Appendix K
Transportation Analysis

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MEMORANDUM

To:	Michael Haberkorn Gatzke Dillon & Ballance LLP	Date:	5-24-2023
From:	John Boarman, P.E. LLG, Engineers	LLG Ref:	3-22-3658
Subject:	SDSU Brawley STEM Facility, Transportation Analysis		

The purpose of this technical memorandum is to analyze the potential transportation impacts related to construction and development of the proposed STEM (science, technology, engineering, and mathematics) building to be constructed on the Brawley campus of San Diego State University (SDSU) (Project or proposed Project). The transportation impacts associated with development of the Brawley campus were analyzed previously in the certified 2003 SDSU Imperial Valley Master Plan Project environmental impact report (EIR), SCH No. 200251010. The EIR analyzed the potential transportation-related impacts associated with development of a Campus Master Plan that would serve a student enrollment up to 850 full-time equivalent (FTE) students. The proposed Project does not include/propose an increase in the previously authorized and approved maximum student enrollment of 850 FTE, nor would the proposed Project result in an FTE enrollment above the previously approved 850.[1]

PROJECT DESCRIPTION

The proposed Project consists of the construction of a new standalone building that would house laboratory, lecture, and research space on the SDSU Brawley campus. The new building would be located on a vacant site in the southwest portion of the campus that was designated for development on the approved Brawley Campus Master Plan. Specifically, the STEM building would be located generally on the site of Building 102, as shown on the Campus Master Plan and previously analyzed and approved as part of the 2003 EIR. See ***Figure C***, Proposed Building.

The proposed building would consist of approximately 66,000 gross square feet ("GSF"), with 43,000 assignable square feet ("ASF"). The structure would include lower and upper division teaching labs, interdisciplinary lecture space, 45 faculty/administrative offices, research and research services space, conference rooms, and mechanical/electrical/telecommunication support space. The facility also will include 20,000 ASF of labs, core facilities with major instruments, and experimental fabrication space for collaborative work with public and private partners.

[1] A full-time equivalent (FTE) student is a student taking a full course load of 15 credits. Three part-time students, each taking five credits, would be considered one FTE student.

The new building would accommodate a portion of the previously approved 850 FTE students; the proposed Project does *not* include or propose an increase in student enrollment over the previously approved level. Existing faculty plus four new faculty members would staff the new facility; no other additional university staff or personnel would be added to the campus population as a result of the proposed Project.[2]

Figure A shows a project vicinity map, depicting the location of the existing campus structures. ***Figure B*** shows a project area map. *Figure C* contains a map of the proposed building.

A summary of the traffic impact analysis presented in the 2003 EIR in support of the approved Campus Master Plan is presented below, followed by additional analysis specific to the proposed Project.

A. Campus Master Plan EIR Traffic Impact Analysis

In 2003, Linscott, Law and Greenspan (LLG) conducted a traffic impact analysis (TIA) pursuant to the requirements of the California Environmental Quality Act (CEQA) for the then proposed SDSU Brawley Campus Master Plan. The Brawley campus is located in the eastern portion of the city of Brawley, approximately one-quarter mile west of McConnell Road on the north side of SR-78. The TIA analyzed the potential transportation-related impacts associated with development of the campus, including an FTE student enrollment of 850. The project analyzed in the traffic study included the development of new classrooms and administrative buildings that would provide the necessary facilities to serve up to 850 FTE students. The complete traffic study, *Traffic Impact Analysis San Diego State University Off-Campus Center Brawley, California* (March 19, 2003, LLG), is attached to this memorandum as ***Appendix A***.

Table 2 of the TIA shows that the campus at buildout, with an enrollment of 850 FTE students, would generate 2,000 Average Daily Trips (ADT), with 170 AM peak hour trips and 200 PM peak hour trips. LLG used the Institute of Traffic Engineers (ITE) trip rates to calculate the number of peak hour trips that would be generated by the campus at buildout.

The study area analyzed in the TIA included the following 8 intersections and 6 street segments (See TIA Tables 3A and 4).

Intersections:

1. SR-78 / SR-86

[2] SDSU reports that approximately 45 FTE students were enrolled for the Fall 2022 semester at the Brawley campus.

2. SR-78 / SR-111 W.
3. SR-111 / Shank Road
4. SR-78 / SR-111
5. SR-78 / Project Access Driveway
6. SR-78 / McConnell Road
7. McConnell Road / Schwartz Road
8. SR-78 / Seybert Road

Street Segments:

1. SR-78: West of SR-86 S.
2. SR-78: SR-86 S. to SR-111 W.
3. SR-78: SR-111 S. to McConnell Road
4. SR-78: McConnell Road to SR-115
5. SR-86: South of SR-78
6. SR-111: North of Shank Road
7. SR-111: South of SR-78

The analysis presented in the TIA concluded that the future Brawley campus, with a buildout enrollment of 850 FTE students, would result in significant cumulative impacts at the SR-78 / SR-111 intersection, the segment of SR-111 south of SR-78, and at the campus access point to SR-78.

To mitigate the identified significant impacts, the Final EIR included the following mitigation measures, which were drafted based on the improvements recommended in the TIA (see Final EIR Mitigation Monitoring and Reporting Program (MMRP) page 11-3). The mitigation measures were adopted by the California State University Board of Trustees, and all of the improvements encompassed by the measures have been implemented to date, with the exception of signalization of the SR-78 / SR-111 intersection because the necessary signal warrants have not yet been met (i.e., the intersection does not yet generate sufficient traffic volumes to warrant signalization). (Existing/current road configurations were noted via Google Maps.)

- Provision of an eastbound left-turn pocket and a westbound right-turn pocket on SR-78 at the project access point, provision of a dedicated southbound left-turn lane and right-turn lane at the project driveway approaching SR-78 shall be completed by Caltrans.
- Caltrans shall ensure that County of Imperial standards are applied to the corner sight distance at the campus access point.
- The eventual signalization of the SR-78 / SR-111 intersection, including dedicated northbound left-turn lane with a shared through-right turn lane shall be completed by Caltrans.

  Note that in addition to the above described improvements, right-of-way consistent with Caltrans standards has been dedicated along the project frontage. As previously mentioned, the access point to SR-78 at the SR-78 / SR-111 intersection remains unsignalized since signal warrants are not met.

B. Project Specific Analysis

The analysis presented below addresses the potential project-specific transportation related impacts associated with construction and development of the STEM building. The previously certified EIR analyzed the potential traffic impacts associated with development of the current approved Brawley Campus Master Plan at a program level of review. As previously noted, that analysis considered the potential impacts associated with a student enrollment of 850 FTE students. Because the proposed Project would not increase student enrollment beyond the number analyzed in the 2003 TIA and related EIR, no further analyses of vehicle trips that would be generated by the student body or faculty/staff is necessary or required.

The following thresholds of significance are based on CEQA Guidelines Appendix G, XVII Transportation. The proposed project would have a potential significant transportation-related effect if the project would:

a) Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?

b) Conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b)?

c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

d) Result in inadequate emergency access?

Would the project conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?

The proposed Project would be constructed and developed consistent with the previously approved 2003 Campus Master Plan for the SDSU Brawley campus. The Project would be built generally on the site of Building 102 as designated on the approved Campus Master Plan. Additionally, the proposed Project does not include any improvements to the Brawley circulation system, including transit, roadway, bicycle, or pedestrian facilities. Any improvements constructed relating to the proposed Project would be constructed on-site and would be consistent with the Campus Master Plan and any applicable CSU policies. Accordingly, the impacts would be **less than significant.**

Would the project conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b)?

CEQA Guidelines section 15064.3, subdivision (b), provides the criteria for analyzing transportation impacts based on a vehicle miles traveled (VMT) metric. Generally, VMT exceeding an applicable threshold of significance may indicate a significant impact requiring mitigation. Projects that decrease VMT in the project area compared to existing conditions should be presumed to have a less than significant transportation impact. Additionally, if existing models or methods are not available to estimate the VMT for a particular project, a lead agency may analyze the project's VMT qualitatively, taking into account such factors as the availability of transit, proximity to other destinations, etc. For many projects, a qualitative analysis of construction traffic may be appropriate. A lead agency has discretion to choose the most appropriate methodology to evaluate a project's VMT.

In terms of construction traffic, construction of the proposed Project would entail 7,500 cubic yards of fill that would be cut on campus and then reused on the Project site. Because the cut and fill process will be balanced on-site, there would be no import or export related vehicle trips and no VMT generated in connection with this process. As to vehicle trips generated by material deliveries, worker trips, etc., based on the relatively small building to be constructed (66,000 SF), it is our professional judgment that construction-related trips would generate a nominal amount of vehicle trips and associated VMT. Moreover, VMT associated with heavy duty truck trips (as opposed to light-duty and passenger vehicle trips) is not considered as part of the CEQA VMT analysis. For these reasons, impacts related to construction-related vehicle trips would be **less than significant**.

As to those vehicle trips that would be generated in connection with operation of the STEM building, as previously explained, vehicle trips associated with a student

enrollment of 850 FTE were previously analyzed as part of the 2003 certified EIR, with appropriate mitigation recommended and implemented. As the proposed Project would not increase, or result in an increase above, the previously approved enrollment, there would be no additional vehicle trips associated with the operation of the Project and, therefore, no further analysis under CEQA is required.

For information purposes, we note that one of the key inputs into VMT calculations is trip length. The presence of the SDSU satellite campus in Brawley allows students that live in Brawley or elsewhere in Imperial County to drive a shorter distance than if they attended another university. For instance, a student living in downtown Brawley would need to drive 6 miles one-way to the SDSU Brawley campus. However, if that same student were to attend SDSU or UC Riverside, the student would need to travel a much greater distance and, thereby, would generate substantially more VMT.

For comparative purposes, we note that the distances to other comparable campuses are much longer.

- Brawley to San Diego State University 120 miles
- Brawley to UC Riverside 160 miles
- Brawley to CSU San Bernardino 150 miles

Due to the far greater distances to travel to other universities, it is reasonable to conclude that the proposed Project would result in reduced trip lengths and, hence, reduced VMT than if the student were traveling to another campus.

Thus, the STEM facility is analogous to opening a neighborhood Starbucks or other local serving facility. These types of facilities are presumed under VMT analyses to shorten trips and reduce areawide VMT because the patrons of such establishments no longer need to travel to more distant locations. (See, Office of Planning and Research (OPR) Technical Advisory (December 2018, page 16.). For these reasons, it is our professional judgment that the proposed Project would have an overall positive effect on VMT.

Would the project substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

The proposed Project would not increase transportation / geometric "hazards" as all Project traffic would use the existing campus access driveway, which is built to Caltrans standards. Any internal campus roads that would be built as part of the project would be designed to applicable standards and as such would not include

sharp curves or dangerous intersections. Additionally, the Project does not include incompatible uses that would require the use of corresponding equipment incompatible with existing vehicular traffic, such as farm equipment. For these reasons, impacts related to hazards would be **less than significant**.

