Center Street Commerce Building
Initial Study
Draft Mitigated Negative Declaration

Please be advised that the public review period for this document has been extended from September 12 to September 30, 2016, 5:00 p.m.

Prepared for:

City of Riverside
Community and Economic Development Department
3900 Main Street, 3rd Floor
Riverside, California 92522

Project Proponent:

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Prepared by:

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August 2016

- This document is designed for double-sided printing -

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1 Introduction

The City of Riverside (Lead Agency) received applications for Design Review and Lot Consolidation for a 308,000-square foot commercial building located on the south side of Center Street and north of Placentia Lane in the City of Riverside. The approval of these applications constitutes a project that is subject to review under the California Environmental Quality Act (CEQA) 1970 (Public Resources Code, Section 21000 et seq.), and the State CEQA Guidelines (California Code of Regulations, Section 15000 et. seq.).

This Initial Study has been prepared to assess the short-term, long-term, and cumulative environmental impacts that could result from the proposed project.

This report has been prepared to comply with Section 15063 of the State CEQA Guidelines, which sets forth the required contents of an Initial Study. These include:

- A description of the project, including the location of the project (See Section 2);
- Identification of the environmental setting (See Section 2.11);
- Identification of environmental effects by use of a checklist, matrix, or other methods, provided that entries on the checklist or other form are briefly explained to indicate that there is some evidence to support the entries (See Section 4.);
- Discussion of ways to mitigate significant effects identified, if any (See Section 4);
- Examination of whether the project is compatible with existing zoning, plans, and other applicable land use controls (See Sections 4.10); and
- The name(s) of the person(s) who prepared or participated in the preparation of the Initial Study (See Section 5).

1.1 – Purpose of CEQA

The body of state law known as *CEQA* was originally enacted in 1970 and has been amended a number of times since then. The legislative intent of these regulations is established in Section 21000 of the California Public Resources Code, as follows:

The Legislature finds and declares as follows:

a) The maintenance of a quality environment for the people of this state now and in the future is a matter of statewide concern.
b) It is necessary to provide a high-quality environment that at all times is healthful and pleasing to the senses and intellect of man.
c) There is a need to understand the relationship between the maintenance of high-quality ecological systems and the general welfare of the people of the state, including their enjoyment of the natural resources of the state.
d) The capacity of the environment is limited, and it is the intent of the Legislature that the government of the state take immediate steps to identify any critical thresholds for the health and safety of the people of the state and take all coordinated actions necessary to prevent such thresholds being reached.
e) Every citizen has a responsibility to contribute to the preservation and enhancement of the environment.
f) The interrelationship of policies and practices in the management of natural resources and waste disposal requires systematic and concerted efforts by public and private interests to enhance environmental quality and to control environmental pollution.
g) It is the intent of the Legislature that all agencies of the state government which regulate activities of private individuals, corporations, and public agencies which are found to affect the quality of the environment, shall regulate such activities so that major consideration is given to preventing environmental damage, while providing a decent home and satisfying living environment for every Californian.

The Legislature further finds and declares that it is the policy of the State to:

h) Develop and maintain a high-quality environment now and in the future, and take all action necessary to protect, rehabilitate, and enhance the environmental quality of the state.
i) Take all action necessary to provide the people of this state with clean air and water, enjoyment of aesthetic, natural, scenic, and historic environmental qualities, and freedom from excessive noise.
j) Prevent the elimination of fish or wildlife species due to man's activities, insure that fish and wildlife populations do not drop below self-perpetuating levels, and preserve for future generations representations of all plant and animal communities and examples of the major periods of California history.
k) Ensure that the long-term protection of the environment, consistent with the provision of a decent home and suitable living environment for every Californian, shall be the guiding criterion in public decisions.
l) Create and maintain conditions under which man and nature can exist in productive harmony to fulfill the social and economic requirements of present and future generations.
m) Require governmental agencies at all levels to develop standards and procedures necessary to protect environmental quality.
n) Require governmental agencies at all levels to consider qualitative factors as well as economic and technical factors and long-term benefits and costs, in addition to short-term benefits and costs and to consider alternatives to proposed actions affecting the environment.

A concise statement of legislative policy, with respect to public agency consideration of projects for some form of approval, is found in Section 21002 of the Public Resources Code, quoted below:

> The Legislature finds and declares that it is the policy of the state that public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects, and that the procedures required by this division are intended to assist public agencies in systematically identifying both the significant effects of proposed projects and the feasible alternatives or feasible mitigation measures which will avoid or substantially lessen such significant effects. The Legislature further finds and declares that in the event specific economic, social, or other conditions make infeasible such project alternatives or such mitigation measures, individual projects may be approved in spite of one or more significant effects thereof.

1.2 – Tiering

This Initial Study *tiers* from the City's General Plan EIR. Section 15152 et seq of the CEQA Guidelines describes *tiering* as a streamlining tool as follows:

(a) *Tiering* refers to using the analysis of general matters contained in a broader EIR (such as one prepared for a general plan or policy statement) with later EIRs and negative declarations on narrower projects; incorporating by reference the general discussions from the broader EIR; and concentrating the later EIR or negative declaration solely on the issues specific to the later project.

(b) Agencies are encouraged to tier the environmental analyses which they prepare for separate but related projects including general plans, zoning changes, and development projects. This approach can eliminate repetitive discussions of the same issues and focus the later EIR or negative declaration on the actual issues ripe for decision at each level of environmental review. Tiering is appropriate when the sequence of analysis is from an EIR prepared for a general plan, policy, or program to an EIR or negative declaration for another plan, policy, or program of lesser scope, or to a site-specific EIR or negative declaration. Tiering does not excuse the lead agency from adequately analyzing reasonably foreseeable significant environmental effects of the project and does not justify deferring such analysis to a later tier EIR or negative declaration. However, the level of detail contained in a first tier EIR need not be greater than that of the program, plan, policy, or ordinance being analyzed.

(c) Where a lead agency is using the tiering process in connection with an EIR for a large-scale planning approval, such as a general plan or component thereof (e.g., an area plan or community plan), the development of detailed,

site-specific information may not be feasible but can be deferred, in many instances, until such time as the lead agency prepares a future environmental document in connection with a project of a more limited geographical scale, as long as deferral does not prevent adequate identification of significant effects of the planning approval at hand.

(d) Where an EIR has been prepared and certified for a program, plan, policy, or ordinance consistent with the requirements of this section, any lead agency for a later project pursuant to or consistent with the program, plan, policy, or ordinance should limit the EIR or negative declaration on the later project to affects which:

(1) Were not examined as significant effects on the environment in the prior EIR; or

(2) Are susceptible to substantial reduction or avoidance by the choice of specific revisions in the project, by the imposition of conditions, or other means.

(e) Tiering under this section shall be limited to situations where the project is consistent with the general plan and zoning of the city or county in which the project is located, except that a project requiring a rezone to achieve or maintain conformity with a general plan may be subject to tiering.

(f) A later EIR shall be required when the initial study or other analysis finds that the later project may cause significant effects on the environment that were not adequately addressed in the prior EIR. A negative declaration shall be required when the provisions of Section 15070 are met.

(1) Where a lead agency determines that a cumulative effect has been adequately addressed in the prior EIR that effect is not treated as significant for purposes of the later EIR or negative declaration, and need not be discussed in detail.

(2) When assessing whether there is a new significant cumulative effect, the lead agency shall consider whether the incremental effects of the project would be considerable when viewed in the context of past, present, and probable future projects. At this point, the question is not whether there is a significant cumulative impact, but whether the effects of the project are cumulatively considerable. For a discussion on how to assess whether project impacts are cumulatively considerable, see Section 15064(i).

(3) Significant environmental effects have been *adequately addressed* if the lead agency determines that:

(A) they have been mitigated or avoided as a result of the prior environmental impact report and findings adopted in connection with that prior environmental report; or

(B) they have been examined at a sufficient level of detail in the prior environmental impact report to enable those effects to be mitigated or avoided by site specific revisions, the imposition of conditions, or by other means in connection with the approval of the later project.

(g) When tiering is used, the later EIRs or negative declarations shall refer to the prior EIR and state where a copy of the prior EIR may be examined. The later EIR or negative declaration should state that the lead agency is using the tiering concept and that it is being tiered with the earlier EIR.

1.3 – Public Comments

Comments from all agencies and individuals are invited regarding the information contained in this Initial Study. Such comments should explain any perceived deficiencies in the assessment of impacts, identify the information that is

purportedly lacking in the Initial Study or indicate where the information may be found. All comments on the Initial Study are to be submitted to:

Brian Norton, Senior Planner
City of Riverside
Community Development Department
3900 Main Street, 3rd Floor
Riverside, California 92522
951-826-2308

Following a 20-day period of circulation and review of the Initial Study, all comments will be considered by the City of Riverside prior to adoption.

1.4 – Availability of Materials

All materials related to the preparation of this Initial Study are available for public review. To request an appointment to review these materials, please contact:

Brian Norton, Senior Planner
City of Riverside
Community Development Department
3900 Main Street, 3rd Floor
Riverside, California 92522
951-826-2308

2 Project Description

2.1 – Project Title

Center Street Commerce Building

2.2 – Lead Agency Name and Address

City of Riverside
Community Development Department
3900 Main Street, 3rd Floor
Riverside, California 92522

2.3 – Contact Person and Phone Number

Brian Norton, Associate Planner
951-826-5371
bnorton@riversideca.gov

2.4 – Project Location

South side of Center Street and north of Placentia Lane
Northside Neighborhood
Riverside, California 92507
(See Exhibit 1, Regional Context and Vicinity Map)

2.5 – Project Sponsor's Name and Address

Transition Properties, LP
PO Box 1010
Blue Jay, California 92317

2.6 – General Plan Land Use Designation

The B/OP – Business/Office Park

2.7 – Zoning District

BMP – Business and Manufacturing Park

The project site is located in the Northside Neighborhood where the City of Riverside Community and Economic Development Department (CEDD), in partnership with the City of Colton, is initiating an effort to prepare the Northside Neighborhood & Pellissier Ranch Inter-Jurisdictional Specific Plan. The City recently sought a consultant team with expertise in, but not limited to, meeting facilitation, land use planning, community-based urban design, real-estate economics, historic preservation, transportation, and infrastructure systems, to assist with the effort. .The City initiated a Request for Qualifications/Request for Proposals (RFQ/RFP) process and concluded with three potential consultant teams. As of August 2016, CEDD staff is recommending Rick Engineering as the preferred firm based on the results of the RFQ/RFP process. This recommendation is subject to approval by the Land Use Committee and City Council. CEDD anticipates that final contract execution with the selected consultant will occur in the fall or winter of 2016 followed soon after by the project initiation. The City estimates that preparation of the specific plan will

take up to twenty months. Interested parties and individuals can find more information about the Northside Specific Plan at http://www.riversideca.gov/planning/northside/.

2.8 – Project Description

The project includes construction of a 308,000-square foot building (see Exhibit 2, Site Plan) on 15.88 gross acres (15.63 net acres) located south side of Center Street and north of Placentia Lane (APNs 246-070-017, 246-040-002, -026, and -027). The building could be used for any number of commercial or light industrial uses as permitted in the BMP zone; however, end users have not been identified at this time, as such, specific details about the future operation of the facility are not currently available. The proposed design will be a concrete tilt-up building. The project includes 110,591 square feet of landscaping, the potential for up to 282 parking stalls, and 47 loading docks. The project applications include Design Review and Lot Consolidation, from 4 lots to 1 lot.

The project site is primarily vacant with a vacant single family residence and five ancillary structures located on the southeastern portion of the site.

The project will have access to Center Street via two 40-foot wide driveways located along the frontage. No access to Placentia Lane to the south will be provided. Interior drive aisles along the western, eastern, and southern sides of the building will have a minimum width of 40 feet to provide adequate vehicle and emergency access as required by the Fire Department. The interior drive aisle along the northern side of the building will be 24 feet wide and provide access for passenger vehicles. Center Street and Placentia Lane are not fully improved streets. The proposed project will include the construction of new curbs and gutters, public sidewalk, and landscaping.

Construction Scheduling

It was estimated that 7,416 square feet of existing, on-site structures will be demolished to accommodate the project. Construction of the building is anticipated to start in 2016 and take approximately 19 months to complete.

Grading and Drainage

The project site is relatively flat and will not require the import or export of soils. Currently, the project site flows from north to south. The proposed building will include roof drains that are directed over proposed landscaped areas before being routed to the proposed landscaped infiltration basin. The proposed infiltration basin will be located at the southeastern corner of the project site and will exceed the existing infiltration capacity of the project site under existing conditions. The proposed project will include a 20-foot wide drainage easement to carry off-site flows through the site and outlet into Placentia Lane.

Landscaping

The proposed landscape coverage for the site is 110,591 square feet. The landscaping will be designed to significantly reduce the required water consumption of the site as compared to traditional landscape designs. Landscaped areas are to be located around the perimeter of the site. In addition, an infiltration basin will be located at the southeastern corner of the project site.

Utilities

Water service will be provided by Riverside Public Utilities Water Department. The proposed project will connect to existing water lines in Center Street to provide for domestic, landscape, and fire suppression. Electrical service will be provided by Riverside Public Utilities Electric Department via connections to existing circuits on Placentia Lane. Sewer service will be provided by the City of Riverside. In addition, there is an existing overhead circuit running through the site that will be relocated and placed within an easement in favor of Riverside Public Utilities Electric Department. Natural gas will be provided by Southern California Gas Company. The proposed project will be served by AT&T for phone service and Charter Cable for cable television.

2.9 – Surrounding Land Uses

Existing development surrounds the project site to the north, east, and south. Vacant land is located to the west and south of the project site. Table 1 (Surrounding Land Uses) lists the existing land use, General Plan Designations, and Zoning districts surrounding the project site.

Table 1
Surrounding Land Uses

Direction	General Plan Designation	Zoning District	Existing Land Use
Project Site	B/OP - Business/Office Park	BMP – Business and Manufacturing Park	Vacant, Single Family Residence
North*	Light Industrial	M-1 – Light Industrial	**Material Storage Yard**
South	PR - Private Recreation B/OP - Business/Office Park	BMP – Business and Manufacturing Park PF – Public Facilities	**Soccer Fields, Vacant**
East	B/OP - Business/Office Park	BMP – Business and Manufacturing Park	**Towing Company**
West	B/OP - Business/Office Park	BMP – Business and Manufacturing Park	Vacant
* City of Colton designation.			

2.10 – Environmental Setting

The project site is primarily vacant with a vacant single family residence and five ancillary structures located on the southeastern portion of the site and is located within a business and manufacturing park area. The AB Brown Sports Complex is located to the south of the project site. The project site is bound by Center Street to the north and Placenta Lane to the south. Existing on-site vegetation includes disturbed/ruderal habitat as well as ornamental tree species along the fence line near the project site's southwest corner, and native trees and shrub species interspersed throughout the disturbed and ruderal habitat areas. Existing drainage proceeds to the south westerly corner of the site. Regional transportation is provided by Interstate 215 to the east, State Routes 60 and 91 to the south, and Interstate 10 to the north.

2.11 – Required Approvals

The City of Riverside is the only land use authority for this project and this project will require the following City approvals:

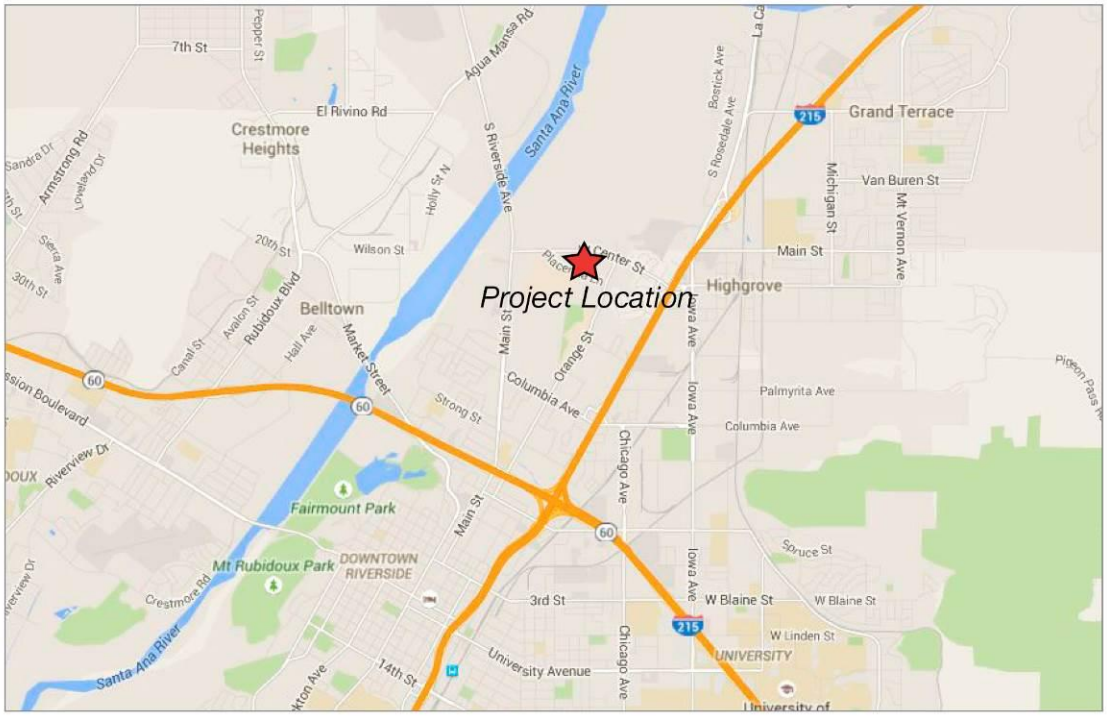
- Design Review (P14-1033)
- Lot Consolidation (P14-1034)

2.12 – Other Public Agencies Whose Approval is Required

None

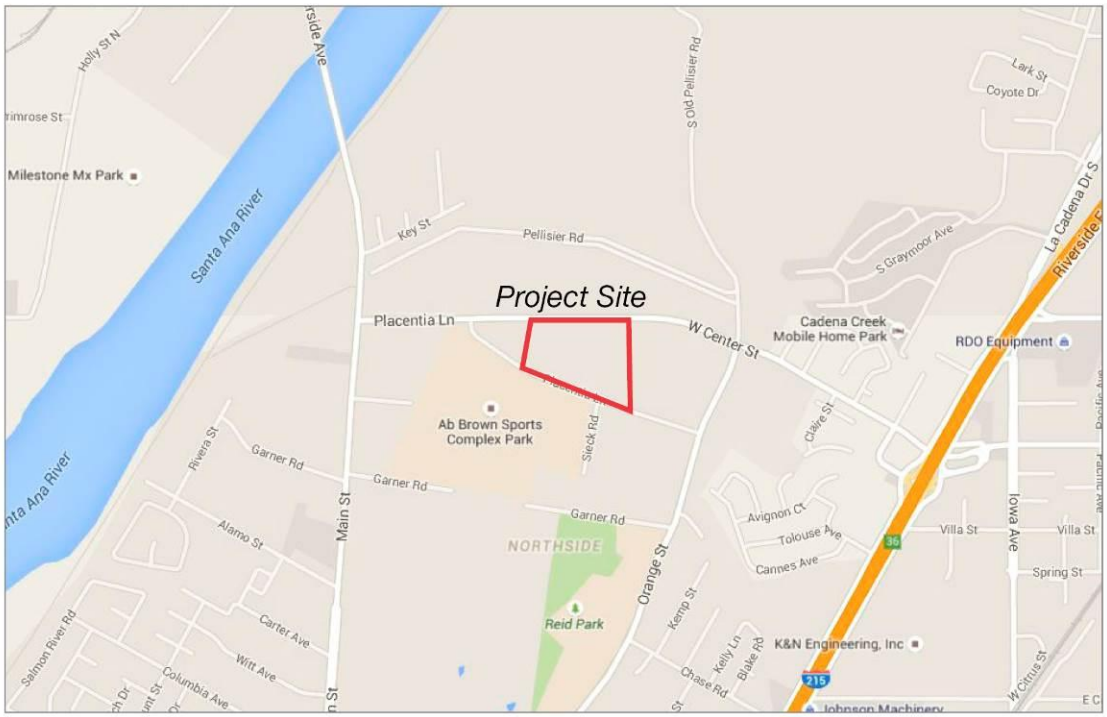
2.13 – Project Specific Technical Studies

- Air Quality/GHG Assessment
- Health Risk Assessment
- Biological Assessment
- Historical/Archaeological Resources Survey
- Geotechnical Engineering Investigation
- Water Quality Management Plan
- Noise Study



Source: Google Maps, 2015

Regional



Source: Google Maps, 2015

Vicinity

Not to Scale

Exhibit 1 Regional and Vicinity Map

Center Street Commerce Building Project
6550 Center Street, Riverside, California

Source: Site Visit on April 7, 2015 & Google Earth, 2015

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MIG Hogle-Ireland

Exhibit 3 Photographic Survey

Center Street Commerce Building
6055 Center Street, Riverside, California

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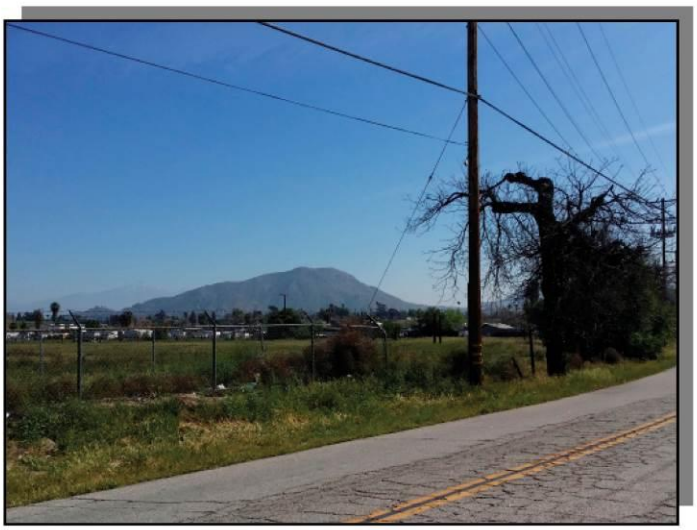

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Exhibit 3a Photographic Survey

Center Street Commerce Building
6550 Center Street, Riverside, California

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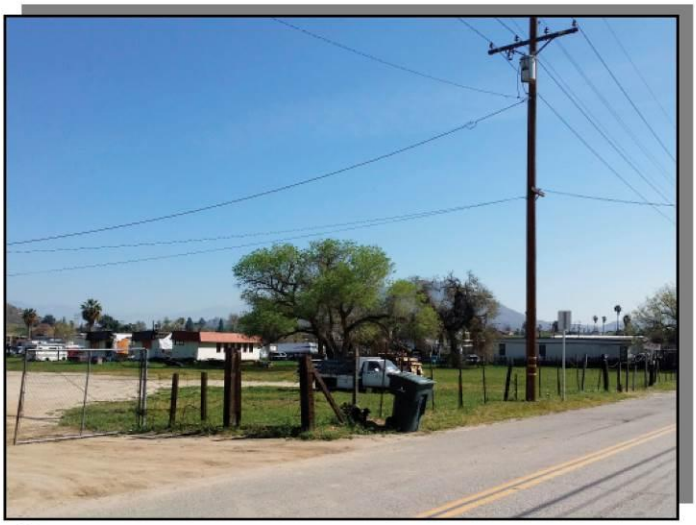

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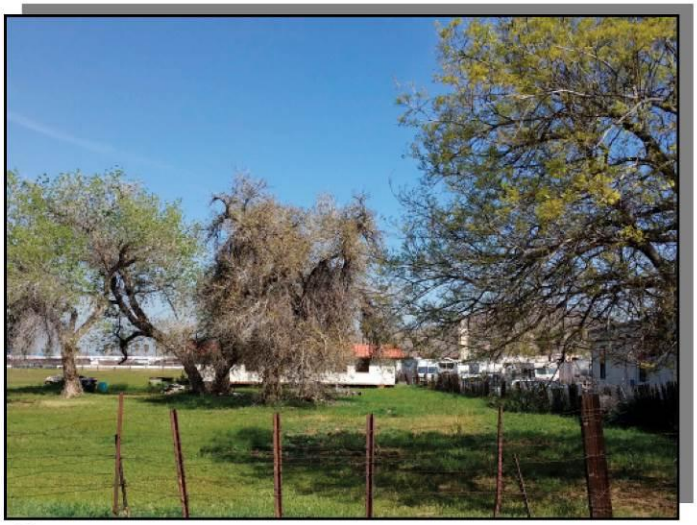

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Exhibit 3c Photographic Survey

Center Street Commerce Building
6550 Center Street, Riverside, California

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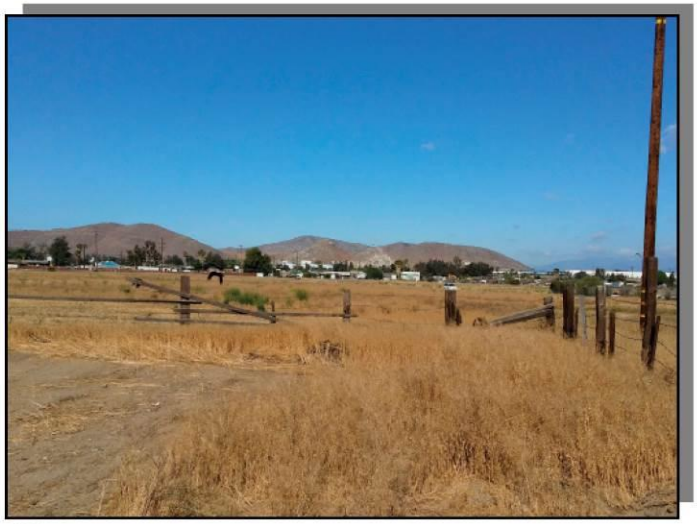

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Exhibit 3d Photographic Survey

Center Street Commerce Building
6550 Center Street, Riverside, California

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Exhibit 3e Photographic Survey

Center Street Commerce Building
6550 Center Street, Riverside, California

3 Determination

3.1 – Environmental Factors Potentially Affected

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a 'Potentially Significant Impact' as indicated by the checklist on the following pages.

☐	Aesthetics	☐	Agriculture Resources	☐	Air Quality
☐	Biological Resources	☐	Cultural Resources	☐	Geology /Soils
☐	Greenhouse Gas Emissions	☐	Hazards & Hazardous Materials	☐	Hydrology / Water Quality
☐	Land Use / Planning	☐	Mineral Resources	☐	Noise
☐	Population / Housing	☐	Public Services	☐	Recreation
☐	Transportation/Traffic	☐	Utilities / Service Systems	☐	Mandatory Findings of Significance

3.2 – Determination

☐	The City of Riverside finds that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
☑	The City of Riverside finds that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.
☐	The City of Riverside finds that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.
☐	The City of Riverside finds that the proposed project MAY have a 'potentially significant impact' or 'potentially significant unless mitigated' impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.
☐	The City of Riverside finds that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Signature

Date

City of Riverside

Printed Name & Title

4.1 – Aesthetics

Would the project:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☑	☐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within view from a state scenic highway?	☐	☐	☐	☑
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☑	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☑	☐

a) **Less than Significant Impact.** Scenic vistas can be impacted by development in two ways. First, a structure may be constructed that blocks the view of a vista. Second, the vista itself may be altered (i.e., development on a scenic hillside). The project site is primarily vacant with a vacant single family residence and five ancillary structures on the southeastern portion of the site and surrounded by material storage yards to the north, towing company to the east, AB Brown Sports Complex and vacant land to the south, and vacant land to the west. Varying views of the La Loma Hills to the north, Blue Mountain to the east, the Box Springs Mountains to the southeast, and Rattlesnake Mountain to the west are currently available from the project site. Views may be blocked with the development of the proposed project; however, the project is proposed within an area designated for business and manufacturing park uses and surrounding properties along Center Street are developed with similar uses. Riverside Municipal Code Chapter 19.130 requires that all development in the Business Manufacturing Park (BMP) zone have a maximum building height of 45 feet with an additional 10-foot allowance for any portion of the building intended for screening purposes. The proposed building will have a maximum height of 47 feet at the northern corners. The project site and vicinity are not designated by the City's General Plan for the preservation or uniqueness of scenic views.[1] Furthermore, the General Plan Environmental Impact Report (EIR) found that impacts to scenic vistas would be less than significant with implementation of General Plan's policies supporting a balance between development interests and broader community preservation objective. This project does not require a general plan amendment and is consistent with the policies of the B/OP land use designation. Considering the project will not directly alter a scenic vista and is consistent with the General Plan EIR analysis, impacts will be less than significant.

[1] City of Riverside. General Plan Environmental Impact Report. November 2007

b) **No Impact.** The project is not adjacent to a designated state scenic highway as identified on the California Scenic Highway Mapping System.[2] The project site is primarily vacant with a vacant single family residence and five ancillary structures. As discussed in Section 4.5 (Cultural Resources), this residence has been previously recorded as Site 33-006973 and is a 1920's era Spanish Eclectic-style single family residence. As determined by the Historical/Archaeological Resources Survey Report (Appendix D), the residence and five ancillary structures have undergone major alterations and are in dilapidated condition; therefore, they do not qualify as historical resources. The site does not contain rock outcroppings, significant trees, or other features that could qualify as a scenic resource. Considering no scenic resources are located on the project site or will be altered as a result of the project, no impact will occur.

c) **Less than Significant Impact.** Degradation of visual character or quality is defined by substantial changes to the existing site appearance through construction of structures such that they are poorly designed or conflict with the site's existing surroundings. Construction of the proposed building on the existing primarily vacant site would alter the existing visual character of the primarily vacant site. However, the project site is located in an area designated for business and office park use. Center Street is developed with similar uses with a warehouse building to the northeast, towing company to the east, and material storage yards to the north of the project site. The project will comply with all pertinent design requirements of the Zoning Code, to assure quality site design and building architecture that is well constructed. This includes installation of landscaping, undulating and decorative screening walls and facades, window fenestration, and varying roof design. Development of the proposed project will improve the overall character of the area by introducing a high-quality design and replacing dilapidated structures on the southeastern portion of the project site. The City of Riverside General Plan EIR 2025 states that City-wide design guidelines prevent the use of highly reflective surfaces and metal siding. The buildings will be of concrete tilt up panel style construction with architecturally enhanced main entrance and blue window glazing. With design features included, the project will have less than significant impacts on the visual character of the site and the surroundings.

d) **Less than Significant Impact.** Excessive or inappropriately directed lighting can adversely impact night-time views by reducing the ability to see the night sky and stars. Glare can be caused from unshielded or misdirected lighting sources. Reflective surfaces (i.e., polished metal) can also cause glare. Impacts associated with glare range from simple nuisance to potentially dangerous situations (i.e., if glare is directed into the eyes of motorists).

Development of the proposed project will require installation of outdoor lighting necessary for public safety and maintenance, as well as to accommodate nighttime business operations. All lighting will comply with the development standards contained in the City's Zoning Code (Title 19). Chapter 19.590 (Performance Standards) requires that on-site lighting be arranged as to reflect away from adjoining property or any public streets. Light shall not be directed skyward or in a manner that interferes with aircraft operation.

The proposed project could involve nighttime activities that would result in additional sources of light in the night. However, the project site is surrounded by material storage yards to the north, a towing company to the east, and the AB Brown Sports Complex to the south. There is currently substantial nighttime lighting in the surrounding areas of the project site due to surrounding developments and the general urban character of the area. There are no residential uses in close proximity to the project site that could be directly affected by new sources of light. Addition of new sources of permanent light and glare as a result of implementation of the proposed project would not significantly increase ambient lighting in the project vicinity. Moreover, due to the built nature of the project area, there is a significant existing amount of ambient light both in the project area and in the immediately surrounding vicinity. Impacts will be less than significant.

[2] California Department of Transportation. California Scenic Highway Mapping System. http://www.dot.ca.gov/hq/LandArch/scenic_highways/ [July 2015]

4.2 – Agriculture and Forest Resources

Would the project:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☑
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☑
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104 (g))?	☐	☐	☐	☑
d) Result in loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☑
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☑

a) **No Impact.** As indicated in the California Department of Conservation Division of Land Resource Protection and the City of Riverside General Plan EIR, the project site is identified as *urban and built-up land* and *other land*.[3] [4] *Urban and built-up land* is defined as land that is occupied by structures with building density of at least one unit to 1.5 acres, or approximately six structures to a 10-acre parcel. *Other land* is identified as land that is not included in any other mapping category. Common examples include low density rural developments and vacant nonagricultural land surrounded on all size by urban development. In addition, the project site is not designated or zoned for agricultural use according to the General Plan and Zoning Map. Therefore, the proposed project will not result in the conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. No impact will result.

b) **No Impact.** As indicated by the 2007 Riverside General Plan EIR and the Department of Conservation Division of Land Resource Protection, the project site is not identified as being on Williamson Act enrolled land.[5] [6] In addition the project is

[3] California Department of Conservation. Division of Land Resource Protection. Farmland Mapping and Monitoring Program. [July 2013]
[4] Albert A. Webb Associates. City of Riverside General Plan 2025 Program Environmental Impact Report. July 2007.
[5] Albert A. Webb Associates. City of Riverside General Plan 2025 Program Environmental Impact Report. July 2007.

currently zoned as Business Manufacturing Park which designates the site for industrial use. Therefore, there will be no conflict with existing zoning for agricultural use or a Williamson Act contract and impacts will be no impacts.

c) **No Impact.** Public Resources Code Section 12220(g) identifies forest land as 'land that can support 10-percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits.' The project site and surrounding properties are not currently being managed or used for forest land as identified in Public Resources Code Section 12220(g). The project site is zoned for industrial uses, with disturbed/ruderal vegetation as well as native and ornamental vegetation onsite. Therefore, development of this project will have no impact to any timberland zoning.

d) **No Impact.** The project site is primarily vacant with one single family residence and five ancillary structures on site. The project site is not being managed or used for forest land and is not zoned for forest land use; thus, there will be no loss of forest land or conversion of forest land to non-forest use as a result of this project.

e) **No Impact.** The project site is primarily vacant with a vacant single family residence and five ancillary structures, disturbed/ruderal habitat, and native and ornamental vegetation on site. The project is surrounded by material storage yards to the north, towing company to the east, the AB Brown Sports Complex and vacant land to the south, and vacant land to the west with little to no trees. None of the surrounding sites contain existing forest uses. Development of this project will not change the existing environment in a manner that will result in the conversion of forest land to a non-forest use.

[6] California Department of Conservation. Division of Land Resource Protection. ftp://ftp.consrv.ca.gov/pub/dlrp/wa/ [June 2015]

4.3 – Air Quality

Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☑	☐
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☑	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☑	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☑	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☐	☑

a) **Less than Significant Impact.** A significant impact could occur if the proposed project conflicts with or obstructs implementation of the South Coast Air Basin 2012 Air Quality Management Plan (AQMP). Conflicts and obstructions that hinder implementation of the AQMP can delay efforts to meet attainment deadlines for criteria pollutants and maintaining existing compliance with applicable air quality standards. Pursuant to the methodology provided in Chapter 12 of the 1993 South Coast Air Quality Management District (SCAQMD) CEQA Air Quality Handbook, consistency with the South Coast Air Basin 2012 AQMP is affirmed when a project (1) does not increase the frequency or severity of an air quality standards violation or cause a new violation and (2) is consistent with the growth assumptions in the AQMP.[7] A consistency review is presented below:

1. The project would result in short-term construction and long-term pollutant emissions that are less than the CEQA significance emissions thresholds established by the SCAQMD, as demonstrated in Section 4.3(b) et seq of this report; therefore, the project could not result in an increase in the frequency or severity of any air quality standards violation and will not cause a new air quality standard violation.

2. The CEQA Air Quality Handbook indicates that consistency with AQMP growth assumptions must be analyzed for new or amended General Plan elements, Specific Plans, and *significant projects*. *Significant projects* include airports, electrical generating facilities, petroleum and gas refineries, designation of oil drilling districts, water ports, solid waste

[7] South Coast Air Quality Management District. CEQA Air Quality Handbook. 1993

disposal sites, and off-shore drilling facilities; therefore, the proposed project is not defined as *significant*. This project does not include a General Plan Amendment and therefore does not required consistency analysis with the AQMP.

