NELSON
NYGAARD

MEMORANDUM

To: Maureen Gardner, City of San Diego

From: Colin Burgett

Date: May 24, 2013

Subject: Mobility Improvements Report

Euclid + Market Land Use & Mobility Plan (EMLUMP)

Purpose of this Report

This document provides Nelson\Nygaard's Task 7.6 deliverable: "Mobility Improvement Projects Report" as described in the Scope of Services for the Euclid + Market Land Use & Mobility Plan (EMLUMP).

What This Report Contains

This memorandum contains the following sections:

1. **Background**
2. **Existing Conditions & Initial Improvement Concepts**
3. **Proposed EMLUMP Mobility Improvements**
4. **Traffic Operations Analysis**
5. **Appendices**
   a. ***Level of Service Calculation Sheets***
   b. ***Mobility Assessment*** **(existing conditions and future opportunities) report prepared by Nelson\Nygaard in September 2011**
   c. ***Road Diet Memo*** **prepared by Nelson\Nygaard in June 2012**

116 NEW MONTGOMERY STREET, SUITE 500 SAN FRANCISCO, CA 94105 415-284-1544 FAX 415-284-1554

www.nelsonnygaard.com

1. BACKGROUND

Purpose of Proposed Mobility Improvements

The proposed mobility improvements were identified based on the key goals and objectives of the EMLUMP are identified in the Scope of Services:

> *The proposed mobility and land use master plan study shall integrate and connect the Euclid and Market Village area to the surrounding community by creating mixed-use, multi-modal corridors along Euclid Avenue and Market Street with an emphasis for mixed use at the transit hubs. The planning effort should also provide a strategic plan for the provision of pedestrian and bicycle access along Chollas Creek.* ***The mobility component of the study shall provide conceptual plans as a framework for future design work.*** The land use component of the study shall serve to build upon and expand the geographic area that was studied in previous Pilot Village http://www.sandiego.gov/planning/genplan/pilotvillage/village.shtml and the Imperial Avenue Corridor Master Plan efforts, as well as the recent amendment to the Southeastern San Diego Community Plan incorporating a new Village/Mixed Use element to the plan. **A summary of objectives are to:**
>
> - Improve bicycle and pedestrian access to the 47th Street Trolley Station, and the Euclid Avenue Trolley Station and bus transit center,
> - Provide conceptual plans for a pedestrian path along Chollas Creek linking the 47th Street and Euclid Avenue Trolley Stations and lateral connections to the path to improve Trolley access and foster environmental stewardship,
> - Develop a multi-modal mobility network to transform the auto-oriented character of the area, to support the community's Smart Growth Village land use vision, and to better connect the Village to the surrounding community, and
> - Recommend appropriate land uses, densities and urban design for an expanded Village area to better support transit, enhance the community, and meet regional smart growth objectives for the Community Center and Transit Corridor place types.

Mobility Study & Plan Components

The overall mobility study conducted for the EMLUMP was divided into several parts:

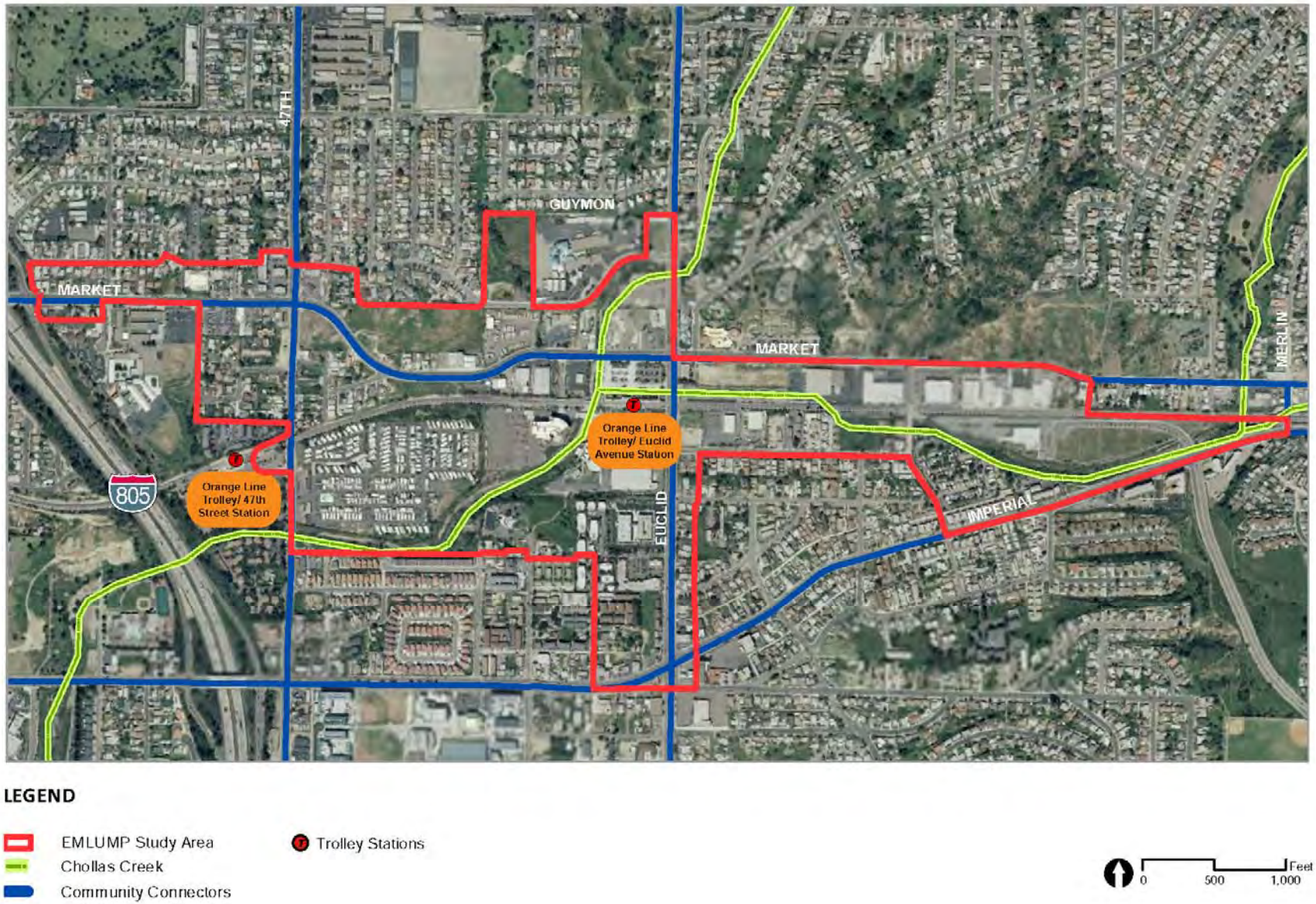
- **Part 1: Mobility Assessment (see Appendix B)** was conducted to provide an initial evaluation of existing and future multi-modal transportation conditions within the Plan Area, including an evaluation of opportunities and constraints related to the four key EMLUMP objectives identified above.
- **Part 2: Initial Mobility Concepts** were proposed (prior to preparation of the Draft EMLUMP) based on opportunities & constraints identified in the Mobility Assessment, and incorporating input received at public workshops and in response to surveys conducted as part of the Plan process.
- **Part 3: Proposed Mobility Improvements** were identified for review by City staff and members of the public as described in Chapter 3 ("Mobility") 0f the February 8, 2013 Draft #3 EMLUMP.

Figure 1-1 Euclid Avenue south of Castana Street (Photo Looking South Towards Imperial)

Photo Source: WRT 2011

Key objectives of the Euclid + Market Land Use and Mobility Plan (EMLUMP) are focused on improving pedestrian and bicycle access to along key access routes to the Euclid and 47th Street Trolley Stations, particularly along and across existing major streets such as Euclid, Market and 47th Street. However, short-term options for sidewalk improvements on some segments may be limited given existing land use and parking access configurations that preclude substantial redesign of the "pedestrian realm" on some segments until redevelopment occurs.

Figure 1-2 EMLUMP Study Area



2. EXISTING CONDITIONS & INITIAL IMPROVEMENT CONCEPTS

Mobility Assessment (Existing Conditions & Opportunities) Overview

The **Mobility Assessment** prepared for the EMLUMP (Nelson Nygaard, September 2011) evaluated current conditions focusing on accessibility and multi-modal mobility within the Euclid + Market Village Master Land Use and Mobility Plan Area. The assessment includes the following:

- Description of existing transportation facilities, and summary of data collection efforts, including traffic volumes, transit ridership, bicycle and pedestrian volumes, on-street parking occupancy, and traffic level of service (LOS).
- Identification of key opportunities and constraints
- Initial recommendations for future transportation strategies to enhance access to, and mobility within, the Plan Area.

The Mobility Assessment report (attached as Appendix B) is divided into the following sections that describe travel conditions for the primary modes of transportation that provide access and circulation within the Plan Area:

- Existing & Planned Future Transportation Network
- Transit Service & Access
- Motor Vehicle Traffic & Parking
- Pedestrian Circulation & Access
- Bicycle Circulation & Access
- Summary of Opportunities & Constraints

A portion of the information described in the Mobility Assessment report is also summarized on the following pages.

Major & Collector Street Network

The following four streets provide access to the Plan Area for automobile, bicycle, bus, and pedestrian travel:

- **Euclid Avenue** is classified as a Major Street (functional classification) and features four travel lanes, a center turn-lane (with median on some segments), wide curb lane (including some on-street parking), and narrow sidewalks.
- **Imperial Avenue**'s functional classification is as a Major Street, and features four to five travel lanes through most of the Plan Area, including a center turn-lane/median and sidewalks.
- **Market Street** currently functions as a 4-Lane Collector Street but is classified as a Major Street. Market Street currently features four travel lanes, center-turn lanes at signalized intersections, on-street parking on most segments, and sidewalks from I-805 to Euclid Street. To the east of Euclid Street, Market Street shrinks to two lanes with unimproved shoulders.
  - However, because it is currently classified as a Major Street, future development projects along this stretch will be required to widen the street to four lanes with a center turn lane/median and sidewalks, consistent with City standards for [1]Major Streets unless the street is reclassified through the Community Plan update (see Figures 3-1a and 3-1b for required cross-section under Major Street standards).
- **47th Street** currently functions as a 2-Lane Collector Street but is classified as a Major Street and features four travel lanes, a center turn-lane, sidewalks, and on-street parking north of Market Street and south of Imperial Avenue. Between these two corridors, however, 47th Street does not conform to its classification: it is only one lane each way, with a center turn lane, some on-street parking, and narrow sidewalks.
  - As on Market Street east of 47th Street, future developers will be required to upgrade 47th Street to match its classification as a 4-Lane Major Street unless the street is reclassified through the Community Plan update (see Figures 3-1a and 3-1b for the required cross-section under Major Street standards).

[1] Required lane dimensions and median widths for Major Streets are based on 45 to 55 mph design speed (as described in the San Diego Street Design Manual; see Figures 3-1a and 3-1b of this report). By contrast, Collector Streets are designed for a slower, 35 mph design speed with narrower lane and median widths (see Figure 3-2).

Traffic Study Intersections & Existing Traffic Volumes

Table 2-1 describes the ten traffic study intersections selected for traffic operations analysis. These ten study intersections were selected based on consultation between City staff and the Consultant Tea, based on identification of key intersections within the Plan Area (such as Euclid/Market and 47th/Market) and primary freeway access ramp ramps serving Market Street and Euclid Avenue. In addition, a review of prior traffic studies was conducted to ensure inclusion of locations with potentially constrained existing or future-year LOS.

Table 2-1: Traffic Study Intersections

Study Intersection	Location	Traffic Signal?
1	Euclid Avenue & SR-94 WB Ramps	NO*
2	Euclid Avenue & SR-94 EB Ramps	NO*
3	Euclid Avenue & Market Street	YES
4	Euclid Avenue & Imperial Avenue	YES
5	47th Street & Imperial Avenue	YES
6	54th Street & Imperial Avenue	YES
7	I-805 SB Ramps & Market Street	YES
8	I-805 NB Ramps & Market Street	YES
9	47th Street & Market Street	YES
10	47th Street & A Street	NO
*Planned signalization and intersection redesign planned prior to Year 2035.		

Figure 2-1 provides a map of the study area and traffic analysis study intersections. Figure 2-3 shows existing peak hour traffic volumes (motor vehicle turning movements) based on counts conducted in May 2011.

Figure 2-1 Map of Study Area & Traffic Study Intersections

Figure 2-2 Peak Hour Traffic Volumes – Existing (May 2011) Conditions

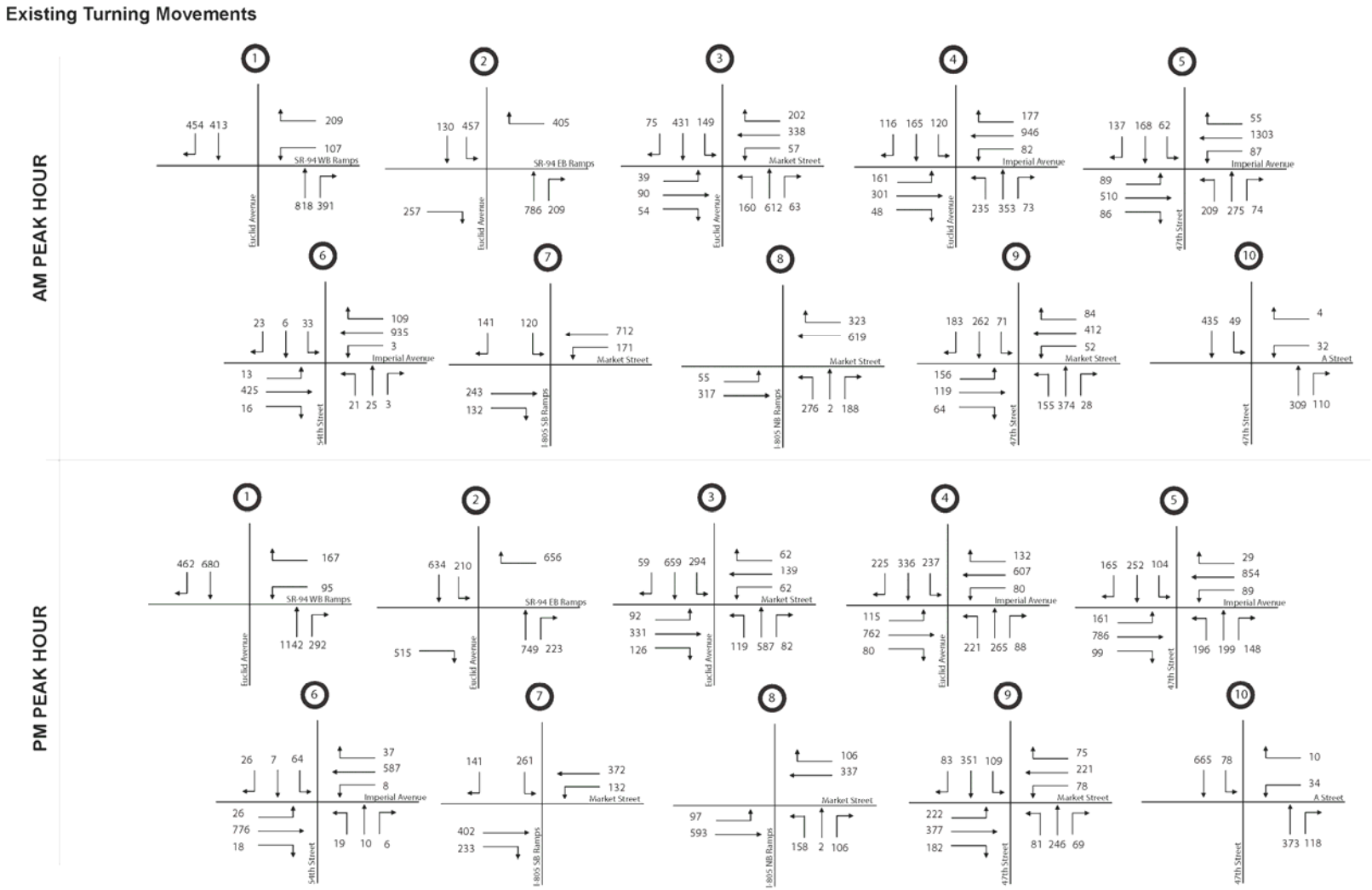


Table 2-2: Intersection Level of Service (Existing Conditions)

EXISTING CONDITIONS (AM & PM PEAK HOURS)						
			AM Peak Hour		PM Peak Hour	
Study Intersection	Location	Intersection Control	Level of Service (LOS)	Average Vehicle Delay (seconds)	Level of Service (LOS)	Average Vehicle Delay (seconds)
1	*Euclid Avenue & SR-94 Westbound Ramps*	*Side-street stop (1)*	*D*	*25.1*	***E***	***46.8***
2	*Euclid Avenue & SR-94 Eastbound Ramps*	*Side-street yield (2)*	*C*	*21.0*	***F***	***>50***
3	Euclid Avenue & Market Street	Signalized	C	23.9	C	27.1
4	Euclid Avenue & Imperial Avenue	Signalized	D	37.7	C	33.8
5	47th Street & Imperial Avenue	Signalized	D	50.6	D	37.0
6	54th Street & Imperial Avenue	Signalized	B	10.5	A	9.5
7	I-805 SB Ramps & Market Street	Signalized	B	8.8	B	18.7
8	I-805 NB Ramps & Market Street	Signalized	B	10.2	A	8.7
9	47th Street & Market Street	Signalized	C	30.5	C	27.0
10	*47th Street & A Street*	*Side-street stop (3)*	*C*	*15.6*	*D*	*19.1*

Bold indicates failing conditions (LOS E or F based on City of San Diego standards).

Notes:

1. LOS at Euclid & SR-94 Wesbound Ramps is based on westbound left-turn (stop-controlled) movement.

2. LOS at Euclid & SR-94 Eastbound Ramps is based on eastbound right-turn (yield-controlled) movement.

10. LOS at 47th & A Street is based on westbound left-turn (stop-controlled) approach.

Source: Nelson\Nygaard 2013

Motor Vehicle Parking Supply & Demand

An inventory of existing, on-street parking facilities and parking occupancies on the Major & Collector Street segments within the Euclid & Market study area was conducted on May 24, 2011.

Based on a review of street dimensions on Euclid, Market and 47th street, just over 300 vehicles could be accommodated within the existing on-street parking supply.

Table 2-3 provides a summary of the existing parking supply and occupancy for each of the street segments (and additional details concerning the on-street parking data is provided in the Technical Appendices). Key findings are that:

- On-street parking demand on Major Arterial and Collector street segments is very low (less than 30 percent occupancy) during all three count periods (morning, afternoon and evening).

Table 2-3: On-Street Parking Occupancy

STREET	MORNING (10 to 11 AM)			AFTERNOON (2 to 3 pm)			EVENING (8 to 9 pm)		
	Supply	Demand	*Pct Occupied*	Supply	Demand	*Pct Occupied*	Supply	Demand	*Pct Occupied*
Euclid Avenue	52	10	*19%*	52	7	*13%*	52	16	*31%*
Market Street	166	47	*28%*	166	50	*30%*	166	33	*20%*
47th Street	88	33	*38%*	88	29	*33%*	88	37	*42%*
TOTAL	**306**	**90**	***29%***	**306**	**86**	***28%***	**306**	**86**	***28%***

Source: Nelson\Nygaard and Wiltec. Parking occupancy counts conducted on May 24, 2011.

Existing Bicycle Network

Bicycle infrastructure within the Plan Area is currently limited to the following:

- **Class III bike routes** ("signed" bicycle routes, that designate shared travel lanes between bicycles and motor vehicles, often without physical improvements to accompany the route designation) are designated on:
    - Market Street between I-805 and Euclid Avenue
    - Imperial Avenue between Euclid Avenue and San Jacinto Drive
    - Valencia Parkway between Imperial Avenue and just north of Skyline Drive
    - San Jacinto Drive between Imperial Avenue and Churchward Street
    - 47th Street between Market Street and Logan Avenue
    - Euclid Avenue between Market Street and SR-94 (and further north) is designated as a bicycle route.
- **There are no Class II bicycle lane segments within the Plan Area today.**
    - Near the Plan Area, on Market Street west of I-805 (just outside the Plan Area) is a segment striped with Class II bicycle lanes.
- **There are no Class I bicycle paths within the Plan Area today.**
    - Near the Plan Area, there is a relatively short (0.2 miles) Class I path paralleling I-805 on the west side of the freeway from Market Street southeast to Maxim Street

Existing Pedestrian Network

Narrow sidewalks and lengthy walking distances characterize the pedestrian circulation network serving the Plan Area, providing a stark contrast to the high quality of transit service that is provided.

- Although it would be easy to assume that the incomplete nature of the pedestrian network is a result of the area's geographical constraints, particularly the steep hill grades and Chollas Creek, such geographic obstacles have been overcome elsewhere (for example: some of the world's most walkable cities have had their share of hills and waterways to overcome). Ultimately, a key factor is the era in which the Plan Area developed.
- As a result of the limited sidewalk space along the Plan Area's north-south and east-west arterials, convenient and desirable walking routes within the Plan Area are extremely hard to find. Market Street between 47th Street and Euclid Avenue is essentially a closed network: for one-half mile, one hilly parcel separates it from Guymon Street residential neighborhoods to the north, and another hill, the Trolley line, and Chollas Creek separate it from the El Rey Trailer Park and other residential developments to the south. Despite these constraints, pedestrian volumes are surprisingly high within the Plan Area.

