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TRAFFIC IMPACT ANALYSIS

IRIS CLUSTER SOLAR FARM

County of Imperial, California
February 10, 2014

LLG Ref. 3-13-2266

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TRAFFIC IMPACT ANALYSIS

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1.0 INTRODUCTION

The following traffic impact analysis has been prepared to determine the potential impacts to the local circulation system due to truck and employee traffic related to construction of the proposed Iris Cluster Solar project in the County of Imperial, California. Once constructed, the project will generate a minimal amount of traffic related to operations and maintenance. Therefore, the focus of this analysis is on the potential traffic impacts related to construction. This report includes the following sections:

- Project Description
- Existing Conditions
- Analysis Approach and Methodology
- Significance Criteria
- Analysis of Existing Condition
- Trip Generation / Distribution / Assignment
- Analysis of Construction Year Conditions
- Post-Construction Operations
- Project Access
- Significance of Impacts and Mitigation Measures

Figure 1–1 depicts the project vicinity. ***Figure 1–2*** depicts the project area map.

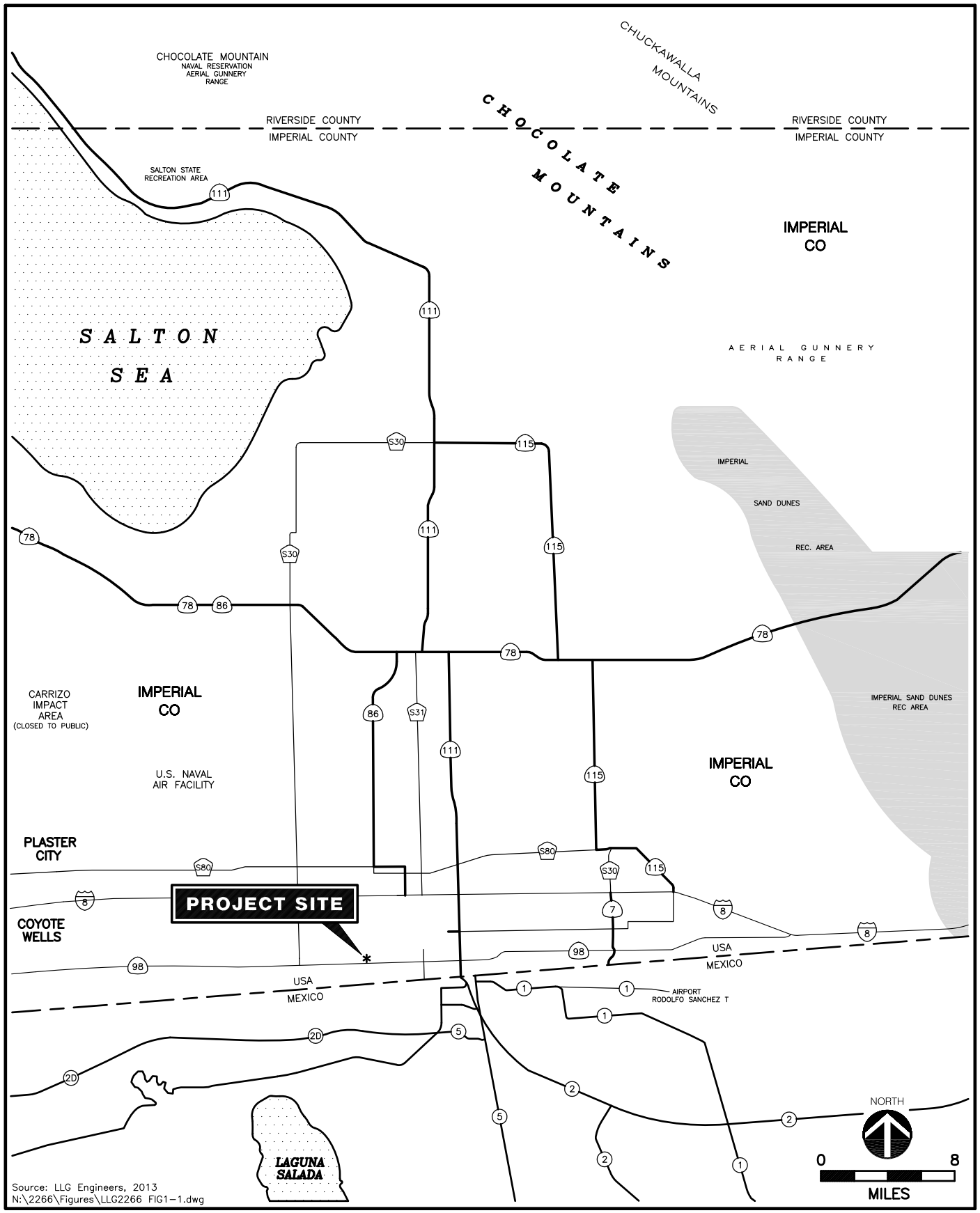

Figure 1-1

Vicinity Map

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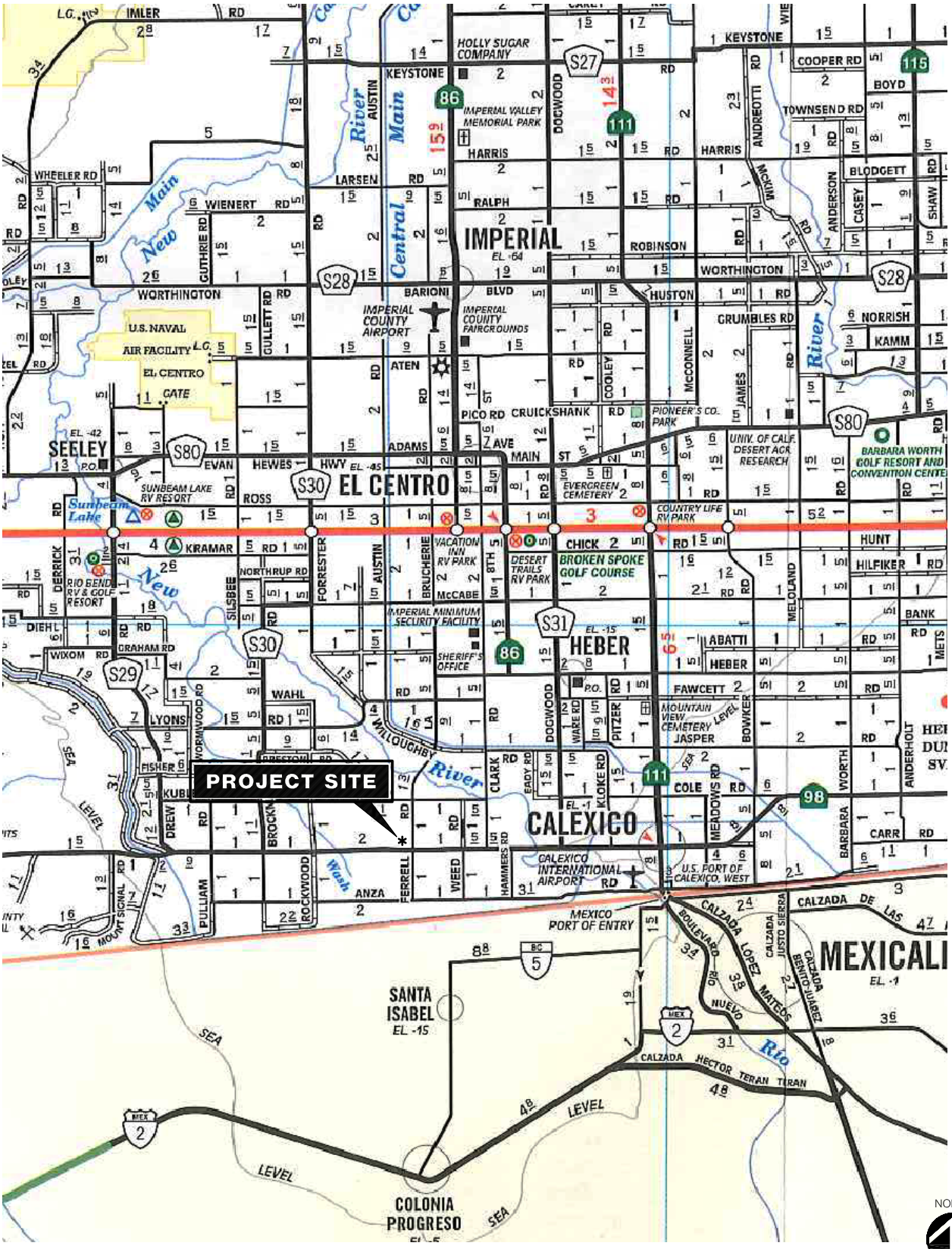

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Figure 1-2

Project Area Map

IRIS SOLAR FARM (ISF)

2.0 PROJECT DESCRIPTION

2.1 Project Location

The Iris Cluster project is comprised of ten separate assessor's parcels (collectively, the "Site" or "Cluster Site") totaling ±1,422 gross acres. The Cluster Site has historically been used for agriculture. The topography of the Site is relatively flat situated about 5 miles west of the City of Calexico in Imperial County, California. The ten parcels are all located generally north of SR 98 and the United States/Mexico International Border. The current use is irrigated agriculture.

2.2 Project Description

The Applicant proposes to develop four photovoltaic energy facilities on the Cluster Site. The Projects are planned to generate the following electrical output during peak daylight hours:

- Ferrell: up to 90 MW AC
- Rockwood: up to 100 MW AC
- Iris: up to 130 MW AC
- Lyons: up to 40 MW AC

The Cluster's interconnection will occur at the 230 kV side of the San Diego Gas & Electric ("SDG&E") Imperial Valley ("IV") Substation, located approximately 5 miles northwest of the Project Site. The Applicant intends to interconnect via 230 kV transmission facilities shared with other solar projects in the vicinity. The Projects intend to transfer electrical power from each of four on-site substations (one each on Ferrell, Rockwood, Iris, and Lyons land) to IV Substation via an off-site shared substation currently under construction by Mount Signal Solar Farm I. Power will be delivered from the Projects to this off-site shared substation via one or more collector lines (up to 230 kV).

