

REDONDO BEACH CIRCULATION ELEMENT

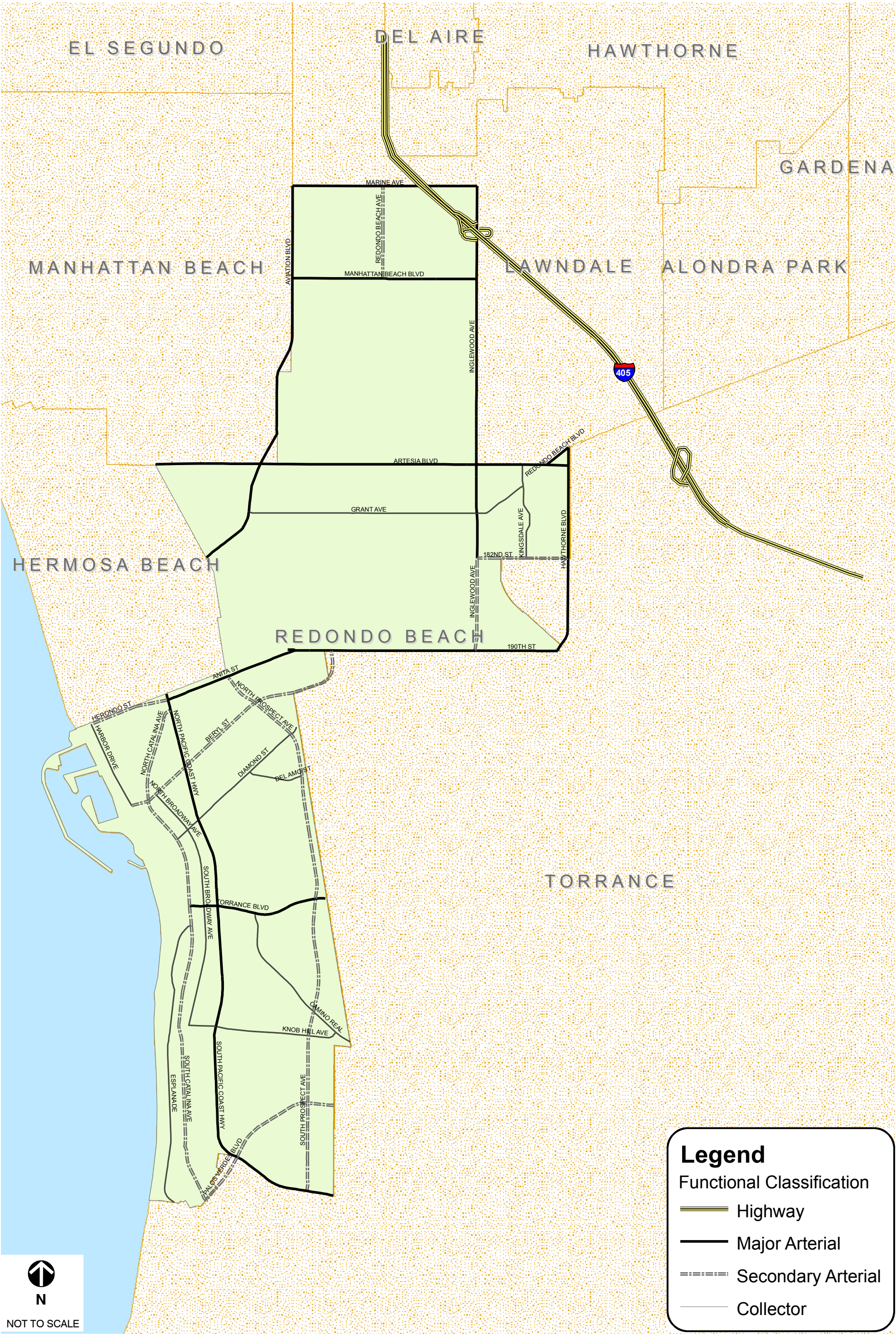


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Torrance Boulevard

Torrance Boulevard is a four-lane east/west major arterial that ends in a cul-de-sac west of Catalina Avenue. On-street parking is permitted along most of its length in the area.



Torrance Boulevard and Prospect Boulevard

182nd Street

182nd Street is a two-lane east/west secondary arterial running eastward from Inglewood Avenue. On-street parking is generally prohibited in the study area.