Figure 2-3 Existing Pedestrian Network & Barriers

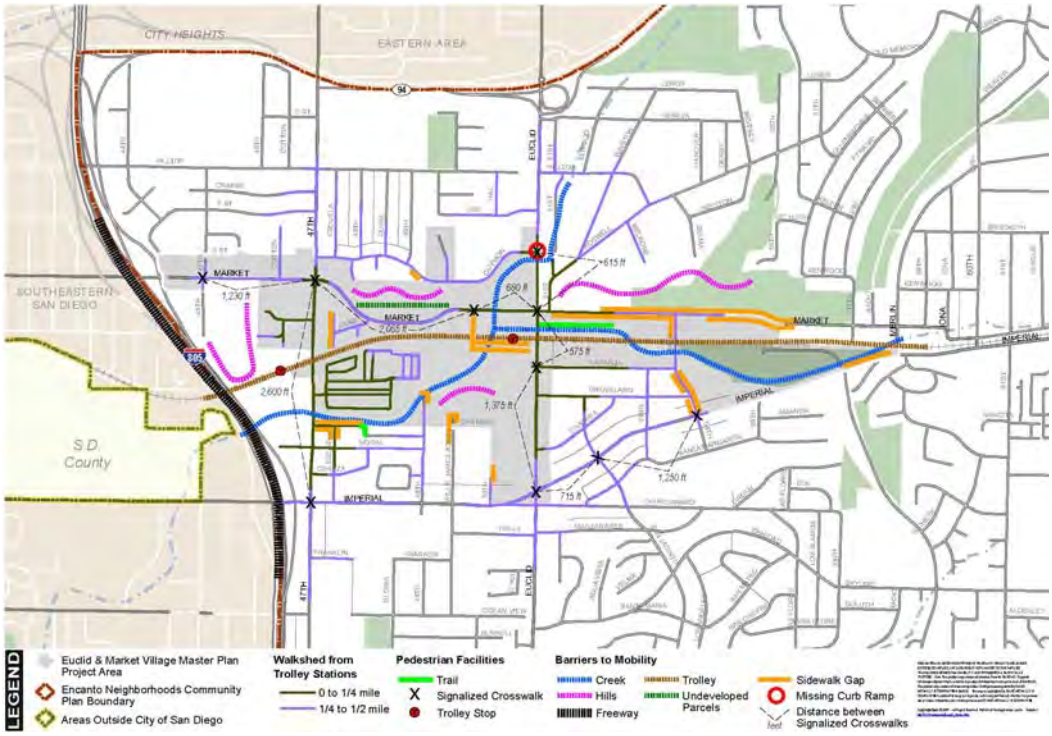
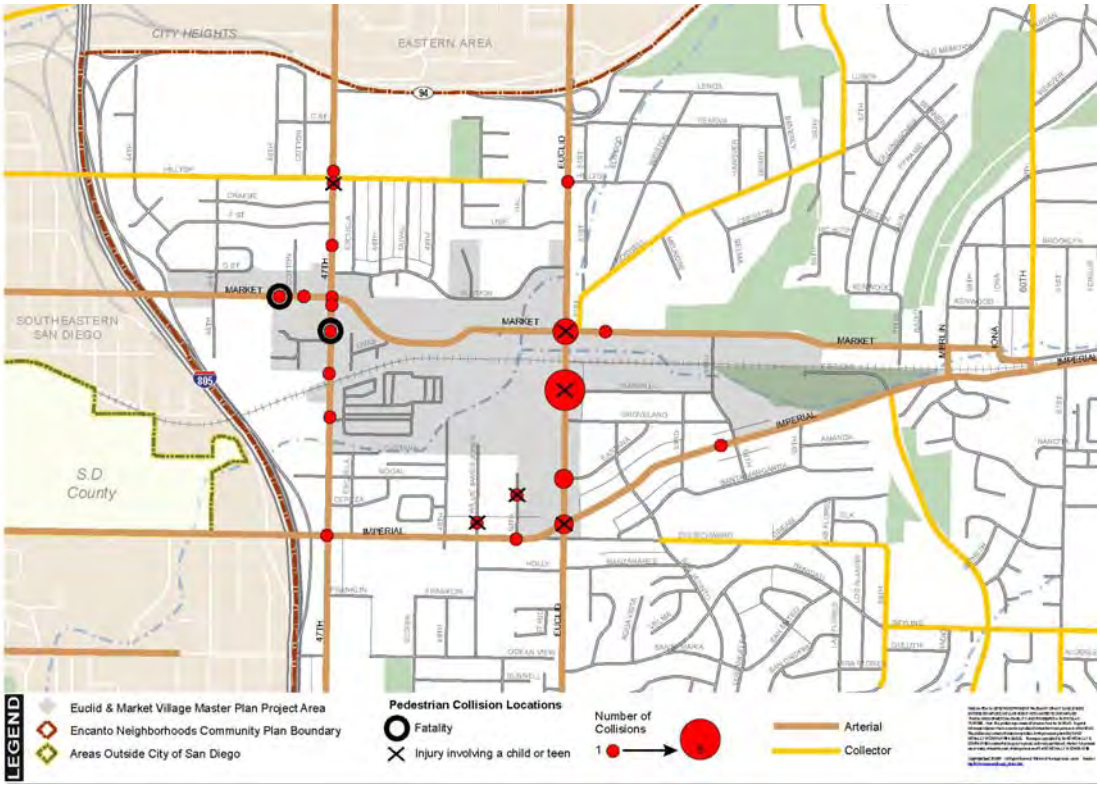


Figure 2-4 Pedestrian / Motor Vehicle Collision Locations 2006-11



Existing Peak Hour Pedestrian Volumes at Study Intersections

Pedestrian volumes during AM and PM peak periods were collected at the ten study intersections on Tuesday, May 24th, 2011. A summary of the findings is shown on Table 2-3.

Table 2-3: Pedestrian Volumes at Study Location (AM & PM Peak Hours)

Study Intersection	Location	AM Peak Hour	PM Peak Hour
1	Euclid Avenue & SR-94 WB Ramps	14	22
2	Euclid Avenue & SR-94 EB Ramps	16	25
3	Euclid Avenue & Market Street	130	95
4	Euclid Avenue & Imperial Avenue	127	83
5	47th Street & Imperial Avenue	81	50
6	54th Street & Imperial Avenue	20	20
7	I-805 SB Ramps & Market Street	135	39
8	I-805 NB Ramps & Market Street	84	28
9	47th Street & Market Street	123	122
10	47th Street & A Street	16	29
N/A	Walkway[2] between Euclid Trolley Station & Market Creek Village retail	139	173

- At most of the study intersections, AM peak period pedestrian counts were higher than PM peak period figures. This is due to the fact that students traveled to school in the morning (during the AM peak hour for motor vehicle travel) but were not counted during the PM peak hour for motor vehicle travel, as most schools let out in the mid-to-late afternoon.
- Relatively few pedestrians were found to travel through locations such as the Euclid Avenue & SR-94 ramp intersections and the 47th Street & A Street intersection to the

[2] Pedestrian counts during AM and PM Peak Hour at Euclid trolley station provided by SEDC based on all-day counts conducted on October 21, 2011. In addition to the "transit to/from retail" counts shown above on Table 2-3), the observations also observed 220 AM Peak Hour transfers between bus and trolley, and 249 PM Peak Hour transfers.

north of the Plan Area during AM and PM peak periods. Rather, higher volumes of pedestrians traveled through intersections located closer to a variety of commercial and institutional destinations within the Plan Area, including Euclid & Imperial Avenue, Euclid Avenue and Market Street, and 47th & Market Streets, counts exceeded 100 pedestrians per AM peak hour.

Public Transit Service & Ridership

MTS operates eight bus lines in the area, all of which share the Euclid Avenue Trolley station as a hub. Throughout its entire system, MTS directly operates about half of its bus routes, and contracts the rest of its routes to Veolia, Inc. Within the Plan Area, MTS operates lines 4, 5, and 13, while Veolia operates lines 3, 916/917, 955, and 960.i

- The Euclid Avenue Station is the terminal stop for five of the eight bus lines that operate within the Plan Area (Lines 3, 5, 916/917, and 960). The schedules of these five lines are "pulsed", with closely coordinated departure times, to facilitate transfers.
- According to the San Diego Association of Government (SANDAG)'s 2009 Onboard Survey among passengers boarding the trolley at Euclid Station:
    - **44 percent of riders reported walking to the Trolley**
    - **34 percent reported having transferred from a bus**
    - **Only three percent reported biking to the station**
    - **Five percent drove via private vehicle and parked**
- By contrast, the 47th Street Station is not served by any local or express bus routes; the nearest stops are nearly a third of a mile to the north and south.

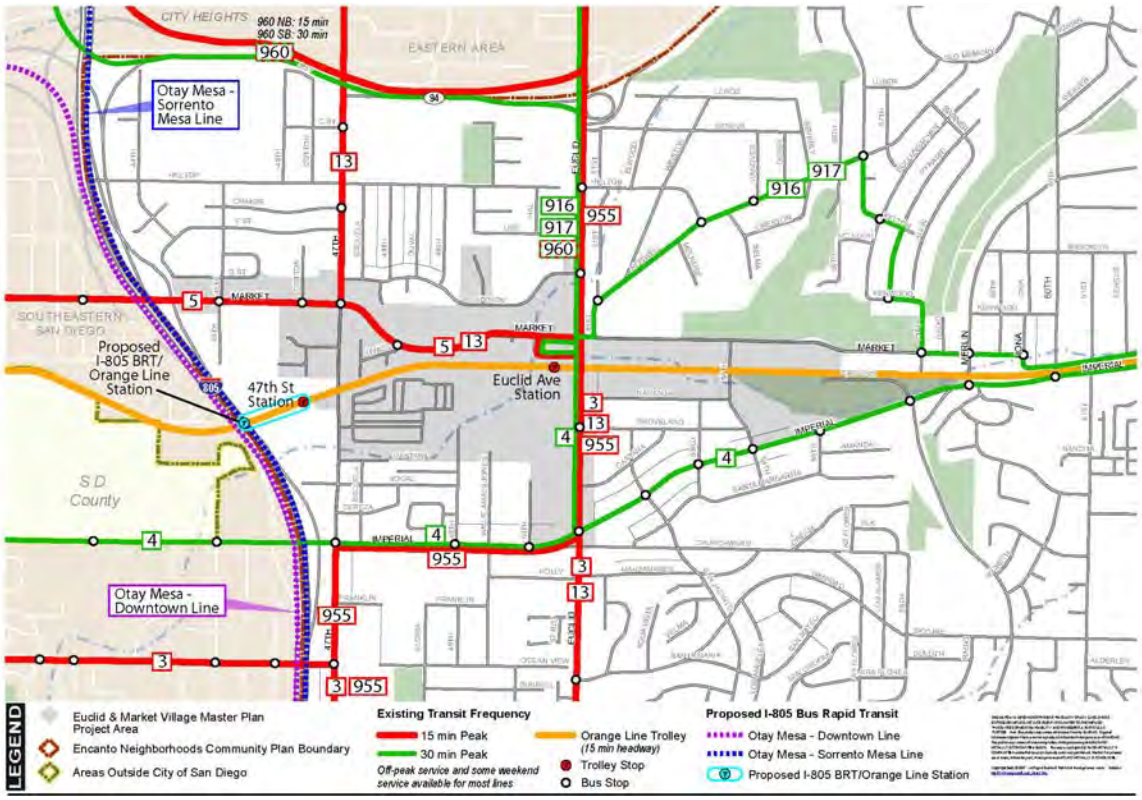
The majority of bus boardings and alightings on all bus lines within the Plan Area take place at the Euclid Avenue Trolley station. On an average[3] weekday at the Euclid Station there are:

- **7,500 daily bus passenger trips (total of boardings & alightings)**
- **5,200 daily trolley passenger trips (total of boardings & alightings)**

The next tier of boarding and alighting ("on" or "off" counts greater than 100 per weekday) occurs at stops along the Euclid Avenue corridor between Market Street and Imperial Avenue, adjacent to significant trip generators such as the Market Village shopping center and the Euclid Health Center.

[3] Data collected 2010-11 and provided by MTS including the following parameters for the data: weekday data are all from FY 2011 (July 1, 2010-June 30, 2011). For the routes operated in house (the 4, 5 and 13), it represents an average for a booking, which are Sep-Jan, Jan-Jun or Jun-Sep. The data you have are averages to date for the Jan-Jun 2011. For the contracted routes (the 3, 13, 916/917, 950 and 960), that data represent one-day snap shots for each trip, although they may not all be collected on the same weekday, taken sometime during the fiscal year."

Figure 2-5 Existing Transit Service



Key Constraints to Local Mobility & Transit Access

Over the past half-century or more, topographical constraints and incremental land development have created a patchwork of streets and land uses within the Plan Area:

- Long blocks, wide arterial streets with narrow sidewalks, and natural hills and gullies contribute to an environment that is relatively inhospitable to bicyclists and pedestrians.
- The Orange Line (MTS Trolley route) right of way bisects the project area from west to east, and despite the availability of crossings at major streets, acts as a barrier to north-south connectivity within the neighborhood.
- Local topography (e.g., creeks, canyons, and mesas) further limits travel in the area. To the east, the Emerald Hills act as a significant physical barrier between that neighborhood and areas to the south and west. Likewise, the Emerald Hills, Encanto, and South Branches of Chollas Creek are real physical constraints that limit north-south and east-west access throughout the project area.

The local street network includes many "dead-end" streets, partly due to topography (as described above) and partly due to the prevailing street design pattern during the era the local street network was developed. Figure 2-6 shows the many "dead-end" streets within the study area that forces most trips to occur on Major Streets within the Plan Area.

Figure 2-6 Circulation Barriers: Disconnected Local Street Network

Initial Improvement Concepts (Prior to Preparing Draft Plan)

Based on key opportunities and constraints identified in the Mobility Assessment, several initial mobility "concepts" were discussed including:

- Potential "Road Diet" (4 to 3 lane conversion) on Market & 47th
- Trolley Grade Separation
- Parking Reductions for transit oriented development (TOD)
- Local Street Grid Connections

Initial concepts were described in the EMLUMP *Mobility Assessment* report (attached Appendix B) and in the prior Draft #3 Mobility Chapter of the Draft Plan, as well as in a prior memo prepared by Nelson\Nygaard (see Appendix C) describing "road diet" examples from other cities, as well as concepts related to parking reductions for transit-oriented development (TOD).

Road Diet Concept

A "road diet" is a cost-effective, relatively simple means of increasing safety, accessibility, and mobility along significant corridors, especially where roadway capacity exceeds both current and forecast traffic volumes. It is considered a form of traffic calming. In general, these projects entail:

- Reducing the amount of vehicular travel lanes, often in conjunction with installing a center turn-lane where none was provided previously. The "4 to 3" road diet is most common, typically involving an existing four-lane street (with two motor vehicle travel lanes in each direction) with no center turn-lane that is restriped with one lane in each direction plus a center turn-lane and bicycle lanes

Figure 2-7 and 2-8 provides photographs showing a typical "before" and "after" scenario with implementation of a "4 to 3" road diet. Figure 2-9 provides examples of three example road diet projects from other West Coast cities (San Francisco, Oakland, and Portland):

- **Such "4 to 3" road diets have typically been implemented on streets with traffic volumes exceeding 20,000 vehicles per day. (By contrast, Market Street serves less than 11,000 vehicles per day).**
- In addition: all three of the road diet examples shown on Figure 2-9 are in areas with closer block spacing (i.e., shorter blocks) than on Market Street. For example, the Valencia Street road diet in San Francisco was installed on a street carrying over 20,000 cars per day, with 550-foot long blocks (and signals at every intersection).
    - By contrast, the average distance between intersections and traffic signals on Market Street is much longer (thus fewer potential delay points):
        - 2,000 feet between Market/47th and Market/Market Creek Place
        - 750 feet between Market/47th and Market/Euclid is 750 feet

With future development of the "former proposed Walmart" site, one additional signal would likely be necessary between 47th and Market Creek Place, with a T-intersection (thus fewer conflicting movements than a typical 4-way intersection. The additional intersection will most likely to be located west of Uvas Street, between 500 and 600 feet east of 47th Street, and 1,400 to 1,500 feet west of Market Creek Place.

Typical Implementation of Road Diets

Road diets have typically been implemented on four-lane arterials or local streets where local circulation and/or neighborhood quality-of-life is constrained due to any one, or all, of the following:

- Narrow sidewalks
- Higher than desired vehicle speed (particularly where vehicular capacity far exceeds average traffic volumes)
- Lack of dedicated bicycle facilities
- Safety concerns due to rear-end collisions

Traffic Volume Thresholds for 4 to 3 Road Diets

Road diets have been successfully installed on streets with varying traffic volumes:

- The most common type of "4 to 3" road diets have primarily been implemented along corridors with average daily traffic (ADT) counts of up to 20,000 to 22,000 ADT.
    - For example, Valencia Street in San Francisco carried 22,000 ADT before implementation of a "4 to 3" road diet, and continues to carry 20,000 ADT today, following a very popular multi-stage implementation effort. Bicycle volumes, in particular, have increased dramatically on Valencia Street following implementation of the road diet.
- In addition, there have been several successful instances of road diets implemented along streets featuring higher average volumes.
    - For example: along Tacoma Street in Portland, Oregon (ADT 30,000), four lanes were reduced to three and additional improvements such as curb extensions, refuge islands, and on-street parking were added; as a result, overall traffic and instances of speeding decreased while few drivers diverted to alternate routes.

Figure 2-7 Typical Road Diet (4 to 3 Conversion)

Before

After

Figure 2-8 Road Diet Example: La Jolla Boulevard

Before

After

Figure 2-9 Road Diet Concept: Market Street

Before (Existing)

After (Proposed – Initial[4] Concept)

[4] EMLUMP Draft #3 recommends the proposed road diet as an "interim" improvement measure only, with long-term widening to 4-Lane Collector standards by 2035 (concurrent with long-term development in the area) based on City staff input on prior draft.

Safety Benefits of Road Diets

Road diets are particularly effective tools to improve the safety of both drivers and bystanders (including pedestrians and bicyclists). In the typical roadway conversion scenario – an existing four-lane road without center-turn lane at most locations -- to three lanes with a continuous center turn lane – a road diet reduces three types of collisions (see additional details in Appendix C):

- Rear-enders: vehicles turning left against oncoming traffic that could be rear-ended from drivers not paying attention may use the center turn lane instead.
- Side swipes: With two lanes in each direction, drivers switching lanes might side swipe another car because of the car's blind spot; with a road diet, however, drivers would not be able to switch lanes.
- Left turn/broadside: Whereas drivers turning left across incoming traffic may not be able to see a car in the far lane if another car in the near lane is waiting for the turn, vehicles turning from a center turn lane have only one lane of traffic to cross in order to complete the turn.
- In addition to driver safety, a road diet often also intrinsically increases bicycle and pedestrian safety by creating dedicated spaces for these modes. Striped bike lanes reinforce that the street is used by multiple modes of transportation, and pedestrians enjoy a combination of buffered walking spaces, wider sidewalks, or refuges (median islands) at crosswalk locations.

Figure 2-9 Road Diet Examples

Location	Average Daily Traffic (ADT)	Change in Design	Effect	Photographs	Source
Valencia Street San Francisco, CA	▪ ~22,000 vehicles and a few hundred bicycles (before) ▪ ~20,000 vehicles and ~5,000 bicycles (after)	▪ 1st iteration (~1999): 4 lanes with no center turn-pocket (before) to 2 with center turn lane and bike lanes ▪ 2nd iteration (~2011): expanded sidewalks and wider bike lanes (and removal of center turn-lane on mid-block segments)	▪ 10% reduction in ADT (to 19,979) ▪ 2-8% increase in ADT on 4 parallel streets. ▪ Crashes decreased from 73.2 to 62/year ▪ Injury crashes decreased from 58.8 to 50/year ▪ Bicycle use in PM peak hour increased from 88 to 215 (initially) followed by a longer-term increase to over 500 peak-hour cyclists (estimated 5,000 daily cyclists) by 2010 ▪ Bicycle crashes increased from 10.1 to 12/year (but rate of bicycle crashes decreased given the significant increase in bicycle volumes)	 1960s  2010s	(1)

Tacoma Street Portland, OR	▪ 30,000 (before)	4 lanes (with limited turn pockets) to 2 lanes with a center turn lane and some on-street parking	▪ Speeding decreased ▪ Overall traffic decreased ▪ Minimal traffic diversion ▪ Increased on-street parking ▪ Improved pedestrian environment	 	(2)

High Street Oakland CA	22,000 to 24,000	4 lanes without center-turn lane (before) to 2 lanes with center turn lane (after)	Crashes decreased from 81 to 68 per year	 **Before**  **After**	(3)

Table adapted from Huang, Stewart, Zegeer, and Tan Esse, 2003

(1) 1960s image, Eric Fischer; Sallaberry, M. *Valencia Street Bicycle Lanes: A One Year Evaluation*. San Francisco Department of Parking and Traffic. December 2000.

(2) Jennifer Rosales, Parsons Brinckerhoff

(3) Knapp, K., T. Welch, and J. Witmer. Converting Four-Lane Undivided Roadways to a Three-Lane Cross Section: Factors to Consider. Presented at the 1999 Annual Meeting of the Institute of Transportation Engineers, Las Vegas, NV, August 1-4, 1999.

(4) Burden, D. and P. Lagerwey. *Road Diets: Fixing the Big Road*

Trolley Grade Separation at Euclid Avenue

One of the major concerns for future mobility within the study area has been identified as congestion along Euclid Avenue south of Market Street, particularly related to perceived delays to motor vehicles where Euclid Avenue intersects the trolley tracks, approximately 200 feet south of Market Street.

