



O ' R O U R K E E N G I N E E R I N G

TRAFFIC IMPACT ANALYSIS

JEFFERSON PLAZA

IN THE CITY OF LA QUINTA, CALIFORNIA

2237 Faraday
Avenue
Suite 120
Carlsbad
California 92008
619 431-6763
FAX: 619 431-0672

415 N. Vineyard
Avenue
Suite 200
Ontario
California 91764
909 467-0221
FAX: 909 467-0178

2677 N. Main
Street
Suite 860
Santa Ana
California 92705
714 541-9011

Prepared For:

GREENBERG FARROW
15101 Red Hill Avenue, Suite 200
Tustin, CA 92680

Prepared By:

O'ROURKE ENGINEERING
415 North Vineyard Avenue, Suite 200
Ontario, CA 92069
(909) 467-0221

June 11, 1996

Revised August 8, 1996 for Phasing Analysis

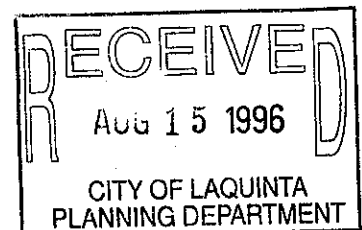


TABLE OF CONTENTS

INTRODUCTION	1
STUDY AREA	2
EXISTING ROADWAYS AND INTERSECTIONS	4
PROJECT IMPACT	6
Land Use/Trip Generation	6
Trip Distribution and Assignment	7
TRAFFIC VOLUMES	8
Existing Volumes	8
Phase I - Year 1997 Traffic Volumes	8
Phase II - Year 2001 Traffic Volumes	8
Buildout	8
ANALYSIS	16
Signal Warrant	16
Level of Service	16
FUTURE GEOMETRICS AND RECOMMENDATIONS	18
Phase I	18
Phase II	18
Buildout	18
CONCLUSION	21
APPENDICES	
Appendix A: Signal Warrant Worksheets	
Appendix B: HCM Worksheets	

LIST OF FIGURES

Figure 1:	Project Location	3
Figure 2:	Existing Lane Geometrics	5
Figure 3A:	Existing Afternoon Peak Hour Volumes	10
Figure 3B:	Existing PM Peak Hour Volumes	11
Figure 4A:	Phase I - 1997 Afternoon Peak Hour Volumes	12
Figure 4B:	Phase I - 1997 PM Peak Hour Volumes	13
Figure 5A:	Phase II - 2001 Afternoon Peak Hour Volumes	14
Figure 5B:	Phase II - 2001 PM Peak Hour Volumes	15
Figure 6:	Future Roadway Needs	20

LIST OF TABLES

Table 1:	Jefferson Plaza Square Footage	6
Table 2a:	Trip Generation - Phase I	7
Table 2b:	Trip Generation - Phase II	7
Table 3:	Level Of Service Analysis	20

INTRODUCTION

The construction of a Home Depot and related shopping center, herein referred to as the Jefferson Plaza, is proposed to be located in La Quinta on the northwest corner of Jefferson Street and Highway 111. O'Rourke Engineering was retained to prepare a traffic analysis report to address and evaluate the impact of the project at the intersection of Jefferson Street/Highway 111 and the proposed project driveways for the existing and future conditions.

The project is to be developed in two phases. Phase I includes the Home Depot opening in July 1997. Phase II includes the opening of the remaining retail and restaurant uses. Although there is currently no planned opening date, it has been assumed for analytical purposes that Phase II will open in 2001. The traffic analysis includes an overview of the project, a review of existing conditions, an assessment of project impacts, level of service for existing and future conditions, and an assessment of roadway improvements. Each of the components is discussed herein.

STUDY AREA

Jefferson Plaza is currently being considered for location in the City of La Quinta at the northwest corner of Jefferson Street and Highway 111. Currently, the lot is vacant. The project site is designated as Non-Residential Overlay in the City's General Plan.

Access to the project would be from three new driveways on Jefferson Street north of the intersection of Jefferson/Highway 111 and four driveways on the north side of Highway 111 west of Jefferson Street. The northern most driveway on Jefferson is to be aligned with Vista Grande with full access. The western most driveway on Highway 111 will also be full access. The full access driveways would serve as the primary entrances for Jefferson Plaza. The remaining driveways would be restricted to right-turn-in and right-turn-out movements.

The traffic analysis included the intersections of: Jefferson Street/Highway 111, Jefferson Street/Vista Grande with the proposed driveway, Highway 111/the western most driveway on Highway 111, and the remaining project driveways.

Figure 1 shows the project and driveway locations.

CYND CHANNEL
WHITE WATER RIVER

VISTA GRANDE

JEFFERSON ST.