Local Designated Truck Routes

Streets that have been designated by the City of Redondo Beach to carry truck traffic in the City are shown in Figure 2. Designated routes are generally limited to major arterials, including the following—north/south: Sepulveda/PCH, Aviation Boulevard, Inglewood Avenue (north of Artesia Boulevard), and Hawthorne Boulevard; east/west: Marine Avenue, Manhattan Beach Boulevard, Artesia Boulevard, Redondo Beach Boulevard, Anita/190th Street (west of Anza Avenue has a reduced weight limitation), and Torrance Boulevard (east of Pacific Coast Highway).

Since commercial uses in the City are concentrated along these major arterial corridors, the truck route designations shown appear to meet current needs. These truck routes are also sufficiently separated from residential areas to prevent excessive conflicts.

Daily Roadway Segment Traffic Volumes

Existing daily traffic volumes for key streets in the City were obtained in 2007. Daily

traffic volumes along Pacific Coast Highway were obtained from the State of California Department of Transportation (Caltrans). To the extent that recent data was available, the daily traffic volumes along these key streets have been summarized in Figure 3. Figure 3 shows that traffic volumes on major and secondary arterial streets generally range between 20,000 and 40,000 vehicles per day (vpd). Collector streets in the City of Redondo Beach generally carry on the order of 5,000 vpd.

Level of Service

Level of Service (LOS) is a qualitative measure used across the traffic engineering and transportation industry to describe the condition of traffic flow within a specified segment of roadway or at an intersection, ranging from excellent conditions (LOS A) to overloaded conditions (LOS F). LOS definitions for signalized intersections are provided in Table 1, and definitions for unsignalized intersections are provided in Table 2. LOS D is generally accepted as a realistic design objective in urban areas, although in certain circumstances other goals and objectives (such as pedestrian safety, or landscaping) may outweigh the decision to accommodate more vehicle traffic.

POLICY: LEVEL OF SERVICE

P9. Where feasible, maintain or achieve LOS D at City intersections.

Redondo Beach has expressed a goal for City intersections not to degrade beyond LOS D. Where intersections currently exceed LOS D, the City will pursue mitigation measures to achieve LOS D. If LOS D is not achievable at an intersection under existing baseline conditions with feasible mitigation, the LOS standard for the intersection will be equal to the 2007/08 intersection LOS.

Public Comments

Several major transportation corridors were identified by community meeting participants as having notable traffic congestion. The following street segments and their intersections were identified as congested:

TABLE 1 LEVEL OF SERVICE DEFINITIONS FOR SIGNALIZED INTERSECTION		
Level of Service	Intersection Capacity Utilization	Definition
A	0.000-0.600	EXCELLENT. No Vehicle waits longer than one red light and no approach phase is fully used.
B	0.601-0.700	VERY GOOD. An occasional approach phase is fully utilized; many drivers begin to feel somewhat restricted within groups of vehicles.
C	0.701-0.800	GOOD. Occasionally drivers may have to wait through more than one red light; backups may develop behind turning vehicles.
D	0.801-0.900	FAIR. Delays may be substantial during portions of the rush hours, but enough lower volume periods occur to permit clearing of developing lines, preventing excessive backups.
E	0.901-1.000	POOR. Represents the most vehicles intersection approaches can accommodate; may be long lines of waiting vehicles through several signal cycles.
F	> 1.000	FAILURE. Backups from nearby locations or on cross streets may restrict or prevent movement of vehicles out of the intersection approaches. Tremendous delays with continuously increasing queue lengths.

Source: *Transportation Research Circular No. 212, Interim Materials on Highway Capacity*
Transportation Research Board, 1980.

TABLE 2 LEVEL OF SERVICE DEFINITIONS FOR UNSIGNALIZED INTERSECTIONS (2000 HIGHWAY CAPACITY MANUAL UNSIGNALIZED METHOD)	
Level of Service	Average Control Delay per Vehicle (seconds)
A	≤ 10.0
B	> 10.0 and ≤ 15.0
C	> 15.0 and ≤ 25.0
D	> 25.0 and ≤ 35.0
E	> 35.0 and ≤ 50.0
F	> 50.0

Source: *Highway Capacity Manual*, Transportation Research Board, 2000.