Would the project result in inadequate emergency access?

Under the proposed project, emergency access would be provided, as it currently is, via the campus access point to SR-78. Since this access is built to Caltrans standards and the proposed project would not alter the existing access, adequate emergency access would be maintained. As such, impacts related to emergency access would be **less than significant**.

cc: File

Attachments: ***Figure A***: Vicinity Map
Figure B: Project Area Map
Figure C: Proposed Building
Appendix A:2003 Traffic Impact Analysis

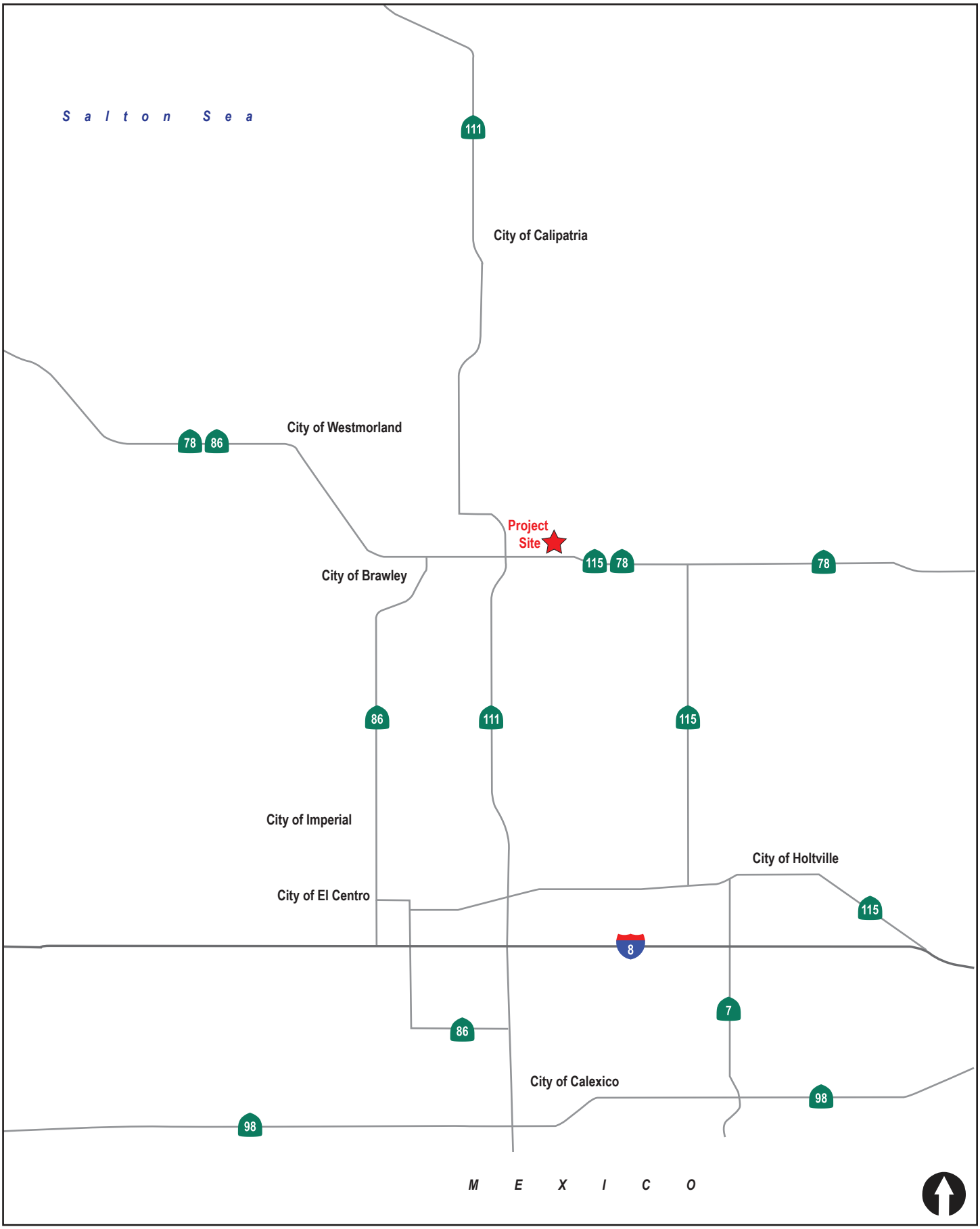

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Figure A

Vicinity Map

BRAWLEY STEM FACILITY

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Figure B

Project Area Map

BRAWLEY STEM FACILITY

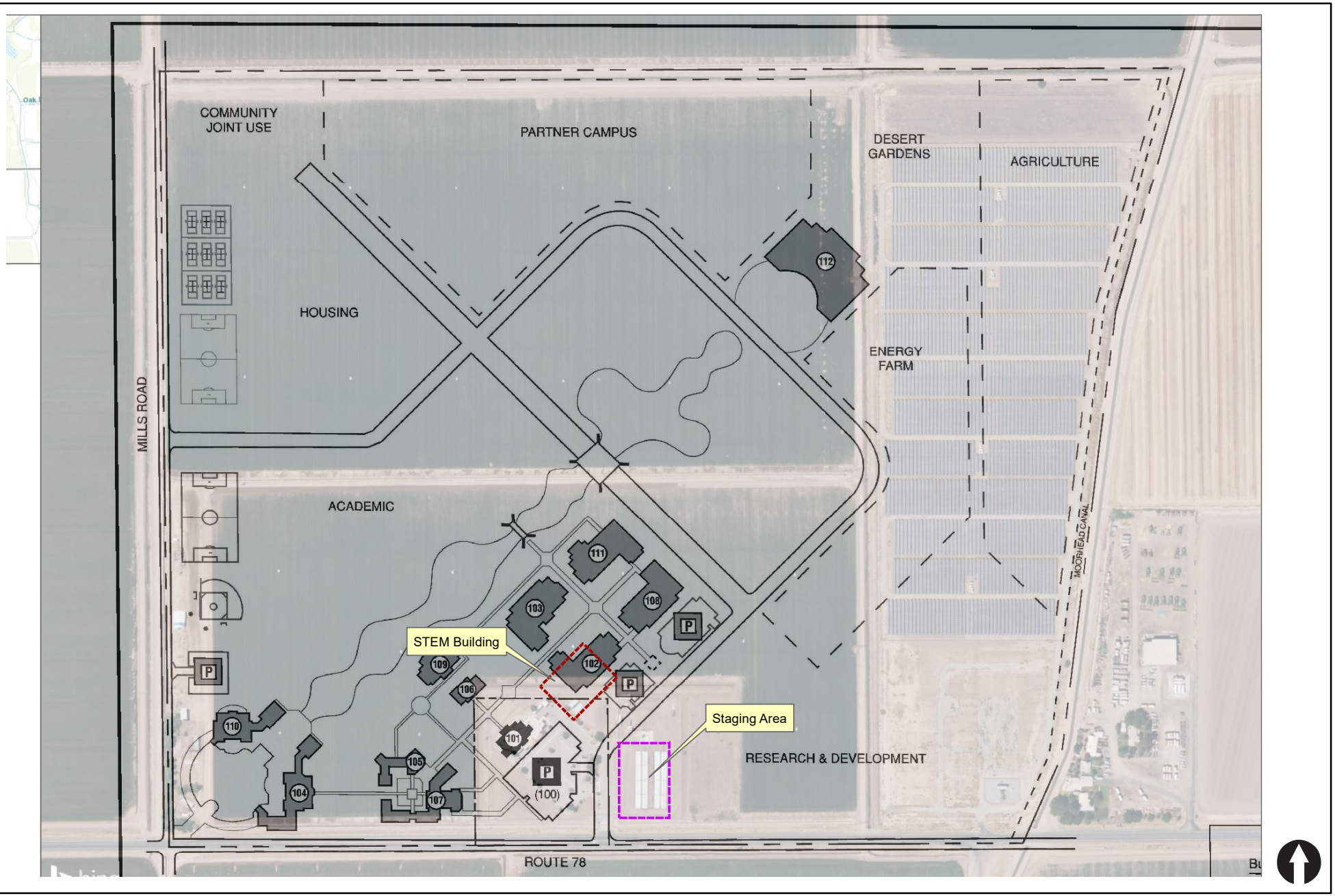

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Figure C

Proposed Building

BRAWLEY STEM FACILITY

APPENDIX A

2003 TRAFFIC STUDY

TRAFFIC IMPACT ANALYSIS
SAN DIEGO STATE UNIVERSITY OFF-CAMPUS CENTER
BRAWLEY, CALIFORNIA

February 13, 2003
Revised: March 19, 2003

Prepared by:

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3-02-1166

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TRAFFIC IMPACT ANALYSIS
SAN DIEGO STATE UNIVERSITY OFF-CAMPUS CENTER
BRAWLEY, CALIFORNIA

1.0 INTRODUCTION

Linscott, Law & Greenspan Engineers (LLG) has been retained to assess the traffic implications due to the construction of an off-campus center, operated by San Diego State University in the City of Brawley. The campus would be constructed in two phases. The first phase of the project would be limited to 350 full time equivalent students (FTE) and the second phase would increase the equivalent enrollment to 850 (FTE).

Figure 1 sets out the site vicinity.

The subject site is located in the eastern portion of the City of Brawley, approximately one quarter-mile west of McConnell Road and one and a-quarter-miles east of Best Road on the north side of State Route 78 (SR 78). Access will be provided via one driveway to SR 78.

1.1 Study Methodology

The following study methodology was adopted for the traffic study, and can be broken into three distinct steps. The first step involved the assessment of the existing traffic conditions in the study area, and includes an inventory of roadway geometries, observations of traffic flow, and the collection of peak period traffic counts.

In the second step of the study, future traffic conditions were forecasted building on the collected existing data. Traffic forecasts reflect traffic generation and the distribution of project traffic.

The third step involved intersection and street segment performance analysis and identification of operational issues. Significant impacts, within the study area were identified, and mitigation measures recommended as appropriate.