Based on the consistency analysis presented above, the proposed project will not conflict with the AQMP.

b) **Less than Significant Impact.** A project may have a significant impact if project related emissions would exceed federal, state, or regional standards or thresholds, or if project-related emissions would substantially contribute to existing or project air quality violations. The proposed project is located within the South Coast Air Basin, where efforts to attain state and federal air quality standards are governed by the SCAQMD. Both the State of California (State) and the Federal government have established health-based ambient air quality standards (AAQS) for seven air pollutants (known as 'criteria pollutants'). These pollutants include ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), inhalable particulate matter with a diameter of 10 microns or less (PM_{10}), fine particulate matter with a diameter of 2.5 microns or less ($PM_{2.5}$), and lead (Pb). The state has also established AAQS for additional pollutants. The AAQS are 0designed to protect the health and welfare of the populace within a reasonable margin of safety. Where the state and federal standards differ, California AAQS are more stringent than the national AAQS.

Air pollution levels are measured at monitoring stations located throughout the air basin. Areas that are in nonattainment with respect to federal or state AAQS are required to prepare plans and implement measures that will bring the region into attainment. Table 2 (South Coast Air Basin Attainment Status) summarizes the attainment status in the Basin for the criteria pollutants. Discussion of potential impacts related to short-term construction impacts and long-term area source and operational impacts are presented below.

Table 2
South Coast Air Basin Attainment Status

Pollutant	Federal	State
O_3 (1-hr)	--	Nonattainment
O_3 (8-hr)	Nonattainment	Nonattainment
PM_{10}	Attainment	Nonattainment
$PM_{2.5}$	Nonattainment	Nonattainment
CO	Unclassified/Attainment	Attainment
NO_2	Unclassified/Attainment	Attainment
SO_2	Attainment	Attainment
Pb	Nonattainment	Attainment
VRP	--	Unclassified
SO_4	--	Attainment
H_2S	--	Unclassified
Sources: ARB 2013		

Construction Emissions

Short-term criteria pollutant emissions will occur during demolition, site grading, building construction, paving, and architectural coating activities. Emissions will occur from use of equipment, worker, vendor, and hauling trips, and disturbance of onsite soils (fugitive dust). To determine if construction of the proposed project could result in a significant air quality impact, the California Emissions Estimator Model (CalEEMod) has been utilized. CalEEMod defaults have generally been used as construction inputs into the model (see Appendix A). The methodology for calculating emissions is included in the CalEEMod *User Guide,* freely available at http://www.caleemod.com.

It was estimated that 7,416 square feet of existing, on-site structures will be demolished to accommodate the project. Construction of the building is anticipated to start in early 2016. CalEEMod defaults for construction schedule phase duration and equipment needs were utilized. Based on the results of the model, maximum daily emissions from the construction of the project will result in excessive emissions of volatile organic chemicals (identified as reactive organic gases) associated with interior and exterior coating activities. To compensate for excessive VOC emissions from coating activities, the model includes use of a minimum 37 grams per liter (g/l) VOC content for interior and exterior coatings. Use of low-VOC coatings during construction activities will reduce VOC emissions to 73 lbs/day, less than the threshold established by SCAQMD.

Table 3
Daily Construction Emissions (lbs/day)

Source	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Summer						
2016	7	75	50	<1	21	13
2017	72	37	45	<1	6	3
Winter						
2016	7	75	50	<1	21	13
2017	72	37	46	<1	6	3
Threshold	75	100	550	150	150	55
Substantial?	No	No	No	No	No	No

Operational Emissions

Long-term criteria air pollutant emissions will result from the operation of the proposed project. Long-term emissions are categorized as area source emissions, energy demand emissions, and operational emissions. Operational emissions will result from automobile, truck, and other vehicle sources associated with daily trips to and from the project. Area source emissions are the combination of many small emission sources that include use of outdoor landscape maintenance equipment, use of consumer products such as cleaning products, and periodic repainting of the proposed project. Energy demand emissions result from use of electricity and natural gas. Emissions from area sources were estimated using CalEEMod defaults.

The California Emissions Estimator Model (CalEEMod) was utilized to estimate mobile source emissions. Trip generation (3.82 daily trips per 1,000 SF) is based on the trip generation rates provided in the Institute of Transportation Engineers *Trip Generation Manual* (9th Edition).[8] Passenger vehicles will consist of 74.4 percent of the fleet mix, light-duty trucks will consist of 8.4 percent of the fleet mix, medium-heavy duty trucks will consist of 4.6 percent of the truck trips, and heavy-heavy duty truck trips consist of 16.6 percent of the fleet mix. CalEEMod defaults were used for trip length, prime and no-primer trip percentages, and trip purpose in light of the proposed project being assessed as manufacturing us. It was assumed that the facility will use five forklifts and one generator set during operations. Assuming an opening year of 2019, the results of the CalEEMod model for summer and winter operation of the project are summarized in Table 4 Operational Daily Emissions (lbs/day). Based on the results of the model, impacts associated with operation of the Project will not exceed the threshold established by SCAQMD.

8 Institute of Transportation Engineers. Trip Generation Manual. 9th ed. September 2012

Table 4 Operational Daily Emissions (lbs/day)

Source	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Summer						
Area Sources	16	<1	<1	0	<1	<1
Energy Demand	<1	3	2	<1	<1	<1
Mobile Sources	4	31	55	<1	12	3
Equipment	1	11	10	<1	2	1
Summer Total	*22*	*45*	*67*	*<1*	*13*	*4*
Winter						
Area Sources	16	<1	<1	0	<1	<1
Energy Demand	<1	3	2	<1	<1	<1
Mobile Sources	4	33	58	<1	12	3
Equipment	1	11	10	<1	2	1
Winter Total	*22*	*46*	*70*	*<1*	*13*	*4*
Threshold	55	55	550	150	150	55
Substantial?	No	Yes	No	No	No	No

c) **Less than Significant Impact.** Cumulative short-term, construction-related emissions from the project will not contribute considerably to any potential cumulative air quality impact because short-term project emissions will be less than significant and other concurrent construction projects in the region will be required to implement standard air quality regulations and mitigation pursuant to State CEQA requirements, just as this project has.

The SCAQMD CEQA Air Quality Handbook identifies methodologies for analyzing long-term cumulative air quality impacts for criteria pollutants for which the Basin is nonattainment. These methodologies identify three performance standards that can be used to determine if long-term emissions will result in cumulative impacts. Essentially, these methodologies assess growth associated with a land use project and are evaluated for consistency with regional projections. These methodologies are outdated, and are no longer recommended by SCAQMD. SCAQMD allows a project to be analyzed using the projection method such that consistency with the AQMP will indicate that a project will not contribute considerably to cumulative air quality impacts. As discussed in AQMP Consistency, the proposed project is consistent with growth assumptions in the AQMP, and would not exceed any applicable SCAQMD thresholds for short- and long-term emissions. Therefore, the proposed project will not contribute to any potential cumulative air quality impacts.

d) **Less than Significant Impact.** Sensitive receptors are those segments of the population that are most susceptible to poor air quality such as children, the elderly, the sick, and athletes who perform outdoors. Land uses associated with sensitive receptors include residences, schools, playgrounds, childcare centers, athletic facilities, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes.

Localized Significance Thresholds

As part of SCAQMD's environmental justice program, attention has recently been focusing more on the localized effects of air quality. Although the region may be in attainment for a particular criteria pollutant, localized emissions from construction activities coupled with ambient pollutant levels can cause localized increases in criteria pollutant that exceed national and/or State air quality standards.

Construction-related criteria pollutant emissions and potentially significant localized impacts were evaluated pursuant to the SCAQMD Final Localized Significance Thresholds Methodology. This methodology provides screening tables for one through five-acre project scenarios, depending on the amount of site disturbance during a day using the Fact Sheet for equipment usage in CalEEMod.[9] Daily oxides of nitrogen (NO_X), carbon monoxide (CO), and particulate matter (PM_{10} and

[9] South Coast Air Quality Management District. Fact Sheet for Applying CalEEMod to Localized Significance Thresholds.

$PM_{2.5}$) emissions will occur during construction of the project, grading of the project site, and paving of facility parking lots and drive aisles. Table 5 (Localized Significance Threshold Analysis) summarize on- and off-site emissions as compared to the local thresholds established for Source Receptor Area (SRA) 23 (Metropolitan Riverside County). Based on the use of four tractors and three dozers during site preparation activities, a 3.5-acre threshold will be used (using linear regression). A 50-meter receptor distance was used to reflect the proximity of residential uses to the sports fields south of the project site. Note that particulate matter emissions account for daily watering required by SCAQMD Rule 403 (three times per day for a 55 percent reduction in fugitive dust). Emissions from construction activities will not exceed any localized threshold.

Table 5
Localized Significance Threshold Analysis (lbs/day)

Phase	CO	NO_X	PM_{10}	$PM_{2.5}$
Demolition	35	46	2	2
Site Preparation	41	55	10	7
Grading	49	75	7	5
Building Construction	19	29	2	2
Paving	15	20	1	1
Architectural Coating	2	2	<1	<1
Threshold	**1,708**	**248**	**28**	**8**
Potentially Substantial?	**No**	**No**	**No**	**No**

Operational

Operation-related STs become a concern when there are substantial on-site stationary and on-site mobile sources that could impact surrounding receptors. The proposed building does not have a tenant and is speculatively considered for manufacturing uses, thus the type and extent of on-site stationary or on-site mobile sources is unknown. In order to generally assess operational impacts related to LSTs, the ARB *Characterization of the Off-Road Equipment Population* for the state was used to estimate the amount of on-site equipment that may be used as party of future operations. The "residual" category of business was queried. This category includes manufacturing uses as the result of survey inquiries throughout the state and extrapolated to the County level. According to this report, manufacturing uses in Riverside County average 0.0313 pieces of equipment per employee. An estimate of 106 employees was calculated for the proposed project based on the NAIOP logistics trends analysis for industrial and warehousing uses. This results in an estimated four pieces of equipment, specifically, three fork-lifts and one generator set. It is standard practice to operate a generator once a month for approximately one hour for maintenance purposes and this practice was considered in the analysis. According to Southern California Edison, the Ontario District (that includes parts of western Riverside County), the area experiences an average of 100 minutes of "sustained" outages (from 2010 through 2015 for outages over five minutes in duration) at a frequency of 0.81 outages annually. Using a composite of this information, the generator set was assumed to operate for a total of 13.35 hours annually. Forklifts were assumed to operate 24 hours a day. Use of on-site equipment coupled with on-site truck idling (limited to five minutes per hour) comprises the on-site emissions inventory that were evaluated for localized impacts. The emissions calculations are summarized in Table 6 and no criteria pollutant will be emitted that will exceed applicable LSTs.

Table 6
Localized Significance Thresholds (Operations)

Source	CO	NOX	PM10	PM2.5
Landscaping	0.04	0.00	0.00	0.00
Natural Gas	2.31	2.75	0.21	0.21
On-Site Idling	0.23	1.78	00.00	0.00
On-Site Equipment	1.36	5.07	0.38	0.35
TOTAL	**3.94**	**9.6**	**0.59**	**0.56**
Potentially Significant?	**No**	**No**	**No**	**NO**

Carbon Monoxide Hot Spots

A carbon monoxide (CO) hotspot is an area of localized CO pollution that is caused by severe vehicle congestion on major roadways, typically near intersections. CO hotspots have the potential to violate State and Federal CO standards at intersections, even if the broader Basin is in attainment for Federal and State levels. The California Department of Transportation Project-Level Carbon Monoxide Protocol (Protocol) screening procedures have been utilized to determine if the proposed project could potentially result in a CO hotspot. Based on the recommendations of the Protocol, a screening analysis should be performed for the proposed project to determine if a detailed analysis will be required. The California Department of Transportation notes that because of the age of the assumptions used in the screening procedures and the obsolete nature of the modeling tools utilized to develop the screening procedures in the Protocol, they are no longer accepted. More recent screening procedures based on more current methodologies have been developed. The Sacramento Metropolitan Air Quality Management District (SMAQMD) developed a screening threshold in 2011 which states that any project involving an intersection experiencing 31,600 vehicles per hour or more will require detailed analysis. In addition, the Bay Area Air Quality Management District developed a screening threshold in 2010 which states that any project involving an intersection experiencing 44,000 vehicles per hour would require detailed analysis. The proposed project's operations would not involve an intersection experiencing this level of traffic; therefore, the proposed project passes the screening analysis and impacts are deemed less than significant. Based on the local analysis procedures, the proposed project would not result in a CO hotspot.

Toxic Air Contaminants

SCAQMD has established thresholds for emissions of toxic air contaminants. Toxic air emissions from a project are considered potentially significant if maximum incremental cancer risk (MICR) is greater than ten persons in 1,000,000 (1E-05). Cancer risk is determined by calculating the combinatory effects of the cancer potency factor (CPF) when inhaling the toxic, the daily inhalation dose, the age group the receptor is cohort to, the duration of exposure over a lifetime (25, 30, or 70 years depending on the analysis), and the amount of time spent at the location of exposure. Cancer risk was assessed for three specific locations within one-quarter mile of the proposed project, as recommended by OEHHA: the maximum exposed individual resident (MEIR) over a 30-year exposure duration that characterizes the maximum residency tendency in California, the maximum exposed individual worker (MEIW) over a 25-year exposure duration characterizing the maximum job tenure tendency in California, and the point of maximum impact (PMI) irrespective of receptor type. Residential risk calculations account for presumed sensitivity to carcinogens and differences in intake rates for the third-trimester to birth, birth to two-years, two-years to nine-years, two-years to nine-years, two-years to 16-years, 16-year to 30-years, and 16-years to 70 years' age bins.

Concentrations were modeled using AERMOD and then input into the Hot Spots and Reporting Program (HARP) Health Risk Assessment Standalone Tool (RAST) computer software to calculate cancer risk based on the methods and recommendations found in the HRA Guidelines. The results of the HARP evaluation of cancer risk for residential 9-years, 30 years, and 70 years, and worker 25-years exposure scenarios for grid receptors and discrete receptors are summarized in the following tables and detailed program results are included in the project health risk assessment.

The breadth of averaging options was included in this study to provide the broadest depth of information regarding cancer risk to the public and local decision makers. In regards to the health risk assessment and CEQA, identifying the MICR is

based on the greater of the MEIW and MEIR using the appropriate scenario for those receptors categories and PMI is assessed through community exposure. The lifetime exposure scenario is appropriate for determining cancer burden in those areas that may be exposed to cancer risk greater than one in one million cases. Evaluation of these scenarios will identify any receptors that exceed the MICR of 10 in one million or the 0.5 increased cancer burden thresholds promulgated by SCAQMD.

The site of the MEIR is the residential dwelling unit located at 3610 Placentia Lane, east of the project site. The incremental increase in cancer risk at this property is 2.87 in one million. The location of the MEIW is at the Brothers Towing of Riverside site directly east of the project site at 3655 Placentia Ln. The incremental increase in cancer risk at this business is 1.09 in one million. MICR at these locations does not exceed 10 in one million.

Cancer burden is the product of public cancer risk and the population exposed to the carcinogen. There are 25 residential properties located within ¼-mile of the project site. Census data indicates that the average owner-occupied household size in the city is 3.10 persons per dwelling unit, thus, an estimated population of 78 people live within one-quarter mile of the project site. The average cancer risk based on the lifetime exposure scenario is 3.34E-06 (approximately 3.34 cases per million people). The product of the cancer risk and the estimated population is 0.0003. This does not exceed the SCAQMD threshold of 0.5 excess cancer cases. Under a worst-case scenario, the PMI calculated as cancer burden of 0.0025 cases is located at the Brothers Towing of Riverside site. Under neither scenario would cancer burden exceed the applicable threshold.

The AB Brown Sports Complex, located directly southeast of the project site on the south side of Placentia Street, is of particular concern to the City and the community as it relates to toxic emissions from the project site. The Sports Complex was input into CalEEMod as a residential use although children, parents, and other users will spend less time at the Sports Complex then they do at home or other residential units. It's estimated that the children will spend approximately 2-8 hours a week at the Sports Complex, depending on the age group and competitive nature of the activities. This is between 92 percent and 66 percent less than when at home. DPM concentrations over the Sports Complex will range from 0.00067 to 0.00759 grams per second per square-meter (g/sec/m^2) with an average concentration of 0.001811 g/sec/m^2. This will result in a potential increase in cancer risk of 0.58 persons per million (5.80E-07) and 6.57 persons per million (6.57E-06) with an average of 1.57 persons per million. To put these estimates in perspective and consider cancer risk from a different perspective, a child who spends four hours a week at the Sports Complex would have need to continue to engage in activities there for approximately 2,948 years before the amount of exposure would reach 10 chances in one million of developing cancer. Based on the evidence provided in the project HRA and the discussion in this Initial Study, impacts to users of the AB Brown Sports Complex will be less than significant.

Chronic non-cancer risks are considered significant if the project toxic air contaminant emissions result in a hazard index greater than or equal to one. The hazard index is determined by calculating the average annual toxic concentration (µg/m3) divided by the reference exposure level (REL) for a particular toxic. The REL is the concentration at which no adverse health impacts are anticipated and is established by OEHHA. The chronic REL for DPM was established by OEHHA as 5 µg/m3. Chronic non-cancer risk was evaluated using HARP and identified the highest hazard index or 0.00712, identified as Index 76 of the lifetime receptor grid. This does not exceed the hazard index threshold of one promulgated by SCAQMD. Table 7 summarizes the results of the risk assessment and indicate that no thresholds of significance will be exceeded. Impacts will be less than significant.

Table 7
Summary Risk Assessment

Receptor (Exposure Time)	Exposure Level	Threshold	
Resident (30 Years) Cancer Risk	0.000002870	0.00001	No
Worker (25 Years) Cancer Risk	0.000001090	0.00001	No
Community Level (70 Years) Cancer Risk	0.002500000	0.50000	No
Non-Cancer Hazard index	0.007120000	1.00000	No

e) **No Impact.** According to the CEQA Air Quality Handbook, land uses associated with odor complaints include agricultural operations, wastewater treatment plants, landfills, and certain industrial operations (such as manufacturing uses that produce chemicals, paper, etc.). The proposed project is sited within an existing industrial and commercial area. The proposed project does not produce odors that would affect a substantial number of people considering that the proposed project will not result in heavy manufacturing activities. No impact will occur.

4.1 – Biological Resources

Would the project:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☑	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or US Fish and Wildlife Service?	☐	☐	☐	☑
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☑	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☐	☑
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☑
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☑	☐

a) **Less than Significant Impact with Mitigation Incorporated.** A biological resources assessment was prepared by MIG | Hogle-Ireland (see Appendix C). No special-status plant or wildlife species listed by the State and/or Federal government as endangered or threatened were identified during the field investigation conducted by MIG | Hogle-Ireland on April 7, 2015.

The coastal whiptail (*Aspidoscelis tigris stejnegeri*), coast horned lizard (*Phrynosoma blainvillii*), and California horned lark (*Eremophila alpestris actia*) have a moderate potential to occur on the project site. Suitable habitat for the coastal whiptail and coast horned lizard exists in the form of disturbed/ruderal habitat which provides open areas and sandy soil. Suitable habitat for the California horned lark exists in the form of disturbed/ruderal habitat that provides open grassy areas. The Coastal whiptail and the California horned lark have no legal protection status; however, the coast horned lizard is a California "Species of Special Concern". In order to avoid potential impacts to nesting birds during construction activities, Mitigation Measures BIO-1 and BIO-2 have been incorporated. Mitigation Measure BIO-1 requires that all suitable habitats be thoroughly surveyed if construction activity and construction noise would occur during the avian nesting season (prior to February 1 or after September 1) no more than five days before commencement of vegetation removal. In the event that the project site is occupied by nesting birds, Mitigation Measure BIO-2 prohibiting grading or heavy equipment activity within 300 feet of sensitive bird nests, 500 feet of raptor nests, or as determined by a qualified biologist shall be incorporated. With implementation of Mitigation Measures BIO-1 and BIO-2, impacts to the coast horned will be reduced to to less-than-significant levels.

The City of Riverside indicated that, according to the Western Riverside County Multi-Species Habitat Conservation Plan (MSHCP), the project site is within a burrowing owl survey area and burrowing owls may be present on site. The April 7, 2015 biological field survey revealed that the project site is comprised of ruderal and disturbed plant communities. Burrowing owls and/or signs of this species (e.g., whitewash at burrows) were not observed during the April 7, 2015 biological field survey. Due to the absence of suitable burrow habitat, burrowing owl has a low potential to occur on the project site. Impacts to burrowing owls will be less than significant.

Existing trees on the project site could support suitable nesting habitat for songbirds. Although no active nests were observed during the 2015 field surveys, there is potential for ground-, tree-, and shrub-nesting birds to establish nests on the project site in the future. Incorporation of Mitigation Measures BIO-1 and BIO-2 requiring thorough surveys of the construction area and the establishment of a buffer area around active nests, respectively, will reduce impacts to migratory songbirds to less-than-significant levels.

Several species of bats are known to occur in the vicinity of the project site. Several sheds, mobile homes, and trees are located on the project site that could provide suitable roosting habitat for bat species. Thus, Mitigation Measure BIO-3, requiring a pre-construction survey of suitable habitat for roosting bats within 14 days prior vegetation or structure removal be conducted, has been incorporated. Should an occupied maternity or colony roost be detected during the pre-construction survey, CDFW shall be contacted about how to proceed. With incorporation of Mitigation Measure BIO-3, impacts to roosting bats will be reduced to less-than-significant levels.

<u>Mitigation Measures</u>

BIO-1 To avoid impacts to nesting birds, construction activities and construction noise should occur outside the avian nesting season (prior to February 1 or after September 1). If construction and construction noise occurs within the avian nesting season (during the period from February 1 to September 1), all suitable habitats shall be thoroughly surveyed for the presence of nests by a qualified biologist no more than five days before commencement of any vegetation removal. If it is determined that the project site is occupied by nesting birds, Mitigation Measure BIO-2 shall apply. Conversely, if the project site is found to be absent of nesting birds, Mitigation Measure BIO-2 shall not be required.

BIO-2 If pre-construction nesting bird surveys result in the location of active nests, no grading or heavy equipment activity shall take place within 300 feet of sensitive bird nests and 500 feet of raptor nests, or as determined by a

qualified biologist. Protective measures (e.g., sampling) shall be required to ensure compliance with the MBTA and relevant California Fish and Game Code requirements.

BIO-3 A pre-construction survey shall be conducted in suitable habitat (e.g., dilapidated sheds and trees) for roosting bats within 14 days prior to activities that remove vegetation or suitable structures. If an occupied maternity or colony roost is detected, CDFW shall be contacted about how to proceed. Typically, a bugger exclusion zone would be established around each occupied roost until bat activities have ceased. The size of the buffer would take into account:

- Proximity and noise levels of project activities;
- Distance and amount of vegetation or screening between the roost and construction activities;
- Species-specific needs, if known, such as sensitivity to disturbance.

Due to restrictions of the California Health Department, direct contact by workers with any bat is not allowed. The qualified bat biologist will be contacted immediately if a bat roost is discovered during project construction.

b) **No Impact.** The April 7, 2015 biological field survey revealed that ornamental vegetation, native vegetation, developed, and disturbed/ruderal habitats exist on the 15.63-acre project site. No sensitive natural vegetation communities or riparian habitat are present on the project site. As such, no impact to riparian habitat or other sensitive natural vegetation communities will occur.

c) **Less than Significant Impact.** No jurisdictional waters were observed on the project site during the April 7, 2015 field visit. Therefore, no impacts to jurisdictional aquatic resources will occur due to project implementation.

The project could have indirect impacts (e.g., inadvertent damage by construction equipment or decreased water/habitat quality due to runoff) on sensitive natural communities downstream or in the vicinity of the project site. However, with implementation of the project SWPPP, including Best Management Practices, these impacts would be reduced to less than significant.

d) **No Impact.** The project site is primarily urban and is not located within an established or potential wildlife movement corridor due to the heavily developed character of the vicinity. Additionally, the project is not in a known wildlife nursery site. No impact will occur.

e) **No Impact.** The City of Riverside General Plan 2025 contains an Open Space and Conservation Element. The following objectives and policies pertain to the protection of biological resources.

Objective OS-5 Protect biotic communities and critical habitats for endangered species throughout the General Plan Area.

Policy OS-5.2 Continue to participate in the MSHCP Program and ensure all projects comply with applicable requirements.

The City of Riverside does have a tree preservation ordinance; however, the proposed project does not proposed the removal of any trees. Therefore, project implementation will not conflict with any local policies or ordinances pertaining to biological resources. No impact will occur.

f) **Less than Significant Impact.** The project site is located within the Western Riverside County MSHCP. The City of Riverside, as the lead agency for the project, requires that the project comply with the Western Riverside County MSHCP. The MSHCP includes a program for the collection of development mitigation fees, policies for the review of projects in areas where habitat must be conserved and policies for the protection of riparian areas, vernal pools, and narrow endemic plants. It also includes requirements to perform plant, bird, reptile, and mammal surveys

in certain areas. The primary intent of the MSHCP is to provide for the conservation of a range of plants and animals and in return, provide take coverage and mitigation for projects throughout Western Riverside County to avoid the cost and delays of mitigating biological impacts on a project-by-project basis. It would allow the incidental take (for development purposes) of species and their habitat from development.

The MSHCP identifies that the project area is located in a burrowing owl and narrow endemic plant species (i.e., San Diego ambrosia (*Ambrosia pumila*), Brand's star phacelia (*Phacelia stellaris*), and San Miguel Savory (*Clinopodium chandleri*)) survey area. Therefore, as required, surveys were conducted to assess potential habitat and to ensure that no burrowing owl or narrow endemic plant species have potential to occur on the project site. The biological field survey conducted on April 7, 2015 revealed that no suitable burrowing owl habitat exists on the project site. In addition, no habitat that could support narrow endemic plant species was observed on the project site during the biological field survey. The project will comply with measures identified in the MSHCP and will not conflict with the MSCHP. Impacts will be less than significant with implementation of standard MSHCP measures.

4.2 – Cultural Resources

Would the project:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a historical resource as defined in '15064.5?	☐	☐	☑	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to '15064.5?	☐	☑	☐	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☑	☐	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☑	☐

a) **Less than Significant Impact.** A Historical/Archaeological Resources Survey Report (Appendix D) was prepared by CRM Tech in June 2015 in which the cultural setting of the area is provided. In addition, historical research and a field survey were conducted.

Records Search

According to Eastern Information Center (EIC) and Archaeological Information Center (AIC) records, the project area had not been surveyed systematically for cultural resources prior to the Historical/Archaeological Resources Survey conducted by CRM Tech but was included in the scope of a large-scale archaeological sensitivity assessment conducted in 2003. Based on background research and a reconnaissance-level field survey, that study concluded that undeveloped or sparsely developed land in the project vicinity – i.e., along the Santa Ana River – should be considered sensitive for archaeological resources from both the prehistoric and the historic periods.

Outside the project boundaries but within a one-mile radius, AIC and EIC records show more than 40 other previous studies covering various tracts of land and linear features. As a result of these and other similar studies in the vicinity, seven prehistoric sites, 27 historic-period sites, three “pending” sites, and five isolates – i.e., localities with fewer than three artifacts – were previously identified within the scope of the records search. One of the historic-period sites, designated 33-006973, represents a residence at 3667 Placentia lane, which is located within the project area on APN 246-070-002. Described as being “typical of smaller houses in the Mediterranean/Spanish Revival style,” the residence was recorded in 1982 during a countywide cultural resources reconnaissance sponsored by the Riverside County Historical Commission.

All of the prehistoric sites recorded within the one-mile radius consisted of bedrock-milling features clustered around the La Loma Hills to the northeast of the project location. The historic-period sites, including the “pending” sites, comprised single-family residences, irrigation canals, wells, and refuse scatters. Of the five isolates, three were prehistoric groundstone artifacts and two were historic-period refuse items. Site 33-006973 will be discussed further below. None of the other recorded cultural resources were located within or adjacent to the project area and thus none of them required further consideration in the Historical/Archaeological Resources Study.

Historical Research

As mentioned above, La Placita de Los Trujillos, the community that the project location is traditionally considered a part of, was established in 1845, destroyed by a flood in 1862, and subsequently rebuilt on higher ground. The re-born village of La Placita extended across both sides of the line between San Bernardino and Riverside Counties when the latter county was created in 1893. In the 1890s, a total of 19 houses were known to be in the Riverside County portion of the village, mostly to the east of the project area and scattered along present-day Orange Street. By 1905, however, the Spanish-speaking community of La Placita had lost much of its separate community character.

Archival records of the Riverside County Assessor's Office reveal that development first occurred in the project area around 1912 when owner Henry Camp was assessed $50 for improvements on APN 246-070-002, the only parcel in the project to have been taxed for improvement value. The 1982 California Historical Resources Inventory site record for Site 33-006793 (on file at the Eastern Information Center, University of California, Riverside) estimated that the main residence on that parcel (Site 33-006973) was built in 1922 but a significant increase in improvement value between 1924 and 1926 suggests a more likely construction date in the mid-1920s when the parcel was under the ownership of C.G. Martini. In any case, two buildings were known to be present at the location of Site 33-006973 on the north side of Placentia Lane by the mid-1930s when Martha Milford was listed as the property owner.

According to local directories, neither Martini nor Milford appears to have resided at this location. In fact, of the owners listed, only three were found in local directories, namely Densmore, Field, and Martini, and among these only Densmore was listed as a resident at this address. The density of development in the La Placita area gradually increased during the ensuing decades but despite being annexed by the City of Riverside in 1990, the rural character of the project vicinity has remained largely changed to the present time.

Field Survey

The field survey of the project area confirmed that the building previously recorded as Site 33-006973, a 1920s-era Spanish Eclectic-style single-family residence, remains in existence in the project area at 3667 Placentia Lane. During the field survey, this one-story stucco building was found to be suffering the effects of neglect, including boarded windows, crumbling stucco and concrete, missing roof tiles, and evidence of efflorescence stemming from rainwater runoff. It is no longer occupied.

Located behind the main residence is a garage of the same design and constructed of similar materials, along with a secondary residence. The secondary residence is a wood-framed, single-story building of vernacular character, featuring stucco walls, steel-framed windows, and a medium-pitched front-gable roof sheathed with composition sheet. This building is occupied. Three ancillary buildings are located to the west of the two residences and the garage, including a metal barn, a wooden shed, and a partially collapsed animal hutch. All of the buildings are in a dilapidated condition.

All six buildings in this group are situated on APN 246-070-002. Since they all appear to be at least 45 years old and share a common property history, Site 33-006973 was expanded to include the five newly recorded buildings. No other buildings, structures, objects, sites, features, or artifact deposits more than 45 years of age were encountered within the project boundaries. Site 33-006973, therefore, represents the only potential "historical resource" in the project area.

Site Evaluation

Site 33-006973, as re-recorded during the Historical/Archaeological Resources Survey (Appendix D), consists of a mid-1920s Spanish Eclectic-style single-family residence and five associated buildings including a secondary residence, a garage, a metal barn, a wooden shed, and an animal hutch. All of the buildings have been altered to some extent but they still exhibit a recognizable level of historical characteristic.

The construction of these buildings post-dates the era when the area retained an independent community identity as the Spanish-speaking village of La Placita, or "Spanishtown," and is more closely associated with a time when the area

underwent a prolonged period of slow, agrarian growth as a sparsely populated outskirt of Riverside. The buildings at Site 33-006973 belong to property types reflective of this episode in local history and retain sufficient historic integrity to relate to that period but they do not demonstrate a particularly close or important association with this pattern of events, or with any other established historic themes.

The historical background research has not identified any persons or specific events of recognized historic significance in close association with these buildings, nor has any prominent architect, designer, or builder been identified in their construction history. In terms of architectural or aesthetic merits, these buildings represent designs and building practices that are common among properties of similar types and vintages and none of them constitutes an important example of any style, type, period, region, or method of construction, nor do they embody any particular architectural ideals or artistic pursuits.
There is a single, potentially historic resource known as the Trujillo Abode located at 3669 Center Street, approximately one-quarter mile northeast of the proposed Project Site, situated northwest of the intersection of Orange Street and Center Street. The abode was constructed circa 1862 and it is currently being evaluated by the City for historic status and potential preservation. The Abode is located outside of the project boundaries and will not be modified or otherwise disturbed by construction or operation of the proposed building.

Based on these considerations, the Historical/Archaeological Resources Survey determined that Site 33-006973 is not eligible for listing in the National Register of Historic Places or the California Register of Historical Resources or for local designation by the City of Riverside. Therefore, it does not meet the definition of a "historical resource" as provided by CEQA and associated regulations. Impacts will be less than significant.

b) **Less than Significant Impact with Mitigation Incorporated.** The project site will not involve import or export of soil. According to the Riverside General Plan EIR, the project site is located in an area with unknown archaeological sensitivity. CRM Tech conducted a records search and consulted with Native American groups as part of the Historical/Archaeological Resources Survey.

In response to CRM Tech's inquiry, the Native American Heritage Commission (NAHC) reports in a letter dated March 17, 2015, that the sacred lands record search identified no Native American cultural resources within the project area, but recommends that local Native American groups be contacted for further information. For that purpose, the commission provided a list of potential contacts in the region.

Upon receiving the NAHC's response, CRM Tech sent written requests for comments to all 23 individuals on the referral list and the organizations they represent. In addition, as referred by these tribal representatives or appropriate tribal government staff, the following individuals were also contacted:

- Rob Roy, Environmental Director, La Jolla Band of Luiseno Indians;
- Raymond Huaute, Cultural Resource Specialist, Morongo Band of Mission Indians;
- Jim McPherson, Manager, Culture Resources Department of the Rincon Band of Luiseno Indians.

As of the time of the survey, three of the tribal representatives contacted have provided written responses. In a letter dated March 23, 2015, Raymond Huaute states that the tribe is not aware of any cultural resources within the project boundaries, but requests the implementation of the tribe's "Standard Development Conditions" to ensure proper treatment of Native American cultural remains, including human remains, encountered during the project.

Shasta Gaughen, Tribal Historic Preservation Officer for the Pala Band of Mission Indians and Assistant Director of the Kupa Cultural Center, states in a letter dated March 25, 2015 that the Pala Band will defer to other tribes in closer proximity to the project area. Responding on behalf of the Pauma Band of Luiseno Indians by e-mail on March 31, 2015 Tribal Cultural Clerk Chris Devers states that the Pauma Band has no specific information on any cultural resources in the project vicinity, but recommends archaeological and Native American monitoring of all ground-disturbing activities during the project. General Plan Policy HP-1.3 states that the City shall protect sites of archaeological and paleontological significance and ensure

compliance with the Federal Native American Graves Protection and Repatriation Act in its planning and project review process.

On September 25, 2014, Governor Brown signed Assembly Bill 52 (AB 52), which imposes new requirements for consultation regarding projects that may affect a tribal cultural resource. AB 52 requires lead agencies to provide notice to tribes that are traditionally and culturally affiliated with the geographic area of a proposed project if they have requested notice of projects within the area. If the tribe requests consultation within 30 days upon receipt of notice, the lead agency must consult with the tribe. The parties must consult in good faith and consultation is deemed concluded when either the parties agree to measures to mitigate or avoid a significant effect on a tribal cultural resource or when a party concludes that mutual agreement cannot be reached. The Soboba Band of Luiseno Indians and the Pechanga Band of Luiseno Indians requested consultation on this project. The City of Riverside, MIG, and CRM Tech representative concluded consultation with these tribes in August 2015 and with no requests for additional analysis or mitigation beyond that provided in the cultural resources technical report.

In the unlikely event that archeological materials are uncovered, Mitigation Measures CUL-1 through CUL-7 are incorporated to ensure that uncovered resources are evaluated, left in place if possible, or curated as recommended by a qualified anthropologist. Native American monitoring is included to provide assistance in identifying potential resources as requested through tribal consultation. Impacts to buried archaeological resources will be less than significant with mitigation incorporated.

Mitigation Measures

In the event of the unanticipated discovery of archaeological resources during earthmoving operations the following mitigation measures are recommended to reduce potentially significant impacts to archaeological resources that are accidentally discovered during implementation of the proposed project to a less than significant level:

CUL-1 Prior to the grading permit issuance, the City should require the Applicant to complete a supplemental Phase I Technical Report for cultural resources if project elements are realigned beyond the limits of the cultural resources report completed in 2015. Phase I work efforts would also be necessary if the final site plan impacts any areas that were not examined during the current cultural resource survey and study. The applicant should retain a qualified archaeologist to submit to the City a Supplemental Phase I Cultural Resources Technical Report discussing any supplemental Phase I evaluation, potential impacts, avoidance, and minimization measures that were not addressed in the original Phase I Technical Report. The supplemental Phase I Technical Report shall be submitted to Native American organizations and other appropriate or concerned agencies/stakeholders for their review and comments.

