CHAPTER 2 – AFFECTED ENVIRONMENT, ENVIRONMENTAL CONSEQUENCES, AND AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

2 Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures

2.1 ENVIRONMENTAL ISSUES WITH NO ADVERSE IMPACTS

As part of the scoping and environmental analysis conducted for the Project, the following environmental issues were considered but no adverse impacts were identified. Consequently, there is no further discussion regarding these issues in the document.

2.1.1 Human Environment

2.1.1.1 Land Use

The Project is consistent with applicable transportation plans and programs, regional growth plans, general and community plans (including the Estuary Policy Plan), and specific development proposals. No impacts are anticipated with regard to land use.

The Project is not located within State coastal jurisdiction or within any coastal zone management program.[1] Therefore, the Project would have no impacts on a coastal zone.

The Project is not located near a wild and scenic river.[2] Therefore, the Project would have no impacts on a wild and scenic river.

2.1.1.2 Growth

The Project area is a developed urban area with little development potential due to low land availability.

The Project would not encourage growth beyond that envisioned in ABAG's growth projections, and the proposed interchange improvements would be consistent with applicable regional growth plans.

Project-related growth is not considered to be "reasonably foreseeable" because the Project has been designed to accommodate present and projected increases in traffic volumes, expected as a result of previously implemented and planned development in the area. In addition, the Project is necessary to improve the safety of both the mainline I-880 as well as the northbound ramps at 29th and 23rd Avenues. As a result, there are no anticipated impacts to growth, and no avoidance, minimization, and/or mitigation measures are required for the Project.

2.1.1.3 Farmlands/Timberlands

There are no farmlands or timberlands within the Project area.[3] Therefore, the Project would have no impacts on farmlands or timberlands.

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1 http://coastalmanagement.noaa.gov/mystate/ca.html

2 http://www.rivers.gov/wildriverslist.html

2.1.1.4 Community Character

Environmental Justice

The Jingletown community is a community that meets the criteria for potential environmental justice impacts. There is an elevated level of minority and low-income populations within the study area. However, it is not anticipated that the Proposed Project would result in disproportionately high or adverse impacts to these populations. On the contrary, the Project addresses existing problems within the vicinity of the community and would result in beneficial impacts to the community as a result of the proposed freeway improvements, including increased quality of life due to reduced noise impacts and increased pedestrian and cyclist safety, particularly in the vicinity of the Lazear Elementary School. The Proposed Project would not result in any displacements, and therefore, would not divide a minority population or impact the economic vitality of these populations. No minority or low-income populations have been identified that would be adversely affected by the Proposed Project. Therefore, this Project is not subject to the provisions of Executive Order 12898.

2.1.2 Physical Environment

2.1.2.1 Hydrology and Floodplain

A review of the Flood Boundary and Floodway Map from the National Flood Insurance Program administered by the Federal Emergency Management Agency (FEMA) indicates that the Project study area is not located within either a 100-year or 500-year floodplain.[4] Therefore, the Project would have no impacts on hydrology and floodplains.

2.1.2.2 Paleontology

There is a low sensitivity for paleontological resources within the Project area.[5] Therefore, the Project would have no impacts on paleontological resources.

2.1.3 Biological Environment

2.1.3.1 Natural Communities

There are no known natural communities of special concern within or in close proximity to the study area. The Project would have no effect on natural communities of special concern.

2.1.3.2 Wetlands and Other Waters

There are no jurisdictional waters of the United States present in the Project area.[6] Therefore, the Project would have no impacts on wetlands or other waters.

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3 http://www.conservation.ca.gov/dlrp/lca/Pages/Index.aspx

4 msc.fema.gov/

5 ICF Jones and Stokes, *Archaeological Survey Report*, April 2009.

6 RBF Consulting, Natural Environment Study – Minimal Impacts, October 2008.

2.1.3.3 Threatened and Endangered Species

No suitable habitat for any of the eight threatened/endangered plant species was present in the study area; no special status species were identified. Based on this, the botanist determined that there are no threatened or endangered plant species in the study area. None of the 23 threatened or endangered wildlife species identified would occur in the study area because it either lacks suitable habitat for the species or the Project is outside the species' known range.[7]

2.1.3.4 Invasive Species

Fourteen noxious weed species were documented in the Project study area. However, there are no native plant communities in the Project area that could be affected by the dispersal of noxious weeds. Therefore, the Project would have no impacts related to invasive species.[8]

[7] RBF Consulting, Natural Environment Study – Minimal Impacts, October 2008.

[8] RBF Consulting, Natural Environment Study – Minimal Impacts, October 2008.

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2.2 HUMAN ENVIRONMENT

2.2.1 Parks and Recreational Facilities

2.2.1.1 Affected Environment

Impacts to recreational facilities are analyzed under two different regulations (NEPA/CEQA and Section 4(f)). The inclusion of a parks and recreational facilities section is included in the preparation of the environmental document to satisfy the NEPA/CEQA requirement, and is also analyzed under Section 4(f) of the Department of Transportation Act of 1966, and in accordance with Federal Highway Administration (FHWA) regulations.

Recreational Section 4(f) Properties

The Lazear School Playground is a publicly owned school playground/playing field that is located within the boundaries of the Lazear School property and qualifies as recreational Section 4(f) property. The playground is used by the public on evenings and weekends for soccer matches and other group sports. The playing field is neither part of a public park or wildlife/waterfowl refuge area, nor occurs within the boundaries of an extant historic property.

The Kennedy Tract Park, a recreational Section 4(f) property is a 0.09-acre vest pocket park located on the cul-de-sac end of East 9th Street. It is bounded by the 29th Avenue overcrossing on the south, the Portwood Shell gas station on the west (rear), and 2857 East 9th Street on the north. Infrequently used by the public for passive recreation purposes, Kennedy Tract Park contains one bench for seating and does not support programmed Oakland Parks and Recreation Department activities.

Lazear School Playground

Located along 29th Avenue in the southeastern half of the APE, and abutting Lazear School (824 29th Avenue) on the school's property, Lazear Playground occupies approximately the easternmost 200 feet of the parcel, consisting of a nearly 1-acre sized ball field on flat terrain planted with grass turf. Although occupying land that was historically associated with the Del Monte cannery facility (the adjoining Fruitvale Station Shopping Center, built in 1997, also occupies a large portion of the land formerly occupied by the cannery), the playground is a new feature dating from approximately 15 years ago. The playground is extensively used by the community athletic groups for soccer matches and other group sports activities during evenings and on weekends.

The recommended soundwall at Lazear Elementary is Option 3, as described in the NSR. Under this option, NB-5 would be constructed 8 feet in height to provide abatement at the lunch tables, which are areas considered to be of frequent human use. In addition, NB-3 would be constructed 10 feet in height to provide noise abatement to outdoor areas along the south of the school property and to lower interior noise levels at classrooms facing south as well as to recreation areas on the east play yard areas of the school. Although the construction of proposed soundwalls NB-3 and NB-5 would potentially occur within the boundaries of the Lazear School, the placement would not occur within the Playground area, nor does it call for the removal of any playground features within the boundaries of that property. All Proposed Project improvements adjoining the playground would occur within the public right-of-way. No attributes that qualify the subject property as a Section

4(f) resource would be adversely affected. Temporary construction easements and construction staging are proposed to occur either on vacant land across 29th Street from Lazear playground or within the I-880 rights-of-way, and would not adversely affect the attributes that qualify this property as a Section 4(f) resource.

No constructive use of properties would occur because the Project would not adversely affect the activities, features, and attributes that qualify the property for protection under Section 4(f); nor is temporary occupancy of the property proposed. The playground would continue to be accessible during the construction process from all directions via Fruitvale Avenue-International Boulevard and the Kennedy Tract/Jingletown neighborhood to the north. The Project is expected to facilitate, rather than hamper, safer access to the subject resource upon completion.

Kennedy Tract Park

Kennedy Tract Park is a 0.09-acre vest pocket park located on the cul-de-sac end of East 9th Street. It is bounded by the 29th Avenue overcrossing on the south, the Portwood Shell gas station on the west (rear), and 2857 East 9th Street on the north, within the southwestern half of the APE, and abutting the Kennedy Tract/Jingletown historic district. The referenced vest pocket park, owned by the City of Oakland Parks and Recreation Department, consists of a parcel on flat terrain planted with grass turf and one shade tree. The property is fully open to the street along East 9th Street (i.e., no fencing separates it from the public sidewalk). Although occupying land that was historically associated with the Kennedy Tract, and formerly developed with residential buildings, the park is a new feature dating from approximately 10 years ago. The park is only infrequently used by the community.

All proposed Project improvements adjoining the park would occur in the curb line/sidewalk area adjoining the park; no take of land from the park is proposed, and no attributes that qualify the subject property as a Section 4(f) resource would be adversely affected.

Temporary construction easements and construction staging are proposed to occur either on vacant land adjacent to but not on the subject property along 29th Street, or alternatively, within the I-880 rights-of-way; hence, the Project would not adversely affect the attributes that qualify this property as a Section 4(f) resource.

No constructive use of properties would occur because the Project would not adversely affect the activities, features, and attributes that qualify the property for protection under Section 4(f); nor is temporary occupancy of the property proposed. Kennedy Tract Park would continue to be accessible both during and following the construction process from the Kennedy Tract/Jingletown neighborhood to the north via East 9th Street.

2.2.1.2 Avoidance, Minimization, and/or Mitigation Measures

Avoidance

Consultation with cooperating agencies and officials with jurisdiction over Section 4(f) properties shall occur to identify specific best management measures that can be implemented to ensure that no harm to Section 4(f) resources results from the Project.

The Project includes several cooperating agencies, including the Alameda County Congestion Management Agency, California Department of Transportation District 4, City of Oakland, and City of Alameda, with the Department serving as the lead agency for

CEQA purposes and for NEPA, per FHWA NEPA delegation. Consultation with local experts on historic resources included Betty Marvin, Historic Preservation Planner with the City of Oakland Cultural Heritage Survey (part of the Community and Economic Development Agency) and Susana Villarreal (City of Oakland, Community and Economic Development Agency)--a knowledgeable former resident of the Kennedy Tract/Jingletown neighborhood. Consultation occurred both during and following a building-by-building intensive survey of the properties within the APE.

Minimization

Outreach to the public occurred through a series of public meetings with community residents and stakeholders beginning in 1999. A Neighborhood Action meeting was held on February 25, 2000 by the Mary Help of Christians Catholic Church Organizing Committee – an affiliate of Oakland Community Organizations. Since that time, this group has held meetings every few months to monitor Project progress and identify community concerns. No concerns have been identified that affect the Project.

2.2.2 Community Impacts

2.2.2.1 Community Character and Cohesion

Regulatory Setting

The National Environmental Policy Act of 1969 as amended (NEPA), established that the federal government shall use all practicable means to ensure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings (42 USC 4331[b][2]). The Federal Highway Administration in its implementation of NEPA (23 USC 109[h]) directs that final decisions regarding projects are to be made in the best overall public interest. This requires taking into account adverse environmental impacts, such as destruction or disruption of human-made resources, community cohesion, and the availability of public facilities and services.

Under the California Environmental Quality Act, an economic or social change by itself is not to be considered an adverse effect on the environment. However, if a social or economic change is related to a physical change, then social or economic change may be considered in determining whether the physical change is adverse. Since this Project would result in a physical change to the environment, it is appropriate to consider changes to community character and cohesion in assessing the significance of the Project's effects.

Affected Environment

A *Community Impact Assessment* was prepared for the Proposed Project in October 2006, revised February 2009. The information contained in this section is based on the analysis conducted for the *Community Impact Assessment* report.

This description of the affected environment is based on data from the U.S. Census Bureau and State and County sources. County, City, and tract-level data are primarily available from the 2000 census. This section describes demographic characteristics of Alameda County, the City of Oakland, and when detailed data are available, the census tracts within which the study area is located.

The Proposed Project is located entirely within the City of Oakland, and adjacent to the City of Alameda, in northwestern Alameda County. The Project study area, as shown in Exhibit

2.2-1, *Study Area*, is defined to include areas anticipated to be directly, indirectly, or and/or cumulatively impacted by the Proposed Project. The Project study area as identified on Exhibit 2.2-1 includes the grading limits and areas of potential permanent and temporary right-of-way acquisition, and is within the boundaries of two census tracts (Census Tracts 4060 and 4061) from the 2000 Census; refer to Exhibit 2.2-2, *Study Area Census Tracts*. The census tracts include residential, industrial, institutional, and commercial land uses, community services and facilities, and other neighborhood features that may be indirectly or cumulatively impacted by the Proposed Project. The study area census tracts include an area much larger than that directly affected by Project construction and right-of-way acquisition, but it provides a more focused picture of the area affected by the Project than the City and County demographics can provide. Census tracts were used because they are the most complete data set for the level of detail required for this analysis. Census tracts are also used to incorporate populations that may not be directly impacted by the Project, but may be indirectly affected by Project construction and operation. Data boundaries with finer level of detail such as census blocks were not selected due to incomplete data in some of the required demographic categories necessary for the community impact analysis. Detailed information concerning the affected environment is provided at City and County levels for certain topics.

The Project study area is located in the Jingletown neighborhood, which is a mixed-use neighborhood, with a long history of industrial as well as residential uses. Oakland has identified the Jingletown neighborhood as a potential Historic District, although the area is not yet a designated Historic District. Jingletown, located in the East Side of Oakland, acquired its name in the early 20th century when it was occupied by Portuguese immigrants. Portuguese men, when socializing in groups after work at the local canneries in Fruitvale, hands thrust in their pockets, would jingle their coins as a sign that they were prosperous. Today it is principally a Latino-populated area and is currently thriving as one of the fastest growing arts districts in the San Francisco Bay area. Among other notable artistic enterprises, Jingletown is the location of the only Institute of Mosaic Art in the United States. There are a large number of residential artists living in the lofts that are situated between the Park and the Fruitvale Street bridges, and a plethora of new residential lofts now line the banks of the estuary that separates Oakland from the island of Alameda.[1] In addition, Studio 880 is located within the Project study area at 829 27th Avenue, approximately 0.3 miles northeast of the Lazear Elementary School. Studio 880, once a one-room recording facility, is now an entire entertainment complex, housing three world-class recording studios, a handful of audio and film/video postproduction suites, and 20 professional offices for music and

1 Retrieved from http://www.jingletown.org/history.html on July 27, 2006.

Source: CIA, October 2006

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INTERSTATE 880 OPERATIONAL AND SAFETY IMPROVEMENTS
AT 29TH AVENUE AND 23RD AVENUE OVERCROSSING IS/EA

Study Area

Exhibit 2.2-1

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Base Map Source: ESRI

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INTERSTATE 880 OPERATIONAL AND SAFETY IMPROVEMENTS
AT 29TH AVENUE AND 23RD AVENUE OVERCROSSING IS/EA

Study Area Census Tracts

Exhibit 2.2-2

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film-related companies. Studio 880 has worked with a variety of great musicians and filmmakers in its eight years of operation.[2]

Jingletown residents have a strong sense of pride in their community, and have joined together to improve their neighborhood. In the early 1990s, the community came together to re-zone parts of their neighborhood from industrial to residential in an effort to clean up the neighborhood when industries relocated out of Oakland. The community initiated the Jingletown Homes Project, a 53-unit affordable housing development that received the State Housing Director's Award for Housing Development Excellence. The Project's design resulted from a series of workshops conducted by the Project architect (Pyatek Associates), involving the Oakland Community Housing, Inc., the Mary Help of Christian Church, the Oakland Community Organization, and the residents of the community.[3] The community has come together again with the facilitation of the Mary Help of Christian Church's Local Organizing Committee, an affiliate of Oakland Community Organizations, to initiate and support the installation of a sound wall to shelter residents from the noise of I-880 and the modifications of the I-880 exit and entrance ramps around the Lazear Elementary School to increase pedestrian safety.

The U.S. Census Bureau reports that the population in Alameda County totaled 1,105,379 in 1980. In the 20 years that followed, the population grew to 1,443,741 (30 percent). The California Department of Finance projects that this growth will continue for the next three decades and that population in Alameda County will rise over 40 percent to 2,038,482 by 2030. ABAG projects that population in Alameda County will rise 24 percent to 1,884,600 by 2030.

Oakland has experienced a slower rate of population growth as compared to Alameda County since 1980. According to the Census Bureau, Oakland's population totaled 339,337 in 1980. The population grew by nearly 18 percent to 399,484 in 2000. According to the *City of Oakland General Plan Housing Element*, the population totaled 408,807 in 2002, which indicates a 2.3 percent growth rate in two years. ABAG projects that Oakland's population will rise 29 percent to 516,900 by 2030.

The total combined population within both study area census tracts (4060 and 4061) totaled 7,956 in 2000, which represents 22% growth since 1990 (6,521), and represents a 2.19 percent annual growth rate.