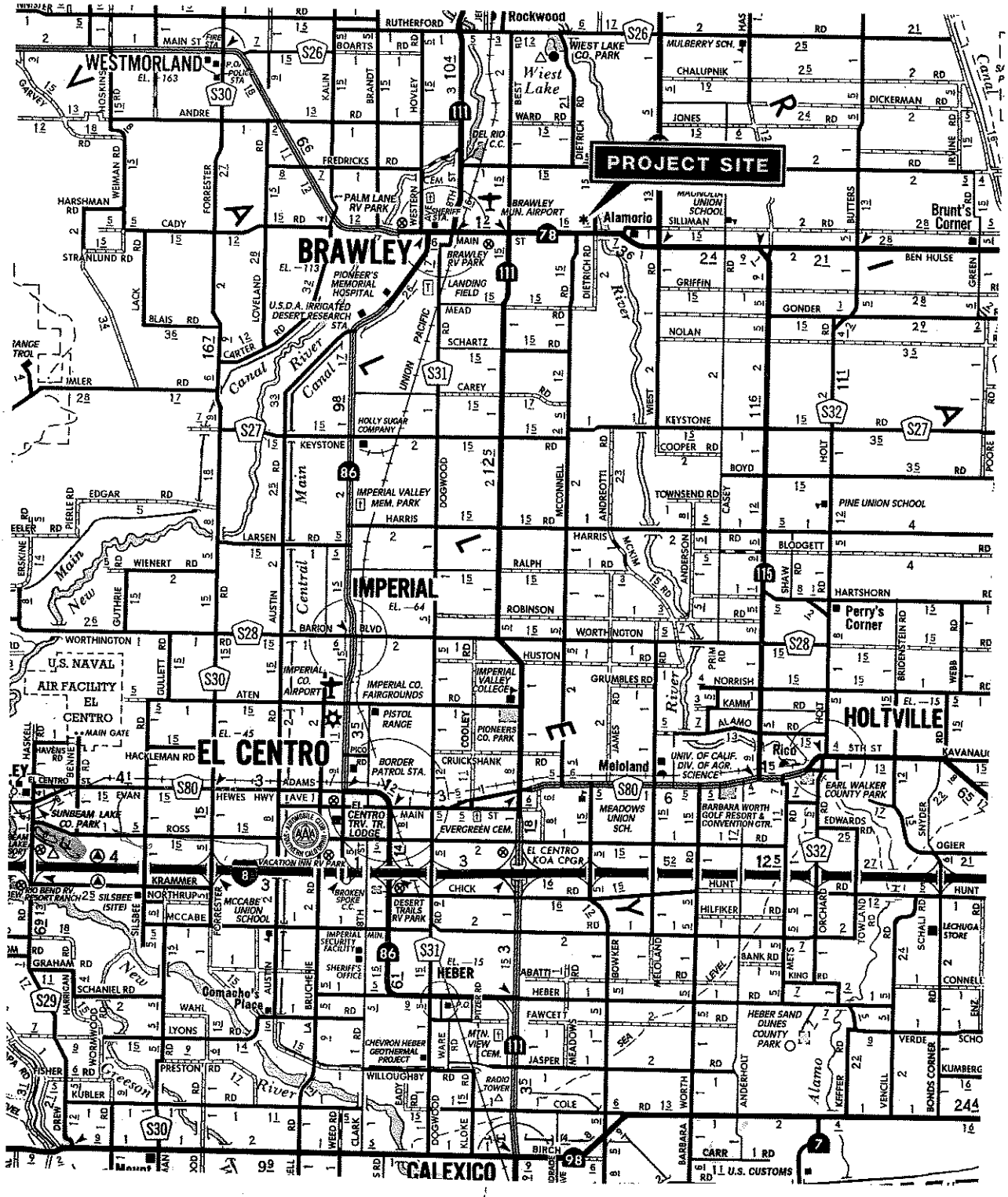

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Figure 1

VICINITY MAP

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1.2 Study Area

The study area for this project encompasses areas of anticipated impact related to the project. Intersections where the project is anticipated to add over 50 peak hour trips were analyzed.

Included in this traffic study are the following chapters:

- Site Context;
- Traffic Forecasts;
- Traffic Operational Analysis;
- Year 2030 Operations; and
- Significance of impacts/Mitigation measures.

2.0 SITE CONTEXT

2.1 Project Description

The project proposes to construct an off-campus center, which would be operated by San Diego State University (SDSU). The project includes the development of new classrooms and administrative buildings to provide facilities for up to 850 full time equivalent students (FTE). The campus will be constructed in two phases, with the first phase of the project accommodating 350 FTE and the second phase accommodating the ultimate number of students at 850 FTE, an increase of 500 FTE. The campus is located in the eastern portion of the City of Brawley, approximately one quarter-mile west of McConnell Road and one and a-quarter-miles east of Best Road on the north side of State Highway 78.

Phase I is anticipated to be completed in 1 year and Phase II by 2009.

Access to campus parking will be via one driveway to SR 78 and serve two main parking areas on the eastern side of the campus. **Appendix A** contains the conceptual site plan.

2.2 Existing Street System

According to County of Imperial Public Road Standards, Primary Arterials should be 80 feet wide in 100 feet of Right-of-Way (R/W), providing four thru lanes, and a raised or painted median. Major Roads should be 60 feet wide in 80 feet of R/W, providing four undivided thru lanes, and curbside parking. Collectors should be 40 feet wide in 60 feet of R/W providing two-thru undivided lanes.

The following is a general description of the roadways in the project area. **Figure 2** depicts the existing conditions including the lane geometrics of the key intersections in the study area.

State Route 78 is classified as a State Highway on the Imperial County Circulation Element and is an east/west route within the project area. State Route 78 is constructed as a four-lane conventional highway (two travel lanes in each direction) from SR 86 to SR 111 through the incorporated City of Brawley. This portion of SR 78 provides no bike lanes, but does provide bus stops and has a posted speed limit of 30 mph. A portion of SR 78 between SR 111 W. and SR 111 S. is constructed as a 4-lane undivided roadway with a Two Way Left turn lane (TWLTL) median. East of SR 111, SR 78 is constructed as a two-lane undivided roadway providing no bike lanes or bus stops. This portion of SR 78 has a posted speed limit of 65 mph.

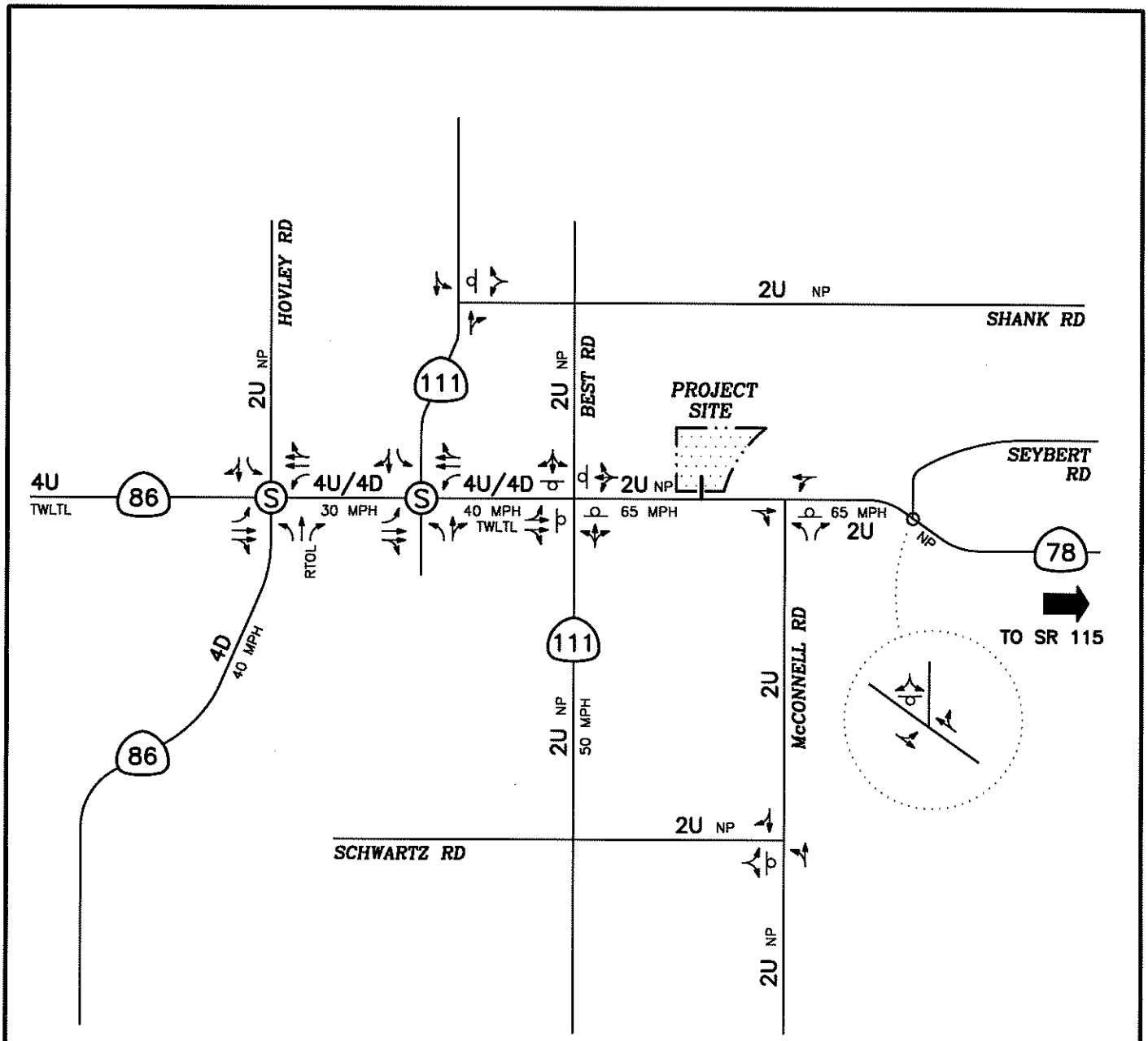

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Figure 2

EXISTING CONDITIONS DIAGRAM

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State Route 111 is classified as a State Highway on the Imperial County Circulation Element and is a north/south route within the project area. SR 111 is constructed as a 2-lane undivided roadway providing no bike lanes or bus stops, and a posted speed limit of 50 mph. SR 111 W. is currently offset to the west from the southern portion of SR 111, which runs from SR 78 south to I-8.

State Route 86 (SR 86) is classified as a State Highway on the Imperial County Circulation Element and is a north/south route within the project area. This facility parallels the western side of the Salton Sea, joining with SR 78 south of Salton City, and continues through Westmorland to Brawley and terminates at SR 111. SR 86 is constructed as a four-lane roadway within the project vicinity providing no bike lanes or bus stops. Parking is prohibited along both sides of the roadway.

Hovley Road is an unclassified 2-lane roadway within the City of Brawley providing no bike lanes or Bus stops. Parking is permitted along both sides of the roadway.

Best Road is an unclassified 2-lane undivided roadway within the City of Brawley providing no bike lanes or Bus stops. Parking is prohibited along both sides of the roadway.

McConnell Road is classified as a Local Collector in the Imperial County Circulation Element. It is currently constructed as a two-lane undivided roadway with no posted speed limit or bike lanes within the project area.

Shank Road is classified as a Local Collector in the Imperial County Circulation Element. It is currently constructed as a two-lane undivided roadway with no posted speed limit or bike lanes within the project area.

Seybert Road is an unclassified 2-lane undivided roadway within the City of Brawley providing no bike lanes or Bus stops. Parking is prohibited along both sides of the roadway.

Schwartz Road is an unclassified 2-lane undivided roadway within the City of Brawley providing no bike lanes or Bus stops. Parking is prohibited along both sides of the roadway.

