Circulation Plan

Gardena General Plan 2006

Authority

As one of the seven State-mandated general plan elements, State Government Code Section 65302(b) requires each city have a circulation element that addresses the general location and extent of existing and proposed major thoroughfares, transportation routes, terminals, and other local public utilities and facilities, all correlated with the land use plan.

Purpose

The purpose of the Circulation Plan is to design and improve the circulation system to meet the future needs of Gardena's residents and visitors. The proposed circulation system should promote the safe and efficient movement of both people and goods through the City. The implementation of the policies in this Plan will enhance the development and maintenance of a transportation system that will maximize freedom of vehicles, transit, rail, bicycles and pedestrian movements. This Plan will guide the planning, development and enhancement of Gardena's circulation system based upon the lands patterns and intensities identified in the Land Use Plan.

Relationships to Other Plans and Programs

Congestion Management Plan

The Los Angeles County Metropolitan Transportation Authority (MTA) is the agency responsible for planning and operating regional transit facilities and services in Los Angeles County. The MTA prepares the Congestion Management Plan (CMP) mandated by State Law, which defines the countywide transportation network, establishes service level targets for network routes, and identifies strategies to reduce congestion.

The MTA is required by law to monitor local implementation of all elements of the state-mandated CMP. Local jurisdictions are required to monitor arterial congestion levels, monitor transit services along certain corridors, implement and adopt a trip reduction and travel demand ordinance, implement a land use analysis program, and prepare annual deficiency plans for portions of the CMP system failing to meet the established service levels. In 2005, the MTA found that 88 jurisdictions, including the City of Gardena, were in conformance with the CMP.

SCAG Regional Transportation Plan

The Regional Transportation Plan (RTP) is a multi-modal, long-range planning document prepared by the Southern California Association of Governments (SCAG) in 2004. The RTP includes programs and policies for congestion management, transit, bicycles and pedestrian, roadway, freight, and financing. The RTP: 1) addresses how to improve mobility and solve congestion problems; 2) evaluates federal, state and local funding available for transportation improvements; 3) estimates costs of projects and develops funding strategies to meet these costs; and 4) meets air quality requirements.

South Coast Air Quality Management Plan

The federal Clean Air Act requires the preparation of plans to improve air quality in geographic areas not meeting state or federal standards for certain pollutants. The South Coast Air Basin, which the City of Gardena is a part of, is in non-attainment. In response to the requirement, the South Coast Air Quality Management Plan (AQMP) mandates a variety of measures to reduce traffic congestion and improve air quality. Such strategies include transportation measures aimed towards enhancing mobility by reducing congestion levels. Gardena's Circulation Plan identifies policies and programs that may contribute to the improvement of the regional air quality.

Gardena's Circulation System

Regional Access

The City of Gardena is served by four nearby freeways, which effectively provide connections to and from the South Bay sub-region to other sub-regions within the metropolitan area. An interchange of the I-110 and SR-91 freeways is located within the City of Los Angeles, near the southeast corner of Gardena. In terms of region-to-region travel, Gardena is not directly connected – such trips require interchanges to true interstate freeways such as the I-5 freeway or the I-10 freeway. The four closest freeway facilities to Gardena are described below:

Interstate 105 – The Century Freeway (I-105) is an east-west freeway that connects the South Bay/LAX area to the I-605 freeway in Norwalk. In the vicinity of Gardena, the freeway traverses the City of Hawthorne, approximately ½-mile north of the Gardena city limits. The closest access points to Gardena are full-access interchanges at Crenshaw Boulevard and Vermont Avenue.

Interstate 110 – The Harbor Freeway (I-110) is a major north-south freeway in the greater Los Angeles Metropolitan area. It traverses the City of Los Angeles immediately east of the city limits of Gardena. The closest access points to Gardena include full-access interchanges at El Segundo Boulevard, Rosecrans Avenue, and Redondo Beach Boulevard.

Interstate 405 – The San Diego Freeway (I-405) is a ring freeway that connects the I-5 to coastal cities within the Los Angeles Basin, between west Los Angeles and Orange County. In the vicinity of Gardena, the freeway traverses the City of Hawthorne and the City of Lawndale, approximately 2.5 miles west of the Gardena city limits. The freeway also traverses the City of Torrance, approximately one mile south of the Gardena city limits.

State Route 91 – The Artesia Freeway (SR-91) is an east-west freeway that connects the local sub-region to north Orange County and the Inland Empire (Riverside and San Bernardino Counties). The western terminus of the SR-91 freeway is at the eastern city limits of Gardena (at Vermont Avenue). West of this point, within the City of Gardena, the SR-91 designation is terminated and a transition occurs into the divided highway of Artesia Boulevard.

Gardena's Roadway Network

Arterials

The function of an arterial roadway is to connect traffic from smaller roadways to freeway interchanges and regional roadway corridors. They are the principal urban thoroughfares, provide a linkage between activity centers in the City to adjacent communities and other parts of the region, and provide intra-city mobility. Similar roadways in most cities generally have right-of-way widths of approximately 100 feet and are designed to move large volumes of traffic, typically in the range of 40,000 to 60,000 vehicles per day. They are generally served by regional bus transit routes and are the primary truck routes in the community. Figure CI-1 illustrates the arterial and major collector roadways in the City and Figure CI-2 presents the roadway cross-sections.

Major Collector Roadways

The primary purpose of major collector roadways is to serve as an intermediate route to carry traffic between collector roadways and arterial roadways. Access to adjacent land uses is generally unrestricted. Traffic controls typically consist of signalization at intersections with arterials; however, left-turn lanes and/or left-turn signalization are generally not provided. On street parking is generally acceptable, although it might be prohibited during certain hours, or it may be based on a maximum time limit. Similar roadways in most cities are designed to carry moderate levels of traffic, with an average right-of-way width of 80 feet, generally in the range of 15,000 to 25,000 vehicles per day.