Table 2.2-1, *Age Distribution*, shows the distribution of the population by age within Alameda County, Oakland, and the study area census tracts. The distribution of the population by age within the study area census tracts is comparable to the distribution within Oakland. However, the number of persons under 18 years old is higher, and the number of seniors over 64 years old is lower, as compared to Oakland and Alameda County. According to the *City of Oakland General Plan Housing Element*, Oakland experienced a small increase in the percent of the population in their late 30s to early 50s and individuals 65 years of age or more from 1990 to 2000. If the population changes over the past decade continue during the next 10 to 20 years, Oakland may be home to a significantly larger number of older adults and retirees who are looking for housing suited to their changing

2 Retrieved from www.studio880.com on July 27, 2006.

3 Retrieved from www.hcd.ca.gov/feature/JingleTown.html on July 27, 2006.

lifestyles and physical needs.[4] Persons under 18 and over 64 comprise a large portion of the transit-dependent population. The existing transit-dependent population (age-related only) is identified in Table 2.2-1, *Age Distribution*. An increase in the population of persons under 18 and over 64 will place increased demands on the existing public transportation that utilizes roadways in the Project area.

Table 2.2-1: Age Distribution

	Percentage			
	Population < 18	**Population 18-64**	**Population > 64**	**Transit-Dependent Population***
Alameda County	24.6%	65.2%	10.2%	34.8%
City of Oakland	25%	64.5%	10.5%	35.5%
Census Tract 4060	21.2%	68.8%	9.9%	35.5%
Census Tract 4061	29.3%	64.5%	6.2%	35.5%

Source: U.S. Census Bureau, Census 2000

* Population under 18 and over 64.

Table 2.2-2, *Ethnic Composition*, shows the ethnic composition of Alameda County, Oakland, and the study area census tracts. Ethnicity in Oakland has gone through significant changes since 1990, with a decrease in the number and proportion of residents who identified themselves as White or as Black/African-American, and an increase in the number and proportion of residents who identified themselves as Asian/Pacific Islander or Hispanic/Latino. The White population decreased by 11 percent, and the Black population by 13 percent, while the Asian population increased by 16 percent and the Hispanic population increased by 78 percent. Oakland's population mix over the past 50 years has been influenced by economic and suburban development trends. The loss of many relatively well-paying "blue-collar" and military jobs, combined with rapid suburbanization in the Bay Area between 1950 and 1980, left Oakland with a higher percentage of lower-income and minority residents. Since the 1980s, increasing numbers of immigrants from Asian, Pacific Island, and Latin American/Hispanic countries have found homes in Oakland. According to the 2000 Census, nearly 12 percent of Oakland residents were foreign born, 90 percent of which were from Asia or Latin America, and came to the United States between 1990 and 2000. There are numerous areas in Oakland where more than 50 percent of residents belong to a single racial/ethnic group.

4 City of Oakland General Plan Housing Element, June 15, 2004, p. 3-9.

Table 2.2-2: Ethnic Composition

Percentage*						
White	Black	American Indian	Asian	Hawaiian/Other Pacific Islander	Other/Two or More Races	Hispanic
Alameda County						
48.8%	14.9%	0.6%	20.4%	0.6%	14.5%	19%
City of Oakland						
31.3%	35.7%	0.7%	15.2%	0.5%	16.7%	21.9%
Census Tract 4060						
19.7%	11.9%	0.6%	44%	0.2%	23.3%	30.2%
Census Tract 4061						
36.3%	12.9%	2%	9.8%	0.2%	38.7%	63.2%

Source: U.S. Census Bureau, Census 2000

* Percentages do not add up to 100 percent because the White, Black, American, Indian, Hawaiian, and Other categories include persons identified with only one race; the Hispanic category overlaps with other categories.

Table 2.2-3, *Local and Regional Demographic Summary*, provides a snapshot of other demographic characteristics of Oakland and Alameda County, as reported in the last census survey. Oakland residents have shifted out of highly capitalized blue-collar manufacturing into low-wage jobs, or into unemployment. The poverty rate for Oakland (19.4 percent) is considerably higher than the Alameda County rate (11 percent). Between 1990 and 2000, Oakland's median household income increased from $27,095 to $40,055, an increase of nearly 48 percent. The median income for families increased from $31,755 to $44,384 (approximately 40 percent), while median income for non-family households increased from $20,713 to $34,075 (approximately 70 percent). Fifty-two percent of the City's households are considered to be very low or low income, substantially higher than the countywide average of approximately 38 percent. Oakland homeownership rate (41.4 percent) is below the Alameda County rate (54.7 percent). Homeownership rates are closely related to incomes. In 2000, White households had the highest median income and the highest ownership rates. However, even though Black households had the second highest median income, their homeownership rates lag behind those of Hispanic and Asian/Pacific Islander households. According to the U.S. Census 2000, 72.8 percent (3,030) of the total population of 4,301 within census tract 4061 are of low-to-moderate income, and 68.7 (2,510) of the total population of 3,655 within census tract 4060 are of low-to-moderate income.[5]

5 www.oaklandnet.com/government/hcd/policy/docs/census/lowmodtractdata.pdf.

Table 2.2-3: Local and Regional Demographic Summary

Characteristic	City of Oakland	Alameda County
Population Change (1990 to 2000)	7.3%	12.9%
Median Household Income	$40,055	$55,946
Persons Below Poverty	76,489 (19.4%)	156,804 (11%)
High School Graduates (over age 25)	46,164	181,668
College Graduates (over age 25)	47,077	202,586
Home Ownership Rate	41.4%	54.7%
Persons per Household	2.6	2.71

Source: U.S. Census Bureau, Census 2000 – Bay Area Census

Environmental Consequences

No Build

The existing conditions of the freeway, off-ramp, and local streets within the Jingletown community contribute to neighborhood disruptions by providing an unsafe transportation corridor resulting from inadequate ramp geometry and deceleration length, as well as from traffic and unsafe pedestrian crossings within the vicinity of the Lazear Elementary School. In addition, the community has joined together to demand mitigation for the substantial noise impacts on their community from the freeway. The No Build Alternative will maintain the existing conditions as is, which will continue to result in neighborhood disruptions related to safety and noise. The Jingletown community is a well-organized community that is solidly united around getting a sound wall installed and improving the health and safety of their children. The No Build Alternative will maintain the reduced quality of life within the study area resulting from the aforementioned issues.

Proposed Project

The Proposed Project would result in installation of a sound wall to protect the Jingletown community from substantial noise impacts from the freeway, which would improve community cohesion and reduce neighborhood disruptions.

Construction Impacts

Access to the area would be maintained through the duration of construction. Construction of the Proposed Project would result in temporary ramp closures, re-routing of traffic, an increase in truck traffic on neighborhood streets, and air quality and noise impacts. While the impacts would disrupt the residents and likely create traffic build-up, these impacts would be temporary and would cease at Project completion. However, because these improvements have been petitioned for and supported by a majority of Jingletown residents for over five years, the end result would provide greater community cohesion and less neighborhood disruptions, as the community would be protected from noise by the sound wall barrier, and would enjoy increased pedestrian safety on local streets and vehicular safety at freeway intersections.

Avoidance, Minimization, and/or Mitigation Measures

Implementation of the following minimization measures related to community (COMM) impacts, COMM-1 through COMM-3, would reduce or eliminate the adverse community character and cohesion effects of the Proposed Project:

COMM-1 Pedestrian access points to businesses and facilities within the construction area will be maintained throughout the construction period. If usual access points are lost, provisions for alternative access to the affected parcels will be made.

COMM-2 Appropriate signage will be developed and displayed to direct both pedestrian and vehicular traffic to businesses via alternate routes.

COMM-3 Appropriate streetlights will be installed to reduce safety hazards to pedestrians.

2.2.2.2 Relocations

Regulatory Setting

The Department's Relocation Assistance Program (RAP) is based on the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (as amended) and Title 49 Code of Federal Regulations (CFR) Part 24. The purpose of RAP is to ensure that persons displaced as a result of a transportation project are treated fairly, consistently, and equitably so that such persons will not suffer disproportionate injuries as a result of projects designed for the benefit of the public as a whole. Please see Appendix D for a summary of the RAP.

All relocation services and benefits are administered without regard to race, color, national origin, or sex in compliance with Title VI of the Civil Rights Act (42 USC 2000d, et seq.). Please see Appendix C for a copy of the Department's Title VI Policy Statement.

Affected Environment

The affected environment for relocations is the same Project area as described in Community Character and Cohesion, above.

Environmental Consequences

Analysis of relocation impacts was conducted using aerial photographs of the Project study area, parcel boundaries, and the proposed right-of-way boundaries, and identifies properties and improvements affected by the Proposed Project. Two types of effects to properties are considered:

- Full acquisition of a property occurs if the entire parcel is within the footprint (right-of-way) of an alternative, or if the majority of the buildings lie within the footprint of the alternative.
- Partial acquisition of a property occurs if any part of a parcel is within the footprint (right-of-way) of the alternative, but does not require the displacement of the entire property. These impacts range from a sliver or edge of a parcel within the right-of-way preservation area to substantial portions that fall short of entire displacement.

Although one gas station access would be modified, which may displace or alter existing uses, based on the current configuration, implementation of the Proposed Project would not

cause any residents or businesses to relocate and therefore no adverse impacts have been identified.

No Build

No partial or full acquisitions would occur, and existing land use would not be affected by the No Build Alternative.

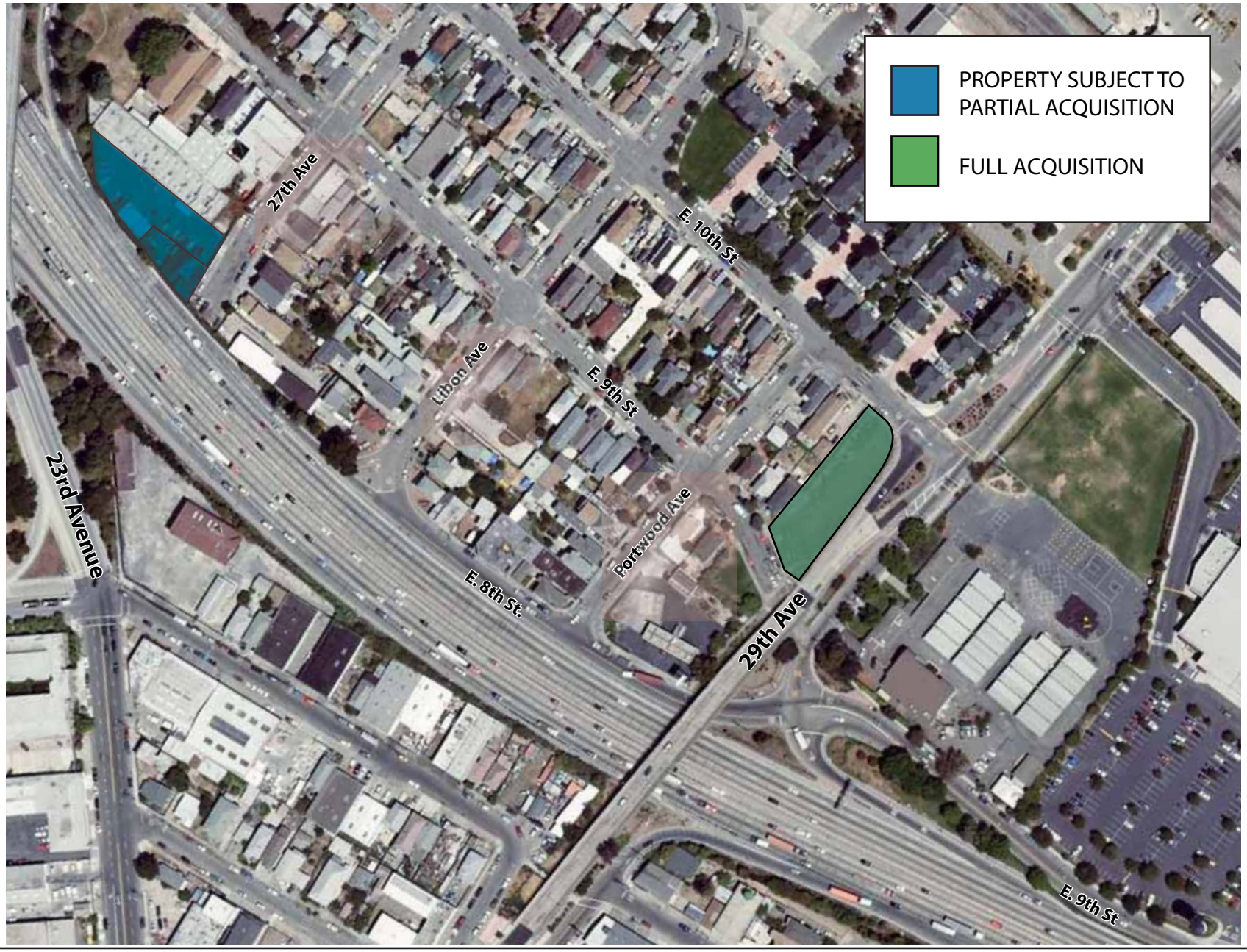
Proposed Project

Construction of the Proposed Project would require partial and full acquisition of private properties. This includes the partial acquisition of parcels 019-082-005-1 and 019-082-006-1 on 27th Avenue, and the full acquisition of parcel 019-085-021 on the corner of East 10th Street and 29th Avenue. These properties are listed in Table 2.2-4, *Properties to be Acquired*, below, and are also shown in Exhibit 2.2-3, *Proposed Acquisitions*.

Table 2.2-4: Properties to be Acquired

Assessor Parcel Number (APN)	Existing Use	Land Use Designation	Building Area (ft^2)	Lot Size (ft^2)
Full Acquisition				
019-085-021	Vacant	Mixed Housing Type Residential	N/A	11,622
Partial Acquisition				
019-082-005-1	Institutional	Mixed Housing Type Residential	N/A	13,654
019-082-006-1	Institutional	Mixed Housing Type Residential	308	4,643
N/A	Commercial	Gas Station	N/A	N/A

Source: Nite Owl Plus Online Property Search



Source: CIA, March 2009

AECOM | RBF CONSULTING

Base Map: Google Earth Pro 2008

SD Mac: 35100463.003/35100463LandscapeLetter.indd

INTERSTATE 880 OPERATIONAL AND SAFETY IMPROVEMENTS
AT 29TH AVENUE AND 23RD AVENUE OVERCROSSING IS/EA

Proposed Acquisitions

Exhibit 2.2-3

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The partial acquisition of parcel 019-082-005-1, located at the 23rd Avenue off-ramp west of the Mary Help of Christians Church, will be up to five percent (+/- 5%), and would result in the location adjustment to the existing on-site storage containers. The containers would need to be relocated to accommodate the proposed sound wall. The relocation of the storage containers would be on-site, and it is not anticipated that any employees would be displaced or that the business would be adversely impacted. In addition, the access location to the site would not be impacted by the partial acquisition. The parcel take would be acquired into Department right-of-way.

The partial acquisition of parcel 019-082-006-1, located at the end of 27th Avenue adjacent to I-880, will be up to thirteen percent (+/- 13%), and would result in the potential removal of a storage shed on-site. Currently, this parcel is on the market for sale. The access location to the site would not be impacted by the partial acquisition. The parcel take would be acquired into Department right-of-way.

The Proposed Project would result in the full acquisition of parcel 019-085-021 located at the northwest corner of 29th Avenue and East 10th Street. Currently, this parcel is a privately owned vacant dirt lot. The parcel would be acquired by the Department and conveyed to the City of Oakland.

In addition to the parcel acquisitions, the proposed Build Alternative would require the removal of the East 8th Street access driveway to the Shell Gas Station on parcel 019-084-035-1 on East 8th Street and Portwood Avenue. The removal would reduce circulation access to the gas station, which could result in impacts to the business's success. The Build Alternative identifies the intersection of East 9th Street/ 29th Avenue/ northbound 29th Avenue on ramp as a roundabout configuration.

The Build Alternative provides a viable roundabout design option that maintains local access by providing a direct access to Lazear Elementary School from westbound 29th Avenue. Because this local access is provided, the Department access denial would not need to be adjusted further into the City of Oakland.

The Build Alternative will provide operational benefits, especially in the off peak hours as traffic will not typically need to come to a complete stop. This will also result in decreased emissions, improving air quality in this area. The roundabout design option will reduce total vehicle miles traveled (VMT) by providing direct access to Lazear Elementary School from westbound 29th Avenue. The roundabout has been placed at a location where the proposed overcrossing columns will not interfere with the site distance requirements. As reported by FHWA, roundabouts have demonstrated substantial safety and operational benefits compared to other forms of intersection control and should be considered as an alternative for all proposed new intersections on Federally-funded projects.

Proposed Nonstandard Features

Non-standard features are proposed with the Build Alternative. An Exception to Mandatory Design Standards Fact Sheet was approved on September 26, 2007 and an Exception to Advisory Design Standards Fact Sheet was approved on June 4, 2007 for the several nonstandard features detailed in the Build Alternative section.

