

Forward Landfill Expansion

Traffic Study

Prepared For

San Joaquin County
Community Development Department

August 23, 2018



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Executive Summary

Background and Study Scope

Forward Inc., a privately owned and operated sanitary and waste landfill located at Austin Road in San Joaquin County is requesting to expand its current facility by 17.3 acres of adjacent land. The landfill currently operates on a 567-acre site; the request will increase the size of the site to a total 584.3 acres. The landfill currently has a permit to receive a maximum of 620 truckloads of waste per day. Truckload received at the landfill fluctuates over time. In 2016 the average daily truckloads received at the landfill was 220 trucks according to counts at the gate.

In 2013 Forward landfill submitted a request for a 184-acre expansion. The request would not increase its 620 daily permitted truckloads but will extend its closing from 2021 to 2039. The County denied the request. In 2014, Forward submitted another request for a 21-acre expansion but later withdrew the request due to a conflict with the Stockton Airport Land Use Plan. The current request for 17.3 acres is a revision of the 2014 request. As with the previous request, the current request would not increase the daily maximum of 620 truckloads.

The purpose of this traffic study is to assess the potential impact on local roadways assuming the landfill generates up to the permitted 620 daily truckloads. The traffic study evaluated traffic operations for 12 gateway intersections near the project site for Existing Condition, Short-term Conditions, and a Long-term 2035 Conditions. All of these three conditions were evaluated with and without the Project. The Existing Condition is the current traffic conditions, the Short-term Condition accounts for traffic generated from approved but not yet built projects, and the 2035 Long-term Conditions assumes area-wide growth and development that is likely to occur by 2035.

The study also evaluated the Project's impact on freeway mainline operations, street segment operation, vehicle queuing, traffic safety, left-turn lane needs analysis, site access and internal circulation, and vehicle-miles-traveled analysis.

Study Findings

Project Trip Generation

The landfill currently generates 220 truckloads per day based on a 2016 gate count. Assuming the site will generate up to its permitted 620 truckloads a day, the site will generate 1,600 passenger car trips a day, calculated based on the remaining quota of 400 truckloads equals 800 truck round trips, or 1,600 passenger car equivalent trips per day based on 1 truck equals 2 passenger cars (PCE) conversion factor.

Traffic LOS, Project Impact, and Signalization Needs

The study found that the project will not create unacceptable conditions (LOS) under Existing Conditions, Short-term Conditions. Under the 2035 Cumulative Conditions, eight of 12 study intersections are projected to operate at unacceptable conditions below LOS D before adding traffic from Forward Landfill. With proposed improvements from previously approved projects, 4 of the 8 study intersections could be improved to acceptable conditions, while 4 will remain at unacceptable conditions.

With the added Forward Landfill traffic, one additional intersection, Arch Road/Austin Road will operate at unacceptable LOS. With the recommended project-level mitigation, the intersection could improve back to acceptable conditions. In all, four intersections will remain at unacceptable conditions: SR 99 southbound ramps at East French Camp Road, the urban interchange at SR 99 and Arch Road, and SR 99 Southbound ramp and northbound ramps at Mariposa Road. SR 99 freeway mainline and Austin Road will operate at acceptable LOS for all study scenarios.

Signal-warrant analysis indicated none of non-signalized intersections evaluated in the study will meet the minimum requirements for signalization. The East French Camp Road and Austin Road intersection may be at the borderline condition for signalization by 2035. Further evaluation should be conducted by that time.

Vehicle Queue Analysis and On-site Circulation

Vehicle queuing analysis indicated that there were frequent vehicle queues in the eastbound direction on Arch Road between the urban interchange and Kingsley Road due to inadequate left-turn lane storage, close spacing, and a large number of large trucks taking up much of the queuing space. Mitigation strategies are discussed in the vehicle queuing section of the report. Queuing analysis also reveals that the site has an adequate storage lane to accommodate the projected number of trucks on the site and the truck queue is not expect to back up traffic on Austin Road.

Traffic Safety and the Need for Left-turn Lane

There were nine reported traffic collisions on Austin Road during the past three years (2015, 2016, and 2017). Eight of the reported collisions occurred near intersections with East French Camp Road and Arch Road. One occurred near Lynch Road, a rural dirt access road serving the agricultural land between Arch Road and East French Camp Road. All of the 9 collisions occurred in 2015 and 2016. No collisions were reported in 2017. Austin Road currently carries about 2,100 vehicles per day and about 5,000 per day by 2035 as projected, which is well under its design capacity. With limited driveways and cross streets, Austin Road is not expected to be a collision hotspot.

Vehicle Miles Traveled (VMT) Analysis

Forward Landfill receives waste material from public waste management agencies throughout Northern California. In 2016 the landfill receives 39,150 truckloads for 783,000 tons of waste materials from various waste management agencies. The estimated total truck travel miles were approximately 2,685,500.

1. Introduction

1.1 Project Description, Background and Study Purpose

The Forward Inc. Landfill, a privately owned and operated sanitary and waste landfill located at Austin Road in San Joaquin County is requesting to expand its current facility by filling an additional 17.3 acres of land within its current site. The landfill currently has a permit to receive a maximum of 620 truckloads of waste per day. Truckload received at the landfill fluctuates over the years. In 2016 the average daily truckloads received at the landfill was 220 trucks, according to counts at the gate. Over the past 5 years, an average of about 233 truckloads/day visited the landfill.

In 2013 Forward landfill submitted a request for a 184-acre expansion. The request would not increase its 620 daily permitted truckloads but will extend its closing from 2021 to 2039. The County denied the request. In 2014, Forward submitted a proposal for a 21-acre expansion but later withdrew that proposal due to Airport Land Use Compatibility issues. The current request for 17.3 acres is a revision of the 2014 request. As with the previous request, the current request would not increase the permitted daily maximum of 620 truckloads.

The goal of this traffic study is to identify and evaluate the potential impact assuming the landfill traffic would increase from the current 220 truckloads to the 620-truckload limit. Figure 1 shows the proposed expansion site plan.

1.2 Scope of Study

The traffic study scope, determined in consultation with San Joaquin County Planning and Traffic Engineering staff, is designed to identify the potential Project traffic impacts. The study evaluates Project trip generation, distribution and its impact on traffic circulation in the area near the Project site; and develops mitigation strategies for identified significant impacts, as feasible. Specifically, the study evaluates peak-hour traffic operations for 12 intersections and driveways near the Forward Landfill site under Existing Conditions, Short-term Conditions, and a 2035 Cumulative Long-term Condition. The study focuses on intersection operations, as they are controlling points of circulation and key indicators of traffic flow conditions.

The study also evaluates mainline traffic operation for sections of SR 99, street segment performance for Austin Road, traffic collisions, vehicle queuing, the need for a left-turn lane at the Project site entrance, and Vehicle-Miles-Traveled (VMT), as these are also measures of the overall traffic performance. Below is a list of the study locations, and a brief description of the study scenarios.

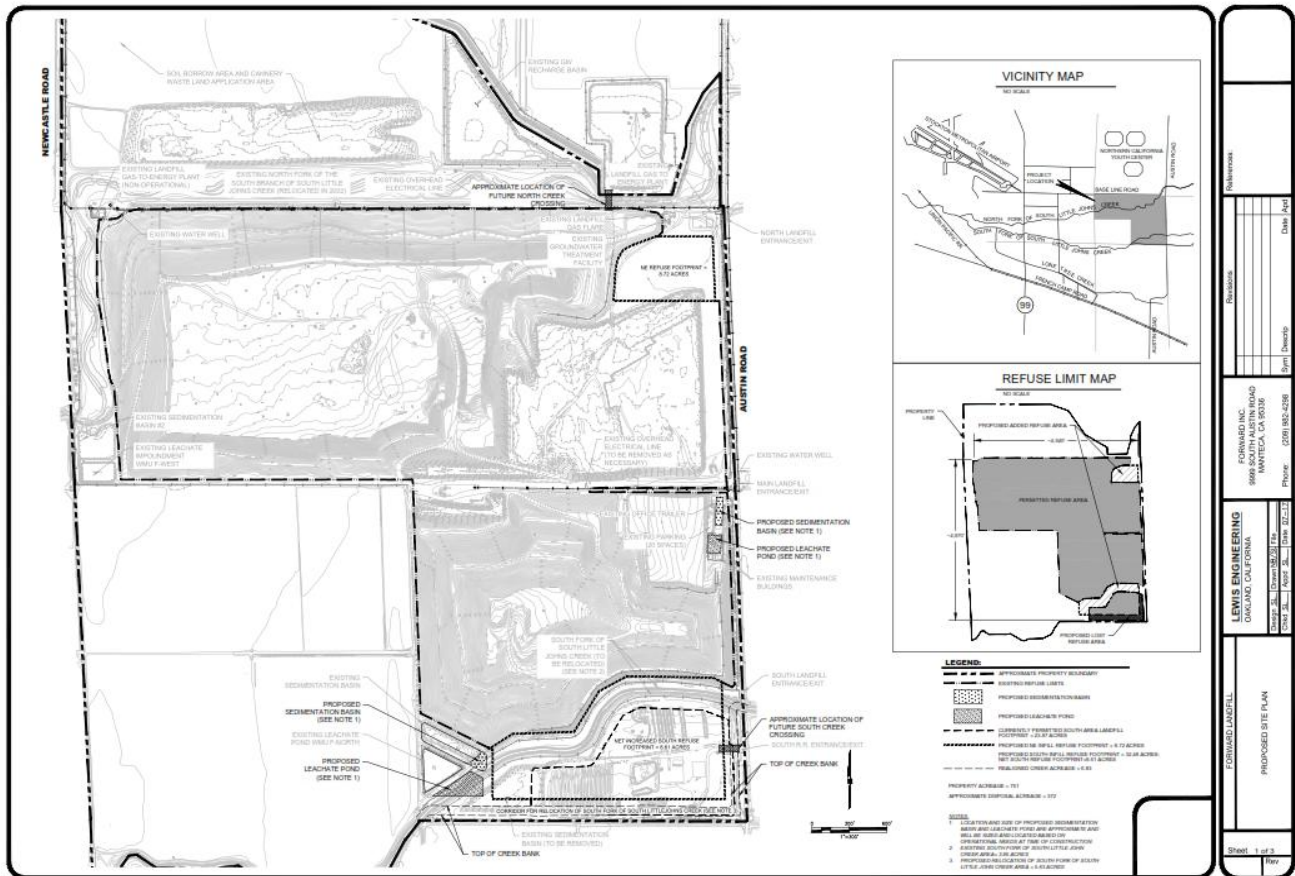


Figure 1. Project Site Plan
 Forward Landfill Traffic Study – PHA Transportation Consultants

Study Intersections

1. Austin Road and main site access driveway (side-street-stop control)
2. Austin Road and secondary site access driveway (side-street-stop control)
3. Austin Road and E. French Camp Road (all-way stop control)
4. SR 99 and French Camp Road Northbound Ramp (signalized)
5. SR 99 and French Camp Road Southbound Ramp (Signalized)
6. SR 99 and Arch Road Urban Interchange (signalized)
7. Arch Road and Kingsley Road (signalized)
8. SR 99 and Mariposa Road Southbound Off-ramp (signalized)
9. SR 99 and Mariposa Road Northbound Off-ramp (signalized)
10. Mariposa Road and Austin Road (signalized)
11. Arch Road and Austin Road (signalized)
12. Austin Road and California Health Facility Access Driveway (signalized)

Study Traffic Scenarios

1. **Existing Conditions**- This condition is based on traffic counts collected in May 2018. This scenario is designed to establish a baseline for the study.
2. **Existing-Plus-Project Conditions**- Current traffic plus the estimated traffic from the landfill. This scenario is designed to identify Project impacts under current conditions. The Project traffic impact, in this case, is determined by the daily permitted truckloads minus current daily truckload count at the gate.
3. **Short-term Conditions** -Existing traffic plus traffic from recently approved but not yet built projects in the Project vicinity. This scenario is designed to account for the potential traffic impacts associated with those recently approved but not yet built projects and to establish a short-term baseline.
4. **Short-term-Plus-Project Conditions** - Existing traffic plus traffic from recently approved but not yet built projects plus the Forward landfill traffic. This scenario is designed to identify Project impacts under the short-term build-out condition.
5. **Long-term Cumulative Conditions** – This condition represents 2035 traffic forecasts for the study area. This scenario is designed to evaluate long-term cumulative traffic condition and to establish a future baseline to identify Project traffic impact.
6. **Long-term Cumulative plus Project**- 2035 traffic forecast for the study area plus the landfill traffic. This scenario is designed to evaluate the Project traffic impact under the long-term cumulative conditions.

Figure 2 shows the Project site and locations of the study intersections and driveway.