Collector Roadways

The primary function of collector roadways is to connect a defined geographic area of the city. These roadways are intended to move traffic from a local roadway to a secondary roadway. They are intended to provide access to all types of land uses and generally have no limitations on access. Parking is generally allowed during most hours. The right-of-way width of this roadway type is variable but generally averages 60 feet, and carries less than 15,000 vehicles per day.

Roadways classified as collector streets within Gardena can be broken down into collector roadways that serve two primary land uses: commercial-industrial uses and residential uses. Collectors in commercial and industrial neighborhoods are two-lane streets that may or may not include on-street parking. Where on-street parking is provided, it may not be available on both

sides of the street. Collectors in residential neighborhoods are two-lane streets with on-street parking on both sides of the street.

Local Streets

The Circulation Plan does not define roadways smaller than collector roads. For purposes of this report, a fifth classification was added: local streets. Local streets are designed to provide vehicular, pedestrian and bicycle access to individual parcels throughout the City. They are intended to carry low volumes of traffic, and allow unrestricted parking. Local streets typically have two travel lanes, and in most cities are 50 feet in width.

In residential neighborhoods, there is a growing trend to design and implement traffic control measures on local streets. Some of these control measures include speed humps, traffic diverters, chokers, traffic circles and pavement treatments. The intent of these treatments is to slow traffic or prevent through traffic from infiltrating residential neighborhoods.

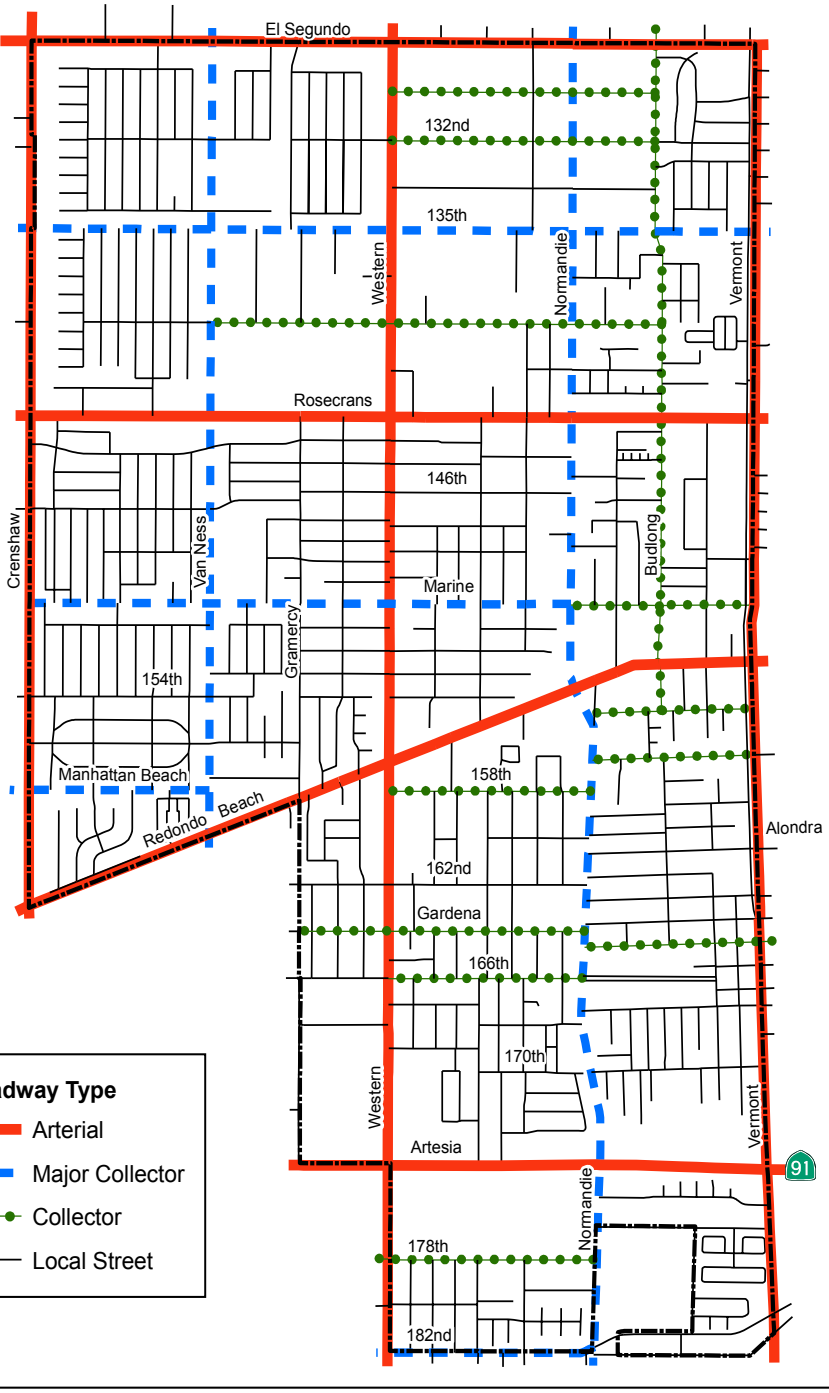
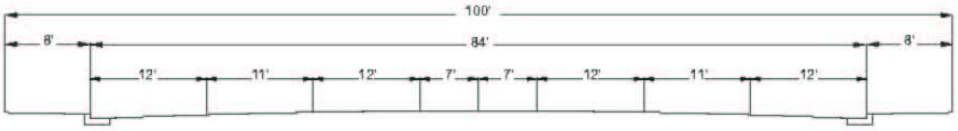
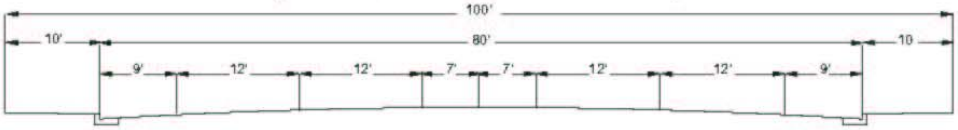