Avoidance, Minimization, and/or Mitigation Measures

Although the Proposed Project does not include the relocation of any persons or businesses, if the Project changed such that any resident or business would be relocated, then the Proposed Project would be subject to the Uniform Relocation Assistance and Real Property Acquisitions Policies Act (Uniform Act). If required, implementation of the following mitigation measure, related to relocation (REL) impacts would reduce or eliminate the adverse property acquisition effects of the Proposed Project:

REL-1 The Uniform Relocation Assistance and Real Property Acquisitions Policies Act (Uniform Act) of 1970 (Public Law 91646, 84 Stat. 1894) mandates that certain relocation services and payments be made available to eligible residents, businesses, and nonprofit organizations displaced by its projects. The Uniform Act provides for uniform and equitable treatment by Federal or Federally-assisted programs of persons displaced from their homes, businesses, or farms, and establishes uniform and equitable land acquisition policies. Oakland will provide affected property owners with a copy of the Uniform Act.

2.2.3 Utilities/Emergency Services

The table below lists the utilities and emergency services that apply to the Project area.

Table 2.2-5: Utilities / Emergency Service Providers

FACILITY TYPES AND AGREEMENTS				
Utility Company/Owner	**Utility Type**	**Agreement Required**	**Number of Pothole Verifications**	**Notes**
East Bay Municipal Utilities District	Water	Yes	4	Protect and Relocate
Pacific Gas & Electric (OH 12KV)	Electrical	Yes	-	Protect and Relocate
Pacific Gas & Electric	Fiber Optic	Yes	2	Protect and Relocate
Pacific Gas & Electric (3", 4", & 24")	Gas	Yes	10	Protect and Relocate
Comcast Cable	Cable	Yes	-	Relocate w/ OH electrical
Pacific Bell (AT&T)	Telephone	Yes	-	Relocate w/ OH electrical
City of Oakland	Sewer	No	6	Reconstruction as necessary
AC Transit, Oakland Location 1600 Franklin Street, Oakland, CA 94612	Bus Service	No	--	--
Oakland Police Department 455 Seventh Street, Oakland, CA 94607	Police	No	--	--
Oakland Fire Department 150 Frank H. Ogawa Plaza, Ste. 3354 Oakland, CA 94612	Fire	No	--	--

2.2.3.1 Affected Environment

Major transmission facilities for all service purveyors are shown on Exhibit 2.2-4, *Existing and Relocated Utilities*. There are six utility companies that own facilities within the limits of this Project. These companies include East Bay Municipal Utilities District, Pacific Gas and Electric (Electrical and Fiber Optic), Pacific Gas and Electric (Natural Gas), Comcast Cable, Pacific Bell, AT&T, and City of Oakland Sanitary Sewer. Utility agreements will be required as identified in the above table.

Many of the existing utilities located within the Project limits are proposed to be protected in place. These existing utilities will be located by physical potholing to determine line and grade during design development. Some of the existing utilities will need to be relocated to accommodate the proposed improvements.

2.2.3.2 Environmental Consequences

The Build Alternative would enhance the operation of I-880 through the Project area. As a result, the delivery of public services (bus service, waste disposal, police and fire protection, public transit and emergency medical response) is expected to improve, thus producing a positive effect. The Build Alternative would require the adjustment or relocation of some

utilities described above during construction. Decisions regarding relocation of utilities will occur during final design.

The following types of temporary impacts are expected to occur relative to emergency services: an increase in the response times of emergency, public, and fire vehicles using the interchange.

While several existing utility service facilities would require adjustment or relocation during construction, any potential disruption in service would be short-term and cease upon Project completion. Potential impacts are not anticipated to be substantial and no temporary curtailment of utility services is expected to occur. Measures are provided to ensure that disruption to services and impacts to the facilities are minimized or avoided during the construction phase. Short-term congestion would be addressed with implementation of a TMP and serve to minimize disruption to emergency services.

No additional temporary impacts are expected with implementation of the Build Alternatives.

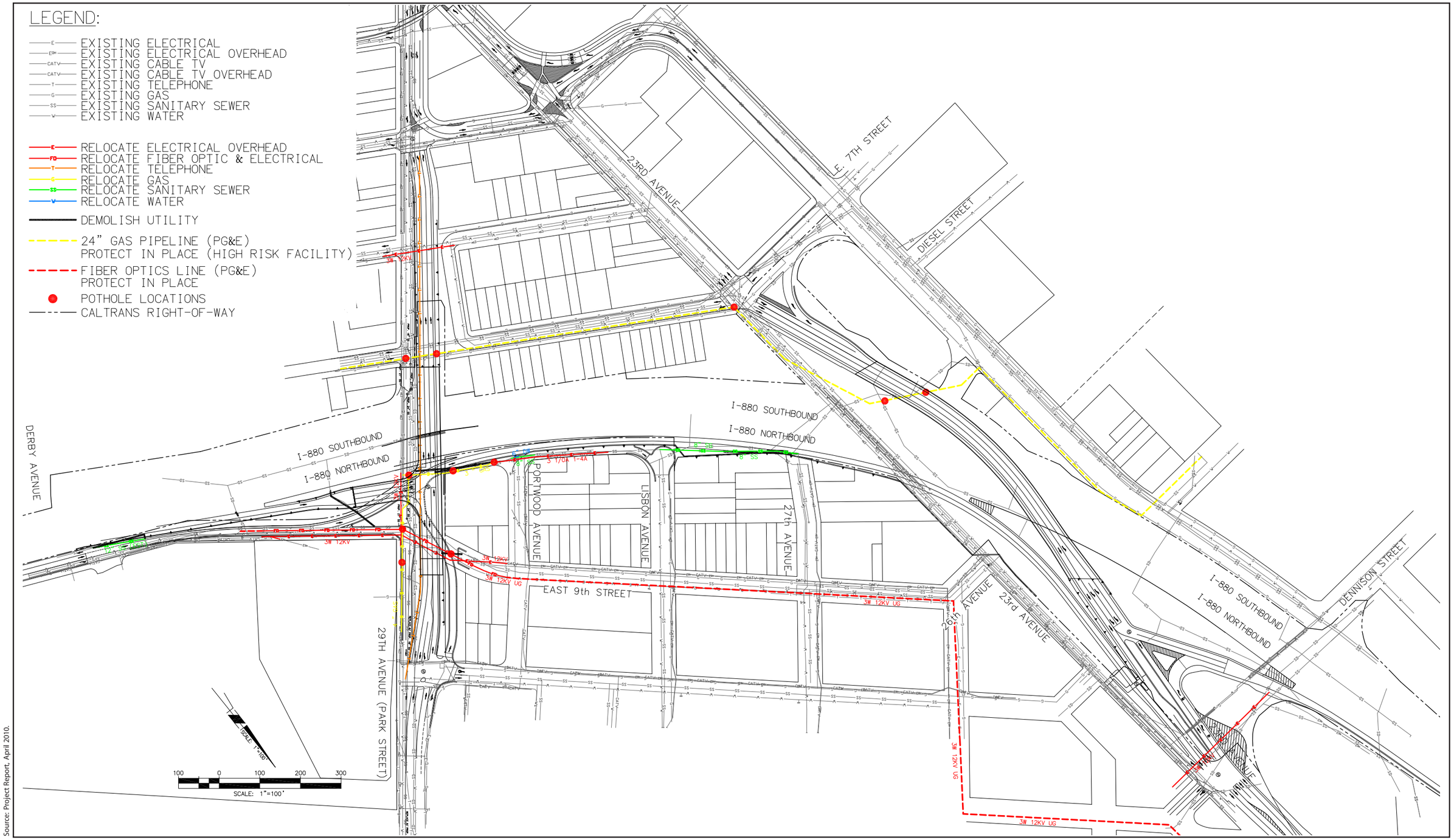
2.2.3.3 Avoidance, Minimization, and/or Mitigation Measures

Implementation of the following minimization measures related to Utilities and Emergency Services (UE) would reduce or eliminate the adverse effects as related to utilities and emergency services associated with the Proposed Project:

UE-1 Prior to commencement of construction, the Project Engineer shall coordinate with all affected utility purveys to establish exact procedures and specifications for all facilities to be relocated during construction. Additionally, the Project Engineer shall notify other service purveyors in the vicinity of the improvements to verify that the proposed activities will not disrupt services to the community.

UE-2 If relocation of any utilities requires use of area(s) beyond the construction footprint currently associated with the Build Alternative studies will be reviewed or performed as appropriate and applicable measures will be implemented.

UE-3 If any ramps are determined during final design to need to be closed for more than 10 consecutive days, a ramp closure study will be performed and the results, including determination of any warranted measures, will be implemented.



Source: Project Report, April 2010.

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INTERSTATE 880 OPERATIONAL AND SAFETY IMPROVEMENTS
AT 29TH AVENUE AND 23RD AVENUE OVERCROSSING IS/EA

Existing and Relocated Utilities

Exhibit 2.2-4

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2.2.4 Traffic and Transportation/Pedestrian and Bicycle Facilities

2.2.4.1 Regulatory Setting

The Department, as assigned by FHWA, directs that full consideration should be given to the safe accommodation of pedestrians and bicyclists during the development of federal-aid highway projects (see 23 CFR 652). It further directs that the special needs of the elderly and the disabled must be considered in all federal-aid projects that include pedestrian facilities. When current or anticipated pedestrian and/or bicycle traffic presents a potential conflict with motor vehicle traffic, every effort must be made to minimize the detrimental effects on all highway users who share the facility.

The Department is committed to carrying out the 1990 Americans with Disabilities Act (ADA) by building transportation facilities that provide equal access for all persons. The same degree of convenience, accessibility, and safety available to the general public will be provided to persons with disabilities.

2.2.4.2 Affected Environment

The following section is primarily based on the Environmental Impact Transportation Analysis dated May 7, 2009 that was prepared for the I-880 Operational and Safety Improvements at 29th Avenue and 23rd Avenue Overcrossings Project. The Environmental Impact Transportation Analysis analyzes the traffic for the existing year, 2008, and the forecast year 2035 for the Build and No Build Alternatives.

I-880 is a vital part of the Bay Area's transportation system. The Oakland segment of I-880 provides access to numerous intermodal facilities and attractions including the Port of Oakland, Oakland International Airport, the U.S. Mail and UPS distribution centers, downtown Oakland, and the Oakland/Alameda County Coliseum complex. With truck restrictions on I-580, the I-880 corridor is the primary regional roadway facility providing access to residents and businesses throughout the cities of Oakland and Alameda. I-880 is also a major commuter route, providing connections between centers in Alameda, Santa Clara, San Francisco, Contra Costa, and San Mateo counties.

Traffic Management Plans, Pedestrians and Bicycles

Enhancements for pedestrians have particularly been provided at the 29th Avenue overcrossing; refer to Exhibit 2.2-5, *Pedestrian and Bicycle Access Exhibit*. Per the request of the City of Oakland, the Project now includes one eight foot sidewalk on the 29th Avenue overcrossing rather than two five foot sidewalks. The Build Alternative places the eight foot sidewalk on the north side of the overcrossing. The City of Oakland has requested to have the option to place the eight foot sidewalk on the south side of the overcrossing. Having the sidewalk on the south side of the overcrossing would reduce the number of overall crossings that pedestrians traveling from the area south of the overcrossing would have to cross; however, this would require having pedestrians crossing the higher speed off ramp traffic. In addition, pedestrians would touch down to the local street intersections in confined islands between two lanes of traffic. It has been determined that the final decision of which side the eight foot sidewalk is on is a design detail that may be worked out in the final design after public input has also been considered.

The Project is programmed in the Regional Transportation Plan (RTP ID 22769) and the State Transportation Improvement Program (TIP ID ALA050019) on the 2009 Transportation

Improvement Program, and is described as follows: CTIPS ID #20600003326: Oakland: I-880 between 16th Avenue to 29th Avenue; reconfigure interchange, including new ramps. The Project is consistent with the City of Oakland General Plan Strategic Transportation Improvement Plan, which highlights the I-880 Improvement Corridor as an important implementation of the policies and goals of the City of Oakland General Plan. Because of the importance of the I-880 corridor in support of economic development and providing opportunities to reconnect the City's neighborhoods with the waterfront, improvements in the I-880 corridor from I-980 to 98th Avenue are the City's highest priority for improvement to the Regional Access system. Therefore, the Project is consistent with applicable transportation plans and programs.

Regional Growth Plans

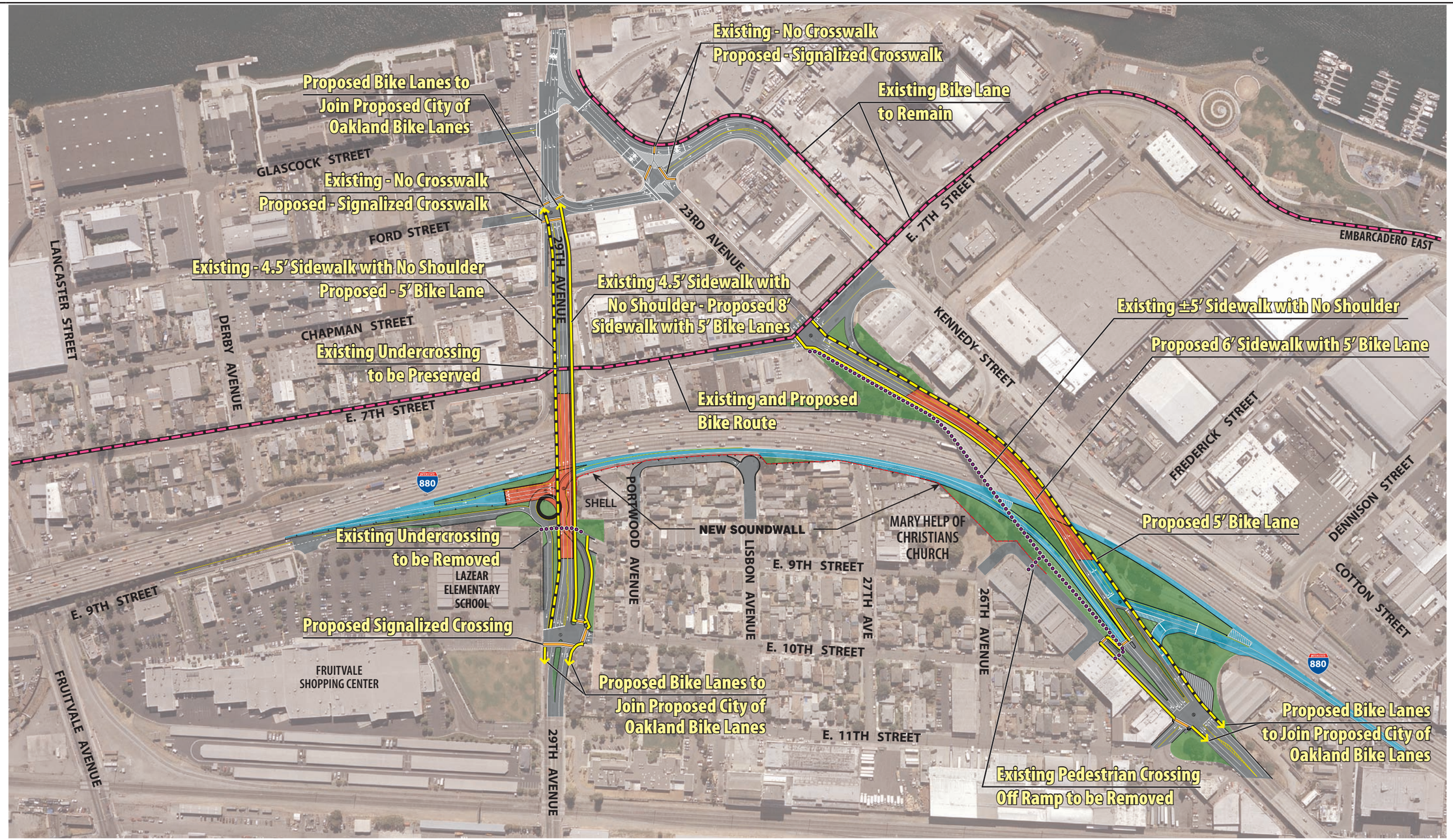
The Association of Bay Area Governments (ABAG) projected a six percent population growth rate for Oakland between 2000 and 2010, and a four percent increase between 2010 and 2020. The ABAG population growth projection for Alameda County is ten percent between 2000 and 2010 and five percent between 2010 and 2020. The City of Oakland General Plan states that most of Oakland's population growth has come from immigration not necessarily related to development trends in the central city and major corridors.

The Project would add minimal roadway capacity at the intersections in order to accommodate the new profiles of the overcrossings, which includes the provision of auxiliary lanes and longer on- and off-ramps to allow for additional acceleration and deceleration lengths to provide additional storage length for queuing vehicles; however, capacity would not be increased on mainline I-880. Therefore, the Project would not encourage growth beyond that envisioned in ABAG's growth projections, and the proposed interchange improvements would be consistent with applicable regional growth plans.

City of Alameda Transportation Master Plan

The Transportation Element Update is an update to the City of Alameda's existing Transportation Element, adopted as part of the 1991 City of Alameda General Plan. This update revises and supplements existing Transportation Element policies with policies that would facilitate the City of Alameda's future transportation decisions consistent with the goals for circulation, livability, transportation choice, and implementation. This document is herein referred to as the "Alameda Transportation Master Plan".[6]

[6] City of Alameda Transportation Element Update, Final Environmental Impact Report. November 2008. Prepared for City of Alameda. Prepared by PMC. SCH No. 2007072075.