- Aviation Boulevard
- Inglewood Avenue
- Pacific Coast Highway
- Torrance Boulevard
- Manhattan Beach Boulevard
- 190th Street
- Catalina Avenue from Torrance Avenue to Anita Street
- Rindge Lane from 190th Street to Artesia Boulevard
- 182nd Street at Hawthorne
- Anita Street at Prospect Avenue

Public comments about intersections were often consistent with LOS analysis. 190th Street & Inglewood Avenue was the most commonly mentioned intersection and LOS analysis shows it to be operating at LOS F during both the AM and PM peak hours. After Inglewood Avenue & 190th Street, the most commonly mentioned intersections were Inglewood Avenue & Manhattan Beach Boulevard (LOS E-AM, LOS F-PM), Torrance Boulevard & Prospect Boulevard (LOS D-AM, LOS C-PM), Torrance Boulevard & Pacific Coast Highway (LOS D-AM, LOS E-PM), and Herondo Street & Pacific Coast Highway (LOS E-AM, LOS E-PM).

Suggestions from community members to address congested traffic intersections included:

- additional lanes
- roundabouts
- one-way couplets
- reversible lanes
- additional turn lanes
- extended turn lanes
- signal synchronization
- signal timing
- smart lights
- left-turn signals
- left-turn prohibitions

Additional community recommendations for improving vehicular circulation included grade separation for the railroad line at Inglewood Avenue and Manhattan Beach Boulevard, adding more public parking near Artesia Boulevard, fixing potholes, and improving enforcement of speed limits.

Existing Intersection Analysis

Peak hour turning movement counts were collected between March and September 2007 at 109 intersections in the study area. These counts were used to calculate intersection LOS. During the AM peak hour, as illustrated in Figure 4 and Table 3, 88 intersections operate at LOS D or better, 11 intersections operate at LOS E, and 10 intersections operate at LOS F. During the PM peak hour, 80 intersections operate at LOS D or better, 16 intersections operate at LOS E, and 13 intersections operate at LOS F.

Figure 4 shows that the greatest levels of peak hour congestion are generally experienced at intersections along 190th Street. In addition, Artesia Boulevard, Aviation Boulevard, Inglewood Avenue, and Pacific Coast Highway have at least one intersection operating at LOS E or F in the AM or PM peak hour. Traffic along the coast, by contrast, is less congested, with most intersections on Harbor Drive, Catalina Avenue, and Broadway Avenue operating at LOS A or B.