- Anecdotal reports suggest that significant motor vehicle delays occur when track gates are lowered to accommodate trolley crossings (e.g., whenever a train enters or exits the station).
- However, as described further below, site observations indicate that motor vehicle delay on this segment of Market Street is caused by at least six different factors, of which the train crossings are a contributor, but not the primary cause of delay.

Planned Long-term Grade Separation

In April 2011, SANDAG released its Draft 2050 Regional Transportation Plan. The plan included a number of transportation improvements that would help to mitigate traffic and improve mobility given increases in population and housing and employment density in the greater San Diego area.

One of the long-term projects outlined in the RTP is to improve Orange Line Trolley performance by building grade-separated overpasses where roads and trolley lines intersect on segments outside of Downtown San Diego, which would allow traffic to flow through the crossing even if a train is present.

- Grade separations are not proposed for Orange Line intersections within Downtown San Diego.
- Five major intersections are identified in the RTP for potential grade-separation projects along the Orange Line. The Euclid Avenue trolley crossing is one of the locations specified in the RTP.
- However, since all trolleys must stop at the Euclid Station (immediately adjacent to the Euclid Avenue crossing), there is unlikely to be significant travel time benefit for trolley operations at this location.
- Potential benefits to trolley operations are likely to be greater at other potential grade-crossing locations that are not located adjacent to stations, where trolleys could travel at maximum speed.
- No detailed planning work has been completed thus far, and the project has yet to develop a detailed schedule, budget, or set of alternatives.
- SANDAG estimates that the project could be implemented after 2030 and could cost a total of between $30 and $50 million.

Costs will vary depending on a number of factors, including:

- Length/size of the aerial structure. A potential structure over Euclid Avenue could begin east of 54th Street, allowing for a potential vehicular connection at this location. To the west, the structure could begin just before the Jacobs Center driveway, possibly enabling a reconstruction of this street to provide better in-site connection or allow access to new development. An aerial guideway would generally cost between $5m - $10m depending on length. However, that is a base cost that

does not include the additional site-specific engineering obstacles at this location, given proximity to Chollas Creek.

- Reconstruction of the Euclid Avenue station. In order to accommodate a new aerial structure, Euclid Avenue station will need to be reconstructed as an elevated station. Generally, costs for elevated stations can be in the range of $30m - $40m, excluding demolition, site preparation, and enhanced access (e.g., escalators, elevators). Additional costs would be incurred in relocating the station to the east side of Euclid Avenue, or reconstructing and/or relocating station area bus bays and layover areas.
- Soft costs. Soft costs differ from "hard costs" such as capital construction in that they are less concrete, often including the cost of planning and other professional services related to a rail project. On average, soft costs for federally-funded fixed guideway transit projects account for about 30% in additional cost above hard costs.

Causes of Motor Vehicle Delay at Trolley Crossing & Initial Improvement Recommendations

As part of the EMLUMP study, Nelson\Nygaard staff observed sources of congestion in the area and found that several factors contribute to increased traffic at various times in the day. Initial congestion mitigations have been identified for most of these factors and are shown in bold below.

Traffic operation at this location is affected by the southbound "downstream" capacity on Euclid Avenue (between Market Street and Naranja Street), which is reduced by the following factors:

- **Euclid Traffic Delay Factor #1:** Traffic signal at the intersection of Euclid Avenue and Naranja Street (primary entrance to the Market Village Shopping Center) is not coordinated with upstream signals (north of the trolley tracks). A significant volume of pedestrian crossings occur across Euclid Avenue at this location due to the lack of additional signalized crosswalks between Naranja Street and Imperial Avenue. As a result, southbound traffic flows frequently must stop at this location.

Short-term Recommendation: Traffic Signal coordination and re-timing measures could potentially reduce this occurrence. Although signal coordination will be overridden when trolley gates are lowered (8 times per hour under existing conditions, with planned increase in trolley service to up 16 times per hour), a coordinated signal plan could potentially be integrated with the trolley schedule based on real-time train arrival and location data.

Short-term to Mid-term Recommendation: Provision of additional signalized pedestrian crossings on Euclid Avenue south of Naranja Street could help to reduce this impact on southbound traffic operations approaching Naranja Street by dispersing pedestrian crossings to additional crossing locations.

- **Euclid Traffic Delay Factor #2:** Shopping center driveway between the light-rail tracks and Naranja Street contributes to delay(s) to southbound traffic approaching the light-rail crossing, due to (1) the volume of motorists making a southbound right-turn from Euclid Avenue into the shopping center, immediately south of the trolley tracks; and (2) the steady volume of pedestrians during peak periods requires those inbound motorists to yield prior to entering the shopping center. As a result, those right-turning vehicles frequently block the curbside southbound travel lane for brief periods.

Potential Short-term to Mid-term Improvement Option A: Closing the driveway to inbound traffic would reduce motor vehicle delay at this location (but is likely impractical).

Potential Short-term to Mid-term Improvement Option B: Providing a right-turn pocket for southbound motor vehicles would reduce motor vehicle delay at this location. However, given the narrow sidewalks and lack of bicycle lanes on this segment, this option would be inconsistent with the recommended "Complete Street" strategy.

- **Euclid Traffic Delay Factor #3: Trolley Track Crossing.** The southbound vehicle queue on Euclid Avenue (approaching Naranja Street) extends past the at-grade light-rail crossing (due to Delay Factors #1 and #2 identified above). The queue length is longer than normal, due to motorists' wise aversion to stopping directly on the light-rail tracks.

Planned Long-term Improvement (after 2030): trolley tracks relocated to a bridge crossing with planned grade separation project, not anticipated to occur prior to 2030.

- **Euclid Delay Factor #4: Bus Safety Measures at Trolley Track Crossing.** The relatively high frequency of bus service on Euclid Avenue results in increased vehicle delay approaching the at-grade rail crossing. This is due to the necessary "safety stop" that each bus makes within the northbound and southbound travel lane(s), prior to crossing the rail tracks.

Planned Mid-term Improvement (after 2020): Following implementation of the planned I-805 BRT – and the corresponding transfer point with the Trolley at the 47th Street station –MTS may realign some of the bus routes that currently terminate at Euclid Avenue station to 47th Street; consequently, there could be fewer buses making a "safety stop" at the tracks.

- **Euclid Delay Factor #5: lengthy pedestrian crossing distances at Market Street & Euclid Avenue intersection** requires nearly 30 seconds for each pedestrian phase. Reducing the pedestrian crossing distances would potentially allow the overall signal cycle length (currently 100 seconds) to be reduced, allowing for more efficient traffic operations.

Improvement Option (Not Recommended by City staff): Provision of median refuges in the crosswalks would reduce crossing distances and improve pedestrian safety as well as help mitigate congestion. MUTCD standards allow for a reduction in pedestrian signal phase time where pedestrian median refuges are provided. However, City staff indicated that provision of median refuge would not be desirable at signalized crossing locations.

- **Euclid Delay Factor #6: trolley crossings south of Market Street occur every 15 minutes** in both the eastbound and westbound direction (so a total of eight such crossings per hour) and each train crossing requires the track gates to lower for approximately 40 seconds during each crossing. Although delays at the Euclid & Market intersection are often attributed to these trolley crossings, Nelson\Nygaard observed that the passage of each trolley had a relatively benign

effect on traffic operations (with vehicle delays primarily attributable to Delay Factors #1 through #5 above).

Traffic Circulation Improvement Concepts

Given the objectives of this Plan (summarized on Page 3 of this report) to focus on bicycle and pedestrian access to transit, traffic circulation enhancements were not a focus of this planning effort. Nonetheless, in some cases: reductions in pedestrian crossing distances could benefit traffic circulation, particularly at intersections where inefficient signal phasing results in an imbalance between traffic volumes and the allocation of time within each cycle. For example:

- At the intersection of Euclid & Imperial, lengthy pedestrian crossing distances require a significant amount of time within each signal cycle to be allocated to north/south through movements (when pedestrian calls occur) despite the fact that many left-turns occur. As a result, delay to left-turning traffic is likely to occur during periods of high pedestrian traffic (such as when the adjacent schools let out).
- Similarly, delays to motorists occur at the intersection of Euclid with Naranja (at the entrance to the Market Village, one block south of the trolley tracks). Pedestrians tend to prefer to cross Euclid at the signalized crosswalk at Naranja Street, even when traveling south towards Imperial, in part due to the lack of other signalized pedestrian crossings between Naranja and Imperial. Provision of an additional signalized crosswalk at Castana could help to disperse the current volume of crossings at Naranja, while provision of a second crossing at Castana may be easier to accommodate with a synchronized timing plan (which is more difficult to accomplish at Naranja, presumably due to proximity to the trolley tracks).

Euclid & Imperial Intersection (Concepts to Reduce Pedestrian Crossing Distances)

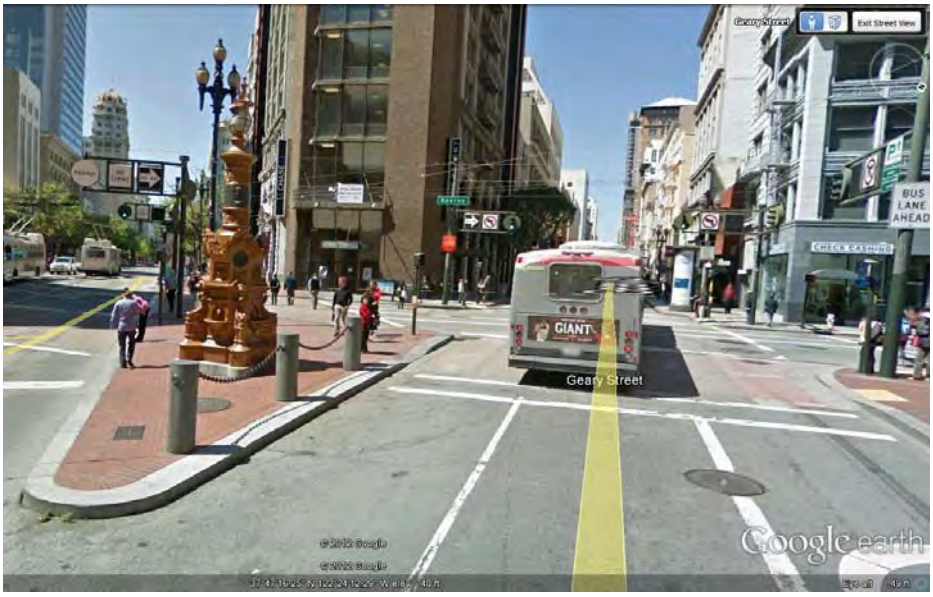
The Euclid & Imperial intersection is notable for having extremely long pedestrian crossing distances, as all four legs require a crossing of greater than 100 feet, while the south leg requires a crossing of over 130 feet (given the off-set configuration of the intersection and adjacent blocks).

The following improvement options are <u>not</u> included in Draft #3 of the Proposed EMLUMP since additional feasibility analysis will be required, but are described here for informational purposes:

- Given the irregular angle that Euclid and Imperial intersect: the installation of standard pedestrian bulbouts may not be feasible at the Northeast and Southeast corners, since vehicle turning movements require a larger radius at this location (given that odd angle of intersection).
- Subject to engineering feasibility studies and detailed design, the installation of "channelized" right-turn treatments (with designs to slow vehicle speeds and maximize pedestrian visibility as shown in AASHTO guidelines) could allow for a reduction in pedestrian crossing distances. The following three pedestrian improvement options were considered for Euclid & Imperial, and evaluated for traffic operations purposes only as part of the traffic LOS analysis:
  - Euclid & Imperial Concept 1: channelized eastbound right-turn, to allow for installation of a corner treatment with a tighter curb radius to reduce south-leg pedestrian crossing distance by 20 feet or more.

- Euclid & Imperial Concept 2: removal of the northbound right-turn lane on Euclid (see LOS evaluation in this report), which would also allow for reduction in the crossing distance of 20 feet or more. (Options 2 & 3 could be pursued together to
- Euclid & Imperial Concept 3: channelized westbound right-turn, to allow for installation of a corner treatment with a tighter curb radius to reduce south-leg pedestrian crossing distance by 20 feet or more.

Figure 2-10 Channelized Right-turn Example to Reduce Pedestrian Crossing Distances



Source: GoogleEarth

Transit Access & Circulation Concepts

Given upcoming, potentially multi-year planning effort concerning the proposed bus rapid transit (BRT) line that is envisioned to serve the 47th Street trolley station, it would be premature to identify bus circulation improvements at this time (such as transit "queue-jump" lanes), since the routes used by some, or many, of the MST bus lines that currently utilize the Euclid station could ultimately be re-routed if the 47th station becomes a major transfer facility.

Therefore, the Draft EMLUMP focused on transit access improvements, primarily focusing on local access within the community, consistent with the key objectives identified for this planning effort.

Qualitative Comparison of Initial Concepts

Figure 2-11 provides a qualitative comparison, based on the transit access objectives identified for the planning effort, of several of the initial mobility concepts that were considered prior to preparation of the Draft EMLUMP.

Figure 2-11 Qualitative Comparison of Initial Mobility Concepts

Mobility Concept	Locations	Improves Bicycle Circulation ?	Improves Motor Vehicle Circulation?	Improves Pedestrian Circulation	Increases Transit Access?	Supports key EMLUMP objectives?	Order-of-Magnitude Cost[5]?	Potential Implementation Timeframe
Road Diets with Bicycle Lanes	Market, 47th	YES	NO	YES	YES	YES	LOW	Short-term (1-5 years)
Signalized Pedestrian Crossings	Euclid	NO	NO	YES	YES	YES	MEDIUM	Short-term (1-5 years)
Restriping and On-Street Parking Removal to Accommodate Bicycle Lanes	Euclid	YES	NO	NO	YES	YES	LOW	Short-term (1-5 years)
Chollas Creek Trail	Creek	YES	NO	YES	YES	YES	HIGH[6]	Contingent on private development
Local Street Grid Connections	Market to Guymon	YES	YES	YES	YES	YES	HIGH	Contingent on private development
Trolley Grade Separation	Euclid	NO	YES	YES	YES	NO	VERY HIGH	Very-long term (20+ years)
Parking Reductions for TOD	Within 1/4 mile of Trolley Station	NO	NO	YES	YES[7]	YES	LOW	Contingent on private development

[5] Order-of magnitude construction cost categories: Very high (projects requiring elevated structures and reconstruction of existing trolley track segments); High (projects requiring construction of new street or pathway segments); Medium (projects requiring significant capital improvements to existing roadways or intersections); Low (projects requiring minor restriping of existing roadways and/or intersections).

[6] Construction could occur as part of private development of sites adjacent to Chollas Creek. However, the cost of such improvements could deter such development in some cases.

[7] Based on reduction in walking distances from adjacent land uses to transit station if less land is allocated to surface parking.

3. PROPOSED EMLUMP MOBILITY IMPROVEMENTS

The proposed EMLUMP mobility strategy and improvements are described in the Land Use & Mobility Plan Draft #3 (February 8, 2013), Chapter 3 "Mobility". Key aspects of the EMLUMP Mobility Chapter include:

- A recommended mobility "strategy" that emphasizes a "back to basics" approach. Rather than emphasizing expensive improvement options (such as grade-separated crossings) and/or other projects that would be prohibitively expensive and likely take years to implement, the proposed Mobility Plan places an emphasis on "completing the streets", i.e. with a fully developed sidewalk and bicycle lane network to complement the high level of transit service provided to the area. This "back to basics" approach is also consistent with input received at public workshops, in which members of the local community expressed a desire for basic mobility elements such as complete sidewalks, improved street lighting, etc.
- Short-term improvement options were developed to allow for implementation with existing right-of-way and curb lines. The intent is to identify potential multi-modal improvements that are not entirely contingent on private development occurring. For example: a proposed interim lane configuration ("interim road diet") is recommended on Market Street (between 47th and 51st) that could be implemented as a low-cost restriping (potentially concurrent with routine street maintenance) to provide bicycle lane access to the light-rail station(s). Such a project could likely be implemented much sooner than other alternatives, such as the proposed Creek Trail which is likely contingent on private developer financing.
- Conceptual plans were prepared for the recommended short-term mobility options, and details concerning the proposed improvements are contained in tables provided in the Mobility Chapter.

Proposed Street Network

The Draft EMLUMP recommends reclassifying Market Street (east of 47th Street) and 47th Street (between Market and Imperial) as Collector Streets. Both streets are currently designated for long-term buildout as 4-Lane Major Streets. The Draft EMLUMP recommends reclassifying both as 4-Lane Collector Streets to allow for a reduced design speeds, narrower curb-to-curb widths and reduced pedestrian crossing distances at full buildout. Figures 3-1 and 3-2 show the applicable standards for 4-Lane Major Streets (55 mph design speed), 4-Lane Urban Major Streets (45 mph design speed), and 4-Lane Collector Streets (35 mph design speed).

Figures 3-3 and 3-4 show the proposed short-term and long-term street networks. In the short-term, Market Street (east of 47th) and 47th Street (between Market and Imperial) are recommended to serve as 2-lane collectors until such time as 4 lanes are needed based on traffic volume.

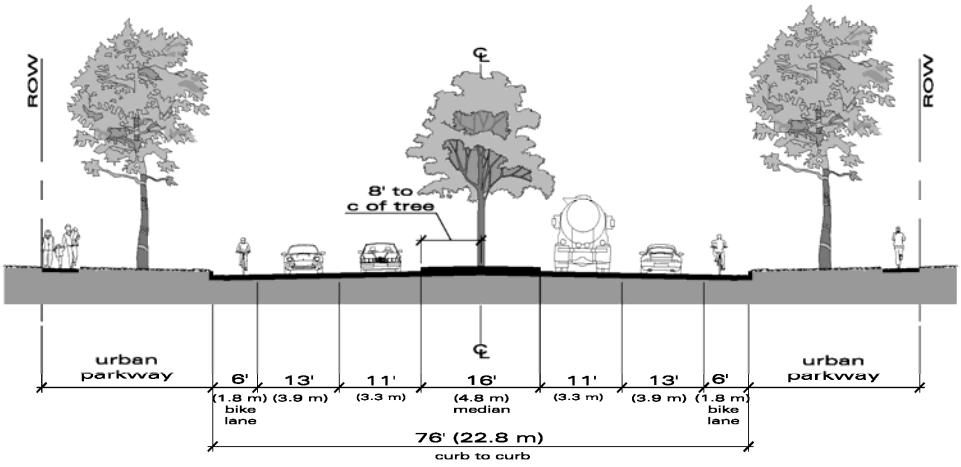
Figure 3-1a Four Lane Major Street Standards (San Diego Street Design Manual)

Four Lane Major Mj

Width, Right-of-Way		120 ft. (36.0 m)
Design ADT	LOS C LOS D	30,000 35,000
Design Speed		55 mph (90 km/h)
Width (includes bike lanes and 16 ft. (4.8 m) raised center median), **Curb-to-Curb**[1,2]		76 ft. (22.8 m)
Maximum Grade		7%
Minimum Curve Radius		1,850 ft. (585 m) with no superelevation 1,350 ft. (430 m) with 2% (min.) superelevation 880 ft. (275 m) with 10% (max.) superelevation
Land Use		Single Dwelling Residential-no front or side yards; Multiple Dwelling Residential-no front or side yards; Community Commercial-no front yards; Regional Commercial; Commercial Office; Visitor Commercial; Church; Public Building; Industrial; Open Space
Parkway		U-4 (b)

[1] Widen additional 10 ft. (3.0 m) at approaches to intersecting four-or-six-lane streets to provide a minimum of 250 ft. (75 m) of two-lane left-turn storage, exclusive of transitions. Receiving lanes for dual lefts shall be 12 ft. (3.6 m) wide. In instances where supporting information exists, such as an approved traffic impact study, showing clearly that dual left-turn lanes would not be warranted, the standard curb-to-curb width may be permitted.

[2] At intersections, a minimum 6 ft. (1.8 m) wide refuge island shall be maintained in the center median.



section A-A (not to scale)

Figure 3-1b Four Lane Urban Major Street Standards & Design Speed (San Diego Street Design Manual)

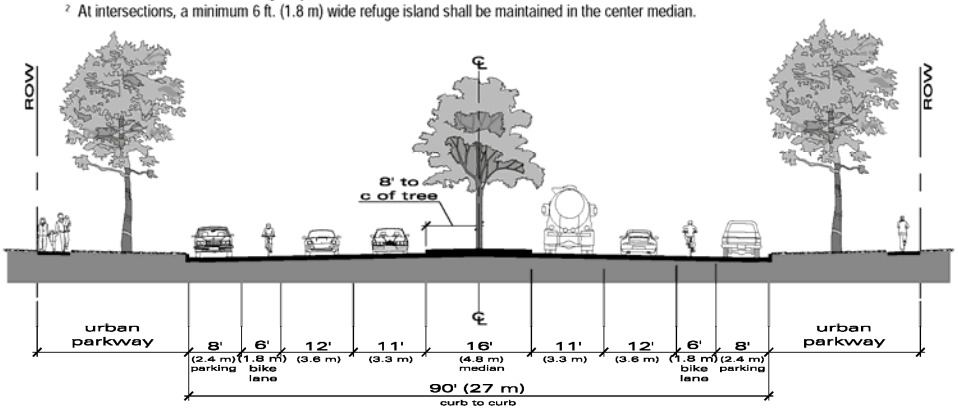
Four Lane Urban Major (Mj)

Width, Right-of-Way		118 ft. (35.6 m) - 130 ft. (39.0 m)
Design ADT	LOS C LOS D	30,000 35,000
Design Speed		45 mph (70 km/h)
Width (includes bike lanes and 16 ft. (4.8 m) raised center median), **Curb-to-Curb**[1,2]		90 ft. (27.0 m)
Maximum Grade		7%
Minimum Curve Radius		1,090 ft. (325 m) with no superelevation 830 ft. (245 m) with 2% (min.) superelevation 660 ft. (195 m) with 6% (max.) superelevation
Land Use		Single Dwelling Residential-no front or side yards; Multiple Dwelling Residential-no front or side yards; Neighborhood Commercial; Community Commercial; Regional Commercial; Commercial Office; Visitor Commercial; School (high school and above); Church; Public Building; Urban Village Commercial Retail; Industrial
Parkway Options		U-4 (a); U-5 (a,b); U-6 (a,b)

NOTE: Four-Lane Urban Major street classification is applicable to streets of limited length, where intersections are closely spaced, where there is extensive driveway access, or in other situations where the speed is expected to be less 45 mph (70 km/h) or less.