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3.0 TRAFFIC FORECASTS

3.1 Existing Traffic Volumes

Existing weekday morning and afternoon traffic volumes were established at key area intersections to capture peak commuter activity. Existing AM and PM counts were conducted by LLG in March 2002 at the key intersections selected for analysis. Existing Average Daily Traffic (ADT) volumes were obtained from the *Caltrans State Highway Traffic Volumes Book* (Year 2000). **Table 1** displays the existing ADTs. **Figure 3** depicts the existing AM / PM peak hour turning movement counts and ADTs within the study area. **Appendix B** contains copies of the intersection manual and ADT volumes sheets. The key signalized and unsignalized intersections within the project area are listed below:

Signalized Intersections

- SR 78 / SR 86; and
- SR 78 / SR 111 (West).

Unsignalized Intersections

- SR 78 / SR 111 (South);
- SR 78 / Project Access Driveway;
- SR 78/ McConnell Road;
- SR 78/ Seybert Road;
- SR 111/ Shank Road; and
- McConnell Road/Schwartz Road.

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Table 1
Existing Daily Traffic Volumes

SEGMENT	YEAR	ADT
SR 78		
West of SR 86	2000	18,600
SR 86 to SR 111 (West)	2000	26,000
SR 111 (South) to SR 115	2000	3,200
SR 86		
South of SR 78	2000	17,400
SR 111		
North of Shank Road	2000	6,200
South of SR 78	2000	7,300

Source: Caltrans Highway Traffic Volumes, 2000
1) ADT – Average Daily Traffic Volume

3.2 Project Traffic Generation

Trip generation estimates for the proposed development were calculated based on Institute of Transportation Engineers (ITE) rates for a College Campus. The amount of equivalent students (850) used to formulate a trip generation were based on the *Enrollment Needs Study for Imperial County prepared* by the California State University Chancellor's office in July 2001. **Table 2** tabulates the project traffic generation for phases I and II. The project is calculated to ultimately generate approximately 2,000 ADT with 130 inbound / 40 outbound trips during the AM peak hour and 60 inbound / 140 outbound trips during the PM peak hour. It should be noted that it was found that deriving the project trip generation based on acreage (Phase I acreage is 5.04) rather than students (FTE) would result in less traffic. Therefore, using students as the trip generation variable results in a conservative estimation of traffic.

Table 2
Project Trip Generation

PHASE	LAND USE	AMOUNT	DAILY TRIP ENDS		AM PEAK HOUR				PM PEAK HOUR			
			RATE	ADT	PEAK %	IN:OUT	VOLUME IN	VOLUME OUT	PEAK %	IN:OUT	VOLUME IN	VOLUME OUT
I	College Campus	350 Students	2.38[2]	830	9%	75:25	50	20	10%	30:70	25	60
II		850[1] Students	2.38[2]	2,000	9%	75:25	130	40	10%	30:70	60	140

NOTES:
1 850 (FTE) students based on findings concluded from *Enrollment Needs Study for Imperial County.*
2 Source: Institute of Transportation Engineers Manual, 5th Ed., Code 550.
3 ADTs rounded to nearest 100 and peak hour volumes rounded to nearest 5.

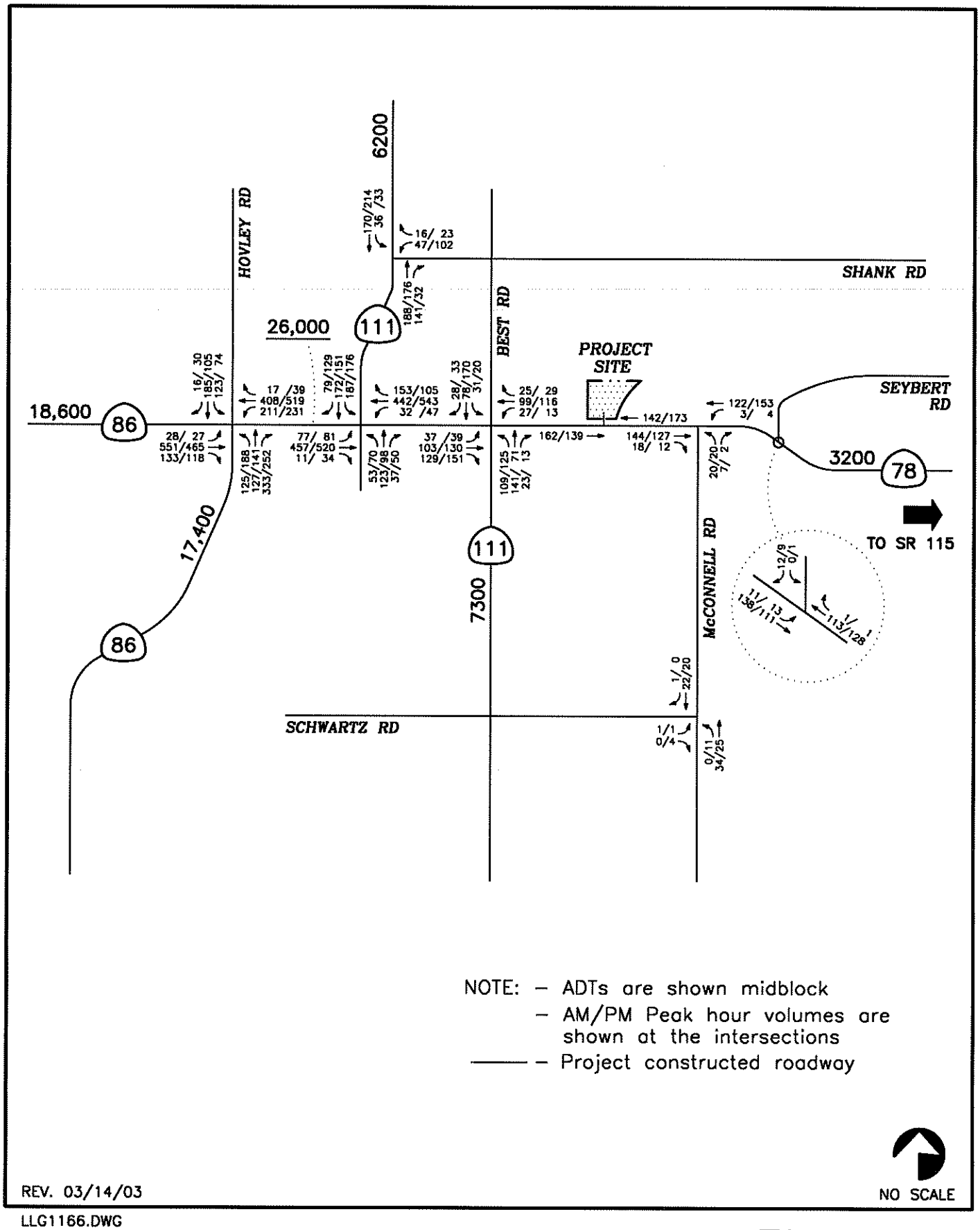

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Figure 3

EXISTING TRAFFIC VOLUMES AM/PM PEAK HOURS & ADTs

SDSU BRAWLEY

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3.3 Project Traffic Distribution / Assignment

The project-generated traffic was distributed and assigned to the street system based on roadway system characteristics (i.e. project's proximity to SR 78, SR 86, and SR 111), and Table 6A from the *Enrollment Needs Study for Imperial County* depicting Imperial County Regional Populations and Imperial Valley Campus (IVC) Enrollments. This table is included in **Appendix C**. Project traffic will access parking via SR 78 only. Appendix A contains the conceptual site plan.

Figure 4 shows the project trip distribution percentages. **Figure 5** shows the assignment of project phase I traffic and **Figure 5a** show the assignment of the ultimate total project traffic. **Figure 6** shows the existing + project phase I traffic.

3.4 Cumulative Projects

Since there are other potential projects in the area which could generate traffic in the near term, additional cumulative traffic was added to the existing + project traffic volumes. Three specific projects were included as outlined below, based on discussions with County staff. **Appendix D** contains the cumulative traffic data utilized for this report.

Brawley Beef Processing Plant is a proposed beef processing facility located north of Shank Road and east of SR 111. The project is calculated to generate 918 ADT, with 365 inbound/65 outbound trips during the AM peak hour and 65 inbound/365 outbound trips during the PM peak hour. Traffic data was taken from traffic study prepared by Darnell & Associates (July 2000).

Luckey Ranch is a proposed mixed-use development within the City of Brawley and extending into the County of Imperial. The project consists of single and multi-family housing, commercial and industrial usage, as well as community and neighborhood parks. For the purpose of this report, Phase I (0-5 years) project traffic was utilized for near-term cumulative traffic data. The entire project is included in the 2030 analysis as a long-term cumulative project. Phase I of the project is estimated to generate 6,047 ADT with 615 inbound/134 outbound trips during the AM peak hour and 131 inbound/493 outbound trips during the PM peak hour. Appendix D contains the trip generation table calculated by LLG. Traffic data was taken from traffic study prepared by Darnell & Associates (July 1999). Unfortunately, this study only includes an ADT assignment of project traffic and not a peak hour assignment.