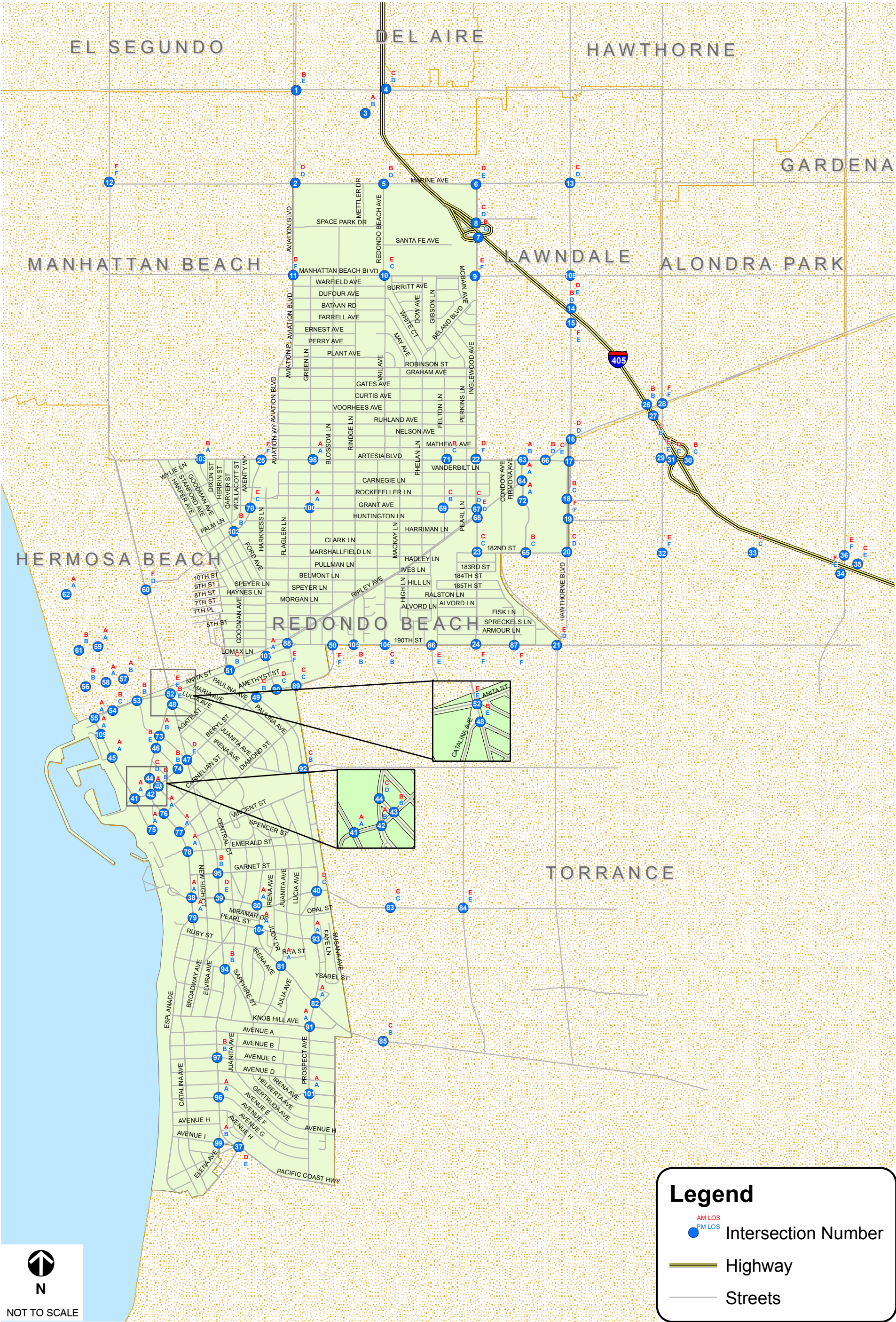


TABLE 3
EXISTING (YEAR 2007) AND FUTURE (YEAR 2030) INTERSECTION LEVELS OF SERVICE

Intersection			2007				2030			
			AM		PM		AM		PM	
Number	Street	Cross Street	LOS	V/C or Delay	LOS	V/C or Delay	LOS	V/C or Delay	LOS	V/C or Delay
1	Aviation Blvd	Rosecrans Av	B	0.683	E	0.918	D	0.889	E	0.986
2	Aviation Blvd	Marine Av	D	0.879	D	0.891	F	1.064	F	1.107
3	Hindry Av	405 SB on-ramp/SB off-ramp	A	0.489	B	0.601	D	0.853	F	1.016
4	405 NB on-ramps	Rosecrans Av	C	0.723	D	0.806	D	0.891	E	0.959
5	Redondo Beach Av	Marine Av	B	0.612	D	0.892	D	0.844	F	1.350
6	Inglewood Av	Marine Av	D	0.872	E	0.953	F	1.153	F	1.131
7	Inglewood Av	405 NB on-ramp/NB off-ramp	B	0.668	C	0.729	D	0.850	D	0.882
8	Inglewood Av	405 SB off-ramp/on-ramp	C	0.749	D	0.850	C	0.798	E	0.916
9	Inglewood Av	Manhattan Beach Blvd	E	0.927	F	1.153	F	1.131	F	1.247
10	Redondo Beach Av	Manhattan Beach Blvd	E	0.919	C	0.798	F	1.147	E	0.978
11	Aviation Blvd	Manhattan Beach Blvd	D	0.858	F	1.033	E	0.957	F	1.128
12	Sepulveda Blvd	Marine Av	F	1.087	F	1.027	F	1.254	F	1.154
13	Hawthorne Blvd	Marine Av	C	0.782	D	0.825	E	0.939	F	1.067
14	Hawthorne Blvd	405 NB on-ramp/off-ramp	B	0.609	D	0.852	C	0.703	E	0.922
15	Hawthorne Blvd	405 SB on-ramp/off-ramp	F	1.142	E	0.922	F	1.203	F	1.019
16	Hawthorne Blvd	Redondo Beach Blvd	D	0.805	D	0.818	F	1.017	F	1.092
17	Hawthorne Blvd	Artesia Blvd	C	0.791	E	0.913	D	0.888	F	1.066
18	Hawthorne Blvd	177th St	B	0.649	C	0.764	B	0.688	E	0.935
19	Hawthorne Blvd	179th St	F	OVRFL *	F	OVRFL *	F	OVRFL *	F	OVRFL *
20	Hawthorne Blvd	182nd St	C	0.711	D	0.830	F	1.011	F	1.020
21	Hawthorne Blvd	190th St	E	0.911	D	0.893	F	1.047	F	1.069
22	Inglewood Av	Artesia Blvd	D	0.896	F	1.023	F	1.150	F	1.253
23	Inglewood Av	182nd St	C	0.714	C	0.742	D	0.828	E	0.903
24	Inglewood Av	190th St	F	1.227	F	1.294	F	1.488	F	1.613
25	Aviation Blvd	Artesia Blvd	F	1.098	F	1.085	F	1.212	F	1.325
26	405 SB off-ramp	Redondo Beach Blvd	B	0.610	B	0.621	C	0.744	D	0.869