CUL-2 Conduct Archaeological Sensitivity Training for Construction Personnel. The Applicant shall retain a qualified professional archaeologist who meets U.S. Secretary of the Interior's Professional Qualifications and Standards, to conduct an Archaeological Sensitivity Training for construction personnel prior to commencement of excavation activities. The training session shall be carried out by a cultural resources professional with expertise in archaeology, who meets the U.S. Secretary of the Interior's Professional Qualifications and Standards. The training session will include a handout and will focus on how to identify archaeological resources that may be encountered during earthmoving activities and the procedures to be followed in such an event, the duties of archaeological monitors, and, the general steps a qualified professional archaeologist would follow in conducting a salvage investigation if one is necessary.

CUL-3 Monitor Construction Excavations for Archeological Resources is required at all depths and strata's. The Applicant shall retain a qualified archaeological monitor, who will work under the direction and guidance of a qualified professional archaeologist, who meets the U.S. Secretary of the Interior's Professional Qualifications and Standards. The archaeological monitor shall be present during all construction excavations (e.g., grading, trenching, or clearing/grubbing) into non-fill younger Pleistocene alluvial sediments. Multiple earth-moving construction activities may require multiple archaeological monitors. The archaeological monitoring will keep a

daily archaeological monitoring log of all earthmoving activities occurring during the grading phase of the project's construction. The frequency of monitoring shall be based on the rate of excavation and grading activities, proximity to known archaeological resources, the materials being excavated (native versus artificial fill soils), and the depth of excavation, and if found, the abundance and type of archaeological resources encountered. Full-time monitoring can be reduced to part-time inspections if determined adequate by the project archaeologist.

CUL-4 Cease Ground-Disturbing Activities and Implement Treatment Plan if archaeological Resources Are Encountered. In the event that archaeological resources are unearthed during ground-disturbing activities, ground-disturbing activities shall be halted or diverted away from the vicinity of the find so that the find can be evaluated. A buffer area of at least 50 feet shall be established around the find where construction activities shall not be allowed to continue until a qualified archaeologist has examined the newly discovered artifact(s) and has evaluated the area of the find. Work shall be allowed to continue outside of the buffer area. All archaeological resources unearthed by project construction activities shall be evaluated by a qualified professional archaeologist, who meets the U.S. Secretary of the Interior's Professional Qualifications and Standards. Should the newly discovered artifacts be determined to be prehistoric, Native American Tribes/Individuals should be contacted and consulted and Native American construction monitoring should be initiated. The Applicant and City shall coordinate with the archaeologist to develop an appropriate treatment plan for the resources. The plan may include implementation of archaeological data recovery excavations to address treatment of the resource along with subsequent laboratory processing and analysis. Collected cultural resources (artifacts) and associated records shall be transferred, including title, to the appropriate curation facility which meets the standards set forth in 36 CRF Part 79 for federal repositories. All sacred sites, should they be encountered within the project area, shall be avoided and preserved as the preferred mitigation, if feasible.

CUL-5 Prepare Report Upon Completion of Monitoring Services. The archaeological monitor, under the direction of a qualified professional archaeologist who meets the U.S. Secretary of the Interior's Professional Qualifications and Standards, shall prepare a final report at the conclusion of archaeological monitoring to include the daily archaeological monitoring log. The report shall be submitted within 60 days of completion of grading activities to the city, Applicant, the Eastern Information Center (EIC), and representatives of other appropriate or concerned agencies to signify the satisfactory completion of the project and required mitigation measures. The report shall include a description of resources unearthed, if any, evaluation of the resources with respect to the California Register and CEQA, and treatment of the resources to include curation.

c) **Less than Significant Impact with Mitigation Incorporated.** The project site will not involve import or export of soil. According to the Riverside General Plan 2025 EIR, the project site is located in an area with unknown prehistoric cultural resource sensitivity. General Plan Policy HP-1.3 states that the City shall protect sites of archaeological and paleontological significance and ensure compliance with the Federal Native American Graves Protection and Repatriation Act in its planning and project review process. In the event that paleontological materials are uncovered, Mitigation Measure CUL-6 is incorporated to ensure that uncovered resources are evaluated, left in place if possible, or curated as recommended by a qualified paleontologist. Impacts to paleontological resources will be less than significant with mitigation incorporated.

<u>Mitigation Measure</u>

CUL-6 If paleontological materials are uncovered during grading or other earth moving activities, the contractor shall be required to halt work in the immediate area of the find, and to retain a professional paleontologist to examine the materials to determine whether it is a significant paleontological resource. If this determination is positive, resource shall be left in place, if determined feasible by the project paleontologist. Otherwise, the scientifically consequential information shall be fully recovered by the paleontologist. Work may continue outside of the area of the find; however, no further work shall occur in the immediate location of the find until all information recovery has been

completed and a report concerning it filed with the Community and Economic Development Director. The applicant shall bear the cost of implementing this mitigation.

d) **Less than Significant with Mitigation Incorporated.** There are no known cemeteries on the project site or within the project area. Therefore, no human remains or cemeteries are anticipated to be disturbed by the proposed project. Grading activities for the proposed development will be limited in scale so as to minimally disturb the existing grade. In the unlikely event that human remains are uncovered, the project would comply with CEQA requirements and the requirements of Mitigation Measure CUL-7 including halting construction activities until a County coroner can evaluate the find and notify a Native American Representative if the remains are of Native American origin. Compliance existing regulations and Mitigation Measure CUL-7 will result in less than significant impacts.

Mitigation Measure

For components of the proposed project that require excavation activities, the following mitigation measure is recommended to reduce potentially significant impacts to human remains to a less than significant level:

CUL-7: Cease Ground-Disturbing Activities and Notify County Coroner If Human Remains Are Encountered. If human remains are unearthed during implementation of the Proposed Project, the City of Riverside and the Applicant shall comply with State Health and Safety Code Section 7050.5. The City of Riverside and the Applicant shall immediately notify the County Coroner and no further disturbance shall occur until the County Coroner has made the necessary findings as to origin and disposition pursuant to PRC Section 5097.98. If the remains are determined to be of Native American descent, the coroner has 24 hours to notify the Native American Heritage Commission (NAHC). The NAHC shall then identify the person(s) thought to be the Most Likely Descendent (MLD). After the MLD has inspected the remains and the site, they have 48 hours to recommend to the landowner the treatment and/or disposal, with appropriate dignity, the human remains and any associated funerary objects. Upon the reburial of the human remains, the MLD shall file a record of the reburial with the NAHC and the project archaeologist shall file a record of the reburial with the CHRIS-EIC. If the NAHC is unable to identify a MLD, or the MLD identified fails to make a recommendation, or the landowner rejects the recommendation of the MLD and the mediation provided for in Subdivision (k) of Section 5097.94, if invoked, fails to provide measures acceptable to the landowner, the landowner or his or her authorized representative shall inter the human remains and items associated with Native American human remains with appropriate dignity on the property in a location not subject to further and future subsurface disturbance

4.3 – Geology and Soils

Would the project:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☑
ii) Strong seismic ground shaking?	☐	☐	☑	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☑	☐
iv) Landslides?	☐	☐	☐	☑
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☑	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☑	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1997), creating substantial risks to life or property?	☐	☐	☐	☑
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☑

a.i) **No Impact.** The proposed project is not located on a known fault as delineated on the Alquist-Priolo Earthquake Fault Zoning Map.[10] No impact will occur.

a.ii) **Less than Significant Impact.** The proposed project will be subject to ground shaking impacts should a major earthquake occur in the future. Potential impacts include injury or loss of life and property damage.

The proposed project is subject to the seismic design criteria of the California Building Code (CBC). Adherence to these requirements will reduce the potential of the buildings from collapse during an earthquake, thereby minimizing injury and loss of life. Although structures may be damaged during earthquakes, adherence to seismic design requirements will minimize damage to property within the structure because the structure is designed not to collapse. The CBC is intended to provide minimum requirements to prevent major structural failure and loss of life. Adherence to existing regulations will reduce the risk of loss, injury, and death; impacts due to strong ground shaking will be less than significant.

a.iii) **Less than Significant Impact.** The Riverside General Plan EIR indicates that the project is located within an area with moderate to high liquefaction potential.[11] However, the geotechnical report determined that the potential for liquefaction at the site is considered to be low, due to the very dense granular soils below a historic groundwater depth of 30 feet. (see Appendix E, Geotechnical Investigation/Geotechnical Infiltration Report). The proposed project would be subject to standard CBC measures to provide for sound structural design that include considerations for on-site soil conditions, occupancy, and the configuration of the structure including the structural system and height. Therefore, based on the determination of the geotechnical report that on-site conditions are not susceptible to liquefaction and with adherence to CBC requirements, project impacts will be less than significant.

a.iv) **No Impact.** Structures built below or on slopes subject to failure or landslides may expose people and structures to harm. The project site is relatively flat and is not located within an area of required investigation for landslides. No impact will result.

b) **Less than Significant Impact.** Erosion and loss of topsoil could result in damage to on-site structures and landscaping or to neighboring properties. Erosion can also impact downstream water bodies while loss of nutrient-rich topsoil impacts the ability for vegetation to grow. The proposed project is subject to SCAQMD Rule 403 and the erosion control requirements of the CBC to prevent wind-blown and stormwater-related erosion. Rule 403 will minimize wind-blown erosion by requiring stabilization of disturbed soils during construction activities through measures such as daily watering. All individual construction project activities greater than one acre will be subject to the State's General Permit for Construction Activities that is administered by the California Regional Water Quality Control Board (RWQCB). Employment of Best Management Practices (BMPs) implemented through a Storm Water Pollution Prevention Plan (SWPPP) would be required to limit the extent of eroded materials from a construction site. Development that is one acre or more would be required to comply with the provisions of the NPDES regulations concerning the discharge of eroded materials and pollutants from construction sites and prepare and implement a SWPPP. With implementation of existing regulations, impacts due to erosion and loss of topsoil will be less than significant.

c) **Less than Significant Impact.** As stated in the Section 4.a.iii), the soils on the project contain low potential for liquefaction. Based on the project site's slope conditions being relatively flat, potential for lateral spreading and landslide would be minimal. The geotechnical report prepared for the project site determined that the proposed development is acceptable from a geotechnical engineering standpoint.. Standard CBC and recommendations from the geotechnical report will be implemented during grading. Standard CBC requirements for construction will be implemented. Impacts related to on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse will be less than significant with adherence to CBC requirements and implementation of the proposed recommendations included in the geotechnical report.

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10 California Department of Conservation. Special Study Zones. San Bernardino South Quadrangle. 1977.

11 Albert A. Webb Associates. City of Riverside General Plan 2025 Program Environmental Impact Report. July 2007.

d) **No Impact.** Expansive soils shrink and swell in response to moisture due to high percentages of clay. Expansive soils can result in damage to structures when clay within the soil swells due to moisture. The project site is not located on soil with high shrink-swell potential according to the Riverside General Plan EIR.[12] No impact will occur.

e) **No Impact.** The project site is served by a fully functional sewer system. The project will connect to this system and will not require use of septic tanks. No impact will occur.

[12] Albert A. Webb Associates. City of Riverside General Plan 2025 Program Environmental Impact Report. July 2007.

4.4 – Greenhouse Gas Emissions

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☑	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☑	☐

a) **Less than Significant Impact.** Climate change is the distinct change in measures of climate for a long period of time.[13] Climate change is the result of numerous, cumulative sources of greenhouse gas emissions all over the world. Natural changes in climate can be caused by indirect processes such as changes in the Earth's orbit around the Sun or direct changes within the climate system itself (i.e. changes in ocean circulation). Human activities can affect the atmosphere through emissions of greenhouse gases (GHG) and changes to the planet's surface. Human activities that produce GHGs are the burning of fossil fuels (coal, oil and natural gas for heating and electricity, gasoline and diesel for transportation); methane from landfill wastes and raising livestock, deforestation activities; and some agricultural practices.

Greenhouse gases differ from other emissions in that they contribute to the "greenhouse effect." The greenhouse effect is a natural occurrence that helps regulate the temperature of the planet. The majority of radiation from the Sun hits the Earth's surface and warms it. The surface in turn radiates heat back towards the atmosphere, known as infrared radiation. Gases and clouds in the atmosphere trap and prevent some of this heat from escaping back into space and re-radiate it in all directions. This process is essential to supporting life on Earth because it warms the planet by approximately 60° Fahrenheit. Emissions from human activities since the beginning of the industrial revolution (approximately 250 years ago) are adding to the natural greenhouse effect by increasing the gases in the atmosphere that trap heat, thereby contributing to an average increase in the Earth's temperature. Greenhouse gases occur naturally and from human activities. Greenhouse gases produced by human activities include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Since 1750, it is estimated that the concentrations of carbon dioxide, methane, and nitrous oxide in the atmosphere have increased over 36 percent, 148 percent, and 18 percent, respectively, primarily due to human activity. Emissions of greenhouse gases affect the atmosphere directly by changing its chemical composition while changes to the land surface indirectly affect the atmosphere by changing the way the Earth absorbs gases from the atmosphere.

A numerical threshold for determining the significance of greenhouse gas emissions in the South Coast Air Basin (Basin) has not been established by the South Coast Air Quality Management District (SCAQMD). As an interim threshold based on guidance provided in the CAPCOA *CEQA and Climate Change* handbook, a non-zero threshold approach based on Approach 2 of the handbook has been used. Threshold 2.5 (Unit-Based Thresholds Based on Market Capture) establishes a numerical threshold based on capture of approximately 90 percent of emissions from future development. The latest threshold developed by SCAQMD using this method is 10,000 metric tons carbon dioxide equivalent (MTCO2E) per year for

[13] United States Environmental Protection Agency. Frequently Asked Questions About Global Warming and Climate Change. Back to Basics. April 2009.

industrial projects.[14] This threshold is based on the review of 711 CEQA projects. This threshold will be utilized herein to determine if emissions of greenhouse gases from this project will be significant.

The proposed project will include activities that emit greenhouse gas emissions over the short- and long-term. While one project could not be said to cause global climate change, individual projects contribute cumulatively to greenhouse gas emissions that result in climate change. A greenhouse gas emissions inventory was prepared for the project using under BAU conditions and is analyzed below.

Short-Term Emissions

The project will result in short-term greenhouse gas emissions from construction and installation activities associated with construction of the proposed project. Greenhouse gas emissions will be released by equipment used for grading, paving, and building construction activities. GHG emissions will also result from worker and vendor trips to and from the project site. Table 8 (Construction Greenhouse Gas Emissions) summarizes the estimated yearly emissions from construction activities. Carbon dioxide emissions from construction equipment and worker/vendor trips were estimated utilizing the California Emissions Estimator Model (CalEEMod) version 2013.2.2 (see Appendix A). Construction activities are short-term and cease to emit greenhouse gases upon completion, unlike operational emissions that are continuous year after year until operation of the use ceases. Because of this difference, SCAQMD recommends in its draft threshold to amortize construction emissions over a 30-year operational lifetime. This normalizes construction emissions so that they can be grouped with operational emissions in order to generate a precise project GHG inventory. Amortized construction emissions are included in Table 8.

Table 8
Construction Greenhouse Gas Emissions

Construction Year	GHG Emissions (MT/YR)			
	CO_2	CH_4	N_2O	TOTAL*
2016	934	<1	0	936
2017	396	<1	0	397
*AMORTIZED TOTAL^*	*44*	*<1*	*0*	*44*

* MTCO2E
Note: Slight variations may occur due to rounding and variations in modeling software
^ Amortized over 30-years

Long-Term Emissions

Warehousing and distribution activities will result in continuous greenhouse gas emissions from mobile and operational sources. Mobile sources including vehicle trips to and from the project site will result primarily in emissions of CO_2 with minor emissions of CH_4 and N_2O. The most significant GHG emission from natural gas usage will be methane. Electricity usage by the project and indirect usage of electricity for water and wastewater conveyance will result primarily in emissions of carbon dioxide. Disposal of solid waste will result in emissions of methane from the decomposition of waste at landfills coupled with CO_2 emission from the handling and transport of solid waste. These sources combine to define the long-term greenhouse gas emissions for the build-out of the proposed project.

To determine long-term emissions, CalEEMod was used. The methodology utilized for each emissions source is based on the CAPCOA *Quantifying Greenhouse Gas Mitigation Measures* handbook.[15] A summary of the project's net long-term greenhouse gas emissions is included in Table 9 (Operational Greenhouse Gas Emissions). Emissions are presented as metric tons of carbon dioxide equivalent (MTCO2E) meaning that all emissions have been weighted based on their Global Warming Potential (GWP) (a metric ton is equal to 1.102 US short tons).

[14] South Coast Air Quality Management District. CEQA Significance Thresholds Working Group. Meeting # 15, Main Presentation. September 28, 2010

[15] California Air Pollution Control Officers Association. Quantifying Greenhouse Gas Emissions. August 2010

Table 9
Operational Greenhouse Gas Emissions

Source	GHG Emissions (MT/YR)			
	CO_2	CH_4	N_2O	TOTAL*
Area	<1	<1	0	<1
Energy	738	<1	<1	740
Mobile	4,827	<1	0	4,828
Solid Waste	59	3	0	132
Water/Wastewater	598	2	<1	664
TOTAL	*6,221*	*6*	*<1*	*6,364*

* MTCO2E/YR
Note: Slight variations may occur due to rounding

Mobile sources are based on annual vehicle miles traveled (VMT) based on daily trip generation identified in the trip generation memorandum.[16] Trip lengths have been adjusted based on a study of metropolitan commercial and freight travel conducted by the National Cooperative Highway Research Program. According to observed data collected in the field for the Southern California Association of Governments (SCAG) region, trip lengths for similar uses are estimated at 5.92 miles for light-duty trucks, 13.06 for medium-duty trucks, and 22.40 for heavy-duty trucks. Total vehicle miles were calculated using the average daily trips for each vehicle class and divided by total daily truck trips to get to an average truck distance of 17.41 miles. Natural gas usage and electricity usage are based on default demand figures utilized in CalEEMod. Solid waste generation is also based on CalEEMod defaults.

CalEEMod does not include outdoor landscape irrigation demand defaults for this type of project. Estimated irrigation needs for landscaping was calculated at 2,591,811 gallons per year. Landscape irrigation requirements were calculated using the California Department of Water Resources (DWR) *Water Budget* Workbook that calculates the Maximum Applied Water Allowance (MAWA) for landscaping based on the requirements of the state water conservation in landscaping act.[17] This reflects the maximum allowable amount of water that is permitted to be used annually after consideration of effective precipitation (25 percent of annual rainfall). MAWA is calculated using the following equation:

$$MAWA = (ET_O - Eppt) * 0.62 * [(0.70 * LA) + (0.30 * SLA)]$$

Where:

MAWA = Maximum Applied Water Allowance (gallons per year)
ET_O = Reference Evapotranspiration for Locale (inches per year)
Eppt = Effective Precipitation (inches per year)
LA = Landscape Area (square feet)
SLA = Special Landscape Area (square feet)

Indoor water demand and wastewater discharges are based on CalEEMod defaults.

Greenhouse Gas Emissions Inventory

Table 10 (Greenhouse Gas Emissions Inventory) summarizes the yearly estimated greenhouse gas emissions from construction and operational sources. The total yearly carbon dioxide equivalent emissions for the proposed project are estimated at 6,408 MTCO2E. This does not exceed the SCAQMD threshold of 10,000 MTCO2E per year.

16 Kunzman Associates, Inc. Trip Generation Memorandum. October 3, 2014
17 California Department of Water Resources. Water Budget Workbook. www.water.ca.gov/wateruseefficiency/docs/WaterBudget.xls [October 2014]www.water.ca.gov/wateruseefficiency/docs/WaterBudget.xls [October 2014]

Table 10
Greenhouse Gas Emissions Inventory

Source	GHG Emissions (MT/YR)			
	CO_2	CH_4	N_2O	TOTAL*
Construction	*44*	*<1*	*0*	*44*
Operation	*6,221*	*6*	*<1*	*6,364*
			Total	**6,408**

* MTCO2E/YR
Note: Slight variations may occur due to rounding
^ Construction impacts amortized over 30-years

b) **Less than Significant Impact.** The SCAQMD supports State, Federal and international policies to reduce levels of ozone depleting gases through its Global Warming Policy and rules and has established an interim Greenhouse Gas (GHG) threshold. As indicated in response A, above, the project would comply with the City's General Plan policies, Municipal Code Chapter 16.07 (Green Code), and State Building Code provisions designed to reduce GHG emissions. In addition, the project would comply with all SCAQMD applicable rules and regulations during construction of the project and, as demonstrated in the Climate Change Analysis, will not interfere with the State's goals of reducing GHG emission to 1990 levels by the year 2020 as stated in AB 32 and an 80 percent reduction in GHG emissions below 1990 levels by 2050 as stated in Executive Order S-3-05. Based upon the prepared Climate Change Analysis for this project and the discussion above, the project will not conflict with any applicable plan, policy or regulation related to the reduction in the emissions of GHG and thus a less than significant impact will occur directly, indirectly and cumulatively in this regard.

4.5 – Hazards and Hazardous Materials

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☑	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☑	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☑
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☑
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☑
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☑
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☑	☐

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☑

a) **Less than Significant Impact.** The proposed project could result in a significant hazard to the public if the project includes the routine transport, use, or disposal of hazardous materials or places housing near a facility which routinely transports, uses, or disposes of hazardous materials. According to the EPA, the proposed project is not located within a quarter-mile of listed facilities that produce hazardous wastes.[18]

The proposed project will not necessarily, but may engage in the routine transport, use, or disposal of hazardous materials or wastes. If hazardous materials are proposed on site in the future, they will be subject to state and federal regulation for permitting and inspection by the Hazardous Materials Division of the City Fire Department. Widely used hazardous materials common at any warehouse land use include paints and other solvents, cleaners, automobile fluids, and pesticides. The remnants of these and other products are disposed of as household hazardous waste (HHW) that includes used motor oil, dead batteries, electronic wastes, and other wastes that are prohibited or discouraged from being disposed of at local landfills. Use of common household hazardous materials and their disposal does not present a substantial health risk to the community. Impacts associated with the routine transport, use of hazardous materials or wastes will be less than significant.

b) **Less than Significant Impact.** Construction of the proposed project and future tenant improvements will require the use and transport of hazardous materials such as asphalt, paints, and other solvents. Construction activities could also produce hazardous wastes associated with the use of such products. Construction of the proposed project requires ordinary construction activities and will not require a substantial or uncommon amount of hazardous materials to complete.

Activities associated with the demolition of existing structures on the southeastern portion of the site may pose a hazard with regard to asbestos containing materials (ACM) and lead-based paints. ACM were used on a widespread basis in building construction prior to and into the 1980s; therefore, it is assumed that ACM is present on the project site and will need to be handled following specific regulations/guidelines described below. Asbestos generally does not pose a threat when it remains intact. When asbestos is disturbed and becomes airborne. SCAQMD Rule 1403 (Asbestos Emissions from Demolition/Renovation Activities) requires work practices that limit asbestos emissions from building demolition and renovation activities, including the removal and disturbance of ACM.[19] This rule is designed to protect uses and persons adjacent to demolition or renovation activity from exposure to asbestos emissions. Rule 1403 requires a certified inspector to survey any facility being demolished or renovated for the presence of all friable and Class I and Class II non-friable ACM. The applicant must also notify SCAQMD of their intent to perform demolition or renovation of any buildings that may contain asbestos prior to demolition and requires that all ACM is removed prior to any demolition. Rule 1403 also establishes notification procedures, removal procedures, handling and clean-up procedures, storage, disposal, landfilling requirements, and warning label requirements, including HEPA filtration, the *glovebag* method, wetting, and some methods of dry removal that must be implemented when disturbing appreciable amounts of ACM (more than 100 square feet of surface area). All ACM shall be disposed of at a waste disposal site operated in accordance with Rule 1403. The applicant will also ensure the safety of constructor workers involved in the ACM removal by complying with all California Asbestos Standards in Construction, including, but not limited to minimum air circulations, use of respirators, wetting of materials, clothing

[18] United States Environmental Protection Agency. Envirofacts. http://www.epa.gov/enviro/index.html [June 2015]
[19] South Coast Air Quality Management District. Rule 1403: Asbestos Emissions from Demolition/Renovation Activities. Amended October 5, 2007

laundering, construction and demolition equipment requirements, and shielding specifications. Adherence to SCAQMD Rule 1403 would ensure that impacts related to the release of ACM are less than significant.

Exposure of construction workers to lead-based paint during demolition activities is also of concern, similar to exposure to asbestos. Exposure of surrounding land uses to lead from demolition activities is generally not a concern because demolition activities do not result in appreciable emissions of lead.[20] The primary emitters of lead are industrial processes. Any lead-based paint utilized on the exterior and interior of the existing structures would generally remain inside the structure or close to the exterior of the building and would be removed during demolition. Improper disposal of lead-based paint could contaminate soil and subsurface groundwater in and under landfills not properly equipped to handle hazardous levels of this groundwater in and under landfills not properly equipped to handle hazardous levels of this material. Due to the age of the buildings it is assumed that lead-based paint is present. Therefore, 8 CCR Section 1532.1 (California Construction Safety Orders for Lead) must be followed for the demolition of all existing structures requiring exposure assessment and compliance measures to keep worker exposure below action levels. The proposed project is also subject to Title 22 requirements for the disposal of solid waste contaminated with excessive levels of lead. Testing, monitoring, containment, and disposal of lead-based materials will comply with all Cal/OSHA standards and regulations under California Construction Safety Orders for Lead section 1532. Adherence to standard regulation would ensure that impacts related to the release of lead based paints would be less than significant.

c) **No Impact.** No schools are located within one-quarter mile of the project site. Therefore, no impact will occur.

d) **No Impact.** The proposed project is not located on a site listed on the State 'Cortese List', a compilation of various sites throughout the state that have been compromised due to soil or groundwater contamination from past uses. Therefore, no impact will occur.

Based upon review of the Cortese list, the project site is not:

- listed as a hazardous waste and substance site by the Department of Toxic Substances Control (DTSC),[21]
- listed as a leaking underground storage tank (LUFT) site by the State Water Resources Control Board (SWRCB),[22]
- listed as a hazardous solid waste disposal site by the SWRCB,[23]
- currently subject to a Cease and Desist Order (CDO) or a Cleanup and Abatement Order (CAO) as issued by the SWRCB,[24] or
- developed with a hazardous waste facility subject to corrective action by the DTSC.[25]

e-f) **No Impact.** The proposed project is not located within two miles of a public or private airstrip or within an airport land use plan. No Impact will occur.

g) **Less than Significant Impact.** The proposed project site is primarily vacant with one single family residence and five ancillary structures on the southeast corner of the site. The project will therefore increase trips in the area. Per state Fire and Building codes, sufficient space will have to be provided around the buildings for emergency personnel and equipment

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20 California Department of Toxic Substances. *Draft Lead Report.* June 2004

21 California Department of Toxic Substances Control. Hazardous Waste and Substances Site List – Site Cleanup (Cortese List). http://www.dtsc.ca.gov/SiteCleanup/Cortese_List.cfm [June 2015]

22 California State Water Resources Control Board. GeoTracker. geotracker.waterboards.ca.gov [June 2015]geotracker.waterboards.ca.gov [June 2015]

23 California State Water Resources Control Board. Sites Identified with Waste Constituents Above Hazardous Waste Levels Outside the Waste Management Unit. www.calepa.ca.gov/SiteCleanup/CorteseList/CurrentList.pdf [June 2015]www.calepa.ca.gov/SiteCleanup/CorteseList/CurrentList.pdf [June 2015]

24 California State Water Resources Control Board. List of Active CDO and CAO. http://www.calepa.ca.gov/sitecleanup/corteselist/ [June 2015]

25 California Department of Toxic Substances Control. Hazardous Facilities Subject to Corrective Action. www.calepa.ca.gov/SiteCleanup/CorteseList/SectionA.htm#Facilities [June 2015]www.calepa.ca.gov/SiteCleanup/CorteseList/SectionA.htm#Facilities [June 2015]

access and emergency evacuation. All project elements, including landscaping, would be sited with sufficient clearance from existing and proposed structures so as not to interfere with emergency access to and evacuation from the site. The project is required to comply with the California Fire Code (Title 24, California Code of Regulations, Section 9). The site plan includes two ingress/egress access points on Center Street.

The project driveways will allow emergency access and evacuation from the site, and will be constructed to California Fire Code specifications. The project would not impair implementation of or physically interfere with an adopted emergency response plan or evacuation plan because no permanent public street or lane closures are proposed. Construction work in the street associated with the buildings would be limited to lateral utility connections that would be limited to nominal potential traffic diversion. Traffic control will be provided for any lane closures. Project impacts will be less than significant.

h) **No Impact.** The project site is surrounded to the north, east, and south by other primarily developed parcels consisting of industrial land uses and the AYSO soccer fields. According to the Riverside General Plan EIR, the project site is not located in a high fire hazard area.[26] No impact will result.

[26] Albert A. Webb Associates. City of Riverside General Plan 2025 Program Environmental Impact Report. July 2007.

4.6 – Hydrology and Water Quality

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☑	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☑	☐
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☐	☑	☐
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☐	☑	☐
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☑	☐
f) Otherwise substantially degrade water quality?	☐	☐	☐	☑
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☑
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☑	☐

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☑	☐
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☑	☐

a) **Less than Significant Impact.** Violations of water quality standards or waste discharge requirements, or degradation of water quality can result in potentially significant impacts to water quality and result in environmental damage or sickness in people. The project would result in a significant impact to water quality if water quality standards, waste discharge requirements, or degradation of water quality occurred.

Point-source pollutants can be traced to their original source. Point-source pollutants are discharged directly from pipes or spills. Raw sewage draining from a pipe directly into a stream is an example of a point-source water pollutant. The project consists of the development of one building totaling 308,000 square feet and does not propose any uses that would generate point source pollutants. Therefore, water quality impacts due to point sources would be less than significant.

Non-point-source pollutants (NPS) cannot be traced to a specific original source. NPS pollution is caused by rainfall or snowmelt moving over and through surface areas. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters, and even underground sources of drinking water. These pollutants include:

- Excess fertilizers, herbicides and insecticides from agricultural lands and residential areas
- Oil, grease, and toxic chemicals from urban runoff and energy production
- Sediment from improperly managed construction sites, crop and forest lands, and eroding streambanks
- Salt from irrigation practices and acid drainage from abandoned mines
- Bacteria and nutrients from livestock, pet wastes, and faulty septic systems
- Atmospheric deposition and hydromodification

Impacts associated with water pollution include ecological disruption and injury or death to flora and fauna, increased need and cost for water purification, sickness or injury to people, and degradation or elimination of water bodies as recreational opportunities. Accidents, poor site management or negligence by property owners and tenants can result in accumulation of pollutant substances on parking lots, loading and storage areas, or result in contaminated discharges directly into the storm drain system.

The Santa Ana Regional Water Quality Control Board (RWQCB) administers the National Pollutant Discharge Elimination System (NPDES) permit in the region. The City is required to implement all pertinent regulations of the program to control pollution discharges from new development. These regulations reduce NPS pollutant loading through the implementation of Best Management Practices (BMPs) and other control measures that minimize or eliminate pollutants from urban runoff, thereby protecting downstream water resources. BMPs implemented to address commercial pollutant sources generally involve maintenance of storm drain facilities, parking lots, vegetated areas, and educational programs. Violations of water quality standards due to urban runoff can be prevented through the continued implementation of existing regional water quality regulations. The proposed project would not interfere with the implementation of NPDES water quality regulations and standards.

The proposed project would disturb approximately 15.88 gross acres of land and therefore will be subject to National Pollutant Discharge Elimination System (NPDES) permit requirements during construction activities in addition to standard NPDES operational requirements. The proposed project will require submittal to the local reviewing agency, the Santa Ana RWQCB, a Storm Water Pollution Prevention Plan (SWPPP) that will include BMPs protects water quality during construction activities. The City will require BMPs as listed in the California Stormwater Quality Association's California Storm Water Best Management Practice Handbooks. These measures, which include resident/owner education, activity restrictions, parking lot sweeping, basin inspection, landscaping, roof runoff controls, efficient irrigation, slope and channel protection, storm drain signage, trash racks, and trash storage areas, will reduce pollutants in storm water runoff and reduce non-storm water discharges to the City's storm water drainage through controlling the discharge of pollutants. Operational BMPs will be identified in a Stormwater Runoff Management Plan that will be submitted to the City for review and approval. Impacts related to violation of water quality standards will be less than significant with implementation of these existing regulations.

b) **Less than Significant Impact.** If the project removed an existing groundwater recharge area or substantially reduced runoff that results in groundwater recharge, a potentially significant impact could occur.

The site is primarily vacant with one single-family residence on the southeast corner of the site. The proposed project will construct impervious pavement with areas of landscaping as well as one water quality basin that could provide for similar levels of groundwater recharge compared to the existing conditions. The site does not accommodate any substantial natural drainage or managed recharge areas. The project site is surrounded by material storage yards to the north, a towing company to the east, and the AB Brown Sports Complex to the south. The City of Riverside is served by City of Riverside Public Utilities (RPU). Domestic water is provided via groundwater basins. According to the General Plan EIR, recharge areas for the primary groundwater aquifer utilized by RPU is located in other jurisdictions. Therefore, development within the City of Riverside will not affect groundwater recharge. The project site is not the location of an existing groundwater spreading basin and will not significantly change the runoff from the project that may otherwise recharge groundwater basins; therefore, impacts to groundwater recharge will be less than significant.

c) **Less than Significant Impact.** Potentially significant impacts to the existing drainage pattern of the site or area could occur if development of the project results in substantial on- or off-site erosion or siltation. As was previously detailed in Section 3.9.b, the site is primarily vacant but surrounded by various uses to the north, east, and south. The site generally surface drains south-westerly.

Proposed on-site low impact development (LID) principles include the implementation of BMPs including landscaping and an infiltration basin. A Project Specific Preliminary Water Quality Management Plan (WQMP) has been prepared for the proposed project and is included in Appendix F. The WQMP indentifies proposed drainage management areas and the effectiveness of proposed BMPs. According to the WQMP, the design capture volume required to capture on-site runoff is 1,904.6 cubic feet. The proposed infiltration basin is proposed to capture approximately 2,035 cubic feet of runoff and infiltrate at a rate of ten inches per hour. According to the WQMP, proposed LID BMPs fully address all drainage management areas and no alternative compliance measures are required for the proposed project.

The design of the proposed project will not substantially alter drainage patterns in the area to the extent that substantial on- or off-site erosion or siltation will occur; therefore, impacts will be less than significant.

d) **Less than Significant Impact.** As was previously detailed in Section 3.9.c herein, the project will not result in an alteration of the drainage pattern or increase in flows that would result in flooding on- or off-site because all on- and off-site drainage will be controlled by storm drain and flood control facilities. The proposed project's infiltration basin has been designed to accommodate on-site runoff and infiltrate runoff into the soil at a rate of ten inches per hour. Impacts to flooding on- or off-site as a result of a change in the drainage pattern or increase in runoff will thus be less than significant.

e) **Less than Significant Impact.** A potentially significant impact could occur if the project creates or contributes runoff that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources

of runoff. As was previously detailed in Section 3.9.c, project-related stormwater flows will be directed to the proposed infiltration basin and infiltrate into the soil. The proposed water quality function of the basin would reduce the amount of polluted runoff that would be conveyed into the ground water. Impacts will be less than significant.

f) **No Impact.** The project does not propose any uses that will have the potential to otherwise degrade water quality beyond those issues discussed in Section 3.9 herein.

g) **No Impact.** The project does not include housing, therefore no impact will occur.

h) **Less than Significant Impact.** The proposed project is not located within a designated 100-year flood hazard area or zone.[27] Therefore, the project will not impede or redirect flood flows. The project will have a less than significant impact.

i) **Less than Significant Impact.** The project site is not located within a dam inundation area.[28] Impacts due to levee failure will be less than significant.

j) **Less than Significant Impact.** The project site is located approximately 0.7 miles east of the Santa Ana River. According to the Riverside General Plan EIR, exposure of people or structures to significant risk or loss, injury or death involving inundation by seiche and tsunami are extremely unlikely. According to the Riverside General Plan EIR, mudflows associated with erosion and fire damage may occur near the Santa Ana River. However, because the project site and the surrounding area are relatively flat, impacts related to significant mudflows will be less than significant. Impacts will be less than significant.

[27] Albert A. Webb Associates. City of Riverside General Plan 2025 Program Environmental Impact Report. July 2007.
[28] Albert A. Webb Associates. City of Riverside General Plan 2025 Program Environmental Impact Report. July 2007.

