8.9 Traffic and Transportation

This section of the Small Power Plan Exemption (SPPE) Application discusses potential impacts of the proposed Chevron Richmond Refinery Power Plant Replacement Project (PPRP, or the Project) on the existing transportation system. This includes any necessary modifications to the transportation system and increase in traffic from construction and operation of the proposed Project. Descriptions of the existing transportation system and Levels of Service (LOS) are presented, along with an analysis of potential impacts and related mitigation measures.

Section 8.9.1 presents a summary description of the PPRP; Section 8.9.2 describes the affected environment; Section 8.9.3 discusses the environmental consequences of construction and subsequent operation; Section 8.9.4 presents applicable laws, ordinances, regulations and standards (LORS); Section 8.9.5 provides a list of required permits and a schedule for obtaining them; Section 8.9.6 provides a list of involved agencies and agency contacts, and Section 8.9.7 provides reference information on the works cited in this section.

8.9.1 Introduction

Chevron is proposing the PPRP to add an additional 60 megawatts (MW) net generation to its existing refinery electrical generation located within Chevron's Richmond Refinery in the City of Richmond (see Figure 1.2-1) in Contra Costa County, California. The proposed PPRP will be integrated into Chevron's plans to meet its growing refinery electrical load, and produce steam to replace an existing boiler plant that is approaching its end of life. The PPRP is a subset of the larger Richmond Refinery Renewal Project that is concurrently undergoing California Environmental Quality Act (CEQA) review by the City of Richmond. The California Energy Commission (CEC) has jurisdiction for only the PPRP portion of the Renewal Project that is the subject of this application.

The PPRP will consist of the following components:

- A nominal 43-MW net, natural gas- or liquid petroleum gas (butane)-fired cogeneration train consisting of one combustion turbine generator (CTG), a refinery fuel gas-fired heat recovery steam generator, 13.8-kV switchgear and ancillary equipment.
- Shutdown of the existing No. 1 power plant refinery steam boilers currently providing steam to the Refinery.
- A 17-MW net extraction, condensing steam turbine generator (STG), an associated cooling tower, and 12-kV switchgear installed as part of the new hydrogen production facility (the remainder of the hydrogen plant is under CEQA review as part of the Renewal Project). The new hydrogen plant will be a net generator of steam for both the STG and the Refinery steam system.
- Reconductoring of approximately 4,000 feet of existing onsite double-circuit overhead 115-kV transmission line to upgrade its ampacity. The reconductoring will reuse existing transmission line structures.

- Adjacent onsite service connections for fuel, reclaimed water, water, wastewater, steam, and electricity to existing piperacks, with the exception of the reconductoring noted above.

The Cogen 3000 portion of the PPRP will occupy approximately 0.5 acre within an existing 5.2-acre cogeneration facility, and the STG and associated equipment (H_2-STG) will occupy approximately 0.5 acre within a new 7.9-acre hydrogen plant that will be built as part of the Richmond Refinery Renewal Project. The PPRP will be located well within the heart of the existing 2,900-acre Richmond Refinery. Temporary construction laydown and parking for the PPRP will be provided in various existing laydown areas within the Refinery that are currently used for ongoing maintenance and project laydown. A complete description of the PPRP is provided in Section 2.0.

8.9.2 Affected Environment

The proposed PPRP is located within the existing Chevron Richmond Refinery boundaries, along the western edge of the City of Richmond, in Contra Costa County, California, at 841 Chevron Way. The approximately 2,900-acre existing Refinery occupies most of the Point San Pablo Peninsula with east and south boundaries in the vicinities of the residential communities of North Richmond and Point Richmond, respectively. The main portion of the Refinery lies within the City's M-3, Heavy Industrial Zoning District.

The Refinery is located west of Castro Street and mostly to the north of Interstate 580 (I-580). All construction would take place within the Refinery boundaries. Any required parking, staging, fabrication, or laydown areas would also be within Refinery boundaries.

This section describes the existing regional and local roadways. Figure 8.9-1 illustrates the major roads, potential access roads, and highways in the PPRP vicinity.

8.9.2.1 Surrounding Roadway Network

The PPRP employees and construction workers commuting during the construction of the Project may affect the roadways in the vicinity of the Project site. Regional access to the PPRP site is provided via I-580, which connects to I-80. Local access to the PPRP site is provided via Castro Street and Richmond Parkway. The affected roadways are described below.

- I-580 is a generally east-west freeway that connects I-80 to the east and Highway 101 in Marin County to the west, via the Richmond-San Rafael Bridge. In the vicinity of the Project site, I-580 is a six-lane freeway. The PPRP can be accessed via the interchange at Castro Street. I-580 is a designated Route of Regional Significance in the City of Richmond General Plan (City of Richmond, 2006) and other regional planning documents.
- I-80 is an east-west freeway that connects Sacramento to the east and the San Francisco Bay Area to the south and west. In the vicinity of the Project site, I-80 is an eight-lane freeway with one HOV lane in each direction. The PPRP can be accessed via an interchange at Richmond Parkway. I-80 is a designated Route of Regional Significance in the City of Richmond General Plan and other regional planning documents.

- Richmond Parkway is a major four- to six-lane divided roadway, which connects I-580 and I-80. Before connecting with I-580, Richmond Parkway splits into two parallel segments, Castro Street and Garrard Boulevard. Richmond Parkway is the only parkway in the City of Richmond, and it is a designated Route of Regional Significance in the City of Richmond General Plan and other regional planning documents.
- Castro Street is a four-lane divided secondary thoroughfare that provides direct access to I-580 to the south, and connects to Richmond Parkway to the north. Refinery Access Gate 31 (Mills Street) and Gate 91 (General Chemical Access), which would be used during Project construction, are located on Castro Street. Castro Street is also a designated Route of Regional Significance.
- Other roadways in the Project vicinity are mostly two- to four-lane local roadways that provide access to a residential area south of I-580 and to industrial sites surrounding the PPRP.

Table 8.9-1 provides characteristics of roadways in the Project vicinity, including annual average daily traffic (AADT), annual average peak hour traffic, and percent of truck traffic. Existing daily average and peak volumes on selected roadway segments were obtained from Caltrans (2006) and the City of Richmond (2006).

TABLE 8.9-1
Characteristics of Roadways in the Project Area

Roadway Segment	Between	Road Class	Median	Number of Lanes	AADT	Peak Hour	Truck Percentage
I-580	Western Drive and Harbour Way	Freeway (RRS)	Divided	6	54,000	4,200	4%
I-80	Appian Way and Hilltop Drive	Freeway (RRS)	Divided	8	190,000	11,900	6%
Richmond Parkway	I-80 and Castro Street	Parkway (RRS)	Divided	4	32,800	N/A	N/A
Castro Street	Richmond Parkway and I-580	Secondary Thoroughfare	Divided	4	27,200	N/A	N/A

Notes:
AADT = Average Annual Daily Traffic
RRS = Route of Regional Significance
N/A = not available
Freeways are roadways whose principal function is to serve regional and inter-city trips.
Parkways are highways that provide movement of through traffic at speeds exceeding those acceptable on other surface streets. Access is controlled and at-grade crossings are permitted.
Secondary Thoroughfares are roadways that serve as a connection between major land use areas and facilities and between major circulation elements such as freeways, major thoroughfares and transit stations.
Sources: Caltrans, 2006; City of Richmond, 2006.

8.9.2.2 Existing Traffic Conditions

Table 8.9-2 lists the existing AADT, design capacities, volume-to-capacity (V/C) ratios, and LOS on the roadway segments that may be affected by the Project during construction and

operation. Freeway capacities were based on 24,000 vehicles/lane/day, and Richmond Parkway and Castro Street capacities were based on 12,000 vehicles/lane/day.

TABLE 8.9-2
Existing Roadway Segment Traffic Conditions in the Project Area

Roadway Segment	Between	AADT	Roadway Capacity	V/C	LOS
I-580	Western Drive and Harbour Way	54,000	144,000	0.38	A
I-80	Appian Way and Hilltop Drive	190,000	192,000	0.99	E
Richmond Parkway	I-80 and Castro Street	32,800	48,000	0.57	A
Castro Street	Richmond Parkway and I-580	27,200	48,000	0.68	B

Notes:
AADT = Average Annual Daily Traffic
V/C = Volume-to-Capacity Ratio
LOS = Level of Service

LOS Criteria for Urban Streets, Highway Capacity Model (Transportation Research Board, 2000):
A 0.00 – 0.60 Free flow; insignificant delays
B 0.61 – 0.70 Stable operation; minimal delays
C 0.71 – 0.80 Stable operation; acceptable delays
D 0.81 – 0.90 Approaching unstable; queues develop rapidly but no excessive delays
E 0.91 – 1.00 Unstable operation; significant delays
F > 1.00 Forced flow; jammed conditions

Sources: Caltrans, 2006; City of Richmond, 2006.

The Countywide Comprehensive Transportation Plan and the West Contra Costa Action Plan set Traffic Service Objectives (TSOs) for the Routes of Regional Significance. TSOs relevant to the PPRP are to achieve LOS E or better on all segments of I-580, to maintain LOS E on all segments of I-80, and to maintain LOS D or better on all segments of Richmond Parkway. Currently, all Routes of Regional Significance potentially affected by the PPRP meet the applicable TSOs. Castro Street operates at LOS B, which is acceptable stable operation with minimal delays.

To provide a more detailed assessment of the potential impacts of PPRP employees and construction workers, the following eleven intersections were evaluated:

- Chevron Way/Marine Street
- Castro Street/Tewksbury Avenue
- Marine Street/I-580 Eastbound Off-Ramps
- Castro Street/I-580 Eastbound Ramps
- Castro Street/Chevron Way
- Castro Street/ I-580 Westbound Ramps (Gate 14)
- Castro Street/Mills Street (Gate 31)
- Castro Street/General Chemical Access (Gate 91)
- Castro Street/Hensley Street
- Richmond Parkway/Hensley Street
- Richmond Parkway/Gertrude Avenue

Existing morning and afternoon peak-hour turning movement volumes for the adjacent street system at these intersections were obtained from the City of Richmond. Traffic volumes for the study intersections were collected in May 2005. Existing intersection configurations are illustrated in Figure 8.9-2. Existing morning and afternoon peak-hour turning movement counts are presented in Figure 8.9-3.

The City of Richmond uses the intersection LOS analysis method from the Highway Capacity Manual (Transportation Research Board, 2000). The LOS rating ranges from LOS A, which represents free-flow conditions, to LOS F, which represents long delays, as shown in Table 8.9-3. For signalized and four-way stop controlled intersections, LOS is based on average delay (in seconds per vehicle) for the overall intersection. For side-street stop controlled intersections, the average delay and LOS are reported for the movements subject to delay by conflicting vehicles (i.e., vehicles on the side street(s) and vehicles making left turns on the major street).

TABLE 8.9-3
Definition for Intersection Level of Service

LOS	Delay (seconds per vehicle)	Description
Unsignalized Intersections		
A	≤ 10.0	Little or no delays
B	10.1 to 15.0	Short traffic delays
C	15.1 to 25.0	Average traffic delays
D	25.1 to 35.0	Long traffic delays
E	35.1 to 50.0	Very long traffic delays
F	> 50.0	Extreme traffic delays with intersection capacity exceeded
Signalized Intersections		
A	< 10.0	Progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
B	> 10.0 to 20.0	Progression is good, cycle lengths are short, or both. More vehicles stop than with LOS A, causing higher levels of average delay.
C	> 20.0 to 35.0	Higher congestion may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level, though many vehicles still pass through the intersection without stopping.
D	> 35.0 to 55.0	The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, and/or high volume-to-capacity (V/C) ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	> 55.0 to 80.0	This level is considered by many agencies to be the limit of acceptable delay. High delay values generally indicate poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.
F	> 80.0	This level is considered unacceptable with oversaturation, which is when arrival flow rates exceed the capacity of the intersection. This level may also occur at high V/C ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be contributing factors to such delay levels.

Sources: City of Richmond, 2006; Contra Costa County Transportation Authority, 2006.

The Chevron Way/Marine Avenue intersection is side-street stop controlled and the Castro Street/Tewksbury Avenue intersection is all-way stop controlled. All other intersections are signalized. Table 8.9-4 presents the results of the intersection LOS analysis for the morning (7:00 AM to 9:00 AM) and evening (4:00 PM to 6:00 PM) peak periods. The City of Richmond General Plan Circulation Element and Contra Costa County classify intersection operating conditions as acceptable if at LOS D or better. During the weekday morning peak hour all intersections operate at an acceptable LOS (LOS A to LOS D). During the weekday afternoon peak hour all intersections operate at an acceptable LOS except for the Castro Street / I-580 Westbound Ramps intersection, which operates at LOS E.