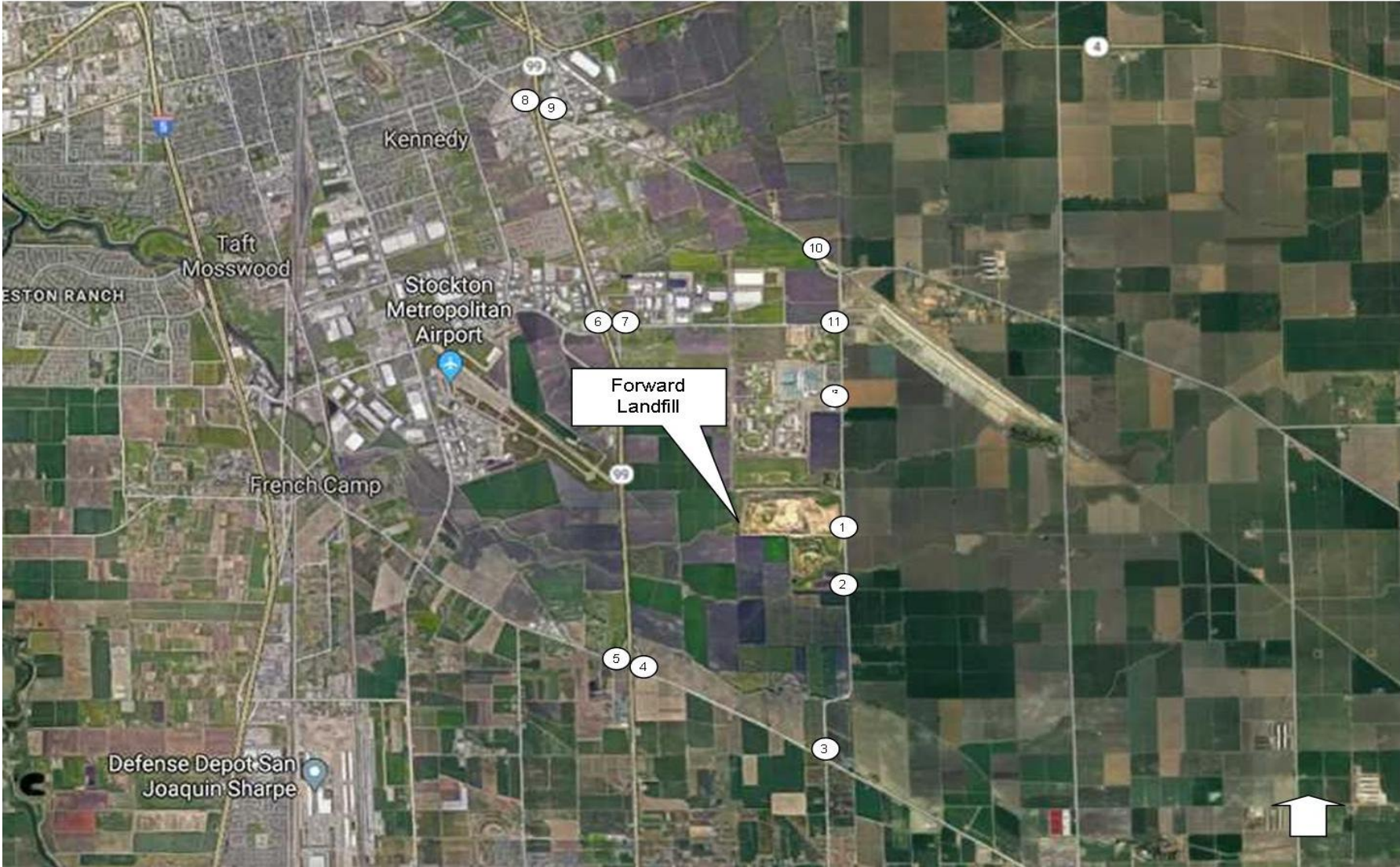


Figure 2. Site Location and Study Intersections
Forward Landfill Traffic Study-Transportation Consultants

1.3 Report Organization

This report consists of 11 chapters.

- **Chapter 1**
This chapter discusses the background of the proposed project, its characteristics and study scope.
- **Chapter 2**
This chapter reviews current study area land use, street system, and access.
- **Chapter 3**
This chapter describes project study methodology, procedures, evaluation criteria and the potential project impact for current, short-term and long-term cumulative conditions.
- **Chapter 4**
This chapter evaluates State Route 99 freeway mainline operation and street segment operation for Austin Road.
- **Chapter 5**
This chapter examines vehicle queuing on Arch Road between State Route 99 interchange and Kingsley Road, and truck queuing on the Forward Landfill site
- **Chapter 6**
This chapter reviews collision data in the study near the Project site and identifies potential collision hotspots.
- **Chapter 7**
This Chapter evaluates and discusses the need for a left-turn lane at the Project site.
- **Chapter 8**
This chapter evaluates and discusses the signalization need for the non-signalized study intersections.
- **Chapter 9**
- This chapter evaluates and estimates the Vehicle-Miles-Traveled (VMT) for the project. Requires by the State as part of CEQA documentation.
- **Chapter 10**
This chapter discusses Project site access and internal circulation.
- **Chapter 11**
This chapter discusses potential mitigation measures for unacceptable traffic conditions.

2. Study Area Description

2.1 Land Use

The project site is located in the unincorporated area of San Joaquin County, east of SR 99, north of East French Camp Road and south of Arch Road. Land use in the vicinity of the project site on Austin Road is predominantly agricultural with several small areas of government and industrial uses to the north near Arch Road.

2.2 Street Network and Access

The street network providing access and circulation to the area and the project site consists of Austin Road, Mariposa Road, Arch Road, East French Camp Road, and State Route 99. A brief description of the streets is as follows:

Austin Road

Austin Road provides direct access to and from the Forward Landfill site. Austin Road is a two-lane, north-south rural road that extends from Mariposa Road to Lathrop in the south. Along the segment between Arch Road and East French Camp Road, there are a few dirt access roads from Austin Road to service the adjacent farmland, and paved access driveways to Forward Landfill and the California HealthCare Service facility. A 2018 daily traffic volume count conducted on Austin Road at a point north of the Forward Landfill showed about 2,100 vehicles per day on that roadway segment. According to the San Joaquin County roadway classification and design capacity standard, a minor arterial/collector road such as Austin Road has the ability to carry about 12,500 vehicles per day at an acceptable Level-of-Service "C". There are no posted speed limit signs along the segment. Field observations indicated the average travel speed along the segment is above 50 mph.

Arch Road

Arch Road is an east-west running arterial road connecting Austin Road, State Route 99, and the Stockton Airport. West of SR 99 the Road is called Arch-Airport Road. The segment between SR 99 and Austin Road varies between two and four lanes, and primarily serves agricultural, warehousing, and industrial developments near the study area. There are recent road-widening improvements and signalization near Arch Road's intersections with Logistic Drive and Newcastle Road. The posted speed limit along the road segment is 45 mph in the vicinity of the Project.

Mariposa Road

Mariposa Road is an east-west two-lane arterial road connecting SR 99 and Austin Road. The segment near SR 99 is four-lane. The road mostly serves agricultural, industrial, and warehousing

developments in the area. The posted speed limit along the roadway is 45 miles per hour (mph) near SR 99 and 55 mph near Austin Road and to the east.

East French Camp Road

East French Camp Road is an east-west two-lane arterial connecting Austin Road and SR 99 in the study area. The land use along the segment between Austin Road and SR 99 is mostly agriculture land. The posted speed limit along the road near SR 99 is 55 mph.

State Route 99

State Route 99 (SR 99) is a major regional north-south freeway connecting cities in California's Central Valley. In the project vicinity, SR 99 is a four-lane divided freeway (two lanes each direction). Access between Route 99 and the project site is provided via an interchange at Arch Road and interchanges at East French Camp Road and Mariposa Road.

2.3 Transit Service

Transit service in the general vicinity of the Forward Landfill is provided by the San Joaquin County Regional Transit District (RTD). RTD provides service between the City of Stockton and the airport. The nearest service route is near the Route 99/Arch Road interchange. There are no transit service lines in the study area.

2.4 Pedestrian and Bicycle Facilities

There are no pedestrian facilities or sidewalks within the study area except a section of Arch Road on the north side between Fite Court and Logistics Drive. Austin Road south of East French Camp Road is a designated bicycle route, but no roads within the study area are so designated.

3. Traffic Impact Analysis

3.1 Study Approach and Assumptions

To identify the potential traffic impact of the Project (Forward Landfill), the study first evaluated current study intersection traffic Levels-of-Service (LOS) to establish a baseline. Subsequently, traffic LOS for study intersections was evaluated with the added Project trips to identify project traffic impacts under the current conditions. For the Short-term Conditions, the study first evaluated traffic LOS by adding traffic from recently approved projects to the baseline traffic, then evaluated traffic LOS again adding the Project traffic. For the Long-Term Cumulative traffic Conditions, the study first evaluated traffic LOS with 2035 traffic volume forecasts, which are based on the built-out condition in the traffic model of the San Joaquin County and Stockton Area. Then, traffic LOSs for study intersections were evaluated with the added Project trips to identify project traffic impacts for the Cumulative 2035 Conditions.

3.2 Traffic (LOS) Analysis Methodology and Evaluation Criteria

Study intersection traffic LOS was evaluated and ranked using the standard traffic Level-of-Service (LOS) grading scale, which is a qualitative measurement of traffic operations and flow characteristics. LOS A represents free flow conditions with little to no delays. LOS E represents conditions at capacity, and LOS F represents over-saturation of roadways and excessive delays.

Two sets of LOS calculation methods were used for intersection capacity analysis in the study; one for signalized intersections and the other for the non-signalized intersections. For signalized intersections, traffic LOS is determined based on the average delay per vehicle for the entire intersection as a whole. For the non-signalized intersections, traffic LOS is determined based on the average vehicle delay for approaches controlled by stop signs or yield signs at minor streets. Through traffic movements on major street approaches were evaluated but are not the determining factor intersection LOS. Table 1 shows the LOS rankings and their relationships to traffic conditions for both signalized and non-signalized intersections.

Table 1. Traffic Operation (LOS) Ranking Criteria Forward Landfill Expansion Traffic Study-San Joaquin County	
Signalized Intersections (HCM 2000 Methodology)	
LOS	Control Delays per Vehicles in Seconds
A	0.0-10.0
B	10.1-20.0
C	20.1-35.0
D	35.1-55.0
E	55.1-80.0
F	>80.0
Non-signalized Intersections (HCM2000 Methodology)	
LOS	Control Delays per Vehicle in Seconds
A	0.0-10.0
B	10.1-15.0
C	15.1-25.0
D	25.1-35.0
E	35.1-50.0
F	>50.0
Source: Highway Capacity Manual 2000. Control delay includes delays of initial deceleration, move-up-time in the queue, stops, and re-acceleration. Calculated LOS is for minor street approaches. Major street traffic movements would operate at good LOS as they do not have traffic control.	

3.3 Significance Criteria and Minimum LOS Standards

Significance criteria are used to determine whether a project impact is considered significant. A proposed development project is considered to have a significant impact if it would cause an increase in traffic which is substantial in relation to the traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, or delay and congestion at intersections), or change the condition of an existing street (e.g., street closures, changing direction of travel) in a manner that would substantially impact access or traffic load and capacity of the street system.

San Joaquin County policy, as discussed in the San Joaquin County Traffic Impact Study Guidelines, applies to study intersections 1, 2, 3, 4, 10, 11 and 12, considers it a significant impact when a “project” generated traffic would lower an intersection from an acceptable LOS A, B, C, or D to an unacceptable LOS E or F, the “project” proponent is required to provide mitigation that would improve the LOS to an acceptable level. If the LOS for conditions at a given location is already at an unacceptable LOS, then mitigation measures that would return the volume to capacity ratio to the existing without “project” level must be identified. Caltrans LOS policy, which applies to the remaining study intersections, defines acceptable operations as an overall LOS D or better.

3.4 Current Conditions Traffic (LOS)

Current study intersection LOSs were evaluated for morning- and afternoon peak-hours based on traffic counts collected for the intersections in May 2018. The calculated traffic LOS for current conditions indicate all study intersections near the project site operated mostly at LOS A and B, meaning traffic generally moves smoothly in the area with no major congestion or delays. It should be noted that some of the study intersections had received improvements in recent years; these improvements include the SR 99 ramps at East French Camp Road ramps signalization, the reconfiguration of at the SR 99 interchange at Mariposa Road, and the signalization at the California HealthCare facility driveway on Austin Road. Table 2 shows current study intersection LOS rankings and corresponding delays. Figure 3 shows current study intersection peak-hour traffic volumes.

While traffic generally moves well in the area with minimal delays, field observation indicated that frequent traffic backups occur on Arch Road between SR 99 ramps and the Kingsley Road intersection. This condition also was noted by San Joaquin County Traffic Engineering staff. As observed, the traffic backup appears to be caused by a combination of factors; close spacing of the SR 99 ramps and the Kingsley Road intersection; the lack of storage space at the left-turn lane from eastbound Arch Road to northbound Kingsley Road; and the presence of many large trucks that take up most of the spacing between SR 99 and Kingsley Road. This is discussed in more detail in the vehicle queuing analysis section of the report.