[1] Widen additional 10 ft. (3.0 m) at approaches to intersecting four- or six-lane streets to provide a minimum of 250 ft. (75 m) of two-lane left-turn storage, exclusive of transitions. Receiving lanes for dual lefts shall be 12 ft. (3.6 m) wide. In instances where supporting information exists, such as an approved traffic impact study, showing clearly that dual left-turn lanes would not be warranted, the standard curb-to-curb width may be permitted.

[2] At intersections, a minimum 6 ft. (1.8 m) wide refuge island shall be maintained in the center median.



section A-A (not to scale)

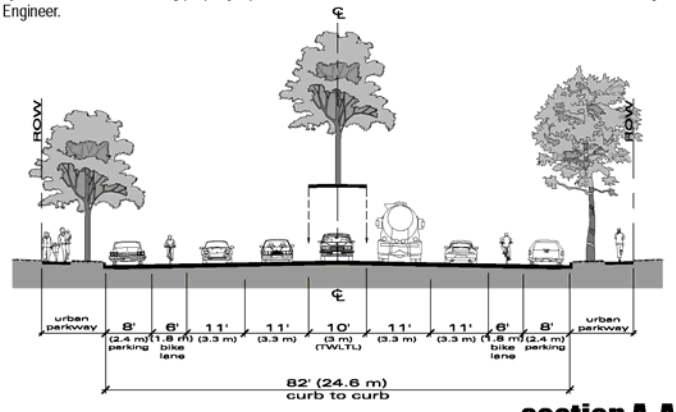
Figure 3-2a Four -Lane Collector Street Standards & Design Speed (San Diego Street Design Manual)

Four Lane Urban Collector with Two Way Left Turn Lane — CI

Width, Right-of-Way		110 ft. (33.2 m) - 122 ft. (36.6 m)
Design ADT	LOS C LOS D	20,000 25,000
Design Speed		35 mph (60 km/h)
Width (includes bike lanes)**, Curb-to-Curb**		82 ft. (24.6 m)
Maximum Grade[1]		8%
Minimum Curve Radius		610 ft. (220 m) with no superelevation 470 ft. (170 m) with 2% (min.) superelevation 380 ft. (135 m) with 6% (max.) superelevation
Land Use **Parkway**		Single Dwelling Residential-no front yards; Low Density Multiple Dwelling Residential-no front yards; Open Space-Park; Industrial; Medium-to-Very High Density Multiple Dwelling Residential-no front yards U-4 (a)
Land Use **Parkway Options**		Neighborhood Commercial; Community Commercial; Regional Commercial; Commercial Office; Visitor Commercial; School; Church; Public Building U-5 (a,b); U-6 (a,b)
Land Use **Parkway Options**		Pedestrian-Oriented Commercial Retail; Urban Village Commercial Retail U-5 (a,b); U-6 (a,b)

median is installed, access provisions across the median for emergency vehicles should be provided at 300 ft. (90 m) intervals.
NOTE: Two-way left-turn lane shall be considered only for streets of limited length where intersections are closely spaced or where there is extensive driveway access. For all other conditions, raised center medians should be considered.

[1] Whenever topographic constraints would cause excessive slope heights or create unmitigable landform impacts, the maximum street grade may exceed 8% for no-fronting property, up to a maximum of 10% for streets with less than 10,000 ADT, subject to approval of the City Engineer.



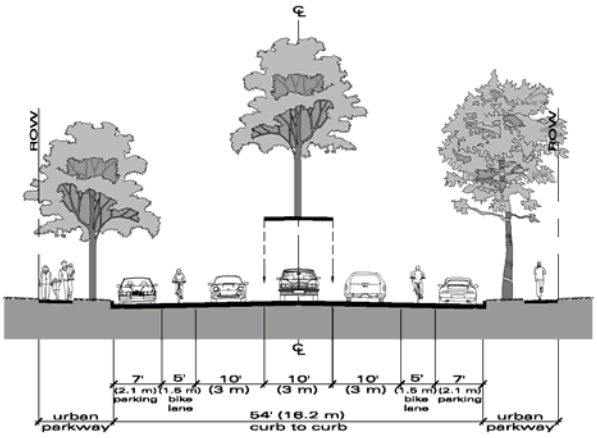
section A-A (not to scale)

Figure 3-2b Lane Collector Street Standards & Design Speed (San Diego Street Design Manual)

Two Lane Collector with Two Way Left Turn Lane — CI

Width, Right-of-Way		78 ft. (23.4 m) - 94 ft. (28.2 m)
Design ADT	LOS C LOS D	10,000 13,000
Design Speed		35 mph (60 km/h)
Width, Curb-to-Curb		54 ft. (16.2 m)
Maximum Grade		8%
Minimum Curve Radius		610 ft. (220 m) with no superelevation 470 ft. (170 m) with 2% (min.) superelevation 380 ft. (135 m) with 6% (max.) superelevation
Land Use **Parkway Options**		Single Dwelling Residential–no front yards, Low Density Multiple Dwelling Residential–no front yards, Open Space-Park, Medium to Very High Density, Multiple Dwelling Residential U-3; U-4 (a)
Land Use **Parkway Options**		Neighborhood Commercial; Community Commercial Regional Commercial; Commercial offices Visitor Commercial; School, Church, Public Building U-5 (a,b); U-6 (a,b)
Land Use **Parkway Options**		Pedestrian-Oriented Commercial Retail, Urban Village Commercial Retail U-5 (a,b); U-6 (a,b)

NOTE: Two-way left-turn lane shall be considered only for streets of limited length where intersections are closely spaced or where there is extensive driveway access. For all other conditions, raised center medians should be considered. Where raised center



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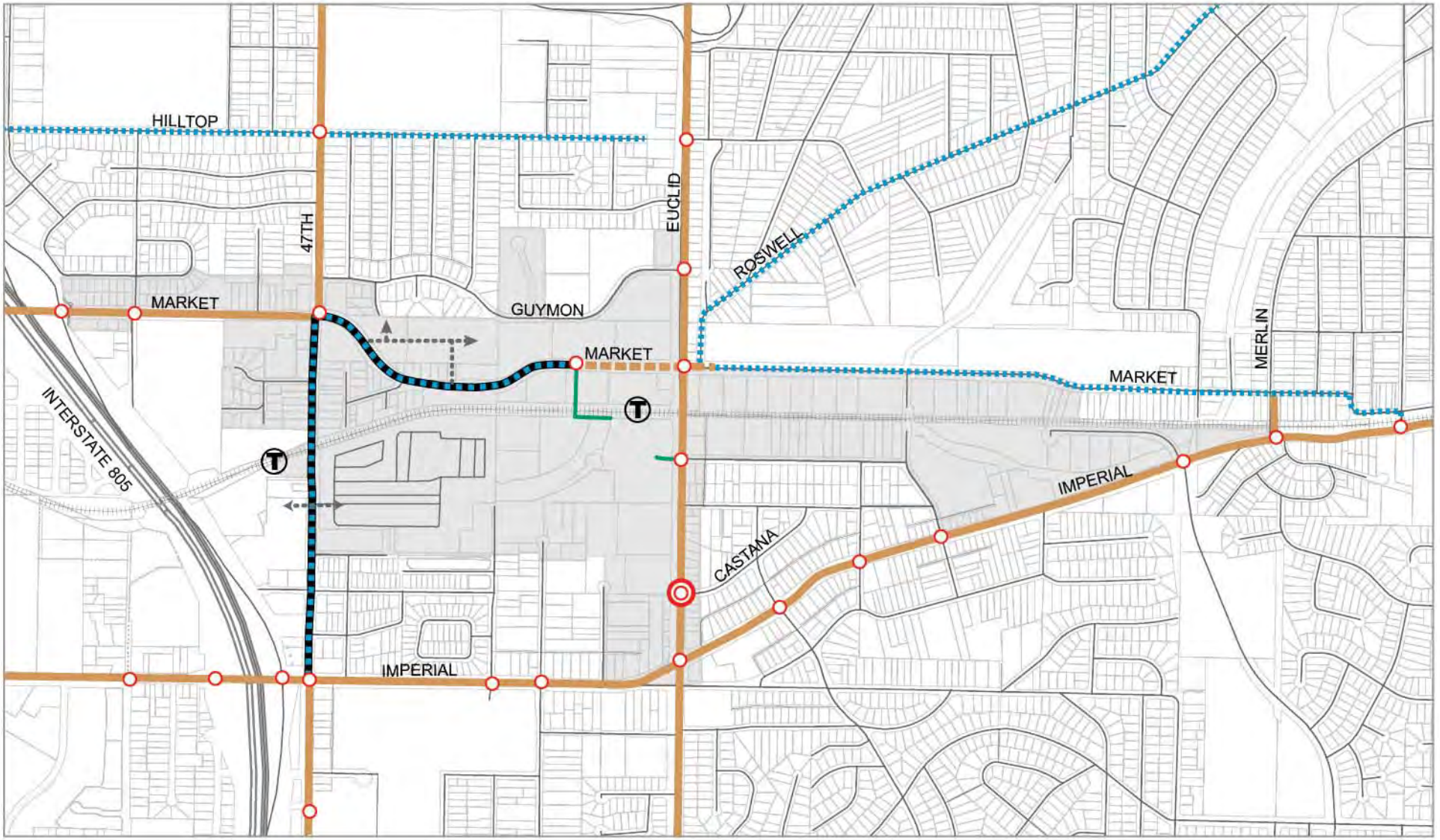


LEGEND

EMLUMP Study Area
Parcels

EXISTING

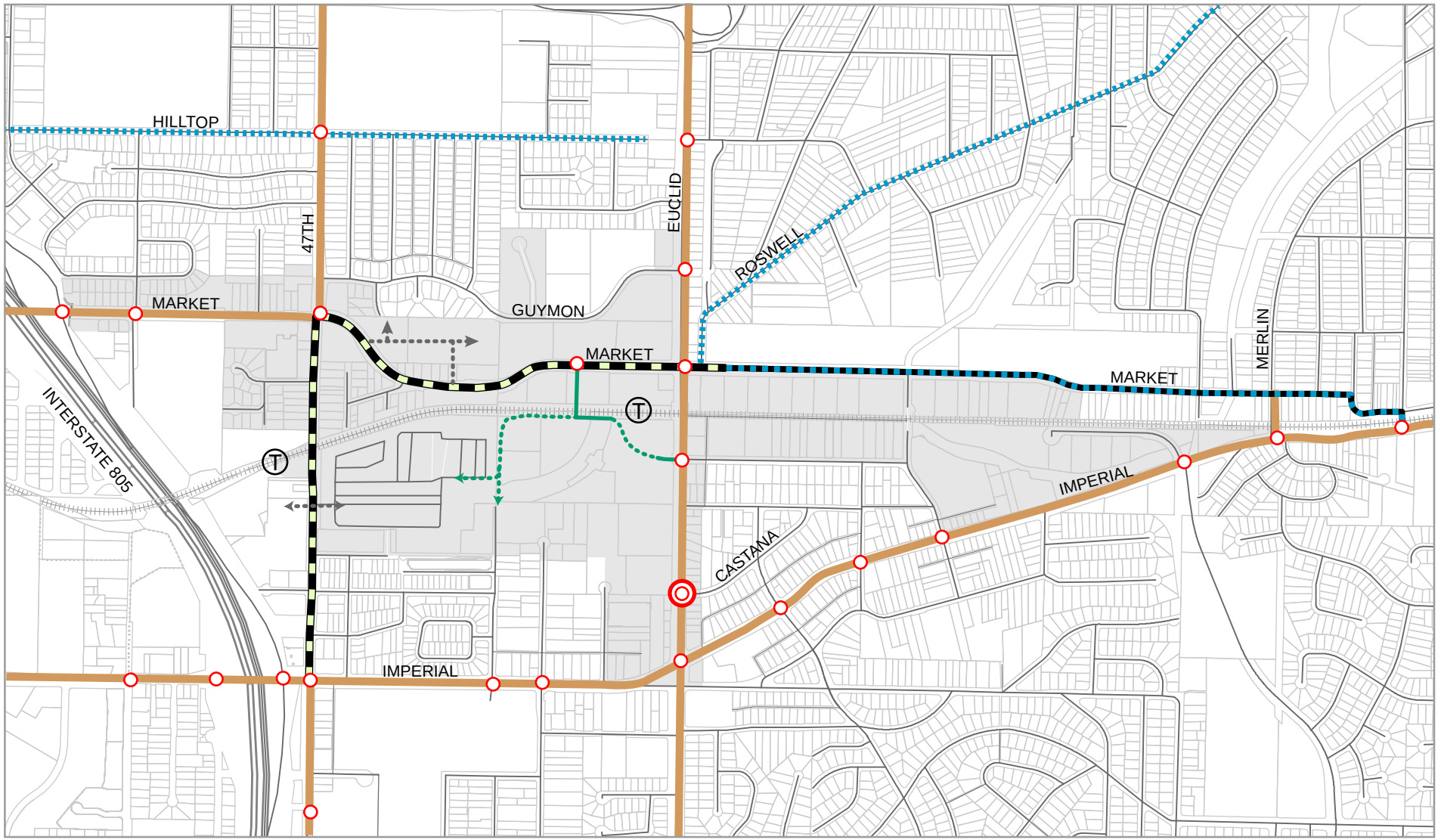
Local Street
Private Street
2-lane Collector
4-lane Collector
4-lane Major Street
Signal
Trolley Tracks
Intermodal Transit Station

FUTURE

Proposed Local Street (Conceptual)
2-lane Collector with Center-Turn Lane (Interim)
Proposed Signal to Enhance Pedestrian Crossings (Subject to Engineering Study)

0 675 1,350 Feet

Figure 3.3: Proposed Street Network (Interim)



LEGEND

EMLUMP Study Area
Parcels

0 675 1,350 Feet

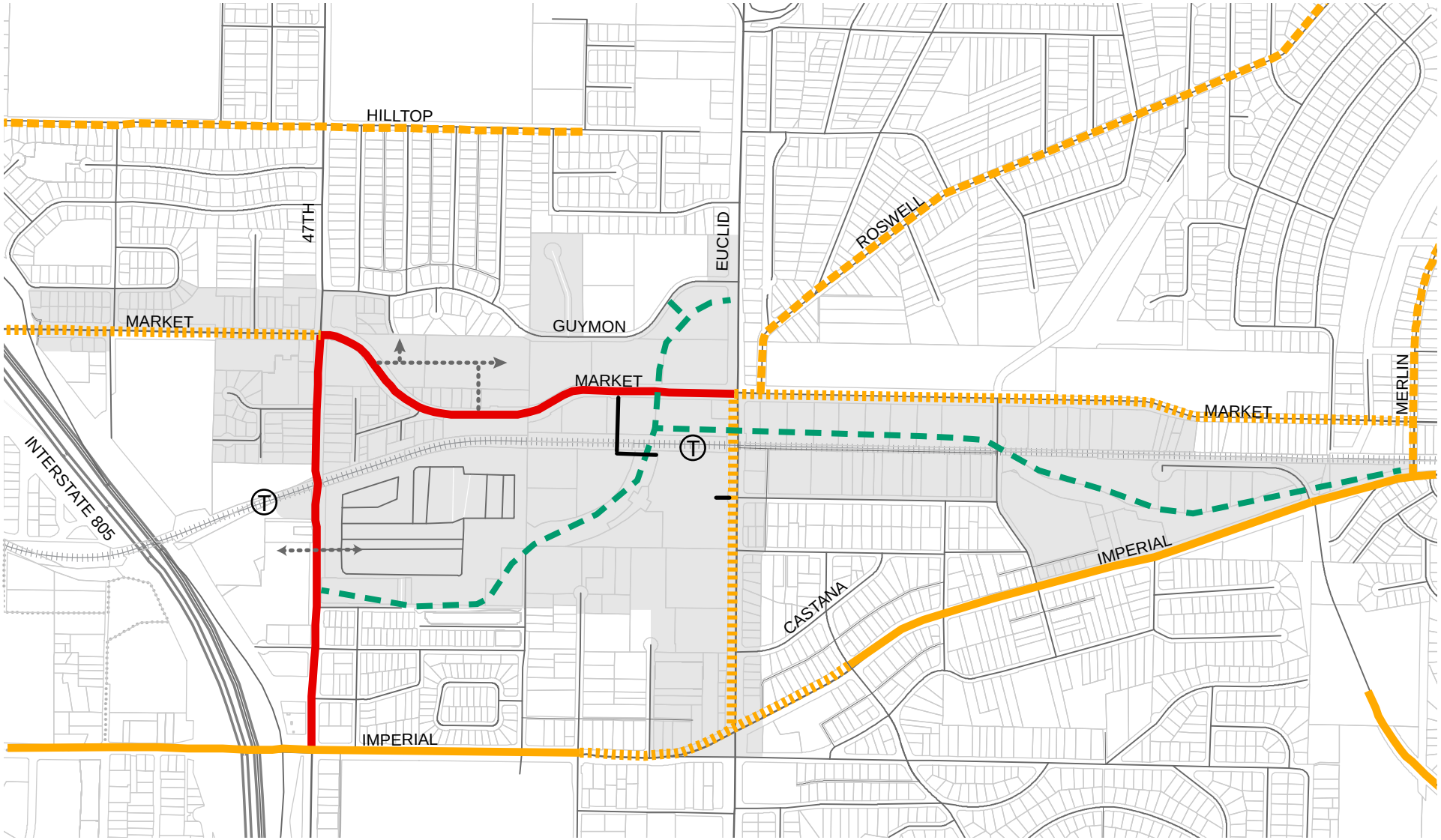
EXISTING

- Local Street
- Private Street
- 2-lane Collector
- 4-lane Major Street
- Signal
- Trolley Tracks
- Intermodal Transit Station

FUTURE

- Proposed Local Street (Conceptual)
- 2-lane Collector with Center Turn Lane (Long-term)
- 4-lane Collector with Center Turn Lane
- Potential Private Street Connections (Conceptual)
- Proposed Signal to Enhance Pedestrian Crossings (Subject to Engineering Study)

Figure 3.4: Proposed Street Network (Long Term)



LEGEND

- EMLUMP Study Area
- Parcels

EXISTING

- Private Street
- Other Streets
- Trolley Tracks
- Intermodal Transit Station
- Class II Bike Lanes

PROPOSED

- Class II Bike Lanes
- Class III Bike Routes
- Class III - Bike Route With Sharrows
- Proposed Multi-Use Path

N

0 590 1,180 Feet

Figure 3.5a: Proposed Bikeway Network (Short-Term)