TABLE 8.9-4
Existing Intersection Level of Service

Intersection	Traffic Control[a]	AM Delay[b]	AM LOS	PM Delay[b]	PM LOS
Chevron Way/Marine Street	SSSC	10.0	B	10.5	B
Castro Street/Tewksbury Avenue	AWSC	8.8	A	9.1	A
Marine Street/I-580 Eastbound Off-Ramps	Signal	12.1	B	18.2	B
Castro Street/I-580 Eastbound Ramps	Signal	12.8	B	30.5	C
Castro Street/Chevron Way	Signal	0.1	A	0.1	A
Castro Street/ I-580 Westbound Ramps (Gate 14)	Signal	31.5	C	**60.7**	**E**
Castro Street/Mills Street (Gate 31)	Signal	2.7	A	22.1	C
Castro Street/General Chemical Access (Gate 91)	Signal	6.6	A	31.4	C
Castro Street/Hensley Street	Signal	3.2	A	5.8	A
Richmond Parkway/Hensley Street	Signal	16.6	B	16.8	B
Richmond Parkway/Gertrude Avenue	Signal	38.6	D	42.7	D

Notes:

[a] SSSC = side-street stop-controlled intersection; AWSC = all-way stop controlled intersection; Signal = traffic signal-controlled intersection

[b] Average overall intersection control delay (seconds per vehicle) reported for signalized and all-way stop-controlled intersections. Average delay on highest-delay movement/approach reported for side-street stop-controlled intersections.

Bold text – Unacceptable LOS

Source: Wilbur Smith Associates, 2007.
Existing peak-hour traffic volumes collected in May 2005. Review on more recent traffic volume data indicates that the 2005 volumes remain valid for the analysis presented.

8.9.2.3 Public Transportation

Public transit service in the City of Richmond includes Bay Area Rapid Transit (BART), bus services and passenger rail. Figure 8.9-4 shows public transit in the vicinity of the PPRP site.

BART is the commuter rail system in the San Francisco Bay Area, which operates two lines, Richmond-Fremont and Richmond-Daly City/Colma, in the City of Richmond. The Richmond and El Cerrito del Norte stations are located approximately 1.5 and 3.5 miles east of the Project site, respectively. In general, both lines provide service at least every 15 minutes.

Alameda-Contra Costa Transit District (AC Transit) serves 13 cities and adjacent unincorporated areas in Alameda County and Contra Costa County. AC Transit operates nine local routes in Richmond. Bus Line 72M runs between the Richmond and El Cerrito del Norte BART stations and terminates at Castro Street and Tewksbury Avenue in the immediate vicinity of the Project site. Bus Line 72M runs approximately every 30 minutes. Two Golden Gate Transit bus lines also provide service in the City of Richmond. Line 40 and Line 42 connect the Richmond and El Cerrito del Norte BART stations and San Rafael via the Richmond-San Rafael Bridge. The nearest bus stop to the Project site is at Castro Street and Tewksbury Avenue and the service is provided approximately every 30 minutes.

Amtrak's Capitol Corridor and San Joaquin routes provide intercity rail service between Richmond, Sacramento, San Jose, Stockton, Fresno and Bakersfield. The nearest Amtrak station is located adjacent to the Richmond BART station. Approximately 24 passenger trains serve Richmond on a typical weekday.

8.9.2.4 Bicycle Facilities

The City of Richmond Redevelopment Department (City of Richmond, 2006) and Contra Costa Countywide Bicycle and Pedestrian Plan (CCTA, 2003) identify existing bicycle facilities throughout the city. Existing off-street and on-street bicycle path runs along

Garrard Boulevard, approximately one-quarter of a mile southwest of Castro Street and the Project site. This bicycle path is a segment of the San Francisco Bay Trail, a planned 400-mile bicycle network around San Francisco Bay and San Pablo Bay.

8.9.2.5 Railway Operations

The City of Richmond is served by Burlington Northern Santa Fe (BNSF), Union Pacific (UP) and Richmond Pacific (RP) railroads.

BNSF operates about 20 trains on a typical weekday with train lengths varying from 10 to 100 cars. Trains travel up to 55 miles per hour (mph) on tracks north of Garrard Boulevard and 10 mph south of Garrard Boulevard.

UP operates about 43 trains per day. UP owns the Capitol Corridor tracks that passenger trains use on a daily basis. The tracks run parallel to Carlson Boulevard and Rumrill Boulevard toward Point Pinole. Amtrak passenger trains travel up to 70 mph and the UP freight trains travel up to 55 mph.

RP operates two trains per day with 10 to 20 cars on the tracks between Richmond Parkway and Rumrill Boulevard and up to 32 trains per day with 2 to 20 cars on the tracks between South 4th Street and Regatta Boulevard.

8.9.2.6 Truck Traffic

Castro Street and Richmond Parkway are two out of 28 designated truck routes in the City of Richmond. Several of these routes are located in the Project vicinity and/or serve the existing Chevron facility. Many routes are located south of I-580 with a convenient access to port terminals on the Richmond Harbor. The routes also extend to other parts of Richmond, including I-580, I-80, Hilltop Mall area, and Richmond Parkway.

All operators of trucks exceeding the maximum allowable weight load and size standards (as specified in Section 8.9.4, Laws, Ordinances, Regulations, and Standards) are required to obtain applicable permits prior to operating vehicles on state and local roadways.

8.9.2.7 Site Access

The proposed route for access to the PPRP site for construction and operational activities and for truck routes will be from I-580 to Castro Street (at the Castro Street/Marine Street interchange) and from I-80 to Richmond Parkway (at the Richmond Parkway/Fitzgerald Drive interchange) and Castro Street. Project access will be primarily at Gate 91 on Castro Street.

8.9.2.8 Other Development Projects

Other planned and approved development projects in the City of Richmond are expected to generate traffic in the year 2008. The volumes were developed using the Contra Costa County Transportation Authority travel demand model (CCTA model). Table 8.9-5 summarizes the key information about the planned and approved development projects to be constructed from year 2005 to 2008. A complete list of the development projects can be found in the Appendix 8.9-A (Table 8.9-A1).

TABLE 8.9-5
List of Planned and Approved Projects in the City of Richmond

Item	Date	Land Use	Unit	Rate	ADT	Description
1	1/20/2005	warehouse	8,405 SF	5	42	Florida Avenue (100) - Construction of two new industrial warehouse buildings (4,625 SF & 3,780 SF)
2	2/10/2005	single family	1	9.57	10	2112 Rheem Av - Construction of a new 510 SF detached second dwelling unit
3	2/16/2005	office	1	9.57	10	465 2nd St - Construction of a 1,735 SF two-story, live/work unit on a 2,950 SF parcel
4	2/16/2005	single family	1	9.57	10	Florida Av (3100) Construct new residence (infill housing initiative)
5	3/3/2005	single family	1	9.57	10	11 Dipper Ct - Construction of a new 3,900 SF single-family residence
6	3/3/2005	single family	1	9.57	10	9 Dipper Ct - Construction of a new 3,212 SF single-family residence
7	3/3/2005	single family	1	9.57	10	4103 Nevin Av - Construction of a new 630 SF single-story second dwelling unit
8	3/14/2005	single family	1	9.57	10	1328 Pelican Wy - Construct new residence
9	3/15/2005	single family	1	9.57	10	Filbert St (1300) - Construct new residence
10	3/23/2005	single family	1	9.57	10	32nd St (400) - Construct new residence
11	3/24/2005	single family	1	9.57	10	2543 Clinton Av - Construct new residence
12	5/17/2005	single family	1	9.57	10	Willard Av (200) - Construct new residence
13	5/17/2005	single family	1	9.57	10	153 Harbour Wy S - Construct new single-family home of 1,918 SF
14	5/26/2005	single family	1	9.57	10	239 17th St - Construct new residence

TABLE 8.9-5
List of Planned and Approved Projects in the City of Richmond

Item	Date	Land Use	Unit	Rate	ADT	Description
15	5/27/2005	single family	1	9.57	10	1525 Hayes St - Construction of a new 577 SF single-story second dwelling unit
16	6/1/2005	single family	1	9.57	10	Garvin Av (2300) - Construct a new duplex
17	6/3/2005	single family	1	9.57	10	S 5th St - Construct new residence
18	6/6/2005	single family	1	9.57	10	366 S 50th St - Construct new residence
19	6/15/2005	single family	1	9.57	10	384 S 34th St - Construct new residence
20	6/24/2005	apartment	6	6.72	40	Cutting Bl (2000) - Construct a 3 story apartment building consisting of 6 units
21	6/30/2005	single family	1	9.75	10	1324 Pelican Wy - Construct new residence
22	7/8/2005	single family	1	9.75	10	236 1st St - Construct new residence
23	8/15/2005	single family	1	9.57	10	1226 Filbert St - Construct new residence
24	9/13/2005	single family	2	9.57	19	Maine Av - Construct 2 single-family residences
25	11/18/2005	single family	1	9.75	10	414 Ripley Av - Construct new residence
26	12/12/2005	single family	1	9.75	10	9th St - Construct new residence
27	12/12/2005	single family	1	9.75	10	425 Bissell Av - Construct new residence
28	12/16/2005	single family	1	9.57	10	6333 Jerilynn Av - Construct a new 7,042 SF single-family residence including garage, carport and interior second dwelling unit
29	12/27/2005	single family	2	9.57	19	253 S 3rd St - Construct 2 1,903 SF single-family dwellings on a 5,625 SF vacant lot, including 3 bedrooms, 2.5 baths, a kitchen, living room, dining room and single car garage
30	1/4/2006	single family	1	9.57	10	124 4th St - Construct a 2,096 SF 2 story single family dwelling
31	1/24/2006	single family	1	9.57	10	8th St - Construct a new 1,600 SF single-family residence
32	2/3/2006	single family	1	9.57	10	1317 Garvin Av - Construct a new duplex residence
33	2/22/2006	townhome	11	5.86	64	Nevin Av - Approval of 11 townhomes situated on a 14,450 SF lot
34	3/17/2006	retail/senior house	2,000 SF, 66 units	11.1/ 3.71	267	300 Macdonald Av - Construct 2 buildings consisting of one 35,582 SF building containing 2,000 SF of retail space, 39 senior housing units and a 28,151 SF building providing 27 senior housing units
35	5/3/2006	single family	1	9.57	10	325 Willard Av - Construct new residence
36	5/3/2006	single family	1	9.57	10	4401 Jenkins Wy - Construct new residence
37	5/3/2006	single family	1	9.57	10	414 Willard Av - Construct new residence
38	5/5/2006	single family	1	9.57	10	326 332nd St - Construct new residence
39	5/24/2006	warehouse	7,200 SF	4.96	36	235 S 1st St - Construct a 72,000 SF warehouse building, parking and landscaping and remove 2 metal buildings

TABLE 8.9-5
List of Planned and Approved Projects in the City of Richmond

Item	Date	Land Use	Unit	Rate	ADT	Description
40	5/24/2006	single family	1	9.57	10	1603 Garvin Av - Construct a new single-family residence on a substandard lot
41	6/1/2006	condominiums	237	5.86	1,389	1029, 1305 Macdonald Av - Construct a mixed-use development for 237 condominium units and 24,000 SF of commercial space on 2 city blocks, includes a request for a Density Bonus with City concessions
42	6/22/2006	office	4,968 SF	11.1	55	761 23rd St - Construct a 2-story office building with four individual commercial office spaces totaling 4,968 SF
43	8/14/2006	apartment + medical	27 units, 9,575 SF	6.72/ 36.13	527	100 Macdonald Av - Construct a 3-story, 35-foot high mixed-use development consisting of 27 low-income residential units, common rooms, and a 9,575 SF medical office building
44	8/18/2006	single family	1	9.57	10	2000 Visalia Av - Construct a single-story 639 SF second dwelling unit
45	10/19/2006	retail/office	2,112 SF	11.1	23	807 23rd St - Construct a new 2,112 SF single-story retail/office building on an existing vacant infill lot

Notes:

After examination of the forecast growth rates in the CCTA model, it has been determined that the growth forecasts accurately included all of the above projects. A growth factor has then been applied to existing traffic volumes to develop future (Year 2008) traffic volumes.

ADT = Average Daily Trips

SF = square feet

ADT has been obtained by multiplying the number of units by the trip generation rate ('rate' here, in trips per day per unit)

Source: Wilbur Smith Associates, 2007.

8.9.2.9 Public Safety

Railroad crossings are the roadway features in the vicinity of the Project that could affect public safety. Figure 8.9-5 shows the railroad crossings that may have an increase in traffic from Project construction or operation. The crossings at Hensley Street and two crossings on Castro Street have full crossing protection with gates and red signaling lights. Crossing at Mills Street is not protected. All four crossings are at grade.

8.9.3 Environmental Consequences

The impact of the Project is measured by the potential change in the LOS of surrounding roadway segments and intersections caused by the Project. Traffic generated by the Project is added to the existing volumes, and the resulting impacts are assessed.