Figure CI-1
Roadway Network

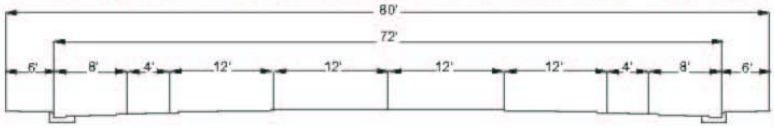
ARTERIAL
(6 LANES, DIVIDED WITHOUT PARKING)



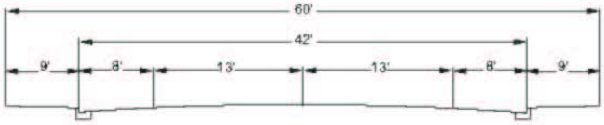
ARTERIAL
(4 LANES, DIVIDED WITH PARKING)



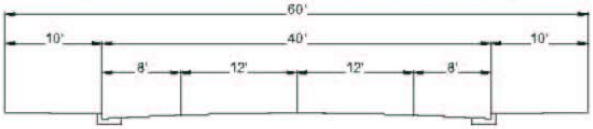
MAJOR COLLECTOR
(4 LANES, UNDIVIDED WITH PARKING AND BIKE LANE - CLASS II)



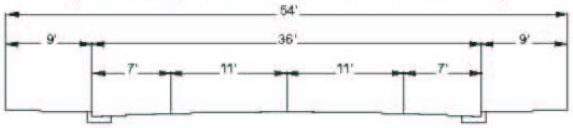
COMMERCIAL-INDUSTRIAL COLLECTOR
(2 LANES, UNDIVIDED WITH PARKING LANE)



RESIDENTIAL COLLECTOR
(2 LANES, UNDIVIDED WITH PARKING)



LOCAL
(2 LANES, UNDIVIDED WITH PARKING)



Note: There are various permutations for the cross-sections, the above represent some examples.

Figure CI-2
Roadway Cross Sections

Truck Routes

Trucks conduct the majority of goods movement within Gardena. The State of California Vehicle Code establishes regulations on the use of local streets and roads by trucks and other heavy vehicles.

The City has designated a number of streets and street segments as truck routes to ensure the orderly movement of commercial vehicles carrying goods and materials through the community. Figure CI-3 illustrates the locations of designated truck routes within Gardena.

Bicycle Facilities

Caltrans has developed statewide standards and definitions for the planning, design and implementation of bicycle facilities. The following is a summation of these standards.

Class I (Bicycle Path) – A bicycle path is a special facility that is designed exclusively for the use of bicycles. They are physically separated from motor vehicle traffic by a barrier or spatial distance. Bicycle paths are more often used for recreation and are generally found in Los Angeles County in parks and recreation areas such as the beach and along river channels.

Class II (Bicycle Lane) – A bicycle lane is a facility where a portion of the paved roadway area is marked as a special lane for use by bicycles only. It is identified by signage along the street that denotes "BIKE LANE", pavement markings and lane line markings. Motor vehicles are prohibited from driving in bike lanes except when turning to and from driveways, intersections, or on-street parking.

Class III (Bicycle Route) – A bicycle route is defined as a bicycle way designated within a public right-of-way. The purpose of the bicycle route is to encourage a sharing of the roadway between vehicles and bicycles. They are identified by signage along the street that denotes "BIKE ROUTE." No other pavement markings are employed with these facilities.

Figure CI-4 illustrates the locations of existing bikeways within the City.