PROJECT
SITE

HWY 111



O'ROURKE ENGINEERING

NTS

LEGEND

● EXISTING SIGNAL

--- PROPOSED DRIVEWAY

FIGURE 1

PROJECT LOCATION
HOME DEPOT LA QUINTA

EXISTING ROADWAYS AND INTERSECTIONS

The project is bounded by two major roadways, Highway 111 and Jefferson Street. Jefferson Street runs north-south and is a 2-lane divided arterial. Six lanes are proposed in the future. Presently, Jefferson Street has a raised concrete median with a northbound left turn pocket lane for U-turns approximately 300 feet north of the intersection with Highway 111, and a northbound left turn lane at Vista Grande. The City recommended that the left turn 300 feet north of Highway 111 be eliminated when the project develops due to its proximity to Highway 111.

Highway 111 runs east-west and is currently a 4-lane divided primary arterial. An expansion to six lanes is proposed for the future. The intersection of Jefferson Street/Highway 111 is currently a signalized intersection. The northwest corner of the intersection lies within the City of La Quinta while the remaining quadrants are within the City of Indio. Both cities plan to expand the intersection in the future.

Vista Grande is located north of the Jefferson Street/Highway 111 intersection and is currently a two lane local road that intersects Jefferson Street.

Figure 2 illustrates the existing roadway and intersection geometrics.

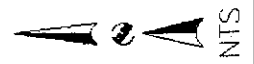
CVWD CHANNEL
WHITE WATER RIVER

VISTA GRANDE

RAISED
MEDIAN

JEFFERSON ST.

HWY 111



LEGEND

- > APPROACH LANE
- SIGNAL
- STOP SIGN
- PROPOSED DRIVEWAY

FIGURE 2

EXISTING
LANE GEOMETRICS
HOME DEPOT LA QUINTA

O'ROURKE ENGINEERING

PROJECT IMPACT

Land Use/Trip Generation

Project traffic was generated based on land use, parcel size, and the Institute of Transportation Engineers (ITE) trip generation rates. The project traffic includes the trips generated by Jefferson Plaza land uses based on the total square footage by phase. Trips were calculated using rates for a Shopping Center (Code 820) for the completion of Phase II. However, for the Phase I, Code 816, which is Hardware and Paint, was used. Using Code 816 reflects the fact that the Center would not yet be functioning like a shopping center and trips would not be reduced. Table 1 summarizes the proposed land uses and square footage associated with each use.

TABLE 1: JEFFERSON PLAZA SQUARE FOOTAGE

	LAND USE	SQUARE FOOTAGE
PHASE I	Home Depot	105,700
	Home Depot's Garden Center	24,102
	Phase I Subtotal	129,802
PHASE II	Retail A	11,440
	Retail B	40,969
	Retail C	26,900
	Restaurant Pad 1	2,668
	Restaurant Pad 2	5,000
	Gas Station	1,500
	Phase II Subtotal	88,477
	TOTAL	218,279

The City of La Quinta requested an afternoon (lunch time) peak hour analysis. The afternoon peak hour trip generation was developed from daily percentage distributions summarized in the ITE Trip Generation, Fifth Edition. Trip generation for the afternoon peak hour, PM peak hour and average weekday are calculated in Table 2 for each phase of the development.

TABLE 2a: TRIP GENERATION-Completion of Phase I

Time Period	Equation/Rate(Code 816)	Total Trips	In / Out
PM Peak	4.87 per 1,000 Sq. Ft.	632	316/316
Daily	53.21 per 1,000 Sq. Ft.	6,907	3,453/3,353
Afternoon Peak	Entering: 9.5% of 6907/2 Exiting: 7.9% of 6907/2	601	328/273

T = Number of Trips Generated

X = Thousands of Square Feet

TABLE 2b: TRIP GENERATION-Completion of Phase II

Time Period	Equation (Land Use Code 820)	Total Trips	In / Out
PM Peak	$\text{Ln}(T) = .637 \text{Ln}(X) + 3.553$	1,078	539/539
Daily	$\text{Ln}(T) = .625 \text{Ln}(X) + 5.985$	11,511	5,755/5,756
Afternoon Peak	Entering: 9.5% of 11511/2 Exiting: 7.9% of 11511/2	1,000	546/454

T = Number of Trips Generated

X = Thousands of Square Feet

Trip Distribution and Assignment

The distribution of trips was determined as the likely origin and destinations of project trips based on existing and proposed land uses within the project vicinity. The trip distribution by general geographic direction is as follows:

North: 18%
 South: 20%
 East: 25%
 West: 37%

The project trips were then assigned to the proposed driveways and the intersection of Jefferson Street/Highway 111 considering the roadway network and its travel time characteristics. The resultant project trip assignments are shown in Figures 4A and 4B for the afternoon and PM peak hours, respectively, in the "Traffic Volumes" section of this report.