8.9.3.1 Significance Criteria

The proposed Project would result in significant transportation impacts if it:

- Worsens intersection operating conditions to LOS E or F.
- Results in projected parking demand that would exceed the proposed parking supply on a regular and frequent basis.
- Results in potential conflicts for pedestrians or bicyclists.
- Increases transit demand above the levels provided by local transit operators or agencies.
- Causes substantial damage or wear of public roadways by increased movements of heavy vehicles.

8.9.3.2 Traffic Impact Analysis Methodology

The revised Administrative Draft Environmental Impact Report (ADEIR) of March 2007 (ESA, 2007) presents the traffic impact analysis of the Chevron Energy and Hydrogen Renewal Project, of which the PPRP is a part. Its trip generation/distribution has been incorporated to the present discussion, since potential mitigation measures cannot be applied solely to the PPRP's portion of the trips, while ignoring the remainder.

Trip Generation

Three primary sources of traffic generation at the Chevron facility have been identified over the 60-month construction period of the proposed Project:

- Construction of the proposed Project (2008).
- Construction traffic from other ongoing projects at the site.
- Major turnarounds associated with usual periodic Refinery maintenance.

The peak construction period will be the first quarter of 2008, so the year of interest for the study will be 2008. This will ensure that the worst-case scenario has been analyzed. The two other sources of traffic will be used in the 2008 cumulative impacts analysis. In 2025, the Refinery is expected to be fully operational. Therefore, the following scenarios have been delineated:

- 2008 Baseline conditions.
- 2008 Baseline plus proposed Project construction conditions.
- 2008 Baseline plus proposed Project construction plus other projects construction conditions.
- 2008 Baseline plus proposed Project construction plus other projects construction plus major Refinery turnaround conditions.
- Future 2025 conditions, assuming normal Refinery operations.

Table 8.9-6 presents the estimated increase in peak daily traffic during the entire construction period.

TABLE 8.9-6
Chevron Richmond Refinery Renewal Project, Other Projects, Major Turnarounds, and Refinery Operations Estimated Daily Trip Generation by Quarter

Year	2007				2008				2009				2010				2011	2012	2013
Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	x4[b]	x4[b]	x4[b]
Worker Vehicles[a]																			
Proposed Project Construction																			
Craft labor vehicle traffic[c]	35	35	376	1,437	1,556	1,506	1,167	736	673	673	673	673	147	72	72	72	72	-	-
Construction support[d]	1	1	9	36	39	38	29	18	17	17	17	17	4	2	2	2	2	-	-
Total Proposed Project Autos per day[e]	**36**	**36**	**385**	**1,473**	**1,595**	**1,544**	**1,196**	**754**	**690**	**690**	**690**	**690**	**151**	**74**	**74**	**74**	**74**	**-**	**-**
Other Projects																			
Craft labor vehicle traffic[c]	145	318	268	97	116	143	143	132	88	88	88	88	88	88	88	88	-	28	-
Miscellaneous turnaround support[d]	4	8	7	2	3	4	4	3	2	2	2	2	2	2	2	2	-	1	-
Total Other Project Autos per day	149	326	275	99	119	147	147	135	90	90	90	90	90	90	90	90	-	29	-
Major Refinery Turnarounds[f]																			
Craft labor vehicle traffic[c]	667	-	-	83	333	83	83	83	500	83	-	83	667	500	-	83	625	333	333
Miscellaneous turnaround support[d]	16	-	-	16	16	16	16	16	8	8	-	8	8	8	-	8	30	18	18
Total Turnaround Autos per day	683	-	-	99	349	99	99	99	508	91	-	91	675	508	-	91	655	351	351
Total Auto Vehicle one-way trips per day	*867*	*362*	*660*	*1,672*	*2,063*	*1,789*	*1,441*	*988*	*1,288*	*872*	*780*	*726*	*916*	*672*	*164*	*255*	*729*	*380*	*351*
Vehicle Summary By Refinery Gate																			
Gate 91 (construction and turnaround contractors)	815	340	620	1,572	1,815	1,574	1,311	899	1,005	680	608	566	861	632	154	240	685	357	330
Gate 31 (construction and turnaround support)	52	22	40	100	248	215	130	89	283	192	172	160	55	40	10	15	44	23	21
Trucks[a]																			
Proposed Project Construction																			
Materials traffic (one-way truck trips)	2	2	242	59	86	67	83	30	32	30	30	30	8	4	4	4	4	-	-
Total Proposed Project Passenger Car Equivalent (PCE) per day[e, h]	**4**	**4**	**484**	**118**	**172**	**134**	**166**	**60**	**64**	**60**	**60**	**60**	**16**	**8**	**8**	**8**	**8**	**-**	**-**
Other Projects																			
Materials traffic (one-way truck trips)	18	18	20	6	12	8	138	138	4	4	4	4	4	4	4	4	-	6	-
Total Other Projects PCE per day[h]	36	36	40	12	24	16	276	276	8	8	8	8	8	8	8	8	-	12	-
Major Refinery Turnarounds[f]																			
Materials traffic (one-way truck trips)	20	-	-	12	12	10	10	10	15	12	-	12	20	15	-	10	20	20	20
Total Turnaround PCE per day[h]	40	-	-	24	24	20	20	20	30	24	-	24	40	30	-	20	40	40	40

TABLE 8.9-6
Chevron Richmond Refinery Renewal Project, Other Projects, Major Turnarounds, and Refinery Operations Estimated Daily Trip Generation by Quarter

Year	2007				2008				2009				2010				2011	2012	2013
Quarter	**1st**	**2nd**	**3rd**	**4th**	**1st**	**2nd**	**3rd**	**4th**	**1st**	**2nd**	**3rd**	**4th**	**1st**	**2nd**	**3rd**	**4th**	**x4[b]**	**x4[b]**	**x4[b]**
Proposed Project Operation[g]																			
Post-construction increase in sulfur product trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20	20	20
Post-construction new liquid oxygen trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14	14	14
Total Project Operations PCE per day	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**68**	**68**	**68**
Total Truck one-way PCE per day	*80*	*40*	*524*	*154*	*220*	*170*	*462*	*356*	*102*	*92*	*68*	*92*	*64*	*46*	*16*	*36*	*116*	*120*	*108*
Truck (PCE) Summary By Refinery Gate																			
Gate 31 (construction and turnaround materials, and refinery operation deliveries)	80	40	524	154	220	170	332	226	102	92	68	92	64	46	16	36	116	120	108
Gate 67 (Castro Cove remediation)	-	-	-	-	-	-	130	130	-	-	-	-	-	-	-	-	-	-	-
Total Proposed Project Construction PCE Volumes [e]	**40**	**40**	**869**	**1,591**	**1,767**	**1,678**	**1,362**	**814**	**750**	**754**	**750**	**750**	**167**	**82**	**82**	**82**	**82**	**0**	**0**
Total Volumes	**947**	**402**	**1,184**	**1,826**	**2,283**	**1,959**	**1,903**	**1,344**	**1,390**	**964**	**848**	**818**	**980**	**718**	**180**	**291**	**845**	**500**	**459**

Notes:

[a] All vehicle and truck trips are shown as one-way trips per day. A round trip equals two trips.

[b] Volumes in these columns are typical for all quarters of the year.

[c] Based on carpooling with 1.2 people per car. Each person makes two trips per day.

[d] Miscellaneous construction support include lunch wagons, fueling, parts runs, etc.

[e] Construction related trips (either vehicle or Passenger Car Equivalent [PCE]) equals ONLY Renewal Project traffic. This is the basis for traffic impact evaluations and is underlined above.

[f] Major turnarounds are shown to provide an idea of total variability in refinery traffic and do not result from the Renewal Project. Totals reflect peak periods, and therefore are not at these levels for the entire quarter. Estimated durations of turnarounds vary from 18 to 38 days per turnaround. 2010-2012 period shows selected peak future quarters with projected turnaround activity and Renewal Project in operation. Turnaround schedules are subject to change (estimated traffic is based on Richmond Refinery Long Range Shut Down Schedule, as of January 29, 2007).

[g] Numbers shown are changes from current operation. One trip per day represents one truck about every other day.

[h] PCE factor represents the number of passenger cars displaced by each truck in the traffic stream. One truck is the equivalent of two passenger cars in this analysis, per HCM 2000.

Source: Wilbur Smith Associates, 2007.

Table 8.9-7 presents the AM and PM peak hour traffic generation estimate for the various sources of traffic during peak construction activity. The construction of the Renewal Project is anticipated to generate a maximum of 485 AM peak hour and 399 PM peak hour trips.

TABLE 8.9-7
Traffic Generation Estimates – 1st Quarter of 2008

Project	Type	Daily (ADT)	AM Peak Hour (Veh/Hour)		PM Peak Hour (Veh/Hour)	
			In	Out	In	Out
Construction	Vehicle	1,595	399	0	0	399
	Trucks	172	86	0	0	0
	Subtotal	*1,767*	*485*	*0*	*0*	*399*
Other Projects	Vehicle	119	30	0	0	30
	Trucks	24	12	0	0	0
	Subtotal	*143*	*42*	*0*	*0*	*30*
Major Refinery Turnaround	Vehicle	349	87	0	0	87
	Trucks	24	12	0	0	0
	Subtotal	*373*	*99*	*0*	*0*	*87*
TOTAL		**2,283**	**626**	**0**	**0**	**516**

Notes:
ADT = Average Daily Traffic
For peak hour trip generation, assume all inbound trips occur during the AM peak hour and all outbound trips occur during the PM peak hour, as shown:

- Half of the vehicle trips arrive at 6:00 AM for a 10-hour shift, departing at 4:00 PM
- Half of the vehicle trips arrive at 7:00 AM for a 10-hour shift, departing at 5:00 PM
- Assume all trucks are inbound in the AM and outbound in the PM
- Assume half trucks arrive at 7:00 AM and depart at 3:00 PM, half arrive at 6:00 AM and depart at 2:00 PM.

Source: Wilbur Smith Associates, 2007.

Trip Distribution

The trip distribution of the construction vehicle-related trips was based on the existing directional split of the vehicles currently entering/leaving Gate 91 from/to north and south. A previous study for the Chevron Refinery, the Cleaner Fuels Project Circulation Analysis (Wilbur Smith Associates, 1993) was used to identify the trip distribution of the construction-related trucks. The trip distribution is shown in Table 8.9-8.

TABLE 8.9-8
Trip Distribution

Trips	North	South
Vehicle	80%	20%
Truck	20%	80%

Sources: Wilbur Smith Associates, 1993; Wilbur Smith Associates, 2007.

Trip Assignment

The AM and PM peak-hour construction volumes were assigned to the road network according to the patterns described in Table 8.9-8, and assigned to Gates 91, 31 and 67, with the majority of the trips oriented to/from Gate 91.

8.9.3.3 Traffic Study Results

2008 Baseline Conditions

Table 8.9-4 includes a summary of the intersection operations analysis for the weekday AM and PM peak hours under Year 2008 conditions. All intersections except one will operate at LOS D or better. The intersection at Castro Street/I-580 westbound ramps will operate at LOS E during the PM peak.

2008 Baseline Plus Project Conditions

The assigned Project trips were added to 2008 Baseline AM and PM peak-hour volumes to derive the 2008 with-Project traffic volumes and to determine Project-specific impacts to study area intersections. Figure 8.9-6 shows the turning movement volumes for the eleven study intersections under Year 2008 plus Project construction conditions.

Table 8.9-9 presents the results of the intersection operations analysis for the AM and PM peak hours under the 2008 construction conditions.

TABLE 8.9-9
Intersection Peak Hour Operations – Year 2008 Plus Construction Traffic Conditions

Intersection	Control[a]	AM Delay		PM Delay	
		sec/veh[b]	LOS	sec/veh[b]	LOS
Chevron Way/Marine Avenue	TWSC	10	B	10.6	B
Castro Street/Tewksbury Avenue	AWSC	9.3	A	10	A
Marine Avenue/I-580 EB Off-Ramps	Signal	15.9	B	18.6	B
Castro Street/I-580 EB Ramps	Signal	13.8	B	36.7	D
Castro Street/Chevron Way	Signal	0.1	A	0.1	A
Castro Street/I-580 WB Ramps	Signal	47.1	D	**63.2**	**E**
Castro Street/Mills Street	Signal	13.4	B	23.4	C
Castro Street/General Chemical Access	Signal	17.8	B	**272.9**	**F**
Castro Street/Hensley Street	Signal	4.5	A	7.3	A
Richmond Parkway/Hensley Street	Signal	18	B	16.6	B
Richmond Parkway/Gertrude Avenue	Signal	**98.7**	**F**	**95.2**	**F**

Notes:

[a] AWSC = all-way stop controlled intersection; Signal = traffic signal-controlled intersection; TWSC = two-way stop controlled intersection.

[b] Average overall intersection control delay (seconds per vehicle) reported for signalized and all-way stop-controlled intersections. Average delay on highest-delay movement/approach reported for side-street stop-controlled intersections.