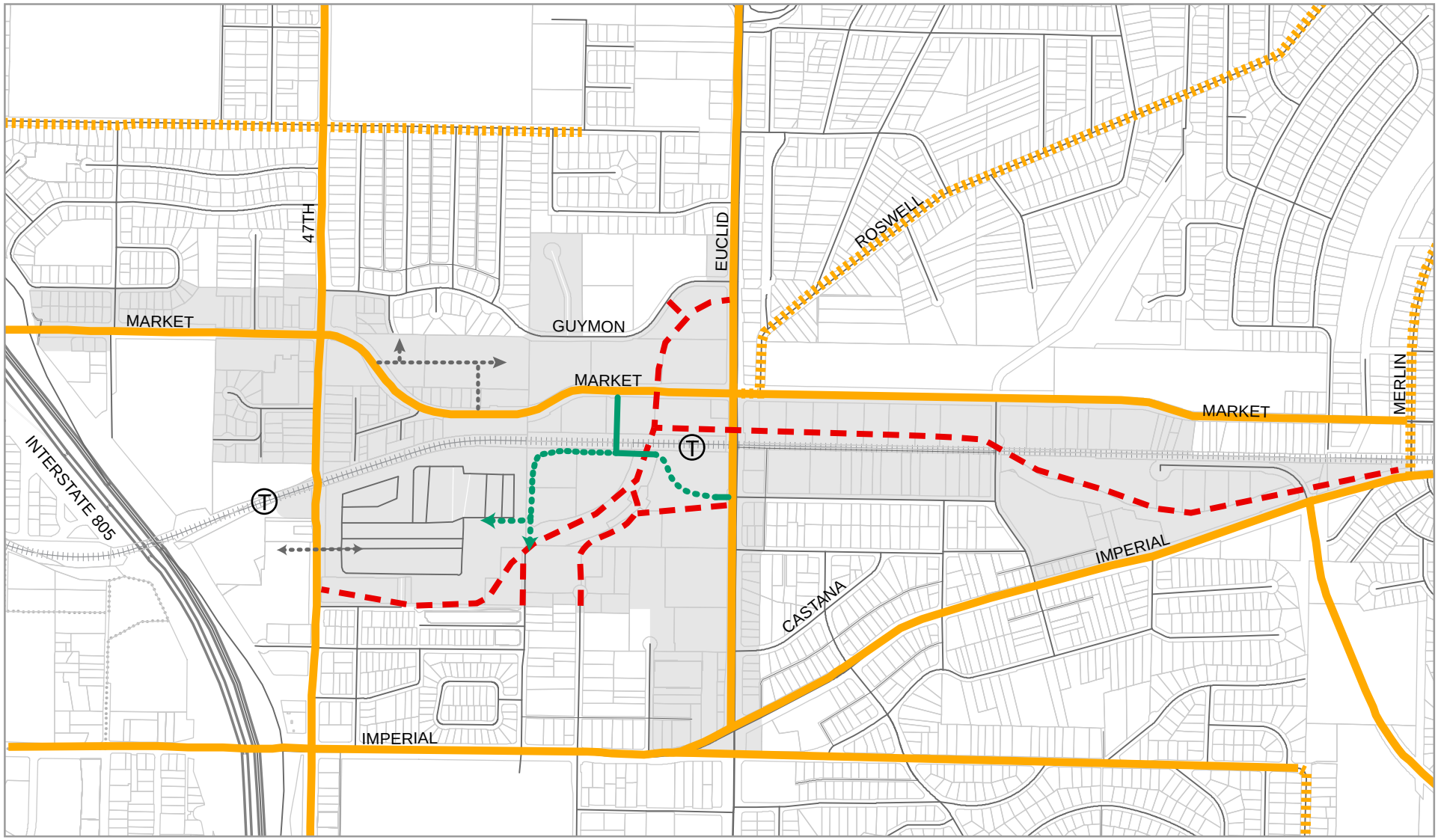
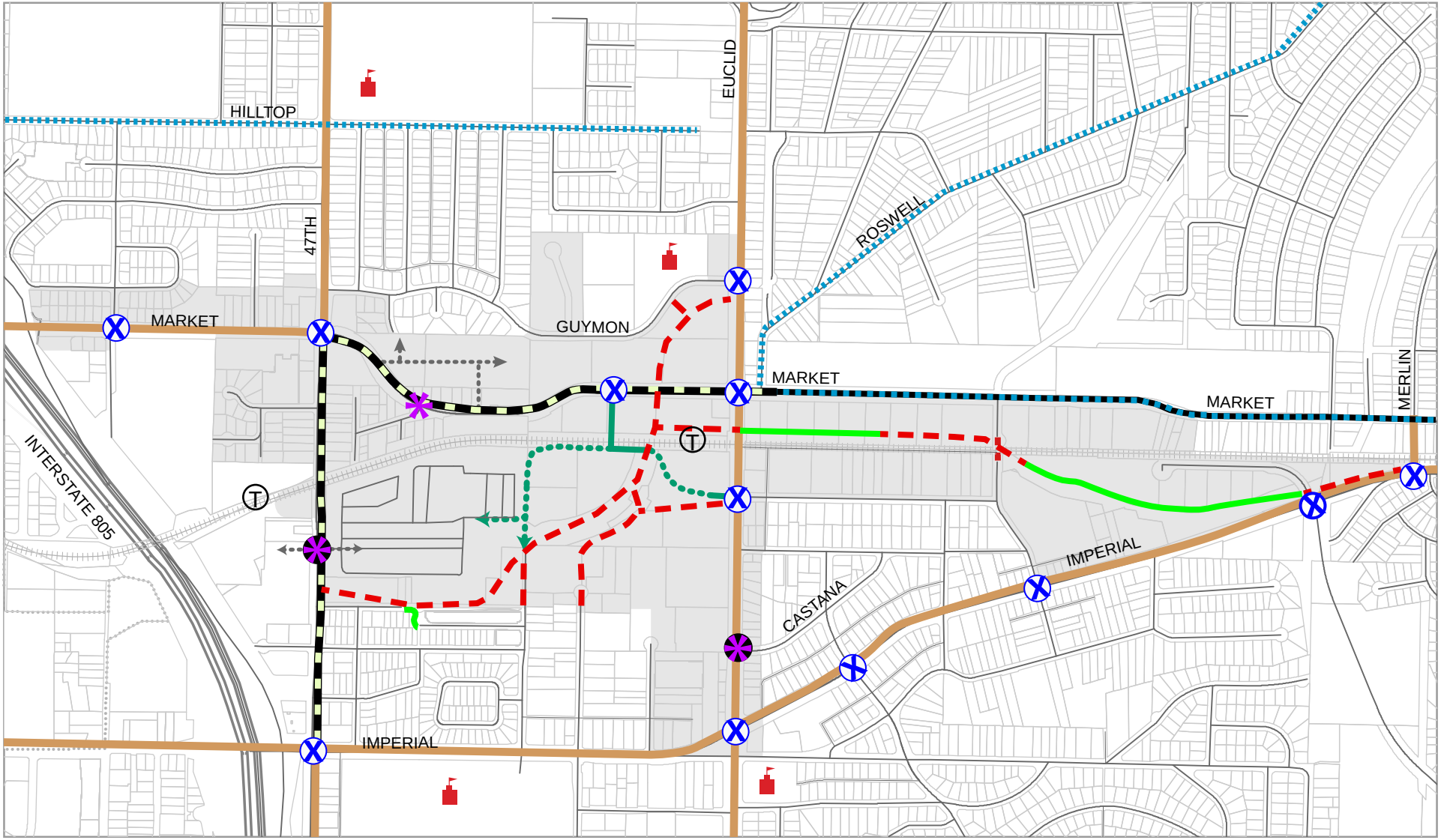


Figure 3.5b: Proposed Bikeway Network (Long-Term)



LEGEND

- EMLUMP Study Area
- Parcels

0 590 1,180 Feet

EXISTING

- Trolley Tracks
- Intermodal Transit Station
- Signalized Crosswalk
- School
- Pedestrian Path
- Local Street
- Private Street
- Collector
- 4-lane Major Street

FUTURE

- Multi-use trail
- Proposed Signalized Crosswalk (Subject to Engineering Study)
- Proposed Enhanced Marked Crosswalk (Subject to Engineering Study)
- Proposed Local Street (Conceptual)
- Potential Private Street Connections (Conceptual)
- 2-lane Collector with Center Turn Lane (Long-term)
- 4-lane Collector with Center Turn Lane (Long-term)

Figure 3.6: Proposed Pedestrian Network

Proposed Improvements by Street & Travel Mode

The proposed improvements included in the Draft EMLUMP provide several options for the City and community to consider. The improvement options described in the Draft EMLUMP would not be mutually exclusive. Several of the improvement options are intended to be "complementary"; for example, bicycle improvements can often benefit pedestrian circulation and vice-versa. Some improvement options are likely to be much more feasible in the short-term than others, either due to cost, existing right-of-way constraints, pending development, and/or traffic concerns. Other improvements would likely be longer-term options.

Some improvements would be contingent on funding and/or private development, although the Draft EMLUMP focuses on "curb-to-curb" circulation options that would not be contingent on private development or long-term future funding. Proposed sidewalk improvements (particularly where the Draft EMLUMP recommends a wider "pedestrian realm" to accommodate 6 to 8 foot wide sidewalks plus landscape strips between curbs and sidewalks) are likely to be contingent on private development occurring on adjacent sites in many cases.

Market Street Bicycle Lanes

- **Market Street Option A, Proposed "Interim Road Diet" to Provide Bicycle Lanes & Pedestrian Crossing Refuges on Market Street.** Restriping Market Street (east of 47th Street) from 4 to 3 lanes (1 through lane in each direction plus a continuous two-way center-turn lane/median) would provide space for Class II bicycle lanes in both directions, within the current 64-foot curb-to-curb width, and without the need to remove on-street parking.
    - In addition, the provision of a continuous 2-way turn lane would create opportunities to provide "pedestrian refuges" at potential crossing locations.
    - Given the land use objective identified for the EMLUMP (i.e., facilitating transit-oriented development), facilitating pedestrian access to the Community Commercial site on the north side of Market Street (near Uvas Street) would support that objective.

- **Market Street Option B, Removal of On-Street Parking to Provide Bicycle Lanes.** Bicycle lanes could be accommodated, in that case, with two 5-foot bicycle lanes, four 12-foot motor vehicle lanes, and an 8-foot on-street parking lane could still be provided on the north side of the street. Based on parking occupancy counts conducted for the Mobility Assessment, occupancy rates for on-street parking are very low on Market Street.
    - However, this option would be unlikely to benefit pedestrian circulation, since no median would be provided that could serve as a pedestrian refuge when crossing. (See example on Figure 3-8b).

- In addition, maintaining the supply of on-street parking on both sides of Market Street may be desirable if land uses were to develop in a "main street" configuration (i.e., generally accessible by on-street parking rather than off-street surface parking lots). The photo on Page 45 (Figure 3.1) of the Draft EMLUMP provides an example of a 2-lane corridor in another California city that serves over 20,000 cars and 5,000 daily bicyclists, within a 62-foot street width that includes bicycle lanes and on-street parking.

▪ **Market Street Option C, Bicycle Lane Implementation Concurrent with Future Development.**

- Although currently designed as a 4-lane Collector Street, Market Street is designated for long-term buildout as a 4-Lane "Major Street", which would allow for bicycle lanes within a 74 to 76-foot curb-to-curb width (or 90 feet if on-street parking is permitted consistent with 4-Lane "Urban" Major Street standards). Therefore, this would require widening from the current curb-to-curb width (64 feet) to planned long-term width (74 to 76 feet) at such time as private development occurs.
- Draft EMLUMP recommends reclassifying Market Street (east of 47th Street) from a Major Street to a 4-Lane Collector, which would allow for the same number of planned future travel lanes (two lanes in each direction plus center-turn lane) plus bicycle lanes with a narrower, 66-foot curb-to-curb width (if on-street parking is prohibited at full buildout of Market Street). In addition to accommodating bicycle lanes within a narrower curb-to-curb width, other long-term benefits of the proposed "reclassification" include:
  - Reduced pedestrian crossing distances at ultimate build-out
  - Reduced design speed for Collector Streets (35 mph) is more compatible with the key objectives of the EMLUMP, particularly focused on enhanced bicycle and pedestrian access to transit and transit-supportive land uses.

Recommended Interim Improvement: Option A (Interim Road Diet) is the recommended improvement short-term option described in the EMLUMP Draft #3.

Recommended Long-term Improvement: reclassification of Market Street (east of 47th Street) from a 4-Lane Major Street to a 4-Lane Collector Street.

Figures 3-7 (a-c) and 3-8 (a-c) provide conceptual illustrations of recommended interim improvement options on Market Street at two locations, near Euclid Avenue (Figures 3-7 a-c) and at the intersection with Uvas Street (Figures 3-8 a-c).

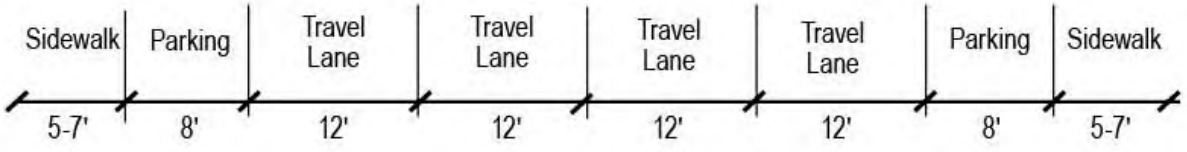
Market Street Pedestrian Improvements

A key benefit of the proposed "interim" lane reduction on Market Street is that the provision of uncontrolled (unsignalized) crosswalks is much more feasible on 2-lane streets consistent with a well-known FHA study that found that safety concerns related to uncontrolled crosswalk locations are primarily related to multi-lane, higher-volume streets . As mentioned in the preceding section: the proposed "Interim Road Diet" would provide a center-turn pocket/median that could be used as a pedestrian refuge at select locations.

- See conceptual design of proposed crosswalk on Market at Uvas Street (Figure 3-8b) in conjunction with the proposed "Interim Road Diet" on Market Street.

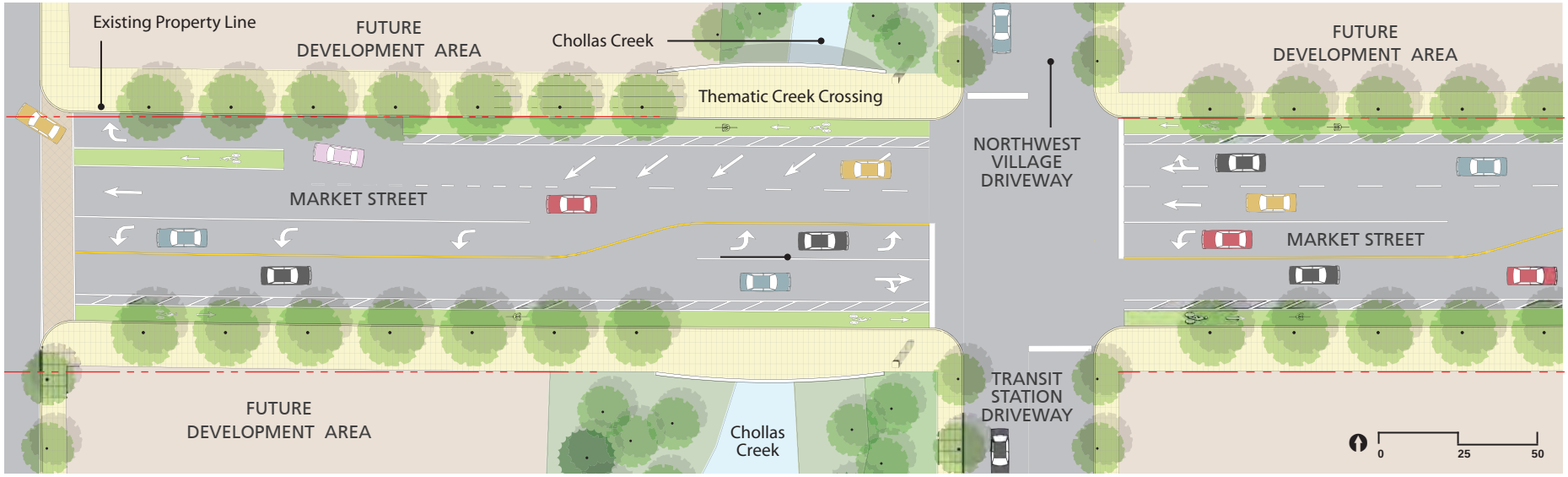
Figure 3-7a Market Street at Creek Crossing: Existing & Proposed (Interim) Cross Section

Proposed Section: Market Street (Interim Condition)



Existing Curb-to-Curb Width: 64 feet (not including sidewalk/pedestrian realm)

Figure 3.7b: Market Street at Creek Crossing (Interim Condition)



Note: Concepts are for illustrative purposes only. Interim configuration would maintain existing 64-foot curb-to-curb width.

Proposed Plan

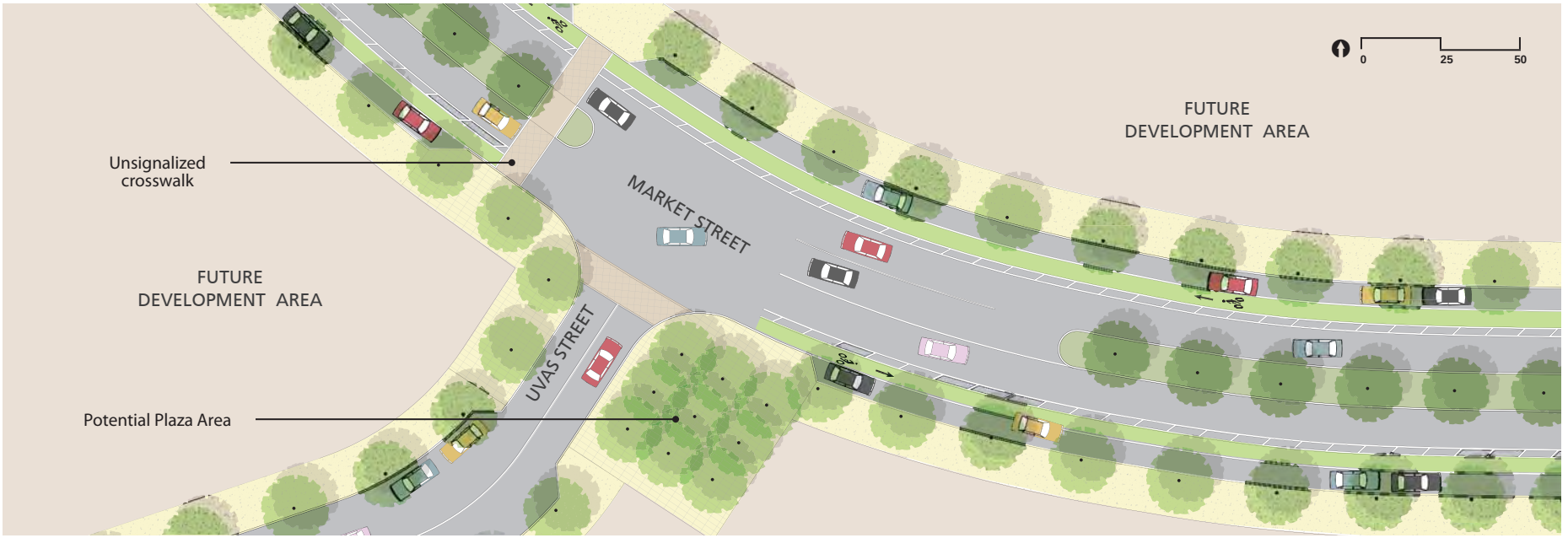
Note: Existing curb-to-curb width is 64 feet plus sidewalks (5-7 feet wide).

Aerial View

Figure 3-8a Market Street at Uvas: Initial Draft Concept Drawing of Interim Road Diet with Conceptual Intersection Redesign[9]

[9] Draft drawing above shows potential reconfiguration of the intersection of Market with Uvas, but reconfiguration would not be necessary for the proposed "interim road diet". The potential reconfiguration, if pursued for implementation, would allow for a reduction in pedestrian crossing distances (as shown further in Revised Draft Proposed Drawing on Figure 3.8b). Proposed transition from 2 to 4 lanes with interim road diet would occur between Uvas and 47th Street (distance of approximately 750 feet between existing intersections).

Figure 3.8b: Market Street & Uvas "Road Diet and Pedestrian Crosswalk" (Interim Condition)



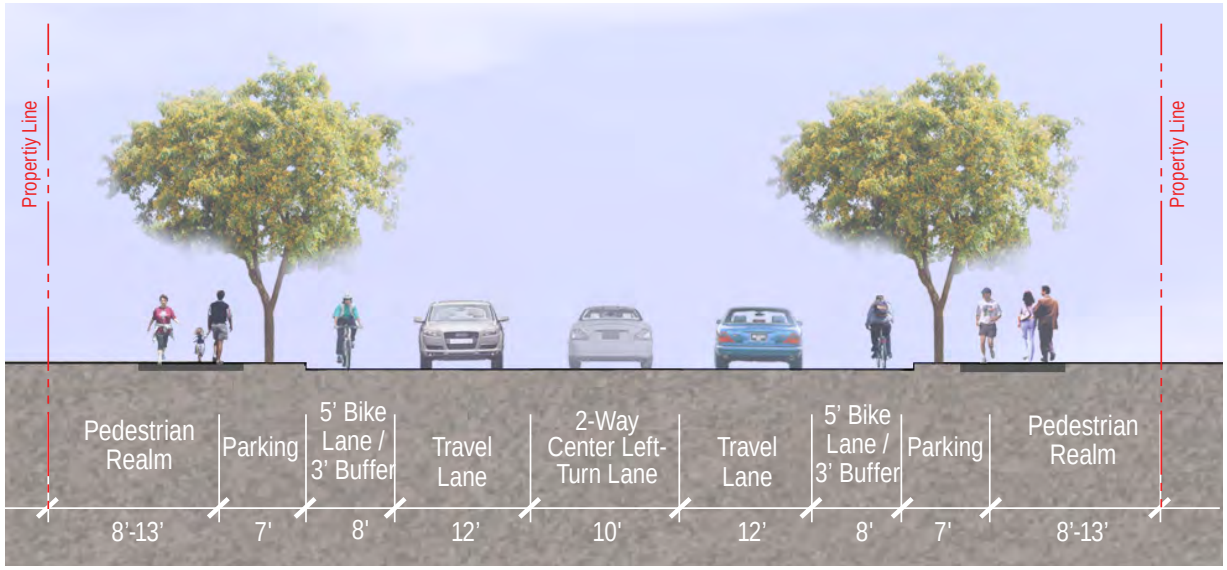
Note: Concepts are for illustrative purposed only. Streetscape elements are shown as potential interim improvements. Hardscape improvements conflicting with Community Plan street classification may require Community Plan Amendment.

Proposed Plan

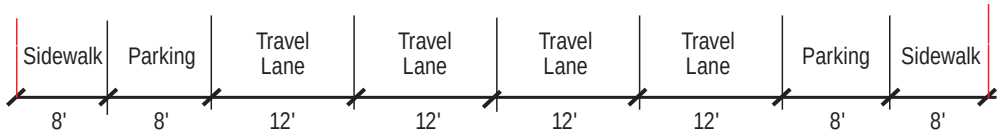
Note: Existing curb-to-curb width is 64 feet not including 8-foot sidewalks.