Table 2. Current (2018)-Conditions Intersection Traffic LOS Summary

Forward Landfill Expansion Traffic Study – San Joaquin County

	Study Intersections and Driveways	Traffic Control	Peak Hour	Existing (2018) Conditions		Acceptable Conditions
				Delays	LOS	
1	Austin Rd. & Forward Main Driveway	SSS	AM	9.2	A*	Yes
			PM	9.5	A*	Yes
2	Austin Rd. & Forward Secondary Driveway	SSS	AM	9.1	A*	Yes
			PM	9.4	A*	Yes
3	Austin Rd. & E. French Camp Rd.	AWS	AM	10.4	B	Yes
			PM	19.0	C	Yes
4	SR 99 NB On-off Ramps & E. French Camp Rd.	Signal	AM	17.7	B	Yes
			PM	20.1	C	Yes
5	SR 99 SB On-off Ramps & E. French Camp Rd.	Signal	AM	15.0	B	Yes
			PM	24.1	C	Yes
6	SR 99 Urban Interchange & Arch Rd.	Signal	AM	14.1	B	Yes
			PM	14.9	B	Yes
7	Arch Rd. & Kingsley Rd.	Signal	AM	22.1	C	Yes
			PM	17.7	B	Yes
8	SR 99 SB On-off Ramps & Mariposa Rd.	Signal	AM	6.6	A	Yes
			PM	8.0	A	Yes
9	SR 99 NB On-off Ramps & Mariposa Rd.	Signal	AM	5.1	A	Yes
			PM	3.8	A	Yes
10	Mariposa Rd. & Austin Rd.	Signal	AM	4.9	A	Yes
			PM	6.1	A	Yes
11	Arch Rd. & Austin Rd.	Signal	AM	11.3	B	Yes
			PM	16.9	B	Yes
12	Austin Rd. & Cal. Health Care Driveway	Signal	AM	3.5	A	Yes
			PM	5.5	A	Yes

Notes:
Traffic counts for the study were conducted In mid-May 2018
SSS=Side-Street-Stop
AWS=All-Way-Stop
Signal=Traffic Signal Light
* For side-street-stop controlled intersections, delay and LOS reported in the above table represent the worst case (the side street approach controlled by the stop sign). The LOS for the intersection as a whole is A with delays less than 10 seconds.
The traffic analysis for study intersection 5 was combined with the adjacent frontage road as one intersection.



Figure 3 Existing (2018) Study Intersection Peak-hour Traffic Volumes
 Forward Landfill Traffic Study

3.5 Project Conditions Traffic and Impacts

Project Trip Generation

Forward Landfill currently operates on about 567 acres of land and is permitted to receive a maximum of 620 truckloads of waste materials daily from public agencies and jurisdictions throughout California. All waste material delivered to the site are prescreened and scheduled. According to a 2017 gate count, the landfill currently generates about 220 trucks per day on the average, 400 truckloads short of the permitted truckloads. Table 3 shows the 2017 truck count at the gate provided by the operator.

Table 3. 2017 Truck Count at The Forward Gate Forward Landfill Expansion Traffic Study – San Joaquin County		
Month	Monthly Total	Daily Average
Jan	4805	172
Feb	4991	208
Mar	6732	249
Apr	5653	226
May	6399	237
Jun	6624	245
Jul	5890	210
Aug	6621	214
Sep	6113	204
Oct	6396	246
Nov	5854	225
Dec	5726	220
Day Average		221
Source: Forward Landfill. The Landfill operates Mondays thru Fridays except for holidays, and accepts waste material from jurisdictions throughout California. All waste materials are prescreened and scheduled in advance.		

To identify and capture the maximum range of Project traffic impacts, the study evaluated the impact of the remaining daily quota of 400 truckloads, or 800 truck round trips (increase from existing approximately 220 daily trucks to maximum permitted 620 daily trucks). In conducting traffic operation (LOS) analysis, all truck trips were converted to passenger cars based on a conversion factor of 1 truck vs. 2 passenger cars (PCE). The final daily trip generation for the Project evaluated in the study is 1,600 passenger car trips. Table 4 shows a summary Project trip generation estimates.

Table 4. Forward Landfill “Project” Trip Generation Estimates Forward Landfill Traffic Study – San Joaquin County					
AM Peak Hour Trips		PM Peak Hour Trips		Daily Trips	
Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
108	132	70	106	800	800
Note: The above trip estimates were determined based on the maximum permitted daily truckloads minus current daily truck count. Peak-hour trips were determined based on turning movement counts conducted at Forward Landfill main access driveway. The above trips are passenger equivalent trips.					

Project Trip Distribution Assumptions

The directional distribution of the project traffic, which identifies the potential routes of travel, was estimated based on examinations of the study area street layout, land use, current circulation patterns and traffic volumes, along with consultation from County staff. Figure 4 shows the estimated directional Project traffic distribution.

Project Condition Scenario Traffic LOS and Impact

Table 5 shows traffic LOS for the Project Condition along with a comparison with the Existing Condition. As shown, all of the study intersections operated at acceptable conditions currently and will continue to operate at acceptable conditions LOS “C” or better. This means the Project will not create significant impacts on area traffic operations. Figure 5 shows existing plus project traffic volumes.

Project Impact on Public Transportation, Bicyclists and Pedestrians Activities

The project is not expected to impact public transportation services, bicycle, and pedestrian activities as there are no such facilities and services in the area.



Figure 4 Project Traffic Distribution Assumptions
Forward Landfill Traffic Study-PHA Transportation Consultants

Table 5 Current-and Project Conditions Intersection Traffic LOS Summary

Forward Landfill Expansion Traffic Study – San Joaquin County

	Study Intersections and Driveways	Traffic Control	Peak Hour	Existing (2018) Conditions		Existing +Project Conditions		Significant Impact
				Delays	LOS	Delays	LOS	
1	Austin Rd. & Forward Main Driveway	SSS	AM	9.2	A*	11.2	B*	No
			PM	9.5	A*	10.7	B*	No
2	Austin Rd. & Forward Secondary Driveway	SSS	AM	9.1	A*	9.7	A*	No
			PM	9.4	A*	9.8	A*	No
3	Austin Rd. & E. French Camp Rd.	AWS	AM	10.4	B	10.9	B	No
			PM	19.0	C	20.6	C	No
4	SR 99 NB On-off Ramps & E. French Camp Rd.	Signal	AM	17.7	B	21.0	C	No
			PM	20.1	C	25.3	C	No
5	SR 99 SB On-off Ramps & E. French Camp Rd.	Signal	AM	15.0	B	16.4	B	No
			PM	24.1	C	24.8	C	No
6	SR 99 Urban Interchange & Arch Rd.	Signal	AM	14.1	B	14.7	B	No
			PM	14.9	B	15.6	B	No
7	Arch Rd. & Kingsley Rd.	Signal	AM	22.1	C	22.8	C	No
			PM	17.7	B	19.5	C	No
8	SR 99 SB On-off Ramps & Mariposa Rd.	Signal	AM	6.6	A	6.7	A	No
			PM	8.0	A	8.3	A	No
9	SR 99 NB On-off Ramps & Mariposa Rd.	Signal	AM	5.1	A	5.2	A	No
			PM	3.8	A	4.4	A	No
10	Mariposa Rd. & Austin Rd.	Signal	AM	4.9	A	4.9	A	No
			PM	6.1	A	5.8	A	No
11	Arch Rd. & Austin Rd.	Signal	AM	11.3	B	12.0	B	No
			PM	16.9	B	17.2	B	No
12	Austin Rd. & Cal. Health Care Driveway	Signal	AM	3.5	A	4.5	A	No
			PM	5.5	A	5.9	A	No

Notes:

Traffic counts were conducted in mid- May 2018

SSS=Side-Street-Stop, AWS=All-Way-Stop, Signal=Traffic Signal Light

* For side-street-stop controlled intersections the delay and LOS reported in the above table represent the worst case (the side street approach controlled by the stop sign. The LOS for the intersection as a whole is A with delays less than 10 seconds.

Study intersections 1, 2, 3, 10, 11 and 12 are County intersections and the lowest acceptable condition is LOS D. Other study intersections are Caltrans intersections and the lowest acceptable LOS is D.

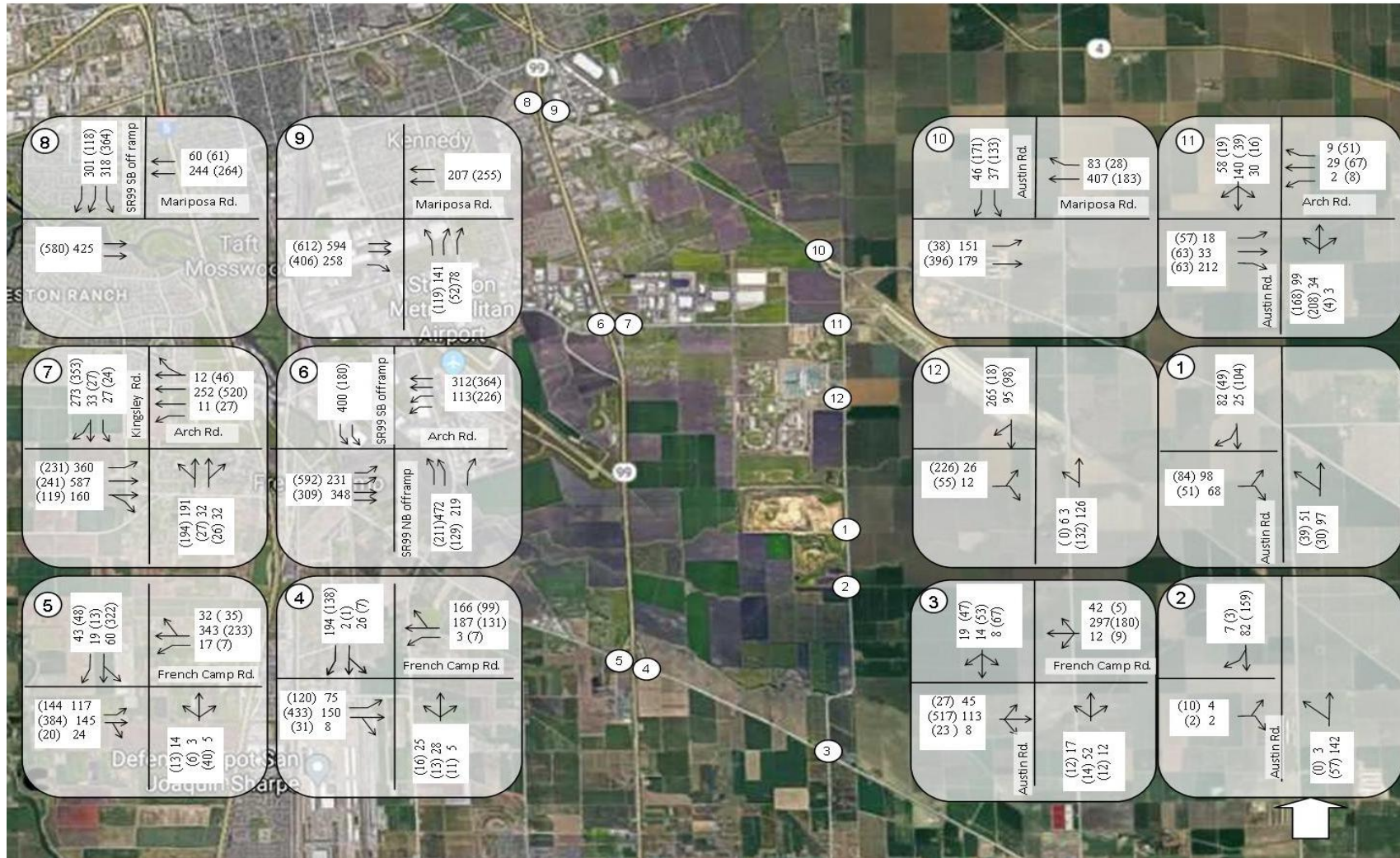


Figure 5. Existing plus Project Peak Hour Traffic Volumes
 Forward Landfill Traffic Study-PHA Transportation Consultants

3.6 Short-term Traffic Conditions and Project Traffic Impact

As discussed previously, the Short-term Condition includes existing traffic plus traffic from recently approved but not yet built projects. According San Joaquin County and City of Stockton Planning staff, there are four approved but not yet built projects that would likely add traffic to the study area. These approved projects are Norcal Logistic Center located north of Arch Road between Austin Road and Newcastle Road, Tidewater Crossing located west of SR 99 and south of the Stockton Airport, Archtown Industrial and Arch Road industrial located on Arch Road near Newcastle Road. Norcal Logistic Center is primarily a warehousing and distribution facility, the Archtown Industrial Park and Arch Road Industrial Park are light industrial facilities, while Tidewater Crossing is a mixed-use project with residential, industrial, school, and other uses. The previously approved Mariposa Lakes Development located north of the Mariposa Road and Austin Road intersection is not expected to be built according to Stockton planning staff and as such is not included in the short-term scenario. Table 6 shows the estimated trips generated from these two approved projects.