TRAFFIC VOLUMES

Traffic volumes were compiled for the various project conditions: existing, Phase I, Phase II and Buildout.

Existing Volumes

Existing traffic counts were collected in the field on Thursday, May 9 during the afternoon and PM peak hours at the intersection of Jefferson Street/Highway 111 and Jefferson Street/Vista Grande. The afternoon peak hour occurs between 11:30 am and 12:30 pm, and the PM peak hour occurs between 4:30 pm and 5:30 pm. Existing Average Daily Traffic Volumes (ADTs) were obtained from the City for Jefferson Street, and from Caltrans for Highway 111. The existing traffic volumes are shown in Figures 3A and 3B for the afternoon and PM peak hours, respectively. Existing ADTs are shown in Figure 3B.

Phase I - 1997 Traffic Volumes

The 1997 Traffic Volumes were estimated by applying a one year growth factor to the existing volumes. The growth rates used were 7% on Jefferson Street and 4% on Highway 111. These rates were supplied by the City of La Quinta and represent the anticipated development in the area.

The Phase I project traffic volumes were added to the existing plus 7% growth to establish the Phase I 1997 traffic volumes as shown in figures 5a and 5b.

Phase II - 2001 Traffic Volumes

Traffic volumes for this scenario were estimated by applying the same yearly growth rates (7% on Jefferson, 4% on Highway 111) for a five year period to represent the anticipated growth for the year 2001. The total project volumes (Phase I and Phase II) were then added to establish the Phase II - 2001 traffic volumes as shown in figures 6a and 6b.

Buildout Traffic Volumes

The future buildout year was analyzed to evaluate the impact of the project as a component of the future volumes on the existing roadway network. Buildout represents a hypothetical scenario when all the General Plan land uses are developed. The zoning and land use designation of the Jefferson Plaza project was adequately represented in the Circulation Element model for the General Plan. Future volumes were obtained from the General Plan model for buildout. The model volumes are projected as Average Daily Traffic (ADT) volumes. The afternoon and PM peak hour turning movement volumes were developed by applying

reasonable peak hour factors and directional splits. Some "smoothing" of the numbers then occurred to balance the approaches with the link volumes.

For the PM peak hour a 7% peak hour factor with a 55/45 eastbound/westbound split was applied on Highway 111. On Jefferson a 7.5% peak hour split was applied with a 60/40 southbound/northbound split.

For the afternoon, a 7.5% peak hour factor was applied on Highway 111 with a 60/40 split and a 8% peak hour factor on Jefferson with a 60/40 split. Figures 4A and 4B illustrate the buildout volumes in the project study area for the afternoon and PM peak hours, respectively.

CAMD CHANNEL
WHITE WATER RIVER

VISTA GRANDE

JEFFERSON ST.

HWY 111

297
2

182
7
2
9

146
140
121
115

508
83

84
6
4
6
16

610
610
610



NTS



O'ROURKE ENGINEERING

FIGURE 3A

EXISTING
AFTERNOON PEAK HOUR VOLUMES
HOME DEPOT LA QUINTA

CWMD CHANNEL
WHITE WATER RIVER

VISTA GRANDE

JEFFERSON ST.