27	405 NB on-ramp	Redondo Beach Blvd	C	15.3	B	14.0	C	24.8	D	27.6
28	Prairie Av	Redondo Beach Blvd	F	1.011	F	1.002	F	1.281	F	1.225
29	Prairie Av	Artesia Blvd	E	0.922	E	0.914	E	0.988	E	0.978
30	405 SB on-ramp/off-ramp	Artesia Blvd	B	10.4	C	24.3	B	10.8	D	34.6
31	405 NB on-ramp/off-ramp	Artesia Blvd	D	0.825	C	0.722	D	0.856	D	0.806
32	Prairie Av	182nd St	E	0.906	F	1.005	E	0.947	F	1.084
33	Yukon Av	182nd St	C	0.757	C	0.724	D	0.816	D	0.863
34	Crenshaw Blvd	405 SB off-ramp/on-ramp	F	1.029	E	0.912	F	1.216	F	1.150
35	405 NB on-ramp/off-ramp	182nd St	C	0.761	E	0.955	D	0.872	F	1.109
36	Crenshaw Blvd	182nd St	E	0.930	F	1.016	F	1.044	F	1.153
37	Pacific Coast Hwy	Palos Verdes Blvd	D	0.863	E	0.963	F	1.009	F	1.137
38	Catalina Av	Torrance Blvd	A	0.529	A	0.532	B	0.653	B	0.687
39	Pacific Coast Hwy	Torrance Blvd	D	0.893	E	0.907	F	1.047	F	1.097
40	Prospect Av	Torrance Blvd	D	0.827	C	0.787	E	0.981	F	1.022
41	Harbor Dr	Beryl St/Portofino Wy	A	0.353	A	0.411	A	0.400	B	0.625
42	Catalina Av	Beryl St	A	0.390	B	0.636	A	0.541	E	0.997
43	Broadway	Beryl St	B	11.2	B	12.9	C	18.3	F	184.5
44	Broadway	Catalina Av	C	16.4	D	27.2	C	24.0	F	50.7
45	Harbor Dr	Marina Wy	A	0.361	A	0.516	A	0.563	E	0.913
46	N Catalina Av	N Francisca Av	B	12.7	E	41.7	C	15.8	F	100.5
47	N Pacific Coast Hwy	Beryl St	D	0.856	E	0.953	E	0.903	F	1.100
48	N Pacific Coast Hwy	N Catalina Av	B	0.673	E	0.931	C	0.705	E	0.997
49	Beryl St	Prospect Av	C	0.796	B	0.670	D	0.844	C	0.787
50	Blossom Ln	190th St	F	195.9	F	367.3	F	OVRFL *	F	OVRFL *
51	Prospect Av	Anita St	C	0.713	B	0.611	D	0.850	D	0.844
52	Pacific Coast Hwy	Herondo St	E	0.924	E	0.917	F	1.110	F	1.091
53	Valley Dr	Herondo St	B	12.1	B	14.9	D	26.1	F	65.6
54	Monterey Blvd	Herondo St	B	13.7	C	16.8	C	21.3	F	275.2
55	Harbor Dr	Herondo St	A	0.593	A	0.465	B	0.669	C	0.788
56	Hermosa Av	2nd St	B	11.1	B	10.8	B	11.9	B	13.5
57	Valley Dr	2nd St	A	9.0	B	11.3	C	19.3	D	29.3
58	Monterey Blvd	2nd St	A	8.2	A	8.9	A	8.5	B	13.8
59	Monterey Blvd	8th St	A	8.3	A	8.7	A	8.5	B	10.1