Table 6. Approved “Project” Trip Generation Estimates				
Forward Landfill Traffic Study – San Joaquin County				
	AM Peak Hour Trips		PM Peak Hour Trips	
	Enter	Exit	Enter	Exit
Norcal Logistic Center	690	439	502	879
Tidewater Crossing	1847	1514	1916	2481
Archtown Industrial	154	98	112	196
Arch Road Industrial	136	87	98	175
Note: The above trip estimates were obtained from the traffic study prepared for the approved projects.				

With the added traffic from the approved projects, traffic operations for the study area intersections were evaluated with and without Forward Landfill traffic. Table 7 shows a comparison of study intersection operation with and with the Project under Short-term Conditions. As shown, only the intersection of East French Camp Road and Austin Road was calculated to operate at LOS D while all other study intersections would continue to operate at LOS C or better. The East French Camp Road and Austin Road intersection is controlled by 4-way stop signs. County traffic LOS policy considers LOS D acceptable conditions. Figures 6 and 7 show the short-term peak-hour traffic with and without the Project.

Table 7. Short-term Conditions Study Intersection Traffic LOS Summary

Forward Landfill Expansion Traffic Study – San Joaquin County

Study Intersections and Driveways	Traffic Control	Peak Hour	Existing + Approved Projects		Existing + Approved Projects + Project		Significant Impact
			Delays	LOS	Delays	LOS	
1 Austin Rd. & Forward Main Driveway	SSS	AM	9.3	A*	11.2	B*	No
		PM	9.7	A*	11.2	B*	No
2 Austin Rd. & Forward Secondary Driveway	SSS	AM	9.2	A*	9.7	A*	No
		PM	9.6	A*	10.1	B*	No
3 Austin Rd. & E. French Camp Rd.	AWS	AM	11.1	B	11.9	B	No
		PM	25.1	D	32.5	D	No
4 SR 99 NB On-off Ramps & E. French Camp Rd.	Signal	AM	23.7	C	23.7	C	No
		PM	21.3	C	23.4	C	No
5 SR 99 SB On-off Ramps & E. French Camp Rd.	Signal	AM	17.2	B	18.3	B	No
		PM	33.8	C	34.8	C	No
6 SR 99 Urban Interchange & Arch Rd.	Signal	AM	15.8	B	15.9	B	No
		PM	16.8	B	17.1	B	No
7 Arch Rd. & Kingsley Rd.	Signal	AM	27.6	C	34.3	C	No
		PM	29.5	C	30.9	C	No
8 SR 99 SB On-off Ramps & Mariposa Rd.	Signal	AM	8.8	A	9.5	A	No
		PM	9.7	A	9.7	A	No
9 SR 99 NB On-off Ramps & Mariposa Rd.	Signal	AM	9.0	A	9.2	A	No
		PM	5.0	A	5.0	A	No
10 Mariposa Rd. & Austin Rd.	Signal	AM	9.3	A	9.6	A	No
		PM	6.6	A	8.0	A	No
11 Arch Rd. & Austin Rd.	Signal	AM	12.4	B	13.5	B	No
		PM	19.3	B	21.3	C	No
12 Austin Rd. & Cal. Health Care Driveway	Signal	AM	3.3	A	3.3	A	No
		PM	5.6	A	6.2	A	No

Notes:

Traffic count conducted in mid-May 2018

SSS=Side-Street-Stop, AWS=All-Way-Stop, Signal=Traffic Signal Light

* For side-street-stop controlled intersections the delay and LOS reported in the above table represent the worst case (the side street approach controlled by the stop sign). The LOS for the intersection as a whole is A with delays less than 10 seconds.

Study intersections 1, 2, 3, 10, 11 and 12 are County intersections and the lowest acceptable condition is LOS D. Other study intersections are Caltrans intersections and the lowest acceptable LOS is D.

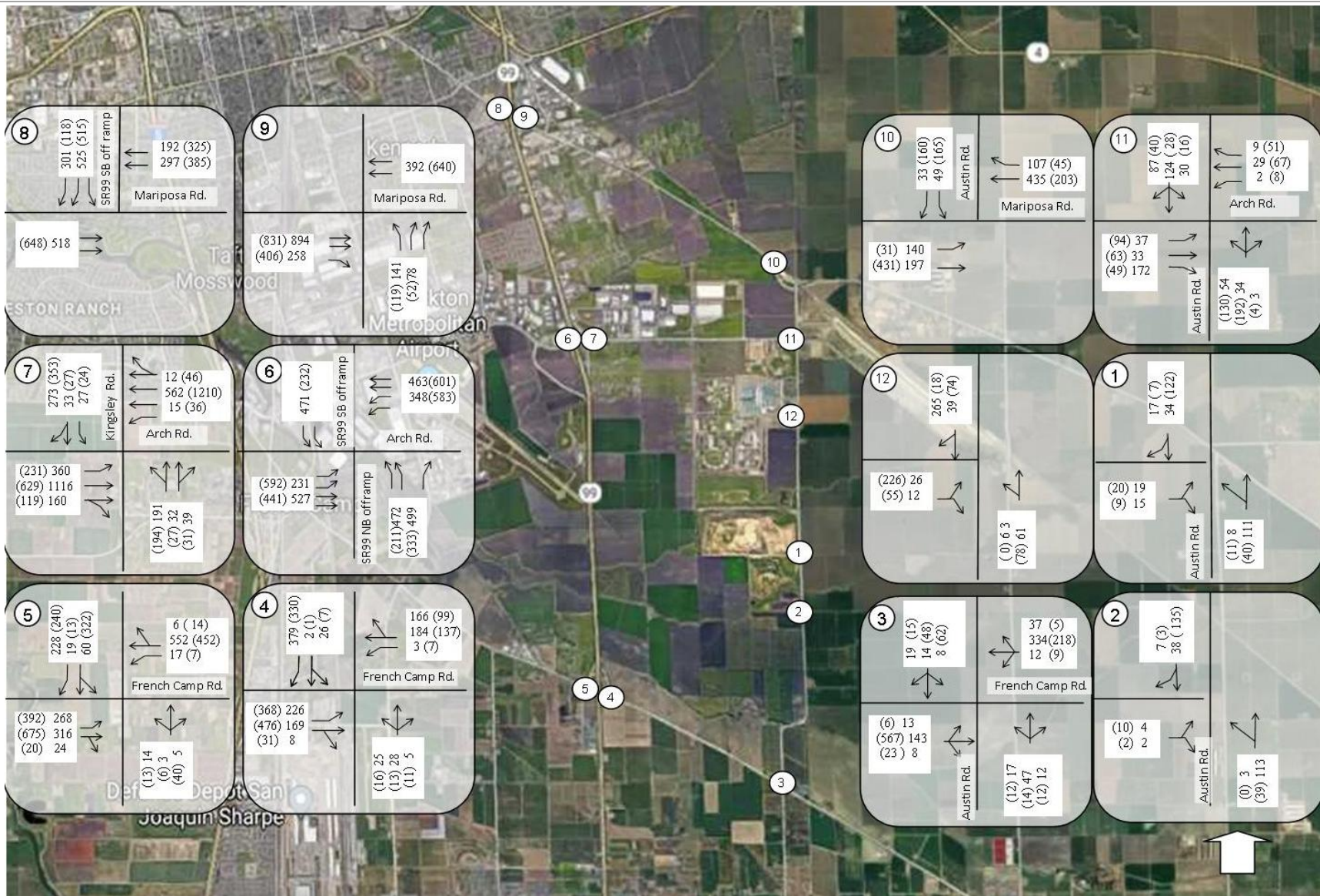


Figure 6. Short-term Study Intersection Traffic Volumes (Existing plus Approved Projects)
 Forward Landfill Traffic Study- PHA Transportation Consultants

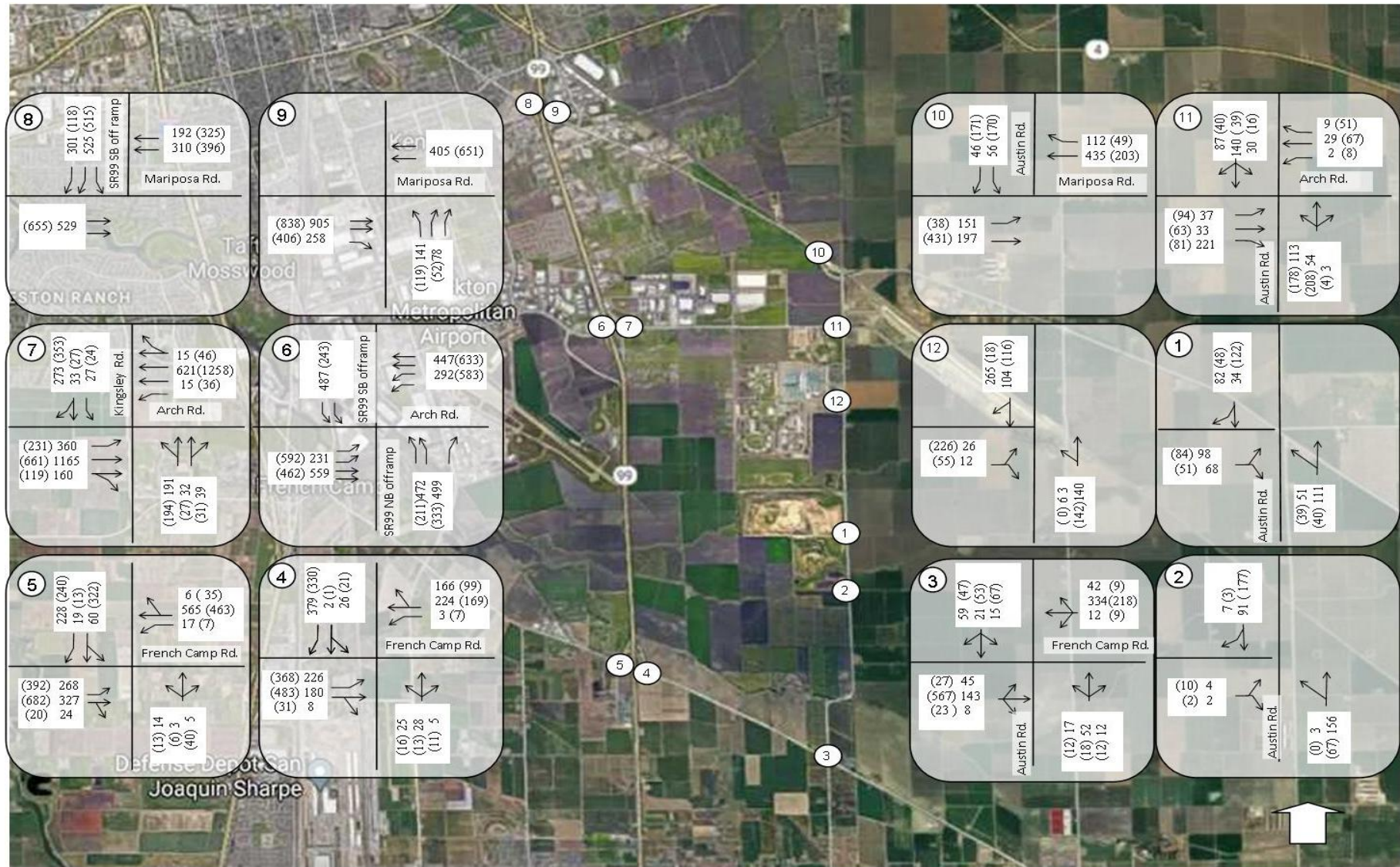


Figure 7. Short-term plus Project Study Intersection Traffic Volumes (Existing plus Approved Projects plus Project)
 Forward Landfill Traffic Study - PHA Transportation Consultants

Project Impact on Public Transportation, Bicyclists and Pedestrians Activities

The Project is not expected to impact public transportation services in the area as there is no transit service on Austin Road and in the vicinity. The Project is a landfill and would generate mostly truck traffic. Employees currently drive their own vehicles to and from work and will be expected to do so in the future. There are currently no bicycle or pedestrian facilities on Austin Road in the vicinity of the Project site. There is minimal bicycle and pedestrian use of the road, as Austin Road a rural road with no sidewalks or bike lanes. This condition is not expected to change in the near future.

3.7 Cumulative 2035 Traffic Conditions and Project Traffic Impact

Study intersections LOS for the Cumulative 2035 traffic conditions were evaluated with and without the Project to identify project impact for the cumulative conditions scenario. The 2035 traffic volumes forecasts for the study intersections were obtained from the traffic reports prepared for the Mariposa Lakes Development and the Tidewater Crossing Development, with results derived from the San Joaquin County Regional Traffic Model prepared by The San Joaquin County Association of Governments.