Bold text - Unacceptable LOS

Source: Wilbur Smith Associates, 2007.
Existing peak-hour traffic volumes collected in May 2005. Review on more recent traffic volume data indicates that the 2005 volumes remain valid for the analysis presented.

For the AM peak under construction conditions, one intersection is projected to operate at an unacceptable LOS. Richmond Parkway at Gertrude Avenue is projected to operate at LOS F.

During the PM peak, three intersections will not operate at an acceptable LOS:

- Castro Street at I-580 westbound ramps (operating at LOS E)
- Castro Street at General Chemical Access (operating at LOS F)
- Richmond Parkway at Gertrude Avenue (operating at LOS F)

The first intersection (Castro Street/I-580 westbound ramps) does not change from existing conditions.

Cumulative Impacts

2008 Baseline Plus Project Plus Other Projects Conditions

Traffic generated by the other projects occurring during the peak construction period at the Chevron facility were added to the Year 2008 plus construction traffic volumes. Figure 8.9-7 shows the turning movement volumes for the eleven study intersections under Year 2008 plus Project plus Other Projects conditions.

Table 8.9-10 presents the results of the intersection operations analysis for the AM and PM peak periods under Year 2008 Baseline plus Project plus Other Projects conditions.

No new intersections will operate at an unacceptable LOS for the Year 2008 plus Construction plus Other Projects scenario. The intersections that will operate at LOS E or LOS F are the same as the Year 2008 plus Construction scenario.

TABLE 8.9-10
Intersection Peak Hour Operations – Year 2008 Plus Construction Plus Other Projects Traffic Conditions

Intersection	Control[a]	AM Delay		PM Delay	
		sec/veh[b]	LOS	sec/veh[b]	LOS
Chevron Way/Marine Avenue	TWSC	10	B	10.6	B
Castro Street/Tewksbury Avenue	AWSC	9.3	A	10	A
Marine Avenue/I-580 EB Off-Ramps	Signal	16.4	B	18.6	B
Castro Street/I-580 EB Ramps	Signal	13.7	B	36.7	D
Castro Street/Chevron Way	Signal	0.1	A	0.1	A
Castro Street/I-580 WB Ramps	Signal	47.4	D	**64**	**E**
Castro Street/Mills Street	Signal	15	B	23.4	C
Castro Street/General Chemical Access	Signal	19.2	B	**298.1**	**F**
Castro Street/Hensley Street	Signal	4.5	A	7.7	A
Richmond Parkway/Hensley Street	Signal	18	B	16.6	B
Richmond Parkway/Gertrude Avenue	Signal	**102.9**	**F**	**98.8**	**F**

Notes:
[a] AWSC = all-way stop controlled intersection; Signal = traffic signal-controlled intersection; TWSC = two-way stop controlled intersection.
[b] Average overall intersection control delay (seconds per vehicle) reported for signalized and all-way stop-controlled intersections. Average delay on highest-delay movement/approach reported for side-street stop-controlled intersections.

Bold text - Unacceptable LOS

Source: Wilbur Smith Associates, 2007.
Existing peak-hour traffic volumes collected in May 2005. Review on more recent traffic volume data indicates that the 2005 volumes remain valid for the analysis presented.

2008 Baseline Plus Project Plus Other Projects Plus Major Refinery Turnaround Conditions

Figure 8.9-8 shows the turning movement volumes for the eleven study intersections under Year 2008 plus Project plus Other Projects plus Major Refinery Turnaround conditions.

Table 8.9-11 presents the results of the intersection operations analysis for the AM and PM peak periods under Year 2008 Baseline plus Project plus Other Projects plus Major Refinery Turnaround conditions.

TABLE 8.9-11
Intersection Peak Hour Operations – Year 2008 Plus Construction Plus Other Project Plus Major Refinery Turnaround Traffic Conditions

Intersection	Control[a]	AM Delay		PM Delay	
		sec/veh[b]	LOS	sec/veh[b]	LOS
Chevron Way/Marine Avenue	TWSC	10	B	10.6	B
Castro Street/Tewksbury Avenue	AWSC	9.3	A	10	A
Marine Avenue/I-580 EB Off-Ramps	Signal	17	B	18.6	B
Castro Street/I-580 EB Ramps	Signal	13.7	B	36.7	D
Castro Street/Chevron Way	Signal	0.1	A	0.1	A
Castro Street/I-580 WB Ramps	Signal	47.7	D	**66.5**	**E**
Castro Street/Mills Street	Signal	16.5	B	23.1	C
Castro Street/General Chemical Access	Signal	25.2	C	**387.2**	**F**
Castro Street/Hensley Street	Signal	4.7	A	9.6	A
Richmond Parkway/Hensley Street	Signal	18	B	16.6	B
Richmond Parkway/Gertrude Avenue	Signal	**114.6**	**F**	**109.4**	**F**

Notes:

[a] AWSC = all-way stop controlled intersection; Signal = traffic signal-controlled intersection; TWSC = two-way stop controlled intersection.

[b] Average overall intersection control delay (seconds per vehicle) reported for signalized and all-way stop-controlled intersections. Average delay on highest-delay movement/approach reported for side-street stop-controlled intersections.

Bold text - Unacceptable LOS

Source: Wilbur Smith Associates, 2007.
Existing peak-hour traffic volumes collected in May 2005. Review on more recent traffic volume data indicates that the 2005 volumes remain valid for the analysis presented.

No new intersections will operate at an unacceptable LOS for the Year 2008 plus Construction plus Other Projects plus Major Turnaround scenario. The intersections that will operate at LOS E or LOS F are the same as the other Year 2008 scenarios.

Future 2025 Conditions

The 2004 Contra Costa Transportation Authority *Travel Demand Forecasting Model* (CCTA Model) was used to model 2025 conditions. It includes the most recent information regarding City and County land use and transportation improvement information for both Contra Costa and Alameda Counties, and uses Association of Bay Area Governments (ABAG) Projections 2000 and 2002 for Land Use and Employment (ABAG, 2000 and 2002) for demographic information. Operation of the Refinery following Project construction would generate 34 new daily one-way truck trips because of increased import and export of materials to and from the Refinery. However, the Refinery's employment levels would remain unchanged.

Figure 8.9-9 shows the turning movement volumes for the eleven study intersections under Year 2008 plus Project plus Other Projects plus Major Refinery Turnaround conditions.

Table 8.9-12 presents the results of the intersection operations analysis for the AM and PM peak periods under Year 2008 Baseline plus Project plus Other Projects plus Major Refinery Turnaround conditions.

Under Year 2025 AM peak hour conditions, two intersections will operate at an unacceptable LOS: Castro Street/I-580 westbound ramps (LOS F) and Richmond Parkway/Gertrude Avenue (also LOS F).

During the PM peak period, four intersections will operate at LOS E or worse:

- Castro Street at I-580 Eastbound Ramps (LOS F)
- Castro Street at I-580 Westbound Ramps (LOS F)
- Castro Street at Mills Street (LOS E)
- Richmond Parkway at Gertrude Avenue (LOS F)

All of these represent degradations in operations from 2008.

TABLE 8.9-12
Intersection Peak Hour Operations – Year 2025 Traffic Conditions

Intersection	Control[a]	AM Delay		PM Delay	
		sec/veh[b]	LOS	sec/veh[b]	LOS
Chevron Way/Marine Avenue	TWSC	10	B	10.5	B
Castro Street/Tewksbury Avenue	AWSC	14.9	B	10.3	A
Marine Avenue/I-580 EB Off-Ramps	Signal	12.3	B	37.7	C
Castro Street/I-580 EB Ramps	Signal	17	B	**>80**	**F**
Castro Street/Chevron Way	Signal	0.2	A	0	A
Castro Street/I-580 WB Ramps	Signal	**>80**	**F**	**>80**	**F**
Castro Street/Mills Street	Signal	3.6	A	**77.4**	**E**
Castro Street/General Chemical Access	Signal	8.9	A	52.8	D
Castro Street/Hensley Street	Signal	5	A	8.3	A
Richmond Parkway/Hensley Street	Signal	18.1	B	17.1	B
Richmond Parkway/Gertrude Avenue	Signal	**>80**	**F**	**>80**	**F**

Notes:

[a] AWSC = all-way stop controlled intersection; Signal = traffic signal-controlled intersection; TWSC = two-way stop controlled.

[b] Average overall intersection control delay (seconds per vehicle) reported for signalized and all-way stop-controlled intersections. Average delay on highest-delay movement/approach reported for side-street stop-controlled intersections.

Bold text - Unacceptable LOS

Source: Wilbur Smith Associates, 2007.
Existing peak-hour traffic volumes collected in May 2005. Review on more recent traffic volume data indicates that the 2005 volumes remain valid for the analysis presented.

The Renewal Project construction is expected to end in 2011, and the only ongoing impacts would be the 34 trucks per day associated with normal Refinery operations. Therefore, any traffic impacts identified under Year 2025 conditions will not be the direct or cumulative result of the Chevron Renewal Project, and will not be subject to mitigation.

8.9.3.4 Project Impacts and Mitigation Measures

The significance criteria listed in Section 8.9.3.1 were used to evaluate potential impacts. Because any impacts associated with the PPRP alone will be subsets of the impacts of the Chevron Renewal Project, study of the larger project's impacts is conservative. Since mitigation measures proposed as part of the Renewal Project will reduce impacts to less than significant levels, no additional measures are needed for the PPRP alone.

Standard: Will the Project worsen intersection operating conditions to LOS E or F?

The potential impacts identified are:

Impact 8.9-1. Year 2008 Project construction traffic would affect the Richmond Parkway/Gertrude Avenue intersection during the AM peak period.

Analysis: Significant.

The operating conditions at this intersection would change from LOS D to LOS F.

Mitigation: Two mitigation measures are proposed:

- Implement temporary traffic control changes at the southbound approach to provide one through lane, one shared left-through lane, and one shared right-through lane (convert exclusive left turn lane to shared left-through lane).
- Implement an alternate signal timing plan during peak arrival and departure times to facilitate traffic flow. The specific change would be to use a permitted left-turn phase instead of protected on the northbound and southbound approaches. Possible implementation plans include:
  - Posting a technician at the intersection location during peak hours to manually operate signal controls (e.g., using the police key feature of standard traffic signal controllers).
  - Programming an alternate signal timing plan that would be in operation during specified peak commute periods.
  - Posting traffic control officers at the intersection to manually control traffic movements.

Analysis after Mitigation: Less than Significant. The expected LOS at the intersection after mitigation would be B (with a delay of 14.4 seconds).

Impact 8.9-2. Year 2008 Project construction traffic would affect the Castro Street/General Chemical Access and Richmond Parkway/Gertrude Avenue intersections during the PM peak period.

Analysis: Significant.

The operating conditions at these intersections would change from LOS C to LOS F (Castro Street / General Chemical Access) and LOS D to LOS F (Richmond Parkway / Gertrude Avenue).

Mitigation: At the Castro Street/General Chemical intersection, the proposed mitigation measures are as follows:

- Widen the eastbound approach to provide two exclusive left turn lanes and one exclusive right turn lane (this improvement would be permanent).
- Modify peak hour traffic signal operations via manual traffic control during peak arrival and departure times to facilitate traffic flow. The specific change would be to optimize the cycle length from 75 to 150 seconds.
- Implement an alternate signal timing plan during peak arrival and departure times to facilitate traffic flow. The specific change would be to use a permitted left-turn phase instead of protected on the northbound and southbound approaches. Possible implementation plans include:
  - Posting a technician at the intersection location during peak hours to manually operate signal controls (e.g., using the police key feature of standard traffic signal controllers).
  - Programming an alternate signal timing plan that would be in operation during specified peak commute periods.
  - Posting traffic control officers at the intersection to manually control traffic movements.

Analysis after Mitigation: Less than Significant. The expected LOS at the intersection after mitigation would be D (with a delay of 54.3 seconds).

The mitigation measure at Richmond Parkway/Gertrude Avenue is to implement an alternate signal timing plan during peak arrival and departure times to facilitate traffic flow. The specific change would be to use a permitted left-turn phase instead of protected on the northbound and southbound approaches. The possible implementation plans are described under Impact 8.9-1.

Analysis after Mitigation: Less than Significant. The expected LOS at the intersection after mitigation would be C (with a delay of 30.2 seconds).

(Cumulative) Impact 8.9-3. Year 2008 Project construction plus Other Project traffic would affect the Richmond Parkway/Gertrude Avenue intersection during the AM peak period.

Analysis: Significant.

The operating conditions at this intersection would change from LOS D to LOS F.

Mitigation: The mitigation measures for Impact 8.9-1 would apply for this impact.

Analysis after Mitigation: Less than Significant. The expected LOS at the intersection after mitigation would be B (with a delay of 14.8 seconds).