10,036

132
582
96

28
547
126

34,941

HWY 111



LEGEND

XX ADT
XX→ TURNING MOVEMENT VOLUMES

FIGURE 3B

EXISTING
PM PEAK HOUR VOLUMES
HOME DEPOT LA QUINTA

O'ROURKE ENGINEERING



NTS

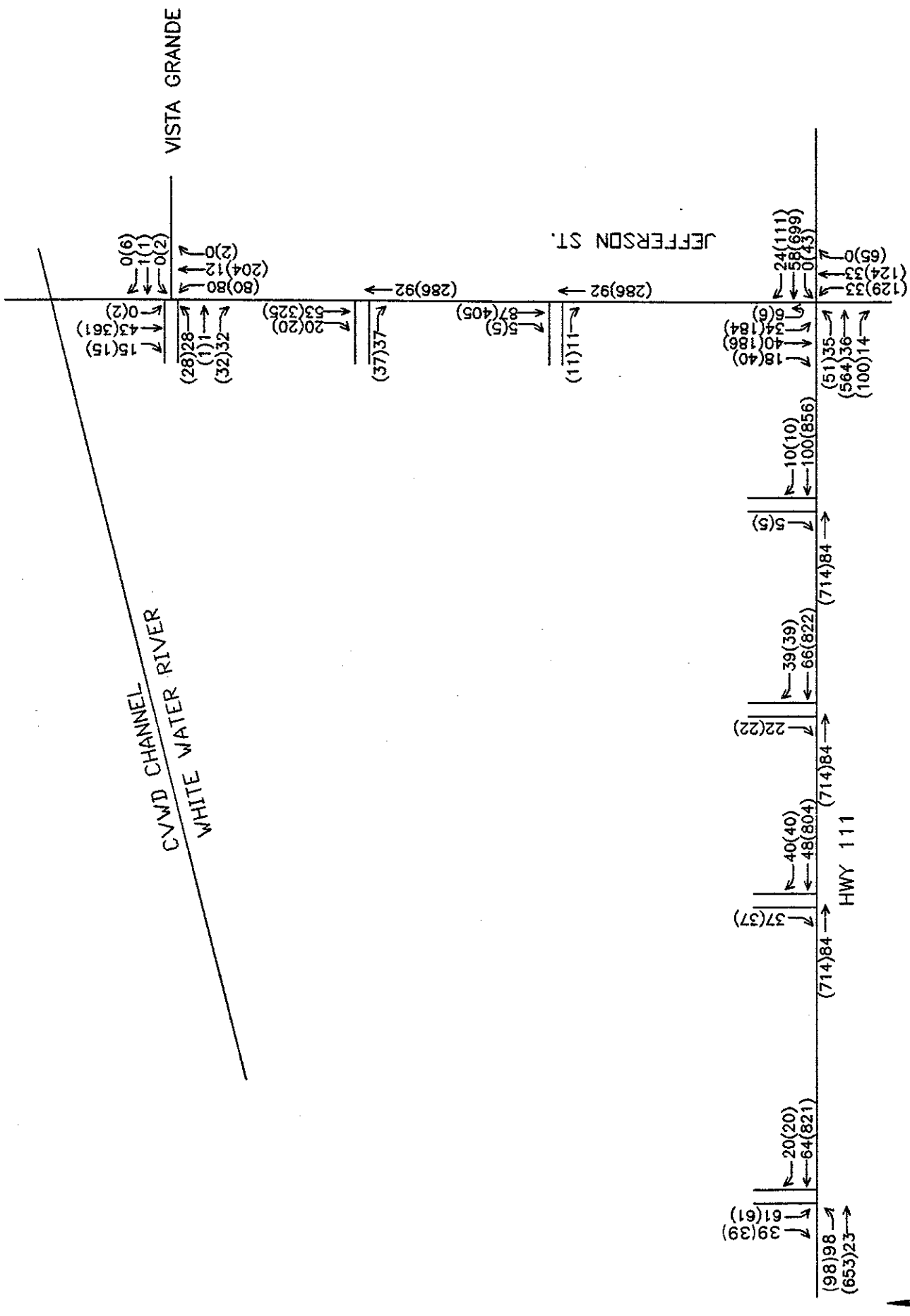
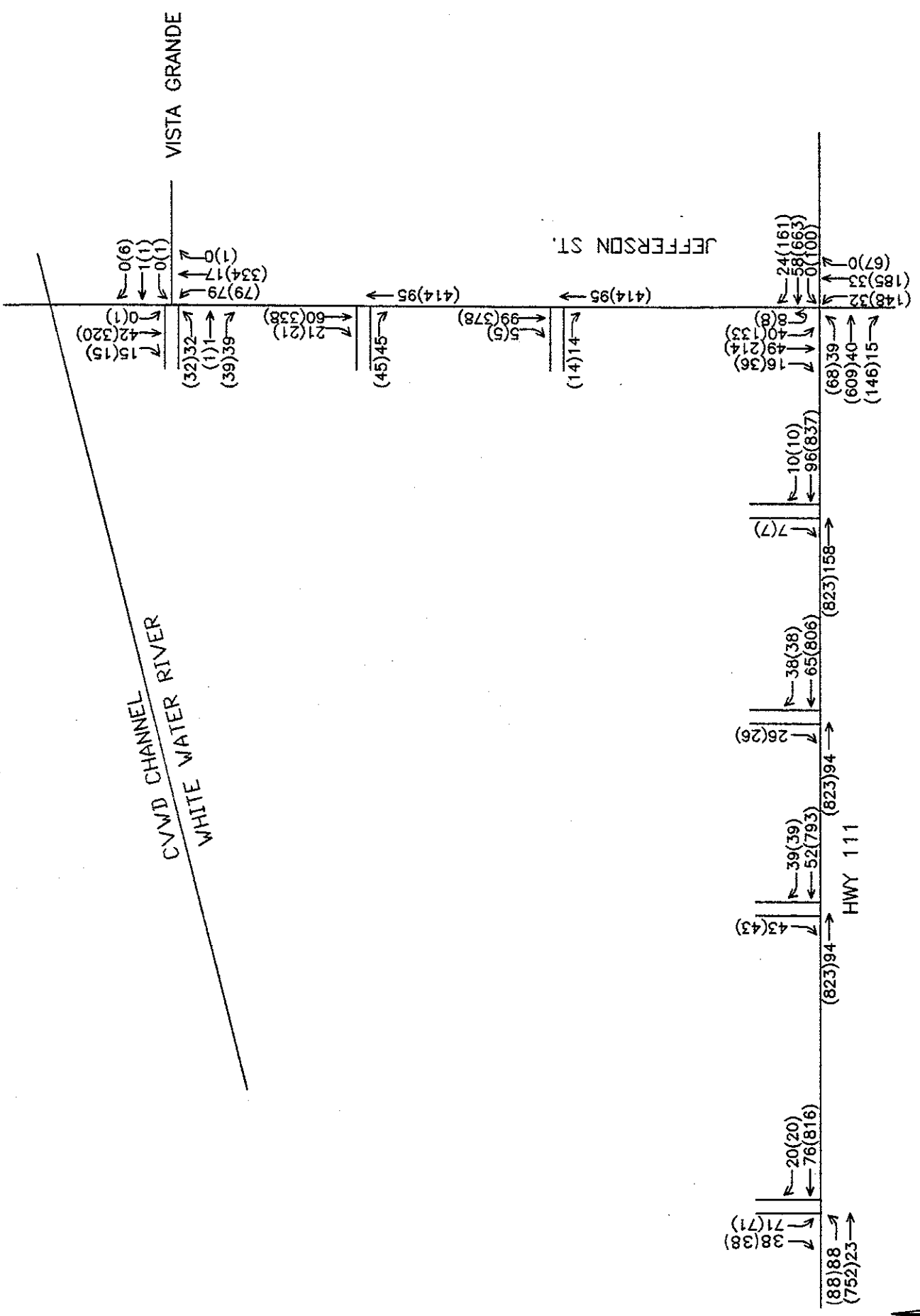