4.7 – Land Use and Planning

Would the project:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Physically divide an established community?	☐	☐	☐	☑
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☑	☐
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☑

a) **No Impact.** The project is surrounded by material storage yards to the north, a towing company to the east, and the AYSO soccer fields to the south. The proposed project is consistent and compatible with the surrounding land uses and will not be dividing an established community. The project does not propose construction of any roadway, flood control channel, or other structure that would physically divide any portion of the community. Therefore, no impact will occur.

b) **Less than Significant Impact.** The proposed project consists of one, 308,000-square foot commerce building. The proposed project would not conflict with any plans or programs adopted to avoid or mitigate an environmental impact because it is consistent with the objectives of the 2025 General Plan and the mitigating policies of the General Plan EIR, as summarized below.

The vision set forth by the City of Riverside in the General Plan to guide industrial development through year 2025 focuses on the creation of high-paying jobs in suitable locations that involve "clean" industrial uses (General Plan 2025, *Preservation of Industrial Land*, pages LU-38 through LU-39). Objectives LU-24 through LU-25, establish the overarching goals, objectives and policies for Riverside's industrial land. The City is clear in its resolve to support clean, economically rich enterprises by limiting any redesignation or rezoning of land from industrial use. Avoid encroachments of incompatible land uses within close proximity of industrial land. . . (Policy LU-24.2)" to ". . . ensure that future uses are in concert with the City's wider policy goals . . .(Policy 24.1)" for industrial and business/office park uses.

The General Plan is not a regulatory document but sets the guidelines for implementation through the City's Zoning Code (Municipal Code Title 19) where the City adopted regulatory standards for site development. The project site is located in the Business and Manufacturing Park Zone (BMP) and is consistent with the General Plan by permitting a ". . . wide variety of industrial, manufacturing, and support uses . . ." in ". . . a district for low-intensity and low-impact industrial, office, and related uses (Section 19.130.010(A))". The Zoning Codes specifically prohibits residential or heavier industrial uses that generate odors (e.g. animal slaughtering, fat rendering, wood distillation), noise (e.g. gravel excavation, automobile wrecking), dust or smoke (e.g. petroleum refining, steel mills, sand excavation), and other causes of nuisance (Sections 19.130.025(A)(1) through (24)) in implementing the policies of the General Plan.

The City analyzed the proposed commerce building as an anticipated manufacturing use providing a “worst-case” scenario due to the greater heavy-truck trips this type of use typically generates. The proposed building is a speculative shell that has the potential to accommodate a breadth of uses permitted by the BMP Zone including warehousing and office. As is documented in this Initial Study, the proposed building will not result in significant impacts to the environment including those related to odors, dust, smoke, noise, or vibration. The proposed project is notably permitted, by right, in the BMP zone and by extension is consistent with the General Plan because it will:

1. Accommodate a variety of manufacturing, office, or warehousing uses;
2. Not generate nuisance or other impacts;
3. Be located in an existing industrial area on a currently underutilized site; and
4. Be physically developable on the site pursuant to City zoning requirements.

The City recognizes that the project is permitted in the BMP zone and is consistent with the General Plan; therefore, any applicable General Plan EIR mitigating policies or measures will be applied to the project, as is standard practice for all development proposals subject to environmental review. The Project Proponent has not requested any General Plan amendments, variances, or other requests that could modify or recues the project from the applicability of required mitigation. General Plan 2025 EIR mitigation measures are designed to avoid cumulative and site specific environmental impacts in concert with other applicable regulations required to mitigate or avoid environmental impacts. Impacts will be less than significant based on these findings.

c) **No Impact.** As discussed in Section 4.4, the project site is subject to the Riverside County Multiple Species Habitat Conservation Plan (MSHCP). All new development is required to comply with the MSHCP, therefore no conflict will occur.

4.8 – Mineral Resources

Would the project:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☑	☐
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☑

a) **Less than Significant Impact.** The project site is located within a MRZ-2 area, which indicates that adequate information is available to indicate that significant mineral deposits are present or there is a high likelihood for their presence and development should be controlled.[29] However, mining operations in the City have not been active for decades. According to the Riverside General Plan EIR, the maximum potential for mineral extraction has occurred; therefore the proposed project would not result in any loss of availability of any known or unknown mineral resource than currently already occurs. There are no known mining operations within the vicinity of the project site and surrounding land uses would preclude mining from occurring. In addition, the designated land use for the area is incompatible for mining operations.[30] Less than significant impact will occur.

b) **No Impact.** The City's General Plan does not identify any locally important mineral resources other than those associated with past mining activities. Maximum potential for those deposits have been reached. The project site is primarily vacant with one single family residence and five ancillary structures and is not used for mineral extraction or mining; therefore the proposed project will not result in any loss of availability of any known or unknown locally important mineral resource than currently already occurs. There are no known mining operations within the vicinity of the project site and zoning and surrounding land uses would preclude mining from occurring. No impact will occur.

29 Albert A. Webb Associates. City of Riverside General Plan 2025 Program Environmental Impact Report. July 2007.
30 California Department of Conservation, State Mining and Geology Board. Guidelines for Classification and Designation of Mineral Lands. 2000.

4.9 – Noise

Would the project result in:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☑	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☑	☐
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☑	☐
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☑	☐	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☑
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☑

Noise can be defined as unwanted sound. Sound (and therefore noise) consists of energy waves that people receive and interpret. Sound pressure levels are described in logarithmic units of ratios of sound pressures to a reference pressure, squared. These units are called *bels*. In order to provide a finer description of sound, a *bel* is subdivided into ten *decibels*, abbreviated dB. To account for the range of sound that human hearing perceives, a modified scale is utilized known as the A-weighted decibel (dBA). Since decibels are logarithmic units, sound pressure levels cannot be added or subtracted by ordinary arithmetic means. For example, if one automobile produces a sound pressure level of 70 dBA when it passes an observer, two 2 cars passing simultaneously would not produce 140 dBA. In fact, they would combine to produce 73 dBA. This same principle can be applied to other traffic quantities as well. In other words, doubling the traffic volume on a street or the speed of the traffic will increase the traffic noise level by 3 dBA. Conversely, halving the traffic volume or speed will

reduce the traffic noise level by 3 dBA. A 3 dBA change in sound is the beginning at which humans generally notice a *barely perceptible* change in sound and a 5 dBA change is generally *readily perceptible*.[31]

Noise consists of pitch, loudness, and duration; therefore, a variety of methods for measuring noise has been developed. According to the California General Plan Guidelines for Noise Elements, the following are common metrics for measuring noise:[32]

L_{EQ} (Equivalent Energy Noise Level): The sound level corresponding to a steady-state sound level containing the same total energy as a time-varying signal over given sample periods. L_{EQ} is typically computed over 1-, 8-, and 24-hour sample periods.

CNEL (Community Noise Equivalent Level): The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of five decibels to sound levels in the evening from 7:00pm to 10:00pm and after addition of ten decibels to sound levels in the night from 10:00pm to 7:00am.

L_{DN} (Day-Night Average Level): The average equivalent A-weighted sound level during a 24-hour day, obtained after the addition of ten decibels to sound levels in the night after 10:00pm and before 7:00am.

CNEL and L_{DN} are utilized for describing ambient noise levels because they account for all noise sources over an extended period of time and account for the heightened sensitivity of people to noise during the night. L_{EQ} is better utilized for describing specific and consistent sources because of the shorter reference period.

A noise study was prepared by MIG | Hogle-Ireland and is included as Appendix G.

Existing Noise Levels

Short-term noise measurements at the project site were conducted to identify the ambient noise in the project vicinity. An American National Standards Institute (ANSI Section SI4 1979, Type 1) Larson Davis model LxT sound level meter was used to monitor existing ambient noise levels in the project area. The noise meter was programmed in “slow” mode to record noise levels in A-weighted form. The microphone height was set at five feet. Two 10-minute daytime noise measurements were taken between 9:48 AM and 10:12 AM on Tuesday, April 7, 2015.

Ambient noise levels ranged from 58.7 to 66.9 dBA CNEL. Ambient noise levels are a composite of noise from all sources, near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location. Ambient noise levels are presented in Table 11 (Ambient Noise Levels).

Vehicular traffic along Center Street and Placentia Lane was the dominant noise source at measurement location 001 and truck traffic entering and exiting the industrial use at the south end of Sieck Road was the dominant noise source at measurement location 002. See Exhibit 4 (Noise Measurement Locations).

Table 11
Ambient Noise Levels

Location	Time Period	Measurement Period	Description	Existing Ambient Noise Levels (dBA CNEL)
001	9:48 AM – 9:58 AM	10 Minutes	Northern property boundary on the south side of Center Street	66.9
002	10:02 AM – 10:12 AM	10 Minutes	Southwestern corner of Placentia Lane and Sieck Road	58.7

31 California Department of Transportation. Basics of Highway Noise: Technical Noise Supplement. November 2009.
32 California Governor’s Office of Planning and Research. General Plan Guidelines. 2003

Source: Google Earth, 2015

http://www.migcom.com • 951-787-9222

MIG Hogle-Ireland

Exhibit 4 Noise Measurement Locations

Center Street Commerce Building Project
6550 Center Street, Riverside, California

a) **Less than Significant Impact with Mitigation Incorporated.** The City of Riverside General Plan has established noise compatibility standards for land uses throughout the city.[33] Exterior noise levels for residential land uses are considered acceptable up to 55 dBA CNEL, 65 dBA CNEL for office/commercial land uses, and 70 dBA CNEL for industrial land uses. Existing land uses surrounding the project site and within the project vicinity generally consists of industrial facilities and single family residences.

Construction Noise Levels

Construction noise levels were estimated for nearby receptors using the FHWA Roadway Construction Noise Model (RCNM). Temporary noise increases will be greatest during the demolition phase. The model indicates that the use of construction equipment such as excavators, dozers, and concrete saws could expose the industrial use located approximately 421 feet to the south of the center of the project site to a combined noise level of 71.1 dBA $L_{max.}$ Construction equipment could expose the industrial use located 640 feet south, the industrial use located 510 feet east, and the park located 544 feet from the center of the project site to a combined noise level of 67.4 dBA L_{max}, 69.4 dBA L_{max}, and 68.8 dBA L_{max}, respectively. Within the City of Riverside, a noise level of 70 dBA is allowable at surrounding industrial uses and a noise level of 65 dBA is allowable at public recreation facilities. To the north of the project site is the City of Colton. Within the City of Colton, the maximum allowable exterior noise level is 65 dBA. Construction activity could result in noise levels in excess of the allowable noise levels at the industrial use to the south, the public recreation use to the south, and the industrial use to the north of the project site. Therefore, Mitigation Measure N-1 have been incorporated to reduce the impact to neighboring uses during construction.

Per Section 7.35.10 (General Noise Regulations) of the Riverside Municipal Code, construction activities occurring between the hours of 7:00 PM and 7:00 AM on Mondays through Fridays, between 5:00 PM and 8:00 AM on Saturdays, and any time on Sundays and federal holidays are prohibited. Due to the time limitations on construction activity, surrounding employees and park users will be exposed to limited construction noise. Because noise levels during construction activities are anticipated to exceed the City's exterior noise standards, measures will be necessary to minimize noise levels at nearby receptors. Mitigation Measure N-1 will be incorporated to minimize noise associated with general construction activities. Mitigation Measure N-1 requires preparation of a construction noise reduction plan to reduce temporary noise impacts by a minimum of 20 dBA. This is a feasible performance standard to achieve based on the availability of construction noise reduction technology and techniques. Engineered noise control options include retrofitting equipment with improved exhaust and intake muffling, disengaging equipment fans, and installation of sound panels around equipment engines. These types of controls can achieve noise level reductions of approximately 10 dBA.[34] [35] Sound curtains and other noise barriers are available for general construction noise and achieve reductions of up to 20 dBA.[36] Implementation of Mitigation Measure N-1 will reduce temporary noise impacts by a minimum of 20 dBA, resulting in a maximum construction noise level of 57.3 dBA at the commercial use to the west of the project site. Therefore, with implementation of Mitigation Measures N-1 and adherence to City standards, construction noise will feasibly be reduced to levels that are less than significant.

Operational Noise levels

The City of Riverside Municipal Code sets an allowable exterior noise level for industrial uses at 70 dBA CNEL, 65 dBA CNEL for public recreational facilities and office/commercial use, 60 dBA for community support uses, and 55 dBA for residential use. The City of Colton sets an allowable noise level of 65 dBA CNEL. Ambient noise at the project site would generally be defined by traffic on Center Street, Placentia Lane, and operational noise from neighboring industrial uses. A substantial increase in ambient noise is an increase that is *barely perceptible* (3 dBA). Operationally, the proposed project will result in periodic landscaping and other occasional noise generating activities. These activities are common in urban uses and do not represent a substantial increase in periodic noise in consideration that the project site is located in an

[33] City of Riverside General Plan Noise Element.
[34] United States Bureau of Mines. Mining Machinery Noise Control Guidelines. 1983
[35] United States Bureau of Mines. Noise Abatement Techniques for Construction Equipment. August 1979
[36] Sound Seal. Sound Seal Sound Curtains Exterior Grade Noise Control. http://www.soundcurtains.com/exterior-grade-noise-control.pdf [October 2014]

industrialized area. Traffic noise from vehicular traffic generated by the proposed project was projected using SoundPLAN software was based on estimated trip generation and distribution provided by Kunzman Associates, Inc.[37]

The Without Project noise levels at neighboring uses were calculated using SoundPLAN software to provide a baseline of the Opening Year 2018 traffic noise levels. A traffic study was not required for this proposed project. Therefore, the Opening Year 2018 Without Project traffic noise environment was estimated utilizing average daily traffic counts provided by Google Earth Pro for Center Street and Orange Street. Google Earth Pro average daily traffic counts for Center Street and Orange Street are from the years 1999 and 2008, respectively. In order to account for growth in the area and increases in traffic volumes, a growth rate of two percent per year has been applied to the provided average daily traffic counts to bring the estimated volumes up to Opening Year 2018. Roadway volumes for Placentia Lane were not available. Therefore, to provide a worst-case analysis, the average daily roadway capacity of a local street experiencing Level of Service C has been assumed (see Table 12 (Roadway Traffic Volumes). Peak hour volumes are estimated to be ten percent of average daily traffic.

Table 12
Roadway Traffic Volumes

Roadway	Opening Year 2018 Volume	Peak Hour Volumes
Center Street[1]	14,569	1,457
Orange Street[2]	2,882	288
Placentia Lane[3]	2,800	280

1 1999 Traffic Count – 10,000 (Source: Google Earth Pro)
2 2008 Traffic Count – 2,364 (Source: Google Earth Pro)
3 Based on City of Riverside Roadway Capacity for Local Road operating at LOS C

Noise levels at the single family homes to the east and west, the industrial uses to the north and east, and the commercial use to the east were calculated (see Appendix C for output data) and projected at the ground floor. The 2017 *Opening Year Without and With Project* traffic noise levels during the peak hour at neighboring uses are summarized in
Table 13 (Opening Year 2017 Peak Hour Roadway uNoise Levels). *Opening Year Without and With Project* exterior noise levels will be within the allowable exterior noise levels established by the City of Colton for the northern industrial use and within the established City of Riverside exterior noise standard for the industrial and commercial uses to the east and the residential use to the southeast of the project site on the east side of Orange Street. The exterior noise levels under the Without and With Project scenarios exceed allowable exterior noise levels at the residential uses to the northeast, southeast, and northwest of the project site. However, the project does not cause the exterior noise levels to exceed the 55 dBA residential threshold for receptors that are currently below the allowable noise levels. In addition, traffic noise levels will not increase more than 3 dBA as a result of the proposed project as shown in
Table 13. Therefore, no significant impacts will result.

Table 13
Opening Year 2017 Peak Hour Roadway Noise Levels

Receptors	Without Project dBA CNEL		With Project dBA CNEL		Difference (AM / PM)	Significant? (AM / PM)
	AM	PM	AM	PM		
1 – Industrial (N)	57.0	57.8	58.2	58.8	+1.2 / +1.0	No / No
2 – Industrial (E)	61.3	62.3	63.3	64.1	+2.0 / +1.8	No / No
3 – Single Family Residential (NE)	**57.9**	**59.4**	**59.7**	**60.8**	+1.8 / +1.4	No / No
4 – Commercial (E)	57.4	58.2	58.2	59.0	+0.8 / +0.8	No / No
5 – Single Family Residential (SE)	53.3	54.0	53.6	54.4	+0.3 / +0.4	No / No

[37] Kunzman Associates, Inc. Center Street Warehouse Project Traffic Impact Analysis. January 19, 2016

6 – Single Family Residential (SE)	**60.7**	**61.4**	**60.9**	**61.8**	+0.2 / +0.4	No / No
7 – Single Family Residential (NW)	**60.2**	**61.1**	**60.9**	**61.8**	+0.7 / +0.7	No / No
Bolded *noise levels exceed 55 dBA exterior threshold for residential uses.*						

Mitigation Measures

N-1 The following measures are required to ensure that project-related short-term construction noise levels are reduced to within the allowable levels of 70 dBA for industrial uses and 65 dBA for recreation facilities Prior to issuance of demolition permits, a construction noise mitigation plan verifying the effectiveness in complying with the following measures shall be prepared and submitted for review by the Planning Director. Should construction noise exceed allowable levels after implementation of the following measures, the use of sound curtains or other noise barriers shall be required. The construction noise mitigation plan shall identify the type and location of sound curtains or other noise barriers to be utilized to reduce construction noise to within allowable levels. These mitigation measures shall be periodically monitored by the Planning Director, or designee, during routine construction inspections.

- Stationary construction noise sources such as generators or pumps must be located at least 100 feet from sensitive land uses, as feasible, or at maximum distance when necessary to complete work near sensitive land uses.
- Construction staging areas must be located as far from noise sensitive land uses as possible.
- Throughout construction, the contractor shall ensure all construction equipment is equipped with factory-provided noise attenuating devices and that they are properly maintained.
- Idling equipment must be turned off when not in use.
- Equipment must be maintained so that vehicles and their loads are secured from rattling and banging.

b) **Less than Significant Impact.** Vibration is the movement of mass over time. It is described in terms of frequency and amplitude and unlike sound; there is no standard way of measuring and reporting amplitude. Vibration can be described in units of velocity (inches per second) or discussed in decibel (dB) units in order to compress the range of numbers required to describe vibration. Vibration impacts to buildings are generally discussed in terms of peak particle velocity (PPV) that describes particle movement over time (in terms of physical displacement of mass). For purposes of this analysis, PPV will be used to describe all vibration for ease of reading and comparison. Vibration can impact people, structures, and sensitive equipment. The primary concern related to vibration and people is the potential to annoy those working and residing in the area. Vibration with high enough amplitudes can damage structures (such as crack plaster or destroy windows). Groundborne vibration can also disrupt the use of sensitive medical and scientific instruments such as electron microscopes. Common sources of vibration within communities include construction activities and railroads.

According to the Caltrans vibration manual, large bulldozers, vibratory rollers (used to compact earth), and loaded trucks utilized during grading activities can produce vibration, and depending on the level of vibration, could cause annoyance at uses within the project vicinity or damage structures. Caltrans has developed a screening tool to determine if vibration from construction equipment is substantial enough to impact surrounding uses.

The Caltrans vibration manual establishes thresholds for vibration impacts on buildings and humans. These thresholds are summarized in Table 14 (Vibration Damage Potential Threshold Criteria) and Table 15 (Vibration Annoyance Potential Threshold Criteria).

Table 14
Vibration Damage Potential Threshold Criteria

Structural Integrity	Maximum PPV (in/sec)	
	Transient	Continuous
Historic and some older buildings	0.50	0.25
Older residential structures	0.50	0.30
New residential structures	1.00	0.50
Modern industrial and commercial structures	2.00	0.50

Source: Caltrans 2013

Table 15
Vibration Annoyance Potential Threshold Criteria

Human Response	PPV Threshold (in/sec)	
	Transient	Continuous
Barely perceptible	0.035	0.012
Distinctly perceptible	0.24	0.035
Strongly perceptible	0.90	0.10
Severely perceptible	2.00	0.40
Source: Caltrans 2013		

Construction Vibration

Construction activities that use vibratory rollers and bulldozers are repetitive sources of vibration; therefore, the *continuous* threshold is used. Industrial uses are located to the north and east of the project site. As a worst case scenario, the *historic and some older buildings* threshold is used. Based on the threshold criteria summarized in Tables 13 and 14, vibration from use of heavy construction equipment for the proposed project would be below the thresholds to cause damage to nearby structures and result in less than *barely perceptible* vibration at the four receptors shown in Table 16 (Distances to Vibration Receptors) and Table 17 (Construction Vibration Impacts).

Table 16
Distances to Vibration Receptors

Receptors	Distance from Center of Project Site (ft)
1 – Industrial (N)	640
2 – Industrial (E)	510
3 – Industrial (S)	421
4 – Park (S)	544

Table 17
Construction Vibration Impacts

Receptors	Equipment	PPVref	Distance (feet)	PPV
1 – Single Family Home (NE)	Vibratory Roller	0.21	640	0.0031
2 – Storage Facility (N)	Vibratory Roller	0.21	510	0.0042
3 – Single Family Home (E)	Vibratory Roller	0.21	421	0.0053
4 – Single Family Home (E)	Vibratory Roller	0.21	544	0.0038
1 – Single Family Home (NE)	Large Bulldozer	0.089	640	0.0013
2 – Storage Facility (N)	Large Bulldozer	0.089	510	0.0018
3 – Single Family Home (E)	Large Bulldozer	0.089	421	0.0023
4 – Single Family Home (E)	Large Bulldozer	0.089	544	0.0016
1 – Single Family Home (NE)	Loaded Truck	0.076	640	0.0011
2 – Storage Facility (N)	Loaded Truck	0.076	510	0.0015
3 – Single Family Home (E)	Loaded Truck	0.076	421	0.0019
4 – Single Family Home (E)	Loaded Truck	0.076	544	0.0014
Source: MIG | Hogle-Ireland, June 2015				

Construction of the project does not require rock blasting, pile driving, or the use of a jack hammer, but will use a vibratory roller, and large bulldozer, and loaded trucks. All of the receptors will experience less than *barely perceptible* vibration from construction of the proposed project. Furthermore, these construction activities will be limited to the hours of 7:00 AM to 7:00

PM Mondays through Friday and the hours of 8:00 AM to 5:00 PM on Saturdays. With regard to long-term operational impacts, activities associated with the project will not result in any vibration-related impacts to adjacent or on-site properties. Construction-related vibration impacts will be less than significant.

Operational Vibration

Operation of the proposed project will include heavy-duty truck traffic along Center Street. According to the Federal Transit Administration (FTA), "It is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads."[38] Furthermore, the FTA recognizes that "Building damage is not a factor for normal transportation projects, with the occasional exception of blasting and pile-driving during construction. Caltrans notes that heavy trucks can impart groundborne vibration when the pavement is not smooth.[39] Recognizing the proximity of the Trujillo Adobe structure located east of the project site, north of Center Street, and west of Orange Street (APN 246-082-002), despite the rarity of potential structural impact due to normal-course transportation patterns, potential building damage due to project operation has been analyzed.

The structure is located approximately 88 feet from the centerline of the nearest lane on Center Street. According to Caltrans, the highest truck traffic vibrations generated on freeway shoulders is 2.0 PPV mm/sec (0.079 PPV in/sec). At 88 feet, the vibration level reaching the Adobe structure is 0.015 PPV. According to project trip generation as estimated by Kunzman Associates, the proposed project is anticipated to generate 148 heavy-duty trucks per day, with a maximum of 28 heavy-duty trucks during the AM and PM peak hour. Although truck trips will occur periodically, the *continuous* threshold has been utilized to provide a worst-case analysis. Based on the Caltrans threshold for *historic and some old buildings* as summarized in Table 16, heavy truck traffic on Center Street will not result in structure damage due to operation-related groundborne vibration. The Caltrans Transportation and Construction Vibration Guidance Manual also provides alternative thresholds, as summarized in Table 18 (Vibration Criteria for Buildings).

Table 18
Vibration Criteria for Buildings

Criteria	Building Type	Continuous Threshold PPV (in/sec)
Swiss Association of Standardization	Class IV: Construction very sensitive to vibration; objects of historic interest	0.12
Konan	Historic and Sensitive Buildings	0.12
AASHTO	Historic Sites or other critical locations	0.10
Source: Caltrans 2013		

As shown in Table 16, periodic heavy truck traffic occurring along Center Street will not exceed vibration criteria for structural damage to historic and sensitive buildings. In addition, according to the Whiffen vibration criteria for continuous vibration, vibration levels of 0.006 – 0.019 are unlikely to cause damage to buildings of any type. The 0.015 PPV resulting from heavy-duty truck traffic is less than this continuous threshold. Operational vibration impacts will be less than significant.

c) **Less than Significant Impact.** A substantial increase in ambient noise is an increase that is *barely perceptible* (3 dBA). Operationally, the proposed project will result in periodic landscaping and other occasional noise generating activities. These activities are common in urban uses and do not represent a substantial increase in periodic noise in consideration that the project site is located in an industrialized area.

Traffic noise levels will not increase more than 3 dBA as a result of the proposed project as shown in

[38] Federal Transit Administration. Transit Noise and Vibration Impact Assessment. May 2006
[39] California Department of Transportation, Transportation and Construction Vibration Guidance Manual, September 2013

Table 19 (Peak Hour Change in Noise Levels). In addition, the ambient noise measurements at the northern and southern boundaries of the project site is generally consistent with the modeled roadway noise levels with project. Therefore, impacts will be less than significant.

Table 19
Peak Hour Change in Noise Levels

Receptors	Without Project dBA CNEL	With Project dBA CNEL	Difference	Significant?
1 – Industrial (N)	62.5	62.7	0.2	No
2 – Industrial (E)	70.1	70.1	--	No
3 – Industrial (S)	57.2	57.2	--	No
4 – Park (S)	54.1	54.1	--	No
5 – Commercial (E)	62.7	62.7	--	No
6 – Single Family Home (E)	61.0	61.0	--	No
7 – Single Family Home (E)	65.8	65.8	--	No
8 – Single Family Hone (W)	65.4	65.4	--	No

d) **Less than Significant Impact with Mitigation Incorporated.** As discussed in question a) above, implementation of Mitigation Measures N-1 will feasibly reduce temporary construction noise to within the allowable noise levels at neighboring land uses. Impacts related to temporary construction noise will be less than significant with mitigation incorporated.

Operationally, the project will result in periodic landscaping and other occasional noise generating activities. These activities are common in industrial uses and do not represent a substantial increase in periodic noise in consideration that the project vicinity is characterized primarily by industrial uses. Furthermore, the project is subject to Zoning Code Section 7.25.010 that limits noise levels to 70 dBA for industrial land uses. With compliance with this existing regulation, periodic operational noise increases will be less than significant.

e,f) **No Impact.** The proposed project is not located within two miles of a public or private airstrip or within an airport land use plan. No impacts will occur.

4.10 – Population and Housing

Would the project:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☑	☐
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☑
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☑

a) **Less than Significant Impact.** The 2012 Regional Transportation Plan (RTP) growth projections are developed utilizing a comprehensive analysis of fertility, mortality, migration, labor force, housing units, and local policies such as land use plans. Growth projections for the 2012 RTP predicted a citywide employment growth between 2008 and 2020 of approximately 45,800 and 66,300 by 2035. Based on average employees per square foot of warehouse in Riverside County, the proposed project is estimated to generate 530 new employees in the area.[40] This project would accommodate additional local employment that is well within the growth forecasts developed for the RTP. Furthermore, the project does not include any infrastructure extension or expansion and therefore will not result in any indirect population growth. Impacts will be less than significant.

b) **No Impact.** The project site is primarily vacant with one single family residence and five ancillary structures located on the southeastern corner of the project site. The proposed project will require the removal of one single family residence and five ancillary structures. As stated in the Historical/Archaeological Resources Survey Report (Appendix D), the existing structures are in a dilapidated condition. The owner of the existing single family residence and ancillary structures has voluntarily sold the property and will vacate voluntarily. Because the existing single family residence and ancillary structures have been voluntarily sold and are in dilapidated condition, removal of this residence will not result in the displacement of housing units that are in good condition and will not result in necessitating the construction of replacement housing elsewhere. No impact will occur.

c) **No Impact.** Displacement, in the context of housing, can generally be defined as persons or groups of persons who have been forced or obliged to flee or to leave their homes or places of habitual residence.[41] One single family residence and five ancillary structures are located on site. The single family residence is currently owner-occupied. Existing residents of this structure will not be displaced in that the property owner has voluntarily sold the property and will voluntarily vacate the residence. As such, there is no *forced or obliged* removal of persons, and therefore no displacement. No impact will occur.

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40 The Natelson Company, Inc. Employment Density Study Summary Report. October 31, 2001

41 The Brookings Institute. Handbook for Applying the Guiding Principles on Internal Displacement. 1999.

4.11 – Public Services

Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Fire protection?	☐	☐	☑	☐
b) Police protection?	☐	☐	☑	☐
c) Schools?	☐	☐	☑	☐
d) Parks?	☐	☐	☐	☑
e) Other public facilities?	☐	☐	☑	☐

a) Less than Significant Impact. The City of Riverside Fire Department provides fire protection and emergency medical response services in the City of Riverside. The project site is primarily serviced by Station No. 6, located at 1077 Orange Street, approximately one mile south of the project site.

The project is a proposed development of a primarily vacant site in a primarily industrial area. The project is located within the service area of the Riverside Fire Department, which has 14 stations. Therefore, the project will not have a significant impact on fire response times and will not otherwise create a substantially greater need for fire protection services than already exists that would necessitate construction of new facilities. No new or expanded fire protection facilities would be required as a result of this project because the project is within the existing service area of the Fire Department. Furthermore, the proposed project does not propose to use substantially hazardous materials or engage in hazardous activities that will require new or modified fire protection equipment to meet potential emergency demand. Any incremental impacts on level of service will be offset by the payment of development impact fees and property taxes. Impacts related to expansion of fire protection services will be less than significant.

b) Less than Significant Impact. The City of Riverside Police Department provides police protection services in the City of Riverside. The project site is served by the Orange Station located at 4102 Orange Street, approximately 4.2 miles south of the project site.

The proposed project will not result in any unique or more extensive crime problems that cannot be handled with the existing level of police resources. The proposed project is located within the Riverside Police Department service area. No new or expanded police facilities will need to be constructed as a result of this project because the project is within the existing service area of the Police Department. Any incremental impacts on level of service will be offset by the payment of development impact fees and property taxes. Impacts related to expansion of police protection services will be less than significant.

c) Less than Significant Impact. The proposed project will result in indirect incremental population growth and potential associated growth in students, within the Riverside Unified School District. In accordance with California Government Code and the Riverside Unified School District, a standard school facility impact fee will be paid to offset any incremental impacts of the proposed project. Impacts to the school facilities will be less than significant.

d) No Impact. The proposed project will not result in direct population growth that would incrementally impact recreation facilities. Impacts to recreation facilities are further discussed in Section 4.15 (Recreation). Any expansion or new construction of recreation facilities resulting from the proposed project will be subject to its own environmental review pursuant to CEQA. No impact will occur.

e) Less than Significant Impact. The proposed project will result in employment growth and indirectly in population growth that would incrementally impact other public services such as libraries or hospitals. Any incremental impact would be addressed through payment of property taxes that go to serve City and County public services. With the payment of development impact fees and property taxes, a less than significant impact will occur.

4.12 – Recreation

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☑
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☑

a) **No Impact.** The proposed project will not directly result in population growth that would impact recreation facilities. However, the addition of employees to the project vicinity will result in increased use of local park facilities. Pursuant to Riverside Municipal Code Chapters 16.60 (Local Park Development Fees) and 16.44 (Regional Parks and Reserve Parks Development Fee), a Local Park Development Fee and a Regional Park and Reserve Park Development Fee is imposed on the construction or placement of all nonresidential units and new dwelling units. Dedication of park land in lieu of payment of all or a portion of the Local Park Development Fee may be accepted by the City Council. Credits for Regional Park Fees can be requested with the donation of land adjoining a regional park or land that is situated in a planned regional park or reserve park as shown in the City's General Plan. With payment of the required Park Development Fees, dedication of land in lieu of payment, or donation of land to the regional park system, no impact will occur.

b) **No Impact.** The proposed project requires no on- or off-site construction of recreational facilities. No impact will occur.

4.13 – Transportation and Traffic

Would the project:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☑	☐
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☐	☑	☐
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☑
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☑	☐
e) Result in inadequate emergency access?	☐	☐	☑	☐
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☑	☐

a) **Less than Significant Impact.** Operation of the proposed project could reduce the performance of the circulation system if the project-related vehicle trips or any proposed improvements decrease the Level of Service (LOS) on existing streets. In addition, impacts could occur if project improvements reduce the performance of any mode of transportation including mass transit and non-motorized travel.

The project site has been designed to take direct access via two driveways on Center Street. Center Street is a two-lane undivided roadway that is aligned east to west. Regional access to the project site is provided by I-215 freeway, SR-60 freeway, and SR-91 freeway.

Trip Generation

Trip generation was estimated based on the Institute of Transportation Engineers 9th edition *Trip Generation* manual. The Traffic Impact Analysis prepared by Kunzman Associates indicates that 875 passenger vehicle trips and 301 truck trips (701 Passenger Car Equivalent trips) will be generated by the project.[42]

To assess Opening Year traffic conditions, existing traffic is combined with areawide growth to characterize Opening Year conditions and potential impacts. The Opening Year for analysis purposes in this report is 2017. To account for areawide growth on roadways, traffic volumes have been calculated based on a conservative 2.0 percent annual growth rate of existing traffic volumes. The results of the Opening Year analysis are summarized in Table 20 (Opening Year (2017) Intersection Performance).

Table 20
Opening Year (2017) Intersection Performance

Intersection	Peak Hour	Without Project		With Project			
		Delay	LOS	Delay	LOS	Project Impact	Significant Impact?
Main St/Riverside Ave at Center St	AM	15.8	C	17.5	C	1.7	No
	PM	16.9	C	24.5	C	7.6	No
Orange St at Center St	AM	8.8	A	11.5	B	2.6	No
	PM	10.5	B	15.7	C	5.2	No
Stephens Ave at Center St	AM	13.8	B	16.2	B	2.4	No
	PM	12.2	B	13.2	B	1.0	No
W La Cadena at Stephens Ave/I-215 SB Ramps	AM	15.2	C	18.1	C	2.9	No
	PM	23.3	C	30.8	D	7.5	No
E La Cadena at Highgrove/I-215 NB Ramps	AM	9.1	A	10.0	A	0.9	No
	PM	10.1	B	10.6	B	0.5	No
Highgrove at Center St	AM	13.6	B	19.9	C	6.3	No
	PM	12.6	B	14.6	B	2.0	No
Iowa Ave/I-215 NB Ramps at La Cadena	AM	99.0	F	99.8	F	0.8	No
	PM	155.7	F	156.2	F	0.5	No
Iowa Ave at Main St	AM	17.8	B	18.9	B	1.1	No
	PM	17.2	B	21.5	C	4.3	No
Iowa Ave at Center St	AM	18.9	B	20.0	B	1.1	No
	PM	17.8	B	18.7	B	0.9	No
Source: Kunzman Associates, 2016							

The study area intersections are projected to operate at acceptable Levels of Service during the peak hours, except for Iowa Avenue/I-215 Freeway northbound ramps at La Cadena Drive, which is projected to operate at unacceptable Levels of Service under Without Project conditions without improvement. A significant impact occurs at a study intersection when the addition of project-generated trips causes either peak hour Level of Service to degrade from acceptable Level of Service (A through D) to unacceptable Level of Service (E or F) or if the proposed project result in increases in peak hour delay by ten

[42] Kunzman Associates, Inc. Center Street Warehouse Project Traffic Impact Analysis. January 19, 2016

seconds for LOS A through B, eight seconds for LOS C, five seconds for LOS D, two seconds for LOS E, and one second for LOS F.