Table 8 shows study intersections LOS for cumulative conditions along with a comparison with existing and short-term conditions LOS. Figures 7 and 8 shows the anticipated traffic volumes for the 2035 traffic condition with and with the Project, as indicated, eight study intersections are projected to operate at unacceptable conditions.

As shown in Table 8, the Project impact for the cumulative condition is relatively small as intersection LOS essentially would remain unchanged with and with the project. It should be noted that since the landfill will cease operation by 2036 and will not be adding much traffic add traffic to the study area beyond the cumulative 2035 conditions.

Project Impact on Public Transportation, Bicyclists and Pedestrians Activities

The project is not expected to impact public transportation services, bicycle, and pedestrian activities under the Cumulative 2035 Condition since there are no such services and bicycle and pedestrian activities near the landfill are minimal.

Table 8. 2035 Cumulative Conditions Intersection Traffic LOS Summary
 Forward Landfill Expansion Traffic Study- San Joaquin County

Study Intersections and Driveways	Traffic Control	Peak Hour	2035 Cumulative Conditions		2035 Cumulative Conditions- Mitigated		2035 Cumulative +Project Conditions		Significant Project Impact	2035 Cumulative + Project- Mitigated	
			Delays	LOS	Delays	LOS	Delays	LOS		Delays	LOS
1 Austin Rd. & Forward Main Driveway	SSS	AM	9.9	A	N.A.	N.A.	12.6	B	No	N.A.	N.A.
		PM	11.3	B	N.A.	N.A.	13.9	B	No	N.A.	N.A.
2 Austin Rd. & Forward Secondary Driveway	SSS	AM	9.8	A	N.A.	N.A.	9.8	A	No	N.A.	N.A.
		PM	11.2	B	N.A.	N.A.	11.2	B	No	N.A.	N.A.
3 Austin Rd. & E. French Camp Rd.	AWS	AM	21.4	C	N.A.	N.A.	27.1	D	No	N.A.	N.A.
		PM	23.6	C	N.A.	N.A.	29.3	D	No	N.A.	N.A.
4 SR 99 NB On-off Ramps & E. French Camp Rd.	Signal	AM	>100	F	10.2	B	15.1	B	No	N.A.	N.A.
		PM	>100	F	11.6	B	30.9	C	No	N.A.	N.A.
5 SR 99 SB On-off Ramps & E. French Camp Rd.	Signal	AM	>100	F	82.8	F	83.2	F	No	N.A.	N.A.
		PM	>100	F	>100	F	>100	F	No	N.A.	N.A.
6 SR 99 Urban Interchange & Arch Rd.	Signal	AM	>100	F	>100	F	>100	F	No	N.A.	N.A.
		PM	>100	F	>100	F	>100	F	No	N.A.	N.A.
7 Arch Rd. & Kingsley Rd.	Signal	AM	>100	F	35.4	D	35.9	D	No	N.A.	N.A.
		PM	>100	F	50.0	D	51.9	D	No	N.A.	N.A.
8 SR 99 SB On-off Ramps & Mariposa Rd.	Signal	AM	99.3	F	31.7	C	82.4	F	No	N.A.	N.A.
		PM	>100	F	84.5	F	84.8	F	No	N.A.	N.A.
9 SR 99 NB On-off Ramps & Mariposa Rd.	Signal	AM	30.2	C	33.5	C	47.6	D	No	N.A.	N.A.
		PM	>100	F	93.6	F	94.6	F	No	N.A.	N.A.
10 Mariposa Rd. & Austin Rd.	Signal	AM	>100	F	50.8	D	51.6	D	No	N.A.	N.A.
		PM	>100	F	39.6	D	41.3	D	No	N.A.	N.A.
11 Arch Rd. & Austin Rd.	Signal	AM	>100	F	24.4	C	39.0	D	Yes	14.5	B
		PM	>100	F	53.6	D	61.8	E	Yes	42.2	D
12 Austin Rd. & Cal. Health Care Driveway	Signal	AM	4.8	A	N.A.	N.A.	4.8	A	No	N.A.	N.A.
		PM	6.5	A	N.A.	N.A.	7.9	A	No	N.A.	N.A.

Notes: Traffic counts were conducted in mid-May, 2018, SSS=Side-Street-Stop. AWS=All-Way-Stop, Signal=Traffic Signal Light
 * For side-street-stop controlled intersections, the delay and LOS reported in the above table represent the worst case (the side street approach controlled by the stop sign). The LOS for the intersection as a whole is A with delays less than 10 seconds.

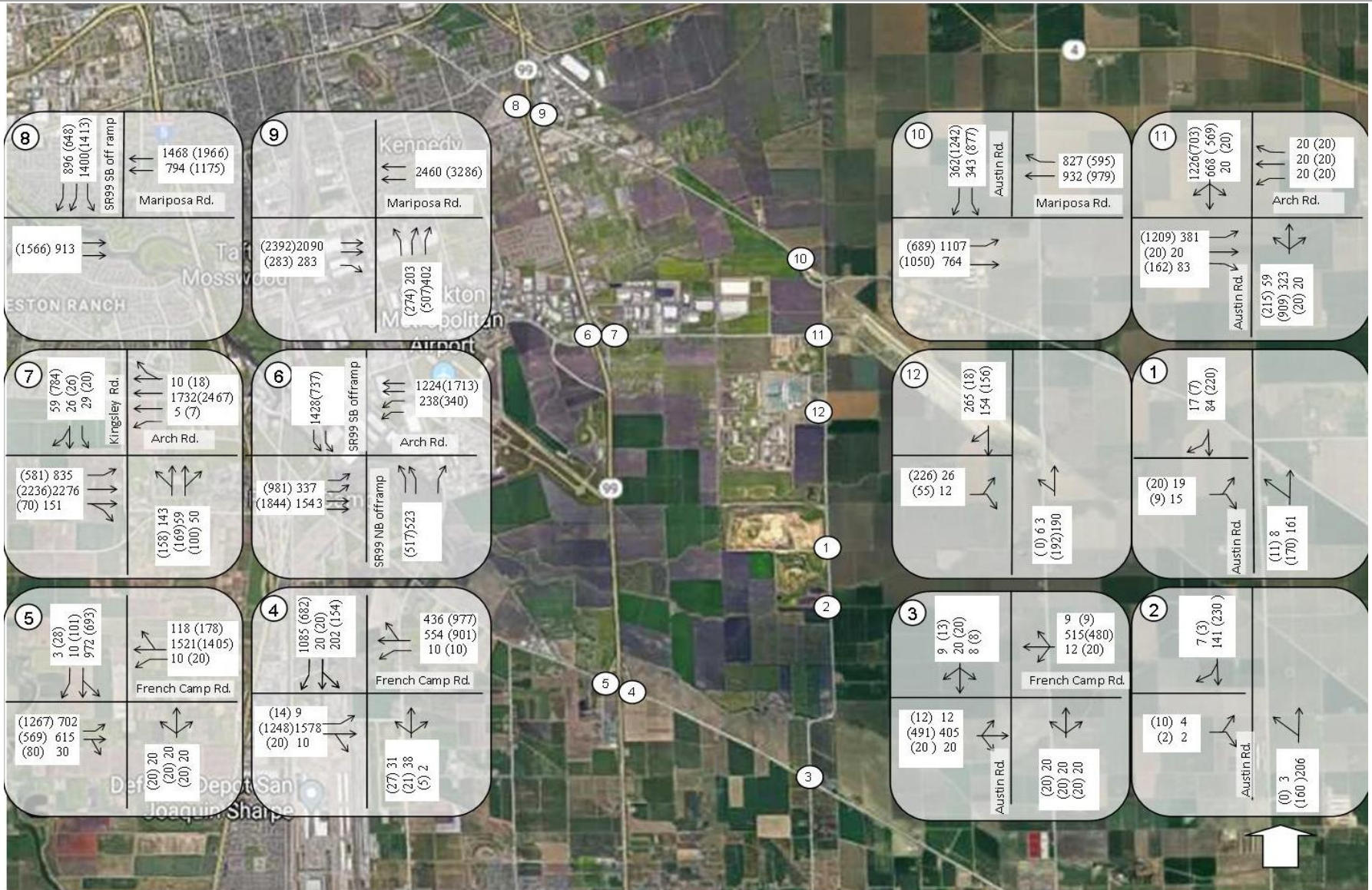


Figure 8. 2035 Cumulative Study Intersection Traffic Volumes
 Forward Landfill Traffic Study – PHA Transportation Consultants

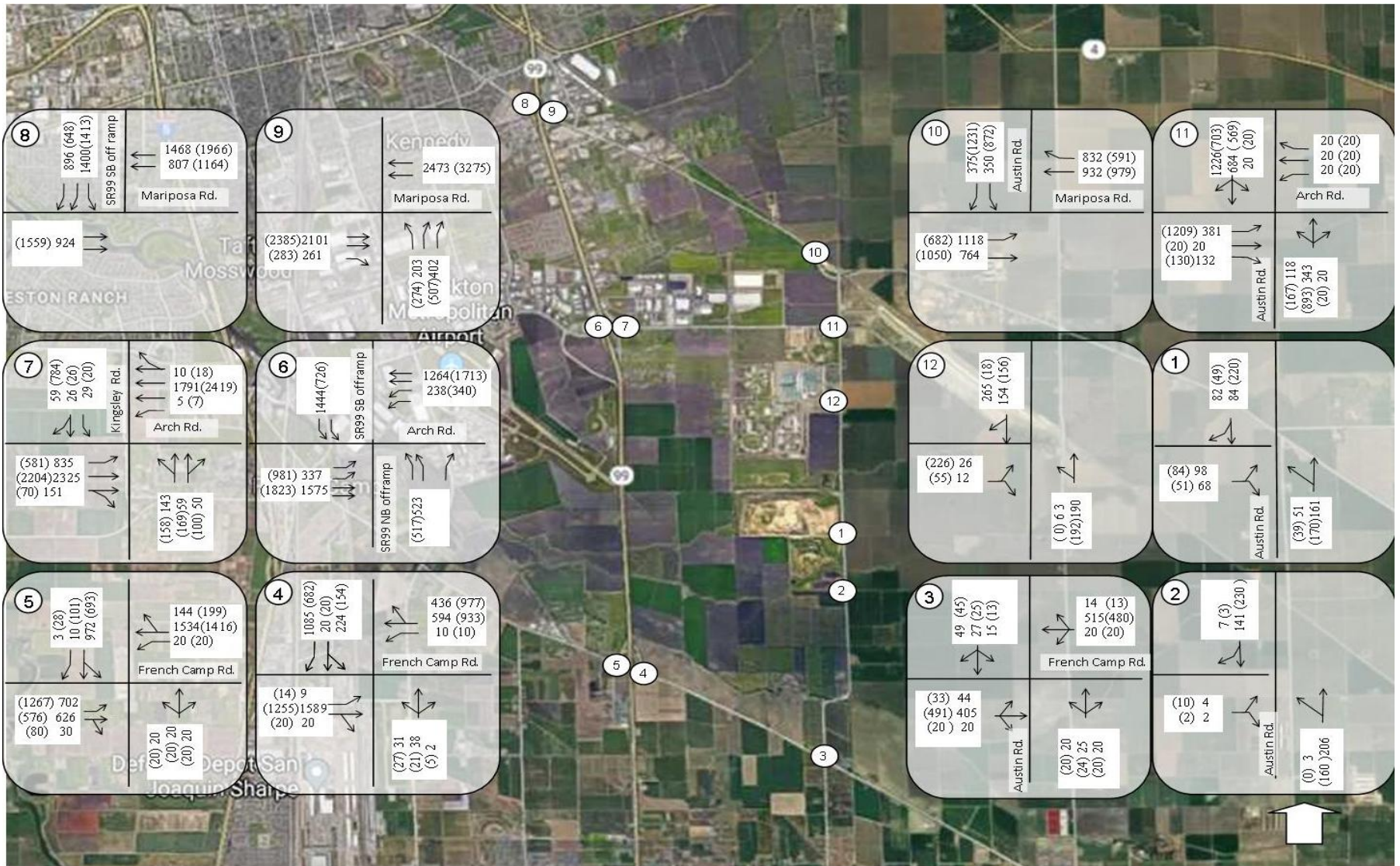


Figure 9. 2035 Cumulative plus Project Study Intersection Traffic Volumes
 Forward Landfill Traffic Study-PHA Transportation Consultants

4. Freeway Mainline and Street Segment Analysis

Freeway mainline operation analyses were conducted to identify traffic operation on SR 99 and to evaluate the Project's potential impact on the freeway segment between Mariposa Road and East French Road during peak-hour operations. In addition, street segment operation analysis was conducted for the Austin Road segment between Arch Road and East French Camp Road.