Aerial View

Figure 3.8c: Market Street & Uvas "Road Diet and Pedestrian Crosswalk" (Interim Condition)

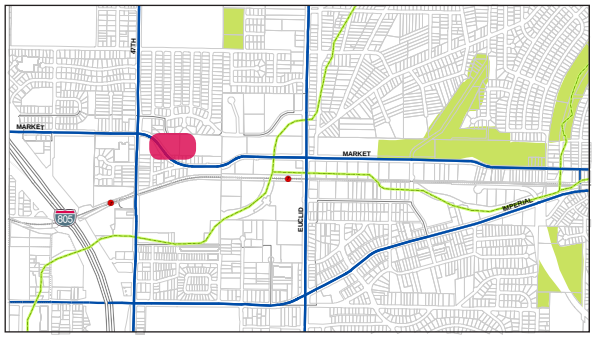


Proposed Section: Market Street near Uvas Street (Interim Condition)



Existing Curb-to-Curb Width (not including sidewalks): 64 feet

Existing Condition



Location

Key Recomendations:

- Implement an interim road diet) by restriping the existing 64' curb-to-curb width with the Proposed Interim EMLUMP travel lane configuration:
  - 80-90' right-of-way
  - 64' curb-to-curb roadway width
  - 11' to 12' motor vehicle travel lanes (one in each direction)
  - 10' center median / left-turn pocket
  - 8' bicycle zone (5' bicycle lanes with 3' buffer between bicycle lane and travel lane)
  - 7' curb-side parking
  - 7' curb-side parking
  - 8' sidewalks (with 6' landscape strip between curb and sidewalks where right-of-way width of 90' is provided)
- Reuse the existing roadway (64' curb-to-curb) for a 2-lane interim configuration with center-turn lane, bike lanes, and on-street parking
- Provide unsignalized enhanced pedestrian crossings with the proposed 2-lane configuration with median refuges

Proposed Chollas Creek Trail to connect the 2 trolley stations

Proposed design of Chollas Creek Trail is described in Chapter 4 of the Revised Draft EMLUMP. The proposed trail would intersect the Major Street network at two locations:

- Market Street (approximately 450 feet west of Euclid Avenue)
- 47th Street (approximately 360 feet south of the entrance to the 47th Street Trolley Station).

Conceptual drawing of potential crossing treatments, where the proposed Creek Trail would intersect Market and 47th Street are shown on Figure 3-7b (potential crossing of Market Street) and Figure 3-8b (potential crossing of 47th Street). This includes a conceptual plan for a potential bicycle and pedestrian crossing location on Market Street that would be located close to the proposed Northwest Village development site (at the northwest corner of Euclid and Market).

  - The feasibility of the potential crossing location will likely be contingent on the ultimate design of the proposed driveway access to the commercial portion of the Northwest Village site. In particular: the planned provision of left-turn in and left-turn out driveway access would likely require placement of left-turn provisions very near to the conceptual trail crossing location.

Given potential cost of trail and related park improvements, and the likelihood that construction of the Creek Trail may be contingent on private-sector development and financing, implementation of the majority of the Creek Trail segments could take a number of years to fully fund and construct. Therefore, the Draft EMLUMP notes that installation of bicycle lanes on Market Street and 47th Street could ultimately be viewed as shorter-term options, with a good chance of implementation within a relatively short period of time (potentially 1 to 5 years).

47th Street Bicycle Lanes

- **47th Street Option A, Interim restriping to provide Bicycle Lanes within existing roadway (requires prohibition of on-street parking).** Bicycle lanes could be accommodated within the current curb-to-curb width of 47th Street (south of Market Street) without removing motor vehicle travel lanes.
  - This option would require removal of up to 88 on-street parking spaces[10]. As shown on Table 2-2 (page 12) of this report: parking counts[11] conducted in May 2011 found that the majority of on-street parking spaces on 47th Street were unoccupied during the period of the counts
    - Morning (10 to 11 am): 33 vehicles parked (38 percent occupancy)
    - Afternoon (2 to 3 pm): 29 vehicles parked (33 percent occupancy)
    - Evening (8 to 9 pm): 37 vehicles parked (42 percent occupancy)
- **47th Street Option B, Bicycle Lane Implementation Concurrent with Future Development.**
  - Although currently designed as a 2-lane Collector Street (south of Market Street), 47th Street is designated as a 4-Lane "Major Street", which would allow for bicycle lanes within a 76-foot curb-to-curb width (if on-street parking is prohibited). Therefore, this would require widening from the current width (46 to 50 feet) at such time as private development occurs.
    - Draft EMLUMP recommends reclassifying 47th Street (south of Market Street and north of Imperial) from a Major Street to a 4-Lane Collector, to allow a narrower, 66-foot curb-to-curb width (if on-street parking is prohibited) and reduced design speeds.

Recommended EMLUMP Improvements on 47th Street (south of Market Street and north of Imperial):

- *Short-term: Option A, restriping to provide Class II Bicycle Lanes within existing curb-to-curb width is the recommended improvement short-term option described in the EMLUMP Draft #3.*
- *Short-term to Mid-term: **pedestrian crossing enhancements** (see concept drawing, Figure 2-9a) near the Creek and 47th Street Trolley Station entrance.*
- *Long-term: reclassify 47th Street (south of Market Street and north of Imperial Street) from 4-Lane Major to 4-Lane Collector Street.*

[10] On-street parking spaces are not marked. Estimated capacity of 88 vehicles based on available curb-space (assumes 20 feet per vehicle).

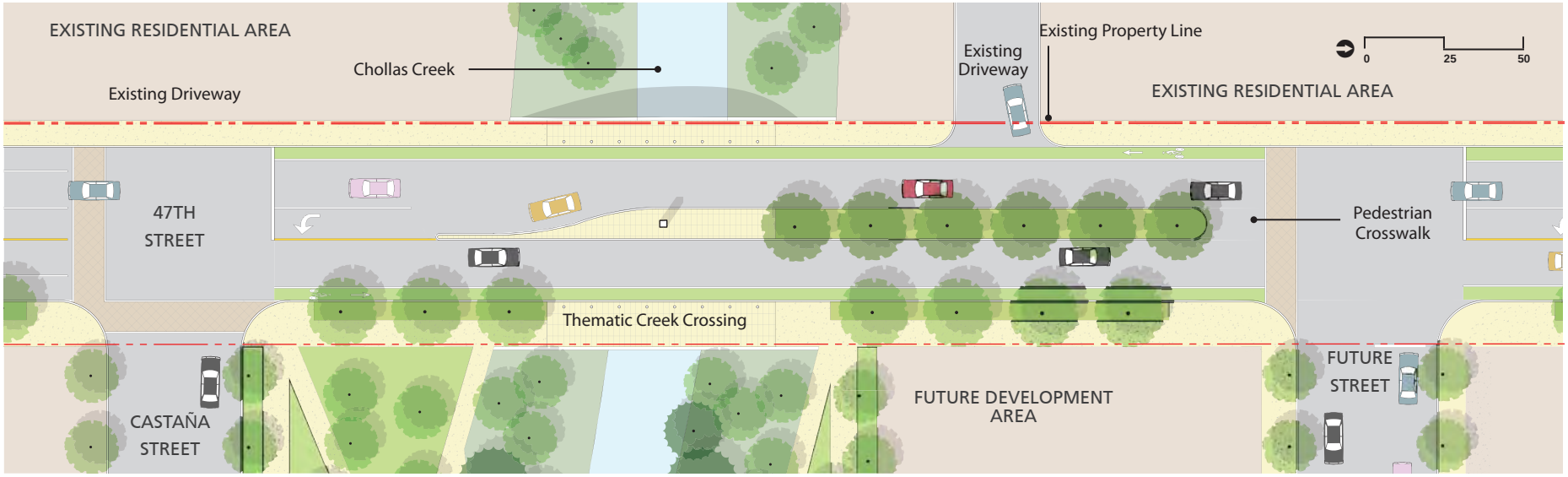
[11] Parking counts conducted by Wiltec, Inc., with data provided to Nelson\Nygaard for inclusion in the EMLUMP Mobility Assessment report (final draft prepared in September 2011), attached as Appendix B.

Figure 3.9a: 47th Street & El Rey Park “Pedestrian Crosswalk and Thematic Creek Crossing” (Interim Condition)

Note: Concepts are for illustrative purposes only.

47th Street at Chollas Creek Complete Street Concept (looking northwest)

Figure 3.9b: 47th Street & El Rey Park "Pedestrian Crosswalk and Thematic Creek Crossing" (Interim Configuration)



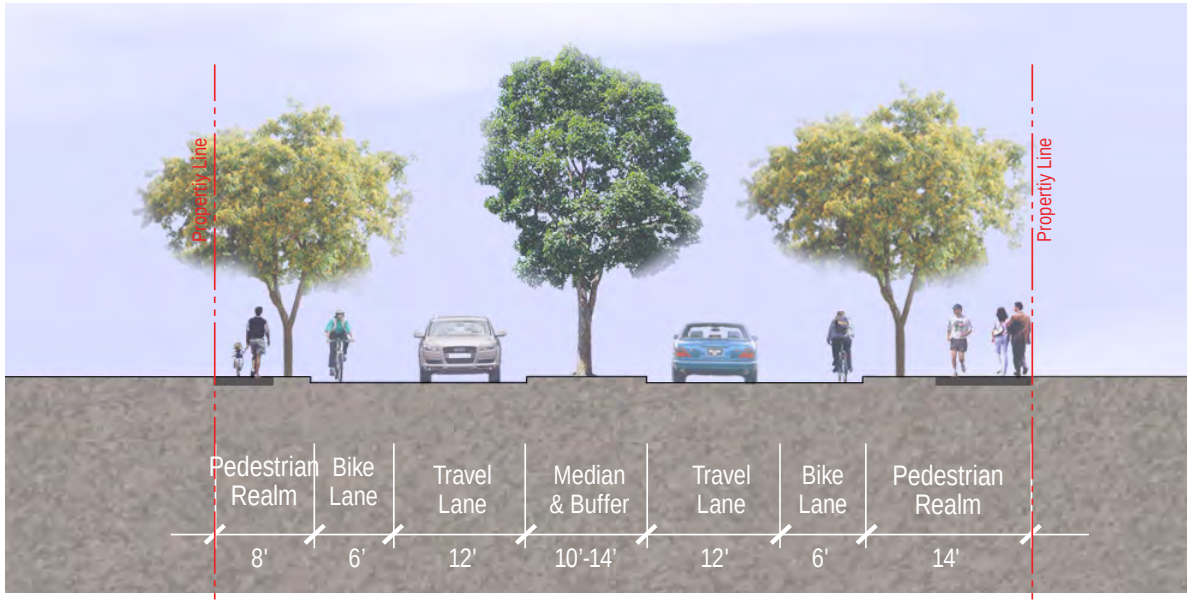
Note: Concepts are for illustrative purposes only. Interim configuration would maintain existing 46-50-foot curb-to-curb width (not including pedestrian realm).

Proposed Plan

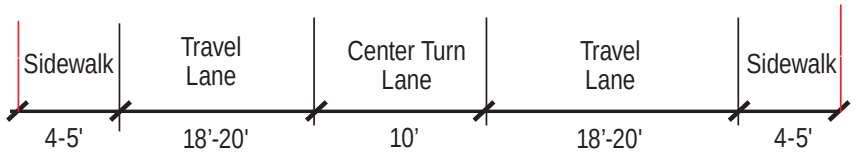
Note: Existing curb-to-curb width is 46-50 feet not including 8-foot sidewalks.

Aerial View

Figure 3.9c: 47th Street & El Rey Park "Pedestrian Crosswalk and Thematic Creek Crossing" (Interim Condition)

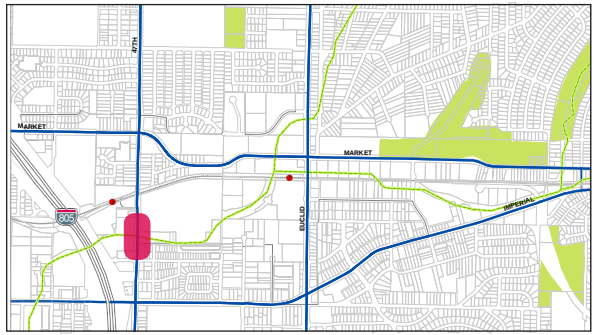


Proposed Section: 47th Street (Interim Condition)



Existing Curb-to-Curb Width (not including sidewalks): 50-64 feet

Existing Condition



Location

Key Recomendations:

- Install a signalized crosswalk close to the 47th Street intermodal transit station at current El Rey Plaza (or Future Development) to provide safer pedestrian access.
- Long-term: Reclassify 47th Street (currently planned as a "4 Lane Major Street) as a planned "4 Lane Collector" In order to allow for narrower lane widths and reduced design speeds when fully built-out.
- Interim Configuration (with 2 existing travel lanes and center turn lane): Restripe 47th Street with bike lanes and prohibit on-street parking.
- Provide Thematic Creek Crossing at Creek Entrance

Euclid Avenue Bicycle Lanes

Bicycle lanes have been planned on Euclid Avenue since the mid-1980s or earlier, as described in the Southeast Area Plan. However, there are several constraints to implementing bicycle lanes on Euclid Avenue. In particular: some segments of Euclid Avenue near the trolley station that are too narrow to accommodate bicycle lanes without modifying adjacent curbs or medians, and modifications to City travel lane standards would likely be required to allow for near-term implementation of bicycle lanes near the transit station. In addition: current motor vehicle traffic volumes and travel speeds likely render Euclid Avenue as a potentially less attractive route as a means of transportation for many cyclists. For that reason: the EMLUMP identifies bicycle lane options on two other primary streets serving the study area: Market Street and 47th Street.

There are two primary options for installing bicycle lanes on Market Street:

- **Option A, Street Widening:** widen the entire length of Market Street to 76 feet to provide space for bicycle lanes, consistent with City travel lane width standards. Since this option would likely be contingent on private development occurring, the potential timeframe for this option would be unknown.
- **Option B, Flexible Lane Widths:** allow for narrower widths of motor vehicle lanes and medians to accommodate bicycle lanes. Street design guidelines prepared by AASHTO and ITE allow (and even encourage) flexible travel lane and median widths in urban environments. In particular: narrower lanes can often lead to a reduction in motor vehicle travel speeds, which is often desirable in walkable, transit-oriented districts.
- **Option C, Alternating Treatments Based on Existing, Variable Curb-to-curb Width:**
    - Bicycle lanes can be accommodated within the existing curb-to-curb width north of Naranja (see **Figures 3-10a** and **3-10b**).
    - Since bicycle lanes cannot be accommodated south of Naranja (given the minimum lane width standards for Major Streets), the EMLUMP recommends installation of Class III (signed) bicycle route with pavement stencils south of Naranja as has been proposed as part of a separate planning effort.
        - Note: on the portion of Euclid south of Castana, bicycle lanes can be accommodated in the northbound direction only (between Imperial and Castana) as shown on **Figure 3-11b**.

Draft EMLUMP Recommended Short-term to Mid-term Bicycle Improvements: Option C (Alternating Treatments with Bicycle Lanes north of Naranja and Class III Bicycle Route with "sharrow" south of Naranja) is the recommended short-term to mid-term improvement option described in the EMLUMP Draft #3.

Draft EMLUMP Recommended Short-term to Mid-term Pedestrian Improvements: subject to an engineering feasibility study, recommended improvement would provide a signalized pedestrian crossing across Euclid at Castana with either a Pedestrian Hybrid or standard traffic signal.

Draft EMLUMP Recommended Long-term Bicycle Improvements: provide Class II Bicycle Lanes on all segments of Euclid Avenue concurrent with future development of adjacent parcels.

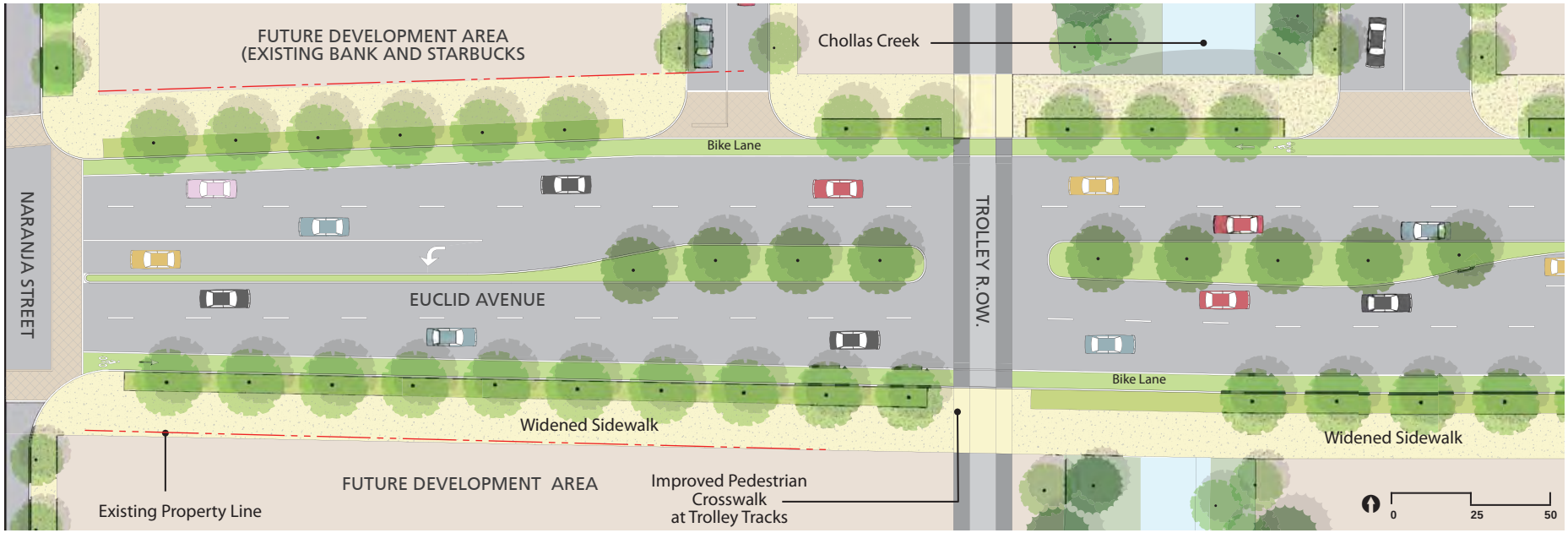
Draft EMLUMP Recommended Long-term Pedestrian Improvements: provide minimum 15-foot "pedestrian realm" (6 to 8 foot sidewalk plus landscape buffer between sidewalk and curb) concurrent with future development of adjacent parcels.

Figure 3.10a: Euclid Avenue & Trolley Crossing (Long Term Configuration)

Note: Concepts are for illustrative purposed only.

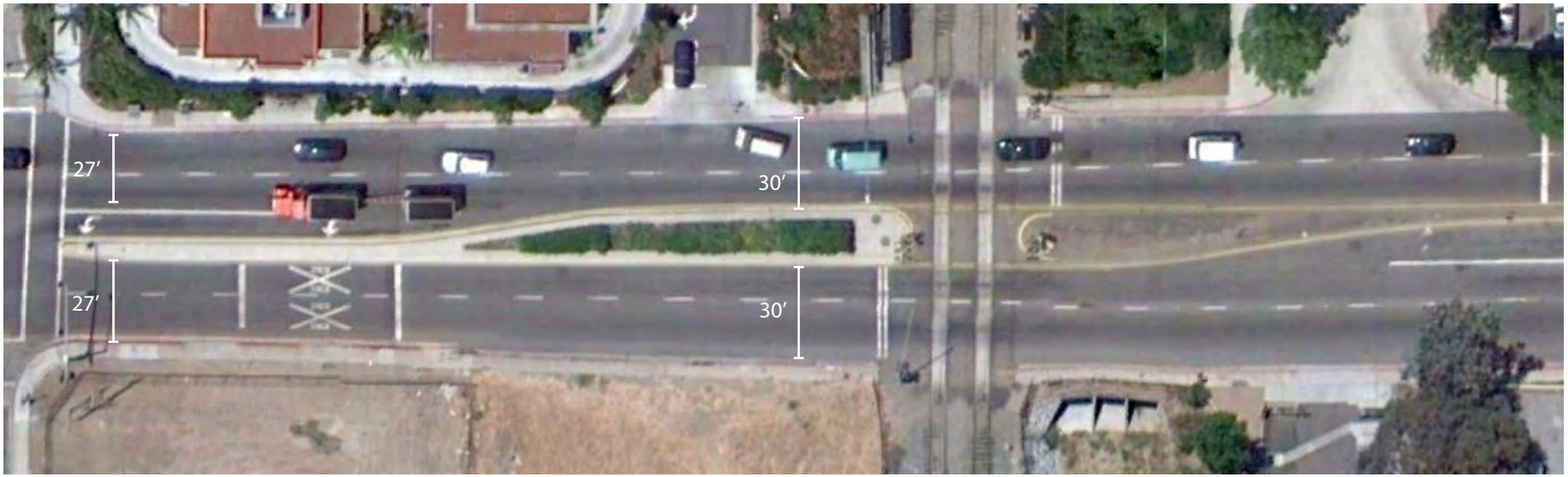
Euclid Avenue at Trolley Crossing Complete Street Concept (looking northwest)

Figure 3.10b: Euclid Avenue & Trolley Crossing (Long Term Configuration)



Note: Concepts are for illustrative purposed only. On the east side of Euclid, proposed sidewalk widening would include a curb adjustment within 140 ft (north) of Naranja to accommodate northbound bike lane.