Ortho-photo flown September 2008

LOCAL ROADWAY IMPROVEMENTS
RAMP IMPROVEMENTS
OVERCROSSING STRUCTURE
PROPOSED LANDSCAPE

Source: Transportation Analysis, July 2009

AECOM | RBF CONSULTING

Base Map Source: Google Earth Pro

SD Mac: 35100463.003/35100463LandscapeTabloid.indd

INTERSTATE 880 OPERATIONAL AND SAFETY IMPROVEMENTS
AT 29TH AVENUE AND 23RD AVENUE OVERCROSSING IS/EA

Pedestrian and Bicycle Access

Exhibit 2.2-5

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Existing and Forecast Traffic

Intersection Analysis

The July 2009, Environmental Impact Transportation Analysis utilized data for existing conditions from the *I-880 Improvements at the 23rd Avenue and 29th Avenue Interchanges Traffic Data Collection Report* (Traffic Data Collection Report). [7] The forecast data utilized in this analysis is provided in the *I-880 Improvements at the 23rd Avenue and 29th Avenue Interchanges Traffic Forecast Report* (Traffic Forecast Report).[8]

The I-880 Improvements at the 23rd Avenue and 29th Avenue Interchanges analysis includes the existing (year 2008) conditions, no build (year 2035) conditions, and the build (year 2035) conditions.

Study Intersections

The intersection locations presented in the Existing Conditions evaluation include 28 different locations. The study intersection locations are shown in Exhibit 2.2-6, *Existing Conditions Intersection Locations*. The intersection numbers correspond to those presented in the Traffic Data Collection Report.

Intersection Analysis Methodology

Intersection Operations

LOS is commonly used as a qualitative description of intersection operation and is based on the capacity of the intersection and the volume of traffic using the intersection. The Highway Capacity Manual (HCM) analysis methodology for Signalized Intersections and Unsignalized Intersections was utilized to determine the operating LOS of the study intersections. Intersection LOS calculations have been prepared utilizing the Synchro software, which takes into account traffic volumes, distance between intersections, traffic signal phasing and cycle lengths, and vehicular traffic progression between and through intersections.

The HCM analysis methodology describes the operation of an intersection using a range of LOS from LOS A (free-flow conditions) to LOS F (severely congested conditions), based on corresponding stopped delay per vehicle ratios for signalized and unsignalized intersections shown in Table 2.2-6, *Intersection Level of Service Criteria.*

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7 I-880 Improvements at the 23rd Avenue and 29th Avenue Interchanges Traffic Data Collection Report. December 22, 2008. Prepared for Alameda County Congestion Management Agency by AECOM.

8 I-880 Improvements at the 23rd Avenue and 29th Avenue Interchanges Traffic Forecast Report. March 12, 2009. Prepared for Alameda County Congestion Management Agency by AECOM.

Table 2.2-6: Intersection Level of Service Criteria

LOS	Description	Intersection Delay[(a)]	
		Signalized	Unsignalized
A	Little or no delay	≤ 10.0	≤ 10.0
B	Short traffic delay	> 10.0 and ≤ 20.0	> 10.0 and ≤ 15.0
C	Average traffic delay	> 20.0 and ≤ 35.0	> 15.0 and ≤ 25.0
D	Long traffic delay	> 35.0 and ≤ 55.0	> 25.0 and ≤ 35.0
E	Very long traffic delay	> 55.0 and ≤ 80.0	> 35.0 and ≤ 50.0
F	Extreme traffic delay	> 80.0	> 50.0

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

(a) Intersection delay in terms of seconds per vehicle.

Network Queuing

At all signalized and unsignalized two-way stop controlled intersections, the vehicle queue lengths were determined by utilizing the Synchro 7 software. This software incorporates the HCM methodology to determine the 95th percentile queue length; however, neither Synchro nor the HCM include a methodology for determining queue lengths at unsignalized all-way stop controlled intersections.

At all unsignalized all-way stop controlled intersection, the vehicle queue lengths were determined by utilizing Dowling Associate's Traffix 7.9 (Release 4) software. Although this queue length methodology is not provided in the HCM, estimated queue lengths provided from Traffix are typically considered reliable for design and planning purposes.

An assessment of vehicle queuing caused by ramp metering operations is included in the Ramp Meter Queuing section. An assessment of bridge operations is included in the Bridge Queuing section. A detailed discussion of the corresponding software and methodology is included in the Regional Freeway Analysis Methodology section.

Intersection Analysis – Existing Conditions

The results of the existing conditions intersection LOS analysis for the weekday AM and PM peak hours is included in Table 2.2-7, *Intersection Operations – Existing Conditions*. As shown in Table 2.2-7, *Intersection Operations – Existing Conditions*, during the weekday AM peak hour, two study intersections operate at LOS E or worse; during the weekday PM peak hour, no study intersections operate at LOS E or worse.

Table 2.2-7: Intersection Operations – Existing Conditions

Intersection		Control Type	Weekday AM Peak Hour		Weekday PM Peak Hour	
			LOS	Delay	LOS	Delay
1	Park St. / Lincoln Av.	Signal	B	13.3	B	13.3
2	Park St. / Buena Vista Av.	Signal	B	12.0	B	14.0
3	Park St. / Clement Av.	Signal	D	41.2	B	18.4
4	Park St. / Blanding Av.	Signal	**F**	**> 80.0**	D	38.2
5	29th Av. / 23rd Av.	TWSC	B	13.6	B	11.2
6	29th Av. / Glascock St.	TWSC	B	13.2	B	10.9
7	29th Av. / Ford St.	TWSC	D	28.7	D	25.1
8	29th Av. / Chapman St.	TWSC	B	11.1	B	11.8
9	29th Av. / E. 7th St.	TWSC	B	11.3	B	12.0
10	29th Av. / E. 9th St.	AWSC	**E**	**46.7**	C	17.3
11	29th Av. / E. 10th St.	TWSC	C	17.5	B	14.2
12	29th Av. / E. 12th St.	Signal	B	13.4	B	14.7
13	29th Av. / International Bl.	Signal	B	12.4	B	14.3
14	Lisbon Av. / E. 8th St.	TWSC	C	18.1	B	11.8
15	Lisbon Av. / E. 10th St.	AWSC	A	7.2	A	7.3
16	23rd Av. / Ford St.	Signal	B	11.9	C	21.6
17	23rd Av. / Chapman St.	TWSC	D	31.8	C	18.1
18	23rd Av. / E. 7th St.	Signal	C	26.5	B	12.7
19	23rd Av. / E. 11th St.	Signal	B	14.6	B	17.5

Table 2.2-7: Intersection Operations – Existing Conditions, continued

Intersection		Control Type	Weekday AM Peak Hour		Weekday PM Peak Hour	
			LOS	Delay	LOS	Delay
20	22nd Av. / E. 12th St.	Signal	C	26.6	C	26.2
21	22nd Av. / International Bl.	Signal	B	12.1	B	12.2
22	Kennedy St. / E. 7th St.	Signal	A	8.2	B	12.1
23	Kennedy St. / Dennison St.	TWSC	C	16.6	D	27.9
24	16th Av. / Embarcadero	TWSC	C	16.9	C	19.2
25	Fruitvale Av. / E. 8th St.	Signal	B	12.7	B	14.2
26	Fruitvale Av. / E. 9th St.	Signal	C	24.6	C	34.1
27	Fruitvale Av. / E. 12th St.	Signal	C	25.8	B	14.5
28	Fruitvale Av. / International Bl.	Signal	B	14.7	B	10.9

Source: AECOM – July 2009

Notes: TWSC = Two-Way Stop Controlled; AWSC = All-Way Stop Controlled; Signal = Signalized; Weekday AM peak period = 6:30am to 9:30am; Weekday PM peak period = 3:30pm to 6:30pm; Delay in terms of seconds per vehicle. **Bold** denotes intersection operating at LOS E or worse.

Intersection Queuing

Existing intersection queuing conditions were evaluated for the weekday AM and PM peak hours. The results of the existing conditions intersection queuing analysis for the weekday AM and PM peak hours are included in Table 2.2-8, *Intersection Queuing – Existing Conditions*. As shown in Table 2.2-8, *Intersection Queuing – Existing Conditions*, during the weekday AM peak hour, vehicle queuing from downstream roadway facilities frequently extend through the following intersections:

- Number 2, Park Street / Buena Vista Avenue (eastbound);
- Number 3, Park Street / Clement Avenue (eastbound);
- Number 7, 29th Avenue / Ford Street (eastbound);
- Number 9, 29th Avenue / East 7th Street (eastbound);
- Number 25, Fruitvale Avenue / East 8th Street (eastbound); and,
- Number 26, Fruitvale Avenue / East 9th Street (westbound).

Table 2.2-8: Intersection Queuing – Existing Conditions

Intersection		Peak Hour	Northbound			Southbound			Eastbound			Westbound		
			L	T	R	L	T	R	L	T	R	L	T	R
1	Park St. / Lincoln Av.	AM	75[a]	75	75	125	100	25	125	125	125	175	175	175
		PM	100[a]	75	75	100	75	25	150	150	150	275	275	275
2	Park St. / Buena Vista Av.	AM	175	175	175	**150**	125	125	150	150	150	75	75	75
		PM	125	125	125	125	150	150	175	175	175	275	275	275
3	Park St. / Clement Av.	AM	250	250	250	**300***	**300***	**300***	175	175	175	75	175	175
		PM	75	75	75	250	250	250	250	250	250	100	25	25
4	Park St. / Blanding Av.	AM	**425***	**425***	**425***	**325***	**325***	**325***	-	**275**	**275**	-	**200**	**200**
		PM	225	225	225	225	225	225	-	**250**	**250**	-	**475***	**475***
5	29th Av. / 23rd Av.	AM	-	-	-	25	-	0	-	0	-	-	-	-
		PM	-	-	-	25	-	0	-	0	-	-	-	-
6	29th Av. / Glascock St.	AM	-	-	25	-	-	-	-	0	0	-	-	-
		PM	-	-	25	-	-	-	-	0	0	-	-	-
7	29th Av. / Ford St.	AM	-	50	50	-	-	-	0	0	0	25	-	0
		PM	-	25	25	-	-	-	0	0	0	25	-	0
8	29th Av. / Chapman St.	AM	-	-	25	-	-	-	-	0	0	25	-	-
		PM	-	-	25	-	-	-	-	0	0	25	-	-
9	29th Av. / E. 7th St.	AM	25	-	25	-	-	-	-	0	0	-	-	-
		PM	25	-	25	-	-	-	-	0	0	-	-	-
10	29th Av. / E. 9th St.	AM	-	450	450	50	50	-	75	75	75	-	-	-
		PM	-	150	150	50	50	-	125	125	125	-	-	-

Table 2.2-8: Intersection Queuing – Existing Conditions, continued

Intersection		Peak Hour	Northbound			Southbound			Eastbound			Westbound		
			L	T	R	L	T	R	L	T	R	L	T	R
11	29th Av. / E. 10th St.	AM	-	-	-	50	-	50	25	0	-	-	0	0
		PM	-	-	-	50	-	50	25	0	-	-	0	0
12	29th Av. / E. 12th St.	AM	125	250	250	50	100	25	150	150	150	75	75	75
		PM	100	125	125	50	150	50	125	**275**	**275**	75	75	75
13	29th Av. / International	AM	125	175	175	25	150	150	75	75	75	125	125	125
		PM	100	125	125	50	225	225	**150**	150	150	150	150	150
14	Lisbon Av. / E. 8th St.	AM	-	0	0	-	-	-	-	-	-	25	-	25
		PM	-	0	0	-	-	-	-	-	-	25	-	25
15	Lisbon Av. / E. 10th St.	AM	50	50	50	25	25	25	25	25	25	25	25	25
		PM	50	50	50	25	25	25	25	25	25	25	25	25
16	23rd Av. / Ford St.	AM	0	100	0	-	-	0	-	-	-	-	150	25
		PM	0	50	0	-	-	0	-	-	-	-	350	25
17	23rd Av. / Chapman St.	AM	25	-	25	-	-	-	-	0	0	25	0	-
		PM	25	-	25	-	-	-	-	0	0	25	0	-
18	23rd Av. / E. 7th St.	AM	25	25	25	125	25	25	**375***	**375***	**375***	50	50	50
		PM	25	25	25	**225**	25	25	175	175	175	100	100	25
19	23rd Av. / E. 11th St.	AM	50	50	50	-	-	-	200	225	225	50	275	275
		PM	75	75	75	-	-	-	250	**450**	**450**	50	300	300
20	22nd Av. / E. 12th St.	AM	**225**	175	175	-	125	125	200	200	200	200	200	200
		PM	150	75	75	-	225	225	275	275	275	125	125	125

Table 2.2-8: Intersection Queuing – Existing Conditions, continued

Intersection		Peak Hour	Northbound			Southbound			Eastbound			Westbound		
			L	T	R	L	T	R	L	T	R	L	T	R
21	22nd Av. / International	AM	100	100	100	75	75	75	75	75	75	125	125	125
		PM	75	75	75	100	100	100	150	150	150	75	75	75
22	Kennedy St. / E. 7th St.	AM	50	50	50	50	50	25	25	25	25	75	75	75
		PM	75	75	50	125	125	50	25	25	25	125	125	125
23	Kennedy St. / Dennison St.	AM	-	-	-	-	-	25	50	-	-	-	-	25
		PM	-	-	-	-	-	125	25	-	-	-	-	25
24	16th Av. / Embarcadero	AM	-	0	0	25	0	-	-	-	-	50	-	25
		PM	-	0	0	25	0	-	-	-	-	50	-	25
25	Fruitvale Av. / E. 8th St.	AM	75	-	75	175	175	25	-	275	275	25	**175**	-
		PM	50	-	50	**250**	**250**	50	-	225	225	25	**375**	-
26	Fruitvale Av. / E. 9th St.	AM	125	125	125	125	125	125	**350**	**625**	**625**	25	**550**	**550**
		PM	125	125	125	**450***	**450***	**450***	**150**	**450**	**450**	25	**600**	**600**
27	Fruitvale Av. / E. 12th St.	AM	50	50	50	50	100	25	**325***	**300**	**300**	125	125	125
		PM	75	50	50	75	125	75	**225**	175	175	100	100	100
28	Fruitvale Av. / International	AM	75	175	175	50	75	75	75	75	75	**350**	**350**	**350**
		PM	75	100	100	75	150	150	125	125	125	200	200	200

Source: AECOM – July 2009

L = Left; T = Through; R = Right; Queue length in terms of feet; Queue length represents longest 95th percentile turning movement queue length; All queue lengths are rounded up to the length of a full vehicle (assuming vehicle length is 25 feet); "-" denotes movement that does not exist; "*" denotes movement where volume exceeds capacity (i.e., queue length is theoretically infinite); **Bold** denotes movements exceeding the queue length storage capacity of the turning pocket or upstream segment; (a) The northbound queue length represents the Tilden Way approach. The Lincoln Avenue approach queue length is 25 feet during the weekday AM and weekday PM peak hours.

As shown in Table 2.2-8, *Intersection Queuing – Existing Conditions*, during the weekday PM peak hour, vehicle queuing from downstream roadway facilities frequently extend through the following intersections:

- Number 3, Park Street / Clement Avenue (eastbound);
- Number 7, 29th Avenue / Ford Street (eastbound);
- Number 8, 29th Avenue / Chapman Street (eastbound);
- Number 9, 29th Avenue / East 7th Street (eastbound);
- Number 25, Fruitvale Avenue / East 8th Street (eastbound); and,
- Number 26, Fruitvale Avenue / East 9th Street (westbound).

Intersection Operations Analysis – Forecast Year 2035 Conditions

Build

In addition to improving the roadway network facilities, the Proposed Project would alter traffic circulation and intersection operations on the local roadways.

The results of the Build Conditions intersection LOS analysis for the weekday AM and PM peak hours is included in Table 2.2-9, *Intersection Operations – Build Conditions*. As indicated on Table 2.2-9, *Intersection Operations – Build Conditions*, during the weekday AM peak hour, 13 of the 28 study intersections would be expected to operate at LOS E or worse in the Build Conditions. During the weekday PM peak hour, 10 of the 28 study intersections would be expected to operate at LOS E or worse in the Build Conditions. In the Build Conditions, the three proposed intersections would all operate at LOS D or better during the weekday AM and PM peak hours.

It should be noted that with the roundabout design option, a metered roundabout (proposed intersection #42) will replace the existing 29th Avenue / East 9th Street intersection (existing intersection #10) in the Build Conditions. The peak hour volumes entering the roundabout during metered operations are less than unmetered peak hour volumes. Therefore for the intersection operations analysis, operations were evaluated using unmetered volumes as they are more conservative for an operational analysis.