As shown in Table 20, the proposed project does not significantly impact study area intersections under Opening Year 2017 With Project traffic conditions. Impacts will be less than significant.

b) **Less than Significant Impact.** The proposed project could result in significant impacts if it conflicts with the Riverside County Congestion Management Program (CMP) through reducing the Level of Service of a non-exempt segment to fall to "F". If LOS for a non-exempt segment is reduced to "F", a deficiency plan outlining specific mitigation measure and a schedule for mitigating the deficiency will be required. The nearest affected CMP designated freeways are I-215, SR-60, and SR-91 and the nearest arterial link is Main Street. A traffic study was not required because the proposed project will result in less than 50 peak hour trips; therefore, LOS on CMP designated freeways and roadways will not occur. Impacts will be less than significant.

c) **No Impact.** The proposed project is not located within two miles of an airport or private air strip. The proposed building would not encroach into air traffic space and this project would have no effects on demand for local air service or volumes of air traffic. The proposed project will not alter air traffic patterns, therefore no impact will occur.

d) **Less than Significant Impact.** If the project will substantially increase hazards due to a design feature, a significant impact could occur. No existing traffic hazards are known to exist in the immediate vicinity of the project. Roadways and intersections provide sufficient sight distance to limit the potential of any hazards and stop signs and traffic signals are placed at intersections to safely control traffic movements. The Traffic Impact Analysis prepared by Kunzman Associates included in its recommendation that sight distance at each project access should be reviewed with respect to California Department of Transportation/City of Riverside standards in conjunction with the preparation of final grading, landscaping, and street improvement plans. Impacts from the project will be less than significant to any potentially existing or future traffic hazard.

e) **Less than Significant Impact.** The proposed project will be accessible via two 40-foot wide driveways on Center Street. Interior drive aisles along the western, eastern, and southern sides of the building will have a minimum width of 40 feet to provide adequate truck and emergency access as required by the Fire Department. The interior drive aisle along the northern side of the building will be 24 feet wide and provide access for passenger vehicles. Access and turning radii entering the site and within the site are adequate to serve the site in case of an emergency. Therefore, the project will have less than significant impacts on the provision of adequate emergency access.

f) **Less than Significant Impact.** The project will not result in conflicts with adopted policies or plans related to alternative modes of travel, such as bus transit, bicycles or walking paths. The project is not located adjacent to or near an existing bike path or pedestrian facilities it could conflict with, nor does the City have adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities that apply to the proposed project site. Therefore, a less than significant impact will occur.

4.14 – Utilities and Service Systems

Would the project:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☑	☐
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☑	☐
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☑
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☑	☐
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☑	☐
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☑	☐
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☑

a) **Less than Significant Impact.** The proposed project could affect Regional Water Quality Control Board treatment standards by increasing wastewater production, which would require expansion of existing facilities or construction of new facilities. Exceeding the RWQCB treatment standards could result in contamination of surface or ground waters with pollutants such as pathogens and nitrates.

The City of Riverside Public Works Department provides sewer service to the project area. The City of Riverside Public Works Department provides for the collection, treatment and disposal of wastewater at the project site through its Riverside Regional Water Quality Treatment Plant (RRWQCP) and complies with state and federal requirements governing the

treatment and discharge of wastewater. The wastewater collection system includes over 776 miles of gravity sewers that range in size from six to 54 inches in diameter and includes 18 wastewater pump stations. According to the City of Riverside 2010 Urban Water Management Plan, RRWQCP treats approximately 34 million gallons per day (MGD). The capacity of the plant is 40 MGD. The plant is currently being expanded and retrofitted to meet the needs of future generations. This expansion will increase the capacity to 46 MGD by the end of 2015. With improved treatment processes being added, the ultimate plant capacity is anticipated to be 52 MGD.[43] Final plant expansion is anticipated to occur in 2026. Sewer connection fees will be determined as outlined under Section 14.08.080 of the City's Municipal Code. Wastewater flows associated with the proposed project would consist of the same kinds of substances typically generated by commerce use and no modifications to any existing wastewater treatment systems or construction of any new ones would be needed to treat this project's wastewater. Estimated wastewater generated by the proposed development is approximately 161.790.3 gallons per day (gpd) (wastewater is estimated to be 80 percent of total water use). This volume is within RRWQCP's remaining treatment capacity (40 MGD – 34 MGD = 6 MGD). This project would thus have a less-than-significant impact on the ability of the RRWQCP to operate within its established wastewater treatment requirements, which are enforced via the facility's NPDES permit authorized by the Santa Ana Regional Water Quality Control Board (SARWQCB). Therefore, the project will have a less than significant impact related to wastewater treatment requirements of the SARWQCB.

b) **Less than Significant Impact.** The City of Riverside's water supply is primarily groundwater, extracted by production wells from the Bunker Hill Basin, Riverside North, and Riverside South. Additional sources of water include groundwater from the Rialto-Colton Basin, recycled water from the City of Riverside's Regional Water Quality Control Plant (RWQCP), and imported water from WMWD through a connection at the Metropolitan Water District of Southern California's Henry J. Mills Treatment Plant. The Riverside Public Utilities Department provides water service to the project area, and will provide water service to the proposed project upon completion of financial arrangements and compliance with the Department's Rules and Regulations for the installation of water facilities. Sections 10910-10915 of the state Water Code require the preparation of a water supply assessment (WSA) demonstrating sufficient water supplies for any industrial development with more than 1,000 employees or over 650,000-square feet of floor area, or the equivalent thereof. As the project is below the established thresholds, no WSA is required.[44] The Riverside Public Utilities Department (RPU) projects adequate water supplies for the project area based upon current water supply and projected growth rates, estimated between 2015 and 2035.[45] The 2010 water usage in the RPU service area was approximately 83,300 AFY and is expected to increase steadily through to 2035. The proposed water use in 2035 is estimated to be 119,800 AFY, an increase of 36,500 AFY. Groundwater supplies will be augmented through three conjunctive use projects: Seven Oaks Dam Conservation Project, Riverside North Aquifer Storage and Recovery Project, and Pellisier Ranch Aquifer Storage and Recovery Project, and through increased use of recycled water. Total available water (including groundwater, conjunctive use projects, recycled water, and imported water from MWD) to the Riverside Public Utilities service area is estimated to reach 143,226 AFY by 2035, which is more than sufficient to meet the estimated 2035 water demand. Based on CalEEMod assumptions, the proposed project's estimated water demand is approximately 226.5 AFY. The proposed project is designed to support typical commerce use. Should a heavy utility use be proposed as a tenant, further City review and approval will be required.

Regarding wastewater facilities, as discussed in the preceding response, wastewater generated at the project site is treated at the Riverside Regional Water Quality Treatment Plant (RRWQCP). The proposed project is estimated to have a wastewater generation of approximately 161,790.3 gpd. This generation is well within the existing remaining treatment capacity of the RRWQCP.

Connections to local water and sewer mains would involve temporary and less than significant construction impacts that would occur in conjunction with other on-site improvements. No additional improvements are needed to either sewer lines or treatment facilities to serve the proposed project. Standard connection fees will address any incremental impacts of the

43 City of Riverside Public Utilities. Final 2010 Urban Water Management Plan. July 2011.
44 Correspondence with Michael L. Plinski, P.E., Senior Water Engineer, Riverside Public Utilities. November 26, 2013.
45 City of Riverside Public Utilities. Final 2010 Urban Water Management Plan. July 2011.

proposed project. Therefore, the project will result in less than significant impacts as a result of new or expanded wastewater treatment facilities.

c) **No Impact.** Potentially significant impacts could occur as a result of this project if storm water runoff was increased to a level that would require construction of new storm drainage facilities. As discussed in the Hydrology section, the proposed project would not generate any increased runoff from the site that would require construction of new storm drainage facilities. The City's NPDES permit requires most new development projects to incorporate best management practices to minimize pollutant levels in runoff. Pursuant to Riverside Municipal Code Chapter 14.12 (Discharge of Wastes into Public Sewer and Storm Drain Systems), all construction projects shall apply Best Management Practices (BMPs) such as sediment barriers, plastic sheeting, detention ponds, filters and berms to prevent erosion. Implementation of BMPs would reduce pollutants in stormwater and urban runoff from the project site. The proposed storm drainage system and BMPs must be designed to the satisfaction of the City's Public Works Director and in conformance with all applicable permits and regulations. The project applicant/developer would be required to provide all necessary on-site infrastructure. The project will have a less than significant impact on requiring the construction of new facilities or expansion of existing storm drainage facilities.

d) **Less than Significant Impact.** The project could result in significant impacts if the project required additional water supplies than are currently entitled. Water demand is provided by survey data utilized in CalEEMod. Water demand is estimated at 73,816,810 gallons per year or 226.5 acre feet per year. Water demand within the Riverside Public Utilities service area is projected to be 119,800 AFY by 2035. The proposed project's estimated water demand is approximately 226.5 AFY, which is within RPU's remaining capacity. Based on the City of Riverside 2010 Urban Water Management Plan (UWMP), the City's service area is approximately 80 percent built out with approximately 15 percent vacant land available for development. The Bunker Hill Basin is managed to maintain adequate future water supplies through future conjunctive use projects, increased use of recycled water, and water imported from MWD. The project would not substantially deplete water supplies, and the project would have a less than significant impact on entitled water supplies.

e) **Less than Significant Impact.** As detailed in Sections 4.17.a) and 4.17.b), the proposed project will be adequately served by existing facilities. Therefore a less than significant impact will occur.

f) **Less than Significant Impact.** Significant impacts could occur if the proposed project will exceed the existing permitted landfill capacity or violates federal, state, and local statutes and regulations. The City of Riverside Public Works Department collects trash from 70 percent of all households. The remaining portions of the City's solid waste are serviced by private collectors.[46] Regional landfill capacity fluctuates daily and is regularly monitored by the County Sanitation Districts of Riverside County to ensure there is sufficient landfill space available to dispose of municipal solid wastes throughout the region. This project's additional solid waste stream would have a less than significant impact on regional landfill capacity. Cities must meet the 50% landfill diversion mandate required by State law. General Plan Policy PF-5.1 states that waste should be diverted from landfills and states that the City should achieve 100% recycling citywide for both residential and non-residential development. In 2013, the per employee disposal rate was 14.0 pounds per day, below the target of no more than 19.5 pounds per day.[47] According to the California Department of Resources Recycling and Recovery (CalRecycle), the City disposes of waste at several area landfills, including:

- Badlands Sanitary Landfill
- El Sobrante Landfill
- Puente Hills Landfill (Closed 2013)
- Olinda Alpha Sanitary Landfill
- San Timoteo Sanitary Landfill

[46] Albert A. Webb Associates. City of Riverside General Plan 2025 Program Environmental Impact Report. July 2007.

[47] CalRecycle. Facility/Site Summary Details, Jurisdiction Diversion/Disposal Rate Summary. http://www.calrecycle.ca.gov/LGCentral/reports/diversionprogram/JurisdictionDiversionPost2006.aspx [June 2015]

- Simi Valley Landfill & Recycling Center
- California Street Landfill
- Mid-Valley Sanitary Landfill
- Azusa Land Reclamation Co. Landfill
- Chiquita Canyon Sanitary Landfill
- Antelope Valley Public Landfill
- American Avenue Disposal Site
- McKittrick Waste Treatment Site

The majority of waste in 2013 went to the Badlands Sanitary Landfill and the El Sobrante Landfill.[48] The Badlands Sanitary Landfill, located in Moreno Valley, has a permitted daily capacity of 4,000 tons, with a permitted total capacity of 33,560,993 cubic yards and a remaining capacity of 14,730,025 cubic yards. This landfill is projected to close in 2024.[49] The El Sobrante Landfill, located in Corona, has a permitted daily capacity of 16,054 tons per day and a total capacity of 184,930,000 tons, with a remaining capacity of 145,530,000 tons. This landfill is estimated to close in 2045.[50] Although these existing landfills currently used by Riverside are anticipated to close in 2024 and 2045, other regional landfills have remaining capacity. Also, regional plans are underway to transport waste by rail to landfill sites in the desert areas to the east.

Different uses have varying levels of estimated solid waste production. Using the default calculations in the CalEEMod model, the proposed project will generate approximately 289.5 tons of solid waste per year. There is adequate landfill capacity in the region to accommodate project-generated waste. Considering the availability of landfill capacity and the relatively nominal amount of solid waste generation from the proposed project, project solid waste disposal needs can be adequately met without a significant impact on the capacity of the nearest and optional, more distant, landfills. Therefore, it is not expected that the proposed project would impact the City's compliance with state-mandated (AB 939) waste diversion requirements. Impacts will be less than significant.

g) **No Impact.** The proposed project is required to comply with all applicable federal, state, County, and City statutes and regulations related to solid waste as a standard project condition of approval. Therefore, no impact will occur.

48 CalRecycle. Jurisdiction Disposal by Facility. http://www.calrecycle.ca.gov/LGCentral/Reports/DRS/Destination/JurDspFa.aspx [June 2015]

49 CalRecycle. Facility/Site Summary Details: Badlands Sanitary Landfill (33-AA-0006) http://www.calrecycle.ca.gov/SWFacilities/Directory/33-AA-0006/Detail/ [June 2015]

50 CalRecycle. Facility/Site Summary Details: El Sobrante Landfill (33-AA-0217) http://www.calrecycle.ca.gov/SWFacilities/Directory/33-AA-0217/Detail/ [June 2015]

4.15 – Mandatory Findings of Significance

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☑	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of the past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☑	☐	☐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☑	☐	☐

a) **Less than Significant with Mitigation Incorporated.** The proposed project would not substantially impact any scenic vistas, scenic resources, or the visual character of the area, as discussed in Section 4.1. The proposed project would not significantly impact any sensitive plants, plant communities, fish, or wildlife, as discussed in Section 4.4. Mitigation Measures BIO-1, BIO-2, and BIO-3 have been incorporated to ensure that impacts to potential nesting birds and roosting bats would remain less than significant. Adverse impacts to historic resources would not occur. Construction-phase procedures would be implemented in the event any important archaeological or paleontological resources are discovered during grading, consistent with Mitigation Measures CUL-1 and CUL-7. This site is not known to have any association with an important example of California's history or prehistory. The environmental analysis provided in Section 4.2 concludes that impacts related to emissions of criteria pollutants and other air quality impacts will be less than significant. Section 4.7 concludes that impacts related to climate change would be less then significant. Section 4.9 concludes that impacts related to hydrology and water quality will be less than significant. Based on the preceding analysis of potential impacts in the responses to items 4.1 thru 4.17, no evidence is presented that this project would degrade the quality of the environment. The City hereby finds that impacts related to degradation of the environment, biological resources, and cultural resources will be less than significant with mitigation incorporated.

b) **Less than Significant with Mitigation Incorporated.** Cumulative impacts can result from the interactions of environmental changes resulting from one proposed project with changes resulting from other past, present, and future projects that affect the same resources, utilities and infrastructure systems, public services, transportation network elements,

air basin, watershed, or other physical conditions. Such impacts could be short-term and temporary, usually consisting of overlapping construction impacts, as well as long term, due to the permanent land use changes involved in the project.

Non-Cumulative Impacts

Impacts related to aesthetics, geology and soils, and airport hazards at the project-level have no potential for cumulative impacts because impacts are limited to on-site conditions and include no component that could result in similar impacts over time or space. Therefore, no cumulative impacts related to these topics will occur.

Local Impacts

Projects can contribute considerably to cumulative impacts in context of the local environment. Local cumulative impacts are limited to agricultural and forestry resources, air quality, biological resources, cultural resources, hazardous materials, wildfires, groundwater levels, drainage and water quality, land use and planning, mineral resources, noise, population and housing, public services, recreation, transportation and traffic, and utilities and service systems. A general discussion of potentially significant cumulative impacts in the local context is summarized below.

The analysis provided in Sections 4.2 and 4.11 found that no individual impacts would occur; therefore, the project could not contribute considerably to local agricultural or mineral resources impacts. The analysis provided in Section 4 related to greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, land use and planning, mineral resources, population and housing, transportation and traffic, and utilities and service systems found that impacts would be less than significant; therefore, while the project will contribute to localized cumulative impacts, the project contribution will not be considerable.

Impacts related to air quality, biological resources, cultural resources, and construction noise were found to be potentially significant and require mitigation to reduce to less than significant levels; therefore, the project could contribute considerably to significant localized cumulative impacts in these topical areas. These topics are discussed in detail below.

Air Quality. The analysis provided in Section 4.3 related to air quality found that impacts would be less than significant with mitigation incorporated to reduce operational NOX emissions requiring that prior to issuance of business licenses, the building tenant shall provide evidence to the City Planning Division that emissions from truck fleet trips and other operations will not exceed the South Coast Air Quality Management District's (SCAQMD) daily oxides of nitrogen threshold. Therefore, while the project will contribute to localized or regional cumulative impacts, the project contribution will not be considerable.

Biological Resources. The context for assessing cumulative impacts to local biological resources includes sensitive species and their habitat in the project vicinity. As discussed in Section 4.4, the project site lacks any substantial vegetation. Suitable coastal whiptail, coast horned lizard, and California horned lark habitat is on site but none were observed. Mitigation Measures BIO-1 and BIO-2 have been included to ensure that impacts to potential nesting birds would remain less than significant. Several species of bats are known to occur in the vicinity but were not observed on site. Mitigation Measure BIO-3 has been included to ensure that impacts to potential bats would remain less than significant. Therefore, the proposed project would not result in cumulative impacts related to the loss of sensitive species in the project area.

Cultural Resources. The context for assessing cumulative impacts to local archeological knowledge of our past is the geographical extent of local historic and pre-historic knowledge. Loss of on-site archaeological resources could reduce or eliminate important information relevant to the City of Riverside and/or the Inland Empire. Mitigation Measures CUL-1 and CUL-7 have been incorporated requiring evaluation of any discovered potential archaeological resources, the uniqueness of the archaeological sample, and appropriate steps to preserve or curate the artifact. This will eliminate any potential loss of important local archaeological information that may be buried under the project site; therefore, the project will have no contribution to a cumulative loss of important local archaeological knowledge.

Noise. The project is not a substantial source of operational noise, as discussed in Section 4.12, and therefore would not contribute considerably to noise levels in the immediate vicinity of the project. The project will contribute to temporary increase in noise levels in the immediate project vicinity during construction activities; however, Mitigation Measures N-1 will

be incorporated to minimize construction-related noise and therefore the project's contribution will not be considerable. The project will increase traffic in the project area; however, project traffic-related noise will not be discernable to the public and therefore will have no considerable contribution to cumulative traffic-related noise.

Regional Impacts

Projects can contribute considerably to cumulative impacts in context of the regional environment. Regional cumulative impacts are limited to air quality, biological resources, cultural resources, hazardous materials, wildfires, groundwater levels, drainage and water quality, flooding, land use and planning, mineral resources, transportation and traffic, and utilities and service systems. A general discussion of potentially significant cumulative impacts in the regional context is summarized below.

The analysis provided in Sections 4.2 and 4.11 found that no individual impacts would occur; therefore, the project could not contribute considerably to regional agricultural or mineral resources impacts. The analysis provided in Section 4 related to greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, land use and planning, mineral resources, population and housing, transportation and traffic, and utilities and service systems found that impacts would be less than significant; therefore, while the project will contribute to regional cumulative impacts, the project contribution will not be considerable.

Impacts related to air quality, biological resources, cultural resources, and noise were found to be potentially significant and require mitigation to reduce to less than significant levels; therefore, the project could contribute considerably to significant localized cumulative impacts in these topical areas. These topics are discussed in detail below.

Air Quality. The context for assessing cumulative air quality impacts to the area is the extent to which project related emissions will contribute to a net increase of any criteria pollutant for which the project region is in non-attainment. The analysis provided in Section 4.3 related to air quality found that impacts would be less than significant with mitigation incorporated to reduce operational NOx emissions. Mitigation Measure AQ-1 requires that prior to issuance of business licenses, the building tenant shall provide evidence to the City Planning Division that emissions from truck fleet trips and other operations will not exceed the South Coast Air Quality Management District's (SCAQMD) daily oxides of nitrogen threshold. Therefore, while the project will contribute to localized or regional cumulative impacts, the project contribution will not be considerable.

Biological Resources. The context for assessing cumulative impacts to regional biological resources includes sensitive species and their habitat in the Inland Empire. As discussed in Section 4.4, the project site lacks any substantial vegetation. Suitable coastal whiptail, coast horned lizard, and California horned lark habitat is on site but none were observed. Mitigation Measures BIO-1 and BIO-2 have been included to ensure that impacts to potential nesting birds would remain less than significant. Several species of bats are known to occur in the vicinity but were not observed on site. Mitigation Measure BIO-3 has been included to ensure that impacts to potential bats would remain less than significant. Therefore, the proposed project would not result in cumulative impacts related to the loss of sensitive species in the region.

Cultural Resources. The context for assessing cumulative impacts to regional archeological knowledge of our past is the geographical extent of regional historic and pre-historic knowledge. Loss of on-site archaeological resources could reduce or eliminate important information relevant to the City of Riverside and/or the Inland Empire. Mitigation Measures CUL-1 and CUL-7 have been incorporated requiring evaluation of any discovered potential archaeological resources, the uniqueness of the archaeological sample, and appropriate steps to preserve or curate the artifact. This will eliminate any potential loss of important local archaeological information that may be buried under the project site; therefore, the project will have no contribution to a cumulative loss of important regional archaeological knowledge.

Noise. The context for assessing cumulative noise impacts to the region is the extent to which temporary or permanent noise generating sources exist in the area. The project is not a substantial source of operational noise, as discussed in Section 4.12, and therefore would not contribute considerably to noise levels in the immediate vicinity of the project. The project will contribute to temporary increases in noise levels in the immediate project vicinity during construction activities;

however, Mitigation Measure N-1 will be incorporated to minimize construction-related noise and therefore the project's contribution will not be considerable. The project will increase traffic in the project area; however, project traffic-related noise will not be discernible to the public and therefore will have no considerable contribution to cumulative traffic-related noise.

Global Impacts

One topic of global concern is climate change. As discussed in Section 4.7, climate change is the result of numerous, cumulative sources of greenhouse gas emissions all over the world. The project will not contribute considerably to global climate change with implementation of existing regulations.

Based on the above analysis concerning the local, regional, and global impacts of the project in consideration of past, current, and future projects, the City of Riverside hereby finds that the contribution of the proposed project to cumulative impacts will be less than significant with mitigation incorporated.

c) **Less than Significant with Mitigation Incorporated.** Based on the analysis of the project's impacts in the responses to items 4.1 thru 4.17, there is no indication that this project could result in substantial adverse effects on human beings. While there would be temporary adverse effects during construction related to noise, these will be reduced to less than significant levels through mitigation and incorporation of standard requirements for noise. Less than significant long-term effects would include air quality, greenhouse gas emissions, hazards, population and housing, public services, traffic, utilities and service systems, and changing the visual character of the site, with a majority of these impacts affecting the project site itself. The analysis herein concludes that direct and indirect environmental effects will at worst require mitigation to reduce to less than significant levels. Generally, environmental effects will result in less than significant impacts. Based on the analysis in this Initial Study, the City finds that direct and indirect impacts to human beings will be less than significant with mitigation incorporated.

5 References

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None

CENTER STREET COMMERCE BUILDING Mitigated Negative Declaration: Mitigation Monitoring Reporting Program							
Mitigation Measures		Monitoring Timing/ Frequency	Action Indicating Compliance	Monitoring Agency	Verification of Compliance		
					Initials	Date	Remarks
Air Quality Mitigation Measure							
AQ-1	Prior to issuance of business permits, a building tenant shall provide evidence that emissions from truck fleet operations and other sources of NOX emissions can be reduced to below SCAQMD thresholds. Emissions from fleet operations can be reduced in a variety of ways including but not limited to engine retrofitting, engine replacement, use of hybrid or zero-emissions vehicles, and operational restrictions such as further limitation on idling beyond state requirements.	Prior to issuance of business permits	Provide evidence that emissions from truck fleet can be reduced to below SCAQMD NOX thresholds	Community Development Department			
Biological Resources Mitigation Measure							
BIO-1	To avoid impacts to nesting birds, construction activities and construction noise should occur outside the avian nesting season (prior to February 1 or after September 1). If construction and construction noise occurs within the avian nesting season (during the period from February 1 to September 1), all suitable habitats shall be thoroughly surveyed for the presence of nests by a qualified biologist no more than five days before commencement of any vegetation removal. If it is determined that the project site is occupied by nesting birds, Mitigation Measure BIO-2 shall apply. Conversely, if the project site is found to be absent of nesting birds, Mitigation Measure BIO-2 shall not be required.	Within 5 days before vegetation removal	Survey for presence of nests	Community Development Department			
BIO-2	If pre-construction nesting bird surveys result in the location of active nests, no grading or heavy equipment activity shall take place within 300 feet of sensitive bird nests and 500 feet of raptor nests, or as determined by a qualified biologist. Protective measures (e.g., sampling) shall be required to ensure compliance with the MBTA and relevant California Fish and Game Code requirements.	Throughout construction	Establish required buffer area around sensitive bird nests and raptor nests	Community Development Department			
BIO-3	A pre-construction survey shall be conducted in suitable habitat (e.g., dilapidated sheds and trees) for roosting bats within 14 days prior to activities that remove vegetation or suitable structures. If an occupied maternity or colony roost is detected, CDFW shall be contacted about how to proceed. Typically, a bugger exclusion zone would be established around each occupied roost until bat activities have ceased. The size of the buffer would take into account: • Proximity and noise levels of project activities; • Distance and amount of vegetation or screening between the roost and construction activities; • Species-specific needs, if known, such as sensitivity to disturbance.	Within 14 days prior to vegetation or structure removal	Submit pre-construction survey and establish required buffer area	Community Development Department			

CENTER STREET COMMERCE BUILDING Mitigated Negative Declaration: Mitigation Monitoring Reporting Program							
Mitigation Measures		Monitoring Timing/ Frequency	Action Indicating Compliance	Monitoring Agency	Verification of Compliance		
					Initials	Date	Remarks
	Due to restrictions of the California Health Department, direct contact by workers with any bat is not allowed. The qualified bat biologist will be contacted immediately if a bat roost is discovered during project construction.						
Cultural Resources							
CUL-1	In the event of the unanticipated discovery of archaeological resources during earthmoving operations the following mitigation measures are recommended to reduce potentially significant impacts to archaeological resources that are accidentally discovered during implementation of the proposed project to a less than significant level: Prior to the grading permit issuance, the City should require the Applicant to complete a supplemental Phase I Technical Report for cultural resources if project elements are realigned beyond the limits of the cultural resources report completed in 2015. Phase I work efforts would also be necessary if the final site plan impacts any areas that were not examined during the current cultural resource survey and study. The applicant should retain a qualified archaeologist to submit to the City a Supplemental Phase I Cultural Resources Technical Report discussing any supplemental Phase I evaluation, potential impacts, avoidance, and minimization measures that were not addressed in the original Phase I Technical Report. The supplemental Phase I Technical Report shall be submitted to Native American organizations and other appropriate or concerned agencies/stakeholders for their review and comments.	Prior to grading permits	Prepare and submit report	Community Development Department			
CUL-2	Conduct Archaeological Sensitivity Training for Construction Personnel. The Applicant shall retain a qualified professional archaeologist who meets U.S. Secretary of the Interior's Professional Qualifications and Standards, to conduct an Archaeological Sensitivity Training for construction personnel prior to commencement of excavation activities. The training session shall be carried out by a cultural resources professional with expertise in archaeology, who meets the U.S. Secretary of the Interior's Professional Qualifications and Standards. The training session will include a handout and will focus on how to identify archaeological resources that may be encountered during earthmoving activities and the procedures to be followed in such an event, the duties of archaeological monitors, and, the general steps a qualified professional archaeologist would follow in conducting a salvage investigation if one is necessary.	Prior to earthmoving activities	Contractor/Applicant Concurrence	Community Development Department			
CUL-3	Monitor Construction Excavations for Archeological Resources is required at all depths and strata's. The Applicant shall retain a qualified archaeological monitor, who will work under the direction and guidance of a qualified professional archaeologist, who meets the U.S. Secretary of the Interior's Professional Qualifications and Standards. The archaeological monitor shall	Throughout earthmoving activities	Contractor/Applicant Concurrence	Community Development Department			

CENTER STREET COMMERCE BUILDING Mitigated Negative Declaration: Mitigation Monitoring Reporting Program							
Mitigation Measures		Monitoring Timing/ Frequency	Action Indicating Compliance	Monitoring Agency	Verification of Compliance		
					Initials	Date	Remarks
	be present during all construction excavations (e.g., grading, trenching, or clearing/grubbing) into non-fill younger Pleistocene alluvial sediments. Multiple earth-moving construction activities may require multiple archaeological monitors. The archaeological monitoring will keep a daily archaeological monitoring log of all earthmoving activities occurring during the grading phase of the project's construction. The frequency of monitoring shall be based on the rate of excavation and grading activities, proximity to known archaeological resources, the materials being excavated (native versus artificial fill soils), and the depth of excavation, and if found, the abundance and type of archaeological resources encountered. Full-time monitoring can be reduced to part-time inspections if determined adequate by the project archaeologist.						
CUL-4	Cease Ground-Disturbing Activities and Implement Treatment Plan if Archaeological Resources Are Encountered. In the event that archaeological resources are unearthed during ground-disturbing activities, ground-disturbing activities shall be halted or diverted away from the vicinity of the find so that the find can be evaluated. A buffer area of at least 50 feet shall be established around the find where construction activities shall not be allowed to continue until a qualified archaeologist has examined the newly discovered artifact(s) and has evaluated the area of the find. Work shall be allowed to continue outside of the buffer area. All archaeological resources unearthed by project construction activities shall be evaluated by a qualified professional archaeologist, who meets the U.S. Secretary of the Interior's Professional Qualifications and Standards. Should the newly discovered artifacts be determined to be prehistoric, Native American Tribes/Individuals should be contacted and consulted and Native American construction monitoring should be initiated. The Applicant and City shall coordinate with the archaeologist to develop an appropriate treatment plan for the resources. The plan may include implementation of archaeological data recovery excavations to address treatment of the resource along with subsequent laboratory processing and analysis. Collected cultural resources (artifacts) and associated records shall be transferred, including title, to the appropriate curation facility which meets the standards set forth in 36 CRF Part 79 for federal repositories. All sacred sites, should they be encountered within the project area, shall be avoided and preserved as the preferred mitigation, if feasible.	In case of discovery	Contractor/Applicant Concurrence	Community Development Department			
CUL-5	Prepare Report Upon Completion of Monitoring Services. The archaeological monitor, under the direction of a qualified professional archaeologist who meets the U.S. Secretary of the Interior's Professional Qualifications and Standards, shall prepare a final report at the conclusion of archaeological monitoring to include the daily archaeological monitoring log. The report shall be submitted within 60 days of completion of grading activities to the city,	Conclusion of monitoring	Prepare and submit report	Community Development Department			

CENTER STREET COMMERCE BUILDING Mitigated Negative Declaration: Mitigation Monitoring Reporting Program							
Mitigation Measures		Monitoring Timing/ Frequency	Action Indicating Compliance	Monitoring Agency	Verification of Compliance		
					Initials	Date	Remarks
	Applicant, the Eastern Information Center (EIC), and representatives of other appropriate or concerned agencies to signify the satisfactory completion of the project and required mitigation measures. The report shall include a description of resources unearthed, if any, evaluation of the resources with respect to the California Register and CEQA, and treatment of the resources to include curation.						
CUL-6	If paleontological materials are uncovered during grading or other earth moving activities, the contractor shall be required to halt work in the immediate area of the find, and to retain a professional paleontologist to examine the materials to determine whether it is a significant paleontological resource. If this determination is positive, resource shall be left in place, if determined feasible by the project paleontologist. Otherwise, the scientifically consequential information shall be fully recovered by the paleontologist. Work may continue outside of the area of the find; however, no further work shall occur in the immediate location of the find until all information recovery has been completed and a report concerning it filed with the Community and Economic Development Director. The applicant shall bear the cost of implementing this mitigation.	In case of discovery	Contractor/Applicant Concurrence	Community Development Department			
CUL-7	Cease Ground-Disturbing Activities and Notify County Coroner If Human Remains Are Encountered. If human remains are unearthed during implementation of the Proposed Project, the City of Riverside and the Applicant shall comply with State Health and Safety Code Section 7050.5. The City of Riverside and the Applicant shall immediately notify the County Coroner and no further disturbance shall occur until the County Coroner has made the necessary findings as to origin and disposition pursuant to PRC Section 5097.98. If the remains are determined to be of Native American descent, the coroner has 24 hours to notify the Native American Heritage Commission (NAHC). The NAHC shall then identify the person(s) thought to be the Most Likely Descendent (MLD). After the MLD has inspected the remains and the site, they have 48 hours to recommend to the landowner the treatment and/or disposal, with appropriate dignity, the human remains and any associated funerary objects. Upon the reburial of the human remains, the MLD shall file a record of the reburial with the NAHC and the project archaeologist shall file a record of the reburial with the CHRIS-EIC. If the NAHC is unable to identify a MLD, or the MLD identified fails to make a recommendation, or the landowner rejects the recommendation of the MLD and the mediation provided for in Subdivision (k) of Section 5097.94, if invoked, fails to provide measures acceptable to the landowner, the landowner or his or her authorized representative shall inter the human remains and items associated with Native American human remains with appropriate dignity on the property in a location not subject to further and future subsurface disturbance	In case of discovery	Contractor/Applicant Concurrence	Community Development Department			

CENTER STREET COMMERCE BUILDING Mitigated Negative Declaration: Mitigation Monitoring Reporting Program							
Mitigation Measures		Monitoring Timing/ Frequency	Action Indicating Compliance	Monitoring Agency	Verification of Compliance		
					Initials	Date	Remarks
Noise							
N-1	The following measures are required to ensure that project-related short-term construction noise levels are reduced to less-than-significant levels. Prior to issuance of demolition permits, a noise mitigation plan verifying that compliance with the following measures would reduce construction noise to within the allowable levels of 70 dBA for industrial uses and 65 dBA for recreation facilities. Should construction noise exceed allowable levels after implementation of the following measures, the use of sound curtains or other noise barriers shall be required. The noise mitigation plan shall identify the type and location of sound curtains or other noise barriers to be utilized to reduce construction noise to within allowable levels. • Stationary construction noise sources such as generators or pumps must be located at least 100 feet from sensitive land uses, as feasible, or at maximum distance when necessary to complete work near sensitive land uses. This mitigation measure must be implemented throughout construction and may be periodically monitored by the Planning Director, or designee during routine inspections. • Construction staging areas must be located as far from noise sensitive land uses as feasible. This mitigation measure must be implemented throughout construction and may be periodically monitored by the Planning Director or designee during routine inspections. • Throughout construction, the contractor shall ensure all construction equipment is equipped with included noise attenuating devices and are properly maintained. • Idling equipment must be turned off when not in use. • Equipment must be maintained so that vehicles and their loads are secured from rattling and banging.	Prior to issuance of demolition permits	Submit a mitigation plan	Building Department			

7 Appendix

Appendix A Air Quality/GHG Assessment

Center Street Commerce Building

Air Quality & Climate Change Assessment

March 2016 (13432)

Prepared for:

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Center Street Commerce Building

Air Quality & Climate Change Assessment

March 2016

City of Riverside

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1 Executive Summary

Construction-related and operational emissions of criteria pollutants were modeled and analyzed for the proposed Center Street Commerce Building project. The building is located south of Center Street and north of Placentia Lane in the City of Riverside. This report also analyzes the project's consistency with the South Coast Air Quality Management District (SCAQMD) 2012 Air Quality Management Plan (AQMP) for the South Coast Air Basin. Cumulative impacts were analyzed using the methodology provided by the 1993 SCAQMD California Environmental Quality Act (CEQA) Air Quality Handbook. Please note that a Health Risk Assessment (HRA) was prepared for this project under separate cover.

Additionally, this report models and analyzes construction- and operation-related emissions of greenhouse gases from the proposed project. This analysis utilizes guidance provided in the California Air Pollution Control Officers Association (CAPCOA) *CEQA and Climate Change* white paper and the *Quantifying Greenhouse Gas Mitigation Measures* handbook. Modeling of emissions utilizes the California Emissions Estimator Model (CalEEMod) v 2013.2.2.

1.1 Project Description

The project includes the construction of a 308,000-square-foot building on 15.63 acres located south of Center Street and north of Placentia Lane in the City of Riverside, California. The building includes 110,591 square feet of landscaping, the potential for up to 282 parking stalls, and 47 loading docks. There is no tenant for the proposed building, thus, the operational components of the project are speculative at this time. The City of Riverside recommended consideration of a "manufacturing" use as a worst-case, conservative approach to assessing operational impacts. The building has been treated as such herein, consistent with the project traffic impact analysis and health risk assessment. Project design features related to pollutant emissions includes use of low-VOC coatings on interiors and exterior surface of 37 grams per liter or less.

1.2 Air Quality

The project will not result in substantial emissions of nitrogen oxides, volatile organic compounds, or particulate matter and would not exceed the regional growth assumptions used in the Air Quality Management Plan (AQMP). The project will not individually cause or cumulatively contribute to an air quality standard violation. Emissions of carbon monoxide and localized construction emissions will not substantially impact sensitive receptors in vicinity of the project. The project will not emit substantial amounts of diesel particulate matter due to the operation of heavy-duty trucks on the project site. The project will not expose a substantial number of people to odors.