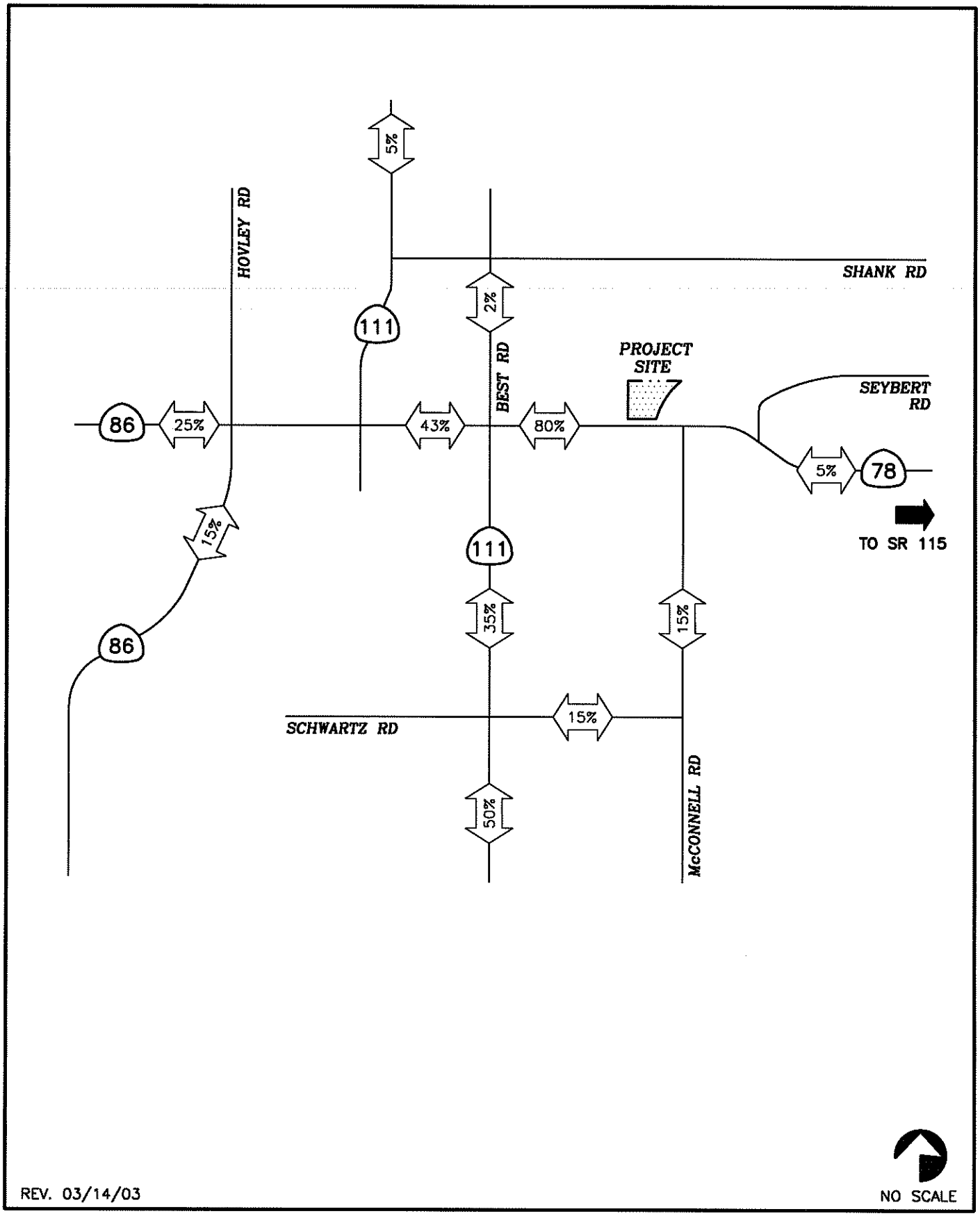

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Figure 4

REGIONAL TRIP DISTRIBUTION

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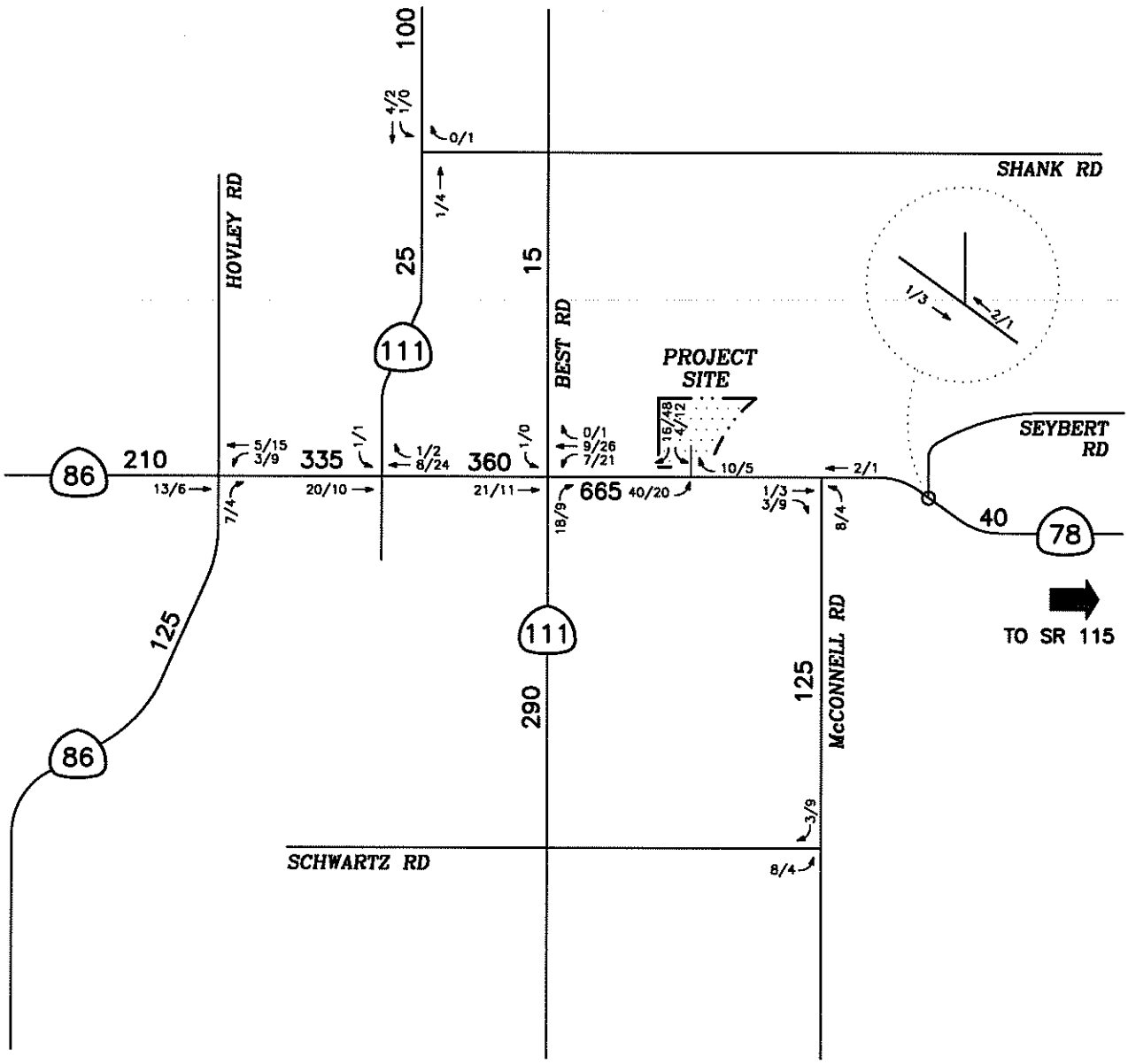

NOTE: – ADTs are shown midblock
– AM/PM Peak hour volumes are shown at the intersections

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Figure 5

PHASE I PROJECT TRAFFIC VOLUMES AM/PM PEAK HOURS & ADTs

SDSU BRAWLEY

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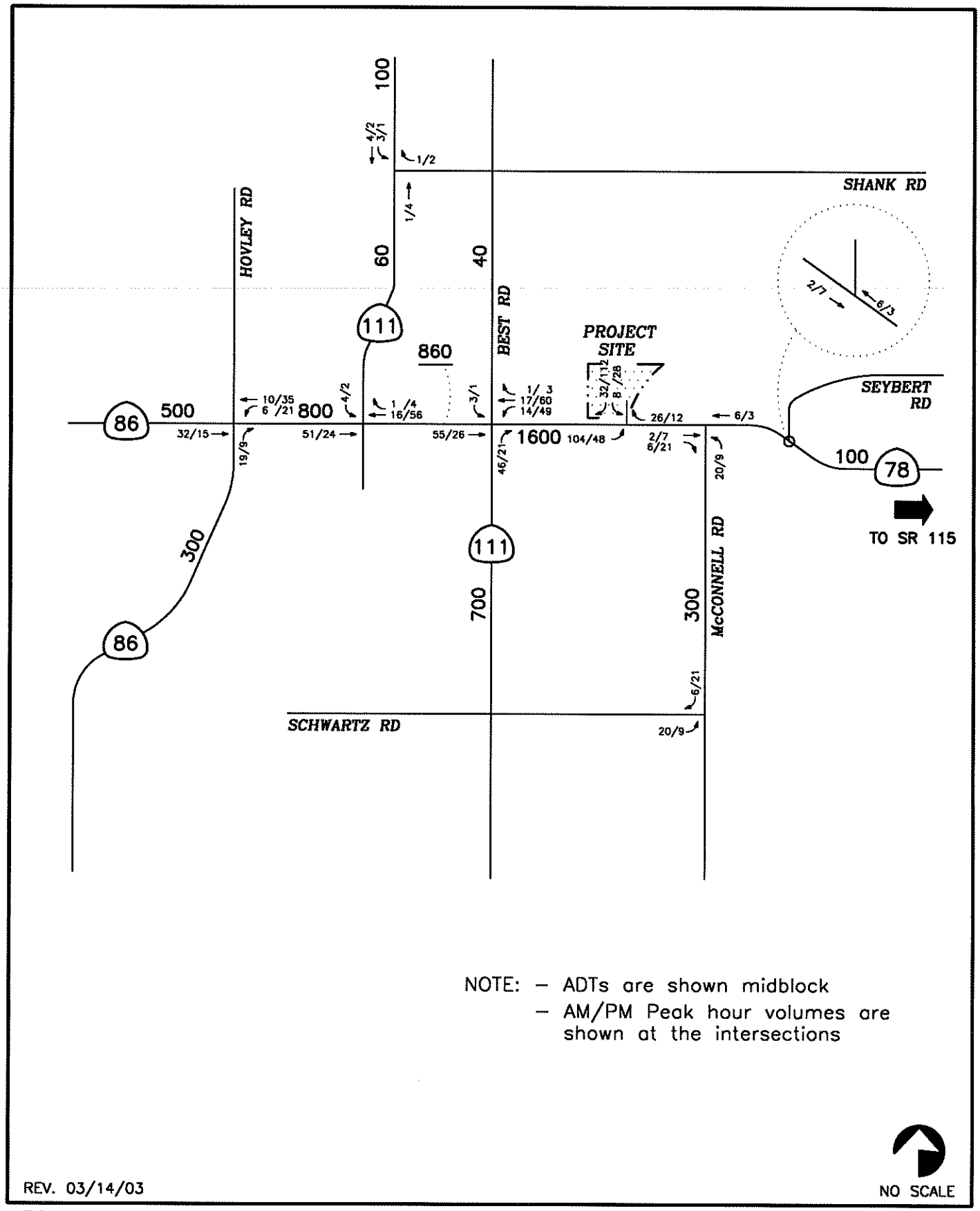

NOTE: – ADTs are shown midblock
– AM/PM Peak hour volumes are shown at the intersections