Each Project may share operations and maintenance ("O&M"), substation, and/or transmission facilities as necessary with one or more of the other Projects, or with another nearby project. Any "unused" O&M, substation, and/or transmission facility areas on-site would be covered by solar panels under such a scenario.

Up to twenty-four (24) full-time employees will operate the Cluster, split roughly evenly between the four Projects. Typically, up to half of the staff will work during the day shift and the remainder during the night shifts and weekend. As noted earlier, it is possible that two or more Projects would share O&M, substation, and / or transmission facilities. In such a scenario, the cooperating Projects would share personnel, thereby reducing the total staff required, It is also possible that one or more Projects would share another nearby project's facilities (e.g., those of Mount Signal Solar Farm I), In that scenario, the project(s) would share personnel with that nearby project, thereby reducing or eliminating the project's on-site staff.

Any Imperial Irrigation District (IID) irrigation canals and drains will remain in place, including any maintenance access roads as per existing IID easements. After the useful life of each project, the panels will be disassembles from the mounting frames and the land restored to its pre-development condition.

2.3 Construction Activities

The construction period for the Cluster, from site preparation through construction, testing, and commercial operation, is expected to commence as early as Q2 2014 and will extend for approximately 12 months.

Construction of the Projects will include the following activities:

- Site preparation
- Grading and earthwork
- Concrete foundations
- Structural steel work
- Electrical/instrumentation work
- Gen-tie installation
- Architecture and landscaping work

No roadways will be affected by the Projects, except during the construction period. Construction traffic will access the Site via State Route 98, Ferrell Road, Weed Road, Brockman Road, and Kubler Road, to varying degrees. Were all four projects (five sites) under concurrent construction, it is estimated that up to 400 workers per day (during peak construction periods) would be required during the construction period. However, it is anticipated that sequential construction will occur, although the activities described above could occur over several sites at once. For example, grading could occur on one location, then move to the second as concrete foundations are poured at the first. This is in contrast to a concurrent development plan, where all five locations are being at once, followed by all five location receiving concrete foundations at once, etc.

Heavy construction is expected to occur between 6:00 am and 5:00 pm, Monday through Friday. Additional hours may be necessary to make up schedule deficiencies or to complete critical construction activities. Some activities may continue 24 hours per day, seven days per week. Low level noise activities may potentially occur between the hours of 10:00 pm and 7:00 am. Nighttime activities could potentially include, but are not limited to, refueling equipment, staging material for the following day's construction activities, quality assurance/control, and commissioning.

Materials and supplies will be delivered to the Site by truck. Truck deliveries will normally occur during daylight hours. However, there will be offloading and/or transporting to the Site on weekends and during evening hours.

Earthmoving activities are expected to be limited to the construction of the access roads, any O&M buildings, any substations, and any storm water protection or storage (detention) facilities. Final

grading may include revegetation with low lying grass or applying earth-binding materials to disturbed areas.

2.4 Work Force

Once the Projects are constructed, maintenance needs are generally limited to:

- Cleaning of PV panels
- Monitoring electricity generation
- Providing Site security
- Facility maintenance - replacing or repairing inverters, wiring and PV modules

It is expected that the Cluster as a whole will require an operational staff of up to twenty-four (24) full-time employees, split roughly evenly between the four Projects. As noted earlier, it is possible that two or more Projects would share O&M, substation, and/or transmission facilities. In that scenario, the cooperating Projects c/would share personnel, thereby reducing the staff required. It is also possible that one or more Projects would share another nearby project's facilities (e.g., those of Mount Signal Solar Farm I). In that scenario, the Projects(s) c/would also share personnel with that project, thereby reducing or eliminating the on-site staff required. The Projects will operate seven days a week, 24 hours a day, generating electricity during normal daylight hours when the solar energy is available. Maintenance activities may occur seven days a week, 24 hours a day to ensure PV panel output when solar energy is available.

3.0 EXISTING CONDITIONS

3.1 Existing Street Network

Following is a brief description of the street segments within the project area. The location of Imperial Irrigation District facilities relative to the project sites is also discussed. ***Figure 3–1*** illustrates the existing conditions, including the lane geometry, for the key intersections in the study area.

SR 98 is classified as a State Highway/Expressway on the Imperial County General Plan Circulation Element. Within the project area, SR 98 is constructed as a two-lane undivided east-west roadway, providing one lane of travel per direction. Bike lanes are provided. No bus stops are provided, and parking is not permitted along either side of the roadway. The posted speed limit is 40 mph. Wistaria Lateral Two runs east-west on the north side of SR 98 in the vicinity of the Iris site.

McCabe Road is classified as a Major Collector on the Imperial County General Plan Circulation Element west of La Brucherie Road and as a Minor Arterial east of La Brucherie Road up to SR 111. Within the project area, McCabe Road is constructed as a two-lane undivided east-west roadway, providing one lane of travel per direction. No bike lanes or bus stops are provided, and parking is not permitted along either side of the roadway. There is no speed limit posted in the vicinity of the project site.

La Brucherie Road is classified as a Major Collector on the Imperial County General Plan Circulation Element between the El Centro City Limits and Kubler Road. Within the project area, La Brucherie Road is constructed as a two-lane undivided north-south roadway, providing one lane of travel per direction. No bike lanes or bus stops are provided, and parking is not permitted along either side of the roadway. There is no speed limit posted in the vicinity of the project site. Wistaria Lateral Four crosses La Brucherie Road at Kubler Road in the vicinity of the Ferrell site.

Ferrell Road is classified as a Major Collector on the Imperial County General Plan Circulation Element between Kubler Road and SR 98. Within the project area, Ferrell Road is constructed as a two-lane undivided north-south roadway, providing one lane of travel per direction. No bike lanes or bus stops are provided, and parking is not permitted along either side of the roadway. There is no speed limit posted in the vicinity of the project site. Wistaria Lateral Four runs parallel to Ferrell Road on the east side in the vicinity of the Ferrell site.

Brockman Road (S30) is classified as a Major Collector on the Imperial County General Plan Circulation Element. Within the project area, Brockman Road is constructed as a two-lane undivided north-south roadway, providing one lane of travel per direction. No bike lanes or bus stops are provided, and parking is not permitted along either side of the roadway. There is no speed limit posted in the vicinity of the project site.

Kubler Road is classified as a Minor Collector on the Imperial County General Plan Circulation Element. Within the project area, Kubler Road is constructed as a two-lane undivided east-west roadway, providing one lane of travel per direction. No bike lanes or bus stops are provided, and

parking is not permitted along either side of the roadway. There is no speed limit posted in the vicinity of the project site. In the vicinity of the Lyons site, Wistaria Lateral Four runs parallel to Kubler Road along the north side from Ferrell Road west to Wistaria Drain Five, east of Brockman Road. Wistaria Lateral Three runs north-south, south of Kubler Road in the vicinity of the Ferrell and Iris sites.

3.2 Existing Traffic Volumes

3.2.1 *Peak Hour Intersection Turning Movement Volumes*

AM and PM peak hour intersection turning movement volume counts commissioned by LLG Engineers in October 2010 for another project at the following locations are used in this analysis.

- La Brucherie Road/ McCabe Road
- SR 98/ Brockman Road
- SR 98/ Ferrell Road

Peak hour volumes at the La Brucherie Road / Kubler Road were estimated using volumes at adjacent intersections.

Figure 3–2 depicts the peak hour intersection turning movement volumes at all the study area intersections.

3.2.2 Segment Volumes

Daily traffic (ADT) volume counts were commissioned by LLG in October 2010 and obtained from Caltrans 2009 traffic volume data.

Figure 3–2 depicts the segment ADT volumes at all the study area segments. ***Table 3–1*** summarizes the segment ADT volumes on all the study area segments.

Appendix A contains the manual intersection and segment count sheets and latest Caltrans traffic volumes.

TABLE 3–1
EXISTING TRAFFIC VOLUMES

Street Segment	Source	Date	ADT [a]
Ferrell Road			
Kubler Road to SR 98	LLG	2010	800
SR 98			
Pulliam Road to Brockman Road	Caltrans	2012	1,750
Brockman Road to Ferrell Road	LLG	2010	1,730
East of Ferrell Road	Caltrans	2012	2,300

Footnotes:

a. Average Daily Traffic Volume.