FIGURE 4A
 1997 PHASE 1
 AFTERNOON PEAK HOUR VOLUMES
 HOME DEPOT LA QUINTA

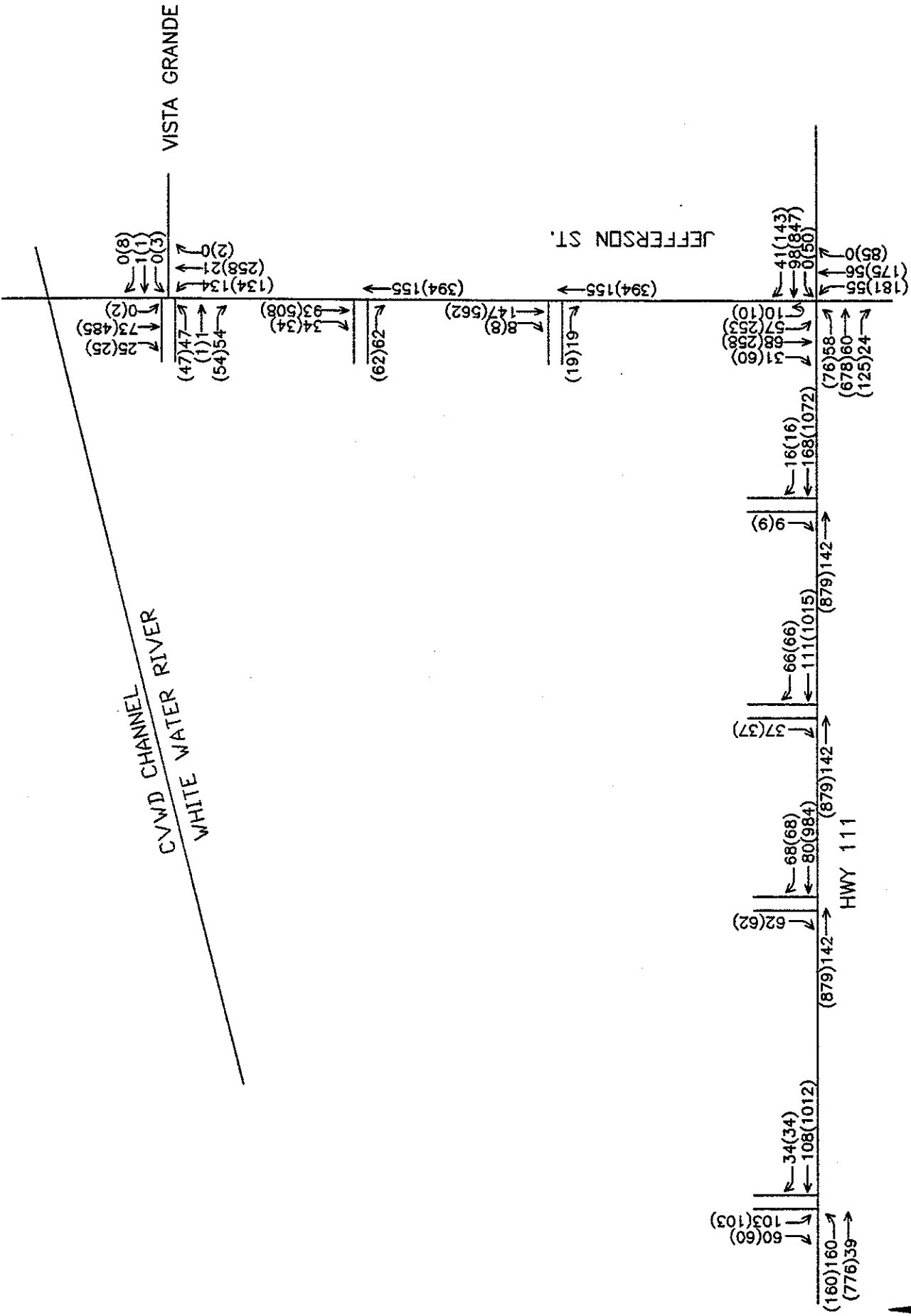
O'ROURKE ENGINEERING

FIGURE 4B
 1997 PHASE 1
 PM PEAK HOUR VOLUMES
 HOME DEPOT LA QUINTA



LEGEND
 ← PROJECT (EXISTING + PROJECT)
 = DRIVEWAY



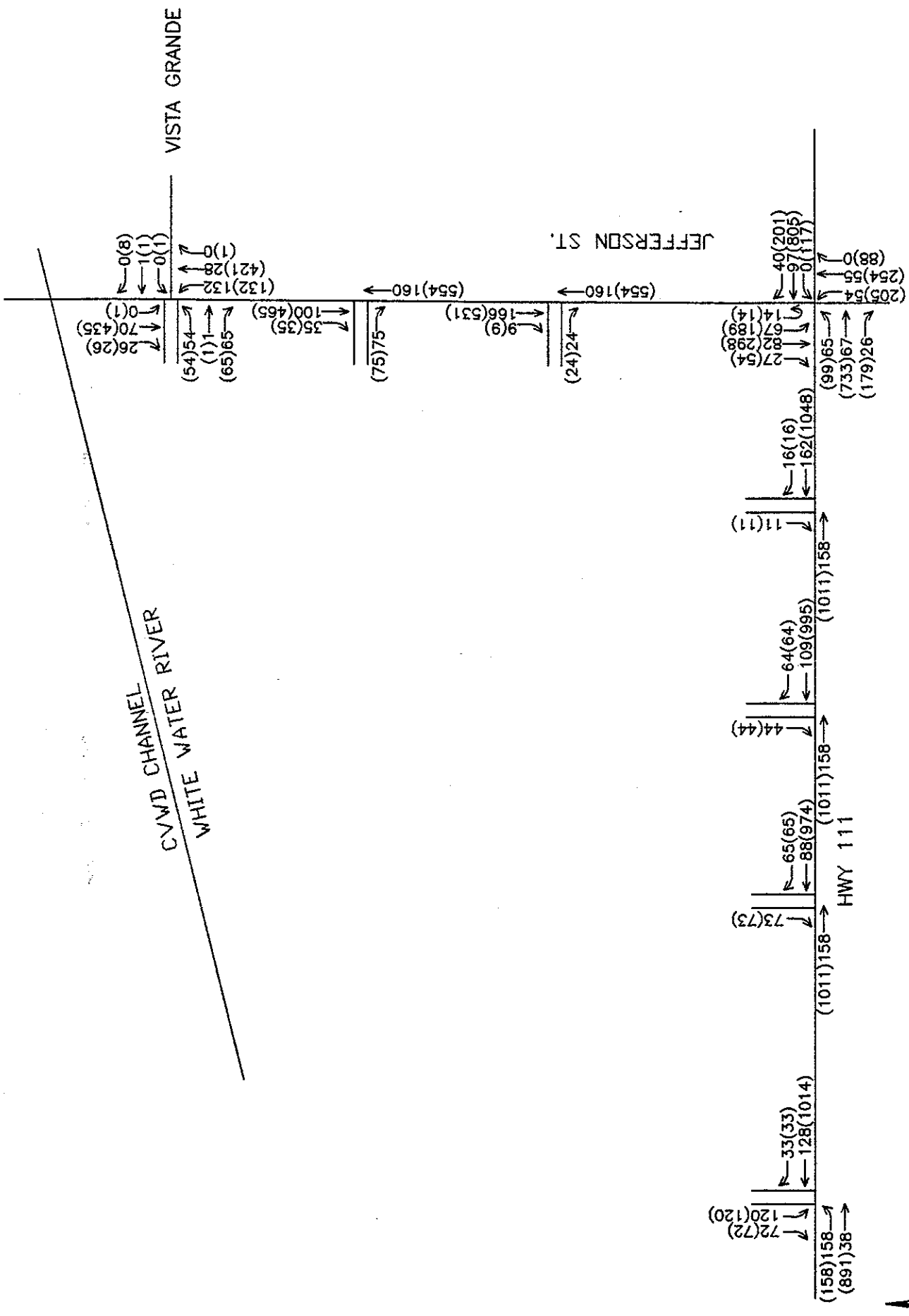


LEGEND
 PROJECT (EXISTING + PROJECT)
 DRIVEWAY

FIGURE 5A
2001 PHASE 2
AFTERNOON PEAK HOUR VOLUMES
HOME DEPOT LA QUINTA

2001 PHASE 2
PM PEAK HOUR VOLUMES
HOME DEPOT LA QUINTA

FIGURE 5B



LEGEND
 PROJECT (EXISTING + PROJECT)
 DRIVEWAY



O'ROURKE ENGINEERING



NTS

ANALYSIS

Two types of analyses were undertaken, signal warrant analysis and level of service analysis.

Signal Warrant Analysis

Signal warrant analyses were undertaken for the intersections of Highway 111 and the westernmost driveway and for Jefferson/Vista Grande. The signal warrant analysis were conducted for each of the study scenarios. The signal warrant worksheets are provided in Appendix A.

Jefferson Street/Vista Grande- This intersection was analyzed to determine when a signal would be signalized. For existing conditions, the signal warrant analysis involved analyzing the existing intersection of Jefferson/Grande Vista using the full, volume warrants for signalization. Tube counts were placed to record 24 hour volumes approaching the intersection. The results of the warrant analysis show that none of the signal warrants are met for the existing conditions.

Future scenarios were analyzed using the peak hour warrant. The peak hour warrant is used for future traffic conditions as the distribution of traffic volumes throughout the day is not available to conduct a full warrant. The analysis shows that a signal is not warranted until Buildout conditions are met.

In other words, the minor street traffic coming from the Home Depot and Grande Vista does not create the need for the signal. However, over time as the volumes increase on Jefferson Street, the major street traffic increases to a point that coupled with small volumes on the minor street triggers the need for a signal. Assuming a 7% growth rate, the signal would need to be installed around Year 2007.

Highway 111 and the Westernmost Driveway-The intersection of Highway 111 and the westernmost driveway was not analyzed using the full warrants since the intersection does not exist.

Again, the future scenarios were analyzed using the peak hour warrant. The analysis shows that the signal is required upon completion of Phase I of the project.

Level of Service