Table 2.2-9: Intersection Operations – Build Conditions

Intersection		Peak Hour	No Build Conditions		Build Conditions	
			LOS	Delay	LOS	Delay
1	Park St. / Lincoln Av.	AM	D	48.7	D	48.7
		PM	**E**	**58.4**	**E**	**58.4**
2	Park St. / Buena Vista Av.	AM	B	17.7	B	17.7
		PM	B	17.0	B	17.0
3	Park St. / Clement Av.	AM	**E**	**61.7**	**E**	**66.2**
		PM	D	47.7	**E**	**61.5**
4	Park St. /	AM	**F**	**>80.0**	**F**	**>80.0**

Table 2.2-9: Intersection Operations – Build Conditions, continued

Intersection		Peak Hour	No Build Conditions		Build Conditions	
			LOS	Delay	LOS	Delay
	Blanding Av.	PM	**F**	**>80.0**	**F**	**>80.0**
5	29th Av. / 23rd Av.	AM	C	20.1	B	14.9
		PM	B	13.9	B	11.3
6	29th Av. / Glascock St.	AM	C	17.9	B	12.4
		PM	B	12.0	C	16.5
7	29th Av. / Ford St.	AM	**F**	**>50.0**	C	28.2
		PM	**F**	**>50.0**	D	48.1
8	29th Av. / Chapman St.	AM	B	11.1	B	10.6
		PM	B	11.8	B	11.6
9	29th Av. / E. 7th St.	AM	B	11.3	B	11.0
		PM	B	12.0	B	12.0
11	29th Av. / E. 10th St.	AM	D	31.1	B	15.9
		PM	D	33.2	B	14.9
12	29th Av. / E. 12th St.	AM	**F**	**>80.0**	**F**	**>80.0**
		PM	**E**	**56.6**	**F**	**>80.0**
13	29th Av. / International	AM	D	53.2	**E**	**61.9**
		PM	**F**	**>80.0**	**F**	**>80.0**
15	Lisbon Av. / E. 10th St.	AM	A	7.4	A	7.4
		PM	A	8.4	A	7.7
16	23rd Av. / Ford St.	AM	B	17.9	A	8.3
		PM	C	24.7	A	7.3
17	23rd Av. / Chapman St.	AM	**F**	**>50.0**	**f**	**>50.0**
		PM	D	34.1	D	25.4
18	23rd Av. / E. 7th St.	AM	**F**	**>80.0**	D	51.3
		PM	C	21.4	B	17.8
19	23rd Av. / E. 11th St.	AM	C	32.6	B	10.3
		PM	**E**	**73.3**	B	11.9
20	22nd Av. / E. 12th St.	AM	**F**	**>80.0**	**F**	**>80.0**
		PM	**F**	**>80.0**	**F**	**>80.0**
21	22nd Av. / International	AM	B	16.1	B	19.6
		PM	C	21.2	B	18.5

Table 2.2-9: Intersection Operations – Build Conditions, continued

Intersection		Peak Hour	No Build Conditions		Build Conditions	
			LOS	Delay	LOS	Delay
22	Kennedy St. / E. 7th St.	AM	A	9.2	B	10.5
		PM	B	15.1	B	17.6
23	Kennedy St. / Dennison St.	AM	C	22.8	C	22.8
		PM	D	29.1	D	29.1
24	16th Av. / Embarcadero	AM	**F**	**>50.0**	**F**	**>50.0**
		PM	**F**	**>50.0**	**F**	**>50.0**
25	Fruitvale Av. / E. 8th St.	AM	B	15.0	B	15.4
		PM	C	25.9	C	26.2
26	Fruitvale Av. / E. 9th St.	AM	**F**	**>80.0**	**F**	**>80.0**
		PM	**F**	**>80.0**	**F**	**>80.0**
27	Fruitvale Av. / E. 12th St.	AM	**F**	**>80.0**	**F**	**>80.0**
		PM	**F**	**>80.0**	**F**	**>80.0**
28	Fruitvale Av. / International	AM	**F**	**>80.0**	**F**	**>80.0**
		PM	D	49.4	D	49.5
41	29th Av. / I-880 Off-Ramp	AM	-	-	B	10.8
		PM	-	-	B	15.5
42[a]	29th Av. / I-880 On-Ramp	AM	-	-	C	18.1
		PM	-	-	B	11.7
42[b]	29th Av. / I-880 On-Ramp	AM	-	-	B	0.75
		PM	-	-	A	0.55
43	23rd Av. / I-880 On-Ramp	AM	-	-	**E**	**76.9**
		PM	-	-	D	40.3

Source: AECOM – July 2009; Weekday AM peak period = 6:30am to 9:30am; Weekday PM peak period = 3:30pm to 6:30pm; Delay in terms of seconds per vehicle; **Bold** denotes intersection operating at LOS E or worse; (a) Tee intersection option; (b) Roundabout option.

No Build

The results of the No Build (year 2035) Conditions intersection LOS analysis for the weekday AM and PM peak hours is provided in Table 2.2-10, *Intersection Operations – No Build (Year 2035) Conditions*. The results of the No Build (year 2035) Conditions intersection LOS analysis for the weekday AM and PM peak hours is included in Table 2.2-10, *Intersection Operations – No Build (Year 2035) Conditions*. During the weekday AM peak hour, 12 of the 28 study intersections would be expected to operate at LOS E or worse in the No Build Conditions. During the weekday PM peak hour, 10 of the 28 study intersections would be expected to operate at LOS E or worse in the No Build Conditions.

Table 2.2-10: Intersection Operations – No Build (Year 2035) Conditions

Intersection		Peak Hour	Existing Conditions		No Build Conditions	
			LOS	Delay	LOS	Delay
1	Park St. / Lincoln Av.	AM	B	13.3	D	48.7
		PM	B	13.3	**E**	**58.4**
2	Park St. / Buena Vista Av.	AM	B	12.0	B	17.7
		PM	B	14.0	B	17.0
3	Park St. / Clement Av.	AM	D	41.2	**E**	**61.7**
		PM	B	18.4	D	47.7
4	Park St. / Blanding Av.	AM	**F**	**>80.0**	**F**	**>80.0**
		PM	D	38.2	**F**	**>80.0**
5	29th Av. / 23rd Av.	AM	B	13.6	C	20.1
		PM	B	11.2	B	13.9
6	29th Av. / Glascock St.	AM	B	13.2	C	17.9
		PM	B	10.9	B	12.0
7	29th Av. / Ford St.	AM	D	28.7	**F**	**>50.0**
		PM	D	25.1	**F**	**>50.0**
8	29th Av. / Chapman St.	AM	B	11.1	B	11.1
		PM	B	11.8	B	11.8
9	29th Av. / E. 7th St.	AM	B	11.3	B	11.3
		PM	B	12.0	B	12.0
10	29th Av. / E. 9th St.	AM	**E**	**46.7**	**F**	**>50.0**
		PM	C	17.3	**F**	**>50.0**
11	29th Av. / E. 10th St.	AM	C	17.5	D	31.1
		PM	B	14.2	D	33.1
12	29th Av. / E. 12th St.	AM	B	13.4	**F**	**>80.0**
		PM	B	14.7	D	56.6
13	29th Av. / International	AM	B	12.4	D	53.2
		PM	B	14.3	**F**	**>80.0**
14	Lisbon Av. / E. 8th St.	AM	C	18.1	C	18.5
		PM	B	11.8	C	15.8
15	Lisbon Av. / E. 10th St.	AM	A	7.2	A	7.4
		PM	A	7.3	A	8.4
16	23rd Av. / Ford St.	AM	B	11.9	B	17.9
		PM	C	21.6	C	24.7
17	23rd Av. / Chapman St.	AM	D	31.8	**F**	**>50.0**
		PM	C	18.1	D	34.1
18	23rd Av. / E. 7th St.	AM	C	26.5	**F**	**>80.0**
		PM	B	12.7	C	21.4
19	23rd Av. / E. 11th St.	AM	B	14.6	C	32.6
		PM	B	17.5	**E**	**73.3**

Table 2.2-10: Intersection Operations – No Build (Year 2035) Conditions, continued

Intersection		Peak Hour	Existing Conditions		No Build Conditions	
			LOS	Delay	LOS	Delay
20	22nd Av. / E. 12th St.	AM	C	26.6	**F**	**>80.0**
		PM	C	26.2	**F**	**>80.0**
21	22nd Av. / International	AM	B	12.1	B	16.1
		PM	B	12.2	C	21.2
22	Kennedy St. / E. 7th St.	AM	A	8.2	A	9.2
		PM	B	12.1	B	15.1
23	Kennedy St. / Dennison St.	AM	C	16.6	C	22.8
		PM	D	27.9	D	29.1
24	16th Av. / Embarcadero	AM	C	16.9	**F**	**>50.0**
		PM	C	19.2	**F**	**>50.0**
25	Fruitvale Av. / E. 8th St.	AM	B	12.7	B	15.0
		PM	B	14.2	C	25.9
26	Fruitvale Av. / E. 9th St.	AM	C	24.6	**F**	**>80.0**
		PM	C	34.1	**F**	**>80.0**
27	Fruitvale Av. / E. 12th St.	AM	C	25.8	**F**	**>80.0**
		PM	B	14.5	**F**	**>80.0**
28	Fruitvale Av. / International	AM	B	14.7	**F**	**>80.0**
		PM	B	10.9	D	49.4

Source: AECOM – July 2009
Weekday AM peak period = 6:30am to 9:30am; Weekday PM peak period = 3:30pm to 6:30pm; Delay in terms of seconds per vehicle; **Bold** denotes intersection operating at LOS E or worse.

Intersection Queuing Analysis – Forecast Year 2035 Conditions

Build

During the weekday AM peak hour, the queue length storage capacity would be exceeded for at least one approach at 12 of the 29 intersection in the Build Conditions (Year 2035). During the weekday PM peak hour, the queue length storage capacity would be exceeded for at least one approach at 12 of the 29 intersection in the Build Conditions. The approach storage capacity was determined to be the distance to the nearest intersection, bridge, or railroad crossing. Intersection queuing conditions were evaluated for the weekday AM and PM peak hours. The results of the Build Conditions intersection queuing analysis for the weekday AM and PM peak hours are included in Table 2.2-11, *Intersection Queuing – Build Conditions – Weekday AM Peak Hour,* and Table 2.2-12, *Intersection Queuing – Build Conditions – Weekday PM Peak Hour.*

It should be noted that with the roundabout design option, a metered roundabout (proposed intersection #42) will replace the existing 29th Avenue / East 9th Street intersection (existing intersection #10) in the Build Conditions. The vehicle queues approaching the roundabout during metered operations are longer than unmetered peak hour vehicle queues. Therefore for the intersection queuing analysis, queuing was evaluated using metered conditions as they are more conservative for a queuing analysis.

Table 2.2-11: Intersection Queuing – Build Conditions – Weekday AM Peak Hour

Intersection		Condition	Northbound			Southbound			Eastbound			Westbound		
			L	T	R	L	T	R	L	T	R	L	T	R
1	Park St. / Lincoln Av.	No Build	75[(a)]	200	200	**250***	100	**75**	250	250	250	**350***	**350***	**350***
		Build	75[(a)]	200	200	**250***	100	**75**	250	250	250	**350***	**350***	**350***
2	Park St. / Buena Vista Av.	No Build	275	275	275	**225**	125	125	150	150	150	150	150	150
		Build	275	275	275	**225**	125	125	150	150	150	150	150	150
3	Park St. / Clement Av.	No Build	250	250	250	**350***	**350***	**350***	**400***	**400***	**400***	75	200	200
		Build	225	225	225	**350***	**350***	**350***	**400***	**400***	**400***	75	200	200
4	Park St. / Blanding Av.	No Build	**425***	**425***	**425***	**500***	**500***	**500***	-	**375***	**375***	-	**475***	**475***
		Build	**425***	**425***	**425***	**500***	**500***	**500***	-	**375***	**375***	-	**500***	**500***
5	29th Av. / 23rd Av.	No Build	-	-	-	50	-	0	-	0	-	-	-	-
		Build	-	-	-	25	-	0	-	0	-	-	-	-
6	29th Av. / Glascock St.	No Build	-	-	25	-	-	-	-	0	0	-	-	-
		Build	-	-	50	-	-	-	-	0	0	-	-	-
7	29th Av. / Ford St.	No Build	-	**700***	**700***	-	-	-	0	0	0	25	-	0
		Build	-	-	25	-	-	-	**550**	**675**	**675**	150	-	375
8	29th Av. / Chapman St.	No Build	-	-	25	-	-	-	-	0	0	25	-	-
		Build	-	-	25	-	-	-	-	0	0	0	-	-
9	29th Av. / E. 7th St.	No Build	25	-	25	-	-	-	-	0	0	-	-	-
		Build	25	-	25	-	-	-	-	0	0	-	-	-
11	29th Av. / E. 10th St.	No Build	-	-	-	75	-	75	25	0	-	-	0	0
		Build	-	-	-	100	-	100	75	250	-	-	100	100

Table 2.2-11: Intersection Queuing – Build Conditions – Weekday AM Peak Hour, continued

Intersection		Condition	Northbound			Southbound			Eastbound			Westbound		
			L	T	R	L	T	R	L	T	R	L	T	R
12	29th Av. / E. 12th St.	No Build	**175***	**525***	**525***	150	150	25	**400***	**300**	**300**	100	100	100
		Build	**175***	**600***	**600***	150	150	25	**400***	**400**	**400**	75	75	75
13	29th Av. / International	No Build	150	300	300	125	275	275	**300**	175	175	**425***	**425***	**425***
		Build	150	325	325	125	275	275	**300**	175	175	**425***	**425***	**425***
15	Lisbon Av. / E. 10th St.	No Build	50	50	50	25	25	25	25	25	25	25	25	25
		Build	50	50	50	25	25	25	25	25	25	25	25	25
16	23rd Av. / Ford St.	No Build	0	125	0	-	-	0	-	-	-	-	375	25
		Build	0	200	0	-	-	0	-	-	-	-	400	25
17	23rd Av. / Chapman St.	No Build	25	-	25	-	-	-	-	0	0	25	0	-
		Build	50	-	50	-	-	-	-	0	0	25	0	-
18	23rd Av. / E. 7th St.	No Build	25	25	25	**175**	25	25	**525***	**525***	**525***	125	125	50
		Build	25	25	25	**175**	25	25	**425***	**425***	**425***	125	125	25
19	23rd Av. / E. 11th St.	No Build	75	75	75	-	-	-	325	**700**	**700**	50	**600***	**600***
		Build	75	-	75	-	-	-	100	200[(b)]	200[(b)]	75	425	**-**
20	22nd Av. / E. 12th St.	No Build	**350***	250	250	-	175	175	**525***	**525***	**525***	**400***	**400***	**400***
		Build	**550***	250	250	-	200	200	**550***	**550***	**550***	**475***	**475***	**475***
21	22nd Av. / International	No Build	250	250	250	125	125	125	125	125	125	200	200	200
		Build	375	375	375	100	100	100	125	125	125	175	175	175
22	Kennedy St. / E. 7th St.	No Build	75	75	50	75	75	25	25	25	25	125	125	125
		Build	100	100	50	75	75	25	50	50	50	125	125	125

Table 2.2-11: Intersection Queuing – Build Conditions – Weekday AM Peak Hour, continued

Intersection		Condition	Northbound			Southbound			Eastbound			Westbound		
			L	T	R	L	T	R	L	T	R	L	T	R
23	Kennedy St. / Dennison St.	No Build	-	-	-	-	-	50	75	-	-	-	-	25
		Build	-	-	-	-	-	50	75	-	-	-	-	25
24	16th Av. / Embarcadero	No Build	-	0	0	25	0	-	-	-	-	450	-	50
		Build	-	0	0	25	0	-	-	-	-	450	-	50
25	Fruitvale Av. / E. 8th St.	No Build	75	-	75	**200**	**200**	25	-	425	425	25	**275**	-
		Build	75	-	75	**200**	**200**	25	-	425	425	25	**275**	-
26	Fruitvale Av. / E. 9th St.	No Build	225	225	225	**175**	**175**	**175**	**575***	**950**	**950**	25	**1,150***	**1,150***
		Build	200	200	200	75	75	75	**500**	**1,025***	**1,025***	25	**1,100***	**1,100***
27	Fruitvale Av. / E. 12th St.	No Build	50	125	125	100	150	75	**500***	**600***	**600***	**400***	**400***	**400***
		Build	50	125	125	100	150	100	**550***	**575***	**575***	**375***	**375***	**375***
28	Fruitvale Av. / International	No Build	**175***	**400***	**400***	100	225	225	150	150	150	**675***	**675***	**675***
		Build	**150***	**425***	**425***	125	225	225	150	150	150	**675***	**675***	**675***
41	29th Av. / I-880 Off-Ramp	No Build	-	-	-	-	-	-	-	-	-	-	-	-
		Build	75	-	50	-	-	-	-	150	-	-	25	-
42[c]	29th Av. / I-880 On-Ramp	No Build	-	-	-	-	-	-	-	-	-	-	-	-
		Build	-	600	-	-	-	-	-	-	-	-	-	100
43	23rd Av. / I-880 On-Ramp	No Build	-	-	-	-	-	-	-	-	-	-	-	-
		Build	-	-	-	-	-	-	**675***	0	-	-	**1,225***	0

Source: AECOM – July 2009

L = Left; T = Through; R = Right; Queue length in terms of feet; Queue length represents longest 95th percentile turning movement queue length; All queue lengths are rounded up to the length of a full vehicle (assuming vehicle length is 25 feet); "-" denotes movement that does not exist; "*" denotes movement where volume exceeds capacity (i.e., queue length is theoretically infinite); **Bold** denotes movements exceeding the queue length storage capacity of the turning pocket or upstream segment;. (a) The northbound queue length represents the Tilden Way approach. The Lincoln Avenue approach queue length is 25 feet during the weekday AM peak hour in the Existing Conditions and No Build Conditions; (b) The eastbound queue length represents the 29th Avenue overcrossing approach. The 29th Avenue frontage approach queue length is 25 feet during the weekday AM peak hour. (c) The queue length assumes metered conditions and would be the same for the tee intersection and roundabout options.