TABLE 3 EXISTING (YEAR 2007) AND FUTURE (YEAR 2030) INTERSECTION LEVELS OF SERVICE										
Intersection			2007				2030			
			AM		PM		AM		PM	
Number	Street	Cross Street	LOS	V/C or Delay	LOS	V/C or Delay	LOS	V/C or Delay	LOS	V/C or Delay
60	Pacific Coast Hwy	Aviation Blvd	F	1.026	D	0.892	F	1.109	F	1.163
61	Hermosa Av	8th St	B	10.8	B	11.0	B	11.5	B	13.0
62	Hermosa Av	Pier Av	A	0.413	A	0.419	A	0.434	A	0.469
63	Kingsdale Av	Artesia Blvd	A	0.577	B	0.645	C	0.709	D	0.806
64	Kingsdale Av	Grant Av	A	0.479	A	0.587	A	0.569	B	0.694
65	Kingsdale Av	182nd St	B	12.1	C	17.5	C	21.9	F	69.1
66	Redondo Beach Blvd	Artesia Blvd	B	0.623	D	0.854	D	0.884	E	0.958
67	Inglewood Av	Grant Av	C	0.799	D	0.849	E	0.906	F	1.053
68	Inglewood Av	Ripley Av	E	45.3	D	30.1	F	103.8	F	668.7
69	Felton Ln	Grant Av	C	0.715	B	0.639	C	0.763	C	0.725
70	Aviation Blvd	Grant Av	C	0.765	C	0.706	D	0.834	D	0.894
71	Felton Av	Artesia Blvd	B	0.697	C	0.754	C	0.781	D	0.859
72	Kingsdale Av	Target Driveway	A	0.243	A	0.501	A	0.259	A	0.581
73	N Gertruda Av	Catalina Av	A	0.413	B	0.601	A	0.544	C	0.763
74	N Francisca Av	Beryl St	B	11.3	B	14.5	B	11.9	D	26.9
75	N Harbor Dr	Pacific Av	A	8.0	A	8.9	A	8.7	B	10.6
76	Camelina St	Catalina Av	A	0.420	A	0.429	A	0.503	A	0.512
77	Diamond St	Catalina Av	A	0.408	A	0.463	A	0.494	A	0.525
78	Emerald St	Catalina Av	A	0.440	A	0.445	A	0.541	A	0.550
79	Pearl St	Catalina Av	A	0.408	A	0.353	A	0.472	A	0.563
80	Camino Real	Torrance Blvd	A	0.494	A	0.523	B	0.600	C	0.703
81	Camino Real	S Juanita Av	A	9.7	A	9.2	B	10.2	B	10.4
82	Camino Real	S Prospect Av	A	0.551	A	0.522	B	0.669	A	0.581
83	Palos Verdes Blvd	Torrance Blvd	C	0.728	C	0.707	C	0.776	D	0.846
84	Anza Av	Torrance Blvd	E	0.926	E	0.999	F	1.044	F	1.225
85	Sepulveda Blvd	Palos Verdes Blvd	C	0.730	B	0.620	E	0.916	C	0.738
86	Anza Av	190th St	E	0.952	E	0.947	F	1.055	F	1.082
87	Firmona Av	190th St	F	198.8	F	231.9	F	OVRFL *	F	939.5
88	Flagler Ln	190th St	E	42.9	F	57.5	F	136.8	F	124.3
89	Flagler Ln	Beryl St	C	16.3	C	17.9	C	22.0	F	58.0
90	Harkness Ln	Beryl St	D	33.2	C	21.2	E	39.4	E	44.0
91	Prospect Av	Knob Hill Av	A	0.403	A	0.419	A	0.484	A	0.481
92	Prospect Av	Del Amo Blvd	C	0.785	B	0.685	F	1.147	F	1.144
93	Prospect Av	Pearl St	A	0.456	A	0.377	A	0.475	A	0.444
94	Pacific Coast Hwy	Saphire St	B	0.629	B	0.688	B	0.681	C	0.766
95	Pacific Coast Hwy	Garnet St	B	0.670	B	0.696	C	0.722	C	0.766
96	Pacific Coast Hwy	Avenue F	A	0.565	A	0.598	B	0.612	B	0.656
97	Pacific Coast Hwy	Avenue C	B	0.626	B	0.638	C	0.709	C	0.728
98	Green Ln	Artesia Blvd	A	0.534	A	0.548	A	0.575	B	0.612
99	Elena Av	Avenue I	A	9.4	B	11.6	B	10.5	B	13.6
100	Green Ln	Grant Av	A	0.573	A	0.562	B	0.637	B	0.637
101	Prospect Av	Palos Verdes Blvd	A	0.453	A	0.455	A	0.531	A	0.519
102	Ford Av	Aviation Blvd	B	0.665	B	0.682	B	0.700	C	0.747
103	Ford Av	Artesia Blvd	B	0.657	A	0.562	B	0.669	B	0.634
104	Camino Real	Pearl St	A	8.6	A	8.4	A	9.0	A	9.0
105	190th St	Rindge Ln	B	0.640	B	0.690	C	0.775	C	0.775
106	190th St	Meyer Ln	C	0.793	B	0.688	E	0.972	D	0.828
107	Anita St	Harkness Ln	A	0.526	A	0.462	B	0.662	A	0.538
108	Manhattan Beach	Hawthorne	D	0.808	E	0.955	F	1.026	F	1.073
109	Harbor Dr	Yacht Club Wy	A	0.402	A	0.506	B	0.669	E	0.925