Jefferson Street/Highway 111 and the full access driveways were analyzed to determine intersection level of service for existing and future conditions using the 1994 Highway Capacity Manual (HCM) Methodology. The City of La Quinta requires a level of service D or better during peak hours. The results of the analysis are summarized in Table 3 for the existing and future conditions. The HCM worksheets are contained in Appendix B.

TABLE 3: LEVEL OF SERVICE ANALYSIS

Intersection	Existing		Phase I - 1997		Phase II - 2001		Buildout(with improve.)	
	After-noon	PM	After-noon	PM	After-noon	PM	After-noon	PM
Jefferson/ Highway 111	C	C	C	C	C	C	D	D
Jefferson/ Vista Grande	B*	B*	B*	B*	C*	C*	C	C
Highway 111/ Driveway	n/a	n/a	B	B	B	B	B	B

* unsignalized

The levels of service presented in Table 3 show the results of the analysis of the existing, Phase I and Phase II scenario using the existing geometrics. Signalization was assumed for the analysis based on the results of the signal warrant analyses. The Buildout scenario shows the levels of service with future improvements in place.

The buildout traffic volumes were too high for the existing roadway network at Jefferson Street/Highway 111 and Jefferson Street/Vista Grande for the afternoon and PM peak hours, and at Highway 111/western most driveway for the afternoon peak hour. As a result, the levels of service at those intersections were F. Recommendations for the intersections that were incorporated into the analysis are listed in the next section of this report. The intersections were reanalyzed with these improvements, including improvements in the City's General Plan, and were able to function at a level of service D or better.

As seen, acceptable levels of service can be achieved at all of the intersections.

FUTURE GEOMETRICS AND RECOMMENDATIONS

Highway 111 and Jefferson Street are both planned as six lane facilities. Given this planned expansion and the results of the signal warrant analysis and level of service analysis, improvements were recommended for the Phase I, Phase II and buildout conditions.

Phase I

Highway 111/Western Most Driveway -- As discussed in the analysis section, a traffic signal is warranted and would need to be installed at the completion of Phase I at the intersection of Highway 111 and the western most project driveway on Highway 111. The geometrics proposed at the western most driveway on Highway 111 when the project is developed include full access with an eastbound left-turn in, a westbound shared through-right turn in lane, and exclusive southbound left and right-turn lanes out.