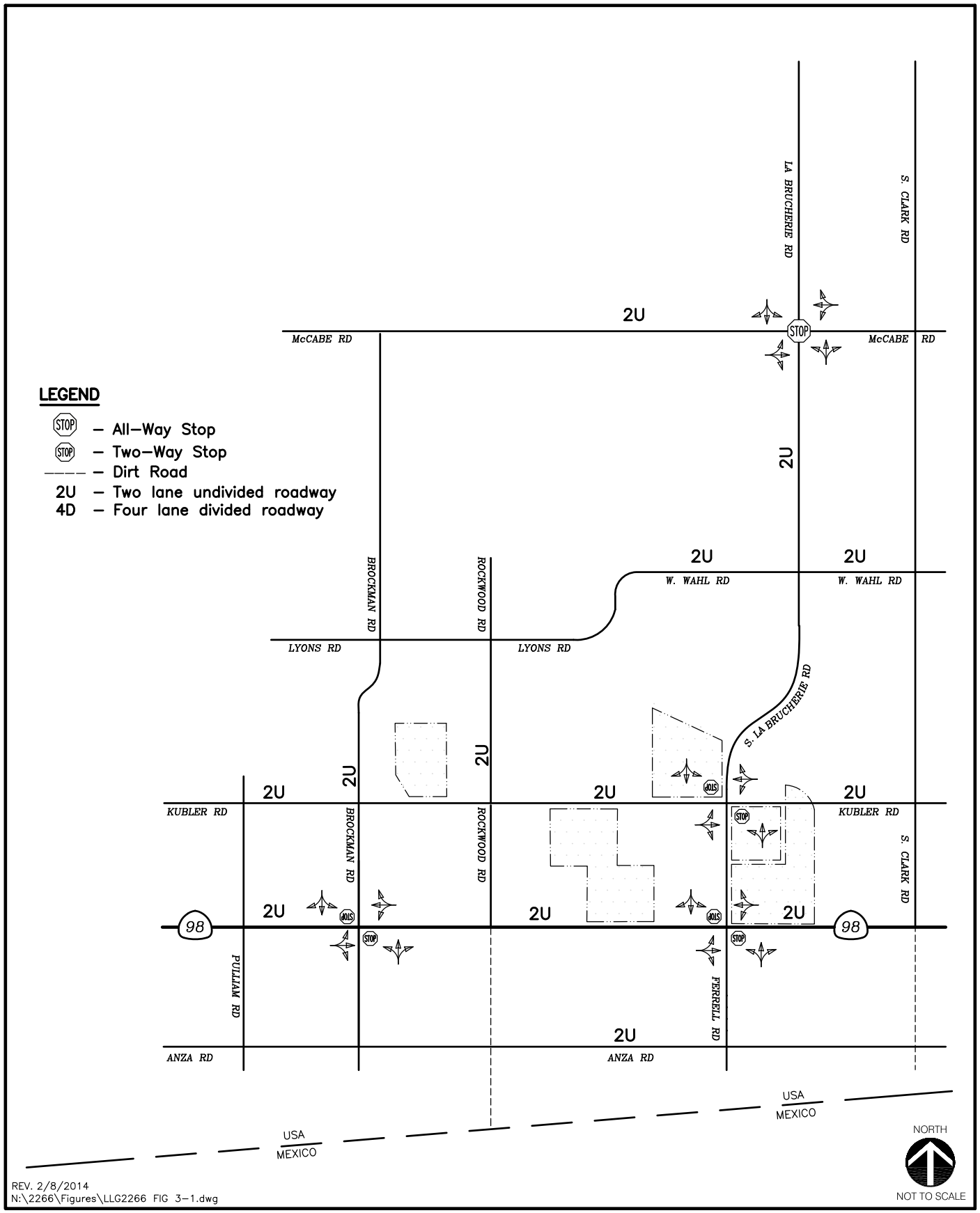

Figure 3-1

Existing Conditions Diagram

IRIS CLUSTER SOLAR FARM

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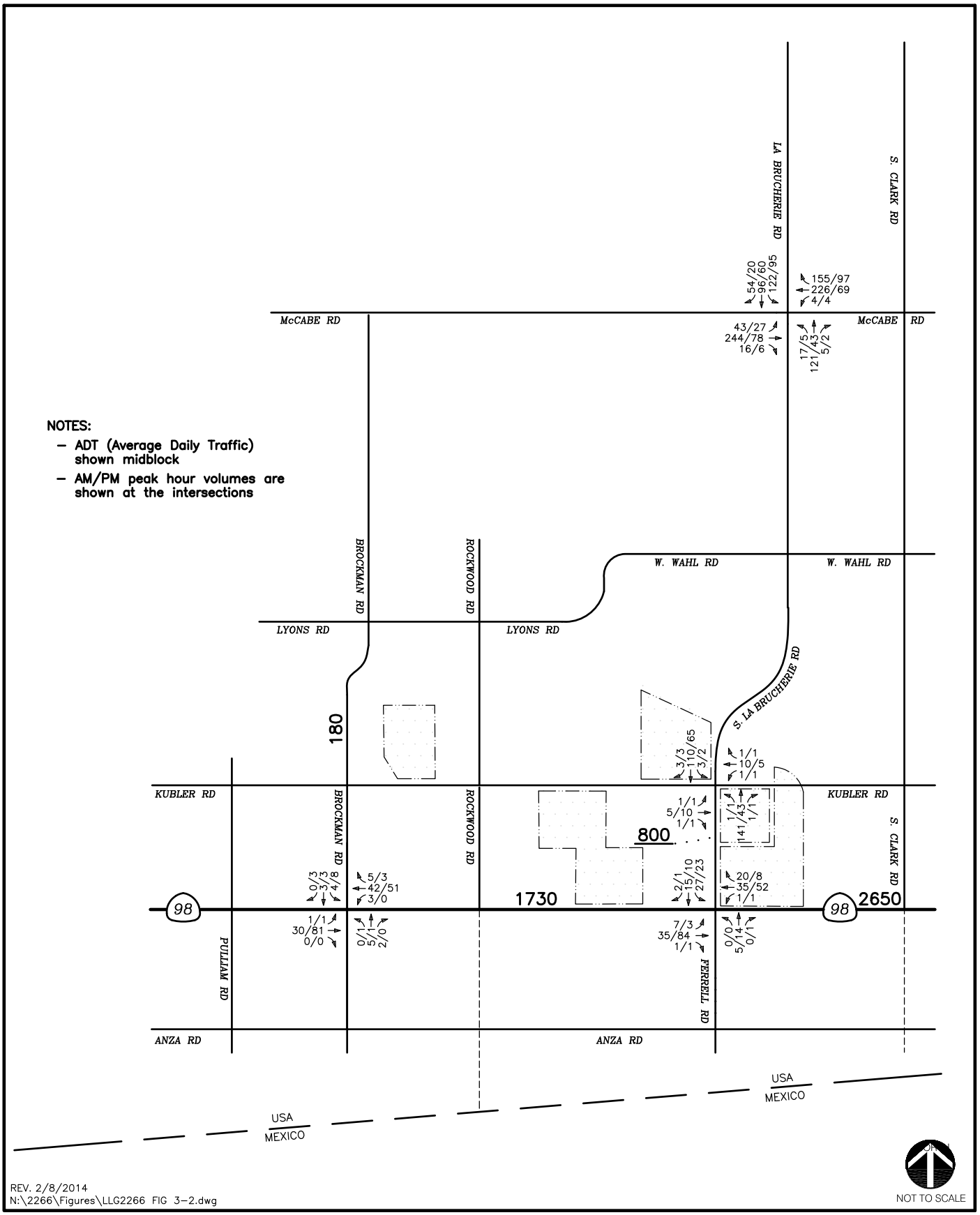

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Figure 3-2

Existing Traffic Volumes AM/PM Peak Hours & ADT

4.0 ANALYSIS APPROACH AND METHODOLOGY

This report analyzes the effects of the construction portion of the development of the proposed project, based on the limited traffic contribution of the project during the subsequent Operations and Maintenance phase (see *Section 7.0* for more information related to project trip generation). For the purpose of being conservative, the concurrent construction of all ten parcels is assumed in the quantitative analyses completed for key off-site intersections and roadway segments in the study area affected by construction project traffic.

Analyses of the existing roadway volumes and network have been completed for reference. Since construction of the proposed project is scheduled for 2014, existing volumes have been increased by a 5% growth factor to account for any cumulative project development that may occur between 2010 (date of traffic counts) and 2014. *Section 8.0* discusses the *Baseline Without Construction Project* condition in further detail. Analyses have been prepared for the following scenarios:

- *Existing* (Year 2010)
- *Baseline Without Construction Project* (Year 2013)
- *Baseline With Total Construction Project* (Year 2013)

Given the very limited traffic associated with the *Shared Operations and Maintenance* of the project (40 ADT), no long-term cumulative analyses is necessary.

The operations of the project area intersections and segments are characterized using the concept of "Level of Service" (LOS). LOS is the term used to denote the different operating conditions which occur on a given roadway segment under various traffic volume loads. It is a qualitative measure used to describe a quantitative analysis taking into account factors such as roadway geometries, signal phasing, speed, travel delay, freedom to maneuver, and safety. LOS provides an index to the operational qualities of a roadway segment or an intersection. LOS designations range from A through F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions. LOS designation is reported differently for signalized and unsignalized intersections, as well as for roadway segments.

Table 4–1 summaries the description for each level of service.

4.1 Unsignalized Intersections

For unsignalized intersections, level of service is determined by the computed or measured control delay and is defined for each minor movement. Level of service is not defined for the intersection as a whole. ***Table 4–2*** depicts the criteria, which are based on the Average control delay for any particular minor movement.

Level of Service F exists when there are insufficient gaps of suitable size to allow a side street demand to safely cross through a major street traffic stream. This level of service is generally evident from extremely long control delays experienced by side-street traffic and by queuing on the minor-street approaches. The method, however, is based on a constant critical gap size; that is, the critical gap remains constant no matter how long the side-street motorist waits.

LOS F may also appear in the form of side-street vehicles selecting smaller-than-usual gaps. In such cases, safety may be a problem, and some disruption to the major traffic stream may result. It is important to note that LOS F may not always result in long queues but may result in adjustments to normal gap acceptance behavior, which are more difficult to observe in the field than queuing.