1.3 Climate Change

Greenhouse gas emissions will not exceed the annual 10,000 metric ton carbon dioxide equivalent threshold established by the South Coast Air Quality Management District and will not conflict with state greenhouse gas emissions strategies.

1.4 Mitigation Measures

None required.

2 Introduction

This report models and analyzes construction- and operation-related emissions of criteria air pollutants and greenhouse gas emissions from the proposed Center Street Commerce Building project totaling 308,000 square feet on 15.63 acres located in City of Riverside, California.

The air quality analysis provided herein utilizes guidance provided in the South Coast Air Quality Management District (SCAQMD) the 1993 California Environmental Quality Act (CEQA) Air Quality handbook as amended and supplemented (http://www.aqmd.gov/ceqa/hdbk.html). Please note that analysis of toxic air contaminants (TAC) is provided under separate cover. Pollutant emissions were assessed utilizing the following:

- California Emissions Estimator Model (CalEEMod) v 2013.2.2
- EMFAC2014
- Final Localized Significance Thresholds Methodology

The climate change analysis provided herein utilizes guidance provided in the California Air Pollution Control Officers Association (CAPCOA) *CEQA and Climate Change* white paper and the *Quantifying Greenhouse Gas Mitigation Measures* handbook. Modeling of greenhouse gas emissions utilizes the California Emissions Estimator Model (CalEEMod) v 2013.2.2.

This report has been prepared utilizing project-specific characteristics where available. In those instances, where project-specific data is not available, the analysis has been supplemented by model defaults or other standardized sources of comparable data. In any case where non-project defaults or other data have been used, a "worst-case" scenario was developed to ensure a conservative estimate of emissions.

This report has been prepared for use by the Lead Agency to assess potential project-related air quality impacts in compliance with the State CEQA Statutes and Guidelines, particularly in respect to the air quality issues identified in Appendix G of the State CEQA Guidelines. This report does not make determinations of significance pursuant to CEQA because such determinations are required to be made solely in the purview of the Lead Agency.

This document has been reviewed in accordance with the *Table 7-2, Checklist for an Air Quality Analysis Section* of the SCAQMD Air Quality Handbook for quality control purposes.

This report was prepared by Christopher Brown (Director of Environmental Services), Olivia Chan (Associate Analyst), and Cameron Hile (Assistant Analyst) of MIG, Inc. under contract with Transitions Properties, LP.

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3 Environmental Setting

3.1 Climate

The project is located in the City of Riverside. The City of Riverside and the broader Inland Empire are defined by a semi-arid, Mediterranean climate with mild winters and warm summers. Annual rainfall averages 9.86 inches with the rainy season occurring during the winter.[1] The coolest month of the year is December with an average monthly low of 41.3° Fahrenheit (F). The warmest month is August with an average monthly high of 94.4° F. Riverside is located at an elevation of approximately 700 feet to 1,400 feet above mean sea level (AMSL).[2] The project site is located at an approximate elevation of 830 AMSL. Wind generally blows from the west.[3]

3.2 Regional Air Quality

The proposed project is located within the South Coast Air Basin (Basin).[4] The basin includes Orange County and the non-desert portions of Los Angeles, San Bernardino, and Riverside Counties. The San Gabriel, San Bernardino, and San Jacinto Mountains bound the Basin to the north and east that trap ambient air and pollutants within the Los Angeles and Inland Empire valleys below. The South Coast Air Quality Management District (SCAQMD) manages the Basin. Pursuant to the California Clean Air Act (CCAA), SCAQMD is responsible for bringing air quality within the Basin into conformity with federal and State air quality standards by reducing existing emission levels and ensuring that future emission levels meet applicable air quality standards. SCAQMD works with federal, State, and local agencies to reduce pollutant sources through the development of rules and regulations.

Both California and the federal government have established health-based ambient air quality standards (AAQS) for seven air pollutants (known as *criteria pollutants*). These pollutants include ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), inhalable particulate matter with a diameter of 10 microns or less (PM_{10}), fine particulate matter with a diameter of 2.5 microns or less ($PM_{2.5}$), and lead (Pb). The State has also established AAQS for the additional pollutants of visibility reducing particles, sulfates, hydrogen sulfide, and vinyl chloride. The AAQS are designed to protect the health and welfare of the populace within a reasonable margin of safety. Where the State and federal standards differ, State AAQS are more stringent than federal AAQS. Federal and State standards are shown in Table 1 (Ambient Air Quality Standards). A brief description of each criteria pollutant is provided below.

Ozone. Ozone is a pungent, colorless, and highly reactive gas that forms from the atmospheric reaction of organic gases with nitrogen oxides in the presence of sunlight. Ozone is most commonly associated with smog. Ozone precursors such as reactive organic gases (ROG) and oxides of nitrogen (NO_X) are released from mobile and stationary sources. Ozone is a respiratory irritant and can cause cardiovascular diseases, eye irritation, and impaired cardiopulmonary function. Ozone can also damage building materials and plant leafs.

Carbon Monoxide. Carbon monoxide is primarily emitted from vehicles due to the incomplete combustion of fuels. Carbon monoxide has wide ranging impacts on human health because it combines with hemoglobin in the body and reduces the amount of oxygen transported in the bloodstream. Carbon monoxide can result in reduced tolerance for exercise, impairment of mental function, impairment of fetal development, headaches, nausea, and death at high levels of exposure.

Nitrogen Dioxide. Nitrogen dioxide and other oxides of nitrogen (NO_X) contribute to the formation of smog and results in the brownish haze associated with it. They are primarily emitted from motor vehicle exhaust but can be omitted from other high-temperature stationary sources. Nitrogen oxides can aggravate respiratory illnesses, reduce visibility, impair plant growth, and form acid rain.

Table 1
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		National Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secontary[3,6]	Method[7]
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	-	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.07 ppm (137 µg/m^3)		0.075 ppm (147 µg/m^3)		
Respirable Particulate Matter (PM_{10}) [8]	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		-		
Fine Particulate Matter($PM_{2.5}$) [8]	24 Hour	-	-	35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	12 µg/m^3	15 µg/m^3	
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/ m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	-	Non-Dispersive Infrared Photometry (NDIR) -
	8 Hour	9.0 ppm (10mg/m^3)		9 ppm (10 mg/m^3)	-	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/ m^3)		-	-	
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.03 ppm (57 µg/m^3)	Gas Phase Chemiluminescence	0.053 ppm (100 µg/m^3)	Same as Primary Standard	Gas Phase Chemiluminescence
	1 Hour	0.18 ppm (339 µg/m^3)		100 ppb (188 µg/m^3)	-	
Sulfur Dioxide (SO_2)	1 Hour	0.25 ppm (655 µg/m^3)	Ultraviolet Fluorescence	75 ppb (196 µg/m^3)	-	Ultraviolet Fluorescence; Spectrophotometry (Pararosaniline Method) -
	3 Hour	-		-	0.5 ppm (1,300 µg/m^3)	
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (for certain areas)[10]	-	
	Annual Arithmetic Mean	-		0.030 ppm (for certain areas)[10]	-	
Lead[11,12]	30 Day Average	1.5 µg/m^3	Atomic Absorption	-	-	High Volume Sampler and Atomic Absorption
	Calendar Quarter	-		1.5 µg/m^3 (for certain areas)[12]	Same as Primary Standard	
	Rolling 3-Month Average[10]	-		0.15 µg/m^3		
Visibility Reducing Particles[13]	8 Hour	See footnote 13	Beta Attenuation and Transmittance through Filter Tape	No Federal Standards		
Sulfates	24 Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[11]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

Source: ARB, October 2015
PPM, parts per million
µg/m3, micrograms per cubic meter
Footnotes for this table can be found at http://www.arb.ca.gov/research/aaqs/aaqs2.pdf

Particulate Matter. Particulate matter is a complex mixture of small-suspended particles and liquid droplets in the air. Particulate matter between ten microns and 2.5 microns is known as PM_{10}, also known as coarse or inhalable particulate matter. PM_{10} is emitted from diverse sources including road dust, diesel soot, combustion products, abrasion of tires and brakes, construction operations, and windstorms. PM_{10} can also be formed secondarily in the atmosphere when NO_2 and SO_2 react with ammonia. Particulate matter less than 2.5 microns in size are called $PM_{2.5}$ or fine particulate matter. $PM_{2.5}$ is primarily emitted from point

sources such as power plants, industrial facilities, automobiles, wood-burning fireplaces, and construction sites. Particulate matter is deposited in the lungs and cause permanent lung damage, potentially resulting in lung disease and respiratory symptoms like asthma and bronchitis. Particulate matter has also been linked to cardiovascular problems such as arrhythmia and heart attacks. Particulate matter can also interfere with the body's ability to clear the respiratory tract and can act as a carrier of absorbed toxic substances. Particulate matter causes welfare issues because it scatters light and reduces visibility, causes environmental damage such as increasing the acidity of lakes and streams, and can stain and damage stone, such as that applied in statues and monuments.

Sulfur Dioxide. Sulfur dioxide and other oxides of sulfur (SO_X) are reactive gases emitted from the burning of fossil fuels, primarily from power plants and other industrial facilities.[5] Other less impacting sources include metal extraction activities, locomotives, large ships, and off-road equipment. Human health impacts associated with SO_X emissions include bronchoconstriction and increased asthma symptoms.

Lead. Lead is primarily emitted from metal processing facilities (i.e. secondary lead smelters) and other sources such as manufacturers of batteries, paints, ink, ceramics, and ammunition. Historically, automobiles were the primary sources before lead was phased out of gasoline. The health effects of exposure to lead include gastrointestinal disturbances, anemia, kidney diseases, and potential neuromuscular and neurologic dysfunction. Lead is also classified as a probable human carcinogen.

3.3 Non-Attainment Status

Air pollution levels are measured at monitoring stations located throughout the Basin. Areas that are in nonattainment with respect to criteria pollutants are required to prepare plans and implement measures that will bring the region into attainment. Table 2 (South Coast Air Basin Attainment Status) summarizes the attainment status in the Basin for the criteria pollutants. The Basin is currently in nonattainment status for ozone and inhalable and fine particulate matter.

Pollution problems in the Basin are caused by emissions within the area and the specific meteorology that promotes pollutant concentrations. Emissions sources vary widely from smaller sources such as individual residential water heaters and short-term grading activities to extensive operational sources including long-term operation of electrical power plants and other intense industrial use. Pollutants in the Basin are blown inward from coastal areas by sea breezes from the Pacific Ocean and are prevented from horizontally dispersing due to the surrounding mountains. This is further complicated by atmospheric temperature inversions that create inversion layers. The inversion layer in Southern California refers to the warm layer of air that lies over the cooler air from the Pacific Ocean. This is strongest in the summer and prevents ozone and other pollutants from dispersing upward. A ground-level surface inversion commonly occurs during winter nights and traps carbon monoxide emitted during the morning rush hour.

Table 2
South Coast Air Basin Attainment Status

Pollutant	Federal	State
O_3 (1-hr)	--	Nonattainment
O_3 (8-hr)	Nonattainment	Nonattainment
PM_{10}	Nonattainment	Nonattainment
$PM_{2.5}$	Nonattainment	Nonattainment
CO	Attainment	Attainment
NO_2	Attainment	Nonattainment
SO_2	Attainment	Attainment
Pb	Nonattainment	Nonattainment
VRP	--	Unclassified
SO_4	--	Attainment
H_2S	--	Unclassified
Sources: ARB 2014		

3.4 Local Air Quality

The City of Riverside is located within the South Coast Air Basin (SCAB), which is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). The project site is located in Area 23. Air quality in Area 23 is monitored in Riverside. Air monitoring results for station 4144 over the last three years of available data is summarized in Table 3 (2011-2013 Local Air Quality).[6] [7] [8] Table 4 (2011-2013 Air Quality Standards Exceedance) summarizes the number of days for each monitoring year that air quality standards were exceeded. Based on the 2011-2013 air quality monitoring data, ozone pollution did not exceed the State-8-hour standard or the Federal 8-hour standard in 2013. The Metropolitan Riverside County area experiences ozone pollution and has exceeded the State 8-hr maximum concentration for 70 days in 2012 and 92 days in 2011. This is not necessarily due to local production of ozone, but due to how ozone forms and travels over the Basin. Ozone precursors are emitted primarily in the urban centers of the Basin such as Los Angeles. Ozone does not form immediately but rather forms over the day. This combined with prevailing winds blowing ozone precursors inland cause the highest concentrations of ozone in the Basin to occur in Riverside County and mountain regions. The County also experiences particulate matter pollution, with approximately 19 percent of PM_{10} samples in year 2012 exceeding the State standard.

Table 3
2011-2013 Local Air Quality

Monitoring Station	CO		O_3 (PPM)		NO_2 (PPB)		PM_{10} (µg/m^3)		$PM_{2.5}$ (µg/m^3)		TSP (µg/m^3)		Pb (µg/m^3)		SO_4 (µg/m^3)
	Max 1-hr	Max 8-hr	Max 1-hr	Max 8-hr	Max 1-hr	AAM	Max 24-hr	AAM	Max 24-hr	AAM	Max 24-hr	AAM	Max Month	Max Qtr	Max 24-hr
Metropolitan Riverside County 2															
2013	--	1.6	--	--	57.6	15.8	--	--	53.7	11.28	--	--	0.007	0.006	--
2012	--	1.6	0.126	0.102	61.7	15.5	67	34.5	38.1	13.51	126	65.7	0.008	0.006	7.7
2011	--	1.4	0.128	0.115	63.3	16.6	82	33.7	60.8	13.6	107	62.7	0.007	0.007	5.1

Source: SCAQMD 2011-2013
* specific station data is not provided by SCAQMD; however, all stations are noted as not exceeding the 20 PPM state 1-hour standard
-- pollutant not monitored
PPM, parts per million
µg/m3, micrograms per cubic meter
AAM, annual arithmetic mean

Table 4
2011-2013 Air Quality Standards Exceedance

Monitoring Station	O_3 (PPM)			PM_{10} (µg/m^3)		$PM_{2.5}$ (µg/m^3)
	Fed* 8-hr	State 1-hr	State 8-hr	Fed 24-hr	State 24-hr	Fed^ 24-hr
Metropolitan Riverside County 2						
2013	--	--	--	--	--	1
2012	47	27	70	0	19	7
2011	67	52	92	0	14	4

Source: SCAQMD 2011-2013
-- pollutant not monitored
* 0.075 ppm
^35 µg/m3

3.5 Sensitive Receptors

Some populations are more susceptible to the effects of air pollution than the population at large; these populations are defined as sensitive receptors. Sensitive receptors include children, the elderly, the sick, and the athletic. Land uses associated with sensitive receptors include residences, schools, playgrounds, childcare centers, athletic facilities, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes. Sensitive receptors are located north, east, and south of the project. The Ab Brown Sports Complex Park is located directly south of the project site. Residential uses are located north and west of the project site. Exhibit 2 (Radius Map) identifies existing development in the project vicinity based on recent assessor's parcel data.

3.6 Local Transportation

The proposed project is located south of Center Street and north of Placentia Lane. Both roadways are two-lane, undivided roadways.

3.7 Climate Change

3.7.1 Defining Climate Change

Climate change is the distinct change in measures of climate for a long period of time. Climate change can result from natural processes and from human activities. Natural changes in the climate can be caused by indirect processes such as changes in the Earth's orbit around the Sun or direct changes within the climate system itself (i.e. changes in ocean circulation). Human activities can affect the atmosphere through emissions of gases and changes to the planet's surface. Emissions affect the atmosphere directly by changing its chemical composition, while changes to the land surface indirectly affects the atmosphere by changing the way the Earth absorbs gases from the atmosphere. The term "climate change" is preferred over the term "global warming" because "climate change" conveys the fact that other changes can occur beyond just average increase in temperatures near the Earth's surface. Elements that indicate that climate change is occurring on Earth include:

- Rising of global surface temperatures by 1.3° Fahrenheit (F) over the last 100 years
- Changes in precipitation patterns
- Melting ice in the Arctic
- Melting glaciers throughout the world
- Rising ocean temperatures
- Acidification of oceans
- Range shifts in plant and animal species

Climate change is intimately tied to the Earth's greenhouse effect. The greenhouse effect is a natural occurrence that helps regulate the temperature of the planet. The majority of radiation from the Sun hits the Earth's surface and warms it. The surface in turn radiates heat back towards the atmosphere, known as infrared radiation. Gases and clouds in the atmosphere trap and prevent some of this heat from escaping back into space and re-radiate it in all directions. This process is essential to supporting life on Earth because it keeps the planet approximately 60° F warmer than without it. Emissions from human activities since the beginning of the industrial revolution (approximately 150 years) are adding to the natural greenhouse effect by increasing the gases in the atmosphere that trap heat, thereby contributing to an average increase in the Earth's temperature. Human activities that enhance the greenhouse effect are detailed below.

<u>Greenhouse Gases</u>

The greenhouse effect is caused by a variety of "greenhouse gases". Greenhouse gases (GHGs) occur naturally and from human activities. Greenhouse gases produced by human activities include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Since the year 1750, it is estimated

that the concentrations of carbon dioxide, methane, and nitrous oxide in the atmosphere have increased over 36 percent, 148 percent, and 18 percent, respectively, primarily due to human activity. The primary GHGs are discussed below.[9]

Carbon Dioxide. CO_2 is emitted and removed from the atmosphere naturally. Animal and plant respiration involves the release of carbon dioxide from animals and its absorption by plants in a continuous cycle. The ocean-atmosphere exchange results in the absorption and release of CO_2 at the sea surface. Carbon dioxide is also released from plants during wildfires. Volcanic eruptions release a small amount of CO_2 from the Earth's crust.

Human activities that affect carbon dioxide in the atmosphere include burning of fossil fuels, industrial processes, and product uses. Combustion of fossil fuels is the largest source of carbon dioxide emissions in the United States, accounting for approximately 85 percent of all equivalent emissions. Because of the fossil fuels used, the largest of these sources is electricity generation and transportation. When fossil fuels are burned, the carbon stored in them is released into the atmosphere entirely as CO_2. Emissions from on site industrial activities also emit carbon dioxide such as cement, metal, and chemical production and use of petroleum produced in plastics, solvents, and lubricants.

Methane. Methane (CH_4) is emitted from human activities and natural sources. Natural sources of methane include wetlands, gas hydrates, permafrost, termites, oceans, freshwater bodies, soils, and wildfires. Human activities that cause methane releases include fossil fuel production, animal digestive processes from farms, manure management, and waste management. It is estimated that 50 percent of global methane emissions are human generated. Wetlands are the primary natural producers of methane in the world because the habitat is conducive to bacteria that produce methane during decomposition of organic material. Methane is produced from landfills as solid waste decomposes. Methane is a primary component of natural gas and is emitted during its production, processing, storage, transmission, distribution, and use. Decomposition of organic material in manure stocks or in liquid manure management systems also releases methane. Releases from animal digestive processes are the primary source of human-related methane.

Nitrous Oxide. Anthropogenic (human) sources of nitrous oxide include agricultural soil management, animal manure management, sewage treatment, combustion of fossil fuels, and production of certain acids. N_2O is produced naturally in soil and water, especially in wet, tropical forests. The primary human-related source of N_2O is agricultural soil management due to use of synthetic nitrogen fertilizers and other techniques to boost nitrogen in soils. Combustion of fossil fuels (mobile and stationary) is the second leading source of nitrous oxide, although parts of the world where catalytic converters are used (such as California) have significantly lower levels than those areas that do not.

High Global Warming Potential Gases. High global warming potential (GWP) gases (or fluorinated gases) are entirely manmade and are mainly used in industrial processes. HFCs, PFCs, and SF_6 are high GWP gases. These types of gases are used in aluminum production, semiconductor manufacturing, electric power transmission, magnesium production and processing, and in the production of hydrochlorofuorocarbon-22 (HCFC-22). High GWP gases are also used as substitutes for ozone-depleting gases like chlorofluorocarbons (CFCs) and halons. Use of high GWP gases as substitutes for ozone-depleting substances is the primary use of these gases in the United States.

Water Vapor. It should be noted that water vapor is also a significant GHG in the atmosphere; however, concentration of water vapor in the air is primarily dependent on air temperature and cannot be influenced by humans.

GHGs behave differently in the atmosphere and contribute to climate change in different ways. Some gases have more potential to reflect infrared heat back towards the earth while some persist in the atmosphere longer than others. To equalize the contribution of GHGs to climate change, the Intergovernmental Panel on Climate Change (IPCC) devised a weighted metric to compare all greenhouse gases to carbon dioxide.[10] The weighting depends on the lifetime of the gas in the atmosphere and its radiative efficiency. As an example, over a time horizon of 100-years, emissions of nitrous oxide will contribute to climate change 298 times more than the same amount of emissions of carbon dioxide while emissions of HFC-23 would contribute 14,800 times more than the same amount of carbon dioxide. These differences define a gas's GWP. Table 5 (Global Warming Potential of Greenhouse Gases) identifies the lifetime and GWP of select GHGs. The lifetime of the GHG represents how many years the

GHG will persist in the atmosphere. The GWP of the GHG represents the GHG's relative potential to induce climate change as compared to carbon dioxide.

Carbon Sequestration

Carbon sequestration is the process by which plants absorb CO_2 from the atmosphere and store it in biomass like leaves and grasses. Agricultural lands, forests, and grasslands can all sequester carbon dioxide, or emit it. The key is to determine if the land use is emitting carbon dioxide faster than it is absorbing it. Young, fast-growing trees are particularly good at absorbing more than they release and are known as a *sink*. Agricultural resources often end up being sources of carbon release because of soil management practices. Deforestation contributes to carbon dioxide emissions by removing trees, or carbon sinks, that would otherwise absorb CO_2. Forests are a crucial part of sequestration in some parts of the world, but not much in the United States. Another form of sequestration is geologic sequestration. This is a manmade process that results in the collection and transport of CO_2 from industrial emitters (i.e. power plants) and injecting it into underground reservoirs.

Table 5
Global Warming Potential (GWP) of Greenhouse Gases (GHG)

GHG	Lifetime (yrs)	GWP
Carbon Dioxide	50-200	1
Methane	12	25
Nitrous Oxide	114	298
HFC-23	270	14,800
HFC-134a	14	1,430
HFC-152a	1.4	124
PFC-14	50,000	7,390
PFC-116	10,000	12,200
Sulfur Hexafluoride	3,200	22,800
Source: IPCC 2007		

3.7.2 Climate Change and California

Specific, anticipated impacts to California have been identified in the 2009 California Climate Adaptation Strategy prepared by the California Natural Resources Agency (CNRA) through extensive modeling efforts.[11] General climate changes in California indicate that:

- California is likely to get hotter and drier as climate change occurs with a reduction in winter snow, particularly in the Sierra Nevadas
- Some reduction in precipitation is likely by the middle of the century
- Sea-levels will rise up to an estimated 55 inches
- Extreme events such as heat waves, wildfires, droughts, and floods will increase
- Ecological shifts of habitat and animals are already occurring and will continue to occur

It should be noted that changes are based on the results of several models prepared under different climatic scenarios; therefore, discrepancies occur between the projections. The potential impacts of global climate change in California are detailed below.

Public Health and Welfare

Concerns related to public health and climate change includes higher rates of mortality and morbidity, change in prevalence and spread of disease vectors, decreases in food quality and security, reduced water availability, and increased exposure to pesticides. These concerns are all generally related to increase in ambient outdoor air temperature, particularly in summer.

Higher rates of mortality and morbidity could arise from more frequent heat waves at greater intensities. Health impacts associated with extreme heat events include heat stroke, heat exhaustion, and exacerbation of medical conditions such as

cardiovascular and respiratory diseases, diabetes, nervous system disorders, emphysema, and epilepsy. Climate change would result in degradation of air quality promoting the formation of ground-level pollutants, particularly ozone. Degradation of air quality would increase the severity of health impacts from criteria and other air pollutants discussed in Section 4.3 (Air Quality). Temperature increases and increases in carbon dioxide are also expected to increase plant production of pollens, spores, and fungus. Pollens and spores could induce or aggravate allergic rhinitis, asthma, and obstructive pulmonary diseases.

Precipitation projections suggest that California will become drier over the next century due to reduced precipitation and increased evaporation from higher temperatures. These conditions could result in increased occurrences of drought. Surface water reductions will increase the need to pump groundwater, reducing supplies and increasing the potential for land subsidence.

Precipitation changes are also suspected to impact the Sierra snowpack (see "Water Management" herein). Earlier snowmelts could coincide with the rainy season and could result in failure of the flood control devices in that region. Flooding can cause property damage and loss of life for those affected. Increased wildfires are also of concern as the State "dries" over time. Wildfires can also cause property damage, loss of life, and injuries to citizens and emergency response services.

Sea-level rises would also threaten human health and welfare. Flood risks will be increased in coastal areas due to strengthened storm surges and greater tidal damage that could result in injury and loss of property and life. Gradual rising of the sea will permanently inundate many coastal areas in the state.

Other concerns related to public health are changes in the range, incidence, and spread of infectious, water-borne, and food-borne diseases. Changes in humidity levels, distribution of surface water, and precipitation changes are all likely to shift or increase the preferred range of disease vectors (i.e. mosquitoes). This could expose more people and animals to potential for vector-borne disease.

Biodiversity and Habitat

Changes in temperature will change the livable ranges of plants and animals throughout the state and cause considerable stress on these species. Species will shift their range if appropriate habitat is available and accessible if they cannot adapt to their new climate. If they do not adapt or shift, they face local extirpation or extinction. As the climate changes, community compositions and interactions will be interrupted and changed. These have substantial implications on the ecosystems in the state. Extreme events will lead to tremendous stress and displacement on affected species. This could make it easier for invasive species to enter new areas, due to their ability to more easily adapt. Precipitation changes would alter stream flow patterns and affect fish populations during their life cycle. Sea level rises could impact fragile wetland and other coastal habitat.

Water Management

Although disagreement among scientists on long-term precipitation patterns in the State has occurred, it is generally accepted by scientists that rising temperatures will impact California's water supply due to changes in the Sierra Nevada snowpack. Currently, the State's water infrastructure is designed to both gather and convey water from melting snow and to serve as a flood control device. Snowpack melts gradually through spring warming into early summer, releasing an average of approximately 15 million acre-feet of water. The State's concern related to climate change is that due to rising temperatures, snowpack melt will begin earlier in the spring and will coincide with the rainy season. The combination of precipitation and snowmelt would overwhelm the current system, requiring tradeoffs between water storage and flood protection to be made. Reduction in reserves from the Sierra Nevada snowpack is troublesome for California and particularly for Southern California. Approximately 75-percent of California's available water supply originates in the northern third of the state while 80 percent of demand occurs in the southern two-thirds. There is also concern is that rising temperatures will result in decreasing volumes from the Colorado River basin. Colorado River water is important to Southern California because it supplies water directly to Metropolitan Water District of Southern California. Water from the Colorado River is also used to recharge groundwater basins in the Coachella Valley.

Agriculture

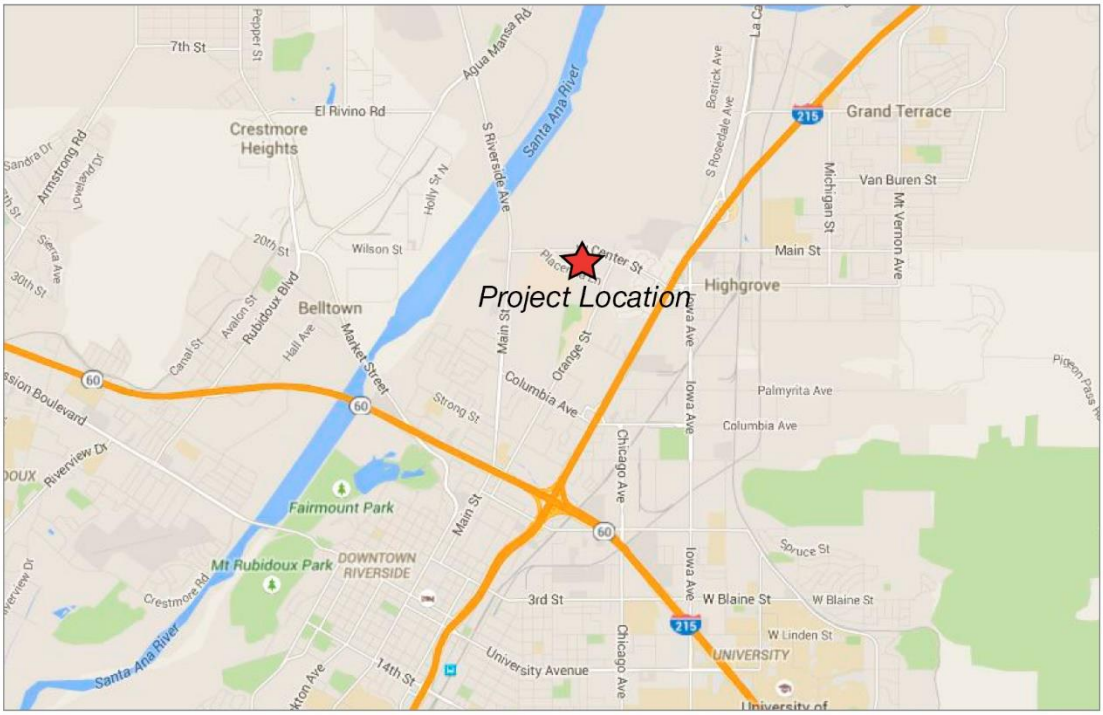
California is the most agriculturally productive state in the US resulting in more than 37 billion dollars in revenue in 2008. California is the nation's leading producer of nearly 80 crops and livestock commodities, supplying more than half of the nation's fruit and vegetables and over 90 percent of the nation's production of almonds, apricots, raisin grapes, olives, pistachios, and walnuts. Production of crops is not limited to the Central Valley but also occurs in Southern California. Strawberries and grapes are grown in San Bernardino and Riverside Counties. Orange County and San Diego County also contribute to strawberry production. Cherries are also grown in Los Angeles and Riverside County. Anticipated impacts to agricultural resources are mixed when compared to the potentially increased temperatures, reduced chill hours, and changes in precipitation associated with climate change. For example, wheat, cotton, maize, sunflower, and rice are anticipated to show declining yields as temperatures rise. Conversely, grapes and almonds would benefit from warming temperatures. Anticipated increases in the number and severity in heat waves would have a negative impact on livestock where heat stress would make livestock more vulnerable to disease, infection and mortality. The projected drying trend and changes in precipitation are a threat to agricultural production in California. Reduced water reliability and changes in weather patterns would impact irrigated farmlands and reduce food security. Furthermore, a drying trend would increase wildfire risk. Overall, agriculture in California is anticipated to suffer due to climate change impacts.

Forestry

Increases in wildfires will substantially impact California's forest resources that are prime targets for wildfires. This can increase public safety risks, property damage, emergency response costs, watershed quality, and habitat fragmentation. Climate change is also predicted to affect the behavior or plant species including seed production, seedling establishment, growth, and vigor due to rising temperatures. Precipitation changes will affect forests due to longer dry periods and moisture deficits and drought conditions that limit seedling and sapling growth. Prolonged drought also weakens trees, making them more susceptible to disease and pest invasion. Furthermore, as trees die due to disease and pest invasion (i.e. the Bark Beetle invasion of the San Bernardino Forest), wildfires can spread more rapidly.

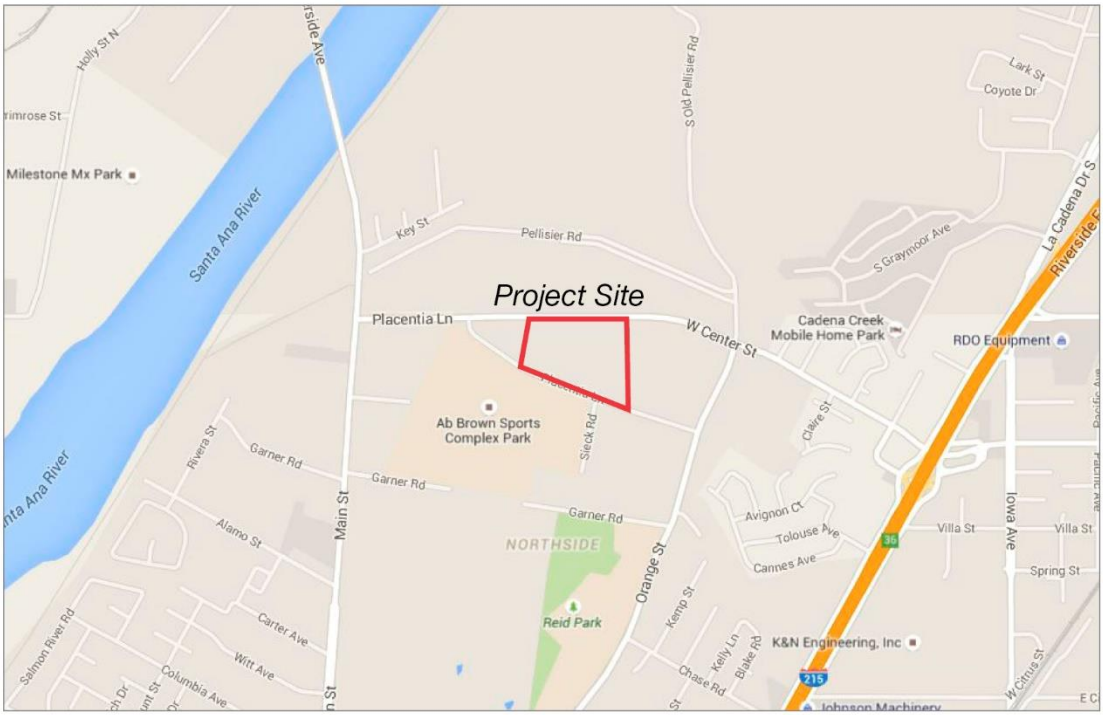
Transportation and Energy Infrastructure

Higher temperatures will require increased cooling, raising energy production demand. Higher temperatures also decrease the efficiency of distributing electricity and could lead to more power outages during peak demand. Climate changes would impact the effectiveness of California's transportation infrastructure as extreme weather events damage, destroy, and impair roadways and railways throughout the state causing governmental costs to increase as well as impacts to human life as accidents increase. Other infrastructure costs and potential impacts to life would increase due to the need to upgrade levees and other flood control devices throughout the state. Infrastructure improvement costs related to climate change adaptation are estimated in the tens of billions of dollars.