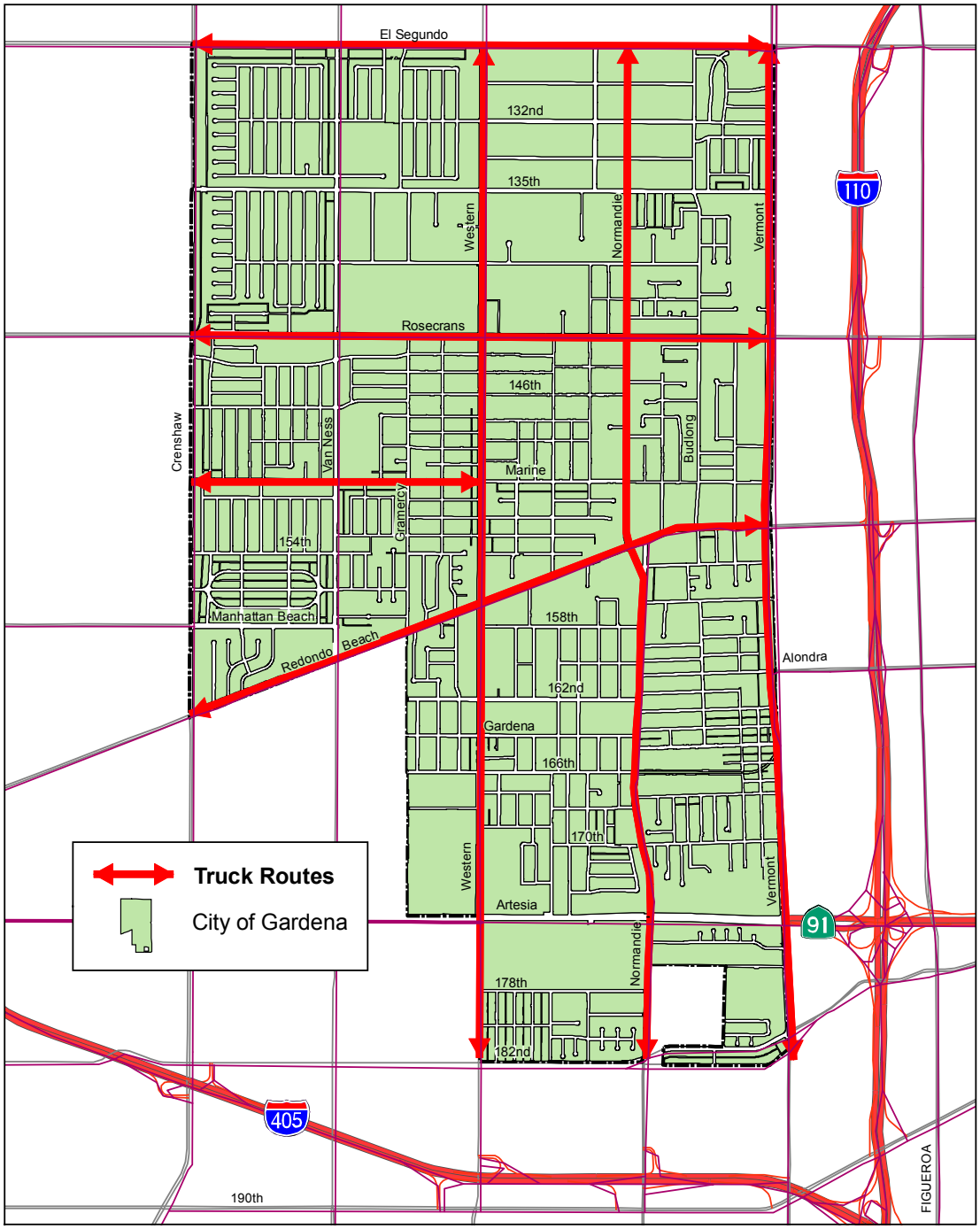


Figure CI-3
Designated Truck Routes

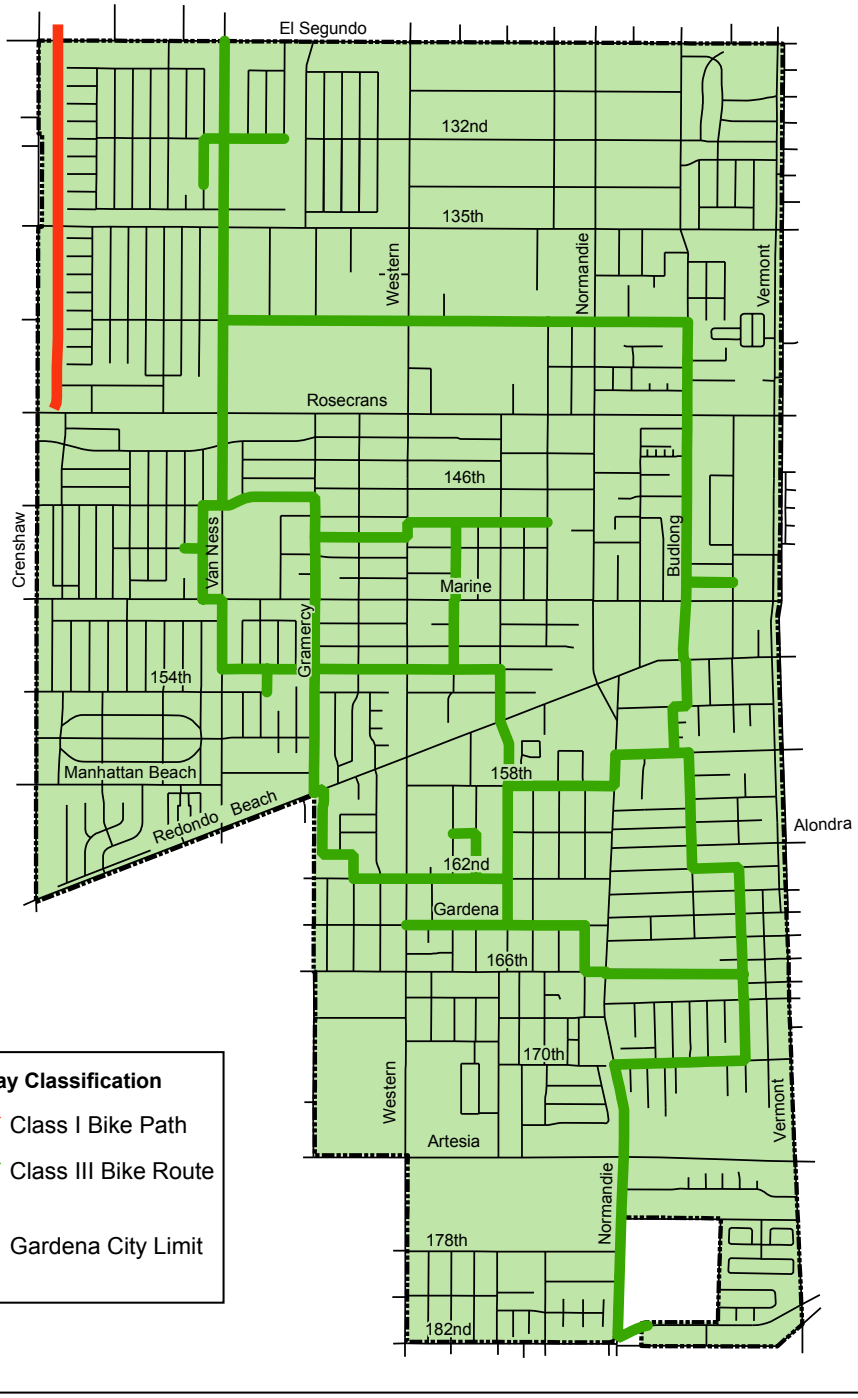


Figure CI-4
Bikeways

Pedestrian Circulation

Pedestrian walking areas are an integral part of a city's circulation system. The connectivity of a sidewalk system is a primary factor in pedestrian mobility between and origin and a destination. A sidewalk is an area of refuge from vehicle traffic that provides a safe route for pedestrian transport.