(Cumulative) Impact 8.9-4. Year 2008 Project construction plus Other Project traffic would affect the Castro Street /General Chemical Access and Richmond Parkway/Gertrude Avenue intersections during the PM peak period.

Analysis: Significant.

The operating conditions at these intersections would change from LOS C to LOS F (Castro Street /General Chemical Access) and LOS D to LOS F (Richmond Parkway/Gertrude Avenue).

Mitigation: The mitigation measures for Impact 8.9-2 would apply for this impact.

Analysis after Mitigation: Less than Significant. The expected LOS at the intersection after mitigation would be D (with a delay of 39.4 seconds) at Castro Street/General Chemical intersection and D at Richmond Parkway/Gertrude Avenue (with a delay of 53.4 seconds).

(Cumulative) Impact 8.9-5. Year 2008 Project construction plus Other Project traffic plus Major Turnaround would affect the Richmond Parkway/Gertrude Avenue intersection during the AM peak period.

Analysis: Significant.

The operating conditions at this intersection would change from LOS D to LOS F.

Mitigation: The mitigation measures for Impact 8.9-1 would apply for this impact.

Analysis after Mitigation: Less than Significant. The expected LOS at the intersection after mitigation would be B (with a delay of 15.9 seconds).

(Cumulative) Impact 8.9-6. Year 2008 Project construction plus Other Project plus Major Turnaround traffic would affect the Castro Street/General Chemical Access and Richmond Parkway/Gertrude Avenue intersections during the PM peak period.

Analysis: Significant.

The operating conditions at these intersections would change from LOS C to LOS F (Castro Street/General Chemical Access) and LOS D to LOS F (Richmond Parkway/Gertrude Avenue).

Mitigation: The mitigation measures for Impact 8.9-2 would apply for this impact.

Analysis after Mitigation: Less than Significant. The expected LOS at the intersection after mitigation would be D (with a delay of 47.9 seconds) at Castro Street/General Chemical intersection and D at Richmond Parkway/Gertrude Avenue (with a delay of 43.9 seconds).

Standard: Will the Project result in projected parking demand that would exceed the proposed parking supply on a regular and frequent basis?

No significant impact. Parking demand generated by Project construction workers would be accommodated via permanent and temporary onsite lots.

Standard: Will the Project result in potential conflicts for pedestrians or bicyclists?

No significant impact. Project-generated traffic increases would occur on regional access roads (I-580 and I-80) and local access roads (Castro Street and Richmond Parkway), which are roads with little if any pedestrian and bicycle traffic.

Standard: Will the Project increase transit demand above the levels provided by local transit operators or agencies?

No significant impact. Project construction workers are expected to commute to and from the site in automobiles (a combination of drive-alone and carpool travel modes), and would not generate demand for public transit. Any workers using transit would be served by existing transit (especially BART) that have capacity in the vicinity of the Project.

Standard: Will the Project cause substantial damage or wear of public roadways by increased movement of heavy vehicles?

Impact 8.9-7. The use of heavy trucks to transport equipment and material to and from the Project work sites could affect road conditions in the designated haul routes by increasing the rate of road wear.

Analysis: Potentially Significant.

The degree to which this impact would occur depends on the roadway design (pavement type and thickness) and the existing condition of the road. Freeways, such as I-580, are designed to handle a mix of vehicle types, including heavy trucks. The Project's impacts are expected to be negligible on those roads. Arterials, such as Castro Street and Richmond Parkway, are likewise designed to handle a mix of vehicle types. However, because of the potential for excessive road wear due to Project construction trucks, measures to mitigate this potentially significant impact are provided.

Mitigation: Prior to Project construction, the City of Richmond Public Services Department would document road conditions for all routes that would be used by Project-related vehicles. The City would also document road conditions after Project construction is completed. The pre- and post-construction conditions of the haul routes shall be reviewed, and Chevron or contractor(s) and staff of the Public Services Department would enter into an agreement prior to construction that details the pre-construction and the post-construction requirements of a rehabilitation program. Roads damaged by construction would be repaired to a structural condition equal to that which existed prior to construction activity.

Analysis after Mitigation: Less than Significant.

8.9.3.5 Threshold Analysis

The following section identifies the traffic volume threshold for the triggering of significant impacts and for the failure of recommended mitigation improvements. These threshold amounts correspond to the maximum traffic volume generation for the Chevron facility before mitigation would be required and before the required mitigation measures would be no longer sufficient.

Castro Street/General Chemical Access Intersection Mitigation

Table 8.9-13 summarizes the thresholds for implementing the mitigation measure for the improvements at the eastbound approach at the Castro Street/General Chemical Access intersection.

The key findings are:

a. 46 vehicles (Passenger Car Equivalent [PCE]) could be added to the eastbound left-turn movement (above forecast Year 2008 volumes for the PM peak) before mitigation is required.

b. 284 total daily vehicles (PCE) could be generated by Chevron before mitigation is required.

c. 394 vehicles (PCE) could be added to the eastbound left-turn movement (above forecast Year 2008 volumes for the PM peak) before the specified mitigation fails.

d. 2,433 total daily vehicles (PCE) could be generated by Chevron before the mitigation fails.

TABLE 8.9-13
Threshold Analysis for Eastbound Left-Turn Movement - PM Peak

	Peak Hour Volume (vph)
2008 PM - EBL Movement[a]	166
Volume Threshold[b]	212
Threshold Added to EBL Movement	*46*
2008+Construction PM - EBL Movement[c]	447
Construction Added[d]	281
Threshold to Exceed Mitigation[e]	560
Threshold Added to EBL Movement	*113*
Total Added Above 2008 PM - EBL Movement[f]	**394**

Notes:
EBL = Eastbound Left-Turn; vph = vehicles per hour

[a] Forecast Year 2008 volume for the specific movement (no additional traffic from Chevron added).

[b] Maximum volume of the specified movement that results in no significant impact.

[c] Forecast Year 2008 column for specified movement with the addition of Chevron Renewal Project construction traffic.

[d] Volume added to specified movement above forecast Year 2008.

[e] Maximum volume of the specified movement for which specified mitigation measure reduced impact(s) to a level of non-significance.

[f] Maximum volume that can be added to the specified movement for which specified mitigation measure reduced impact(s) to a level of non-significance.

Source: Wilbur Smith Associates, 2007.

Richmond Parkway/Gertrude Avenue Intersection Mitigation (Northbound Approach)

Table 8.9-14 summarizes the thresholds for implementing the mitigation measure for the improvements at the northbound approach to the Richmond Parkway/Gertrude Avenue intersection.

The key findings are:

a. 38 vehicles (PCE) could be added to the northbound through movement (above forecast Year 2008 volumes for the PM peak) before mitigation is required.

b. 206 total daily vehicles (PCE) could be generated by Chevron before mitigation is required.

c. 539 total vehicles (PCE) could be added to the northbound through movement (above forecast Year 2008 volumes for the PM peak before the mitigation fails.

d. 2,934 total daily vehicles (PCE) could be generated by Chevron before the mitigation fails.

TABLE 8.9-14
Threshold Analysis for Northbound Through Movement - PM Peak

	Peak Hour Volume (vph)
2008 PM - NBT Movement[a]	2,451
Volume Threshold[b]	2,489
Threshold Added to NBT Movement	*38*
2008+Construction PM - NBT Movement[c]	2,770
Construction Added[d]	319
Threshold to Exceed Mitigation[e]	2,990
Threshold Added to NBT Movement	*190*
Total Added Above 2008 PM - NBT Movement[f]	**539**

Notes:
NBT = Northbound Through; vph = vehicles per hour

[a] Forecast Year 2008 volume for the specific movement (no additional traffic from Chevron added).

[b] Maximum volume of the specified movement that results in no significant impact.

[c] Forecast Year 2008 column for specified movement with the addition of Chevron renewal Project Construction traffic.

[d] Volume added to specified movement above forecast Year 2008.

[e] Maximum volume of the specified movement for which specified mitigation measure reduced impact(s) to a level of non-significance.

[f] Maximum volume that can be added to the specified movement for which specified mitigation measure reduced impact(s) to a level of non-significance.

Source: Wilbur Smith Associates, 2007.

Richmond Parkway/Gertrude Avenue Intersection Mitigation Measure (Southbound Approach)

Table 8.9-15 summarizes the thresholds for implementing the mitigation measure for the proposed improvements at the southbound approach to the Richmond Parkway/Gertrude Avenue intersection.

The key findings are:

a. 49 vehicles (PCE) could be added to the southbound through movement (above forecast Year 2008 volumes for the AM peak) before mitigation is required.

b. 263 total daily vehicles (PCE) could be generated by Chevron before mitigation is required.

c. 1,050 total vehicles (PCE) could be added to the southbound through movement (above forecast Year 2008 volumes for the AM peak) before the mitigation fails.

d. 5,630 total daily vehicles (PCE) could be generated by Chevron before the mitigation fails.

TABLE 8.9-15
Threshold Analysis for Southbound Through Movement - AM Peak

	Peak Hour Volume (vph)
2008 AM - SBT Movement[a]	2,250
Volume Threshold[b]	2,299
Threshold Added to SBT Movement	*49*
2008+Construction PM - SBT Movement[c]	2,586
Construction Added[d]	336
Threshold to Exceed Mitigation[e]	3,300
Threshold Added to SBT Movement	*714*
Total Added Above 2008 AM - SBT Movement[f]	**1,050**

Notes:
SBT = Southbound through; vph = vehicles per hour

[a] Forecast Year 2008 volume for the specific movement (no additional traffic from Chevron added).

[b] Maximum volume of the specified movement that results in no significant impact.

[c] Forecast Year 2008 column for specified movement with the addition of Chevron renewal Project Construction traffic.

[d] Volume added to specified movement above forecast Year 2008.

[e] Maximum volume of the specified movement for which specified mitigation measure reduced impact(s) to a level of non-significance.

[f] Maximum volume that can be added to the specified movement for which specified mitigation measure reduced impact(s) to a level of non-significance.

8.9.4 Laws, Ordinances, Regulations, and Standards

LORS related to traffic and transportation are summarized in the following sections.

8.9.4.1 Federal

The federal laws that apply to the Project are:

- Title 49, Code of Federal Regulations (CFR), Sections 171-177, govern the transportation of hazardous materials, the types of materials defined as hazardous, and the marking of the transportation vehicles. The Project will conform to this law by requiring that shippers of hazardous materials use the required markings on their transportation vehicles.

- Title 49 CFR, Sections 350-399, and Appendices A-G, Federal Motor Carrier Safety Regulations, address safety considerations for the transport of goods, materials, and substances over public highways. The Project will comply with all standards for the transportation of goods, materials, and substances over public highways.

- Title 49 CFR, Section 397.9, the Hazardous Materials Transportation Act of 1974, directs the United States Department of Transportation to establish criteria and regulations for the safe transportation of hazardous materials. The Project will comply with all standards for the transportation of hazardous materials.
- Title 14, CFR, Section 77.13(2)(i), requires an applicant to notify the Federal Aviation Administration (FAA) of the construction of structures within 20,000 feet of the nearest point of the nearest runway of an airport with at least one runway longer than 3,200 feet. No airports are within 20,000 feet of the PPRP site; therefore, this requirement is not applicable.

The proposed PPRP facility would cause no traffic or transportation impacts that would be inconsistent with federal LORS.

8.9.4.2 State

State laws that apply to this Project include the following:

- California Vehicle Code, Sections 13369, 15275, and 15278, address the licensing of drivers and classifications of licenses required to operate particular types of vehicles. In addition, certificates permitting the operation of vehicles transporting hazardous materials are addressed. The Project will conform to this law by requiring shippers to obtain required licenses and certificates.
- California Vehicle Code, Sections 25160 et seq., address the safe transport of hazardous materials. The Project will comply with these safety requirements.
- California Vehicle Code, Sections 2500-2505, authorize the issuance of licenses by the Commissioner of the California Highway Patrol (CHP) to transport hazardous materials, including explosives. The Project will comply with these license requirements.
- California Vehicle Code, Section 31303, requires that hazardous materials be transported on the state or interstate highway that offers the shortest overall transit time possible. The Project will conform to this law by requiring shippers of hazardous materials to use the shortest route feasible to and from the Project site.
- California Vehicle Code, Sections 31600-31620 regulate the transportation of explosive materials. The Project will comply with these regulations.
- California Vehicle Code, Sections 32100-32109, establish special requirements for the transportation of substances presenting inhalation hazards and poisonous gases. California Vehicle Code, Section 32105 requires that shippers of inhalation hazardous or explosive materials contact the CHP and apply for a Hazardous Material Transportation License. The Project will conform to this law by requiring shippers of these types of material to obtain the Hazardous Material Transportation License.
- California Vehicle Code, Sections 34000-34121, establish special requirements for transporting flammable and combustible liquids over public roads and highways. The Project will comply with these requirements.