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Figure 5a

TOTAL PROJECT (Phases I & II) TRAFFIC VOLUMES AM/PM PEAK HOURS & ADTs

SDSU BRAWLEY

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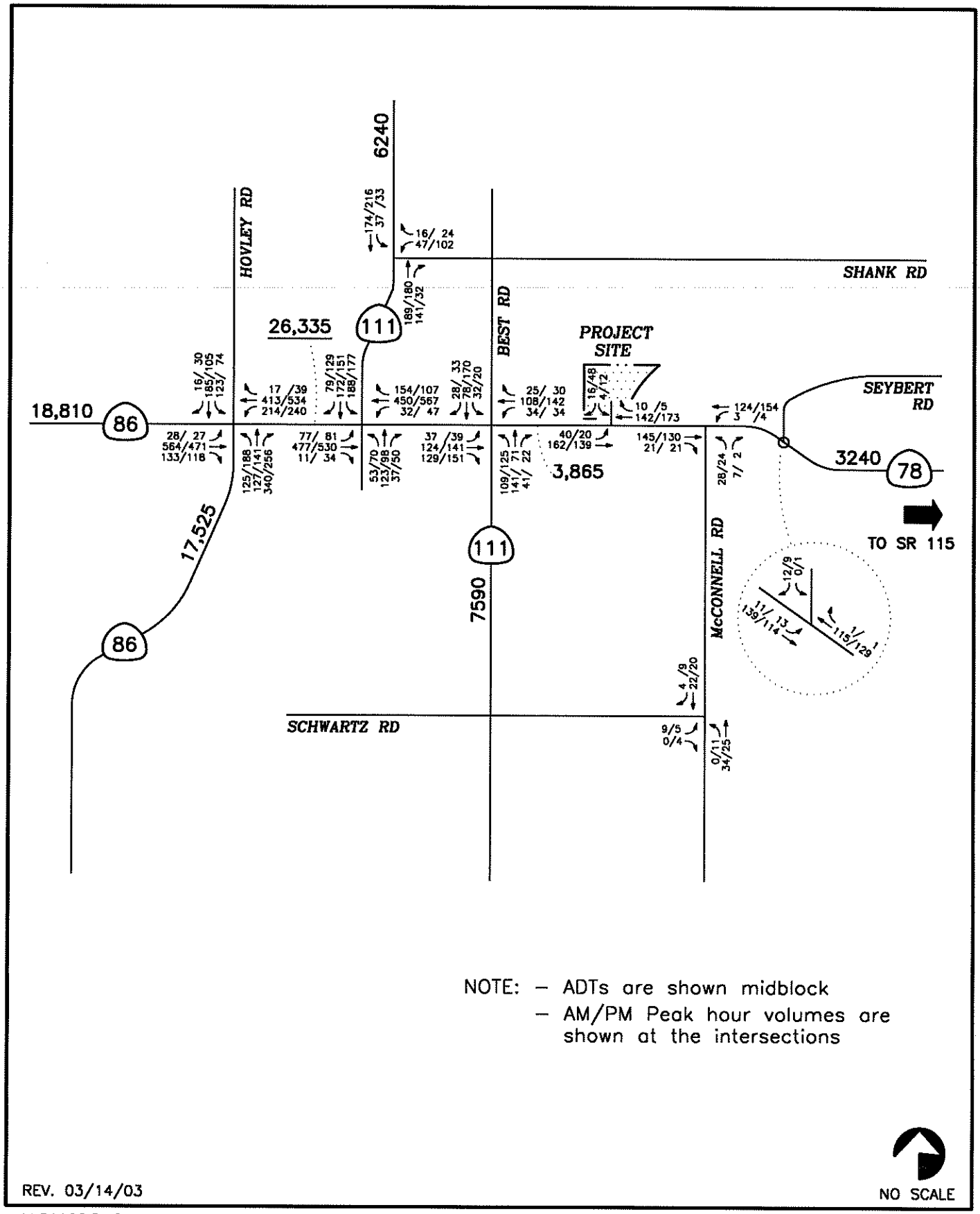

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Figure 6

EXISTING + PROJECT PHASE I TRAFFIC VOLUMES AM/PM PEAK HOURS & ADTs

SDSU BRAWLEY

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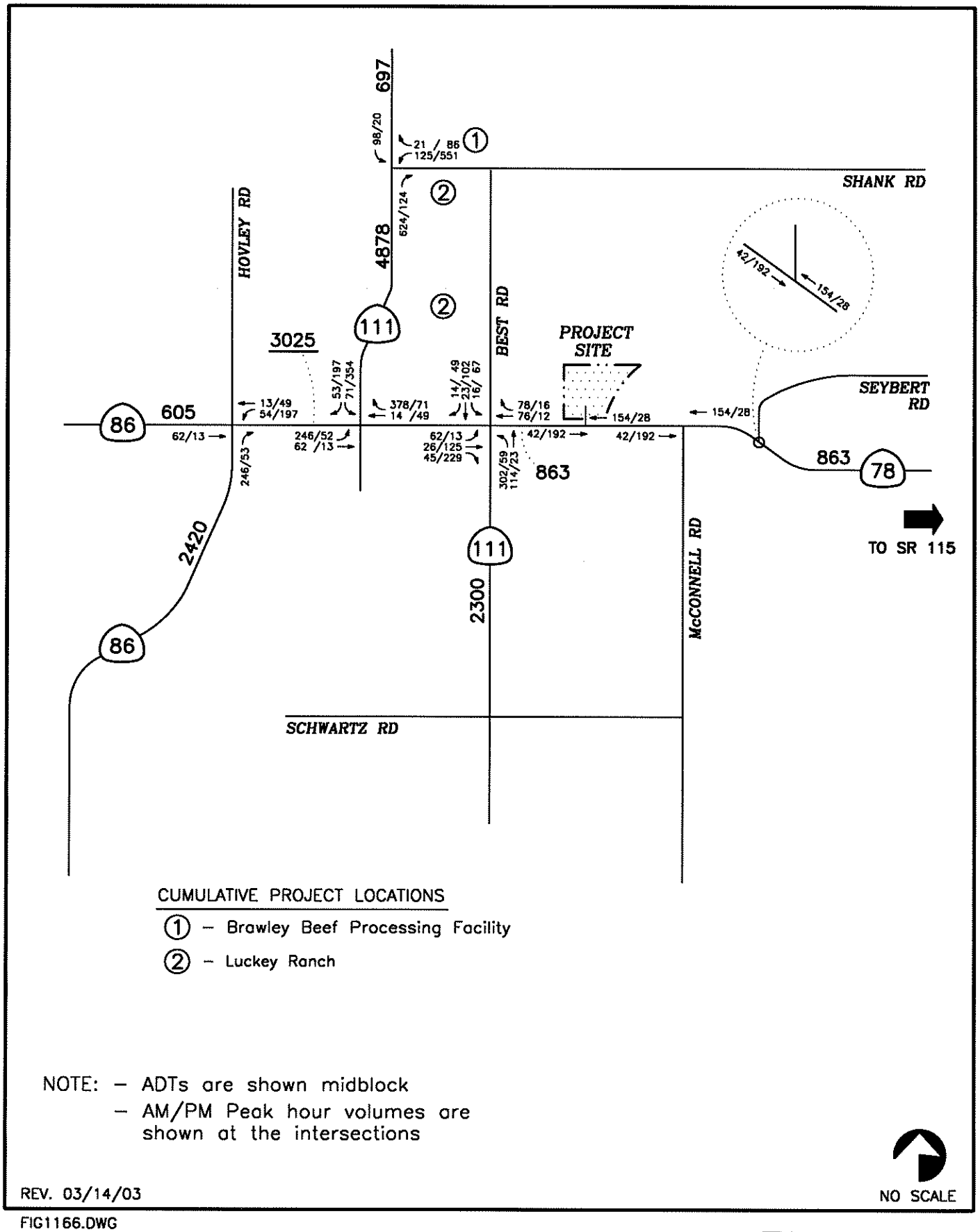
The Brawley Bypass Project proposes to adopt a new alignment and construct a four-lane expressway in Imperial County from SR 86 northeast of the city of Brawley, to SR 111, southeast of the city of Brawley. Three alignment alternatives are proposed. For the purpose of this report, this project was only included in the long-term cumulative analysis (2030), utilizing Table 1-1 (Traffic Projections) of the *Brawley Bypass* Draft Environmental Impact Report (DEIR), prepared by CALTRANS in May 2001 (see Appendix D).

In addition, a **growth factor** of 21% (3% per year for 7 years) was added to the existing traffic volumes to account for general growth within the project area and an assumed Phase II completion year of 2009. To be conservative, the Brawley Bypass was assumed to not be completed prior to 2009. However, the Brawley Bypass was assumed to be in for the 2030 analysis.

Figure 7 shows the total cumulative projects traffic volumes. The resultant future traffic volumes (existing + growth + cumulative projects) are set out in **Figure 8**. **Figure 9** shows the existing + growth + cumulative projects + total project traffic volumes.



CUMULATIVE PROJECT LOCATIONS

(1) – Brawley Beef Processing Facility

(2) – Luckey Ranch

NOTE: – ADTs are shown midblock
– AM/PM Peak hour volumes are shown at the intersections

REV. 03/14/03

NO SCALE

FIG1166.DWG

Figure 7

CUMULATIVE PROJECTS TRAFFIC VOLUMES AM/PM PEAK HOURS & ADTs

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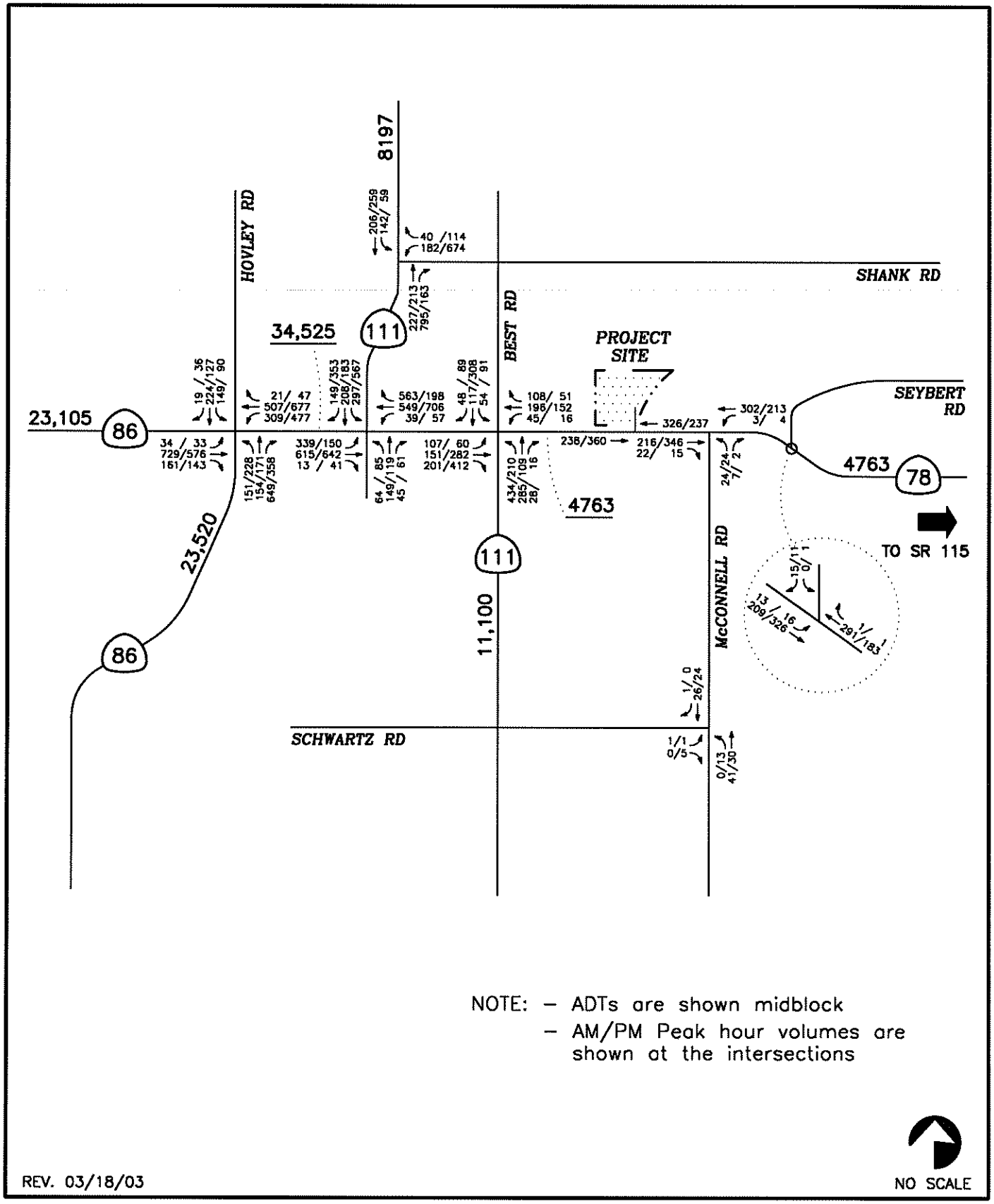