In order for sidewalks to be an effective choice for circulation, they need to be kept free of obstructions. When equipment such as utility poles, fire hydrants, traffic controls or street lighting must be placed on the sidewalk, it should be placed to minimize interference with pedestrian flow. When street furniture becomes an obstacle to pedestrian flow, it should be prohibited or placed on an adjacent street segment with wider sidewalk facilities.

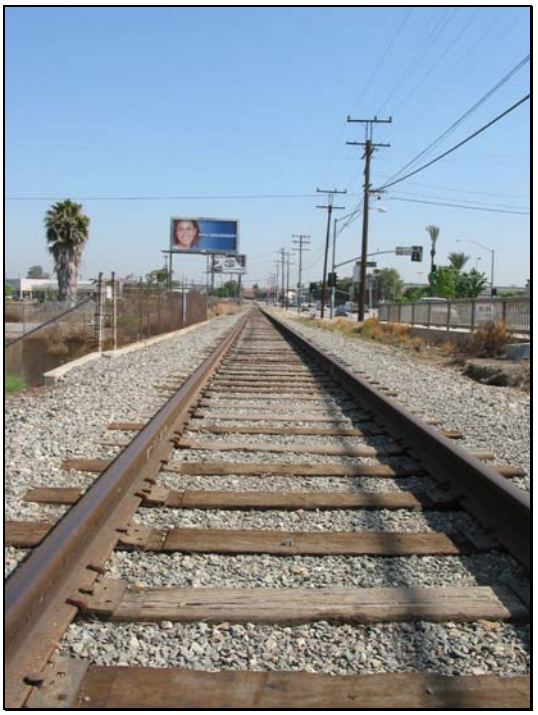
Public Transportation

Public transportation in the City of Gardena consists of local and regional fixed-route bus service. Rail service is also provided in the vicinity of Gardena. This network of alternative transportation modes serving Gardena provides viable alternatives to the use of private automobiles.

Local transit service is provided by the City of Gardena, through the Gardena Municipal Bus Lines, Torrance Transit and the Los Angeles County Metropolitan Transportation Authority.

Freight Railroads

The City of Gardena is served by the Union Pacific railroad, along the Normandie Avenue corridor south of 166th Street. Additional corridors served by rail include Vermont Avenue south of Redondo Beach Boulevard and 166th Street from the Normandie corridor to Western Avenue. The Burlington Northern Santa Fe railroad has port-related and refinery-related trackage near the I-405 freeway corridor, to the west of the city limits. Truck trips to and from local industry are therefore reduced somewhat by the presence of these freight rail corridors.



Level of Service Analysis

Level of Service (LOS) is a relative measure of driver satisfaction with ranges from A (Free Flow; volume to capacity ratio of less than .60) to F (Forced Flow; volume to capacity ratio in excess of 1.0). A LOS D is

traditionally considered the minimum acceptable level of operation for urban peak hour conditions. At that level, most traffic clears on the first available green phase, but short accumulations of vehicles may occur. Average vehicle speeds are on the order of 20-25 miles per hour including stops. LOS E and F are characterized by long queues of waiting vehicles existing over extended periods of time, often blocking nearby intersections and requiring several cycles to clear. In addition the technique used to assess the operation of an intersection is known as Intersection Capacity Utilization (ICU) which represents the peak hour volume-to-capacity ratios. Table CI-1 presents the LOS definitions for intersections.

Table CI-1

Level of Service (LOS) Definitions for Intersections

Level of Service	Description	Volume to Capacity Ratio
A	Excellent operation. All approaches to the intersection appear quite open, turning movements are easily made, and nearly all drivers find freedom of operation.	0 - 0.60
B	Very good operation. Many drivers begin to feel somewhat restricted within platoons of vehicles. This represents stable flow. An approach to an intersection may occasionally be fully utilized and traffic queues start to form.	0.60 – 0.70
C	Good operation. Occasionally drivers may have to wait more than 60 seconds, and back-ups may develop behind turning vehicles. Most drivers feel somewhat restricted.	0.71 – 0.80
D	Fair operation. Cars are sometimes required to wait more than 60 seconds during short peaks. There are no longer-standing traffic queues. This level is typically associated with design practice for peak periods.	0.81 – 0.90
E	Poor operation. Some long-standing vehicular queues develop on critical approaches to intersections. Delays may be up to several minutes	0.91 – 1.00
F	Forced flow. Represents jammed conditions. Backups from locations downstream or on the cross street may restrict or prevent movement of vehicles out of the intersection approach lanes; therefore, volumes carried are not predictable. Potential for stop and go type traffic flow.	Above 1.00

Performance Criteria

Evaluating the ability of the circulation system to service the City requires establishing suitable performance criteria. Performance criteria establish a desired LOS and a technical component that specifies how traffic forecast data could be used to measure criteria achievement. Table CI-2 presents the performance criteria.