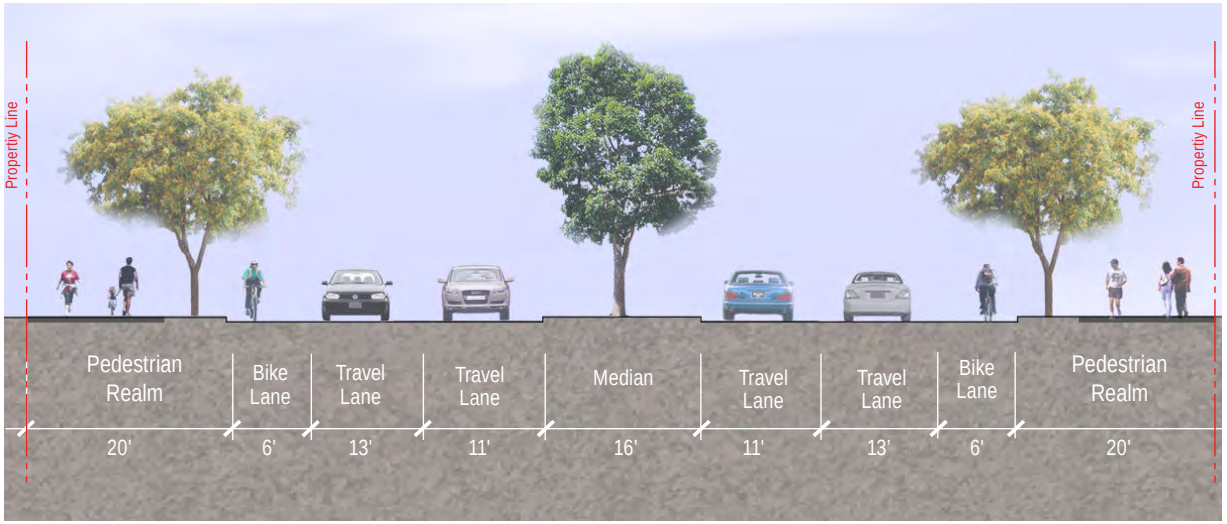
Proposed Plan



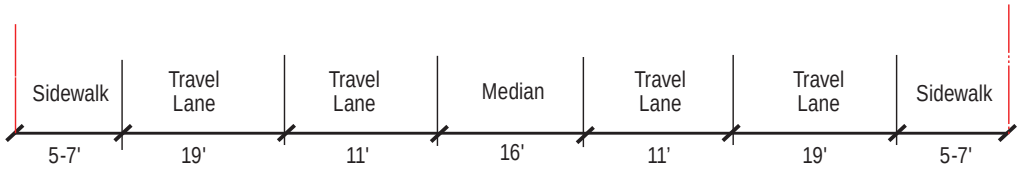
Note: Existing curb-to-curb width is 76 feet not including sidewalks.

Aerial View

Figure 3.10c: Euclid Avenue & Trolley Crossing (Long Term Configuration)

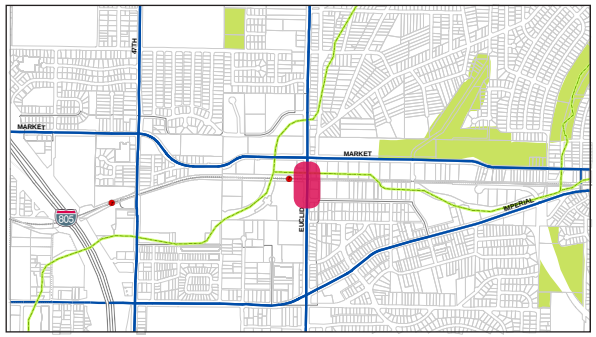


Proposed Section: Euclid Avenue at Trolley Crossing



Existing Section: 76 feet curb-to-curb (not including sidewalks)

Existing Condition



Location

Key Recomendations:

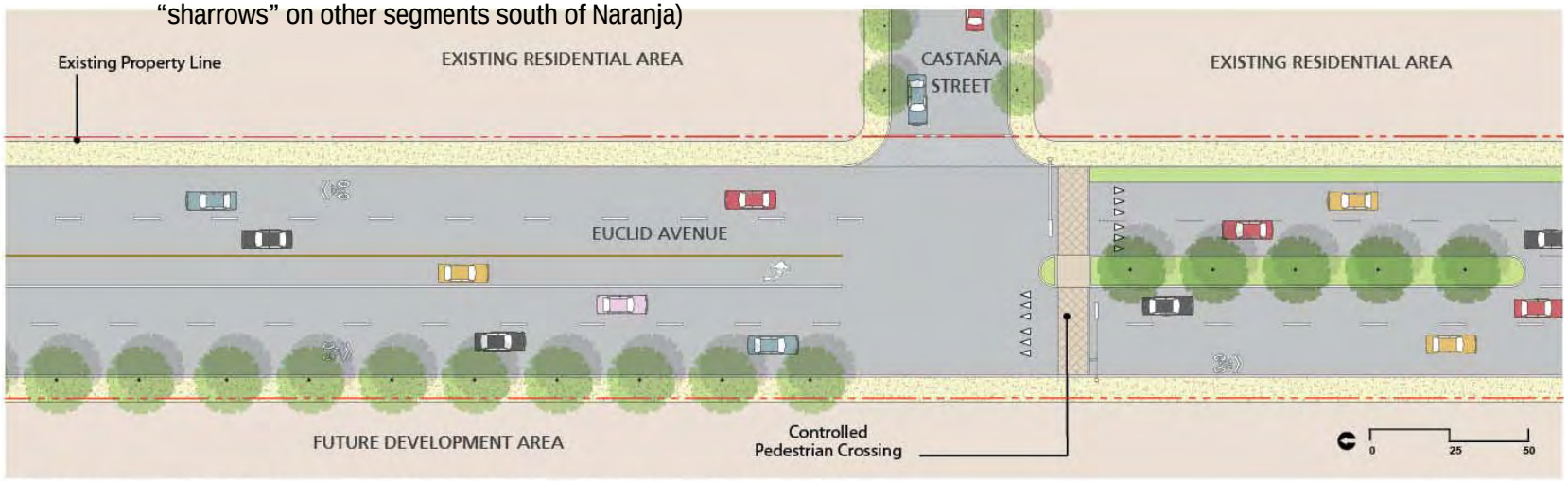
- Improve the sidewalk on Euclid Avenue at the Trolley crossing to facilitate mobility for pedestrians by widening and leveling the paved sidewalk area and providing yellow tactile curb ramps at each side of the crossing.
- Add signage to direct pedestrians seeking the Chollas Creek multi-use path gateway entry to available signalized crosswalks at Market Street or Naranja Street.
- Restripe Euclid Avenue to:
  - 11-13 foot travel lanes
  - 6 foot bike lanes (sharrow in constrained portions south of Naranja)
  - Landscaped median or two-way center left-turn lane as required, including median refuges at crosswalks
- Consider reducing the required median width from 16' (required for 4-Lane Major Streets) to 12' on constrained segments of Euclid Avenue in order to accommodate Class II bike lane
- Provide bike buffer where adequate right-of-way exists

Euclid Avenue Pedestrian Improvements

The Draft Plan includes several improvement options to facilitate pedestrian crossings of Euclid, Market and 47th Street. The key recommendation for crossing Euclid is as follows:

- **Proposed Sidewalk Improvements along Euclid near Trolley Crossing.**
- **Proposed Signalized Crosswalk on Euclid Avenue at Castana.** (See **Figure 3-11a**).
    - Proposed crosswalk will reduce the distance between signalized pedestrian crossings on Euclid. Currently, there are no signalized crossings between Naranja and Imperial, a distance of approximately 1,400 feet (over one-fourth of a mile). The Draft EMLUMP recommends that marked or controlled crossings should be provided every 600 feet on Major or Collector Streets in order to enhance pedestrian circulation near the trolley stations (consistent with the goals of the EMLUMP).
    - The crosswalk recommendation is not based on a warrants analysis, which typically determines the need for signal based on motor vehicle traffic volumes and existing pedestrian crossing volumes. It is unlikely that the crosswalk will be warranted based on pedestrian volumes, since the high travel speeds and width of Euclid deters most pedestrians from crossing at this location. Nonetheless, pedestrians have been struck by vehicles attempting to cross at this location (see Figure 2-4 on page 13, *Pedestrian / Motor Vehicle Collision Locations 2006-11*).
    - Given the number of motor vehicle lanes, traffic volumes and speeds on Euclid Avenue, it is recommended that any such crossings on Euclid should be signalized.
    - Prior to implementation, an engineering study should be conducted to determine the appropriate type of signal:
        - Pedestrian Hybrid Signal; or
        - Standard Intersection Signal

Figure 3-11a Proposed Crosswalk at Euclid & Castana (with bike lane northbound only between Imperial and Castana; Class III bike route with "sharrows" on other segments south of Naranja)

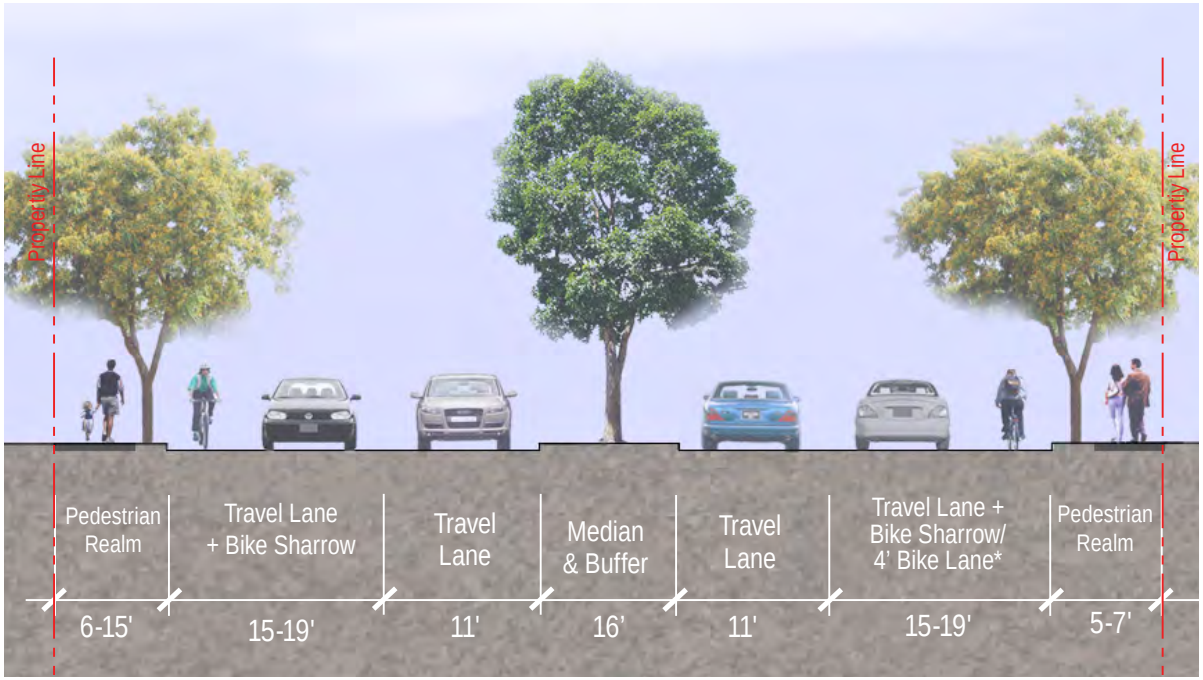


Note: Concepts are for illustrative purposed only. Controlled Pedestrian Crossing subject to engineering study.

Proposed Plan

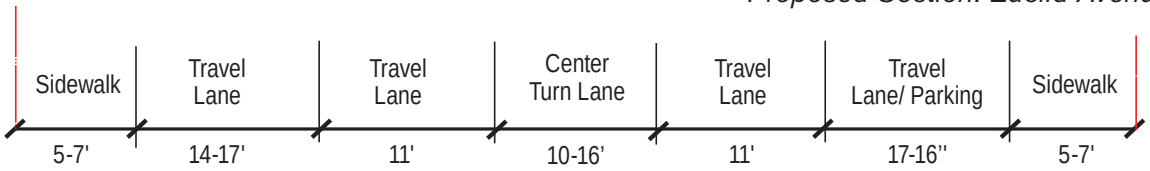
Aerial View

Figure 3.11c: Euclid Avenue & Castaña "Pedestrian Crosswalk"

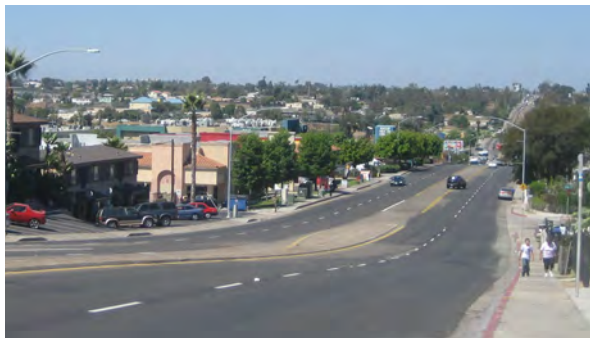


* Northbound bike lane only north of Castaña.

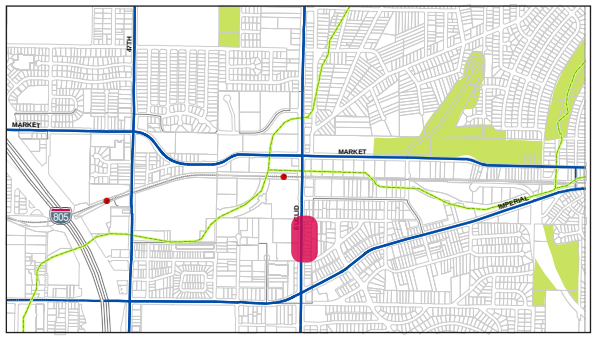
Proposed Section: Euclid Avenue



Existing Section: 68 - 78 feet curb-to-curb width (not including sidewalk)



Existing Condition



Location

Key Recomendations:

- Restripe Euclid Avenue in accordance with the standards set forth in the San Diego Street Design Manual, including:
  - 6 foot bike lanes where possible
  - Landscaped median or two-way center left-turn lane as required, including median refuges at crosswalks
  - 4-lane configuration with raised median or center-turn lane, bike lanes, and on-street parking
- Subject to an engineering study, Install traffic signal (potentially a "pedestrian hybrid" signal) marked, high-visibility crosswalks and median refuge for safer crossings.

4. TRAFFIC OPERATIONS ANALYSIS

Proposed Improvements Most Relevant to the LOS Analysis

Euclid Avenue

The EMLUMP proposes no changes to motor vehicle lane configurations on Euclid Avenue. Proposed bicycle treatments would not affect LOS at study intersections.

Proposed crosswalk with traffic signal (pedestrian hybrid or standard signal) would not affect LOS at Euclid/Imperial intersection (located approximately 400 feet south) with coordinated signal plan. Such a coordinated signal plan could accommodate pedestrian phases concurrently with east/west traffic phases on Imperial (when north/south traffic on Euclid would have a "red light" approaching Imperial) with appropriate signal off-sets.

Market Street (west of 47th)

No changes to street configuration are proposed, given higher traffic volumes on segments west of 47th .

Market Street (between 47th and 51st)

Near-term: proposed "interim" road diet between 47th and 51st Street would reduce the number of through lanes to one in each direction, with a continuous center-turn lane and bicycle lanes in both directions. No changes to proposed turn-lanes at intersections.

Long-term (Year 2035): no change to proposed Year 2035 lane configurations, which would include two lanes in each direction, with a continuous center-turn lane and bicycle lanes in both directions. Proposed reclassification of Market Street (east of 47th Street) would not affect the LOS analysis at signalized intersections with Euclid and 47th.

47th Street

Near-term: The Draft EMLUMP proposes to maintain the current 2-lane configuration with center t-turn-lane (but augmented with Class II bicycle lanes) as an "interim" improvement south of the intersection with Market Street. Installation of bicycle lanes would require removal of ## on-street parking spaces.

Long-term (Year 2035): two lanes in each direction, with a continuous center-turn lane and bicycle lanes in both directions. Proposed reclassification of Market Street (east of 47th Street) and 47th Street (between Market and Imperial) would not affect the LOS analysis at signalized intersections with Euclid and 47th.

Additional potential long-term improvements on 47th Street could be identified based on the result of the I-805 BRT study. For example, the station could become a transfer facility for MST buses (potentially diverting some buses that currently use the Euclid Station).

Imperial Avenue

The EMLUMP proposes no changes to motor vehicle lane configurations on Imperial Avenue.

Forecasted Daily Traffic Volumes

Model Calibration

Baseline land uses were provided to SANDAG for purposes of calibrating the model based on Existing (Year 2011) daily traffic volumes on roadways serving the study area utilizing the SANDAG Transportation Model. Trip generation was forecasted by the Transportation Model based on the City of San Diego's approved trip generation rates.

EMLUMP Vehicle Trip Generation Forecast

Based on the preferred land use scenario and buildout assumptions provided by the City, SANDAG prepared a model forecast of Year 2035 traffic volumes. Table 4-1 provides a comparison of vehicle trip generation, based on the proposed EMLUMP land uses.

Figure 4-1 Proposed EMLUMP Land Use Map

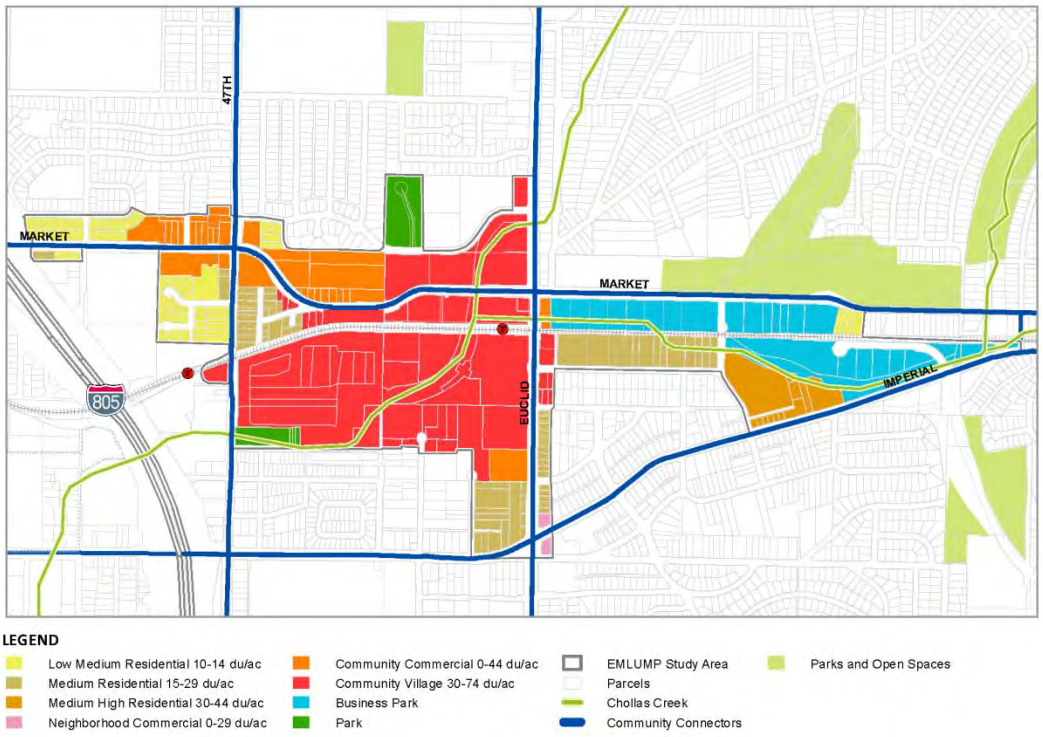


Table 4-1 EMLUMP Trip Generation[15] Comparison

Model Scenario	Land Uses		Daily Trip Generation Forecast		Net Increase from Existing Baseline		Pct Increase from Exsiting Baseline	
	Dwelling Units (1)	Commercial sf (2)	Person Trips	Vehicle Trips	Person Trips	Vehicle Trips	Person Trips	Vehicle Trips
Existing Baseline (Year 2008)	2,500	1,040,000	80,218	56,964	0	0	0%	0%
Year 2035 Baseline (Adopted Community Plan)	3,700	1,540,000	108,440	77,493	28,222	20,529	35%	36%
Year 2035 Proposed (EMLUMP)	6,300	1,460,000	131,736	93,512	51,518	36,548	64%	64%
Notes:								
1. Dwelling units rounded to nearest hundred.								
2. Commercial space rounded to nearest ten-thousand square feet.								

Model Corrections & TAZ Splitting

During the Transportation Model calibration process, several corrections were made to the loading of traffic by the model, including the splitting of several traffic analysis zones (TAZ):

- The Transportation Model was previously loading up to 50 percent of traffic from parcels bordering Market Street (between 47th and Euclid) directly to Euclid via Guymon Street. However, this loading pattern is not possible since there is no vehicle connection (existing or proposed) between Euclid and Guymon. This loading pattern, if used for analyzing future-year conditions, would potentially inflate the Year 2035 traffic forecast on Euclid by a substantial amount.
  - This incorrect loading pattern was due to the fact that parcels on Market Street (between 47th and Euclid) were previously included in a single TAZ with single-family residential parcels bordering Guymon to the north. This loading pattern was rectified by splitting the Market Street parcels into a separate TAZ with traffic loading directly to Market Street.
    - However, by loading traffic directly to Market Street, the model now tends to potentially inflate Year 2035 traffic volumes on some segments of Market Street near Euclid Avenue. Actual traffic volumes on Market Street, near Euclid, will ultimately be reduced by right-in/right-out driveway access directly to Euclid (such as for the commercial portion of the NW Village site). The potential for right-in/right-out driveway access to/from Euclid is not reflected in the model forecast described in this report. Therefore, the forecast of daily traffic volumes on Market Street should be considered a "conservatively high" forecast. Similarly, the LOS analysis of peak-hour traffic operations at the Euclid/Market
- The Transportation Model was also loading traffic from several other large development sites:
  - Traffic generated by the Jacobs Center site (immediately west of Market Creek Village) was previously being loaded by the Transportation Model directly to Euclid Avenue, despite provision of direct access to Market Street via Market Creek Place. For the EMLUMP modeling effort, Market Creek Place Driveway was split into a separate TAZ from Market Creek Village, and Market Creek Place

[15] Trip generation forecast provided by SANDAG from Transportation Model utilizing City of San Diego trip generation rates and land use data (for each scenario) provided by City of San Diego staff.

Driveway was added as a connector to the model, thus allowing traffic generated by the Jacobs Center site to be loaded directly to Market Street (west of Euclid).