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Figure 8

EXISTING + GROWTH + CUMULATIVE PROJECTS TRAFFIC VOLUMES AM/PM PEAK HOURS & ADTs

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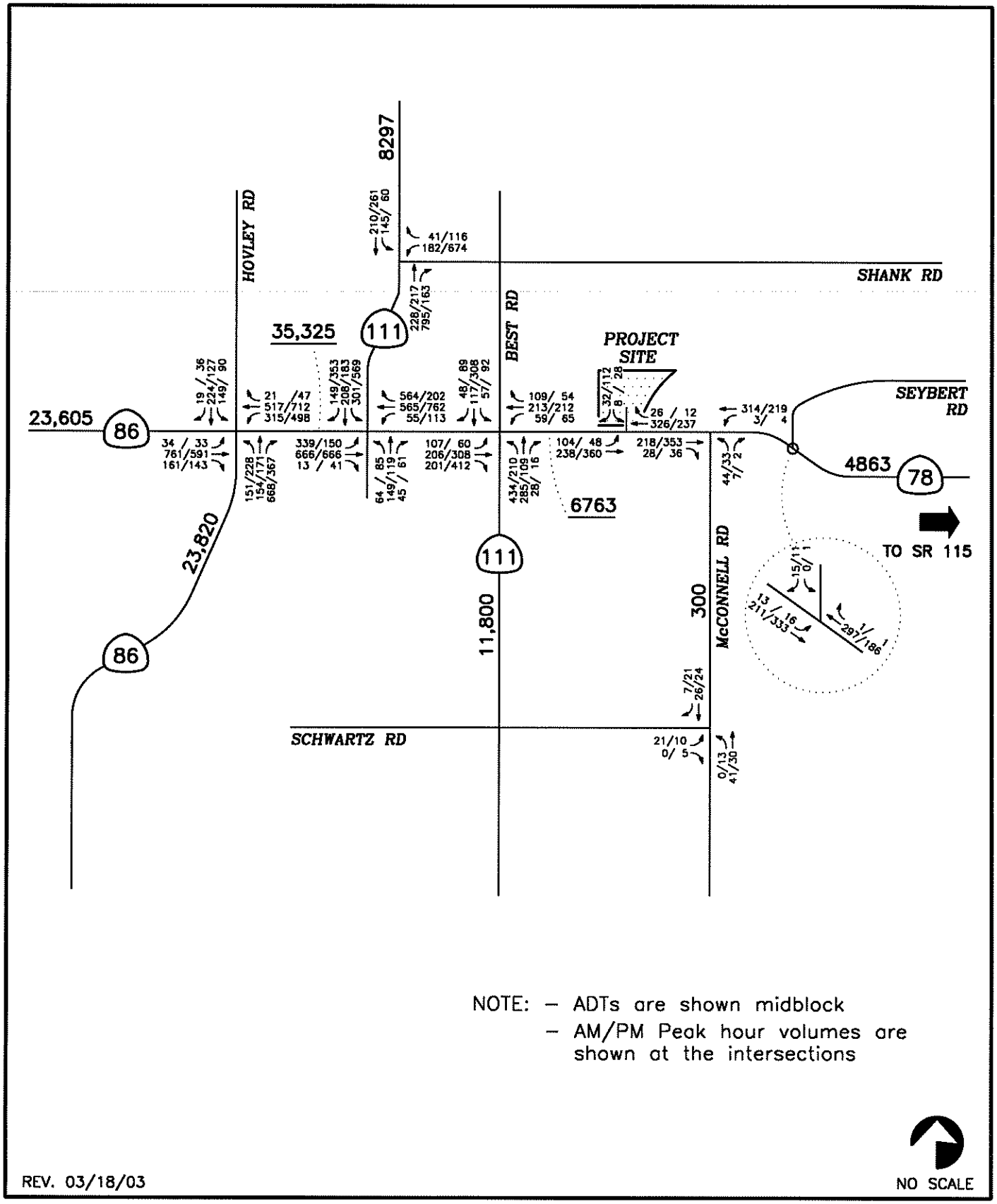

NOTE: – ADTs are shown midblock
– AM/PM Peak hour volumes are shown at the intersections

REV. 03/18/03

NO SCALE

LLG1166.DWG

Figure 9

EXISTING + GROWTH + CUMULATIVE PROJECTS + TOTAL PROJECT TRAFFIC VOLUMES AM/PM PEAK HOURS & ADTs

SDSU BRAWLEY

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4.0 TRAFFIC OPERATIONS ANALYSIS

4.1 Significance Criteria

A project traffic impact was considered significant if the addition of project traffic caused an intersection or street segment to operate at worse than LOS C, based on language contained in the Imperial County General Plan. If an intersection or street segment is calculated to currently operate at LOS D or worse, an impact is considered significant if the project causes intersection delays to increase by more than 2 seconds or the V/C ratio to degrade by more than 0.02.

4.2 Traffic Analysis Methodology

Level of Service (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 of the effect of a number of factors including roadway geometries, speed, travel delay, freedom to maneuver, and safety. Level of service provides an index to the operational qualities of a roadway segment or an intersection. Level of service designations range from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions. Level of service designation is reported differently for signalized and unsignalized intersections, as well as for roadway segments as described below.

Signalized intersections were analyzed under weekday morning and afternoon peak hour conditions. Average vehicle delay was determined utilizing the methodology found in Chapter 16 of the *2000 Highway Capacity Manual (HCM),* with the assistance of the *Traffix* (version 7.5) computer software. The delay values (represented in seconds) were qualified with a corresponding intersection LOS. Signalized intersection calculation worksheets and a more detailed explanation of the methodology are attached in **Appendix E**. **Table 3a** reports signalized intersection operations during peak hour conditions. **Table 3b** shows the Intersecting Lane Volume (ILV) analysis for the signalized intersections. The ILV analysis sheets are attached in Appendix E.

Unsignalized intersections were analyzed under weekday morning and afternoon peak hour conditions. Average vehicle delay and Levels of Service (LOS) was determined based upon the procedures found in Chapter 17 of the *2000 Highway Capacity Manual (HCM),* with the assistance of the *Traffix* (version 7.5) computer software. Unsignalized intersection calculation worksheets and a more detailed explanation of the methodology are attached in **Appendix F**. **Table 4** reports unsignalized intersection operations during peak hour conditions.

Street segment analysis is based upon the comparison of daily traffic volumes (ADTs) to the Roadway capacities on the City of Brawley General Plan roadway classifications as shown in **Appendix G**. This table provides segment capacities for different street classifications, based on traffic volumes and roadway characteristics. **Table 5** outlines the near-term street segment analysis results with **Table 6** outlining Year 2030 street segment analysis results both with and without the proposed Brawley Bypass alignment of SR 78/SR 111.

4.3 Existing Operations

Table 3a shows under existing conditions, the key signalized intersections are calculated to operate at LOS C during both the morning and afternoon peak periods.

Table 3b shows under existing conditions, the key signalized intersections are calculated to operate at under capacity during both the morning and afternoon peak periods.

Table 4 shows under existing conditions, the minor street movements at each key unsignalized intersection are calculated to operate at LOS B or better during both the morning and afternoon peak periods.

Table 5 shows under existing conditions, all key segments are calculated to currently operate at LOS C or better.

4.4 Existing + Project Phase I Operations

Table 3a shows that with the addition of project phase I traffic, the key signalized intersections are calculated to continue to operate at LOS C during the morning and afternoon peak periods. The delays increases are very minimal (0.7 second maximum increase).

Table 3b shows with the addition of project - phase I traffic, the key signalized intersections are calculated to continue to operate at under capacity during both the morning and afternoon peak periods.

Table 4 shows that with the addition of project phase I traffic, the minor street movements at the key unsignalized intersections are calculated to continue to operate at LOS B or better during the morning and afternoon peak periods. The delays increase only slightly (0.8 second maximum increase).

Table 5 shows that with the addition of project traffic, all key segments are calculated to continue to operate at LOS D or better.

4.5 Existing + Growth + Cumulative Projects Operations

The following is a description of analysis results for this scenario.

Table 3a shows that the key signalized intersections are calculated to continue to operate at LOS C during the morning and afternoon peak periods.

Table 3b shows that the key signalized intersections are calculated to operate at near capacity during both the morning and afternoon peak periods using the Caltrans ILV method.

Table 4 shows that the minor street movements at the key unsignalized intersections are calculated to continue to operate at LOS B or better during the morning and afternoon peak periods with the exception of the minor street movement at the following two intersections which are calculated to operate at LOS F:

- SR 111 / Shank Road; and
- SR 78 / SR 111 S.

These poor levels of service are due to the large amount of traffic generated by Luckey Ranch.

Table 5 shows that with the addition of total project traffic, all key segments are calculated to continue to operate at LOS D or better with the exception of the following segments which are calculated to operate at LOS E.

- SR 78: SR 86 S. to SR 111 W.; and
- SR 111: South of SR 78.

These poor levels of service are due to the large amount of traffic generated by Luckey Ranch.

4.6 Existing + Growth + Cumulative Projects + Total Project Operations

The following is a description of analysis results for this scenario.

Table 3a shows that the LOS D is calculated at the SR 78/SR 86 intersection during the morning and afternoon peak periods. However, the intersection of SR 78/SR 111 W. degrades to LOS E during both the morning and afternoon peak periods.