Table CI-2
Performance Criteria

Mid-Block Roadway Segment Criteria	
Volume-to-capacity (V/C) ratio not to exceed 0.90 (LOS D)	
Peak Hour Intersection Criteria – Residential Intersections	
Intersection capacity utilization (ICU) not to exceed 0.90 (LOS D)	
Saturation flow rate	1,600 vehicles per hour per lane
Clearance interval	0.10 ICU
Peak Hour Intersection Criteria – Commercial Intersections	
Intersection capacity utilization (ICU) not to exceed 1.00 (LOS E)	
Saturation flow rate	1,600 vehicles per hour per lane
Clearance interval	0.10 ICU

Existing Traffic Conditions

Roadway Segments

Figure CI-5 shows the existing roadway segment level of service. Level of service (LOS) values were calculated by dividing the existing daily traffic volumes by the capacity of the roadway within the particular segment. Capacity numbers were defined by the type of roadway and the per-lane capacity defined by the City. The following roadway segments currently operate at LOS E or F:

- Normandie Avenue, between Redondo Beach Boulevard & 158th Street
- Normandie Avenue, between 158th Street and 162nd Street
- Marine Avenue, between Western Avenue and Normandie Avenue

Intersections

The analysis of existing operations at the study intersections is based on the weekday a.m. and p.m. peak hours. Manual turn movement counts were conducted at these intersections in September 2004.

The results of the analysis of existing peak-hour intersection conditions are summarized in Table CI-3 and illustrated in Figures CI-6 and CI-7.

As shown by the bold text within Table CI-3, three intersections operate at LOS E or F during the AM or PM peak hours:

- Crenshaw Blvd. / El Segundo Blvd. This intersection operates at LOS E in the a.m. peak period. This poor level of service is caused by the conflicts between heavy eastbound left turn volumes and opposing westbound thru volumes.
- Western Ave. / Redondo Beach Blvd. This intersection operates at LOS F in the p.m. peak period. This poor level of service is caused by the conflicts between heavy northbound left turn volumes and opposing southbound thru volumes.
- Normandie Ave. / Redondo Beach Blvd. This intersection operates at LOS E in the p.m. peak period. This poor level of service is caused by the conflicts between heavy northbound left turn volumes and opposing southbound thru volumes.