- California Vehicle Code, Sections 34500, 34501, 34501.2, 34501.3, 34501.4, 34501.10, 34505.5-7, 34506, 34507.5, and 34510-11, regulate the safe operation of vehicles, including those used to transport hazardous materials. The Project will comply with these regulations.

- California Vehicle Code, Sections 35100-35559, specify limits for vehicle width, height, length, and gross weight. Specifically, Section 35550 states: "The gross weight imposed upon the highway by the wheels on any one axle of a vehicle shall not exceed 20,000 pounds and the gross weight upon any one wheel, or wheels, supporting one end of an axle, and resting upon the roadway, shall not exceed 10,500 pounds." The Project will comply with these requirements by limiting vehicle sizes and gross weights to the specified limits or by obtaining a Single-Trip Transportation Permit for oversized or excessive loads over state highways, as described in the next paragraph.

- California Vehicle Code, Section 35780, requires a Single-Trip Transportation Permit to transport oversized or excessive loads over state highways. The permit can be acquired through the California Department of Transportation. This law is enforced by the CHP. The Project will conform to this law by requiring that shippers obtain a Single-Trip Transportation Permit for oversized loads for each vehicle.

- The California Streets and Highways Code, Sections 660, 670, 1450, 1460 et seq. 1470, require encroachment permits for projects involving excavation in city streets. This law is generally enforced at the local level. The Project will comply with this requirement by obtaining an encroachment permit from the City of Richmond Public Works Department.

- California State Planning Law, Government Code Section 65302, requires each city and county to adopt a General Plan consisting of seven mandatory elements to guide its physical development. Section 65302(b) requires that a circulation element be one of the mandatory elements. The scope of a circulation element consists of 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 element of the plan." The City has prepared a General Plan; therefore, no action is required by the Applicant.

- California Department of Transportation Manual on Uniform Traffic Control Devices specifies standards for construction in the public right-of-way. It also requires that a temporary traffic control plan be provided for "continuity of function (movement of traffic, pedestrians, bicyclists, transit operations), and access to property/utilities" during any time the normal function of a roadway is suspended. All construction in the public right-of-way will comply with the specified standards.

The proposed PPRP facility will cause no traffic or transportation impacts that would be inconsistent with state LORS.

8.9.4.3 Local

The transportation elements of local plans that are applicable to the PPRP are summarized in this section.

- The City of Richmond requires an Encroachment Permit for any work performed within the public right-of-way. The public right-of-way is generally defined as areas of the roadway and the sidewalk between the property lines measured from one side of the street to the property lines on the other side of the street. The Project will comply with these requirements by obtaining the permit from the City of Richmond Engineering Division before performing any work within the public right-of-way.
- The City of Richmond requires an Oversized/Overweight Load Permit before moving any extralegal vehicles or loads over public streets. The Project will comply with these requirements by obtaining the permit from the City of Richmond Engineering Division before operating any oversize and/or overweight vehicles within the City.
- The City of Richmond requires a Sidewalk Permit for any work performed on the sidewalk, driveway approach or curb and gutter. The Project will comply with these requirements by obtaining the permit from the City of Richmond Engineering Division before performing any work on the sidewalk, driveway approach or curb and gutter within the City.
- The City of Richmond General Plan Circulation Element and Growth Management Element establishes Traffic Level of Service standards for intersections. The minimum acceptable LOS for intersections in the Project area is LOS D. The mitigation measures for the PPRP will reduce impacts to nearby roads to insignificant levels to conform to this goal.
- The City of Richmond General Plan complies with the Contra Costa County General Plan, and the Contra Costa Transportation Authority Comprehensive Transportation Plan and Congestion Management Program, which set the same LOS standards for regional roadways.

8.9.4.4 Compliance with Laws, Ordinances, Regulations, and Standards

Table 8.9-16 lists the federal, state, and local LORS that apply to traffic and transportation.

TABLE 8.9-16
LORS Applicable to Traffic and Transportation

LORS	Applicability	Conformance (Section)
Federal		
49 CFR 171-177	Governs the transportation of hazardous materials, including the marking of the transportation vehicles.	8.9.4.1
49 CFR 350-399 and Appendices A-G	Addresses safety considerations for the transport of goods, materials, and substances over public highways.	8.9.4.1
49 CFR 397.9	Establishes criteria and regulations for the safe transportation of hazardous materials.	8.9.4.1

TABLE 8.9-16
LORS Applicable to Traffic and Transportation

LORS	Applicability	Conformance (Section)
14 CFR 77.13(2)(i)	Requires applicants to notify Federal Aviation Administration (FAA) of construction, within 20,000 feet of an airport, of greater height than an imaginary surface as defined by the FAA.	8.9.4.1
State		
California Vehicle Code, Sections 13369, 15275, and 15278	Addresses the licensing of drivers and classifications of licenses required to operate particular types of vehicles, including certificates permitting the operation of vehicles transporting hazardous materials.	8.9.4.2
California Vehicle Code, Sections 25160 et seq.	Addresses the safe transport of hazardous materials.	8.9.4.2
California Vehicle Code, Sections 2500-2505	Authorizes the issuance of licenses by the Commissioner of the California Highway Patrol (CHP) to transport hazardous materials, including explosives.	8.9.4.2
California Vehicle Code, Section 31303	Requires transporters of hazardous materials to use the shortest route possible.	8.9.4.2
California Vehicle Code, Sections 31600-31620	Regulates the transportation of explosive materials.	8.9.4.2
California Vehicle Code, Sections 32100-32109	Requires transporters of inhalation hazardous materials or explosive materials to obtain a Hazardous Materials Transportation License.	8.9.4.2
California Vehicle Code, Sections 34000-34121	Establishes special requirements for transporting flammable and combustible liquids over public roads and highways.	8.9.4.2
California Vehicle Code, Sections 34500, 34501, 34505, 34506, 34507, and 34510	Regulates the safe operation of vehicles, including those used to transport hazardous materials.	8.9.4.2
California Vehicle Code, Section 35100 et seq.	Specifies limits for vehicle width.	8.9.4.2
California Vehicle Code, Section 35250 et seq.	Specifies limits for vehicle height.	8.9.4.2
California Vehicle Code, Section 35400 et seq.	Specifies limits for vehicle length.	8.9.4.2
California Vehicle Code, Section 35780	Requires a Single-Trip Transportation Permit to transport oversized or excessive loads over state highways.	8.9.4.2
The California Streets and Highways Code, Sections 660, 670, 1450, 1460 et seq. 1470	Requires encroachment permits for projects involving excavation in city streets.	8.9.4.2
California State Planning Law, Government Code Section 65302	Requires each city and county to adopt a General Plan consisting of seven mandatory elements to guide its physical development, including a circulation element.	8.9.4.2
California Department of Transportation Manual on Uniform Traffic Control Devices	Specifies standards for construction in the public right-of-way.	8.9.4.2

TABLE 8.9-16
LORS Applicable to Traffic and Transportation

LORS	Applicability	Conformance (Section)
Local		
Encroachment Permit	The City of Richmond requires a permit for any work performed within the public right-of-way.	8.9.4.3
Oversized/Overweight Load Permit	The City of Richmond requires a permit before moving any extralegal vehicles or loads over public streets.	8.9.4.3
Sidewalk Permit	The City of Richmond requires a permit for any work performed on the sidewalk, driveway approach or curb and gutter.	8.9.4.3
The City of Richmond General Plan	The plan establishes LOS standards for intersections in compliance with the Contra Costa County General Plan, the Contra Costa Transportation Authority Comprehensive Transportation Plan and Congestion Management Program.	8.9.4.3

8.9.5 Permits Required

Table 8.9-17 provides a list of permits and approximate timeframe to obtain them.

TABLE 8.9-17
Permit Schedule for Traffic and Transportation

Permit	Schedule
Transport oversized or excessive loads over state highways from State Agency	Obtain when necessary, 2-hour processing time (single trip) to 2 weeks (annual trip).
Transportation permit for oversized vehicles from State Agency	Obtain when necessary, same day processing.
Encroachment Permit for work performed within the public right-of-way from City of Richmond	Obtain when necessary, same day approval by Engineering Division
Oversized/Overweight Load Permit for moving any extralegal vehicles or loads over public streets from City of Richmond	Obtain when necessary, same day approval by Engineering Division
Sidewalk Permit for work performed on the sidewalk, driveway approach or curb and gutter from City of Richmond	Obtain when necessary, same day approval by Engineering Division

8.9.6 Involved Agencies and Agency Contacts

Table 8.9-18 provides a list of involved agencies and agency contacts.

TABLE 8.9-18
Involved Agencies and Contacts

Issue	Contact	Title	Telephone
Single-Trip Transportation Permit for Oversized Loads	Caltrans North Region Transportation Permits Office 1823 14th Street Sacramento, CA 95814	Staff	(909) 383-4637
Hazardous Material Transportation License	California Highway Patrol Accounting Section (HM Licensing Program) P.O. Box 942902 Sacramento, CA 94298-2902	Staff	(916) 327-5039
Encroachment Permit	City of Richmond, Engineering Division 1401 Marina Way South Richmond, CA 94804	Staff	(510) 307-8091
Oversized/Overweight Load Permit	City of Richmond, Engineering Division 1401 Marina Way South Richmond, CA 94804	Staff	(510) 307-8091
Sidewalk Permit	City of Richmond, Engineering Division 1401 Marina Way South Richmond, CA 94804	Staff	(510) 307-8091

8.9.7 References Cited

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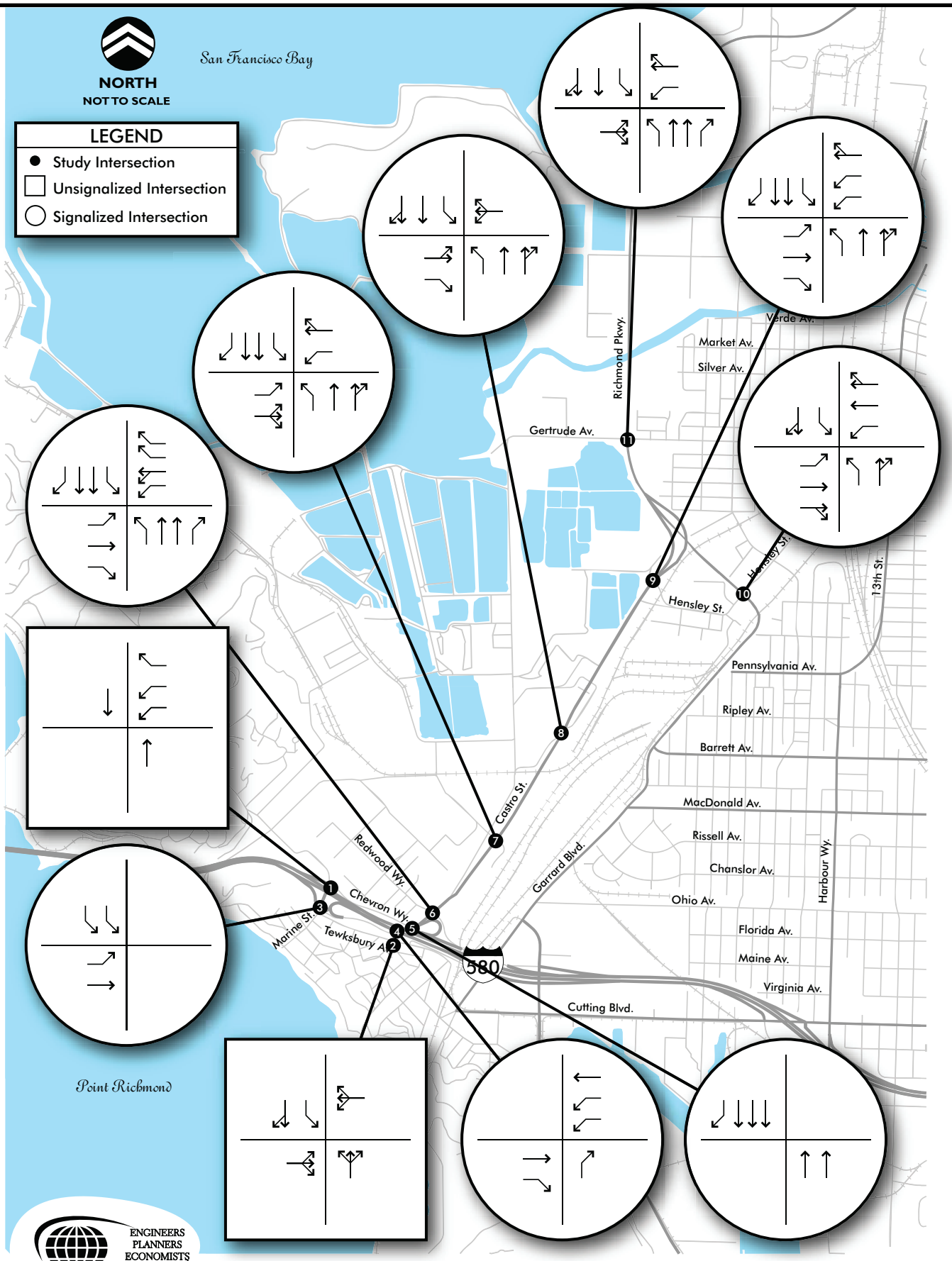
Project Boundary