Table 2.2-12: Intersection Queuing – Build Conditions – Weekday PM Peak Hour

Intersection		Condition	Northbound			Southbound			Eastbound			Westbound		
			L	T	R	L	T	R	L	T	R	L	T	R
1	Park St. / Lincoln Av.	No Build	175[a]	150	150	150	75	75	**400***	**400***	**400***	**425***	**425***	**425***
		Build	175[a]	150	150	150	75	75	**400***	**400***	**400***	**425***	**425***	**425***
2	Park St. / Buena Vista Av.	No Build	175	175	175	125	175	175	175	175	175	350	350	350
		Build	175	175	175	125	175	175	175	175	175	350	350	350
3	Park St. / Clement Av.	No Build	75	75	75	**300***	**300***	**300***	**400***	**400***	**400***	**125***	25	25
		Build	75	75	75	**300***	**300***	**300***	**400***	**400***	**400***	**150***	25	25
4	Park St. / Blanding Av.	No Build	225	225	225	**550***	**550***	**550***	-	**275***	**275***	-	**650***	**650***
		Build	225	225	225	**550***	**550***	**550***	-	**275***	**275***	-	**675***	**675***
5	29th Av. / 23rd Av.	No Build	-	-	-	50	-	0	-	0	-	-	-	-
		Build	-	-	-	25	-	0	-	0	-	-	-	-
6	29th Av. / Glascock St.	No Build	-	-	25	-	-	-	-	0	0	-	-	-
		Build	-	-	50	-	-	-	-	0	0	-	-	-
7	29th Av. / Ford St.	No Build	-	**725***	**725***	-	-	-	0	0	0	25	-	0
		Build	-	-	25	-	-	-	**400***	**825**	**825**	225	-	725
8	29th Av. / Chapman St.	No Build	-	-	25	-	-	-	-	0	0	25	-	-
		Build	-	-	25	-	-	-	-	0	0	25	-	-
9	29th Av. / E. 7th St.	No Build	25	-	25	-	-	-	-	0	0	-	-	-
		Build	25	-	25	-	-	-	-	0	0	-	-	-
11	29th Av. / E. 10th St.	No Build	-	-	-	100	-	100	25	0	-	-	0	0
		Build	-	-	-	100	-	100	25	350	-	-	175	125

Table 2.2-12: Intersection Queuing – Build Conditions – Weekday PM Peak Hour, continued

Intersection		Condition	Northbound			Southbound			Eastbound			Westbound		
			L	T	R	L	T	R	L	T	R	L	T	R
12	29th Av. / E. 12th St.	No Build	**175***	175	175	125	250	50	250	**675***	**675***	125	125	125
		Build	**200***	175	175	125	250	50	275	**900***	**900***	150	150	150
13	29th Av. / International	No Build	150	175	175	50	425	425	**350***	325	325	**475***	**475***	**475***
		Build	150	175	175	50	425	425	**400***	400	400	**475***	**475***	**475***
15	Lisbon Av. / E. 10th St.	No Build	50	50	50	50	50	50	50	50	50	50	50	50
		Build	50	50	50	50	50	50	50	50	50	50	50	50
16	23rd Av. / Ford St.	No Build	0	75	0	-	-	0	-	-	-	-	425	25
		Build	0	100	0	-	-	25	-	-	-	-	200	25
17	23rd Av. / Chapman St.	No Build	25	-	25	-	-	-	-	0	0	25	0	-
		Build	25	-	25	-	-	-	-	0	0	25	0	-
18	23rd Av. / E. 7th St.	No Build	25	25	25	**325**	25	25	400	400	400	125	125	25
		Build	25	25	25	**325**	25	25	275	275	275	100	100	25
19	23rd Av. / E. 11th St.	No Build	100	100	100	-	-	-	550	**975***	**975***	50	**575***	**575***
		Build	150	-	150	-	-	-	75	350[(b)]	350[(b)]	75	400	-
20	22nd Av. / E. 12th St.	No Build	**250***	125	125	-	275	275	**650***	**650***	**650***	275	275	275
		Build	**275***	125	125	-	275	275	**600***	**600***	**600***	250	250	250
21	22nd Av. / International	No Build	200	200	200	275	275	275	275	275	275	125	125	125
		Build	225	225	225	275	275	275	250	250	250	125	125	125
22	Kennedy St. / E. 7th St.	No Build	100	100	50	175	175	225	50	50	50	175	175	175
		Build	125	125	75	175	175	225	50	50	50	175	175	175
23	Kennedy St. / Dennison St.	No Build	-	-	-	-	-	125	75	-	-	-	-	25
		Build	-	-	-	-	-	125	75	-	-	-	-	25

Table 2.2-12: Intersection Queuing – Build Conditions – Weekday PM Peak Hour, continued

Intersection		Condition	Northbound			Southbound			Eastbound			Westbound		
			L	T	R	L	T	R	L	T	R	L	T	R
24	16th Av. / Embarcadero	No Build	-	0	0	50	0	-	-	-	-	175	-	25
		Build	-	0	0	50	0	-	-	-	-	175	-	25
25	Fruitvale Av. / E. 8th St.	No Build	100	-	100	**475***	**475***	50	-	425	425	25	**175**	-
		Build	100	-	100	**475***	**475***	50	-	425	425	25	**175**	-
26	Fruitvale Av. / E. 9th St.	No Build	175	175	175	**675***	**675***	**675***	**200**	**875***	**875***	25	**1,175***	**1,175***
		Build	175	175	175	375	375	375	**175**	**875***	**875***	25	**1,175***	**1,175***
27	Fruitvale Av. / E. 12th St.	No Build	175	75	75	125	275	150	**300***	**625***	**625***	**325***	**325***	**325***
		Build	175	75	75	125	325	175	**300***	**575***	**575***	**325***	**325***	**325***
28	Fruitvale Av. / International	No Build	150	200	200	**150***	325	325	250	250	250	**525***	**525***	**525***
		Build	150	200	200	**150***	325	325	225	225	225	**500***	**500***	**500***
41	29th Av. / I-880 Off-Ramp	No Build	-	-	-	-	-	-	-	-	-	-	-	-
		Build	100	-	100	-	-	-	-	275	-	-	175	-
42[c]	29th Av. / I-880 On-Ramp	No Build	-	-	-	-	-	-	-	-	-	-	-	-
		Build	-	575	-	-	-	-	-	-	-	-	-	50
43	23rd Av. / I-880 On-Ramp	No Build	-	-	-	-	-	-	-	-	-	-	-	-
		Build	-	-	-	-	-	-	575	0	-	-	1,400	0

Source: AECOM – July 2009

L = Left; T = Through; R = Right; Queue length in terms of feet; Queue length represents longest 95th percentile turning movement queue length; All queue lengths are rounded up to the length of a full vehicle (assuming vehicle length is 25 feet); "-" denotes movement that does not exist; "*" denotes movement where volume exceeds capacity (i.e., queue length is theoretically infinite); **Bold** denotes movements exceeding the queue length storage capacity of the turning pocket or upstream segment; (a) The northbound queue length represents the Tilden Way approach. The Lincoln Avenue approach queue length is 25 feet during the weekday PM peak hour in the Existing Conditions and No Build Conditions; (b) The eastbound queue length represents the 29th Avenue overcrossing approach. The 29th Avenue frontage approach queue length is 25 feet during the weekday PM peak hour. (c) (c) The queue length assumes metered conditions and would be the same for the tee intersection and roundabout options.

No Build

Intersection queuing conditions were evaluated for the weekday AM and PM peak hours. The results of the No Build (year 2035) Conditions intersection queuing analysis for the weekday AM and PM peak hours are included in Table 2.2-13, *Intersection Queuing – No Build Conditions*. During the weekday AM peak hour, the queue length storage capacity would be exceeded for at least one approach at 13 of the 28 intersections in the No Build Conditions. During the weekday PM peak hour, the queue length storage capacity would be exceeded for at least one approach at 13 of the 28 intersections in the No Build Conditions.

Table 2.2-13: Intersection Queuing – No Build Conditions

Intersection		Peak Hour	Existing Conditions				No Build Conditions			
			NB	SB	EB	WB	NB	SB	EB	WB
1	Park St. / Lincoln Av.	AM	75[(a)]	125	125	175	200[(a)]	250	**250**	**350**
		PM	100[(a)]	100	150	**275**	200[(a)]	150	**400**	**425**
2	Park St. / Buena Vista Av	AM	175	150	150	75	275	225	150	150
		PM	125	150	175	275	175	175	175	**350**
3	Park St. / Clement Av.	AM	250	300	175	175	225	350	**400**	200
		PM	75	250	250	100	75	300	**400**	100
4	Park St. / Blanding Av.	AM	425	325	275	**200**	425	500	375	**475**
		PM	225	225	250	**475**	225	550	275	**650**
5	29th Av. / 23rd Av.	AM	-	25	0	-	-	50	0	-
		PM	-	25	0	-	-	50	0	-
6	29th Av. / Glascock St.	AM	25	-	0	-	25	-	0	-
		PM	25	-	0	-	25	-	0	-
7	29th Av. / Ford St.	AM	50	-	0	25	**700**	-	0	25
		PM	25	-	0	25	**725**	-	0	25
8	29th Av. / Chapman St.	AM	25	-	0	0	25	-	0	25
		PM	25	-	0	0	25	-	0	0
9	29th Av. / E. 7th St.	AM	0	-	0	-	0	-	0	-
		PM	25	-	0	-	25	-	0	-
10	29th Av. / E. 9th St.	AM	450	50	75	-	550	50	75	-
		PM	150	50	125	-	500	50	150	-
11	29th Av. / E. 10th St.	AM	-	50	25	0	-	75	25	0
		PM	-	50	25	0	-	100	25	0
12	29th Av. / E. 12th St.	AM	250	100	150	75	**525**	150	**400**	100
		PM	125	150	**275**	75	175	250	**675**	125

Table 2.2-13: Intersection Queuing – No Build Conditions, continued

Intersection		Peak Hour	Existing Conditions				No Build Conditions			
			NB	SB	EB	WB	NB	SB	EB	WB
13	29th Av. / International	AM	175	150	75	125	300	**275**	300	425
		PM	125	225	150	150	175	**425**	350	475
14	Lisbon Av. / E. 8th St.	AM	0	-	-	25	0	-	-	25
		PM	0	-	-	25	0	-	-	50
15	Lisbon Av. / E. 10th St.	AM	50	25	25	25	50	25	25	25
		PM	50	25	25	25	50	50	50	50
16	23rd Av. / Ford St.	AM	100	0	-	150	125	0	-	375
		PM	50	0	-	350	75	0	-	425
17	23rd Av. / Chapman St.	AM	25	-	0	25	25	-	0	25
		PM	25	-	0	25	25	-	0	25
18	23rd Av. / E. 7th St.	AM	25	125	**375**	50	25	175	**525**	125
		PM	25	225	175	100	25	**325**	**400**	125
19	23rd Av. / E. 11th St.	AM	50	-	225	275	75	-	**700**	600
		PM	75	-	**450**	300	100	-	**1,000**	575
20	22nd Av. / E. 12th St.	AM	225	125	200	200	350	175	525	**400**
		PM	150	225	275	125	250	275	650	275
21	22nd Av. / International	AM	100	75	75	125	250	125	125	200
		PM	75	100	150	75	200	275	275	125
22	Kennedy St. / E. 7th St.	AM	50	50	25	75	75	75	25	125
		PM	75	125	25	125	100	225	25	175
23	Kennedy St. / Dennison St.	AM	-	25	50	0	-	50	75	0
		PM	-	125	25	0	-	125	75	0
24	16th Av. / Embarcadero	AM	0	25	-	50	0	25	-	450
		PM	0	25	-	50	0	50	-	175
25	Fruitvale Av. / E. 8th St.	AM	75	175	275	175	75	**200**	**425**	**275**
		PM	50	**250**	225	375	100	**475**	**425**	**375**
26	Fruitvale Av. / E. 9th St.	AM	125	125	**625**	**550**	**225**	175	**950**	**1,150**
		PM	125	**450**	**425**	**600**	175	**675**	**875**	**1,175**
27	Fruitvale Av. / E. 12th St.	AM	50	100	**325**	125	125	150	**600**	400
		PM	75	125	225	100	175	275	**625**	325

Table 2.2-13: Intersection Queuing – No Build Conditions, continued

Intersection		Peak Hour	Existing Conditions				No Build Conditions			
			NB	SB	EB	WB	NB	SB	EB	WB
28	Fruitvale Av. / International	AM	175	75	75	**350**	400	225	150	**675**
		PM	100	150	125	200	200	325	250	**525**

Source: AECOM – July 2009

Queue length represents longest 95th percentile queue (in feet) of all movements at each approach; All queue lengths are rounded up to the length of a full vehicle (assuming vehicle length is 25 feet); "-" is shown where approach does not exist; **Bold** denotes approaches exceeding the queue length storage capacity of the upstream segment; (a) The northbound queue length represents the Tilden Way approach. The Lincoln Avenue approach queue length is 25 feet during the weekday AM and PM peak hours.

Local Roadway Analysis

Study Roadways

The Project study area includes roadway facilities located in the City of Oakland and the City of Alameda. The local roadway analysis consists of an evaluation of the arterial and intersection operations and local roadway network conditions. The evaluation area of the local roadway analysis is bounded by 16th Avenue (north), Fruitvale Avenue (south), International Boulevard (east), and Tilden Way / Lincoln Avenue (west). The study intersection locations are shown in Exhibit 2.2-6, *Existing Conditions Intersection Locations*. The intersection numbers correspond to those presented in the Traffic Data Collection Report.

Local Roadways Analysis Methodology

A network simulation model was developed to evaluate the operations of the regional freeway facilities and local arterial roadways. The simulation model was developed in McTrans' TSIS-CORSIM 6.1 (Build 509) software program. The CORSIM software is a specialized corridor simulation tool that was originally developed by the FHWA.

The network simulation model developed for the regional freeway analysis includes arterial segments and intersections in the local roadway network. The local roadway model was developed in conjunction with the regional freeway model utilizing the same software and methodology.

The simulation model produced a visual representation of the results and quantitative Measures of Effectiveness (MOE). The following Measures of Effectiveness were extracted from the model:

- Vehicle travel time;
- Vehicle on-ramp queuing; and,
- Vehicle drawbridge queuing.

The vehicle on-ramp queuing and vehicle drawbridge queuing results are presented in the Network Queuing section.

Local Roadways – Existing Conditions

The Existing Conditions local roadway intersection lane geometry is shown in Exhibit 2.2-7, *Existing Conditions Intersection Lane Geometry*. The corresponding intersection turning movement volumes for the weekday AM and PM peak hours are shown as Exhibit 2.2-8, *Existing Conditions Intersection Turning Movement Volumes*.

Local Roadways – Forecast Year 2035

Build Alternative

The Build Conditions study intersection locations are shown in Exhibit 2.2-9, *Build Conditions Study Intersection Locations*. The Build Conditions local roadway intersection lane geometry is shown in Exhibit 2.2-10, *Build Conditions Intersection Lane Geometry*. The corresponding intersection turning movement volumes for the weekday AM and PM peak hours are shown as Exhibit 2.2-11, *Build Conditions Intersection Turning Movement Volumes*.

No Build Alternative

The No Build Conditions local roadway intersection turning movement volumes for the weekday AM and PM peak hours are shown as Exhibit 2.2-12, *No Build (2035) Conditions Intersection Traffic Volumes*. The intersection locations in the No Build Conditions are expected to be the same as the Existing Conditions.

Regional Freeway Analysis

Study Regional Freeways

The regional freeway analysis consists of an evaluation of the freeway operations and freeway network conditions. The evaluation area of the regional freeway analysis is bounded by the Adeline Street / Market Street interchanges (north – Oakland) and the 98th Avenue interchange (south – Oakland).