– Similarly, traffic generated by several potential development parcels, located east of Euclid and south of the trolley tracks, was being loaded by the model directly to Market Street (east of 51st Street). However, those parcels do not have direct vehicle access to Market Street, and no such connections are proposed for Year 2035 conditions. This loading pattern would have inflated Year 2035 traffic growth on Market Street (east of Euclid Avenue). As part of the EMLUMP modeling effort, the loading pattern was corrected to load traffic from parcels south of the tracks to Imperial (east of Euclid) and Euclid (south of the tracks).

Year 2035 Traffic Forecast

Following review and approval of the Baseline model run by City staff (including the model loading adjustments and TAZ splits described above), the Proposed Future EMLUMP Land Uses were provided to SANDAG. The forecasted Year 2035 model-forecasted volume on some roadway segments was adjusted by City staff to reflect "historic high" daily volumes (recorded between 2002 and 2009) that were higher in some cases than the Year 2011 baseline volume used for model calibration purposes.

The resulting Year 2035 traffic volume forecasts on roadway segments within and adjacent to the study area are shown on Table 4-2. Initial observations based on that forecast are that:

- The forecasted growth in traffic volumes on Euclid (north of Market) anticipates relatively modest growth, with a forecasted Year 2035 volume of 30,000 daily vehicles on segments of Euclid between Market and SR-94. This is a much lower forecast than other recent studies, such as the *Euclid-SR 94 Interchange Study* (September 2012) that predicted 49,160 daily vehicles on Market Street (south of SR-94) under Year 2035 conditions .
    - As noted on the previous page: the lower forecast for EMLUMP Year 2035 traffic volumes may partially reflect the correction to model loading.
- Forecasted traffic growth on most segments of Euclid and Imperial would represent an increase of approximately 20 percent increase over existing traffic volumes.
- The greatest increases in traffic would occur on Market (between 47th and Euclid) and 47th (both north and south of Market):
    - Volumes on most segments of Market and 47th would increase by approximately 70 percent to an average of approximately 17,000 on most segments, reflecting in part the relatively low "baseline" volume on both of those streets (just 10,000 daily vehicles under existing conditions).
    - The greatest traffic increase would occur on the westernmost block of Market (between the Community Commercial site that would load most motor vehicle traffic from an access driveway anticipated to be located west of Uvas and east of 47th), with an approximately 130 percent increase in traffic volumes forecasted for that segment of Market Street (west of Uvas and east of 47th) under Year 2035 EMLUMP conditions.
    - The primary generator of traffic growth on Market reflects the growth in traffic from the Community Commercial site (the former "proposed Walmart" site),

which is the largest single trip generator in the study area. Daily traffic volumes relative to capacity will remain below the City's "LOS thresholds" based on currently planned 4-Lane Major Street configurations. As stated in the City's guidelines, the "LOS thresholds" based on daily traffic volumes are intended as guidelines, but are not strict LOS standards.

Table 4-2 Year 2035 EMLUMP Traffic Volume Forecast & Comparison with 1983 & Existing Volumes

Roadway Segment	1983 Daily Traffic Volume[16]	Existing Baseline Daily Traffic Volume	Year 2035 EMLUMP Daily Traffic Volume Forecast[17]
Market (east of I-805 and west of 47th)	11,100	15,000	19,000
Market (east of 47th, one block to future western driveway access to development site)	7,300	10,100	23,000
Market (from one block west of Uvas to one block east of Uvas)	7,300	10,100	19,000
Market (from driveway one block east of Uvas to Euclid)	7,300	10,100	16,000[18]
Market (east of Euclid one block to 51st)	N/A	13,200	17,000[19]
Market (east of 51st to PItta)	9,100	11,100	13,000
Market (east of Pitta to Merlin Dr)	N/A	N/A	13,000
Market (east of Merlin Dr)	6,200	11,700	13,000
Imperial (east of I-805 to 47th)	N/A	38,000	45,000
Imperial (47th to Euclid)	22,500	26,700	40,000
Imperial (Euclid to 54th)	21,400	23,400	28,000
Imperial (54th to 60th)	N/A	21,600	23,000
Imperial (east of 60th)	20,600	N/A	23,000
47th (north of Market)	10,200	12,300	19,000
47th (south of Market)	6,300	10,200	17,000
47th (north of Imperial)	6,300	10,200	19,000
Euclid (north of SR 94)	N/A	36,300	46,000
Euclid (south of SR 94)	22,500	25,400	30,000 [20]
Euclid (north of Market Street)	22,500	25,400	30,000 [21]
Euclid (south of Market Street)	17,000	21,000	25,000
Euclid (north of Imperial)	17,000	21,000	20,000
Euclid (Imperial to Churchward)	N/A	15,000	16,000

[16] Source: *Southeast Area Plan* (circa 1984, Figure 15)

[17] Year 2035 forecast provided by City staff based on Transportation Model outputs and review of "historic high" volumes.

[18] Forecasted volume on easternmost segment of Market Street (between Market Creek Place and Euclid) includes future traffic growth generated by NW Village site, and traffic growth generated by allowed development on the Euclid trolley station site. A significant portion of such trips could enter the NW Village and trolley station sites directly from Euclid via right-in/right-out driveway access. However, the model forecast does not assume direct driveway access. Therefore, the forecasted volume of 16,000 on Market Street (immediately west of Euclid Avenue) represents a conservatively high forecast for traffic analysis purposes.

[19] Year 2035 forecast for 1-block segment of Market between Euclid & 51st was increased to match daily volume of 17,000 recorded in 2003. (Transportation model predicts very little growth over existing volumes on Market east of Euclid).

[20] Prior traffic studies have predicted much higher traffic volumes on Euclid (north of Market and south of SR-94); the *SR-94-Euclid Avenue Interchange Study* (prepared September 2012) forecasted 49,160 daily vehicles in Year 2035, while the *NW Village TIA* (prepared September 2012) predicted 42,580 vehicles in Year 2030, and the *5th Amendment to the Central Imperial Redevelopment Plan* forecasted 36,700 under Year 2030 Baseline and 46,751 under Year 2030 Plus Project conditions. The higher traffic growth forecasts on Euclid Avenue from previous studies may partially reflect the incorrect model loading pattern described on Page 67 of this report (corrected for the EMLUMP analysis).

[21] See footnote above for Euclid (south of SR-94 above).

Table 4-3a City of San Diego Street Classifications & Daily Traffic Volume LOS

CITY OF SAN DIEGO STREET CLASSIFICATIONS		LEVEL OF SERVICE (1)				
STREET CLASSIFICATION	**LANES**	**A**	**B**	**C**	**D**	**E**
Freeway	8 lanes	60,000	84,000	120,000	140,000	150,000
Freeway	6 lanes	45,000	63,000	90,000	110,000	120,000
Freeway	4 lanes	30,000	42,000	60,000	70,000	80,000
Expressway	6 lanes	30,000	42,000	60,000	70,000	80,000
Primary Arterial	6 lanes	25,000	35,000	50,000	55,000	60,000
Major Arterial	6 lanes	20,000	28,000	40,000	45,000	50,000
Major Arterial	4 lanes	15,000	21,000	30,000	35,000	40,000
Collector	4 lanes	10,000	14,000	20,000	25,000	30,000
Collector (no center lane) (continuous left-turn lane)	4 lanes 2 lanes	5,000	7,000	10,000	13,000	15,000
Collector (no fronting property)	2 lanes	4,000	5,500	7,500	9,000	10,000
Collector (commercial-industrial fronting)	2 lanes	2,500	3,500	5,000	6,500	8,000
Collector (multifamily)	2 lanes	2,500	3,500	5,000	6,500	8,000
Sub-Collector (single-family)	2 lanes	—	—	2,200	—	—

Notes:
(1) Level of service based on approximate recommended Average Daily Traffic (ADT) based on the City of San Diego Traffic Impact Study Manual.

(2) Cross sections (XX/XXX)= Curb-to-curb width / Right-of-way width for each street classification, based on City of San Diego Traffic Impact Study Manual.

Source: *City of San Diego Traffic Impact Study Manual* (1998)

Table 4-3b Daily Traffic Volume Comparison & Segment LOS

Existing & Year 2035 EMLUMP -- Daily Traffic Volumes & City of San Diego LOS Thresholds													
Street	**Segment Location**	**Existing Conditions**				**Year 2035 with EMLUMP Land Uses & BASELINE ROAD NETWORK**				**Year 2035 with EMLUMP Land Uses & PROPOSED EMLUMP ROAD NETWORK**			
		Configuration	**City of San Diego LOS E Threhold (1)**	**24-hour Traffic Volume**	**LOS**	**Configuration**	**City of San Diego LOS E Threhold (1)**	**24-hour Traffic Volume**	**Motor Vehicle LOS**	**Configuration**	**City of San Diego LOS E Threhold (1)**	**24-hour Traffic Volume (3)**	**Daily LOS**
Euclid Avenue	North of Market Street & South of SR-94	4-lane Major Street	40,000	25,364	C	4-lane Major Street	40,000	30,000	C	4-lane Major Street	40,000	30,000	C
	South of Market Street & North of Imperial A	4-lane Major Street	40,000	20,933	B	4-lane Major Street	40,000	25,000	C	4-lane Major Street	40,000	25,000	C
Market Street	East of 47th & West of Uvas	**4-lane Major Street**	15,000 (see note 4)	10,000	A	**4-lane Major Street**	40,000	23,000	B	***4-lane Collector***	30,000	23,000	D
	Midpoint Between 47th & Euclid	**4-lane Collector (no center turn lane)**	15,000 (see note 4)	10,022	C	**4-lane Major Street**	40,000	16,000	A	***4-lane Collector***	30,000	16,000	C
	East of Euclid & West of 51st	**4-lane Collector**	30,000	13,200	B	**4-lane Major Street**	40,000	17,000 (see note	A	***4-lane Collector***	30,000	17,000 (see note 6)	C
	East of 51st	**2-lane Collector**	15,000 (see note 5)	11,136	C	**4-lane Major Street**	40,000	13,000	A	***4-lane Collector***	30,000	13,000	B
47th Street	North of Market Street	4-lane Major Street	40,000	12,263	A	4-lane Major Street	40,000	19,000	A	4-lane Major Street	40,000	19,000	A
	South of Market Street	**2-lane Collctor**	15,000 (see note 5)	10,145	C	**4-lane Major Street**	40,000	17,000	C	***4-lane Collector***	30,000	17,000	C

Bold indicates LOS E or F conditions. As stated in the San Diego Traffic Manual, the LOS thresholds are "only intended as a general planning guideline".

NOTES:

Highlighted cells indicate proposed street reclassifcations.

(1) LOS E Capacity based on City of San Diego Traffic Impact Study Manual (1998).

(2) Existing 24-hour traffic volume counts conducted on May 24, 2011. (Note: existing volume on one-block segment of Market Street, east of Euclid and west of 51st, was derived from peak-hour turning movements conducted in May 2011).

(3) Future 24-hour traffic volume based on SANDAG model forecast for Proposed EMLUMP land uses.

(4) Based on City of San Diego Traffic Impact Study Manual (1998).

(5) Capacity of 4-lane collector (without center turn-lane) is typically ~30,000 daily vehicles. Value shown here is based on City of San Diego Traffic Impact Study Manual (1998).

(6) Note: the traffic model does not predict growth in traffic on Market Street under Year 2035 conditions. However, the increase as shown is based on City review of historic traffic volumes from Year 2003 on the one-block segment west of 51st & east of Euclid.

Year 2035 Peak Hour Traffic Volume Forecast

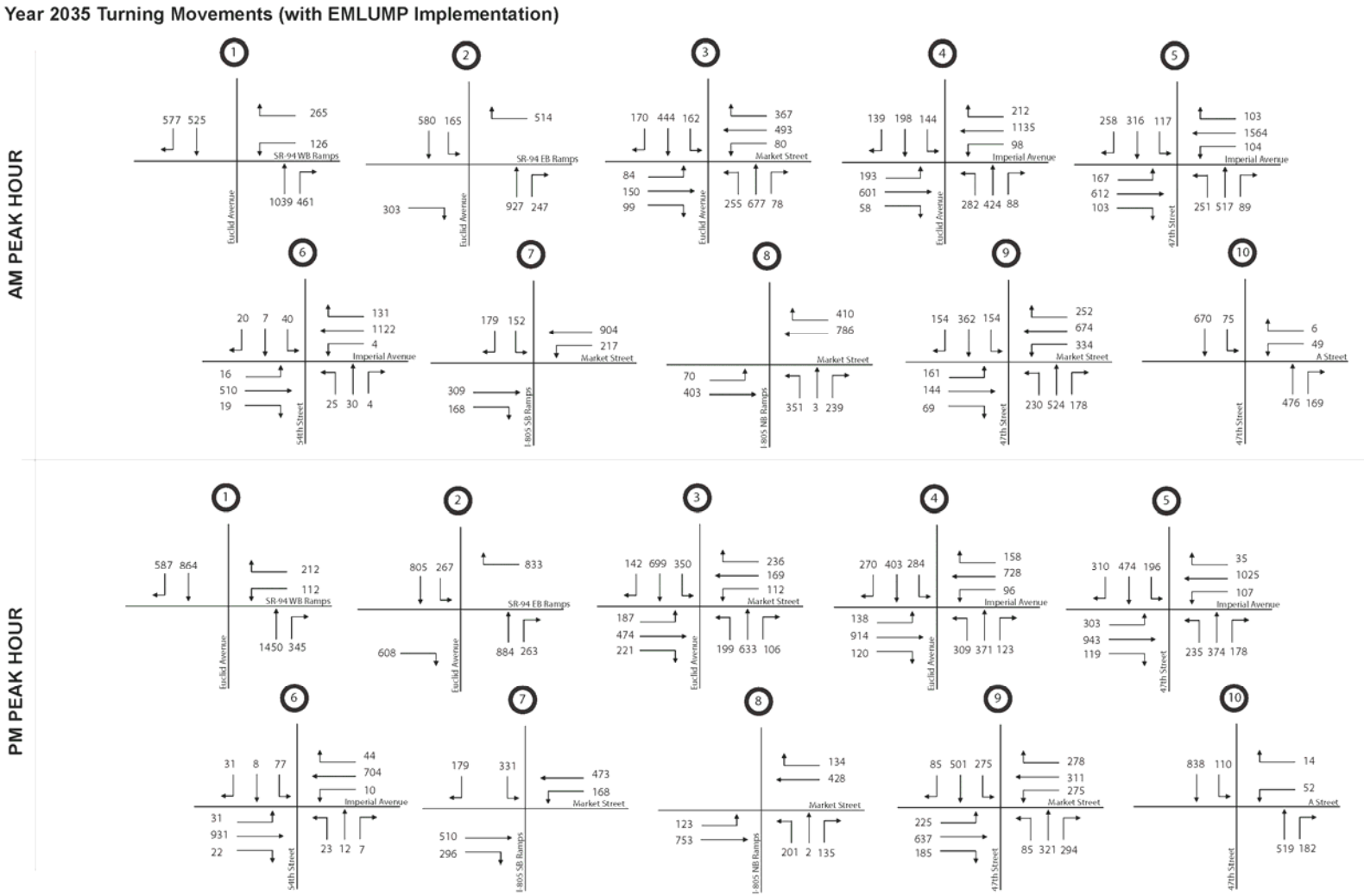
Based on the anticipated increase in Year 2035 Daily Volumes, Peak Hour Volumes were forecasted by Nelson\Nygaard at each of the ten study intersections:

- At the following intersections within the "core" of the Plan Area, AM and PM Peak Hour volumes were forecasted based on a volume balancing method:
    - Euclid/Market
    - Market/47th
- At the following intersections at the periphery of the Plan Area, the AM and PM volumes were forecasted by applying a growth factor derived from the growth in daily traffic volumes on adjacent segments. The "factor" method was employed at the following study intersections:
    - Euclid/SR-94 EB Ramps
    - Euclid/SR-94 WB Ramps
    - Market/I-805 SB Ramps
    - Market/1-805 NB Ramps
    - 47th / A Street
    - Imperial/47th
    - Imperial/Euclid
    - Imperial/54th

Traffic volumes at the intersection of Market & 47th are forecasted to increase by approximately 66 percent, although volumes on Market (west of 47th) would only increase by 27 percent. This reflects the assignment of a large portion of trips to/from the north or south via 47th.

Figure 4-2 shows the forecasted (year 2035 with Proposed EMLUMP) traffic volumes at each study intersection.

Figure 4-2 Peak Hour Traffic Volumes -- Cumulative (Year 2035) with EMLUMP



Year 2035 Peak Hour Intersection Level of Service Results

The traffic level of service (LOS) analysis was conducted for Year 2035 Conditions based on the proposed Year 2035 EMLUMP roadway network (see Figure 3-4) as summarized in this report.

Figure 4-4 provides a standard definition of LOS for study intersections based on Highway Capacity Manual (HCM) methodology.

Table 4-5 presents the results of the Peak Hour Traffic LOS at each study intersection.

Figure 4-4 Traffic Level of Service Thresholds at Study Intersections

Level of Service	Average Control Delay (seconds/vehicle)	
	Unsignalized Intersection	Signalized Intersection
A	0 to 10	≤10
B	>10 to 15	>10 to 20
C	>15 to 25	>20 to 35
D	>25 to 35	>35 to 55
E	>35 to 50	>55 to 80
F	>50	>80

Source: Highway Capacity Manual 2000.

Figure 4-5 Intersection Level of Service – Year 2035 EMLUMP Conditions

EXISTING & YEAR 2035 EMLUMP CONDITIONS (AM & PM PEAK HOURS)

			EXISTING CONDITIONS				YEAR 2035 EMLUMP			
			AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
Study Intersection	Location	Intersection Control	Level of Service (LOS)	Average Vehicle Delay (seconds)	Level of Service (LOS)	Average Vehicle Delay (seconds)	Level of Service (LOS)	Average Vehicle Delay (seconds)	Level of Service (LOS)	Average Vehicle Delay (seconds)
1	Euclid Avenue & SR-94 Westbound Ramps	*Existing Side-street stop (1); Planned Signalizatoin*	*D*	*25.1*	***E***	***46.8***	A	3.8	A	4.0
2	Euclid Avenue & SR-94 Eastbound Ramps	*Existing Side-street yield (2); Planned Signalization*	*C*	*21.0*	***F***	***>50***	C	23.3	D	43.2
3	Euclid Avenue & Market Street	Signalized	C	31.2	C	27.1	D	37.9	D	38.8
4	Euclid Avenue & Imperial Avenue	Signalized	D	37.4	C	33.8	D	40.7	D	45.4
5	47th Street & Imperial Avenue	Signalized	D	50.6	D	37.0	**E**	**73.9**	D	54.3
6	54th Street & Imperial Avenue	Signalized	B	10.2	A	9.5	B	17.7	B	12.0
7	I-805 SB Ramps & Market Street	Signalized	A	8.8	B	18.7	B	18.2	B	17.7
8	I-805 NB Ramps & Market Street	Signalized	B	10.2	A	8.7	B	12.4	A	8.7
9	47th Street & Market Street	Signalized	C	30.5	C	27.0	D	50.4	D	49.9
10	47th Street & A Street	Side-street stop (3)	C	15.6	D	19.1	**F (4)**	**>50**	**E (4)**	**40.0**

Bold indicates failing conditions (LOS E or F based on City of San Diego standards).

Notes:

1. Exising LOS at Euclid & SR-94 Wesbound Ramps is based on westbound left-turn (stop-controlled) movement. Year 2035 LOS based on Alternative 2 of Euclid/SR-94 Interchange Study, January 2013.
2. Existing LOS at Euclid & SR-94 Eastbound Ramps is based on eastbound right-turn (yield-controlled) movement. Year 2035 LOS based on Alternative 2 of Euclid/SR-94 Interchange Study, January 2013.
3. LOS at 47th & A Street is based on westbound left-turn (stop-controlled) approach.
4. Reflects increased delay to stop-controlled westbound left-turn. Westbound approach volumes would not trigger signal warrant.

Source: Nelson\Nygaard 2013

Summary of Traffic Findings

As shown on Figure 4-5:

- The key intersections within the "core" of the Plan Area, Euclid/Market, 47th/Market and Euclid/Imperial, would both operate with an acceptable LOS of D or better during both the AM and PM Peak Hour.
- Of the remaining seven study intersections, the following four intersections would operate acceptably under all scenarios:
    - Market / I-805 SB Ramp
    - Market / I-805 NB Ramp
    - Imperial/54th
    - 47th / A Street
- The two intersections of Euclid with the SR-94 Eastbound & Westbound Off-Ramps would operate acceptably with planned signalization by Year 2035. The LOS analysis was based on Alternative 2 as described in the January 2013 Euclid/SR-94 Interchange Study.
- The intersection of 47th Street with Imperial would operate unacceptably at LOS E during the AM Peak Hour. The intersection failing LOS results due to the combined volume of traffic on 47th (with an increase in traffic volume of approximately 88 percent on the southernmost segment that intersects Imperial) with the high volume of traffic on Imperial and school traffic during the AM Peak Hour. In addition: given the close proximity of this intersection to theI-805 Northbound Ramp, westbound queues already tend to back-up past the intersection with 47th during the AM Peak Hour.
- The side-street stop-controlled intersection of A Street with 47th Street would operate unacceptably due to average delay to the westbound left-turn exceeding 50 seconds during the AM Peak Hour (LOS F) and average delay of 40 seconds during the PM Peak Hour (LOS E). The added delay would be due to increased north-south volume on 47th Street. However, the westbound approach volumes would not trigger a signal warrant, since forecasted westbound approach volumes would be less than 70 vehicles (combined total for westbound left and westbound right) during both peak hours.