TABLE 4–1
INTERSECTION LEVEL OF SERVICE DESCRIPTIONS

Level of Service	Description
A	Occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
B	Generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.
C	Generally results when there is fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
D	Generally results in noticeable congestion. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume-to-capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	Considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high volume-to-capacity ratios. Individual cycle failures are frequent occurrences.
F	Considered to be unacceptable to most drivers. This condition often occurs with over saturation i.e. when arrival flow rates exceed the capacity of the intersection. It may also occur at high volume-to-capacity ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

TABLE 4–2
LEVEL OF SERVICE THRESHOLDS FOR UNSIGNALIZED INTERSECTIONS

Average Control Delay Per Vehicle (Seconds/Vehicle)	Level of Service	Expected Delay to Minor Street Traffic
0.0 ≤ 10.0	A	Little or no delay
10.1 to 15.0	B	Short traffic delays
15.1 to 25.0	C	Average traffic delays
25.1 to 35.0	D	Long traffic delays
35.1 to 50.0	E	Very long traffic delays
≥ 50.0	F	Severe congestion

4.2 Street Segments

Street segments were analyzed based upon the comparison of ADT to the County of Imperial *Roadway Classifications, Levels of Service (LOS) and Average Daily Traffic (ADT)* table (see ***Table 4–3*** below). *Table 4–3* provides segment capacities for different street classifications, based on traffic volumes and roadway characteristics. Segment analysis is a comparison of ADT volumes and an approximate daily capacity on the subject roadway.

TABLE 4–3
IMPERIAL COUNTY STANDARD STREET CLASSIFICATION AVERAGE DAILY VEHICLE TRIPS

Road		Level of Service W/ADT*				
Class	**X-Section**	**A**	**B**	**C**	**D**	**E**
Expressway	128 / 210	30,000	42,000	60,000	70,000	80,000
Prime Arterial	106 / 136	22,200	37,000	44,600	50,000	57,000
Minor Arterial	82 / 102	14,800	24,700	29,600	33,400	37,000
Major Collector (Collector)	64 / 84	13,700	22,800	27,400	30,800	34,200
Minor Collector (Local Collector)	40 / 70	1,900	4,100	7,100	10,900	16,200
Residential Street	40 / 60	*	*	< 1,500	*	*
Residential Cul-de-Sac / Loop Street	40/60	*	*	< 1,500	*	*
Industrial Collector	76 / 96	5,000	10,000	14,000	17,000	20,000
Industrial Local Street	44 / 64	2,500	5,000	7,000	8,500	10,000

* Levels of service are not applied to residential streets since their primary purpose is to serve abutting lots, not carry through traffic. Levels of service normally apply to roads carrying through traffic between major trip generators and attractors.

5.0 SIGNIFICANCE CRITERIA

5.1 County of Imperial

The County of Imperial does not have published significance criteria. However, the County General Plan does state that the level of service (LOS) goal for intersections and roadway segments is to operate at LOS C or better. Therefore, if an intersection or segment degrades from LOS C or better to LOS D or worse with the addition of project traffic, the impact is considered significant. If the location operates at LOS D or worse with and without project traffic, the impact is considered significant if the project causes the intersection delta to increase by more than two (2) seconds, or the V/C ratio to increase by more than 0.02. These amounts are consistent with those used in the City of El Centro and the County of Imperial in numerous traffic studies.

5.2 Caltrans

A project is considered to have a significant impact if the new project traffic has decreased the operations of surrounding roadways by a defined threshold. The defined thresholds for roadway segments and intersections are defined in ***Table 5–1*** below. If the project exceeds the thresholds in *Table 5–1*, then the project may be considered to have a significant project impact. A feasible mitigation measure will need to be identified to return the impact within the thresholds (pre-project + allowable increase) or the impact will be considered significant and unmitigated.

TABLE 5–1
TRAFFIC IMPACT SIGNIFICANT THRESHOLDS

Level of Service with Project [a]	Allowable Increase Due to Project Impacts [b]					
	Freeways		Roadway Segments		Intersections	Ramp Metering
	V/C	Speed (mph)	V/C	Speed (mph)	Delay (sec.)	Delay (min.)
D, E & F (*or ramp meter delays above 15 minutes*)	0.01	1	0.02	1	2	2[c]

Footnotes:

a. All level of service measurements are based upon HCM procedures for peak-hour conditions. However, V/C ratios for Roadway Segments may be estimated on an ADT/24-hour traffic volume basis (using Table 4-3 or a similar LOS chart for each jurisdiction). The acceptable LOS for freeways, roadways, and intersections is generally "D" ("C" for undeveloped or not densely developed locations per jurisdiction definitions). For metered freeway ramps, LOS does not apply. However, ramp meter delays above 15 minutes are considered excessive.

b. If a proposed project's traffic causes the values shown in the table to be exceeded, the impacts are deemed to be significant. These impact changes may be measured from appropriate computer programs or expanded manual spreadsheets. The project applicant shall then identify feasible mitigations (within the Traffic Impact Study [TIS] report) that will maintain the traffic facility at an acceptable LOS. If the LOS with the proposed project becomes unacceptable (see note a above), or if the project adds a significant amount of peak hour trips to cause any traffic queues to exceed on- or off-ramp storage capacities, the project applicant shall be responsible for mitigating significant impact changes.

c. The allowable increase in delay at a ramp meter with more than 15 minutes of delay and freeway LOS E is 2 minutes and at LOS F is 1 minute.

General Notes:

1. V/C = Volume to Capacity Ratio
2. Speed = Arterial speed measured in miles per hour
3. Delay = Average stopped delay per vehicle measured in seconds for intersections, or minutes for ramp meters.
4. LOS = Level of Service

6.0 ANALYSIS OF EXISTING CONDITIONS

6.1 Peak Hour Intersection Levels of Service

The project study area is located in a rural setting and all intersections are unsignalized. As seen in ***Table 6–1,*** all study area intersections are calculated to currently operate at LOS C or better during both the AM and PM peak hours.

Appendix B contains the *Existing* peak hour intersection analysis worksheets.

TABLE 6–1
EXISTING INTERSECTION OPERATIONS

Intersection	Control Type	Peak Hour	Existing	
			Delay [a]	LOS [b]
1. La Brucherie Road/ McCabe Road	AWSC [c]	AM	18.5	C
		PM	8.9	A
2. La Brucherie Road/ Kubler Road	MSSC [d]	AM	10.7	B
		PM	9.7	A
3. SR 98/ Ferrell Road	MSSC	AM	9.7	A
		PM	10.0	A
4. SR 98/ Brockman Road	MSSC	AM	9.3	A
		PM	9.7	A

Footnotes:

a. Delay per vehicle in seconds
b. LOS - Level of service
c. AWSC - All-Way STOP Controlled intersection.
d. MSSC - Minor street STOP Controlled intersection. Minor street left-turn delay is reported.

UNSIGNALIZED

Delay	LOS
0.0 < 10.0	A
10.1 to 15.0	B
15.1 to 25.0	C
25.1 to 35.0	D
35.1 to 50.0	E
> 50.1	F

6.2 Daily Street Segment Levels of Service

As described above, the project study area is located in a rural setting and all segments are two-lane facilities. As seen in ***Table 6–2***, all study area segments are calculated to currently operate at LOS B or better.

TABLE 6–2
EXISTING STREET SEGMENT OPERATIONS

Street Segment	Functional Roadway Classification [a]	Capacity (LOS E) [b]	ADT [c]	LOS [d]	V/C [e]
Ferrell Road					
Kubler Road to SR 98	2-Ln Local Collector	16,200	800	A	0.05
SR 98					
Pulliam Road to Brockman Road	2-Ln Local Collector	16,200	1,750	A	0.11
Brockman Road to Ferrell Road	2-Ln Local Collector	16,200	1,730	A	0.11
East of Ferrell Road	2-Ln Local Collector	16,200	2,300	B	0.14

Footnotes:

a. County of Imperial roadway classification
b. Roadway capacity corresponding to Level of Service E from Imperial County Standard Street Classification, Average Daily Vehicle Trips table.
c. Average Daily Traffic volumes
d. Volume / Capacity ratio.
e. Level of Service

7.0 TRIP GENERATION/DISTRIBUTION/ASSIGNMENT

7.1 Trip Generation

Project traffic generation was determined for each project using the methodology developed for a similar solar project in the study area. Each phase of the project consists of two parts: *Construction*, and *Operations and Maintenance (O&M)*. The construction stage is expected to commence in 2014, with opening year planned for 2015. Trip generation is based on site-specific trip generating characteristics provided by the applicant. For the O&M stage, the following personnel would be expected:

Operations & Maintenance

- 7 on-site staff daily during normal business hours
- 1 security guard daily, 24-hours a day (3 shifts)

The trip generation for the Iris Cluster project is based on trip generation calculations completed for similar projects in the study area utilizing the more traffic-intensive PV technology. Assumptions about construction and maintenance and operations traffic characteristics for similar sites were increased accordingly to reflect the anticipated traffic activity associated with development and operations of the proposed project site. If CPV panel technology is used, installation will require less drilling and therefore less construction traffic, and no additional impacts would occur.

Based on these calculations, the four projects within the cluster calculated to generate trips as follows:

The ***Ferrell Project*** (90 MW) would generate 208 ADT by passenger vehicles, with 68 inbound trips during the AM peak hour and 68 outbound trips during the PM peak hour. It would also generate 14 ADT by trucks, with 2 inbound and 2 outbound trips during the AM and PM peak hours, respectively. A passenger car equivalence factor (PCE) of 2.0 is applied to these trips for the purposes of the analysis to account for the reduced performance characteristics (stopping, starting, maneuvering, etc.) of heavy vehicles in the traffic flow.

The ***Rockwood*** (100 MW) would generate 231 ADT by passenger vehicles, with 75 inbound trips during the AM peak hour and 75 outbound trips during the PM peak hour. It would also generate 15 ADT by trucks, with 3 inbound and 3 outbound trips during the AM and PM peak hours, respectively. A PCE is applied to these trips as explained above.

