about 70 percent of its energy consumption through renewables. However, the installation of such systems will depend upon the technical and financial viability of such systems at the time the project is being constructed.

3. Drainage

Existing Conditions. A Preliminary Engineering and Drainage Report was prepared by Otomo Engineering. The report analyzes current conditions, including drainage patterns, existing improvements, and runoff totals (**See**: Appendix H, "Preliminary Engineering and Drainage Report). The following summarizes existing drainage conditions on the property.

Figure No. 45 ~~40~~ shows existing drainage pattern across the project site. Onsite runoff generally sheet flows in a west to east direction. Currently there are seven (7) diversion berms along the upper most portion of the mauka site, which intercept surface runoff and divert it into Waikapū Stream. The diversion berms were constructed when the lot was used for pineapple cultivation. These lands will not be developed and will remain in agricultural use and the berms will remain in place and function as they are presently doing. The berms are protected by various grasses and weeds, which help to maintain a low runoff velocity as well as filter sediments that are carried by the runoff. Based on a 50-year, 1-hour storm, the existing diversion berms intercept approximately 140,509 cubic feet of storm runoff and divert it into Waikapū Stream. These diversion berms prevent runoff from sheet flowing into the proposed development areas. In addition, some existing runoff sheet flows into the Waiheʻe Ditch, which traverses along the western boundary of T.M.K.: (2) 3-6-005: 007. The ditch flows in a southerly direction toward Māʻalaea and supplies water to existing agricultural reservoirs.

Runoff from the areas below the existing diversion berms generally sheet flows in a west to east direction toward Honoapi'ilani Highway. There are several small culverts that divert runoff

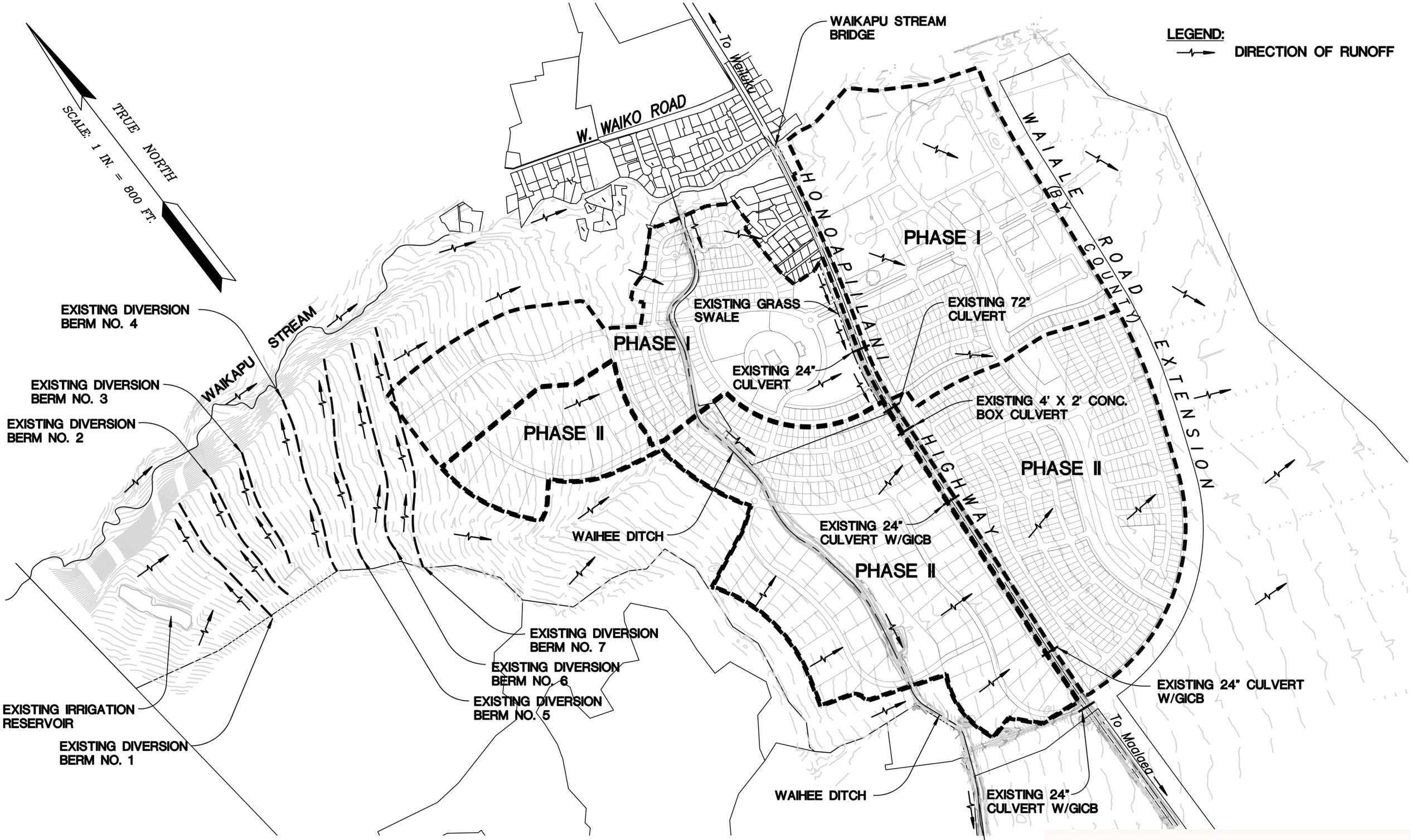

Figure 45:
Existing Drainage Pattern