Jefferson Street/Vista Grande -- Full access at the northern most driveway on Jefferson Street at Vista Grande is also proposed in the existing plus project condition. The geometrics at this driveway include a northbound left-turn in, a southbound shared through-right in, an eastbound shared left-through out, and an exclusive eastbound right-turn out.

The proposed geometrics for the remaining driveways on Highway 111 and Jefferson Street consists of a single right-turn-out lane and a shared through right-turn in lane.

Jefferson Street/Highway 111 -- The intersection of Jefferson Street/Highway 111 requires modification to the signal to allow separate northbound and southbound left-turn phasing.

It was also recommended by the City to eliminate the left turn pocket on Jefferson Street 300' north of Highway 111 when the project develops. This elimination would be necessary given the proximity of the turn pocket to the intersection of Jefferson Street/Highway 111 and the increased volumes on the network.

Phase II

Additional improvements beyond those outlined for Phase I are not required.

Buildout

For the future buildout condition, the intersections of Jefferson Street/Highway 111, Jefferson Street/Vista Grande, and Highway 111/western most driveway will require geometric improvements in order for the intersections to operate at an acceptable level of service. It is logical for the future buildout volumes to require buildout of

the roadway network. Both Jefferson Street and Highway 111 are included in the General Plan as a 6-lane divided major arterial. The future improvements are consistent with those plans.

Jefferson Street/Vista Grande -- At Jefferson Street/Vista Grande recommended improvements include adding another through lane in both directions on Jefferson Street. This is consistent with the widening plans for Jefferson Street. With an additional through lane, this intersection is able to function at an acceptable level of service.

Jefferson Street/Highway 111 -- In addition to the through lanes, the intersection of Jefferson Street/Highway 111 would need to be fully expanded. This expansion would consist of a total of two left-turn lanes, three through lanes, and an exclusive right on all four legs in order to accommodate the buildout volumes.

Highway 111/ Westernmost Driveway -- At buildout conditions Highway 111/western most driveway on Highway 111 will not require additional improvements other than the improvements included in the City's General Plan.

The need for widening in the buildout scenario is a function of General Plan growth and not the Jefferson Plaza.

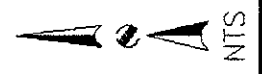
Figure 6 illustrates the proposed geometrics for the Buildout condition.

CVWD CHANNEL
WHITE WATER RIVER

VISTA GRANDE

JEFFERSON ST.

HWY 111



LEGEND

- EXISTING SIGNAL
- PROPOSED SIGNAL
- EXISTING LANE
- ⇄ PROPOSED LANE
- DRIVEWAY

FIGURE 6

FUTURE ROADWAY NEEDS
HOME DEPOT LA QUINTA

O'ROURKE ENGINEERING



CONCLUSION

The study intersection and the full access driveways function at acceptable levels of service for the existing and existing plus project scenario with the existing geometrics in place. A level of service D or better is required by the City of La Quinta during peak hours. The existing volumes plus the additional project traffic generated by Home Depot and the surrounding businesses utilizing the same driveways should not have an impact on the existing geometrics.

The Home Depot Shopping Center will generate approximately 11,511 daily trips, 1,000 afternoon peak hour trips, and 1,078 PM peak hour trips at the completion of Phase II. Based on analyses, the existing roadway network can accommodate these volumes with the addition of improvements at the project driveways.

The western most driveway on Highway 111 was analyzed as a full access driveway with an eastbound left-turn lane, a westbound shared through-right lane, and exclusive southbound left and right-turn lanes. The proposed geometrics for the remaining driveways on Highway 111 consists of a single right-turn-out lane and a shared right-turn-in lane.

The northern most driveway on Jefferson Street at Vista Grande was also analyzed with full access movements, with signalization required by buildout. The proposed geometrics at that driveway include an eastbound shared left-through lane and exclusive right turn lane, a southbound shared through-right turn lane, and a single northbound left turn lane in.

The proposed geometrics at the remaining driveways on Jefferson Street include a single right-turn-out lane and a shared right-turn-in lane.

Both Highway 111 and Jefferson Street are proposed to be widened to six lanes as a function of the General Plan Buildout. Given the future widening, the intersection of Jefferson Street/Highway 111 was analyzed to determine the geometrics to be constructed in that future scenario. The future buildout scenario revealed high volumes on Highway 111 and Jefferson Street. To accommodate these volumes, the intersection would need to be fully expanded to include two left-turn lanes with U-turns, three through lanes, and one right-turn lane on all approaches. To compensate those driveways with restricted right-turn in and right-turn out movements, U-turns are recommended at the intersection. The exact timing of the full expansion should be tied to planned, future growth.

The widening at buildout conditions is a function of General Plan growth and not a function of Jefferson Plaza.

Given the analyses, the impacts of Jefferson Plaza can be fully mitigated.