The I-880 freeway between Adeline Street / Market Street and 98th Avenue is a four-lane facility and is approximately 7.8 miles long. The northbound I-880 freeway consists of ten (10) on-ramps and eleven (11) off-ramps. The southbound I-880 freeway consists of thirteen (13) on-ramps and seven (7) off-ramps. These 41 freeway ramp locations are shown in Exhibit 2.2-13, *Existing (2008) Conditions Freeway Ramp Locations.*

Regional Freeway Analysis Methodology

The network simulation model developed to evaluate the operations of the regional freeway facilities and local arterial roadways, described above under the Local Roadways Methodology section was also was utilized for the regional freeway analysis. The simulation model produced a visual representation of the results and quantitative Measures of Effectiveness. The following Measures of Effectiveness were extracted from the model:

- Vehicle throughput;
- Vehicle speed; and,
- Vehicle density.

The Department advocates the use of HCM analysis methodology to analyze the operation of freeway segments. HCM analysis methodology describes the operation of a basic freeway segment using a range of LOS from LOS A to LOS F based on corresponding density

(passenger cars/mile/lane) shown in Table 2.2-14, *Freeway Level of Service Criteria*. The Department goal for basic freeway segment operation is the transition between LOS C and LOS D.

Table 2.2-14: Freeway Level of Service Criteria

LOS	Description	Density[(a)]
A	No traffic congestion	≤ 10.0
B	Little traffic congestion	> 10.0 and ≤ 20.0
C	Average traffic congestion	> 20.0 and ≤ 28.0
D	Heavy traffic congestion	> 28.0 and ≤ 35.0
E	Very heavy traffic congestion	> 35.0 and ≤ 43.0
F	Extreme traffic congestion	> 43.0

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

[(a)] Density in terms of passenger cars per mile per lane (pcpmpl).

Freeway Ramp Queuing

An evaluation of vehicle queuing was conducted at freeway off-ramp intersections located in the vicinity of the 23rd Avenue and 29th Avenue interchanges. Freeway off-ramp queuing was analyzed based on the 95th percentile queue criteria. The operations of these intersections were consistent with the intersection analyses conducted in the local roadway analysis. A detailed discussion of the vehicle queuing analysis methodology is included above, in the Local Roadway Analysis Methodology section.

The vehicle queuing evaluation includes the effective deceleration length of the off-ramp with respect to the back of the 95th percentile vehicle queue. Typically, the deceleration length of an off-ramp is measured from the back of the 95th percentile queue, rather than the off-ramp intersection control.

Regional Freeway Analysis – Existing Conditions

The Existing Conditions freeway mainline and ramp traffic volumes on I-880 between the 23rd Avenue and 29th Avenue interchanges are shown in Exhibit 2.2-14, *Existing Conditions Freeway Mainline and Ramp Traffic Volumes*.

As shown in Table 2.2-15, *Freeway Measures of Effectiveness – Existing Conditions* the section of I-880 through the Project site currently operates at an LOS F in the AM Peak Hour and LOS D in the PM Peak Hour.

During the weekday AM peak hour of the Existing Conditions, the freeway travel speeds are typically more than 50 mph throughout the I-880 corridor in the southbound direction. In the northbound direction, travel speeds are typically less than 50 mph throughout the I-880 corridor. Significant slowing occurs between the Hegenberger interchange and the 23rd Avenue interchange. The slow speeds in the northbound direction are caused by the poor freeway junction operations at the Oak Street interchange and the 23rd Avenue interchange. Additionally, roadway grade and vertical curvature at the I-880 overcrossings at High Street and Fruitvale Avenue reduce the freeway capacity and cause increased upstream density and slower speeds in the northbound direction.

During the weekday PM peak hour of the Existing Conditions, the travel speeds are typically more than 50 mph in the southbound direction. At the Oak Street interchange and the 98th Avenue interchange, the travel speed is between 40 mph and 50 mph. In the northbound direction, travel speeds are typically above 50 mph throughout the corridor. At the High Street interchange the travels speed slows to less than 30 mph. The roadway grade and vertical curvature at the I-880 overcrossings at High Street reduces the freeway capacity and causes increased upstream density and slower speeds in the northbound direction.

Table 2.2-15: Freeway Measures of Effectiveness – Existing Conditions

Freeway Section	Weekday AM Peak Hour		Weekday PM Peak Hour	
	Density	Speed	Density	Speed
Southbound I-880 Freeway				
Diverge Section at 23rd Avenue	23	63	23	63
Merge Section at 23rd Avenue	27	59	27	59
Weaving Section between 29th Avenue and Fruitvale Avenue	26	56	26	55
Northbound I-880 Freeway				
Diverge Section at 29th Avenue	26	57	27	64
Weaving Section between Lisbon Avenue and 23rd Avenue	25	36	26	58
Merge Section at 23rd Avenue (EB)	35	31	35	53
Merge Section at 23rd Avenue (WB)	32	49	32	59

Source: AECOM – July 2009

Density in terms of passenger cars / lane / mile; Speed in terms of miles per hour.

Source: Transportation Analysis, July 2009

INTERSTATE 880 OPERATIONAL AND SAFETY IMPROVEMENTS
AT 29TH AVENUE AND 23RD AVENUE OVERCROSSING IS/EA

AECOM

RBF CONSULTING

Existing Conditions Study Intersection Locations

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Exhibit 2.2-6

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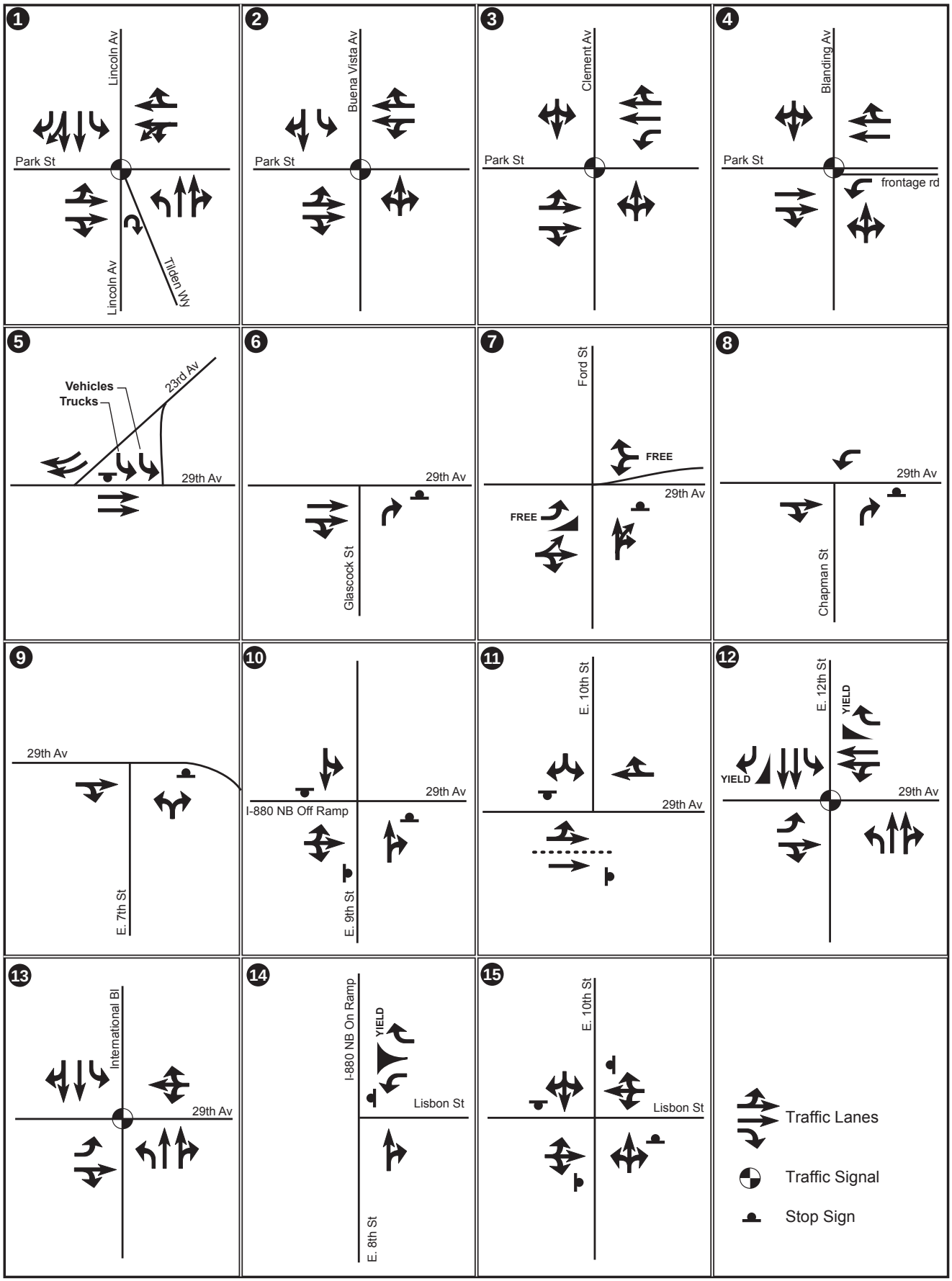

Source: Transportation Analysis, July 2009

INTERSTATE 880 OPERATIONAL AND SAFETY IMPROVEMENTS
AT 29TH AVENUE AND 23RD AVENUE OVERCROSSING IS/EA

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Existing Conditions Intersection Lane Geometry

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Exhibit 2.2-7

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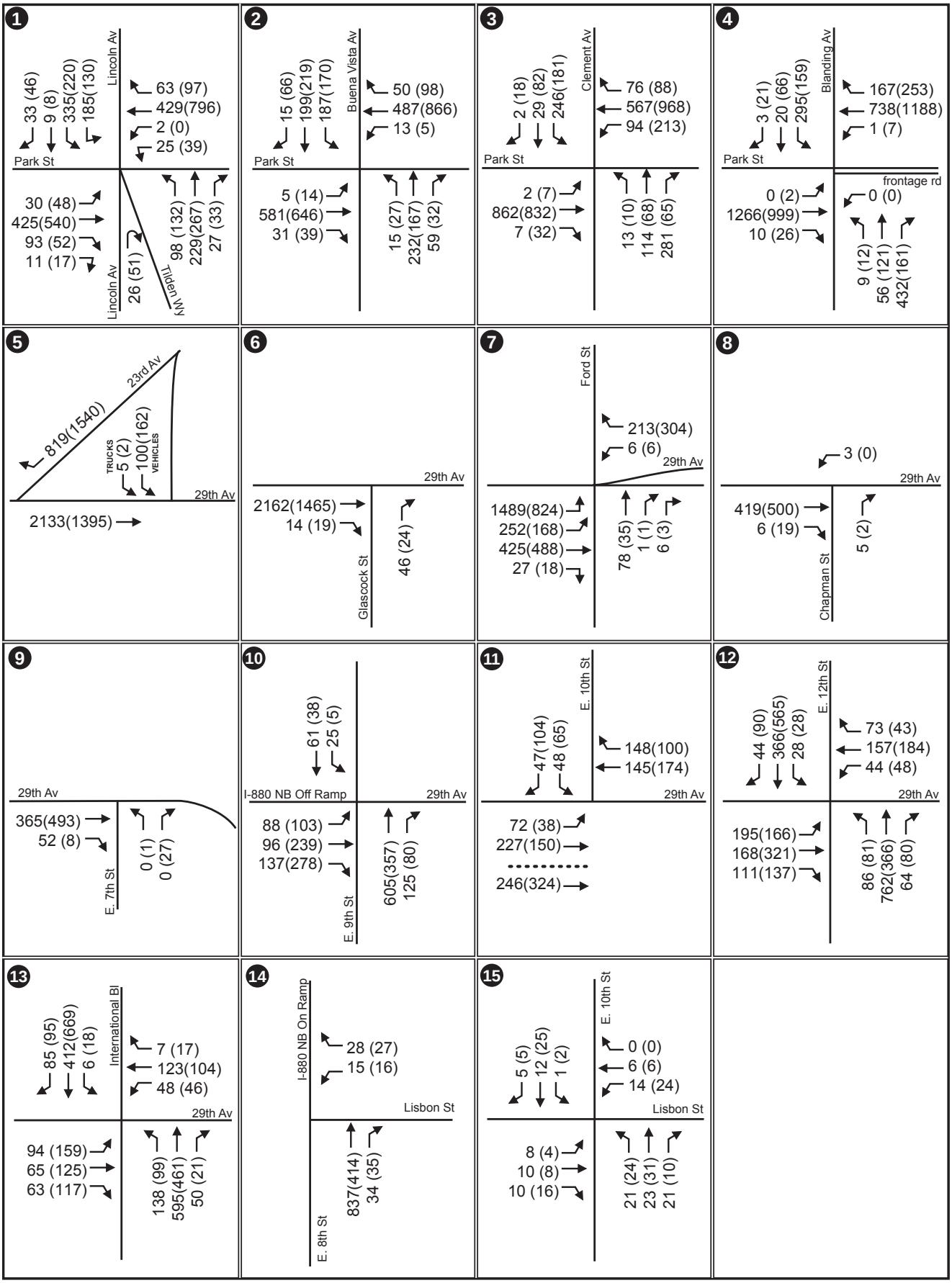

Source: Transportation Analysis, July 2009

INTERSTATE 880 OPERATIONAL AND SAFETY IMPROVEMENTS
AT 29TH AVENUE AND 23RD AVENUE OVERCROSSING IS/EA

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Existing Conditions Intersection Traffic Volumes

Exhibit 2.2-8

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Source: Transportation Analysis, July 2009

INTERSTATE 880 OPERATIONAL AND SAFETY IMPROVEMENTS
AT 29TH AVENUE AND 23RD AVENUE OVERCROSSING IS/EA

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Build Alternative (2035) Conditions Study Intersection Locations

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Exhibit 2.2-9

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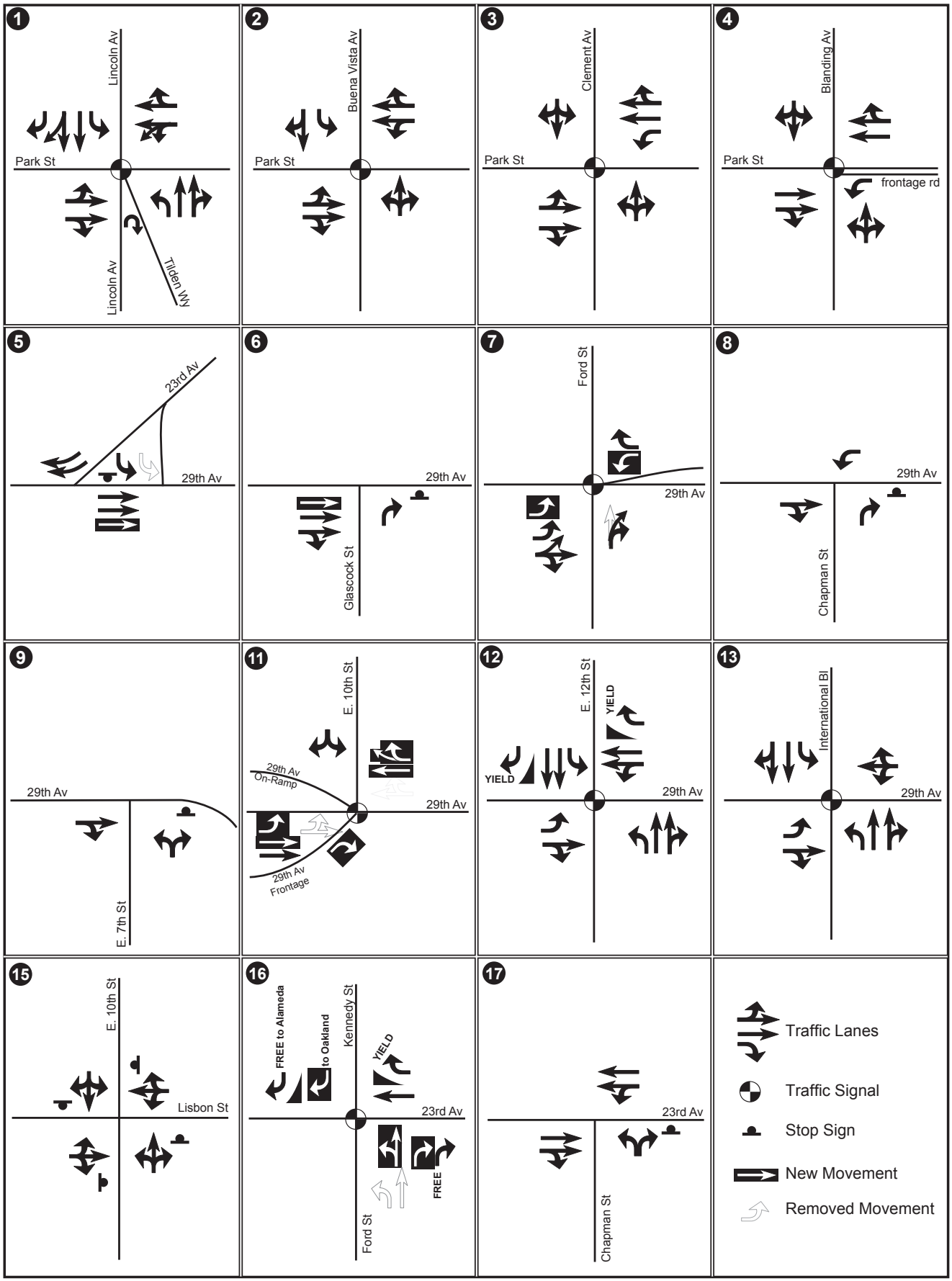