The ***Iris*** (130 MW) would generate 300 ADT by passenger vehicles, with 98 inbound trips during the AM peak hour and 98 outbound trips during the PM peak hour. It would also generate 20 ADT by trucks, with 4 inbound and 4 outbound trips during the AM and PM peak hours, respectively. A PCE is applied to these trips as explained above. ***This is the largest traffic contribution of any single site, and represents the "Project" traffic in this analysis.***

The ***Lyons*** (40 MW) would generate 92 ADT by passenger vehicles, with 30 inbound trips during the AM peak hour and 30 outbound trips during the PM peak hour. It would also generate 6 ADT by trucks, with 1 inbound and 1 outbound trips during the AM and PM peak hours, respectively. A PCE is applied to these trips as explained above.

Table 7–1 is a summary of the construction traffic and O&M traffic. As seen in *Table 7–1*, the construction traffic is substantially greater than the O&M traffic, which validates the assertion that analysis of the construction impacts would represent the worst-case potential traffic impacts of the project. The largest single-site construction traffic analyzed in this report for the Iris site is 320 ADT, with 102 inbound/0 outbound trips during the AM peak hour, and 0 inbound/102 outbound trips during the PM peak hour.

TABLE 7–1
PROJECT TRIP GENERATION

Trip Type	Daily Total (ADT) [a]	AM Peak Hour			PM Peak Hour		
		In	Out	*Total*	In	Out	*Total*
LYONS							
Construction							
Employee Vehicles	92	30	0	30	0	30	30
Construction Trucks	6	1	0	1	0	1	1
Total (w/PCE [b])	***98***	***31***	***0***	***31***	***0***	***31***	***31***
Operations and Maintenance (O&M)							
Vehicles	40	8	2	*10*	2	8	*10*
Trucks	0	0	0	*0*	0	0	*0*
Total (w/PCE)	***40***	***8***	***2***	***10***	***2***	***8***	***10***
ROCKWOOD							
Construction							
Employee Vehicles	231	75	0	75	0	75	75
Construction Trucks	15	3	0	3	0	3	3
Total (w/PCE [b])	***246***	***78***	***0***	***78***	***0***	***78***	***78***
Operations and Maintenance (O&M)							
Employee Vehicles	40	8	2	*10*	2	8	*10*
Construction Trucks	0	0	0	*0*	0	0	*0*
Total (w/PCE)	***40***	***8***	***2***	***10***	***2***	***8***	***10***

Continued in the next page

TABLE 7–1
PROJECT TRIP GENERATION (CONT'D)

Trip Type	Daily Total (ADT) [a]	AM Peak Hour			PM Peak Hour		
		In	Out	*Total*	In	Out	*Total*
FERRELL - NW [c]							
Construction							
Employee Vehicles	104	34	0	34	0	34	34
Construction Trucks	7	1	0	1	0	1	1
Total (w/PCE [b])	***111***	***35***	***0***	***35***	***0***	***35***	***35***
FERRELL – SE							
Construction							
Employee Vehicles	104	34	0	34	0	34	34
Construction Trucks	7	1	0	1	0	1	1
Total (w/PCE [b])	***111***	***35***	***0***	***35***	***0***	***35***	***35***
IRIS							
Construction							
Employee Vehicles	300	98	0	98	0	98	98
Construction Trucks	20	4	0	4	0	4	4
Total (w/PCE [b])	***320***	***102***	***0***	***102***	***0***	***102***	***102***
Operations and Maintenance (O&M)							
Employee Vehicles	40	8	2	*10*	2	8	*10*
Construction Trucks	0	0	0	*0*	0	0	*0*
Total (w/PCE)	***40***	***8***	***2***	***10***	***2***	***8***	***10***
TOTAL							
Construction							
Employee Vehicles	831	271	0	271	0	271	271
Construction Trucks	55	10	0	10	0	10	10
Total (w/PCE [b])	***886***	***281***	***0***	***281***	***0***	***281***	***281***
Operations and Maintenance (O&M)							
Employee Vehicles	120	24	6	30	6	24	30
Construction Trucks	0	0	0	0	0	0	0
Total (w/PCE)	***40***	***8***	***2***	***10***	***2***	***8***	***10***

General Notes:

1. Source: 8minuteenergy Renewables, LLC, and Fehr & Peers, 2010.

Footnotes:

a. ADT = Average Daily Traffic (24-hour total bi-directional traffic on a roadway segment)
b. PCE = Passenger Car Equivalent, used to reflect the additional impacts of heavy vehicles in the technical analyses.

7.2 Trip Distribution

Regional trip distribution for construction truck traffic was estimated based on information from the applicant that material deliveries will primarily be from north of the site, from Interstate 8. ***Figure 7–1*** shows the distribution of truck traffic, which is primarily oriented along La Brucherie Road and SR 98 in the study area.

It is anticipated that the majority of construction workers will be from the local population centers of Calipatria, El Centro, and Calexico. ***Figure 7–2*** shows the distribution of construction employee passenger car traffic north, west and east of the site. The majority of employee traffic (95%) is anticipated to be to/from north and east of the site, from the local labor pool utilizing I-8 and SR 98 as their primary routes to work.

As discussed in *Section 3.1*, there are IID facilities present along several of the roadways in the study area. LLG assumed that project access would not cross these facilities, called Laterals and Drains. Thus, access for the sites is analyzed as follows:

- Lyons – Via Kubler Road
- Rockwood – Via Kubler Road
- Ferrell NW – Via S. La Brucherie Road
- Ferrell SE – Via Kubler Road
- Iris – Via Kubler Road

Regional distribution (both trucks and employees) is constant for the various sites; localized distribution is adjusted based on the driveway assumptions above.

7.3 Trip Assignment

The trip generation summaries for the Iris site construction shown in *Table 7–1* were multiplied by the related truck and employee distribution percentages shown on *Figures 7–1* and *7–2*, respectively. The Iris site construction truck traffic assignment is shown on ***Figure 7–3. Figure 7–4*** shows the Iris site employee vehicle traffic assignment. ***Figure 7–5*** depicts the total Iris site construction traffic assignment.