4.1 Freeway Mainline Analysis

Tables 9 – 11 show SR 99 mainline peak-hour volumes and operations between Mariposa Road and East French Camp Road for all study scenarios. Freeway mainline LOS was determined based on density, which is calculated by the number of passenger cars per mile per lane over speed. As shown, SR 99 freeway mainline between Mariposa Road and East French Camp Road would operate at acceptable conditions for all of the study scenarios, and the Project impact is minimal. Table 12 shows the freeway mainline evaluation criteria and ranking scale.

Table 9. Freeway Mainline Operation Analysis – Existing Conditions								
Forward Landfill Expansion Traffic Study – San Joaquin County								
State Route 99 (Mariposa Rd.-French Camp Rd.)		Existing Conditions			Existing Conditions + Project			Project Impact +%
		Volume	Density	LOS	Volume	Density	LOS	
Northbound	AM	2080	17.3	B	2100	17.5	B	0.9%
	PM	3120	26.0	C	3136	26.1	D	0.5%
Southbound	AM	2755	23.0	C	2771	23.1	C	0.6%
	PM	2880	24.0	C	2890	24.1	C	0.3%
Note: SR 99 volumes for the analysis are obtained from a 2016 Caltrans peak-hour count. Speed used in the analysis is 60 mph								

Table 10. Freeway Mainline Analysis-Short-term Conditions								
Forward Landfill Expansion Traffic Study – San Joaquin County								
State Route 99 (Mariposa Rd.-French Camp Rd.)		Existing Conditions + Approved Projects			Existing Conditions + Approved + Projects			Project Impact +%
		Volume	Density	LOS	Volume	Density	LOS	
Northbound	AM	2625	21.9	C	2645	22.1	C	0.7%
	PM	3842	32.0	D	3858	32.1	D	0.4%
Southbound	AM	3289	27.4	D	3305	27.5	D	0.5%
	PM	3401	28.3	D	3411	28.4	D	0.3%
Note: Analysis is based on a 2016 Caltrans peak-hour volume for SR 99. Approved project volumes are derived from Norcal Logistic Center project and tidewater Crossing projects.								

Table 11. Freeway Mainline Analysis- Cumulative 2035 Conditions

Forward Landfill Expansion Traffic Study – San Joaquin County

State Route 99 (Mariposa Rd.-French Camp Rd.)		2035 Conditions			2035 + Projects			Project Impact +%
		Volume	Density	LOS	Volume	Density	LOS	
Northbound	AM	2390	19.9	B	2410	20.0	B	0.8%
	PM	3590	29.9	D	3600	30.0	C	0.3%
Southbound	AM	3170	26.4	C	3190	26.6	C	0.6%
	PM	3300	27.5	C	3310	27.6	C	0.3%

Note: 2035 freeway mainline volumes are estimated with a 1% annual growth rate for 15 years.

Table 12. Freeway Traffic Operation (LOS) Ranking Criteria

Forward Landfill Expansion Traffic Study-San Joaquin County

LOS	Density (passenger car/mi/lane)
A	0.0-11.0
B	>11-18.00
C	>18.0-26.0
D	>26.0-35.0
E	>35.0-45.0
F	>45.0

Source: Highway Capacity Manual 2000.

4.2 Austin Road Street Segment Analysis

Austin Road is a two-lane rural road connecting Mariposa Road in the north and East French Camp Road in the south in the study area. It provides direct site access to California Health Care facility and Forward Landfill. The segment between Mariposa Road and East French Road is about 4.6 miles long and has only very few driveways and cross-streets, as much of the land use along the segment is agriculture. The average travel speed as observed is above 50 mph and the daily traffic volume is 2,100 vehicles per day, according to a count conducted by PHA in May 2018, north of Forward Landfill.

The San Joaquin County 2035 General Plan has no roadway classification for Austin Road. Based on its current design and functional characteristic, Austin Road could be classified as either a “minor arterial” or “collector” with a design capacity range of 10,000 to 12,500 vehicles per day.

Austin Road currently operates at good Level-of-Service as it carries only 2,100 vehicles per day. The proposed Forward expansion will add 1,600 vehicles (400 round trip trucks *2.0 PCE daily to Austin Road). This is assuming a worse case that the landfill reaches its permitted 620 daily truckloads). The Norcal Logistic Center project is expected to add about 1,000 daily trips (5% of its total estimated site generated trips) to Austin Road according to its traffic study estimates. This makes a total of about 4,700 daily vehicle trips on Austin Road in the short-term scenario, well below the recommended design capacities for either collector streets or minor arterial streets.

There are no available 2035 traffic forecasts for Austin Road. As much of land along the study segment near the Project site is agricultural land, not much is expected to happen that will significantly change the current traffic patterns. Assuming an annual 1% growth rate for the next 15 year, the daily volumes will be about 5,500 vehicles per day and would be well within the LOS "C" standard as shown in the following San Joaquin County's General Plan Road Classifications and corresponding capacities.

**TABLE 4.D-7
THRESHOLD CAPACITY VOLUMES (LEVEL OF SERVICE C)
SAN JOAQUIN COUNTY, AUGUST 2008**

Roadway Classification	Lanes	Capacity (vehicles)
Major Arterial	2	12,500
with two-way center left	3	15,000
with two-way center left	4	30,100
with two-way center left	5	35,000
with two-way center left	6	45,000
Minor Arterial	2	12,500
with two-way center left	3	15,000
with two-way center left	4	25,000
Collector (Commercial/Industrial)	2	10,000
Collector (Residential)	2	7,000
Local (Commercial/Industrial)	2	7,000
Local (Residential)	2	2,000

SOURCE: San Joaquin County.

5. Vehicle Queuing Analysis

5.1 Arch Road and Kingsley Road Intersection Vehicle Queuing

Traffic operation analysis for existing traffic conditions and short-term traffic conditions indicate acceptable LOS for all of the study intersections. San Joaquin County Engineering staff noted that there is currently a vehicle queuing problem on Arch Road between the urban interchange at SR 99 and Kingsley Road. PHA field observation also confirmed frequent vehicle queues in the eastbound direction at the intersection with Kingsley Road.

The queuing problem appears due to the close spacing between Kingsley Road and the SR 99 interchange; inadequate left-turn storage at the Arch Road/Kingsley Road intersection from eastbound to northbound; close spacing between the northbound off-ramp from SR 99 and Kingsley Road and its free-flow right-turn traffic movements; and the high volume of long trucks in the area, particularly from the eastbound to northbound direction.

As observed in the field, the eastbound left-turn lane at the Arch Road/Kingsley Road intersection is measured about 200 feet long and can accommodate about eight passenger vehicles or two long trucks; the vehicle spillover from the left-turn lane to the through traffic lanes frequently backups traffic and affecting traffic progression. The high volume of large trucks in the area that take up much of the through traffic lane storage, and the free right-turn movements from the SR 99 northbound off-ramp to northbound on Kingsley Road weaving across to the left-turn lane within a short distance, makes the problem worse.

Another problem at this intersection identified by San Joaquin County Engineering staff is the location of the monument at the northeast corner of the Arch Road/Kingsley Road intersection, which restricts the sight distance for southbound motorists turning right from Kingsley Road to westbound Arch Road. This does not add to the current queuing condition on Arch Road in the eastbound direction, however, moving the monument further away from the corner should be considered and investigated to improve safety.

The Tidewater Crossing Development traffic study recommended widening the Arch Road/Kingsley Road intersection to provide two left-turn lanes, one through lane and one right-turn lane in the southbound direction, two left-turn lanes one through lane and one right-turn lane in the northbound direction, two left-turn lanes four through lanes in the eastbound direction and one left-turn lane, four through lanes and one right-turn lane in the westbound direction to mitigate a 2035 traffic conditions. This may or may not be feasible due to the limited ROW on Arch Road at the interchange.

For short-term relief, adding more green time to the eastbound direction, coupled with synchronizing the two intersections at SR 99 and Kingsley would help, if the signals are not already synchronized. Restricting trucks at the left-turn at certain hours and route them to next the intersection also could be considered. Adding just one eastbound left-turn lane also may work for now, but additional ROW (Right-of-Way) would need to be acquired from the currently

vacant parcel at southwest corner to shift the right-lane over there, and the northwest corner to provide for two receiving lanes at the northbound departure.

Forward Landfill, both current and with the expansion, would add traffic to Arch Road and the segment between the SR 99 urban interchange and Kingsley Road, but will not affect the eastbound left-turn traffic at the Arch Road/Kingsley Road intersection.

5.2 On-site Truck Queuing Analysis

The Forward Landfill generates mostly solid waste haul truck traffic. There is a concern that truck queuing on the site may back traffic up, affecting Austin Road.

PHA conducted a queuing analysis to evaluate if there is sufficient storage area within the site to accommodate trucks waiting to be processed. The Landfill has two weighing scales located at the end of a long and straight drive aisle about 2,340 feet away from the entrance gate. Based on field observation, trucks driving from Austin Road can go straight through to the scale without having to stop at the gate. According to Forward Landfill staff, each truck requires approximately 60 seconds to be processed at the scales. One scale is always in operation, and a second scale will open during busy periods or as needed. At a length of 2,340 feet between the entrances to the scales, the drive aisle can accommodate 78 trucks at one time assuming an average 30 feet long per truck. No truck queuing was observed during a morning field observation at the site.

It should be noted that, based on a traffic turning movement count at the driveway, there are currently 25 trucks entering the site during the morning peak hour. Assuming a worse case under the project conditions, with 620 truckloads per day, an estimated 66 trucks (130 passenger car equivalents) would enter the site during the morning peak hour. The landfill has the ability to accommodate the traffic without creating queuing problem on the site or on Austin Road. Figure 9 shows observed trucks entering Forward Site. Figure 10 shows typical dumpster truck lengths.



Figure 10. Typical Trucks Observed at Forward Site

Forward Landfill Traffic Study-PHA Transportation Consultants

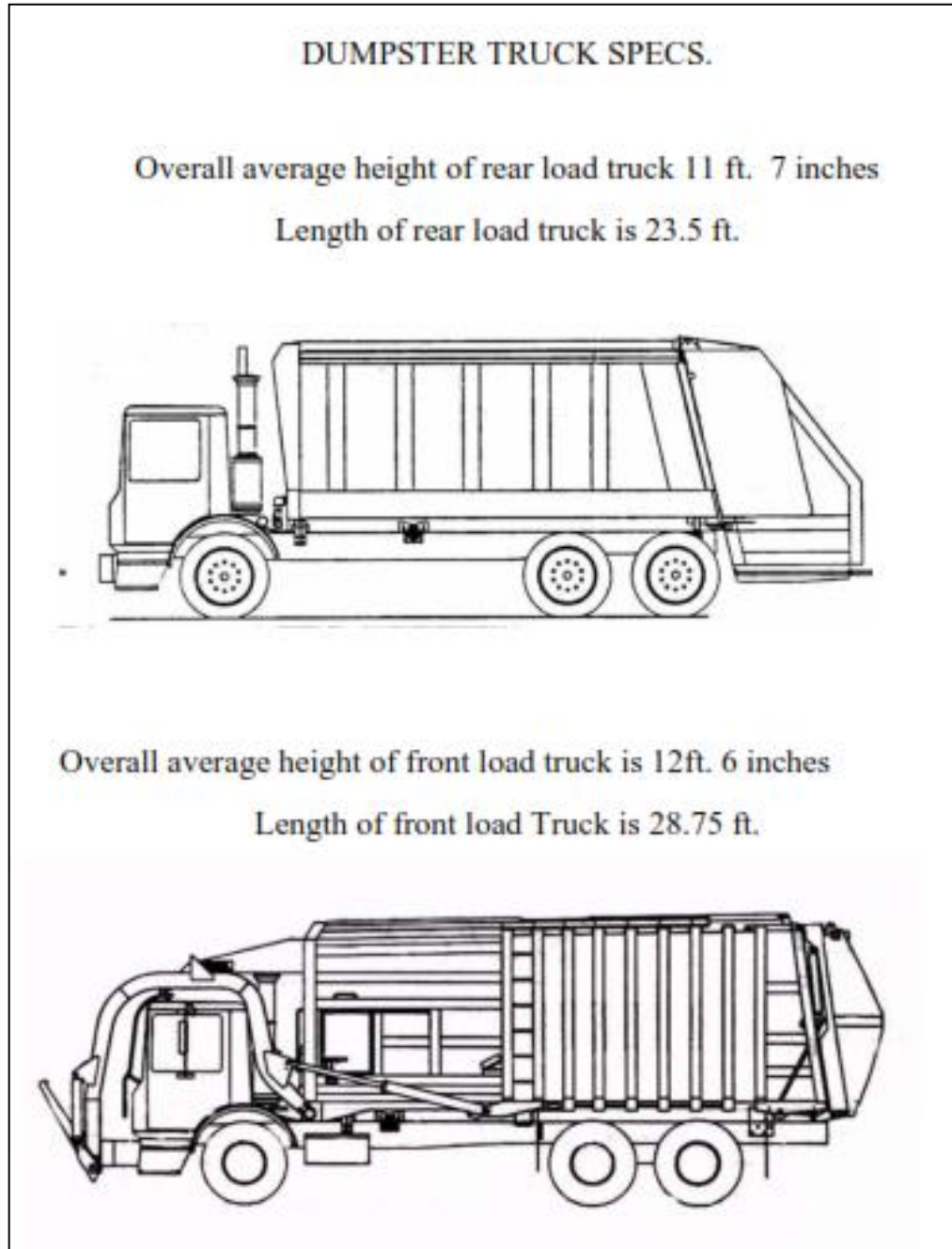


Figure 11 Typical Dump Truck Lengths
Forward Landfill Traffic Study-PHA Transportation Consultants

6. Traffic Collision Review

PHA conducted a traffic collision review to identify traffic collision hotspots near the Forward Landfill site. Based on collision records obtained from SWITRS (Statewide Integrated Traffic Records System) for the past three years (2015, 2016 and 2107), there were 9 reported collisions along Austin Road between Arch Road and East French Road. All of them occurred during 2015 and 2016, and none in 2017. Most reported collisions occurred at or near the intersection with East French Camp Road or Arch Road. Table 13 shows the past reported collision in the area.