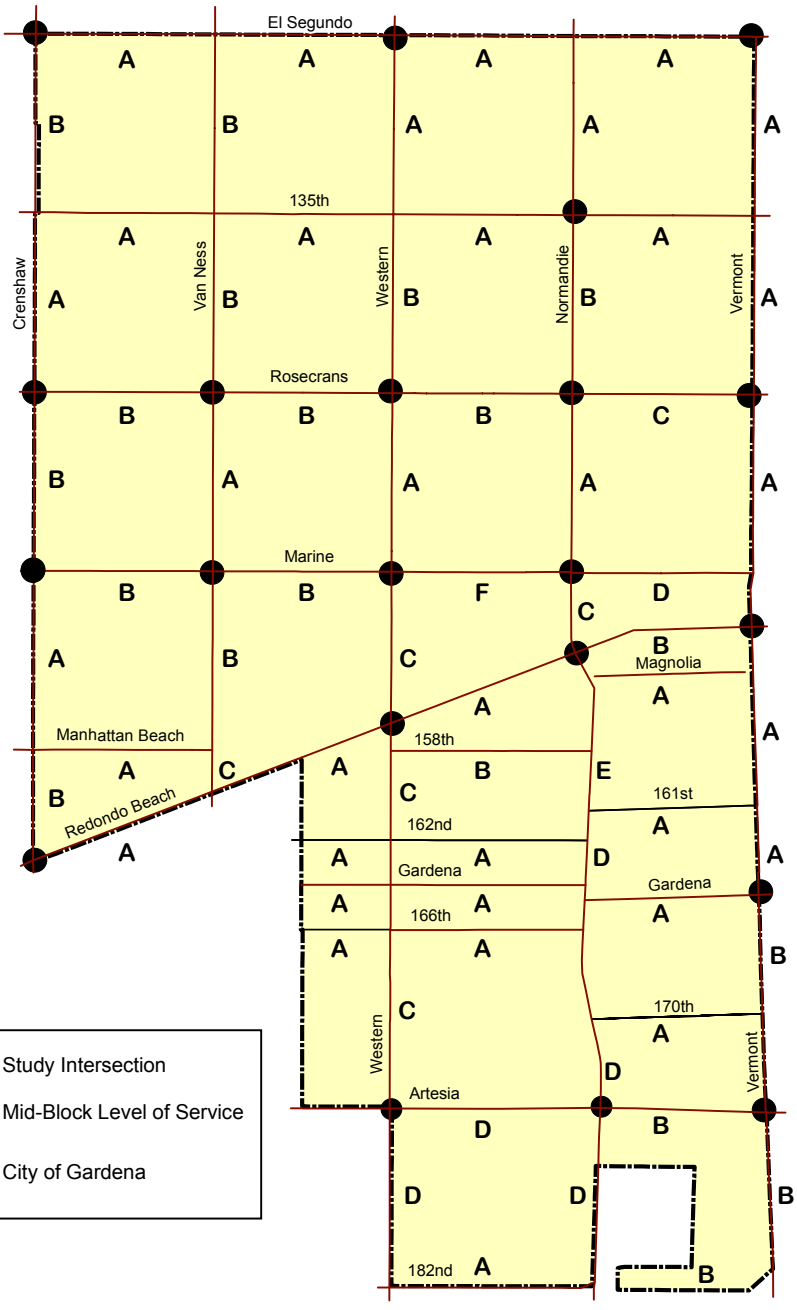


Figure CI-5
Roadway Segment Level of Service

Table CI-3

Existing (2004) Peak Hour Conditions at Study Intersections

	Intersection	AM Peak Hour		PM Peak Hour	
		V/C	LOS	V/C	LOS
1	Crenshaw Blvd. / El Segundo Blvd.	**0.953**	**E**	0.868	C
2	Western Ave. / El Segundo Blvd.	0.893	D	0.895	D
3	Vermont Ave. / El Segundo Blvd.	0.808	D	0.784	C
4	Normandie Ave. / 135th St.	0.535	A	0.628	B
5	Crenshaw Blvd. / Rosecrans Ave.	0.824	D	0.779	C
6	Van Ness Ave. / Rosecrans Ave.	0.813	D	0.770	C
7	Western Ave. / Rosecrans Ave.	0.715	C	0.786	C
8	Normandie Ave. / Rosecrans Ave.	0.706	C	0.716	C
9	Vermont Ave. / Rosecrans Ave.	0.773	C	0.763	C
10	Crenshaw Blvd. / Marine Ave.	0.682	B	0.677	B
11	Van Ness Ave. / Marine Ave.	0.670	B	0.698	C
12	Western Ave. / Marine Ave.	0.680	B	0.725	C
13	Normandie Ave. / Marine Ave.	0.714	C	0.781	C
14	Crenshaw Blvd. / Redondo Beach Blvd.	0.833	D	0.885	C
15	Western Ave. / Redondo Beach Blvd.	0.733	C	**1.002**	**F**
16	Normandie Ave. / Redondo Beach Blvd.	0.735	C	**0.943**	**E**
17	Vermont Ave. / Redondo Beach Blvd.	0.656	B	0.842	D
18	Vermont Ave. / Gardena Blvd.	0.862	D	0.715	C
19	Western Ave. / Artesia Blvd.	0.790	C	0.885	D
20	Normandie Ave. / Artesia Blvd.	0.829	D	0.889	D
21	Vermont Ave. / Artesia Blvd.	0.885	D	0.871	D

Source: Katz, Okitsu and Associates, Traffic Analysis for the City of Gardena, Dec. 2005