Source: Google Maps, 2015

Regional



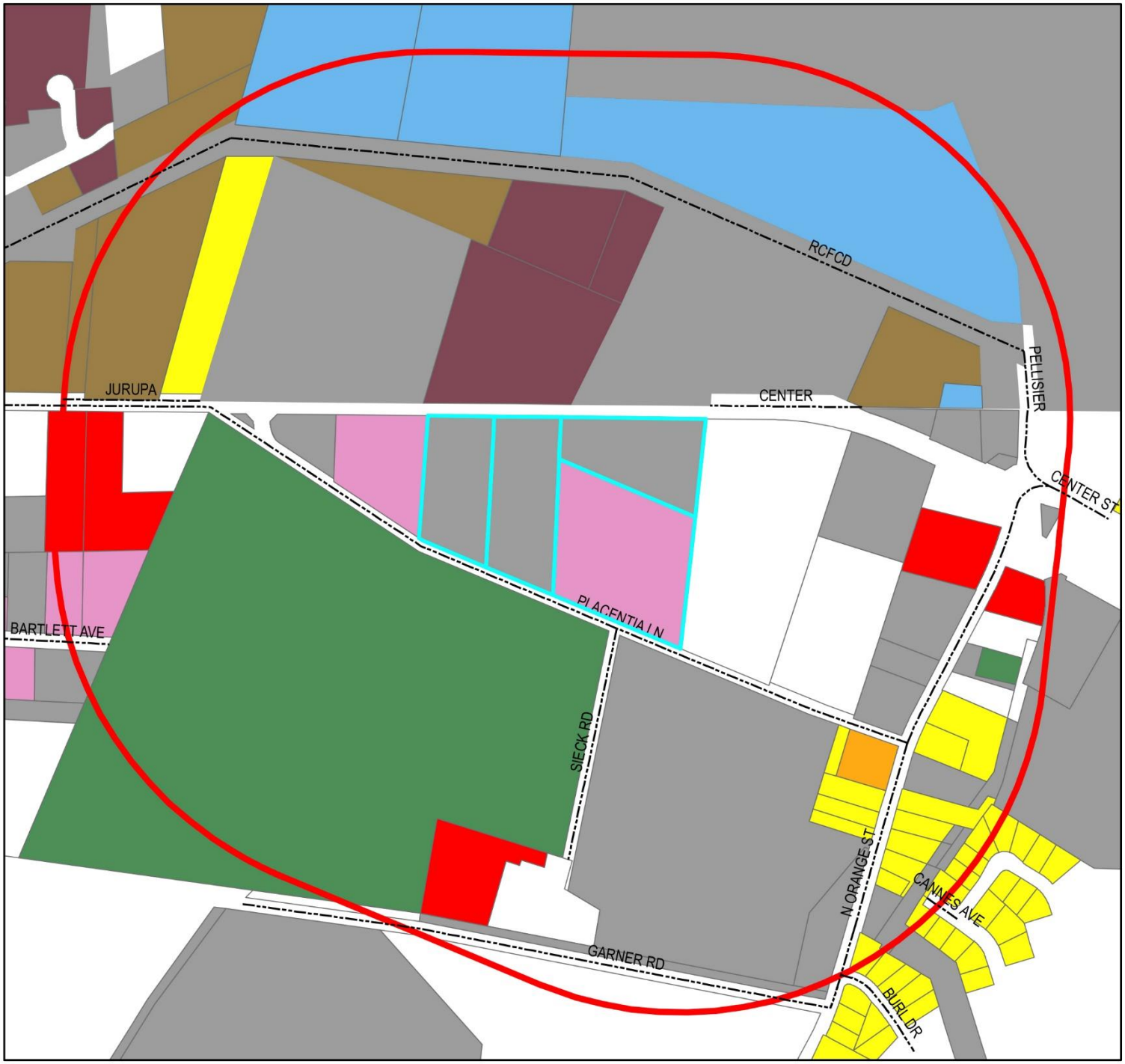
Source: Google Maps, 2015

Vicinity

Not to Scale

Exhibit 1 Regional and Vicinity Map

Center Street Commerce Building Project
6550 Center Street, Riverside, California



Legend

- Project Site
- 0.25 Mile Radius

0 0.03 0.06 0.12 0.18 0.24 Miles

N

Land Uses

- Unknown
- Vacant
- Commercial
- Storage
- Light Industrial
- Residential Use in Commercial Zone
- Single Family Residential
- Multi-Family Residential
- Miscellaneous Structures
- Electric Power Transmissions

Exhibit 2 Radius Map

Center Street Commerce Building Project

6550 Center Street, Riverside, California

4 Regulatory Framework

The following summarizes Federal, State, and local regulations related to air quality, pollution control, greenhouse gas emissions.

4.1 Clean Air Act

The Federal Clean Air Act (CAA) defines the Environmental Protection Agency's (EPA) responsibilities for protecting and improving the United States air quality and ozone layer.[12] Key components of the CAA include reducing ambient concentrations of air pollutants that cause health and aesthetic problems, reducing emission of toxic air pollutants, and stopping production and use of chemicals that destroy the ozone.

Federal clean air laws require areas with unhealthy levels of ozone, inhalable particulate matter, Carbon monoxide, nitrogen dioxide, and sulfur dioxide to develop State Implementation Plans (SIPs); comprehensive documents that identify how an area will attain NAAQS. Deadlines for attainment were established in the 1990 amendments to the CAA based on the severity of an area's air pollution problem. Failure to meet air quality deadlines can result in sanctions against the State or the EPA taking over enforcement of the CAA in the affected area. SIPs are a compilation of new and previously submitted plans, programs, district rules, and State and Federal regulations. The SCAQMD implements the required provisions of an applicable SIP through its AQMP. Currently, SCAQMD implements the 8-hr Ozone and $PM_{2.5}$ SIP in the 2007 AQMP and the PM_{10} SIP in the 2003 AQMP. The $PM_{2.5}$ SIP is currently being revised by SCAQMD in response to partial disapproval by the EPA. The 2012 Lead SIP for the Los Angeles County portion of SCAB was adopted by the SCAQMD Board on May 4, 2012 and approved by ARB on May 24, 2012 and forwarded to the EPA for approval as a revision to the California SIP.

4.2 California Clean Air Act

The California Clean Air Act (CCAA) of 1988 was enacted to develop plans and strategies for attaining California Ambient Air Quality Standards (CAAQS). The California Air Resources Board (ARB), which is part of the California Environmental Protection Agency (Cal-EPA), develops statewide air quality regulations, including industry-specific limits on criteria, toxic, and nuisance pollutants. The CCAA is more stringent than Federal law in a number of ways including revised standards for PM^{10} and ozone and State for visibility reducing particles, sulfates, hydrogen sulfide, and vinyl chloride.

4.3 2012 Air Quality Management Plan

The purpose of an Air Quality Management Plan (AQMP) is to bring an air basin into compliance with federal and state air quality standards and is a multi-tiered document that builds on previously adopted AQMPs.[13] The 2003 AQMP was adopted in August 2003 and demonstrated O_3 and PM_{10} for the Basin. It also provides the maintenance plans for CO and NO_2, which the Basin has been in attainment for since 1997 and 1992, respectively. The 2007 AQMP for the Basin was approved by the SCAQMD Board of Directors in June 2007. The 2007 AQMP builds on the 2003 AQMP and is designed to address the federal 8-hour ozone and $PM_{2.5}$ air quality standards. The AQMP identifies short- and long-term control measures designed to reduce stationary, area, and mobile source emissions, organized into four primary components:

1. District Stationary and Mobile Source Control Measures
2. Air Resources Board (ARB) State Strategy
3. Supplement to ARB Control Strategy
4. SCAG Regional Transportation Strategy and Control Measures

The 2012 AQMP was adopted by the SCAQMD board on December 7, 2012. The 2012 AQMP incorporated the latest scientific and technological information and planning assumptions, including the 2012 Regional Transportation Plan/Sustainable Communities Strategy and updated emission inventory methodologies for various source categories. The 2012 AQMP includes the new and changing federal requirements, implementation of new technology measures, and the continued development of economically sound, flexible compliance approaches. The SCAQMD is currently initiating an early development process for preparation of the 2016 AQMP.

4.4 SCAQMD Rule Book

In order to control air pollution in the Basin, SCAQMD adopts rules that establish permissible air pollutant emissions and governs a variety of businesses, processes, operations, and products to implement the AQMP and the various federal and state air quality requirements. SCAQMD does not adopt rules for mobile sources; those are established by ARB or the United States Environmental Protection Agency (EPA). Rules that will be applicable during construction of the proposed project include Rule 403 (Fugitive Dust) and Rule 1113 (Architectural Coatings). Rule 403 prohibits emissions of fugitive dust from any grading activity, storage pile, or other disturbed surface area if it crosses the project property line or if emissions caused by vehicle movement cause substantial impairment of visibility (defined as exceeding 20 percent opacity in the air). Rule 403 requires the implementation of Best Available Control Measures (BACM) and includes additional provisions for projects disturbing more than five acres and those disturbing more than fifty acres. Rule 1113 establishes maximum concentrations of VOCs in paints and other applications and establishes the thresholds for low-VOC coatings.

4.5 Executive Order S-3-05

Executive Order S-3-05 was issued by California Governor Arnold Schwarzenegger and established targets for the reduction of greenhouse gas emission at the milestone years of 2010, 2020, and 2050. Statewide GHG emissions must be reduced to 1990 levels by year 2020 and by 80 percent beyond that by year 2050. The Order requires the Secretary of the California Environmental Protection Agency (CalEPA) to coordinate with other State departments to identify strategies and reduction programs to meet the identified targets. A Climate Action Team (CAT) was created and is headed by the Secretary of CalEPA who reports on the progress of the reduction strategies. The latest CAT *Biennial Report to the Governor and Legislature* was completed in April 2010.[14] CAT also works in 11 subgroups to support development and implementation of the Scoping Plan (see "California Global Warming Solutions Act" herein).

4.6 Executive Order B-30-15

Executive Order B-30-15 was issued by California Governor Edmund G. Brown Jr. on April 29, 2015 to establish a California greenhouse gas reduction target of 40 percent below 1990 levels by 2030. This is meant as an interim target to ensure the state meets its ultimate goal of 80 percent below 1990 levels by 2050.

4.7 California Global Warming Solutions Act

The California State Legislature adopted the California Global Warming Solutions Act in 2006 (AB32). AB32 establishes the caps on statewide greenhouse gas emissions proclaimed in Executive Order S-3-05 and establishes a regulatory timeline to meet the reduction targets. The timeline is as follows:

January 1, 2009	Adopt Scoping Plan
January 1, 2010	Early action measures take effect
January 1, 2011	Adopt GHG reduction measures
January 1, 2012	Reduction measures take effect
December 31, 2020	Deadline for 2020 reduction target

As part of AB32, CARB had to determine what 1990 GHG emissions levels were and projected a business-as-usual (BAU) estimate for 2020 to determine the amount of GHG emissions that will need to be reduced. BAU is a term used to define emissions levels without considering reductions from future or existing programs or technologies. 1990 emissions are estimated at 427 million metric tons of carbon dioxide equivalent (MMTCO2E) while 2020 emissions (after accounting for the economic downturn in 2008 and implementation of Pavley 1 vehicle emissions reductions and the State Renewable Portfolio Standard identified in Air Resources Board Scoping Plan below) are estimated at 507 MMTCO2E; therefore, California GHG emissions

must be reduced 80 MMTCO2E (507 – 427 = 80) by 2020, a reduction of approximately 16 percent below BAU. Emissions are required to be reduced an additional 80 percent below 1990 levels by 2050.

4.8 Sustainable Communities and Climate Protection Act

In January 2009, California Senate Bill (SB) 375 went into effect known as the Sustainable Communities and Climate Protection Act.[15] The objective of SB375 is to better integrate regional planning of transportation, land use, and housing to reduce sprawl and ultimately reduce greenhouse gas emissions and other air pollutants. SB375 tasks ARB to set greenhouse gas reduction targets for each of California's 18 regional Metropolitan Planning Organizations (MPOs). Each MPO is required to prepare a Sustainable Communities Strategy (SCS) as part of their Regional Transportation Plan (RTP). The SCS is a growth strategy in combination with transportation policies that will show how the MPO will meet its GHG reduction target. If the SCS cannot meet the reduction goal, an Alternative Planning Strategy (APS) may be adopted that meets the goal through alternative development, infrastructure, and transportation measures or policies.

In the Southern California Association of Governments (SCAG) region (in which the proposed project is located), sub-regions can also elect to prepare their own SCS or APS. In August 2010, ARB released the proposed GHG reduction targets for the MPOs to be adopted in September 2010. The proposed reduction targets for the SCAG region were 8-percent by year 2020 and 13-percent by year 2035. The 8-percent year 2020 target was adopted in September 2010 and tentatively adopted the year 2035 until February 2011 to provide additional time for SCAG, ARB, and other stakeholders to account for additional resources (such as state transportation funds) needed to achieve the proposed targets. In February 2011, the SCAG President affirmed the year 2035 reduction target and SCAG Staff updated ARB on additional funding opportunities.

4.9 Air Resources Board Scoping Plan

The ARB Scoping Plan is the comprehensive plan to reach the GHG reduction targets stipulated in AB32. The key elements of the plan are to expand and strengthen energy efficiency programs, achieve a statewide renewable energy mix of 33 percent, develop a cap-and-trade program with other partners in the Western Climate Initiative (includes seven states in the United States and four territories in Canada), establish transportation-related targets, and establish fees.[16] The Scoping Plan measures are identified in Table 6 (Scoping Plan Measures). Note that the current early discrete actions are incorporated into these measures. ARB estimates that implementation of these measures will reduce GHG emissions in the state by 174 MMTCO2E by 2020; therefore, implementation of the Scoping Plan will meet the 2020 reduction target. In a report prepared on September 23, 2010, ARB indicates that 40 percent of the reduction measures identified in the Scoping Plan have been secured.[17] The cap-and-trade program began on January 1, 2012 after ARB completes a series of activities that deal with the registration process, compliance cycle, and tracking system; however, covered entities will not have an emissions obligation until 2013.[18] ARB is currently working on the low carbon fuel standard where public hearings and workshops are currently being conducted. In August 2011, the Scoping plan was reapproved by the ARB Board with the program's environmental documentation.

The ARB has prepared the First Update to the Scoping Plan (Update) with a draft made available for public review on February 10, 2014. The Update to the Scoping Plan builds upon the 2008 Scoping Plan with new strategies and recommendations. The Update identifies opportunities to leverage existing and new funds to further drive GHG emission reductions through strategic planning and targeted low carbon investments. The Update defines ARB's climate change priorities for the next five years and sets the groundwork to reach post-2020 goals set forth in Executive Orders S-3-05 and B-16-2012. The Update highlights California's progress toward meeting the 2020 GHG emission reduction goals defined in the 2008 Scoping Plan. It also evaluates how to align the State's long-term GHG reduction strategies with other State policy priorities for water, waste, natural resources, clean energy, transportation, and land use. A draft Environmental Analysis (EA) was released for a 45-day public review period on March 14, 2014. After considering public comments and Board direction, the final First Update, summary of comments received on the draft EA, and ARB's responses to those comments were released on May 15, 2014. The First Update to the Scoping Plan was approved by the Board on May 22, 2014.

4.10 Water Conservation in Landscaping Act

Section 65591 of the Government Code requires all local jurisdictions to adopt a water efficient landscape ordinance. The ordinance is to address water conservation through appropriate use and grouping of plants based on environmental conditions, water budgeting to maximize irrigation efficiency, storm water retention, and automatic irrigation systems. Failure to adopt a water efficiency ordinance requires a local jurisdiction to enforce the provisions of the State's model water efficiency ordinance. In 2009, the Department of Water Resources (DWR) updated the Model Water Efficient Landscape Ordinance pursuant to amendments to the 1991 Act. These amendments and the new model ordinance went into effect on January 1, 2010. The amended Act is applicable to any new commercial, multi-family, industrial or tract home project containing 2,500 square feet (SF) or more of landscaping. Individual landscape projects of 5,000 SF or more on single-family properties will also be subject to the Act. All landscape plans are required to include calculations verifying conformance with the maximum applied water allowance and must be prepared and stamped by a licensed landscape architect.

4.11 California Green Building Standards

New California Green Building Standards Code (CALGREEN) went into effect on January 1, 2011.[19] The purpose of the new addition to the California Building Code (CBC) is to improve public health, safety, and general welfare by enhancing the design and construction of buildings using concepts to reduce negative impacts or produce positive impacts on the environment. The CALGREEN regulations cover planning and design, energy efficiency, water efficiency and conservation, material conservation and resources efficiency, and environmental quality. Many of the new regulations have the effect of reducing greenhouse gas emissions from the operation of new buildings. Table 7 (CALGREEN Requirements) summarizes the previous requirements of the CBC and the new requirements of CALGREEN that went into effect in January 2011. Minor technical revisions and additional requirements went into effect in July 2012. The Code was further updated in 2013, effective January 1, 2014 through 2016.

Table 6
Scoping Plan Measures

Measure	Description
T-1	Pavely I and II – Light Duty Vehicle Greenhouse Gas Standards
T-2	Low Carbon Fuel Standard
T-3	Regional Transportation-Related Greenhouse Gas Targets
T-4	Vehicle Efficiency Measures
T-5	Ship Electrification at Ports
T-6	Good Movement Efficiency Measures
T-7	Heavy-Duty Vehicle Aerodynamic Efficiency
T-8	Medium and Heavy-Duty Vehicle Hybridization
T-9	High Speed Rail
E-1	Energy Efficiency (Electricity Demand Reduction)
E-2	Increase Combined Heat and Power Use
E-3	Renewable Portfolio Standard
E-4	Million Solar Roofs
CR-1	Energy Efficiency (Natural Gas Demand Reduction)
CR-2	Solar Water Heating
GB-1	Green Buildings
W-1	Water Use Efficiency
W-2	Water Recycling
W-3	Water System Energy Efficiency
W-4	Reuse Urban Runoff
W-5	Increase Renewable Energy Production
W-6	Public Good Charge (Water)
I-1	Energy Efficiency for Large Industrial Sources
I-2	Oil and Gas Extraction GHG Reductions
I-3	Oil and Gas Transmission Leak Reductions
I-4	Refinery Flare Recovery Process Improvements
I-5	Removal of Methane Exemption from Existing Refinery Regulations
RW-1	Landfill Methane Control
RW-2	Increase Landfill Methane Capture Efficiency
RW-3	Recycling and Zero Waste
F-1	Sustainable Forest Target
H-1	Motor Vehicle Air Conditioning
H-2	Non-Utilities and Non-Semiconductor SF_6 Limits
H-3	Semiconductor Manufacturing PFC Reductions
H-4	Consumer Products High GWP Limits
H-5	High GWP Mobile Source Reductions
H-6	High GWP Stationary Source Reductions
H-7	High GWP Mitigation Fees
A-1	Large Dairy Methane Capture

Table 7
CALGREEN Requirements

Item		Requirements	
		Previous	CALGREEN
4.1	Stormwater Management	Stormwater management required on projects > than one acre	All projects subject to stormwater management.
	Surface Drainage	Surface water must flow away from building	Drainage patterns must be analyzed
4.2	Energy Efficiency	California Energy Code	Minimum energy efficiency to be established by California Energy Commissions
4.3	Indoor Water Use	HCD maximum flush rates; CEC water use standards for appliances and fixtures	Indoor water use must decrease by at least 20 percent (prescriptive or performance based)
	Multiple Showerheads	Not covered	Multiple showerheads cannot exceed combined flow of the code
	Irrigation Controllers	Not covered	Irrigation controllers must be weather or soil moisture based controllers
4.4	Joint Protection	Plumbing and Mechanical Codes	All openings must be sealed with materials that rodents cannot penetrate
	Construction Waste	Local Ordinances	Establishes minimum 50 percent recycling and waste management plan
	Operation	Plumbing Code for gray water systems	Educational materials and manuals must be provided to building occupants and owners to ensure proper equipment operation
4.5	Fireplaces	Local Ordinances	Gas fireplaces must be direct-vent sealed-combustion type; Wood stoves and pellet stoves must meet USEPA Phase II emissions limits
	Mechanical Equipment	Not covered	All ventilation equipment must be sealed from contamination during construction
	VOCs	Local Ordinances	Establishes statewide limits on VOC emissions from adhesives, paints, sealants, and other coatings
	Capillary Break	No prescriptive method of compliance	Establishes minimum requirements for vapor barriers in slab on grade foundations
	Moisture Content	Current mill moisture levels for wall and floor beams is 15-20 percent	Moisture content must be verified prior to enclosure of wall or floor beams
	Whole House Fans	Not covered	Requires insulated louvers and closing mechanism when fan is off
	Bath Exhaust Fans	Not covered	Requires Energy Star compliance and humidistat control
	HVAC Design	Minimal requirements for heat loss, heat gain, and duct systems	Entire system must be designed in respects to the local climate
7	Installer Qualifications	HVAC installers need not be trained	HVAC installers must be trained or certified
	Inspectors	Training only required for structural materials	All inspectors must be trained
Source: HCD 2010			

5 Project Description

The project includes the construction of a 308,000-square-foot building on 15.63 acres located south of Center Street and north of Placentia Lane in the City of Riverside, California. The building includes 110,591 square feet of landscaping, the potential for up to 282 parking stalls, and 47 loading docks. There is no tenant for the proposed building, thus, the operational components of the project are speculative at this time. The City of Riverside recommended consideration of a “manufacturing” use as a worst-case, conservative approach to assessing operational impacts. The building has been treated as such herein, consistent with the project traffic impact analysis and health risk assessment. Project design features related to pollutant emissions includes use of low-VOC coatings on interiors and exterior surface of 37 grams per liter or less.

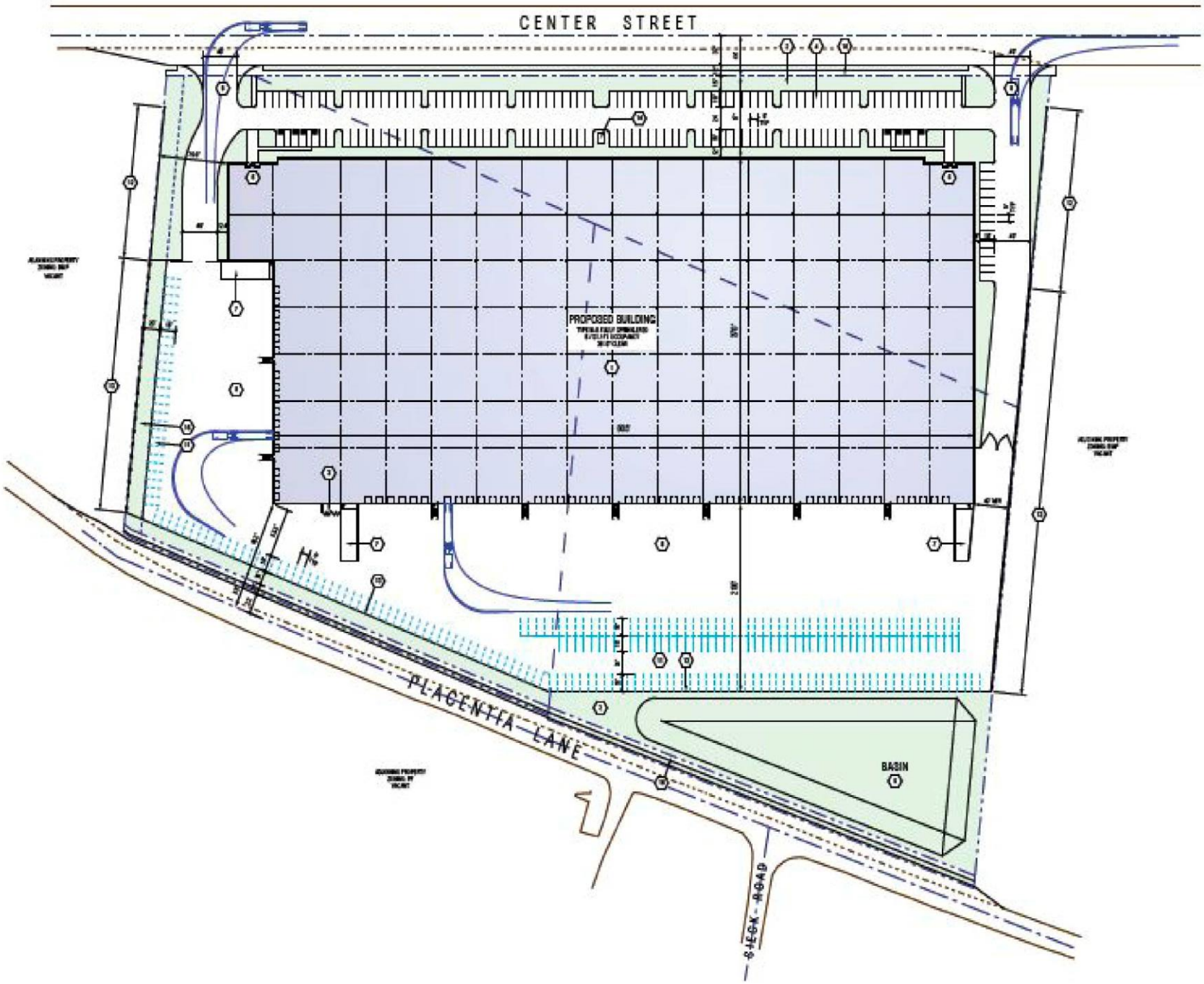


Exhibit 3 Site Plan

6 Air Quality Impact Analysis

The impact analysis contained herein was prepared utilizing guidance provided in the 1993 SCAQMD California Environmental Quality Act (CEQA) Air Quality Handbook. The thresholds identified in Appendix G of the State CEQA Guidelines, as implemented by the City of Riverside, have been utilized to determine the significance of potential impacts.

6.1 Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines and the local implementation procedures of the City of Riverside, the project could result in potentially significant impacts related to air quality if it:

A. Conflicts with or obstructs implementation of the applicable air quality plan.
B. Violates any air quality standard or contributes substantially to an existing or projected air quality violation.
C. Results in a cumulatively considerable net increase of any criteria pollutant that the region is non-attainment under an applicable Federal or State ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors).
D. Exposes sensitive receptors to substantial pollutant concentrations.
E. Create objectionable odors affecting a substantial number of people.

To determine if maximum daily criteria pollutant emissions from construction and operation of the proposed project are significant, the SCAQMD significance thresholds are used. These thresholds are identified in Table 8 (SCAQMD Maximum Daily Emissions Thresholds (lbs/day)).

Table 8
SCAQMD Maximum Daily Emissions Thresholds (lbs/days)

Pollutant	Construction	Operation
NO_X	100	55
VOC/ROG	75	55
PM_{10}	150	150
$PM_{2.5}$	55	55
SO_X	150	150
CO	550	550
Lead	3	3
Source: SCAQMD 2015		

6.2 AQMP Consistency

A significant impact could occur if the proposed project conflicts with or obstructs the implementation of South Coast Air Basin 2012 Air Quality Management Plan. Conflicts and obstructions that hinder implementation of the AQMP can delay efforts to meet attainment deadlines for criteria pollutants and maintaining existing compliance with applicable air quality standards. Pursuant to the methodology provided in Chapter 12 of the 1993 SCAQMD CEQA Air Quality Handbook, consistency with the South Coast Air Basin 2012 Air Quality Management Plan (AQMP) is affirmed when a project (1) does not increase the frequency or severity of an air quality standards violation or cause a new violation and (2) is consistent with the growth assumptions in the AQMP.[20] Consistency review is presented below:

1. The project would result in short-term construction and long-term pollutant emissions that are less than the CEQA significance emissions thresholds established by the SCAQMD, as demonstrated in Section 6.3 et seq of this report; therefore, the project could not result in an increase in the frequency or severity of any air quality standards violation and will not cause a new air quality standard violation.

2. The CEQA Air Quality Handbook indicates that consistency with AQMP growth assumptions must be analyzed for new or amended General Plan elements, Specific Plans, and *significant projects*. *Significant projects* include airports, electrical generating facilities, petroleum and gas refineries, designation of oil drilling districts, water ports, solid waste disposal sites, and off-shore drilling facilities; therefore, the proposed project is not defined as *significant*. This project does not include a General Plan Amendment and therefore does not require analysis consistency with the AQMP.

Based on the consistency analysis presented above, the proposed project will not conflict with the AQMP.

6.3 Pollutant Emissions

6.3.1 Construction

Short-term criteria pollutant emissions will occur during demolition, site grading, building construction, paving, and architectural coating activities. Emissions will occur from use of equipment, worker, vendor, and hauling trips, and disturbance of onsite soils (fugitive dust). To determine if construction of the proposed project could result in a significant air quality impact, the California Emissions Estimator Model (CalEEMod) has been utilized. CalEEMod defaults have generally been used for construction inputs in the model (see Appendix A for input values) and the results are summarized in Table 9 (Daily Construction Emissions). The methodology for calculating emissions is included in the CalEEMod *User Guide,* freely available at http://www.caleemod.com.

It was estimated that 7,416 square feet of existing, on-site structures will be demolished to accommodate the project. Construction of the building is anticipated to start in early 2017. CalEEMod defaults for construction schedule phase duration and equipment needs were utilized. Based on the results of the model, maximum daily emissions from the construction of the project will not result in excessive emissions of criteria pollutants when compared to SCAQMD daily thresholds. Volatile organic compounds (identified as reactive organic gases) associated with interior and exterior coating activities typically would exceed the threshold for a building of this size; however, the model includes use of a maximum 37 grams per liter (g/l) VOC content for interior and exterior coatings, as identified as a design feature in the project description. Use of low-VOC coatings during construction activities will result in daily, construction-related VOC emissions of 72 lbs/day, less than the threshold established by SCAQMD.

Table 9
Daily Construction Emissions (lbs/day)

Source	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Summer						
2017	6	70	48	<1	21	13
2018	72	33	43	<1	6	3
Winter						
2017	6	70	48	<1	21	13
2018	72	33	44	<1	6	3
Threshold	75	100	550	150	150	55
Substantial?	No	No	No	No	No	No

6.3.2 Operational and Area Sources

Long-term criteria air pollutant emissions will result from the operation of the proposed project. Long-term emissions are categorized as area source emissions, energy demand emissions, and operational emissions. Operational emissions will result from automobile and other vehicle sources associated with daily trips to and from the project. Area source emissions are the combination of many small emission sources that include use of outdoor landscape maintenance equipment, use of consumer products such as cleaning products, and periodic repainting of the proposed project. Off-site energy demand emissions result from use of electricity and natural gas and were also modeled using default information encoded into the emissions estimation software. Emissions from area sources were estimated using CalEEMod defaults.

The California Emissions Estimator Model (CalEEMod) was utilized to estimate mobile source emissions. Trip generation (3.82 daily trips per 1,000 SF) is based on the trip generation rates provided in the Institute of Transportation Engineers *Trip Generation Manual* (9th Edition).[21] Passenger vehicles will consist of 74.4 percent of the fleet mix, light-duty trucks will consist of 8.4 percent of the fleet mix, medium-heavy duty trucks will consist of 4.6 percent of the truck trips, and heavy-heavy duty truck trips consist of 16.6 percent of the fleet mix. CalEEMod defaults were used for trip length, prime and no-primer trip percentages, and trip purpose in light of the proposed project being assessed as manufacturing us. It was assumed that the facility will use five forklifts and one generator set during operations. Assuming an opening year of 2019, the results of the CalEEMod model for summer and winter operation of the project are summarized in Table 10 (Daily Operational Emissions). Based on the results of the model, impacts associated with operation of the Project will not exceed the threshold established by SCAQMD.

Table 10
Daily Operational Emissions (lbs/day)

Source	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Summer						
Area Sources	16	<1	<1	0	<1	<1
Energy Demand	<1	3	2	<1	<1	<1
Mobile Sources	4	31	55	<1	12	3
Equipment	1	11	10	<1	2	1
Summer Total	*22*	*45*	*67*	*<1*	*13*	*4*
Winter						
Area Sources	16	<1	<1	0	<1	<1
Energy Demand	<1	3	2	<1	<1	<1
Mobile Sources	4	33	58	<1	12	3
Equipment	1	11	10	<1	2	1
Winter Total	*22*	*46*	*70*	*<1*	*13*	*4*
Maximum Daily	**22**	**46**	**70**	**<1**	**13**	**4**
Threshold	55	55	550	150	150	55
Substantial?	No	No	No	No	No	No

6.4 Sensitive Receptors

6.4.1 Localized Significance Thresholds

As part of SCAQMD's environmental justice program, attention has recently been focusing more on the localized effects of air quality. Although the region may be in attainment for a particular criteria pollutant, localized emissions from construction activities coupled with ambient pollutant levels can cause localized increases in criteria pollutant that exceed national and/or State air quality standards.

Construction

Construction-related criteria pollutant emissions and potentially significant localized impacts were evaluated pursuant to the SCAQMD Final Localized Significance Thresholds Methodology. This methodology provides screening tables for one through five-acre project scenarios, depending on the amount of site disturbance during a day using the Fact Sheet for equipment usage in CalEEMod.[22] Daily oxides of nitrogen (NO_X), carbon monoxide (CO), and particulate matter (PM_{10} and $PM_{2.5}$) emissions will occur during construction of the project, grading of the project site, and paving of facility parking lots and drive aisles. Table 11 (Localized Significance Threshold Analysis) summarize on- and off-site emissions as compared to the local thresholds established for Source Receptor Area (SRA) 23 (Metropolitan Riverside County). Based on the use of four tractors and three dozers during site preparation activities, a 3.5-acre threshold will be used (using linear regression). A 50-meter receptor distance was used to reflect the proximity of residential uses to the sports fields south of the project site. Note that particulate matter

emissions account for daily watering required by SCAQMD Rule 403 (three times per day for a 55 percent reduction in fugitive dust). Emissions from construction activities will not exceed any localized threshold.

Table 11
Localized Significance Threshold Analysis for Construction (lbs/day)

Phase	CO	NO_X	PM^{10}	$PM^{2.5}$
Demolition	34	43	2	2
Site Preparation	40	52	10	6
Grading	47	70	7	4
Building Construction	18	26	2	2
Paving	14	17	1	1
Architectural Coating	2	2	<1	<1
Threshold	**1,708**	**248**	**28**	**8**
Potentially Substantial?	**No**	**No**	**No**	**No**

Operational

Operation-related LSTs become of concern when there are substantial on-site stationary and on-site mobile sources that could impact surrounding receptors. The proposed building does not have a tenant and is speculatively considered for manufacturing uses, thus the type and extent of on-site stationary or on-site mobile sources is unknown. In order to generally assess operational impacts related to LSTs, the ARB *Characterization of the Off-Road Equipment Population* for the state was used to estimate the amount of on-site equipment that may be used as part of future operations in the proposed building.[23] The "residual" category of businesses was queried that includes manufacturing uses as a result survey inquires throughout the state and extrapolated to the state and county levels. According to this report, manufacturing uses in Riverside County average 0.0313 pieces of equipment per employee. An estimate of 106 employees was calculated for the proposed project based on the NAIOP[1] logistics trends analysis for warehouses.[24] This results in an estimated 4 pieces of equipment that when compared to the countywide ratios of equipment populations and the type of non-specialized equipment associated with manufacturing uses, results in an estimate of three forklifts and one generator set. It's estimated that the facility will operate the generator at least once a month for an hour for maintenance purposes. According to Southern California Edison, the Ontario District (that includes parts of western Riverside), the area experiences an average of 100 minutes of "sustained" outage a year (from 2010 through 2015 for outages over five minutes in duration) with an annual frequency of 0.81 "sustained" outages per year. Using a composite of this information, the generator set was assumed to operated twelve times a year at 167 hours per operation. Use of these equipment coupled with on-site idling of trucks (subject to the state's 5-minute maximum idling restrictions) comprises the on-site emissions estimates for comparison to operation LSTs and summarized in Table 12 (Localized Significance Thresholds for Operations). The project will not result in local emissions in excessive of applicable screening thresholds.

Table 12
Localized Significance Thresholds for Operations)

Source	CO	NO_X	PM^{10}	$PM^{2.5}$
Landscaping	0.04	0.00	0.00	0.00
Natural Gas	2.31	2.75	0.21	0.21
On-Site Idling	0.23	1.78	0.00	0.00
On-Site Equipment	1.36	5.07	0.38	0.35
Total	*3.94*	*9.6*	*0.59*	*0.56*
Threshold	**1,708**	**248**	**28**	**8**
Potentially Substantial?	**No**	**No**	**No**	**No**

[1] Note that this is not an acronym.

6.4.2 Carbon Monoxide Hotspots

A carbon monoxide (CO) hotspot is an area of localized CO pollution that is caused by severe vehicle congestion on major roadways, typically near intersections. CO hotspots have the potential to violate State and Federal CO standards at intersections, even if the broader Basin is in attainment for Federal and State levels. The California Department of Transportation Project-Level Carbon Monoxide Protocol (Protocol) screening procedures have been utilized to determine if the proposed project could potentially result in a CO hotspot. Based on the recommendations of the Protocol, a screening analysis should be performed for the proposed project to determine if a detailed analysis will be required. The California Department of Transportation notes that because of the age of the assumptions used in the screening procedures and the obsolete nature of the modeling tools utilized to develop the screening procedures in the Protocol, they are no longer accepted. More recent screening procedures based on more current methodologies have been developed. The Sacramento Metropolitan Air Quality Management District (SMAQMD) developed a screening threshold in 2011, which states that any project involving an intersection experiencing 31,600 vehicles per hour or more will require detailed analysis. In addition, the Bay Area Air Quality Management District developed a screening threshold in 2010, which states that any project involving an intersection experiencing 44,000 vehicles per hour would require detailed analysis. The proposed project's operations would not involve an intersection experiencing this level of traffic; therefore, the proposed project passes the screening analysis and impacts are deemed less than significant. Based on the local analysis procedures, the proposed project would not result in a CO hotspot.

6.5 Odors

According to the CEQA Air Quality Handbook, land uses associated with odor complaints include agricultural operations, wastewater treatment plants, landfills, and certain industrial operations (such as manufacturing uses that produce chemicals, paper, etc.). The proposed project is sited within an existing industrial and commercial area. The proposed project does not produce odors that would affect a substantial number of people considering that the proposed project will not result in heavy manufacturing activities.

6.6 Cumulative Impacts

6.6.1 Cumulative Construction Impacts

Cumulative short-term, construction-related emissions from the project will not contribute considerably to any potential cumulative air quality impact because short-term project emissions will be less than significant and other concurrent construction projects in the region will be required to implement standard air quality regulations and mitigation pursuant to State CEQA requirements, just as this project has.