Table 13 Study Area Traffic Collision Review			
Forward Landfill Expansion Traffic Study – San Joaquin County			
	2015	2016	2017
Austin Road (between Arch Rd. and Austin Rd.	4	5	0
Arch Road (between Kingsley Rd. and Austin Rd.	6	9	0
E. French Camp Road (between Austin Rd and SR 99	4	9	1
Source: SWITRS 2015, 2016, and 2017 data			

Austin Road between Arch Road and East French Camp Road is a 2-lane rural road with a design capacity for about 12,500 vehicles per day at acceptable LOS according to San Joaquin County General Plan. As the daily 2,100 daily traffic volume count collected at a point north of Forward landfill, which is well below its design capacity, along with a limited number of cross streets and driveways, Austin Road does not appear to have the potential for a traffic collision hotspot. The study segment of East French Camp Road between Austin Road and SR 99 is a two-lane low-volume rural road with only a couple of unpaved farm access roads. Its intersection at SR 99 had been signalized recently and the potential for collision should be lowered. As noted previously in the report, the monument at the north-east corner of the Arch Road/Kingsley Road presents a sight-distance restriction for motorists traveling from the southbound approach of the intersection. Relocating the monument further back will improve sight distance and minimize the potential for collision. The recent road widening and signalization at the Newcastle Road and Logistics Drive intersection should further enhance roadway safety on Arch Road.

7. Left-turn Lane Need Analysis

Austin Road is a two-lane rural road near Forward Landfill and there is a concern that left-turn traffic into the site could be a safety concern due to high vehicle speed and the lack of a left-turn lane. In standard traffic engineering practice, whether or not a left-turn lane is needed depends on three factors; left-turn traffic volume, advancing volume, and volume in the opposing direction. In most cases, the need for a left-turn lane should be considered when the left-turn traffic reaches about 100 vehicles during an hour along with a considerable high traffic volume in the opposing direction.

The current (2018) daily volume count on Austin Road is about 2,100 vehicles per day, while the peak-hour traffic turning movement count at the landfill driveway shows about 10 left-turn vehicles (trucks) during the morning and afternoon. Under the Short-term and 2035 Project conditions, the peak-hour left-turn volume to the site is 51 vehicles. According to the ASSHTO (American Society of State Highway Transportation Officials), the current volumes would not meet the left-turn lane warrant guideline. Table 14 shows the current and future traffic volumes at the Landfill's main site access driveway, and Figure 11 shows the left-turn lane warrant analysis. Data points (traffic volumes) plotted on the left side of the red-curve indicates a left-turn lane is not warranted.

Table 14. Left-turn Lane Needs Analysis						
Forward Landfill Expansion Traffic Study – San Joaquin County						
	Existing + Project Conditions		Short-term + Project Conditions		2035+ Project Conditions	
	AM	PM	AM	PM	AM	PM
Left-turn traffic into the site	51	39	51	38	51	39
Advancing volume	97	30	111	40	161	170
Thru-traffic (opposing direction)	25	104	34	122	84	220
Left-turn lane Needed	No	No	No	No	No	No
Note: The above left-turn volume represents passenger cars since the traffic study converted all trucks into passenger car equivalent.						

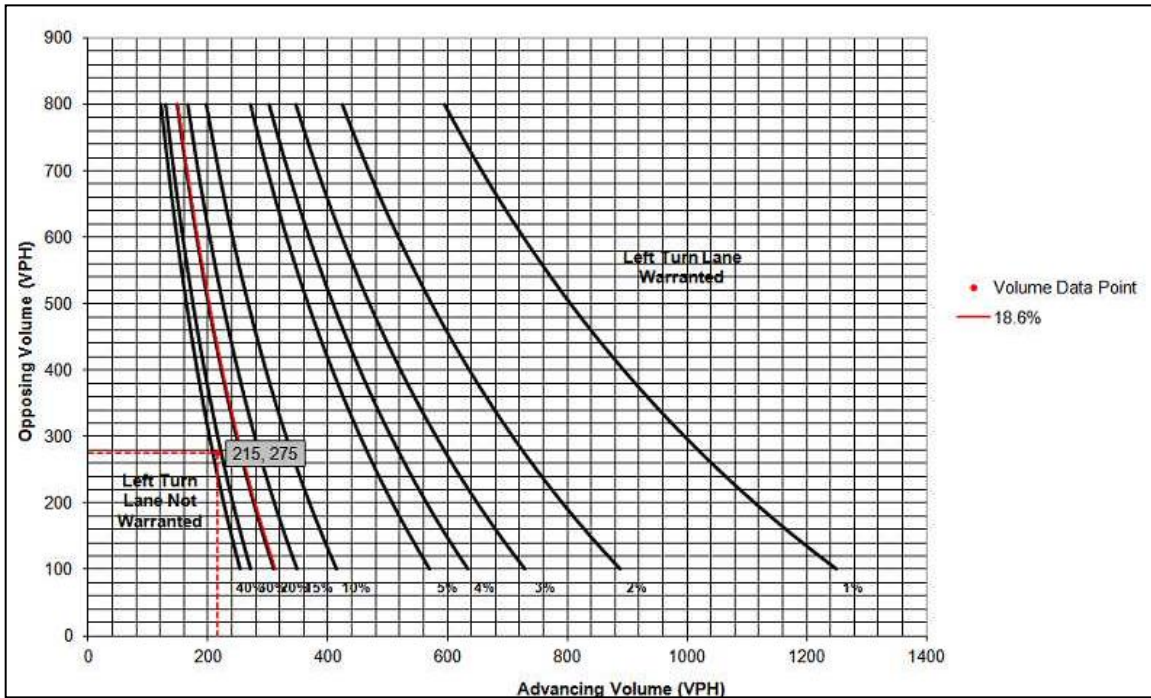


Figure 12. Left-turn Lane Need Analysis
 Forward Landfill Traffic Study-PHA Transportation Consultants

8. Signal Warrant Analysis

Currently, three out of the 12 study intersections, including the two Forward Landfill access driveways and the Austin Road/East French Camp Road intersection are controlled by stop signs. As such, signal warrant analyses were conducted to evaluate whether or not signalization are needed. According to Caltrans guidelines for signalization, at least one of the following warrants should be met for consideration of traffic signal installation.

- Warrant 1, Eight-Hour Vehicular Volume
- Warrant 2, Four-Hour Vehicular Volume
- Warrant 3, Peak Hour Volume
- Warrant 4, Pedestrian Volume
- Warrant 5, School Crossing
- Warrant 6, Coordinated Signal System
- Warrant 7, Crash Experience
- Warrant 8, Roadway Network
- Warrant 9, Intersection Near a Grade Crossing

Of the above warrants, the peak-hour volume warrant is the most basic warrant and the easiest to satisfy. Review of the peak-hour traffic volumes indicated none of the three non-unsignalized intersections would satisfy the minimum requirements the signalization under current conditions, Project conditions, or Short-term plus Project conditions. The East French Camp Road and Austin Road intersection, however, would be at the borderline of meeting the peak-hour volume signal warrant in the 2035 Cumulative Condition. Signal warrant analysis for this location should be evaluated again as 2035 nears.

9. Vehicle Miles Traveled Analysis

With the recent passage of the Senate Bill 743 (SB743) traffic studies prepared as part of CEQA documents need to include “Vehicle Miles Traveled” (VMT) analysis for proposed projects. At the time of the study, however, VMT study methodologies, evaluation criteria, and significant impact thresholds were not yet established. Therefore, the VMT information for the Project presented herein is for information purposes.

Based on data collected from the California Department of Resources Recycling and Recovery, Forward Landfill received 782,970 tons of waste materials from public waste recycle agencies throughout California in 2016. Table 15 shows the estimated truckloads received in 2016 and the estimated annual VMT for the project. The number of truckloads is estimated based on an average capacity load of 20 tons per truck.

Table 15 “Project” Vehicle Miles Traveled Analysis¹ Forward Landfill Expansion Traffic Study – San Joaquin County				
Total Tonnage	Total Truckloads	Annual Truck Trip Miles (1-way)	Annual Truck Trip Miles (2-way)	Annual VMT (Miles)
782,970	39,148	1,342,750	2,685,500	2,685,500
Note: VMT estimates are based on the tonnage received data reported to California Department of Resources Recycling and Recovery (CalRecycle) for 2016. The number of truckloads is estimated based on an average of 20 tons per truck. The above miles traveled are measured based on mapped distances from the originating waste origin agencies to Forward Landfill for 2016. The Project VMT will change depending on the locations of the origin agencies and tonnage of waste needed to be transported to Forward Landfill from the originating agencies. A more detailed analysis showing the origin agencies, distances, and tonnage of waste materials is included in the appendices.				

10. Project Site Access and Circulation

The Project is not expected to change the current site access and configuration as it is an expansion of its current facility internally to accommodate more waste materials. All delivery trucks will enter the site via the current main access driveway. Once enter the site, trucks will continue to drive through a long drive aisle straight to the truck scales located more than 2,300 feet away from the gate, without having to stop at the gate to check-in. There will be no significant construction activities that will create construction traffic impacts on the road.

The current 2,300 feet long drive aisle leading to the truck scales will be able to accommodate the potential truck queues assuming a worse-case of 620 trucks permitted per day. As indicated in the left-turn lane analysis, the access driveway would have the capacity to handle the expected traffic load and would not meet the minimum requirement for a traffic signal installation or a left-turn lane.

11. Mitigation Measures

The above analysis indicates that the project would not create significant impacts under existing and short-term conditions, but will create unacceptable LOS under 2035 and 2035-plus-Project conditions.

11.1 Project Mitigation

Existing plus Project Conditions

The proposed Forward expansion would not create significant impacts on any of the study intersections under the existing condition scenario. No Project mitigation is recommended.

Short-term plus Project Conditions

The proposed Forward expansion would not create significant impacts on any of the study intersections under the short-term condition scenario. No Project mitigation is recommended.

Cumulative 2035 without Project Conditions

For 2035, eight study intersections as shown in Table 16 are projected to operate with unacceptable LOS. With proposed improvements, four intersections would remain with unacceptable LOS with no feasible mitigation

	Study Intersection w/ Unacceptable Conditions	Peak Hour	2035 Conditions		2035 Conditions w/Proposed Improvements		Significant Impact
			Delay	LOS	Delay	LOS	
4	SR 99 NB On-off Ramps & E. French Camp Rd.	AM	>100	F	10.2	B	No
		PM	>100	F	11.6	B	No
5	SR 99 SB On-off Ramps & E. French Camp Rd.	AM	>100	F	82.8	F	Yes
		PM	>100	F	>100	F	Yes
6	SR 99 Urban Interchange & Arch Rd.	AM	>100	F	>100	F	Yes
		PM	>100	F	>100	F	Yes
7	Arch Rd. & Kingsley Rd.	AM	>100	F	35.4	D	No
		PM	>100	F	50.0	D	No
8	SR 99 SB On-off Ramps & Mariposa Rd.	AM	99.3	F	31.7	C	No
		PM	>100	F	84.5	F	Yes
9	SR 99 NB On-off Ramps & Mariposa Rd.	AM	30.2	C	33.5	C	Yes
		PM	>100	F	93.6	F	Yes
10	Mariposa Rd. & Austin Rd.	AM	>100	F	50.8	D	No
		PM	>100	F	39.6	D	No
11	Arch Rd. & Austin Rd.	AM	>100	F	54.1	D	No
		PM	>100	F	51.9	D	No

Note: LOS calculated with HCM 2000 Method with SYNCHRO computer software.