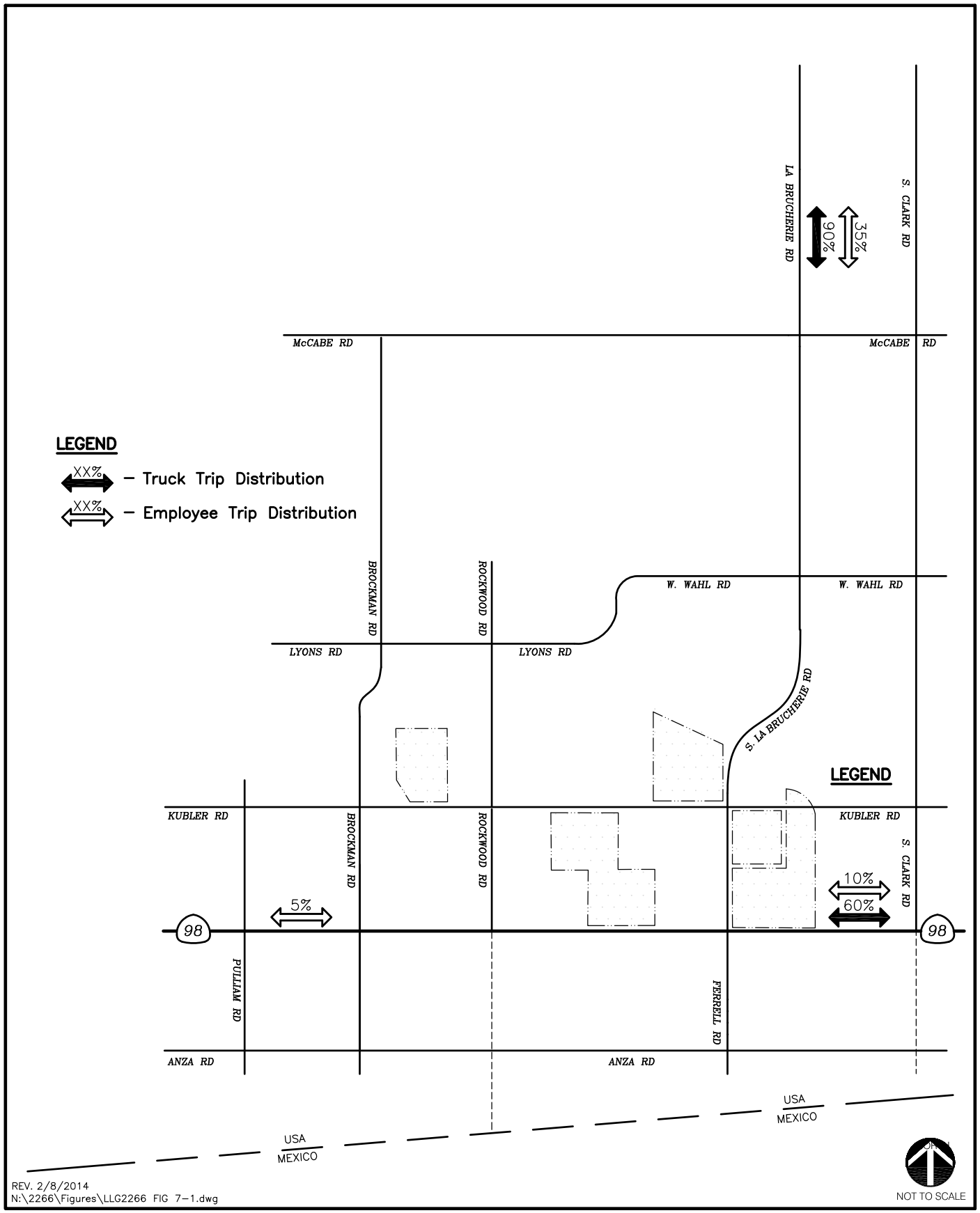

Figure 7-1
Regional Distribution

LINSCOTT LAW & GREENSPAN engineers

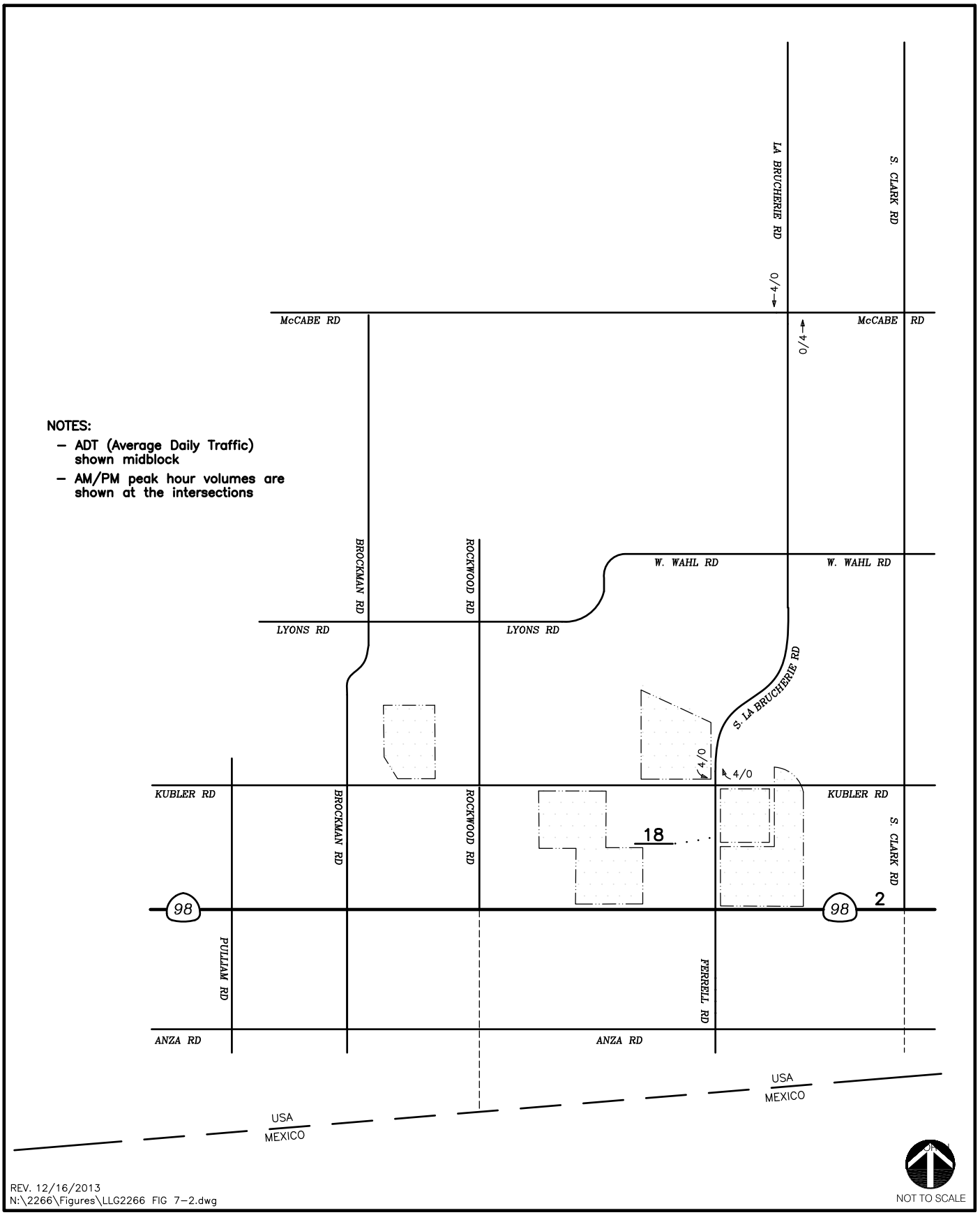

Figure 7-2

Total Construction Truck Project Traffic Volumes AM/PM Peak Hours & ADT

IRIS SOLAR FARM (ISF)

LINSCOTT LAW & GREENSPAN engineers

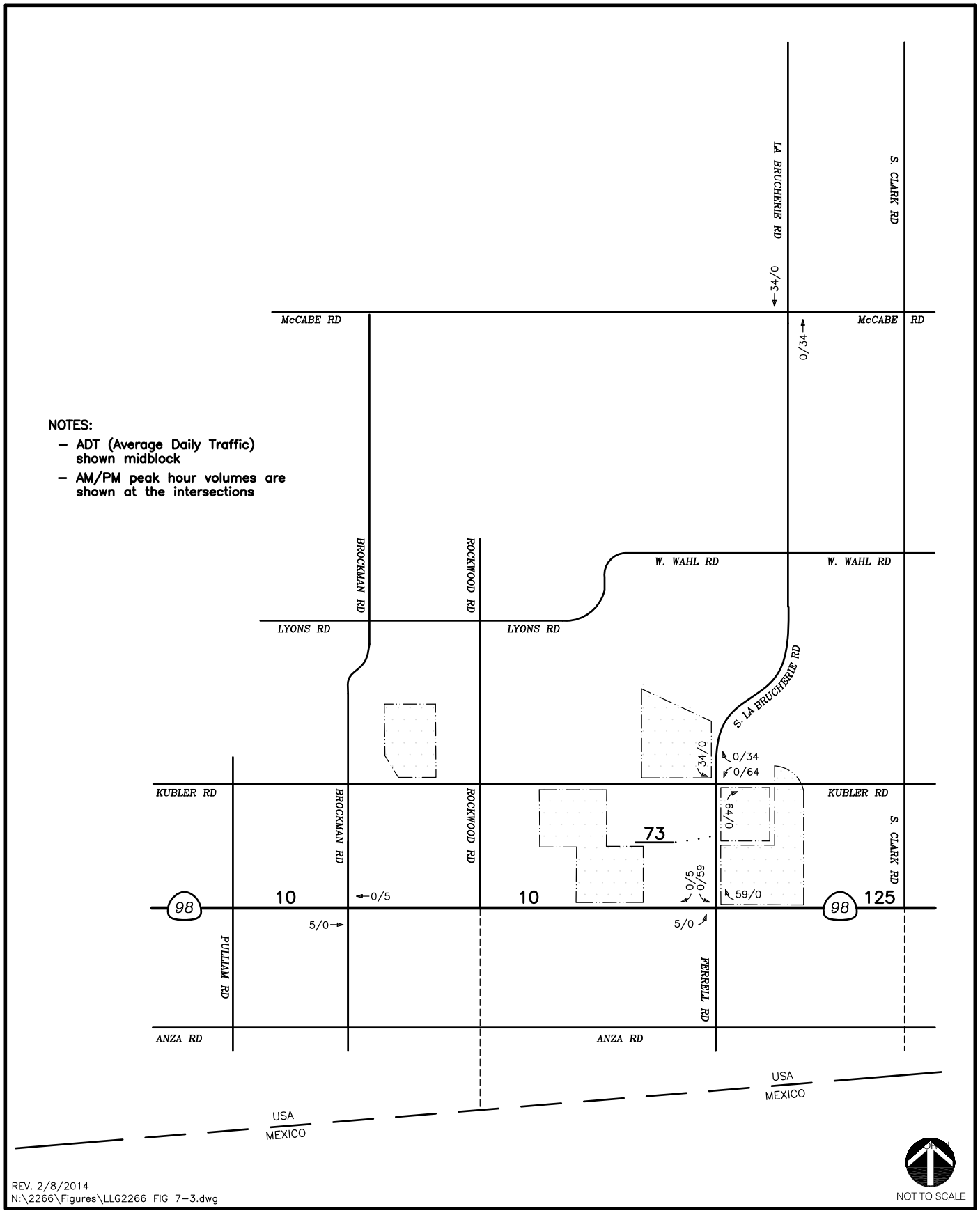

Figure 7-3

Total Construction Employee Project Traffic Volumes AM/PM Peak Hours & ADT

IRIS SOLAR FARM (ISF)