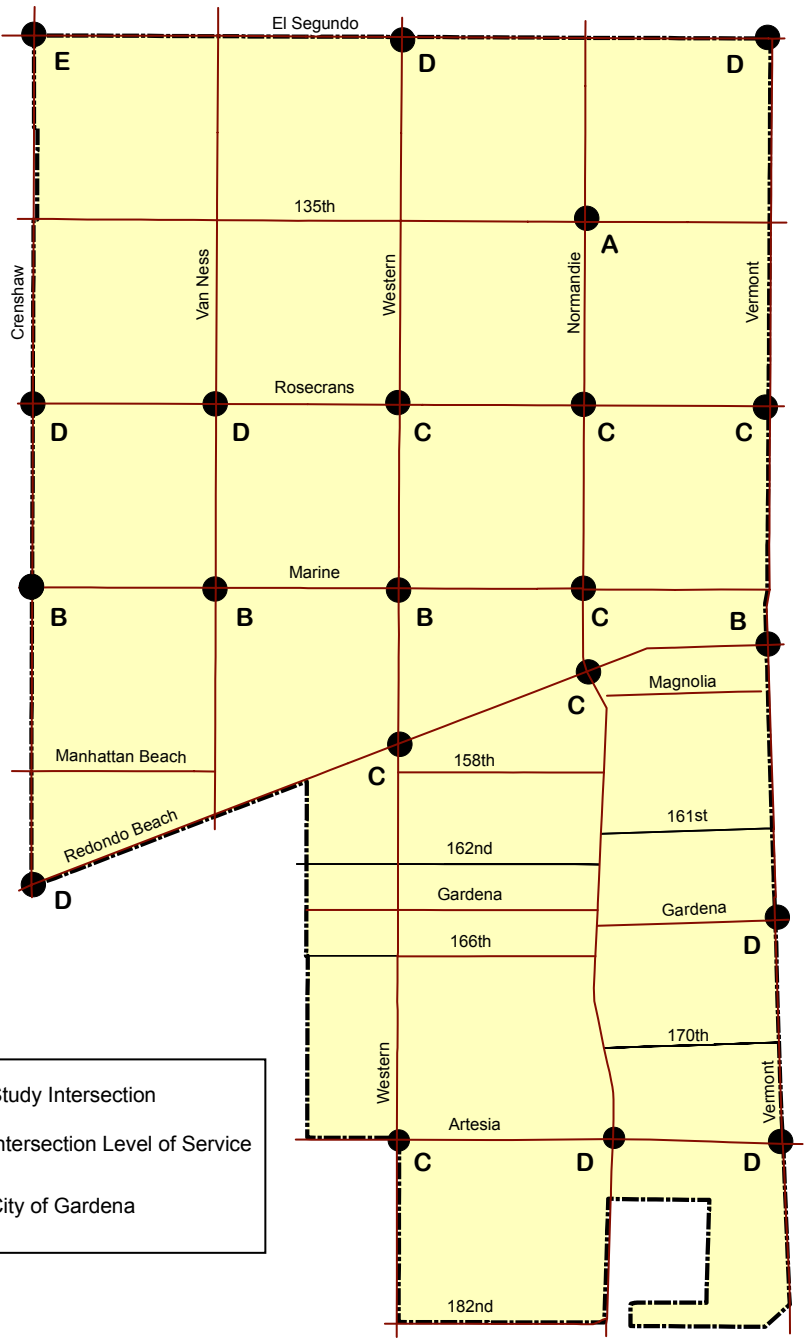


Figure CI-6

Existing AM Peak Hour Intersection LOS

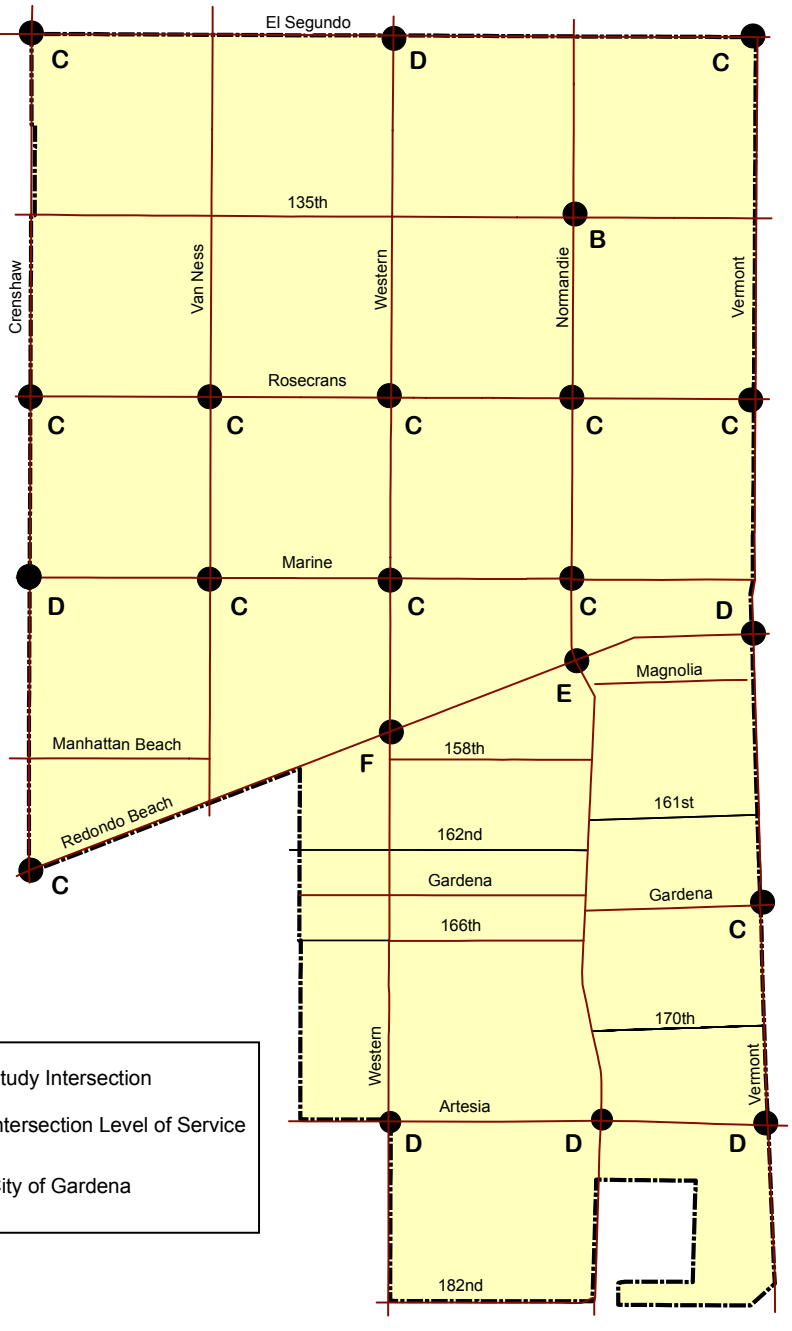


Figure CI-7
Existing PM Peak Hour Intersection LOS

Goals and Policies

CI Goal 1	Promote a safe and efficient circulation system that benefits residents and businesses, and integrates with the greater Los Angeles/South Bay transportation system.

Policies

CI 1.1: To the extent feasible, maintain traffic flows at nonresidential, signalized intersections at LOS D, and maintain LOS E during peak rush hours.

CI 1.2: Minimize truck traffic through Gardena and minimize adverse impacts by regulating off-street truck parking, intrusions into neighborhoods, and noise levels.

CI 1.3: Cooperate with surrounding cities, regional transportation agencies, and other responsible agencies to provide efficient traffic management along the major roadway corridors traversing Gardena.

CI 1.4: Provide streetscape enhancement programs for major highways, to improve the appearance of streets.

CI Goal 2	Promote a safe and efficient local street system that is attractive and meets the needs of the community.

Policies

CI 2.1: To the extent feasible, maintain traffic flows at residential signalized intersections at LOS C, and maintain LOS D during peak rush hours.

CI 2.2: Apply creative traffic management approaches to address congestion in areas with unique problems, particularly in the vicinity of schools, businesses with drive through access and locations where businesses interface with residential areas.

CI 2.3: The City's Capital Improvement Program should ensure that roads are maintained and rehabilitated as needed.

CI 2.4: Protect residential neighborhoods from cut-through traffic by improving intersections on major highways, prohibiting cut-through traffic, and improving street signage.

CI 2.5: Traffic-calming measures and devices (e.g., sidewalks, streetscapes, speed humps, traffic circles, cul-de-sacs and signals) should promote safe routes through neighborhoods for pedestrians.

CI 2.6: Provide signs at major City gateways to indicate arrival into the Gardena and to indicate the direction to heavily frequented destinations within the City.

CI Goal 3 Promote alternative modes of transportation that are safe and efficient for commuters, and available to persons of all income levels and disabilities.

Policies

CI 3.1: Work with Gardena Municipal Bus Lines and MTA to increase the use of public transit, establish or modify routes, and improve connectivity to regional services.

CI 3.2: Maintain, to the extent fiscally feasible, and regularly evaluate the efficiency and effectiveness of the Gardena Municipal Bus Lines and Dial-a-Ride services for City residents.

CI 3.3: Maintain and expand sidewalk installation and repair programs, particularly in areas where sidewalks link residential neighborhoods to local schools, parks, and shopping areas.

CI 3.4: Maintain a citywide bicycle route and maintenance plan that promotes efficient and safe bikeways integrated with the MTA's regional bicycle system.

CI Goal 4 Provide adequate public facilities and infrastructure that support the needs of City residents and businesses

Policies

CI 4.1: The condition of sewer, drainage and water systems, streets, and other support facilities should be inventoried and monitored.

CI 4.2: A comprehensive plan to finance the ongoing maintenance, repair, and rehabilitation of City infrastructure systems.

CI 4.3: Maintain a collaborative relationship with service providers to ensure that infrastructure investments are protected.