FIGURE 8.9-1
MAJOR ROADS, POTENTIAL ACCESS ROADS IN PROJECT VICINITY
CHEVRON POWER PLANT REPLACEMENT PROJECT
RICHMOND, CA

CH2MHILL



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ECONOMISTS
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FIGURE 8.9-2
EXISTING INTERSECTION CONFIGURATIONS
CHEVRON POWER PLANT REPLACEMENT PROJECT
RICHMOND, CA

CH2MHILL

ES042007007SAC figure_8.9-2.ai 05/08/07 tdaus

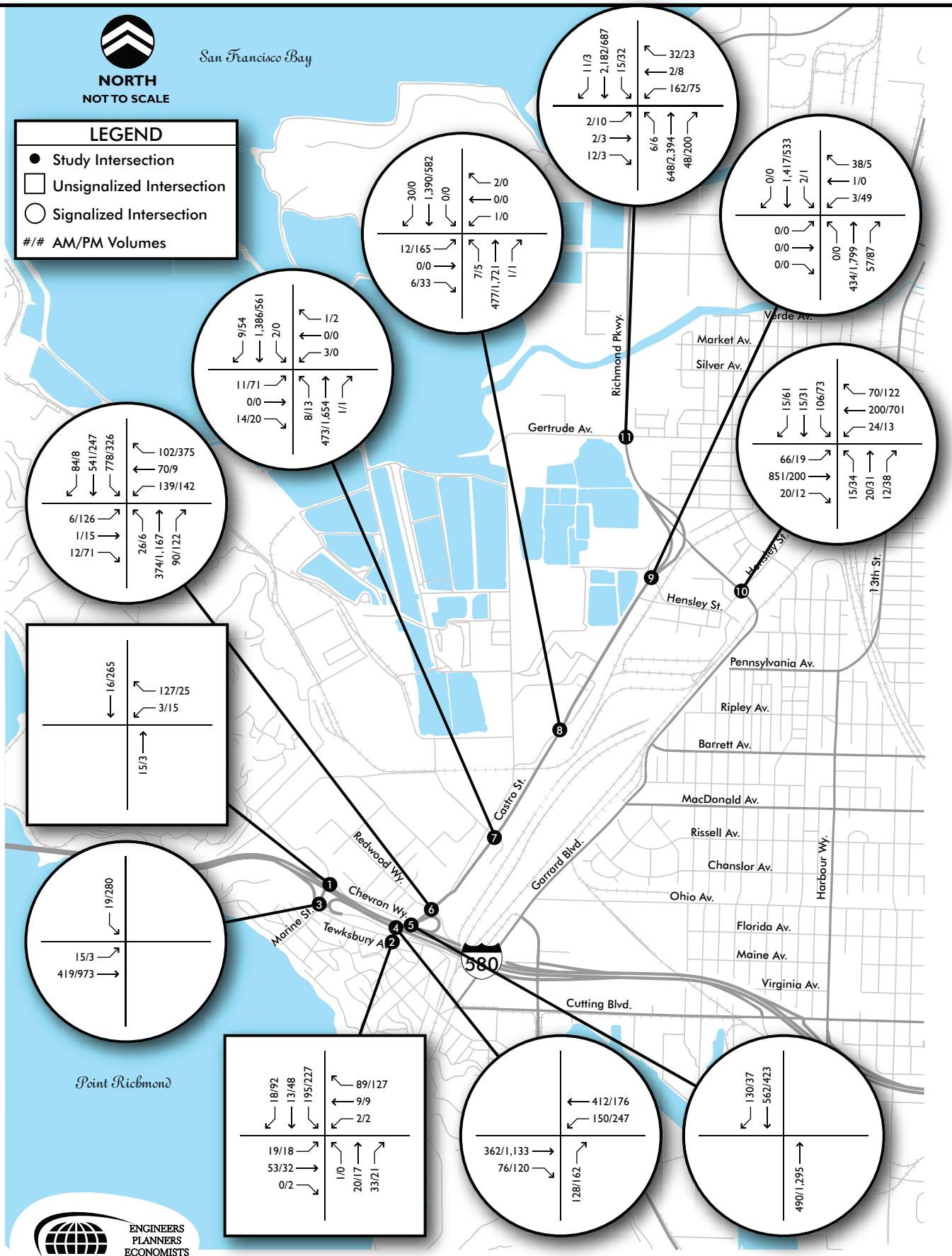

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FIGURE 8.9-3
EXISTING PEAK HOUR INTERSECTION VOLUMES - AM/PM
CHEVRON POWER PLANT REPLACEMENT PROJECT
RICHMOND, CA

CH2MHILL

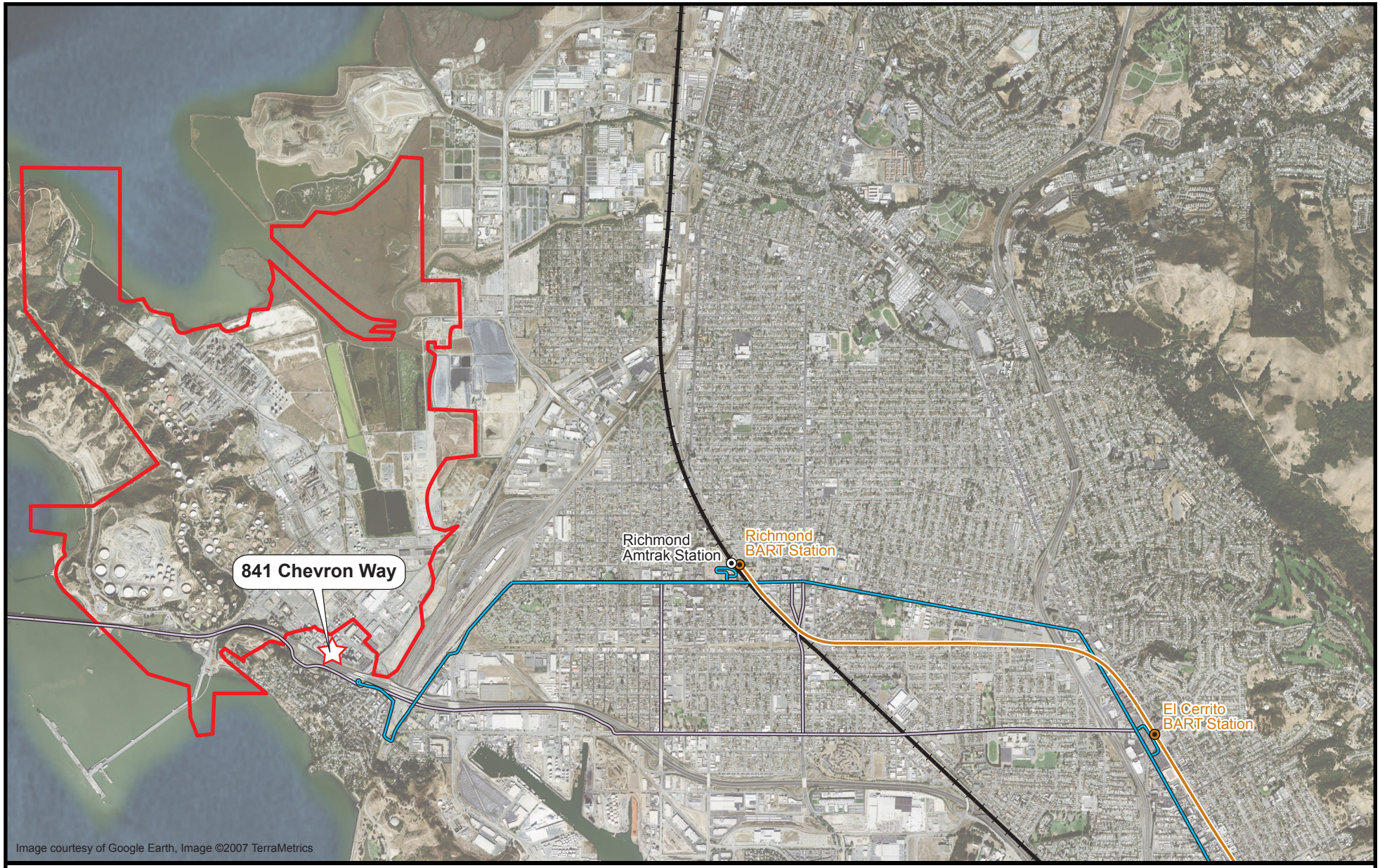

FIGURE 8.9-4
PUBLIC TRANSIT SERVICE IN PROJECT VICINITY
CHEVRON POWER PLANT REPLACEMENT PROJECT
RICHMOND, CA

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ES042007007SAC figure_8.9-4.ai 05/08/07 tdaus

Project Boundary

Railroad Crossing

FIGURE 8.9-5
RAILROAD CROSSING IN PROJECT VICINITY
CHEVRON POWER PLANT REPLACEMENT PROJECT
RICHMOND, CA

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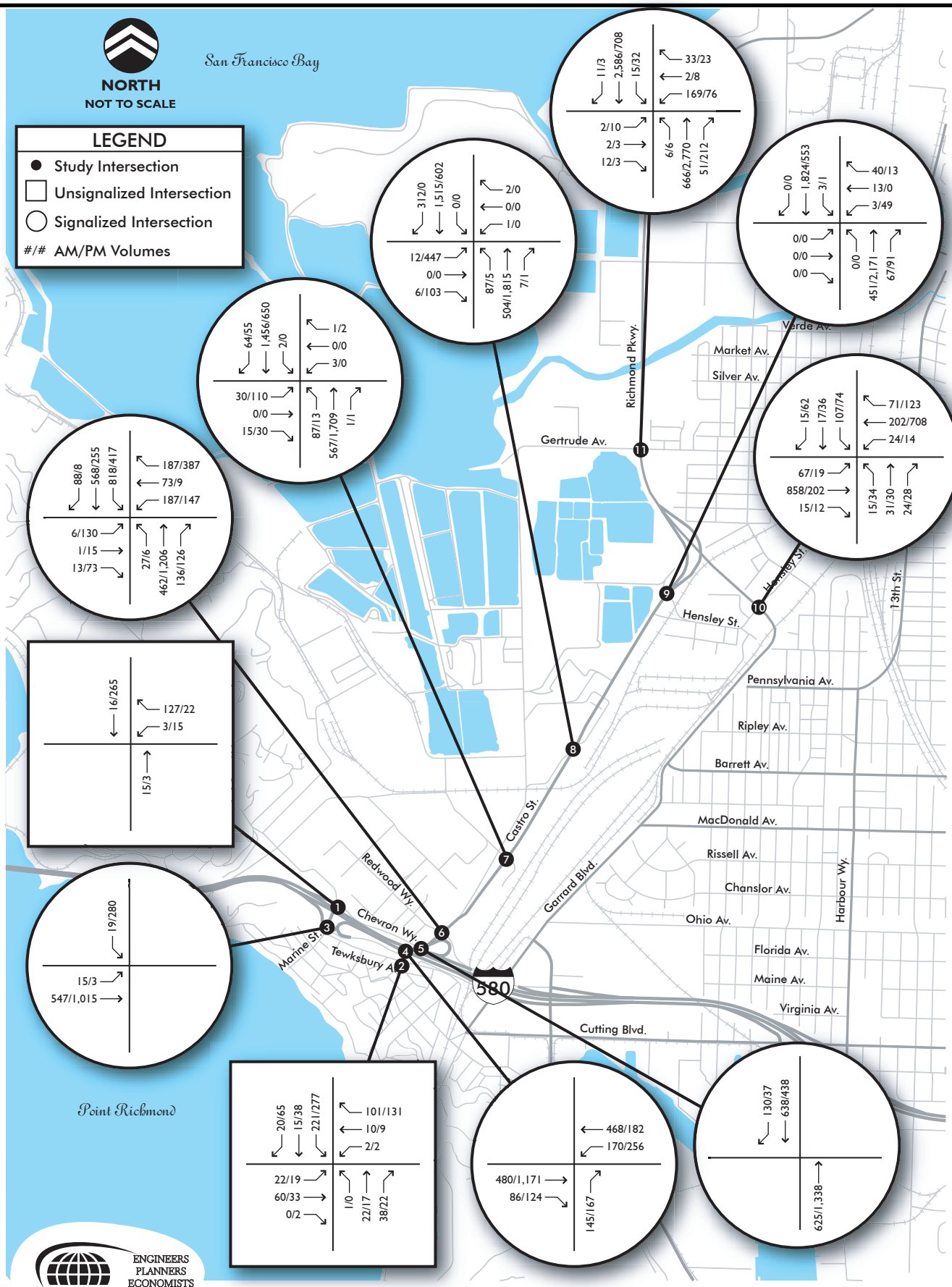