Table 3b shows with the addition of cumulative project traffic, the key signalized intersections are calculated to continue to operate at near capacity during the morning and afternoon peak periods.

Table 4 shows that the minor street movements at the key unsignalized intersections are calculated to continue to operate at LOS B or better during the morning and afternoon peak periods with the following exceptions which are calculated to continue operate at LOS F.

- SR 111/Shank Road; and
- SR 78/SR 111 S.

The Luckey Ranch Traffic Study recommends that a traffic signal be installed at the intersection of SR 111/Shank Road. LOS C is calculated with the installation of a traffic signal.

Table 5 shows that all segments are calculated to operate at LOS D or better with the following exceptions which are calculated to continue to operate at LOS E.

- SR 78: SR 86 S. to SR 111 W.; and
- SR 111: South of SR 78.

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Table 3a
Signalized Intersection Operations

Intersection	Peak Hour	Existing		Existing + Project Phase I		Existing + Growth + Cumulative Projects		Existing + Growth + Cumulative Projects + Total Project		Delay Increase due to Total Project	Sig[3]
		Delay[1]	LOS[2]	Delay	LOS	Delay	LOS	Delay	LOS		
SR 78/SR 86	AM	29.7	C	29.8	C	44.2	D	47.6	D	3.4	NO
	PM	27.4	C	28.1	C	35.9	D	37.1	D	1.2	NO
SR 78/SR 111 W.	AM	24.6	C	24.7	C	55.9	E	57.1	E	1.2	NO
	PM	24.4	C	24.6	C	49.5	D	52.3	D	2.8	NO

Notes:
1. Average delay expressed in seconds per vehicle.
2. Level of Service. See Appendix for delay thresholds.
3. Sig - Significant project impacts based on Significance Criteria.
4. Shading represents a significant impact.

SIGNALIZED

DELAY / LOS THRESHOLDS

DELAY	LOS
0.0 < 10.0	A
10.1 to 20.0	B
20.1 to 35.0	C
35.1 to 55.0	D
55.1 to 80.0	E
> 80.1	F

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Table 3b
Signalized Intersection Operations
ILV Methodology

Intersection	Peak Hour	Existing		Existing + Project Phase I		Existing + Growth + Cumulative Projects		Existing + Growth + Cumulative Projects + Total Project	
		ILV[1]	STATUS	ILV	STATUS	ILV	STATUS	ILV	STATUS
SR 78/SR 86	AM	786	UNDER	888	UNDER	1,277	NEAR	1,280	NEAR
	PM	846	UNDER	858	UNDER	1,228	NEAR	1,256	NEAR
SR 78/SR 111 W.	AM	722	UNDER	727	UNDER	1,386	NEAR	1,399	NEAR
	PM	755	UNDER	768	UNDER	1,349	NEAR	1,381	NEAR

Notes:
1. ILV – Intersection Lane Volume

STATUS

≤ 1,200 ILV/HR	UNDER CAPACITY
>1,200 but ≤ 1,500 ILV/HR	NEAR CAPACITY
> 1,500 ILV/HR	OVER CAPACITY

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TABLE 4
UNSIGNALIZED INTERSECTION OPERATIONS

INTERSECTIONS	CONTROL TYPE	PEAK HOUR	EXISTING		EXISTING + PROJECT PHASE I		EXISTING + GROWTH + CUMULATIVE PROJECTS		EXISTING + GROWTH + CUMULATIVE PROJECTS + TOTAL PROJECT		Sig[3]
			DELAY[1]	LOS[2]	DELAY	LOS	DELAY	LOS	DELAY	LOS	
SR 111 / Shank Road	TWSC[1]	AM	12.9	B	13.0	B	> 50.1	F	25.2	C*	NO
		PM	13.9	B	14.0	B	> 50.1	F	27.5	C*	NO
SR 78 / SR 111 S.	AWSC	AM	11.3	B	11.9	B	> 50.1	F	> 50.1 *29.1*	F *C***	YES[4]
		PM	11.7	B	12.5	B	> 50.1	F	> 50.1 *24.0*	F *C***	YES[4]
SR 78 / Project Access D/W	TWSC[1]	AM	DNE	DNE	9.5	A	DNE	DNE	12.1	B	NO
		PM	DNE	DNE	9.8	A	DNE	DNE	12.4	B	NO
SR 78 / McConnell Road	TWSC[1]	AM	10.2	B	10.4	B	12.3	B	13.2	B	NO
		PM	10.5	B	10.6	B	13.3	B	13.9	B	NO
McConnell Road / Schwartz Road	TWSC[1]	AM	8.8	A	8.9	A	8.9	A	9.0	A	NO
		PM	8.5	A	8.7	A	8.7	A	8.9	A	NO
SR 78 / Seybert Road	TWSC[1]	AM	9.0	A	9.0	A	10.1	B	10.1	B	NO
		PM	9.2	A	9.2	A	9.3	A	9.6	A	NO

NOTES:
1. Average delay expressed in seconds per vehicle and represents worst case minor street movement.
2. Level of Service
3. Significant project impacts based on Significance Criteria.

DNE - Does not exist
N/A - Not applicable since Driveway does not exist today.
AWSC - All Way Stop Controlled intersection
TWSC - Two Way Stop Controlled intersection
Shading represents a significant impact
* - LOS with traffic signal mitigation recommended in the Luckey Ranch Traffic Study.
** - LOS with recommended mitigation (installation of traffic signal).

4. A Significant cumulative impact is calculated.

UNSIGNALIZED DELAY / LOS THRESHOLDS	
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

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Table 5
Near-Term Street Segment Operations

Street Segment	Classification	Existing Capacity (LOS E)[1]	Existing			Existing + Project Phase I			Sig[5]	Existing + Growth + Cumulative Projects			Existing + Growth + Cumulative Projects + Total Project			Project V/C increase	Sig
			ADT[2]	V/C[3]	LOS[4]	ADT	V/C	LOS		ADT	V/C	LOS	ADT	V/C	LOS		
SR 78																	
West of SR 86 S.	State Highway	37,000	18,600	0.50	B	18,810	0.51	B	NO	23,105	0.62	B	23,605	0.64	C	0.01	NO
SR 86 S. to SR 111 W.	State Highway	37,000	26,000	0.70	C	26,335	0.71	C	NO	34,525	0.93	E	35,325	0.95	E	0.02	NO
SR 111 S. to McConnell Road	State Highway	16,200	3,200	0.20	B	3,865	0.24	B	NO	4,763	0.29	C	6,763	0.42	C	0.12	NO
McConnell Road to SR 115	State Highway	16,200	3,200	0.20	B	3,240	0.20	B	NO	4,763	0.29	C	4,863	0.30	C	0.01	NO
SR 86																	
South of SR 78	State Highway	37,000	17,400	0.47	B	17,525	0.47	B	NO	23,520	0.64	B	23,820	0.64	B	0.01	NO
SR 111																	
North of Shank Road	State Highway	16,200	6,200	0.38	C	6,240	0.39	C	NO	8,197	0.51	D	8,297	0.51	D	0.01	NO
South of SR 78	State Highway	16,200	7,300	0.45	D	7,590	0.47	D	NO	11,100	0.69	E	11,800	0.73	E	0.04	YES

NOTES:
1. Capacity based on County of Imperial roadway classification.
2. Average Daily Traffic.
3. Volume to Capacity ratio.
4. Level of Service.
5. Significant project impacts based on Significance Criteria.

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5.0 YEAR 2030 OPERATIONS

Year 2020 traffic volumes were taken from Table 1-1 of the *SR 78/SR 111 Brawley Bypass (DEIR)* study. This table depicts the Year 2020 ADTs both with and without the proposed SR 78/SR 111 alignment. Table 1-1 is included in **Appendix H**. These volumes were increased by 20% (2% per year over 10 years) to represent Year 2030 volumes.

Table 6 shows the addition of project traffic to the Year 2030 traffic volumes taken from Table 1-1. Table 6 shows that with the proposed SR 78/SR 111 Brawley Bypass alignment, all key segments are calculated to operate at LOS D or better. Table 6a shows that without the proposed SR 78/SR 111 alignment, all key segments are calculated to operate at LOS F.

Table 6
Year 2030 Street Segment Operations

			YEAR 2030* (With Bypass)			YEAR 2030* (Without Bypass)		
Street Segment	**Classification**	**Capacity (LOS E)[1]**	**YEAR 2030 + PROJECT**			**YEAR 2030 + PROJECT**		
			ADT[2]	**V/C[3]**	**LOS[4]**	**ADT[2]**	**V/C[3]**	**LOS[4]**
SR 78								
SR 86 S. to SR 111 W.	State Highway	37,000	27,360	0.74	C	48,960	1.32	F
SR 111 W. to SR 111 S.	State Highway	34,200	27,430	0.80	D	49,030	1.43	F
SR 111								
SR 78 to Adler Street	State Highway	57,000	18,070	0.32	A	24,070	1.49	F
SR 78 to Malan Street	State Highway	57,000	6,840	0.12	A	18,840	1.16	F

SOURCE: Table 1-1 from the CALTRANS SR 78/SR 111 Bypass report (May 2001).

NOTES:
1. Capacity based on County of Imperial roadway classifications.
2. Average Daily Traffic.
3. Volume to Capacity.
4. Level of Service.
5. Significant project impacts based on Significance Criteria.

* Includes project traffic.

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6.0 SIGNIFICANCE OF IMPACTS / MITIGATION MEASURES

Based on the established significance criteria, no significant direct project impacts were calculated.

No significant cumulative impacts are calculated at the signalized intersections since the project adds less than 2 seconds of delay to the intersections, which are calculated to degrade to LOS D or worse with cumulative traffic. A significant cumulative impact is calculated at the SR 78/SR 111 S. unsignalized intersection, since LOS F is calculated with the addition of cumulative and project traffic and the project adds over 2 seconds of delay and a significant cumulative impact is also calculated on SR 111, south of SR 78. In addition, significant impacts would occur if adequate access were not provided to the site via SR 78.

The following measures are recommended to mitigate impacts (by phase) to below a level of significance.

Project Phase I Mitigation:

1) Provide an eastbound left-turn pocket and a westbound right turn pocket on SR 78 at the project access point. In addition, provide a dedicated southbound left turn lane and right turn lane at the project driveway approaching SR 78.

2) Ensure corner sight distance meets Caltrans standards at the project driveway to SR 78.

3) Dedicate Right-of-Way (ROW) along the project frontage to ultimate SR 78 standards.

Total Project Mitigation:

4) Contribute a fair share towards the eventual signalization of the SR 78/SR 111 S. intersection. The northbound approach should provide a dedicated northbound left-turn lane with a shared through-right turn lane. This would mitigate the cumulative significant impact at both the SR 78/SR 111 S. intersection and the SR 111 segment, south of SR 78.

5) Annually monitor the SR 78/project driveway intersection for possible future signalization.