LINSCOTT LAW & GREENSPAN engineers

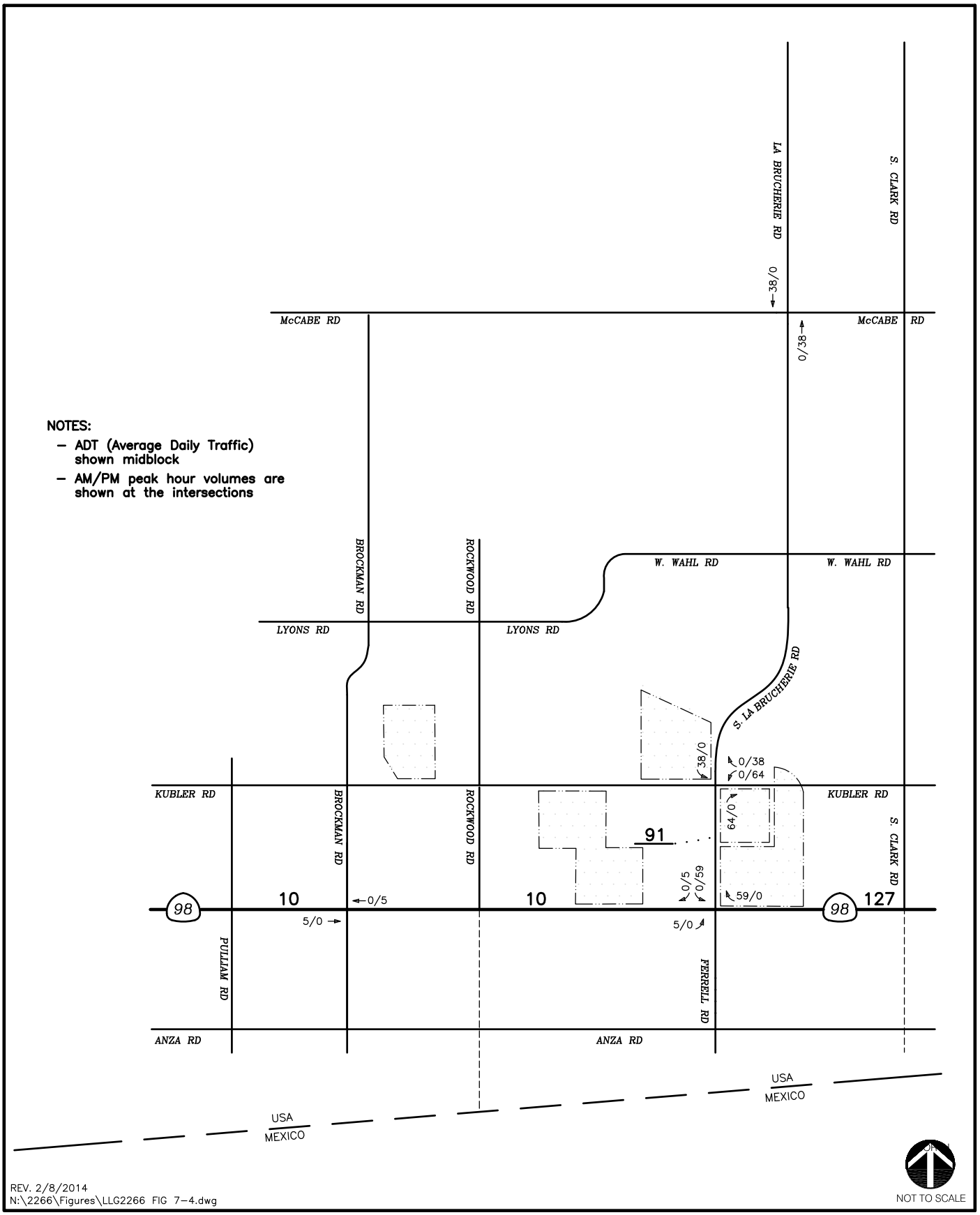

Figure 7-4

Total Construction Project Traffic Volumes AM/PM Peak Hours & ADT

IRIS SOLAR FARM (ISF)

LINSCOTT LAW & GREENSPAN engineers

8.0 CONSTRUCTION YEAR ANALYSIS

Project construction is anticipated to start in 2014. Therefore, a baseline condition representing ambient traffic growth in the area was established. To account for potential cumulative project traffic increases that may occur between 2010 (date of counts) and the construction timeframe, a 5% growth factor was applied to all existing 2010 traffic volumes throughout the study area. This 5% growth would conservatively represent the amount of traffic that may utilize the street system in the project vicinity proposed from future unapproved development projects planned in Imperial County, such as Brookfield 101 Ranch, Alder/Scaroni, Mosiac Specific Plan, and others. ***Figure 8–1*** shows the *Baseline Without Construction Project* traffic volumes in the study area. ***Appendix C*** contains the cumulative traffic data information.

8.1 Baseline Without Construction Project Analysis

8.1.1 *Intersection Operations*

Table 8–1 summarizes the intersection operations throughout the project study area given the projected *Baseline Without Construction Project* traffic volumes. This table shows that all of the unsignalized intersections in the study area are forecasted to operate at LOS C or better during the AM and PM peak hours.

8.1.2 *Segment Analysis*

Table 8–2 summarizes the street segment operations throughout the project study area given the projected *Baseline Without Construction Project* traffic volumes. This table shows that all of the street segments in the study area are forecasted to operate at LOS B or better.

8.2 Baseline With Construction Project Analysis

The Iris site construction project traffic was added to the *Baseline Without Construction Project* traffic, and the potential impacts associated with the proposed project were calculated by comparing the results. The following is a summary of the intersection and segment analyses. ***Figure 8–2*** shows the *Baseline With Construction Project* traffic volumes in the study area.

8.2.1 *Intersection Analysis*

Table 8–1 also summarizes the *Baseline With Construction Project* peak hour intersection operations. As seen in *Table 8–1*, all study area intersections are calculated to operate at LOS D or better with the addition of the Iris site construction project traffic. ***No significant impacts*** are determined. ***Appendix D*** contains the both the *Baseline Without Construction Project* and *Baseline With Construction Project* peak hour intersection analysis worksheets.

8.2.2 *Segment Analysis*

Table 8–2 also summarizes the street segment operations throughout the project study area given the projected *Baseline With Construction Project* traffic volumes. This table shows that all study area segments are calculated to continue to operate at LOS B or better with the addition of construction project traffic. The increase in V/C due to the construction traffic is no greater than 0.01 at these segments, which is considered ***not significant***.

TABLE 8–1
CONSTRUCTION YEAR INTERSECTION OPERATIONS

Intersection	Control Type	Peak Hour	Baseline Without Construction Project Traffic		Baseline With Construction Project Traffic		Δ [c] Delay	Impact Type
			Delay [a]	LOS [b]	Delay	LOS		
1. La Brucherie Road/ McCabe Road	AWSC [d]	AM	22.4	C	25.7	D	3.3	None
		PM	9.0	A	9.2	A	0.2	None
2. La Brucherie Road/ Kubler Road	MSSC [e]	AM	10.6	B	11.8	B	1.2	None
		PM	9.7	A	9.8	A	0.1	None
3. SR 98/ Ferrell Road	MSSC [e]	AM	9.6	A	10.3	B	0.7	None
		PM	10.1	B	10.5	B	0.4	None
4. SR 98/ Brockman Road	MSSC	AM	9.4	A	9.4	A	0.0	None
		PM	9.8	A	9.8	A	0.0	None

Footnotes:
a. Average delay expressed in seconds per vehicle.
b. Level of Service.
c. Δ denotes an increase in delay due to project.
d. AWSC - All-Way STOP Controlled intersection.
e. MWSC – Minor Street Stop Controlled intersection. Minor street left turn delay is reported.

UNSIGNALIZED

Delay	LOS
0.0 ≤ 10.0	A
10.1 to 15.0	B
15.1 to 25.0	C
25.1 to 35.0	D
35.1 to 50.0	E
≥ 50.1	F

TABLE 8–2
CONSTRUCTION YEAR STREET SEGMENT OPERATIONS

Street Segment	Functional Roadway Classification	Existing Capacity (LOS E)[a]	Baseline Without Construction Project Traffic			Baseline With Construction Project Traffic			Δ[e]
			ADT[b]	V/C[c]	LOS[d]	ADT	V/C	LOS	
Ferrell Road									
Kubler Rd to SR 98	2-Ln Local Collector	16,200	840	A	0.05	931	A	0.06	0.01
SR 98									
Pulliam Rd to Brockman Rd	2-Ln Local Collector	16,200	1,840	A	0.11	1,850	A	0.11	>0.01
Brockman Rd to Ferrell Rd	2-Ln Local Collector	16,200	1,820	A	0.11	1,830	A	0.11	>0.01
East of Ferrell Rd	2-Ln Local Collector	16,200	2,420	B	0.15	2,547	B	0.16	0.01

Footnotes:

a. Roadway capacity corresponding to Level of Service E from Imperial County Standard Street Classification, Average Daily Vehicle Trips table.
b. Average Daily Traffic volumes
c. Volume / Capacity ratio.
d. Level of Service
e. Increase in V/C due to construction traffic.