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FIGURE 8.9-6
YEAR 2008 PLUS CONSTRUCTION TRAFFIC PEAK HOUR INTERSECTION VOLUMES - AM/PM

CHEVRON POWER PLANT REPLACEMENT PROJECT
RICHMOND, CA

CH2MHILL

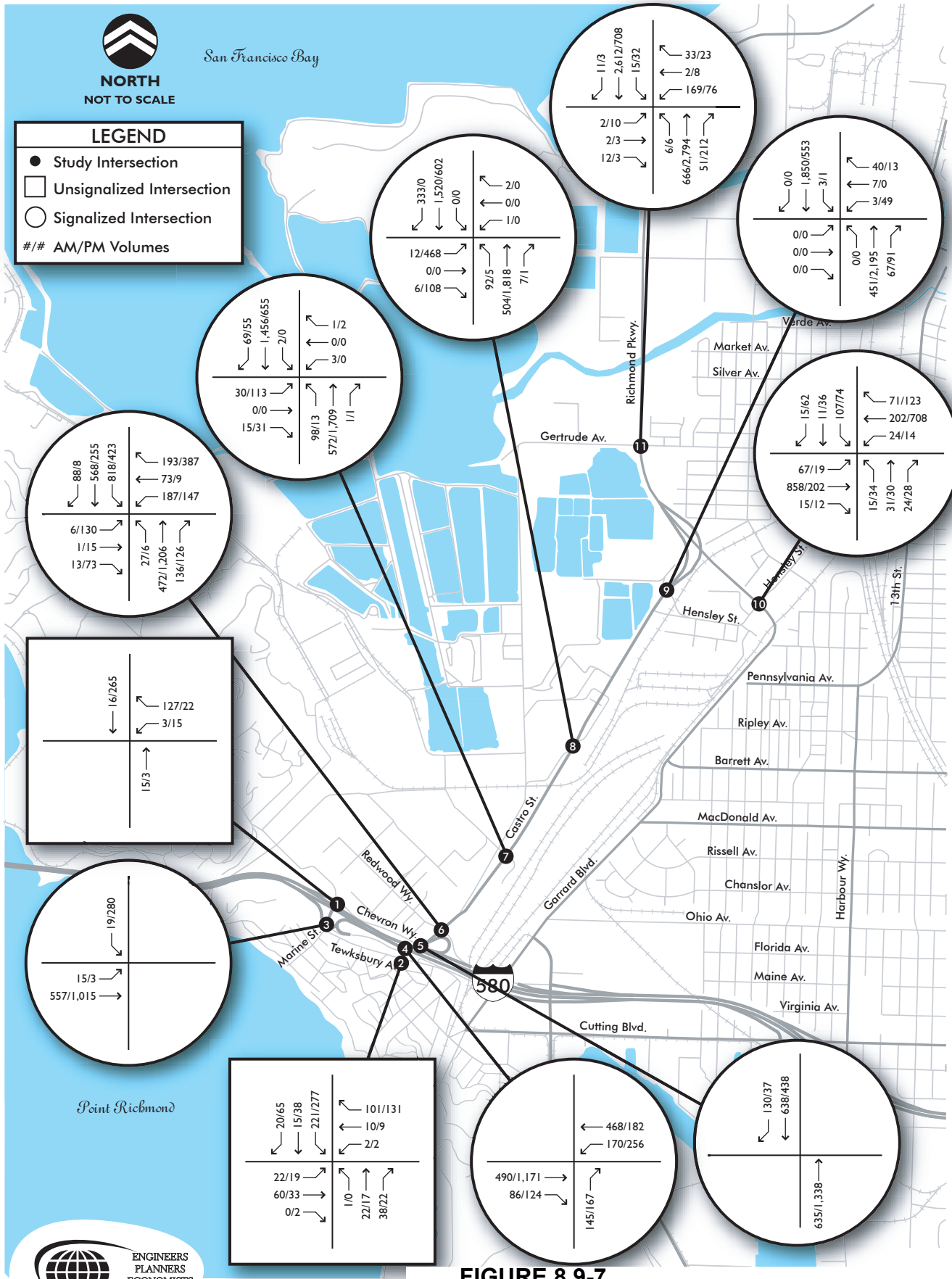

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FIGURE 8.9-7
YEAR 2008 PLUS CONSTRUCTION PLUS OTHER PROJECTS TRAFFIC PEAK HOUR INTERSECTION VOLUMES - AM/PM
CHEVRON POWER PLANT REPLACEMENT PROJECT
RICHMOND, CA

CH2MHILL

ES042007007SAC figure_8.9-7.ai 05/04/07 tdaus

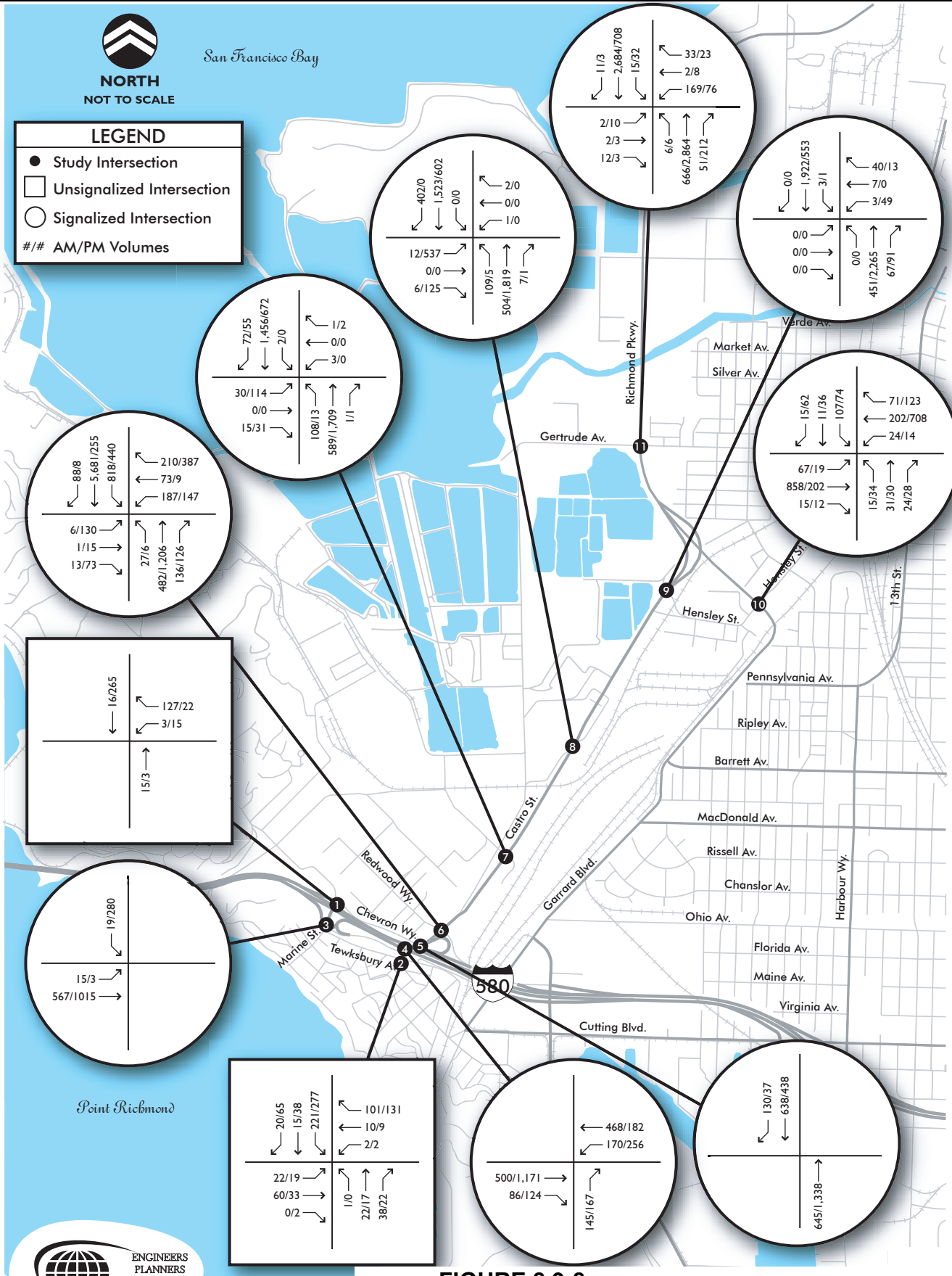

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FIGURE 8.9-8
YEAR 2008 PLUS CONSTRUCTION PLUS OTHER PROJECTS PLUS TURNAROUND TRAFFIC PEAK HOUR INTERSECTION VOLUMES - AM/PM
CHEVRON POWER PLANT REPLACEMENT PROJECT
RICHMOND, CA

CH2MHILL

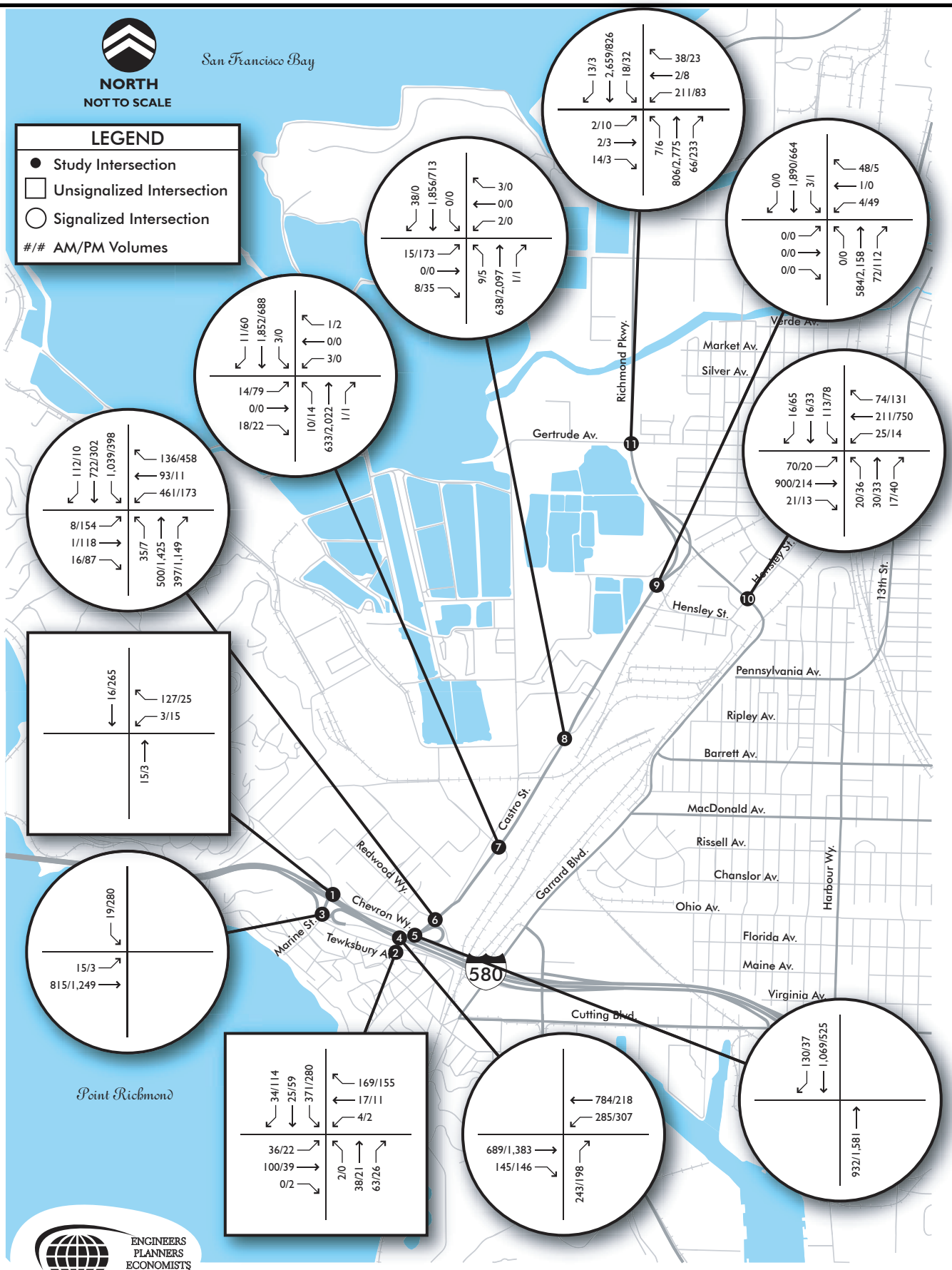

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FIGURE 8.9-9
YEAR 2025 PEAK HOUR INTERSECTION VOLUMES - AM/PM
CHEVRON POWER PLANT REPLACEMENT PROJECT
RICHMOND, CA

CH2MHILL