Source: Transportation Analysis, July 2009

INTERSTATE 880 OPERATIONAL AND SAFETY IMPROVEMENTS
AT 29TH AVENUE AND 23RD AVENUE OVERCROSSING IS/EA

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Build Alternative (2035) Conditions Intersection Lane Geometry

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Exhibit 2.2-10

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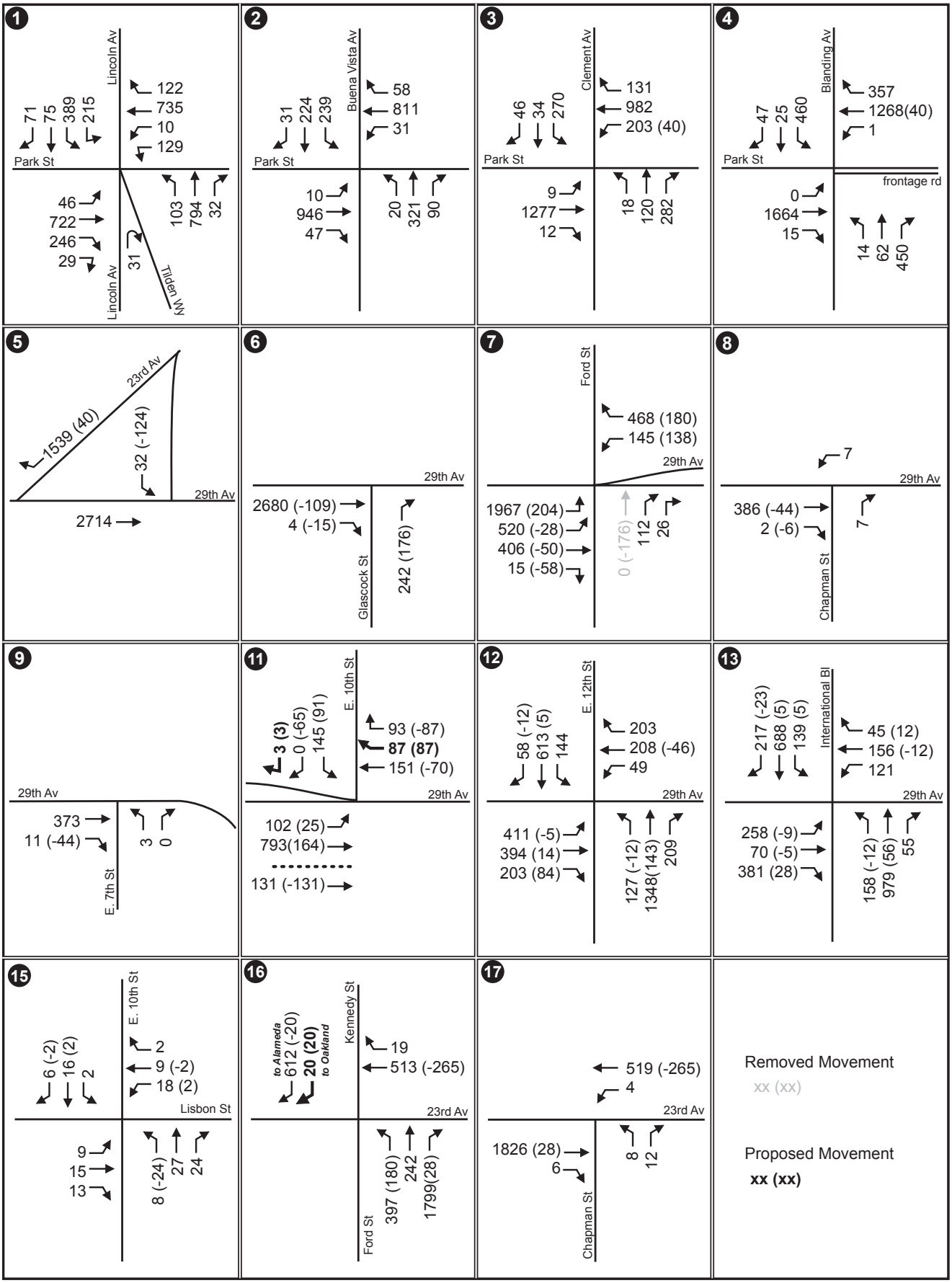

Source: Transportation Analysis, July 2009

INTERSTATE 880 OPERATIONAL AND SAFETY IMPROVEMENTS
AT 29TH AVENUE AND 23RD AVENUE OVERCROSSING IS/EA

AECOM

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Build Alternative (2035) Conditions Intersection Traffic Volumes

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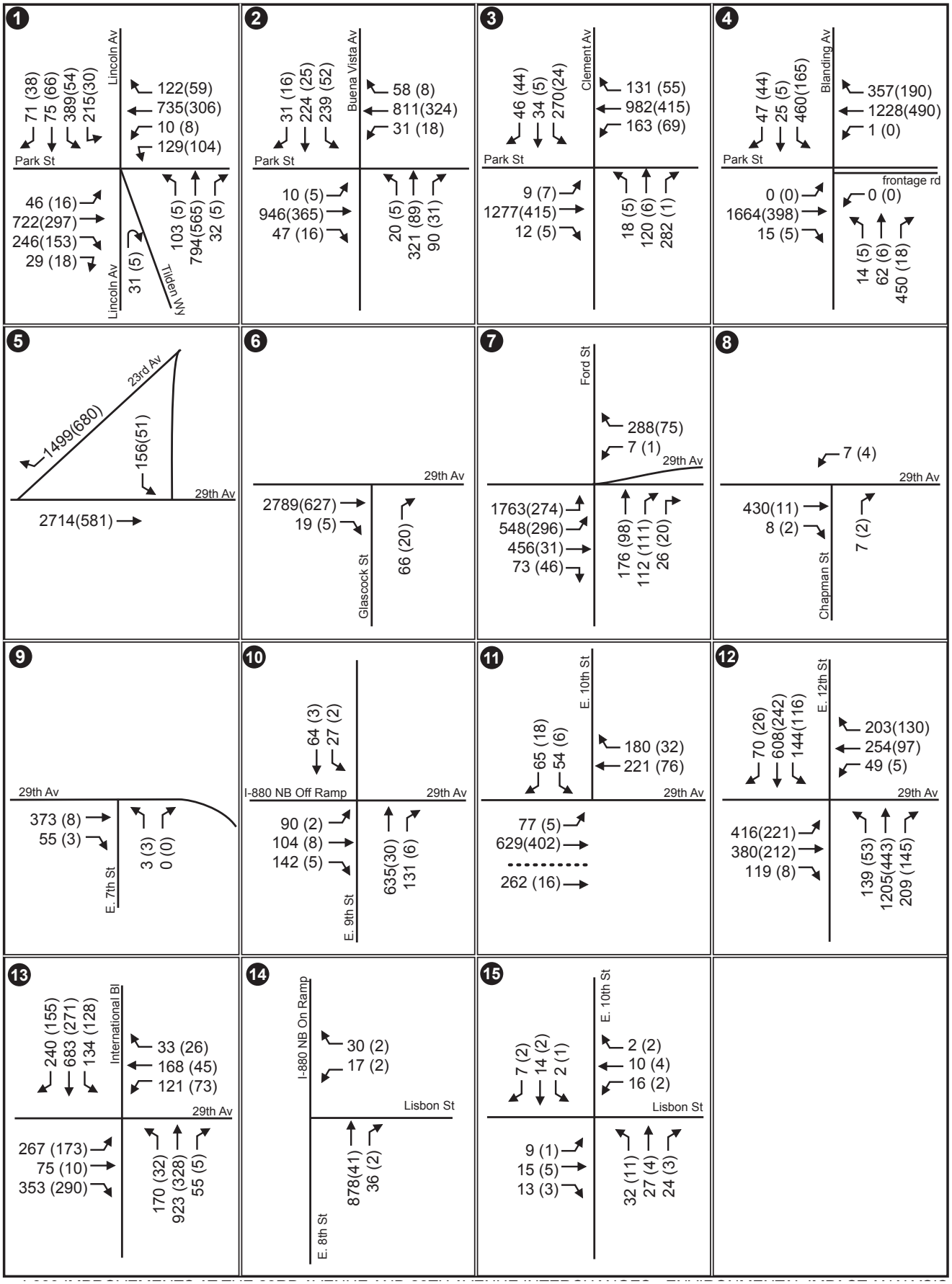

Source: Transportation Analysis, July 2009

INTERSTATE 880 OPERATIONAL AND SAFETY IMPROVEMENTS
AT 29TH AVENUE AND 23RD AVENUE OVERCROSSING IS/EA

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No Build (2035) Conditions Intersection Traffic Volumes

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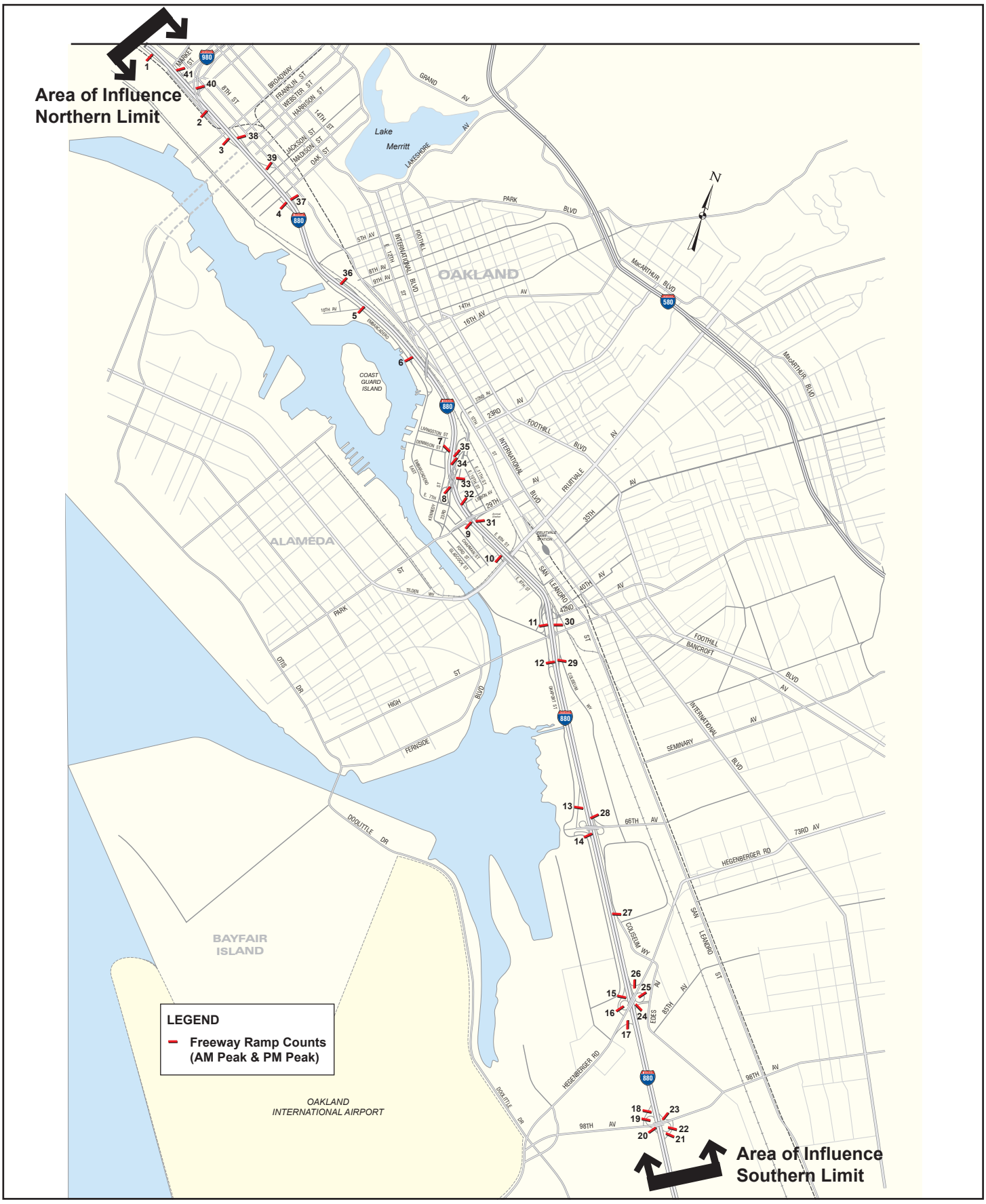

Source: Transportation Analysis, July 2009

INTERSTATE 880 OPERATIONAL AND SAFETY IMPROVEMENTS
AT 29TH AVENUE AND 23RD AVENUE OVERCROSSING IS/EA

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Existing Conditions Freeway Ramp Locations

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Exhibit 2.2-13

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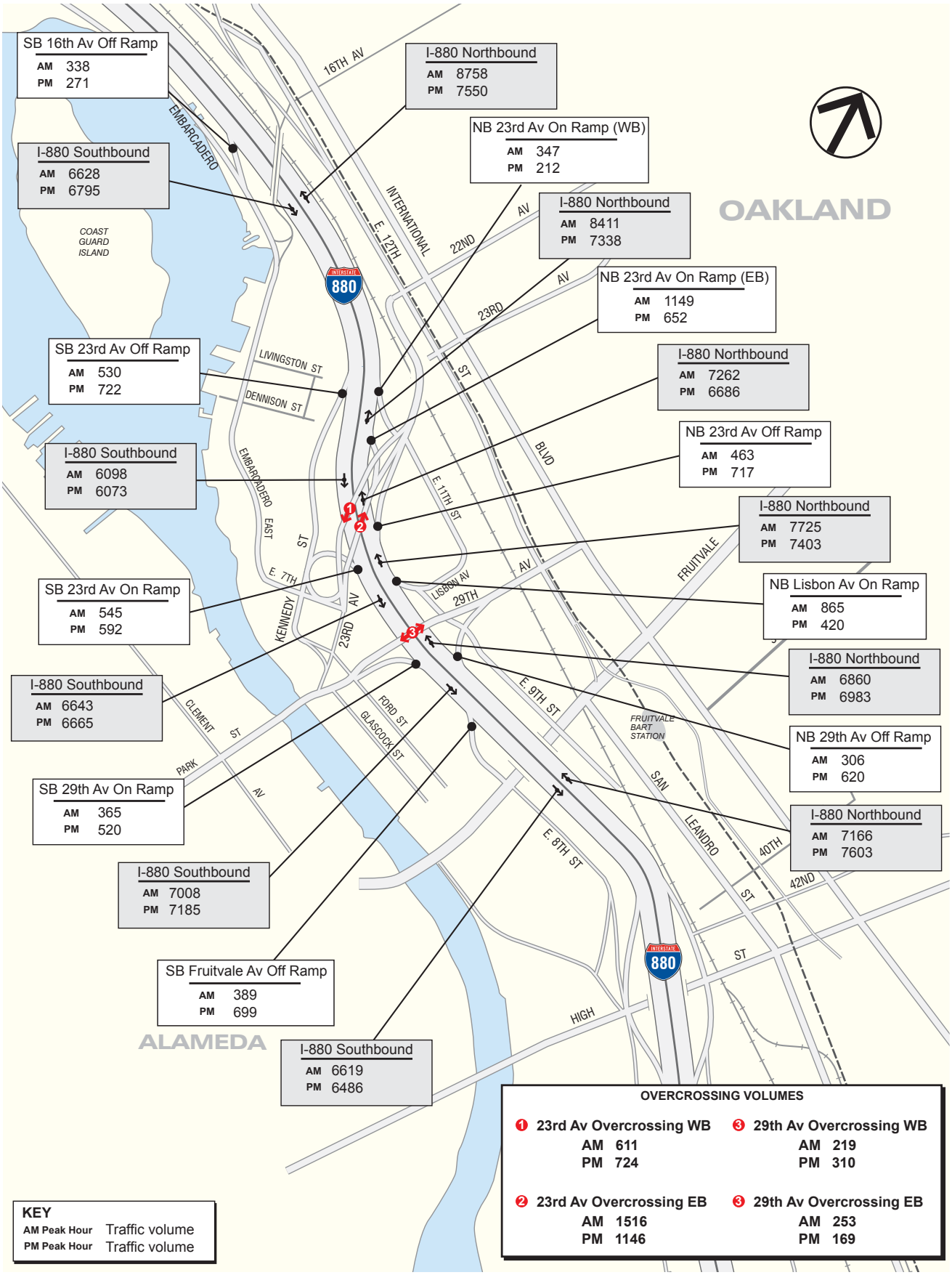

Source: Transportation Analysis, July 2009

INTERSTATE 880 OPERATIONAL AND SAFETY IMPROVEMENTS
AT 29TH AVENUE AND 23RD AVENUE OVERCROSSING IS/EA

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Existing Conditions Freeway Traffic Volumes

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Exhibit 2.2-14

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