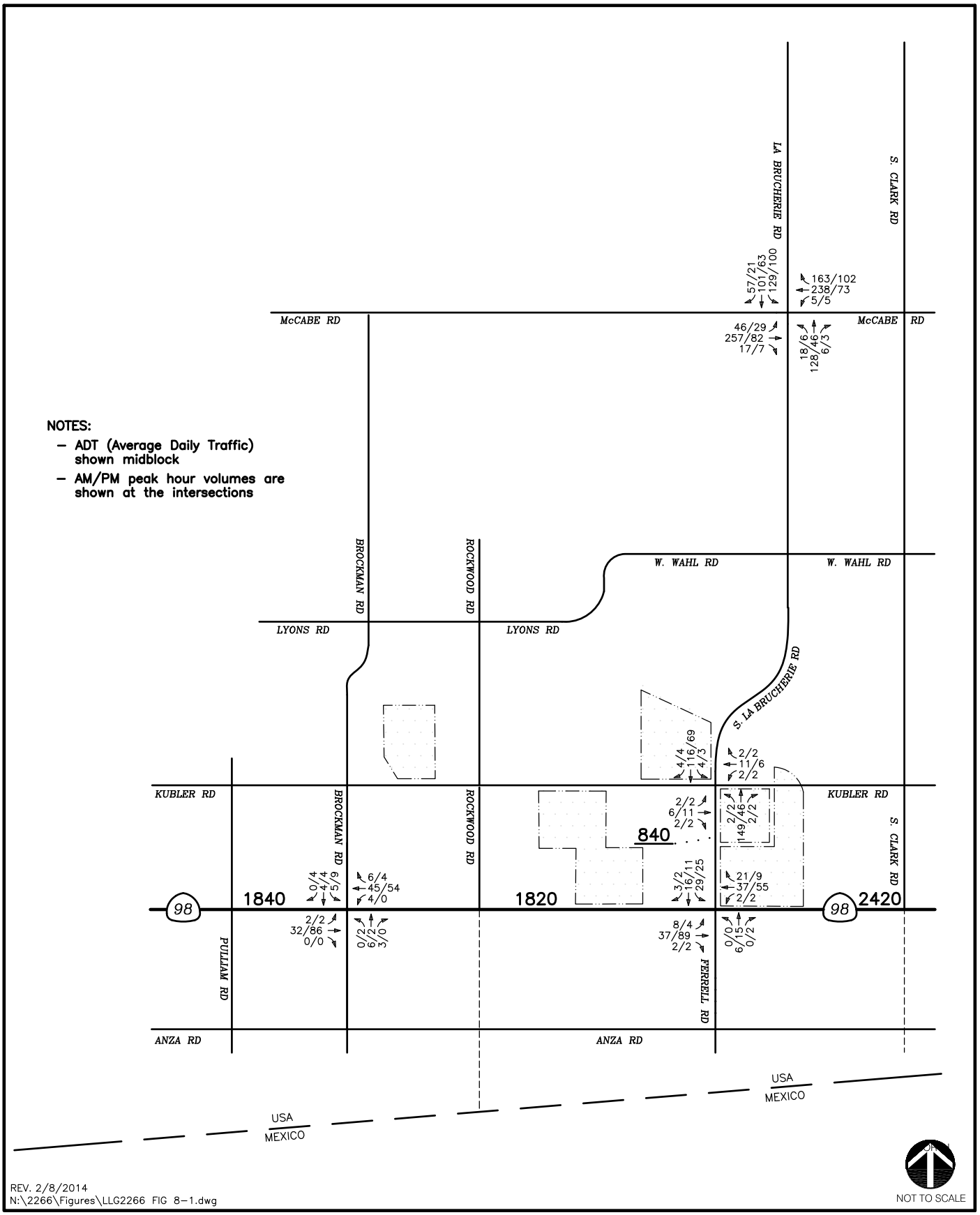

Figure 8-1

Baseline Without Construction Traffic Volumes AM/PM Peak Hours & ADT

IRIS SOLAR FARM (ISF)

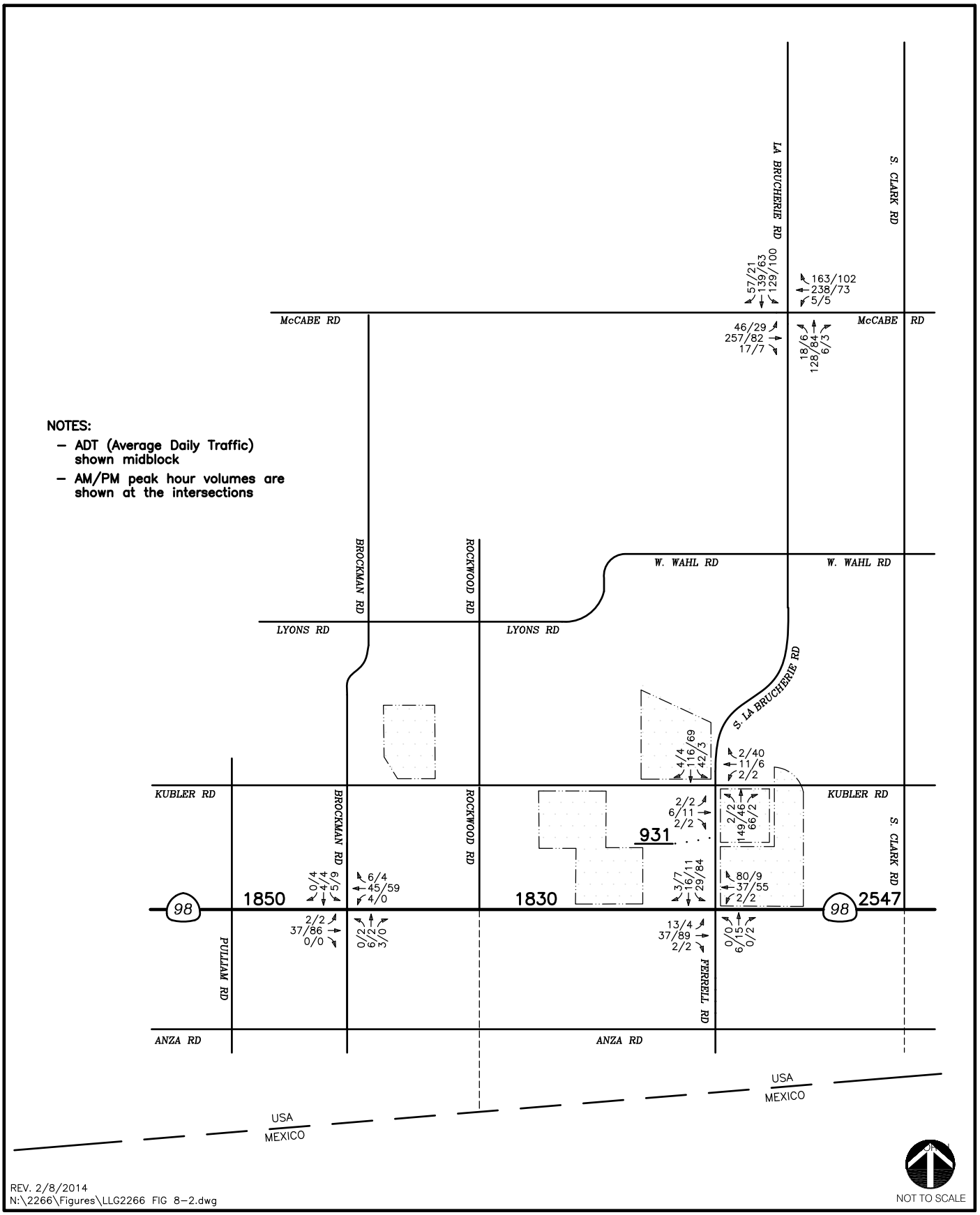

Figure 8-2

Baseline With Total Construction Traffic Volumes AM/PM Peak Hours & ADT

IRIS SOLAR FARM (ISF)

LINSCOTT LAW & GREENSPAN engineers

9.0 POST-CONSTRUCTION OPERATIONAL TRAFFIC

The Operations and Maintenance of the plant subsequent to the construction of the total project will generate, at most, 40 ADT with 10 maximum total peak hour volumes during either peak hour under the shared O&M scenario. This increase is substantially less than the trips generated by the construction traffic, which were demonstrated to cause no significant impacts. Therefore, it is anticipated that the post-construction intersection and segment operations will continue to operate at acceptable levels of service. No impacts associated with Operations and Maintenance would be expected.

10.0 PROJECT ACCESS

The four projects are comprised of ten separate assessor's parcels, generally located on five sites (Ferrell is non-contiguous). Project access to these sites has not been finalized, but it is assumed that access will be dictated by the existing locations of several IID facilities, including the Wistaria Laterals Two, Three & Four, and Wistaria Drain Five. The following is a brief discussion of the access assumptions for each of the projects.

10.1 Lyons

Access to the Lyons site is also anticipated to occur via Kubler Road. Although the site is bound by SR 98 to the south, Wistaria Lateral Two lies between SR 98 and the site, which would necessitate a crossing. The highest directional peak hour construction traffic associated with the Lyons site is 78 driveway trips.

10.2 Rockwood

Access to the Rockwood site is anticipated to occur via Kubler Road utilizing any of several existing driveways that cross over Wistaria Lateral Four. The highest directional peak hour construction traffic associated with the Rockwood site is 31 driveway trips. Ferrell NW

The Ferrell NW site lies north of Kubler Road and west of La Brucherie Road. Access to the Ferrell NW site is anticipated to occur either via La Brucherie Road, utilizing existing driveway that crosses over an existing concrete irrigation ditch, or via Kubler Road using Corda Road, which crosses the Wistaria Canal. The highest directional peak hour construction traffic associated with the Ferrell NW site is 35 driveway trips.

10.3 Ferrell SE

The Ferrell SE site lies south of Kubler Road and east of Ferrell Road. Access to the Ferrell SE site is anticipated to occur via Kubler Road utilizing an existing access road along Wistaria Lateral Three. The highest directional peak hour construction traffic associated with the Ferrell SE site is 35 driveway trips.

10.4 Iris

The Iris site lies east of Ferrell Road and generally south of Kubler Road with the exception of a small parcel north of Kubler Road. The Iris site surrounds the Ferrell SE site on the latter's east and south perimeter. Similar to the Ferrell SE site, access for Iris is anticipated to occur via Kubler Road

utilizing the existing access road along Wistaria Lateral Three. The highest directional peak hour construction traffic associated with the Iris site is 102 driveway trips.

In all cases, the number of maximum peak hour trips (from 10 to 102) would not be expected to result in peak hour congestion to the adjacent roadways based on the low existing traffic volumes in the study area.

11.0 CONCLUSIONS & RECOMMENDATIONS

The capacity analyses performed for the key roadway segments and unsignalized intersections indicate that ***no significant impacts would occur*** during the sequential construction of the four projects comprising the Iris Cluster Solar Farm. The subsequent maintenance and operations stage of the project generate less traffic than does the construction Phase. Therefore, no significant impacts would be associated with maintenance and operations, either.

Concurrent construction of all four projects (five sites) would result in short-term cumulative impacts at the La Brucherie Road/McCabe Road unsignalized intersection, as this intersection receives regional traffic from both the north (Interstate 8) and the east (State Route-SR-111). Concurrent development with other solar farm projects in the area could result in similar impacts.

Were the cluster to be developed concurrently, or in conjunction with other solar farms in the Mt. Signal area, consideration should be given to either a) staggering AM work hours between 6AM and 9 AM, and/or b) requiring employees from the north and east to utilize SR 98 via SR 111. Both of these strategies would reduce potential cumulative impacts to the La Brucherie Road/McCabe Road unsignalized intersection.