notes:

Future year Intersection LOS in **bold** indicates that the intersection is forecast to exceed the target LOS of D or better in the future

Future year Intersection LOS in **bold italics** indicates that the intersection is forecast to exceed the target LOS of D or better in the future and was meeting that target in 2007 or the intersection was not meeting the target in 2007 and is forecast to operate at a worse LOS in the future

* Overflow conditions - Delay cannot be accurately calculated.

Future Growth

The 2030 analysis of traffic congestion in Redondo Beach assumes that all land uses have been developed for maximum trip generation. While this full buildout is highly unlikely, it provides an instructive scenario for understanding the transportation implications of future land use.

The 2030 travel demand model for Redondo Beach predicts a 37% increase in average daily traffic (ADT) (Figure 5). Of this increase in traffic, approximately 54% is generated by commercial, office, retail, or restaurant land uses. The remainder is divided among other land uses such as industrial (22%), residential (11%), mixed-use (7%), and public or semi-public use (6%).

During the AM peak hour, for trips that start or end in Redondo Beach, 15% stay inside the City and 85% leave the City. Thirty percent of traffic on the network at this time is “cut-through” traffic—it neither begins nor ends in the City. During the PM peak hour, 20% of trips begin in the City and end in the City, 80% of trips begin in the City and end outside the City, and 29% of all City traffic has neither trip end within City limits.

Future Intersection Analysis

In 2030, increased traffic is expected to degrade LOS throughout the City, as seen in Figure 6 and Table 3. During the AM peak hour, 10 intersections are predicted to operate at LOS E, and 28 are predicted to operate at LOS F, leaving 71 intersections operating at LOS D or better. During the PM peak hour, 14 intersections are expected to operate at LOS E and 44 intersections are expected to operate at LOS F. Of 109 intersections, 51 are predicted to operate at LOS D or better. Traffic continues to operate poorly on 190th Street. In addition, LOS on the following streets is significantly worse than in 2007: Marine Boulevard, Manhattan Beach Boulevard, Artesia Boulevard, Inglewood Avenue, Hawthorne Boulevard, and Torrance Boulevard. Intersections on Harbor Drive, Catalina Avenue, and Broadway Avenue, continues to operate at a comfortable LOS in 2030.

POLICY: LEVEL OF SERVICE SIGNIFICANCE THRESHOLD

P10. A significant traffic impact will result if one of the following three conditions is met:

- 1) 4% increase in the volume to capacity ratio at an intersection when the baseline intersection condition is LOS C
- 2) 2% increase in the volume to capacity ratio at an intersection when the baseline intersection condition is LOS D
- 3) 1% increase in the volume to capacity ratio at an intersection when the baseline intersection condition is LOS E or worse

Traffic Congestion Mitigation

GOAL: SYNCHRONIZE TRAFFIC SIGNALS

G9. To improve vehicular travel, the City supports the implementation of additional traffic signal synchronization to increase throughput capacity.

GOAL: EXPLORE A CITYWIDE TRAFFIC IMPACT MITIGATION FEE

G10. The City should consider establishing a traffic impact fee for new development consistent with State legislation.