Proposed Improvements for 2035 Condition-(Tidewater Crossing)

Intersection 4 SR 99 NB on-ramp/E. French Camp Road

1. Eastbound-add one lane to provide one left-turn lane, one thru lane, and one shared thru and right-turn lane.
2. Westbound-add two lanes to provide one left-turn lane, two thru lanes and one right-turn lane
3. Northbound-add one lane to provide one left-turn lane and one shared thru and right-turn lane.
4. Southbound-add one lane to provide one left-turn lane, one thru lane and one right-turn lane.

Intersection 5 SR 99 SB off-ramp/E. French Camp Road

1. Eastbound-add two lanes to provide two left-turn lanes, one thru lane, and one shared thru and right-turn lane.
2. Westbound-add three lanes to provide one left-turn lane, three thru lanes and one right-turn lane
3. Northbound-add one lane to provide one left-turn lane, and one shared thru and right-turn lane.
4. Southbound-add one lane to provide two left-turn lanes, one shared thru and free right-turn lane.

Intersection 6 SR 99 urban interchange/Arch Road

1. No available improvements due to limited ROW

Intersection 7 Arch Road/Kingsley Road

1. Eastbound-add two lane to provide two left-turn lanes, two thru lane, and one shared thru and right-turn lane.
2. Westbound-add one lane to provide one left-turn lane, three thru lanes, and one right-turn lane
3. Northbound-add one lane to provide one left-turn lane, one shared thru and right-turn lane.
4. Southbound-add one lane to provide one left-turn lane, one thru lane, and one free-right turn lane.

Intersection 8 SR 99 SB off-ramp/Mariposa Road

1. Convert southbound off-ramp from one left-turn lane, two right-turn lanes to two left-turn lanes and one right-turn lane.

Intersection 9 SR 99 NB off-ramp/Mariposa Road

1. No available improvements

Intersection 10 Mariposa Road/Austin Road

1. Eastbound-add two lanes to provide two left-turn lanes and two thru lanes.
2. Westbound-add one lane to provide one left-turn lane, two thru lanes.
3. Southbound-add one lane to provide two left-turn lanes and one free right-turn lane.

Intersection 11 Arch Road/Austin Road

1. Eastbound-convert current lane configuration from one left-turn lane, one thru lane and one right-turn lane to two left-turn lanes and one shared thru and right-turn lane.
2. Westbound-maintain the current one left-turn lane one thru lane and one right-turn lane.
3. Northbound-add two lane to provide one left-turn lane, one thru lane, and one shared thru and right-turn lane.
4. Southbound-add two lanes to provide one left-turn lane, one thru lane, and one right-turn lane.

Cumulative 2035-Plus-Project Conditions

Adding the proposed Forward Landfill expansion traffic, one additional study intersection, Austin Road and Arch Road would operate at unacceptable LOS. This makes a total of five intersections to operate at unacceptable LOS. With the proposed Project mitigation, by adding one thru lane to the southbound approach, the intersection would operate at acceptable conditions. Table 17 shows the 2035 conditions Project Conditions before and after mitigation. Four intersection would remain at unacceptable LOS with no feasible mitigation as with the 2035 without project conditions.

Table 17. 2035 w/ Project Mitigated LOS Conditions							
Forward Landfill Expansion Traffic Study – San Joaquin County							
	Study Intersection w/ Unacceptable Conditions	Peak Hour	2035 +Project Conditions		2035Conditions + Project Mitigated		Significant Impact
			Delay	LOS	Delay	LOS	
4	SR 99 NB On-off Ramps & E. French Camp Rd.	AM	15.1	B	15.1	B	No
		PM	30.9	C	30.9	C	No
5	SR 99 SB On-off Ramps & E. French Camp Rd.	AM	83.2	F	83.2	F	No
		PM	>100	F	>100	F	No
6	SR 99 Urban Interchange & Arch Rd.	AM	>100	F	>100	F	No
		PM	>100	F	>100	F	No
7	Arch Rd. & Kingsley Rd.	AM	35.9	D	35.9	D	No
		PM	51.9	D	51.9	D	No
8	SR 99 SB On-off Ramps & Mariposa Rd.	AM	82.4	F	82.4	F	No
		PM	84.8	F	84.8	F	No
9	SR 99 NB On-off Ramps & Mariposa Rd.	AM	47.6	D	47.6	D	No
		PM	94.6	F	94.6	F	No
10	Mariposa Rd. & Austin Rd.	AM	51.6	D	51.6	D	No
		PM	41.3	D	41.3	D	No
11	Arch Rd. & Austin Rd.	AM	39.0	D	14.5	B	No
		PM	61.8	E	42.2	D	No
Note: LOS calculated with HCM 2000 Method with SYNCHRO computer software							

Cumulative 2035 Plus Project Conditions Mitigation

Intersection 11 Arch Road/Austin Road

1. Southbound-add one lane to provide one left-turn lane, two thru lanes, and one right- turn lane.

Figures 12 and 13 show existing lane configurations for the eight study intersections that are expected to operate at unacceptable LOS by 2035; the proposed improvements (lane configurations) from the Tidewater Crossing Development for 2035, and the proposed mitigation for Forward Landfill for 2035 conditions.

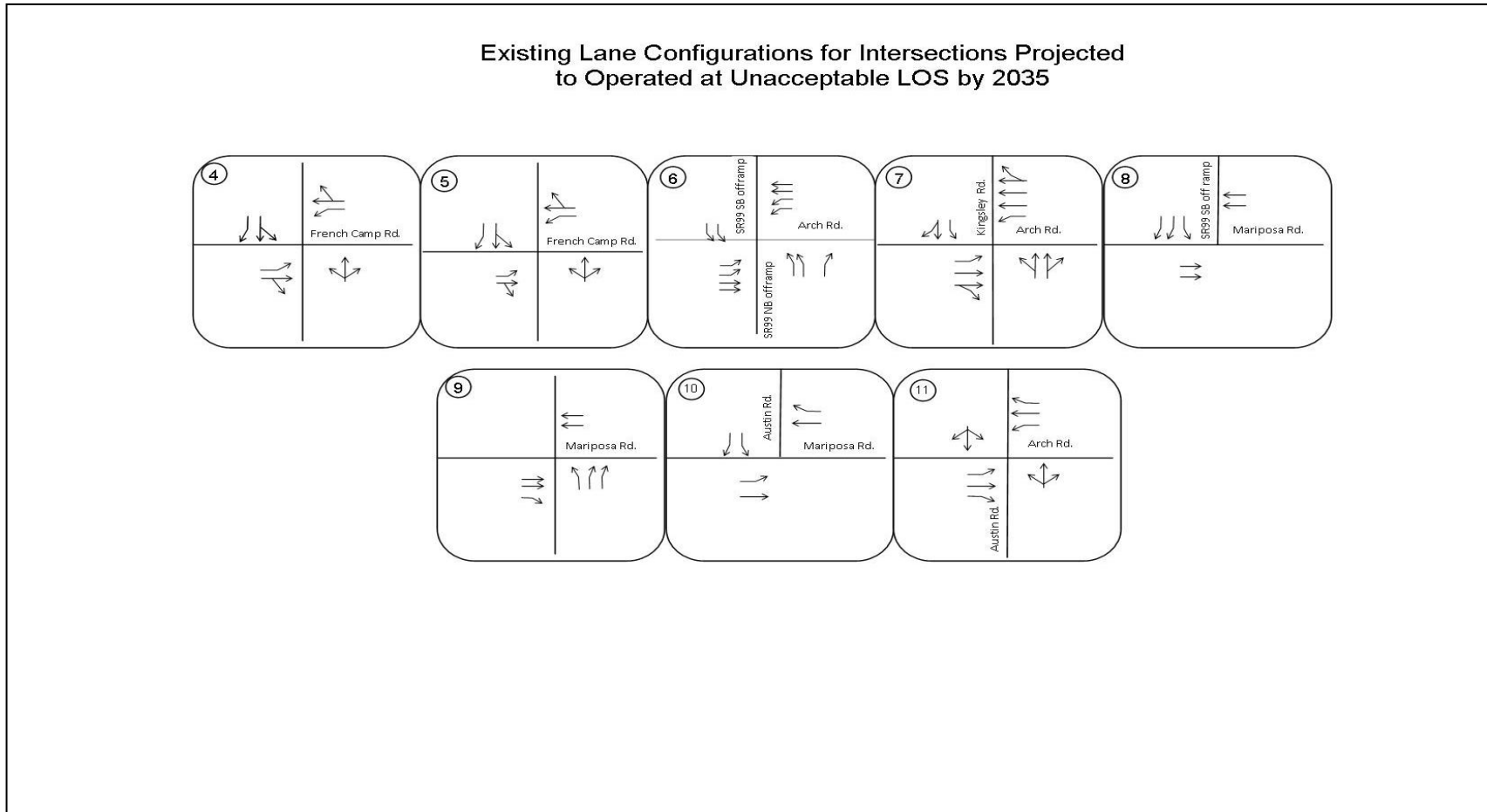


Figure 13 Existing Lane Configuration for Intersections Projected to Operate at Unacceptable LOS
 Forward Landfill Traffic Study-PHA Transportation Consultants

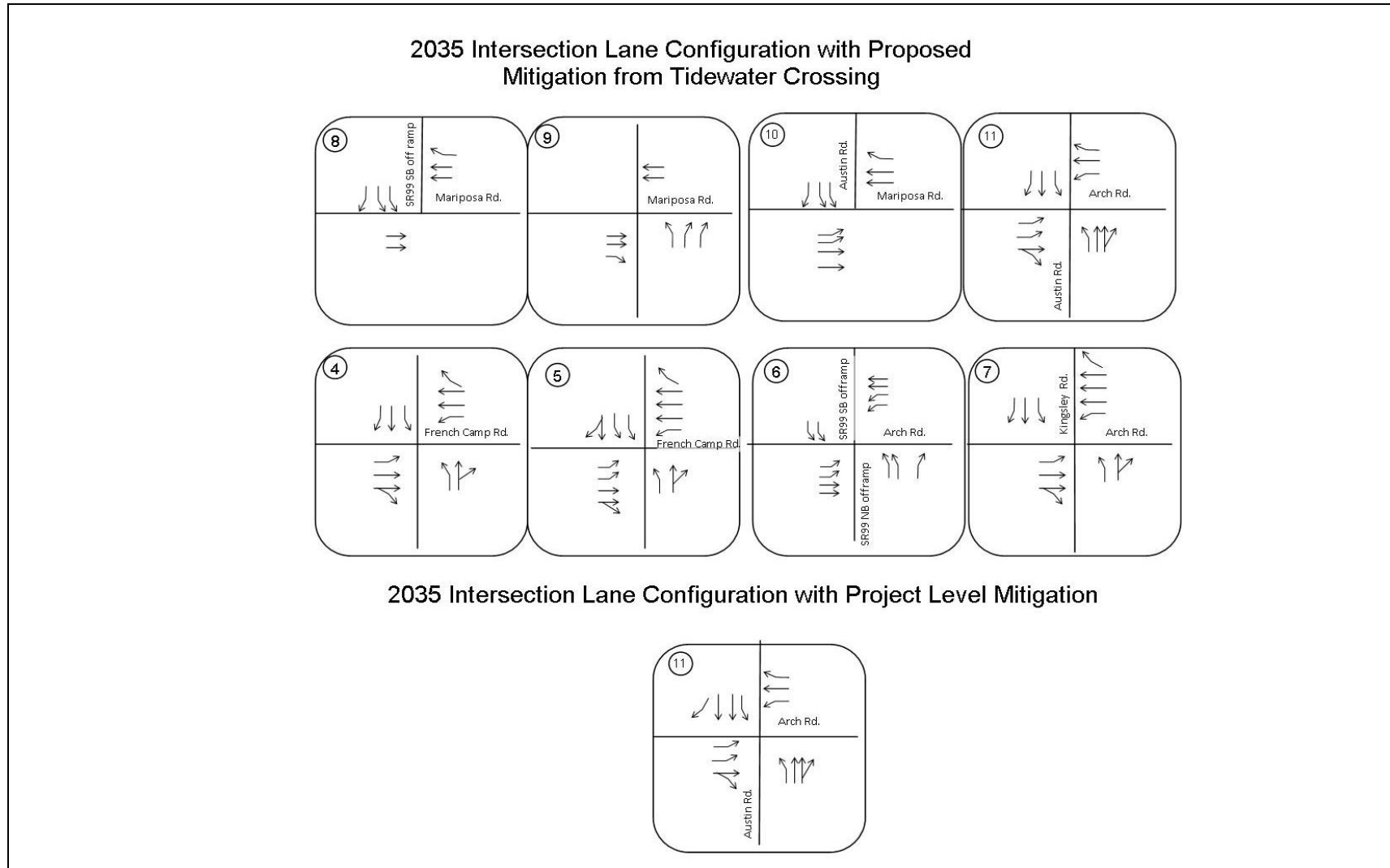


Figure 14 Intersection Lane Configuration with Improvement and Project Mitigation
 Forward Landfill Traffic Study – PHA Transportation Consultants