6.6.2 Cumulative Operational Impacts

The SCAQMD CEQA Air Quality Handbook identifies methodologies for analyzing long-term cumulative air quality impacts for criteria pollutants for which the Basin is nonattainment. These methodologies identify three performance standards that can be used to determine if long-term emissions will result in cumulative impacts. Essentially, these methodologies assess growth associated with a land use project and are evaluated for consistency with regional projections. These methodologies are outdated, and are no longer recommended by SCAQMD. SCAQMD allows a project to be analyzed using the projection method such that consistency with the AQMP will indicate that a project will not contribute considerably to cumulative air quality impacts. As discussed in AQMP Consistency, the proposed project is consistent with growth assumptions in the AQMP, and would not exceed any applicable SCAQMD thresholds for short- and long-term emissions. Therefore, the proposed project will not contribute to any potential cumulative air quality impacts.

7 Climate Change Impact Analysis

7.1 Thresholds of Significance

The proposed project could result in potentially significant impacts related to greenhouse gas emissions and global climate change if it would:

A. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.

B. Conflict with an applicable plan, policy, or regulation adopted for the purposes of reducing the emissions of greenhouse gases.

A numerical threshold for determining the significance of greenhouse gas emissions in the South Coast Air Basin (Basin) has not been established by the South Coast Air Quality Management District (SCAQMD). As an interim threshold based on guidance provided in the CAPCOA *CEQA and Climate Change* handbook, a non-zero threshold approach based on Approach 2 of the handbook has been used. Threshold 2.5 (Unit-Based Thresholds Based on Market Capture) establishes a numerical threshold based on capture of approximately 90 percent of emissions from future development. The latest threshold developed by SCAQMD using this method is 10,000 metric tons carbon dioxide equivalent (MTCO2E) per year for industrial projects.[25] This threshold is based on the review of 711 CEQA projects. This threshold will be utilized herein to determine if emissions of greenhouse gases from this project will be significant.

7.2 Direct and Indirect Emissions

The proposed project will include activities that emit greenhouse gas emissions over the short- and long-term. While one project could not be said to cause global climate change, individual projects contribute cumulatively to greenhouse gas emissions that result in climate change. A greenhouse gas emissions inventory was prepared for the project using under BAU conditions and is analyzed below.

7.2.1 Short-Term Emissions

The project will result in short-term greenhouse gas emissions from construction and installation activities associated with construction of the proposed project. Greenhouse gas emissions will be released by equipment used for grading, paving, and building construction activities. GHG emissions will also result from worker and vendor trips to and from the project site. Table 12 (Construction Greenhouse Gas Emissions) summarizes the estimated yearly emissions from construction activities. Carbon dioxide emissions from construction equipment and worker/vendor trips were estimated utilizing the California Emissions Estimator Model (CalEEMod) version 2013.2.2 (see Appendix A). Construction activities are short-term and cease to emit greenhouse gases upon completion, unlike operational emissions that are continuous year after year until operation of the use ceases. Because of this difference, SCAQMD recommends in its draft threshold to amortize construction emissions over a 30-year operational lifetime. This normalizes construction emissions so that they can be grouped with operational emissions in order to generate a precise project GHG inventory. Amortized construction emissions are included in Table 12.

Table 13
Construction Greenhouse Gas Emissions

Construction Year	GHG Emissions (MT/YR)			
	CO_2	CH_4	N_2O	TOTAL*
2017	910	<1	0	912
2018	391	<1	0	392
*AMORTIZED TOTAL^*	*43*	*<1*	*0*	*43*

* MTCO2E
Note: Slight variations may occur due to rounding and variations in modeling software
^ Amortized over 30-years

7.2.2 Long-Term Emissions

Warehousing and distribution activities will result in continuous greenhouse gas emissions from mobile and operational sources. Mobile sources including vehicle trips to and from the project site will result primarily in emissions of CO_2 with minor emissions of CH_4 and N_2O. The most significant GHG emission from natural gas usage will be methane. Electricity usage by the project and indirect usage of electricity for water and wastewater conveyance will result primarily in emissions of carbon dioxide. Disposal of solid waste will result in emissions of methane from the decomposition of waste at landfills coupled with CO_2 emission from the handling and transport of solid waste. These sources combine to define the long-term greenhouse gas emissions for the build-out of the proposed project.

To determine long-term emissions, CalEEMod was used. The methodology utilized for each emissions source is based on the CAPCOA *Quantifying Greenhouse Gas Mitigation Measures* handbook.[26] A summary of the project's net long-term greenhouse gas emissions is included in Table 13 (Operational Greenhouse Gas Emissions). Emissions are presented as metric tons of carbon dioxide equivalent (MTCO2E) meaning that all emissions have been weighted based on their Global Warming Potential (GWP) (a metric ton is equal to 1.102 US short tons).

Table 14
Operational Greenhouse Gas Emissions

Source	GHG Emissions (MT/YR)			
	CO_2	CH_4	N_2O	TOTAL*
Area	<1	<1	0	<1
Energy	2,741	<1	<1	2,748
Mobile	2,087	<1	0	2,088
Solid Waste	39	2	0	87
Water/Wastewater	600	1	<1	632
TOTAL	*5,467*	*6*	*<1*	*5,555*

* MTCO2E/YR
Note: Slight variations may occur due to rounding

Mobile sources are based on annual vehicle miles traveled (VMT) based on daily trip generation identified in the trip generation memorandum.[27] Trip lengths have been adjusted based on a study of metropolitan commercial and freight travel conducted by the National Cooperative Highway Research Program. According to observed data collected in the field for the Southern California Association of Governments (SCAG) region, trip lengths for similar uses are estimated at 5.92 miles for light-duty trucks, 13.06 for medium-duty trucks, and 22.40 for heavy-duty trucks. Total vehicle miles were calculated using the average daily trips for each vehicle class and divided by total daily truck trips to get to an average truck distance of 17.41 miles. Natural gas usage and electricity usage are based on default demand figures utilized in CalEEMod. Solid waste generation is also based on CalEEMod defaults.

CalEEMod does not include outdoor landscape irrigation demand defaults for this type of project. Estimated irrigation needs for landscaping was calculated at 2,591,811 gallons per year. Landscape irrigation requirements were calculated using the California Department of Water Resources (DWR) *Water Budget* Workbook that calculates the Maximum Applied Water Allowance (MAWA) for landscaping based on the requirements of the state water conservation in landscaping act.[28] This reflects the maximum allowable amount of water that is permitted to be used annually after consideration of effective precipitation (25 percent of annual rainfall). MAWA is calculated using the following equation:

$$MAWA = (ET_O - Eppt) * 0.62 * [(0.70 * LA) + (0.30 * SLA)]$$

Where:

MAWA = Maximum Applied Water Allowance (gallons per year)
ET_O = Reference Evapotranspiration for Locale (inches per year)
Eppt = Effective Precipitation (inches per year)
LA = Landscape Area (square feet)
SLA = Special Landscape Area (square feet)

Indoor water demand and wastewater discharges are based on CalEEMod defaults.

7.2.3 Greenhouse Gas Emissions Inventory

Table 14 (Greenhouse Gas Emissions Inventory) summarizes the yearly estimated greenhouse gas emissions from construction and operational sources. The total yearly carbon dioxide equivalent emissions for the proposed project are estimated at 5,598 MTCO2E. This does not exceed the SCAQMD threshold of 10,000 MTCO2E per year.

Table 15
Greenhouse Gas Emissions Inventory

Source	GHG Emissions (MT/YR)			
	CO_2	CH_4	N_2O	TOTAL*
Construction	*43*	*<1*	*0*	*43*
Operation	*5,467*	*6*	*<1*	*5,555*
			Total	**5,598**

* MTCO2E/YR
Note: Slight variations may occur due to rounding
^ Construction impacts amortized over 30-years

7.3 Greenhouse Gas Emissions Reduction Planning

ARB's *Scoping Plan* identifies strategies to reduce California's greenhouse gas emissions in support of AB32. Many of the strategies identified in the Scoping Plan are not applicable at the project level, such as long-term technological improvements to reduce emissions from vehicles. Some measures are applicable and supported by the project, such as energy efficiency. Finally, while some measures are not directly applicable, the project would not conflict with their implementation. Reduction measures are grouped into 18 action categories, as follows:

1. **California Cap-and-Trade Program Linked to Western Climate Initiative Partner Jurisdictions.** Implement a broad-based California cap-and-trade program to provide a firm limit on emissions. Link the California cap–and-trade program with other Western Climate Initiative Partner programs to create a regional market system to achieve greater environmental and economic benefits for California.[29] Ensure California's program meets all applicable AB 32 requirements for market-based mechanisms.
2. **California Light-Duty Vehicle Greenhouse Gas Standards.** Implement adopted Pavley standards and planned second phase of the program. Align zero-emission vehicle, alternative and renewable fuel and vehicle technology programs with long-term climate change goals.
3. **Energy Efficiency.** Maximize energy efficiency building and appliance standards, and pursue additional efficiency efforts including new technologies, and new policy and implementation mechanisms. Pursue comparable investment in energy efficiency from all retail providers of electricity in California (including both investor-owned and publicly owned utilities).
4. **Renewables Portfolio Standards.** Achieve 33 percent renewable energy mix statewide.
5. **Low Carbon Fuel Standard.** Develop and adopt the Low Carbon Fuel Standard.

6. **Regional Transportation-Related Greenhouse Gas Targets.** Develop regional greenhouse gas emissions reduction targets for passenger vehicles.
7. **Vehicle Efficiency Measures.** Implement light-duty vehicle efficiency measures.
8. **Goods Movement.** Implement adopted regulations for the use of shore power for ships at berth. Improve efficiency in goods movement activities.
9. **Million Solar Roofs Program.** Install 3,000 megawatts of solar-electric capacity under California's existing solar programs.
10. **Medium- and Heavy-Duty Vehicles.** Adopt medium- (MD) and heavy-duty (HD) vehicle efficiencies. Aerodynamic efficiency measures for HD trucks pulling trailers 53-feet or longer that include improvements in trailer aerodynamics and use of rolling resistance tires were adopted in 2008 and went into effect in 2010.[30] Future, yet to be determined improvements, includes hybridization of MD and HD trucks.
11. **Industrial Emissions.** Require assessment of large industrial sources to determine whether individual sources within a facility can cost-effectively reduce greenhouse gas emissions and provide other pollution reduction co-benefits. Reduce greenhouse gas emissions from fugitive emissions from oil and gas extraction and gas transmission. Adopt and implement regulations to control fugitive methane emissions and reduce flaring at refineries.
12. **High Speed Rail.** Support implementation of a high speed rail system.
13. **Green Building Strategy.** Expand the use of green building practices to reduce the carbon footprint of California's new and existing inventory of buildings.
14. **High Global Warming Potential Gases.** Adopt measures to reduce high warming global potential gases.
15. **Recycling and Waste.** Reduce methane emissions at landfills. Increase waste diversion, composting and other beneficial uses of organic materials, and mandate commercial recycling. Move toward zero-waste.
16. **Sustainable Forests.** Preserve forest sequestration and encourage the use of forest biomass for sustainable energy generation. The 2020 target for carbon sequestration is 5 million MTCO2E/YR.
17. **Water.** Continue efficiency programs and use cleaner energy sources to move and treat water.
18. **Agriculture.** In the near-term, encourage investment in manure digesters and at the five-year Scoping Plan update determine if the program should be made mandatory by 2020.

Table 15 (Scoping Plan Consistency Summary) summarizes the project's consistency with the State Scoping Plan. As summarized, the project will not conflict with any of the provisions of the Scoping Plan and in fact supports seven of the action categories through water conservation and recycling.

Table 16
Scoping Plan Consistency Summary

Action	Supporting Measures	Consistency
Cap-and-Trade Program	--	**Not Applicable.** These programs involve capping emissions from electricity generation, industrial facilities, and broad scoped fuels. Caps do not directly affect this type of project.
Light-Duty Vehicle Standards	T-1	**Not Applicable.** This is a statewide measure establishing vehicle emissions standards.
Energy Efficiency	E-1	**Consistent.** The project will not conflict with any State mandated energy efficiency requirements.
	E-2	
	CR-1	
	CR-2	
Renewables Portfolio Standard	E-3	**Not Applicable.** Establishes the minimum statewide renewable energy mix.
Low Carbon Fuel Standard	T-2	**Not Applicable.** Establishes reduced carbon intensity of transportation fuels.
Regional Transportation-Related Greenhouse Gas Targets	T-3	**Consistent.** The project includes features that reduce greenhouse gas emissions, assisting the region in meeting emissions targets.
Vehicle Efficiency Measures	T-4	**Not Applicable.** Identifies measures such as minimum tire-fuel efficiency, lower friction oil, and reduction in air conditioning use.
Goods Movement	T-5	**Not applicable.** Identifies measures to improve goods movement efficiencies such as advanced combustion strategies, friction reduction, waste heat recovery, and electrification of accessories. While these measures are yet to be implemented and will be voluntary, the proposed project would not interfere with their implementation.
	T-6	
Million Solar Roofs Program	E-4	**Not Applicable.** Sets goal for use of solar systems throughout the state. While the project currently does not include solar energy generation, the buildings could support solar panels in the future.
Medium- & Heavy-Duty Vehicles	T-7	**Consistent.** MD and HD trucks and trailers working from the proposed project will be subject to aerodynamic and hybridization requirements as established by ARB; no feature of the project would interfere with implementation of these requirements and programs.
	T-8	
Industrial Emissions	I-1	**Not Applicable.** These measures are applicable to large industrial facilities (> 500,000 MTCOE2/YR) and other intensive uses such as refineries.
	I-2	
	I-3	

Action	Supporting Measures	Consistency
	I-4	
	I-5	
High Speed Rail	T-9	**Not Applicable.** Supports increased mobility choice.
Green Building Strategy	GB-1	**Consistent.** The project includes water and solid waste efficiencies consistent with 2011 CALGREEN requirements.
High Global Warming Potential Gases	H-1	**Not Applicable.** The proposed project is not a substantial source of high GWP emissions and will comply with any future changes in air conditioning, fire protection suppressant, and other requirements.
	H-2	
	H-3	
	H-4	
	H-5	
	H-6	
	H-7	
Recycling and Waste	RW-1	**Consistent.** The project is subject to a minimum 50 percent recycling standard and will recycle a minimum of 50 percent of construction debris per State and City requirements.
	RW-2	
	RW-3	
Sustainable Forests	F-1	**Consistent.** The project will increase carbon sequestration by maintaining on-site trees in project landscaping.
Water	W-1	**Consistent.** The project includes use of recycled water and low-flow fixtures.
	W-2	
	W-3	
	W-4	
	W-5	
	W-6	
Agriculture	A-1	**Not Applicable.** The project is not an agricultural use.

8 Mitigation Measures

None required.

9 References

1 Western Regional Climate Center. Period of Record Monthly Climate Summary: Riverside Citrus Exp St, California (047473). http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca7473 [October 2014]
2 United States Geological Survey. Riverside Quadrangle 15 Minute Series. 1942
3 Western Regional Climate Center. Prevailing Wind Directions 1992-2002. http://www.wrcc.dri.edu/htmlfiles/westwinddir.html [October 2014]
4 South Coast Air Quality Management District. CEQA Air Quality Handbook. 1993
5 United States Environmental Protection Agency. Sulfur Dioxide. http://www.epa.gov/airquality/sulfurdioxide/ [August 2014]
6 South Coast Air Quality Management District. Air Quality. 2009
7 South Coast Air Quality Management District. Air Quality. 2010
8 South Coast Air Quality Management District. Air Quality. 2011
9 United States Environmental Protection Agency. Greenhouse Gas Emissions. www.epa.gov/climatechange/emissions/index.html [September 2014]
10 Intergovernmental Panel on Climate Change. Changes in Atmospheric Constituents and in Radiative Forcing (Working Group I). Fourth Assessment Report. 2007
11 California Natural Resources Agency. 2009 California Climate Adaptation Strategy.
12 United States Environmental Protection Agency. Clean Air Act. www.epa.gov/air/caa/ [August 2014]
13 South Coast Air Quality Management District. Air Quality Management Plan. 2012
14 California Climate Action Team. Biennial Report. April 2010
15 Southern California Association of Governments. Senate Bill 375 Fact Sheet. http://scag.ca.gov/Documents/SCAG_SB375_Factsheet.pdf [September 2014]
16 California Air Resources Board. Climate Change Scoping Plan. December 2008
17 California Air Resources Board. AB 32 Climate Change, Scoping Plan Progress Report. September 2010
18 California Air Resources Board. Cap-and-Trade. http://www.arb.ca.gov/cc/capandtrade/capandtrade.htm [September 14, 2011]
19 California Building Standards Commission. California Code of Regulations Title 24. California Green Building Standards Code. 2010
20 South Coast Air Quality Management District. CEQA Air Quality Handbook. 1993
21 Institute of Transportation Engineers. Trip Generation Manual. 9th ed. September 2012
22 South Coast Air Quality Management District. Fact Sheet for Applying CalEEMod to Localized Significance Thresholds.
23 ERG & California Air Resources Board. Characterization of the Off-Road Equipment population. December 2008
24 NAIOP. Logistics Trends and Specific Industries that Will Drive Warehouses and Distribution Growth and Demand for Space. March 20120
25 South Coast Air Quality Management District. CEQA Significance Thresholds Working Group. Meeting # 15, Main Presentation. September 28, 2010
26 California Air Pollution Control Officers Association. Quantifying Greenhouse Gas Emissions. August 2010
27 Kunzman Associates, Inc. Trip Generation Memorandum. October 3, 2014
28 California Department of Water Resources. Water Budget Workbook. www.water.ca.gov/wateruseefficiency/docs/WaterBudget.xls [October 2014]
29 California Air Resources Board. California GHG Emissions – Forecast (2002-2020). October 2010
30 California Air Resources Board. Scoping Plan Measures Implementation Timeline. October 2010

Appendix A
CalEEMod Results

Center Street Warehouse

South Coast Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Manufacturing	308.00	1000sqft	7.07	308,000.00	0
Other Non-Asphalt Surfaces	101.59	1000sqft	2.33	101,590.00	0
Parking Lot	6.23	Acre	6.23	271,378.80	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2019
Utility Company	Riverside Public Utilities				
CO2 Intensity (lb/MWhr)	1325.65	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Demolition -

Architectural Coating - Use of Low-VOC Paints

Vehicle Trips -

Vechicle Emission Factors - Fleet Mix Per Traffic Study

Vechicle Emission Factors - Fleet Mix Per Traffic Study

Vechicle Emission Factors - Fleet Mix Per SCAQMD Recommendation

Water And Wastewater - Include Landscape Water Demand using State Water Budget Worksheet

Solid Waste - 50% Mandatory Recycling Requirement

Construction Off-road Equipment Mitigation - Water 3 times daily

Operational Off-Road Equipment - Assume Forklifts and Generator Set Equipment per ERG/ARB 2005 Survey
Generators Operatiosn Based on SCE Outage Data

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	250.00	37.00
tblArchitecturalCoating	EF_Nonresidential_Interior	250.00	37.00
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	12.00
tblOperationalOffRoadEquipment	OperFuelType	Diesel	CNG
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	1.67
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	3.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblProjectCharacteristics	OperationalYear	2014	2019
tblSolidWaste	SolidWasteGenerationRate	381.92	190.96
tblVehicleEF	HHD	0.03	0.13
tblVehicleEF	HHD	0.03	0.13
tblVehicleEF	LDA	0.51	0.74
tblVehicleEF	LDA	0.51	0.74
tblVehicleEF	LDA	0.51	0.74
tblVehicleEF	LDT1	0.06	0.00
tblVehicleEF	LDT1	0.06	0.00
tblVehicleEF	LDT1	0.06	0.00
tblVehicleEF	LDT2	0.18	0.00
tblVehicleEF	LDT2	0.18	0.00
tblVehicleEF	LDT2	0.18	0.00

tblVehicleEF	LHD1	0.04	0.08
tblVehicleEF	LHD1	0.04	0.08
tblVehicleEF	LHD1	0.04	0.09
tblVehicleEF	LHD2	6.6660e-003	0.00
tblVehicleEF	LHD2	6.6660e-003	0.00
tblVehicleEF	LHD2	6.6660e-003	0.00
tblVehicleEF	MCY	4.3770e-003	0.00
tblVehicleEF	MCY	4.3770e-003	0.00
tblVehicleEF	MCY	4.3770e-003	0.00
tblVehicleEF	MDV	0.14	0.00
tblVehicleEF	MDV	0.14	0.00
tblVehicleEF	MDV	0.14	0.00
tblVehicleEF	MH	2.1280e-003	0.00
tblVehicleEF	MH	2.1280e-003	0.00
tblVehicleEF	MHD	0.02	0.05
tblVehicleEF	MHD	0.02	0.05
tblVehicleEF	MHD	0.02	0.05
tblVehicleEF	OBUS	1.9400e-003	0.00
tblVehicleEF	OBUS	1.9400e-003	0.00
tblVehicleEF	OBUS	1.9400e-003	0.00
tblVehicleEF	SBUS	5.8200e-004	0.00
tblVehicleEF	SBUS	5.8200e-004	0.00
tblVehicleEF	UBUS	2.4960e-003	0.00
tblVehicleEF	UBUS	2.4960e-003	0.00
tblVehicleEF	UBUS	2.4960e-003	0.00
tblWater	AerobicPercent	87.46	97.79

tblWater	AerobicPercent	87.46	97.79
tblWater	AerobicPercent	87.46	97.79
tblWater	OutdoorWaterUseRate	0.00	2,591,811.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2017	0.6684	5.5485	5.9757	0.0108	0.6154	0.2811	0.8965	0.2099	0.2623	0.4722	0.0000	909.8475	909.8475	0.1175	0.0000	912.3146
2018	0.9682	1.8518	2.3844	4.8300e-003	0.1993	0.0936	0.2928	0.0536	0.0877	0.1413	0.0000	391.0767	391.0767	0.0435	0.0000	391.9891
Total	**1.6366**	**7.4003**	**8.3601**	**0.0157**	**0.8146**	**0.3747**	**1.1893**	**0.2635**	**0.3500**	**0.6135**	**0.0000**	**1,300.9241**	**1,300.9241**	**0.1609**	**0.0000**	**1,304.3037**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2017	0.6684	5.5485	5.9757	0.0108	0.4809	0.2811	0.7620	0.1467	0.2623	0.4090	0.0000	909.8470	909.8470	0.1175	0.0000	912.3142
2018	0.9682	1.8518	2.3844	4.8300e-003	0.1993	0.0936	0.2928	0.0536	0.0877	0.1413	0.0000	391.0765	391.0765	0.0435	0.0000	391.9889
Total	**1.6366**	**7.4003**	**8.3601**	**0.0157**	**0.6802**	**0.3747**	**1.0548**	**0.2003**	**0.3500**	**0.5503**	**0.0000**	**1,300.9235**	**1,300.9235**	**0.1609**	**0.0000**	**1,304.3030**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**

Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**16.51**	**0.00**	**11.31**	**23.98**	**0.00**	**10.30**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.9452	5.0000e-005	5.3600e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0103	0.0103	3.0000e-005	0.0000	0.0109
Energy	0.0553	0.5026	0.4222	3.0200e-003		0.0382	0.0382		0.0382	0.0382	0.0000	2,740.9403	2,740.9403	0.0585	0.0200	2,748.3561
Mobile					1.3370	0.0000	1.3370	0.3282	0.0000	0.3282	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Offroad	0.0629	0.5618	0.4704	6.0000e-004		0.0434	0.0434		0.0400	0.0400	0.0000	54.2454	54.2454	0.0170	0.0000	54.6021
Waste						0.0000	0.0000		0.0000	0.0000	38.7632	0.0000	38.7632	2.2908	0.0000	86.8707
Water						0.0000	0.0000		0.0000	0.0000	25.1995	574.9771	600.1766	0.6713	0.0574	632.0694
Total	**3.0635**	**1.0644**	**0.8980**	**3.6200e-003**	**1.3370**	**0.0817**	**1.4186**	**0.3282**	**0.0782**	**0.4064**	**63.9627**	**3,370.1731**	**3,434.1358**	**3.0377**	**0.0774**	**3,521.9092**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.9452	5.0000e-005	5.3600e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0103	0.0103	3.0000e-005	0.0000	0.0109
Energy	0.0553	0.5026	0.4222	3.0200e-003		0.0382	0.0382		0.0382	0.0382	0.0000	2,740.9403	2,740.9403	0.0585	0.0200	2,748.3561
Mobile					1.3370	0.0000	1.3370	0.3282	0.0000	0.3282	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Offroad	0.0629	0.5618	0.4704	6.0000e-004		0.0434	0.0434		0.0400	0.0400	0.0000	54.2454	54.2454	0.0170	0.0000	54.6021
Waste						0.0000	0.0000		0.0000	0.0000	38.7632	0.0000	38.7632	2.2908	0.0000	86.8707
Water						0.0000	0.0000		0.0000	0.0000	25.1995	574.9771	600.1766	0.6709	0.0573	632.0292
Total	**3.0635**	**1.0644**	**0.8980**	**3.6200e-003**	**1.3370**	**0.0817**	**1.4186**	**0.3282**	**0.0782**	**0.4064**	**63.9627**	**3,370.1731**	**3,434.1358**	**3.0372**	**0.0773**	**3,521.8690**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**2.05**	**52.78**	**52.39**	**16.57**	**0.00**	**53.20**	**3.06**	**0.00**	**51.13**	**9.84**	**0.00**	**1.61**	**1.58**	**0.57**	**0.12**	**1.55**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2017	1/27/2017	5	20	
2	Site Preparation	Site Preparation	1/28/2017	2/10/2017	5	10	
3	Grading	Grading	2/11/2017	3/24/2017	5	30	
4	Building Construction	Building Construction	3/25/2017	5/18/2018	5	300	
5	Paving	Paving	5/19/2018	6/15/2018	5	20	
6	Architectural Coating	Architectural Coating	6/16/2018	7/13/2018	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 75

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 626,597; Non-Residential Outdoor: 208,866 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	162	0.38

Demolition	Rubber Tired Dozers	2	8.00	255	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Scrapers	2	8.00	361	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	226	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	125	0.42
Paving	Paving Equipment	2	8.00	130	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	733.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	286.00	112.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

Architectural Coating	1	57.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0405	0.4270	0.3389	4.0000e-004		0.0213	0.0213		0.0198	0.0198	0.0000	36.6182	36.6182	0.0101	0.0000	36.8292
Total	**0.0405**	**0.4270**	**0.3389**	**4.0000e-004**		**0.0213**	**0.0213**		**0.0198**	**0.0198**	**0.0000**	**36.6182**	**36.6182**	**0.0101**	**0.0000**	**36.8292**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.2000e-003	0.0981	0.0774	2.7000e-004	6.2800e-003	1.4400e-003	7.7200e-003	1.7200e-003	1.3200e-003	3.0500e-003	0.0000	24.3087	24.3087	1.7000e-004	0.0000	24.3124
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.4000e-004	8.0000e-004	8.2900e-003	2.0000e-005	1.6500e-003	1.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.4827	1.4827	8.0000e-005	0.0000	1.4843
Total	**6.7400e-003**	**0.0989**	**0.0857**	**2.9000e-004**	**7.9300e-003**	**1.4500e-003**	**9.3800e-003**	**2.1600e-003**	**1.3300e-003**	**3.5000e-003**	**0.0000**	**25.7914**	**25.7914**	**2.5000e-004**	**0.0000**	**25.7967**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0405	0.4270	0.3389	4.0000e-004		0.0213	0.0213		0.0198	0.0198	0.0000	36.6182	36.6182	0.0101	0.0000	36.8291
Total	**0.0405**	**0.4270**	**0.3389**	**4.0000e-004**		**0.0213**	**0.0213**		**0.0198**	**0.0198**	**0.0000**	**36.6182**	**36.6182**	**0.0101**	**0.0000**	**36.8291**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.2000e-003	0.0981	0.0774	2.7000e-004	6.2800e-003	1.4400e-003	7.7200e-003	1.7200e-003	1.3200e-003	3.0500e-003	0.0000	24.3087	24.3087	1.7000e-004	0.0000	24.3124
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.4000e-004	8.0000e-004	8.2900e-003	2.0000e-005	1.6500e-003	1.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.4827	1.4827	8.0000e-005	0.0000	1.4843
Total	**6.7400e-003**	**0.0989**	**0.0857**	**2.9000e-004**	**7.9300e-003**	**1.4500e-003**	**9.3800e-003**	**2.1600e-003**	**1.3300e-003**	**3.5000e-003**	**0.0000**	**25.7914**	**25.7914**	**2.5000e-004**	**0.0000**	**25.7967**

3.3 Site Preparation - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0903	0.0000	0.0903	0.0497	0.0000	0.0497	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0242	0.2588	0.1970	2.0000e-004		0.0138	0.0138		0.0127	0.0127	0.0000	18.1577	18.1577	5.5600e-003	0.0000	18.2745
Total	**0.0242**	**0.2588**	**0.1970**	**2.0000e-004**	**0.0903**	**0.0138**	**0.1041**	**0.0497**	**0.0127**	**0.0623**	**0.0000**	**18.1577**	**18.1577**	**5.5600e-003**	**0.0000**	**18.2745**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.2000e-004	4.8000e-004	4.9700e-003	1.0000e-005	9.9000e-004	1.0000e-005	1.0000e-003	2.6000e-004	1.0000e-005	2.7000e-004	0.0000	0.8896	0.8896	5.0000e-005	0.0000	0.8906
Total	**3.2000e-004**	**4.8000e-004**	**4.9700e-003**	**1.0000e-005**	**9.9000e-004**	**1.0000e-005**	**1.0000e-003**	**2.6000e-004**	**1.0000e-005**	**2.7000e-004**	**0.0000**	**0.8896**	**0.8896**	**5.0000e-005**	**0.0000**	**0.8906**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0352	0.0000	0.0352	0.0194	0.0000	0.0194	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0242	0.2588	0.1970	2.0000e-004		0.0138	0.0138		0.0127	0.0127	0.0000	18.1577	18.1577	5.5600e-003	0.0000	18.2745
Total	**0.0242**	**0.2588**	**0.1970**	**2.0000e-004**	**0.0352**	**0.0138**	**0.0490**	**0.0194**	**0.0127**	**0.0320**	**0.0000**	**18.1577**	**18.1577**	**5.5600e-003**	**0.0000**	**18.2745**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.2000e-004	4.8000e-004	4.9700e-003	1.0000e-005	9.9000e-004	1.0000e-005	1.0000e-003	2.6000e-004	1.0000e-005	2.7000e-004	0.0000	0.8896	0.8896	5.0000e-005	0.0000	0.8906
Total	**3.2000e-004**	**4.8000e-004**	**4.9700e-003**	**1.0000e-005**	**9.9000e-004**	**1.0000e-005**	**1.0000e-003**	**2.6000e-004**	**1.0000e-005**	**2.7000e-004**	**0.0000**	**0.8896**	**0.8896**	**5.0000e-005**	**0.0000**	**0.8906**

3.4 Grading - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1301	0.0000	0.1301	0.0540	0.0000	0.0540	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0915	1.0439	0.7021	9.3000e-004		0.0498	0.0498		0.0458	0.0458	0.0000	85.9109	85.9109	0.0263	0.0000	86.4637
Total	**0.0915**	**1.0439**	**0.7021**	**9.3000e-004**	**0.1301**	**0.0498**	**0.1799**	**0.0540**	**0.0458**	**0.0997**	**0.0000**	**85.9109**	**85.9109**	**0.0263**	**0.0000**	**86.4637**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0800e-003	1.5900e-003	0.0166	4.0000e-005	3.2900e-003	3.0000e-005	3.3200e-003	8.7000e-004	2.0000e-005	9.0000e-004	0.0000	2.9653	2.9653	1.5000e-004	0.0000	2.9685
Total	**1.0800e-003**	**1.5900e-003**	**0.0166**	**4.0000e-005**	**3.2900e-003**	**3.0000e-005**	**3.3200e-003**	**8.7000e-004**	**2.0000e-005**	**9.0000e-004**	**0.0000**	**2.9653**	**2.9653**	**1.5000e-004**	**0.0000**	**2.9685**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0507	0.0000	0.0507	0.0210	0.0000	0.0210	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0915	1.0439	0.7021	9.3000e-004		0.0498	0.0498		0.0458	0.0458	0.0000	85.9108	85.9108	0.0263	0.0000	86.4636
Total	**0.0915**	**1.0439**	**0.7021**	**9.3000e-004**	**0.0507**	**0.0498**	**0.1005**	**0.0210**	**0.0458**	**0.0668**	**0.0000**	**85.9108**	**85.9108**	**0.0263**	**0.0000**	**86.4636**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0800e-003	1.5900e-003	0.0166	4.0000e-005	3.2900e-003	3.0000e-005	3.3200e-003	8.7000e-004	2.0000e-005	9.0000e-004	0.0000	2.9653	2.9653	1.5000e-004	0.0000	2.9685
Total	**1.0800e-003**	**1.5900e-003**	**0.0166**	**4.0000e-005**	**3.2900e-003**	**3.0000e-005**	**3.3200e-003**	**8.7000e-004**	**2.0000e-005**	**9.0000e-004**	**0.0000**	**2.9653**	**2.9653**	**1.5000e-004**	**0.0000**	**2.9685**

3.5 Building Construction - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.3102	2.6406	1.8129	2.6800e-003		0.1781	0.1781		0.1673	0.1673	0.0000	239.4791	239.4791	0.0589	0.0000	240.7169
Total	**0.3102**	**2.6406**	**1.8129**	**2.6800e-003**		**0.1781**	**0.1781**		**0.1673**	**0.1673**	**0.0000**	**239.4791**	**239.4791**	**0.0589**	**0.0000**	**240.7169**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0911	0.9253	1.2370	2.4300e-003	0.0689	0.0142	0.0831	0.0197	0.0130	0.0327	0.0000	217.3424	217.3424	1.5600e-003	0.0000	217.3751
Worker	0.1027	0.1521	1.5806	3.8500e-003	0.3138	2.5700e-003	0.3164	0.0833	2.3700e-003	0.0857	0.0000	282.6929	282.6929	0.0146	0.0000	282.9996
Total	**0.1939**	**1.0774**	**2.8175**	**6.2800e-003**	**0.3827**	**0.0167**	**0.3994**	**0.1030**	**0.0154**	**0.1184**	**0.0000**	**500.0353**	**500.0353**	**0.0162**	**0.0000**	**500.3747**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.3102	2.6406	1.8129	2.6800e-003		0.1781	0.1781		0.1673	0.1673	0.0000	239.4788	239.4788	0.0589	0.0000	240.7166
Total	**0.3102**	**2.6406**	**1.8129**	**2.6800e-003**		**0.1781**	**0.1781**		**0.1673**	**0.1673**	**0.0000**	**239.4788**	**239.4788**	**0.0589**	**0.0000**	**240.7166**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0911	0.9253	1.2370	2.4300e-003	0.0689	0.0142	0.0831	0.0197	0.0130	0.0327	0.0000	217.3424	217.3424	1.5600e-003	0.0000	217.3751
Worker	0.1027	0.1521	1.5806	3.8500e-003	0.3138	2.5700e-003	0.3164	0.0833	2.3700e-003	0.0857	0.0000	282.6929	282.6929	0.0146	0.0000	282.9996
Total	**0.1939**	**1.0774**	**2.8175**	**6.2800e-003**	**0.3827**	**0.0167**	**0.3994**	**0.1030**	**0.0154**	**0.1184**	**0.0000**	**500.0353**	**500.0353**	**0.0162**	**0.0000**	**500.3747**

3.5 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1334	1.1630	0.8766	1.3400e-003		0.0747	0.0747		0.0702	0.0702	0.0000	118.3848	118.3848	0.0290	0.0000	118.9932
Total	**0.1334**	**1.1630**	**0.8766**	**1.3400e-003**		**0.0747**	**0.0747**		**0.0702**	**0.0702**	**0.0000**	**118.3848**	**118.3848**	**0.0290**	**0.0000**	**118.9932**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0426	0.4247	0.5925	1.2100e-003	0.0345	6.6700e-003	0.0411	9.8400e-003	6.1300e-003	0.0160	0.0000	106.8481	106.8481	7.7000e-004	0.0000	106.8643
Worker	0.0461	0.0690	0.7157	1.9300e-003	0.1569	1.2500e-003	0.1581	0.0417	1.1600e-003	0.0428	0.0000	136.0707	136.0707	6.7800e-003	0.0000	136.2130
Total	**0.0888**	**0.4936**	**1.3083**	**3.1400e-003**	**0.1914**	**7.9200e-003**	**0.1993**	**0.0515**	**7.2900e-003**	**0.0588**	**0.0000**	**242.9187**	**242.9187**	**7.5500e-003**	**0.0000**	**243.0773**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1334	1.1630	0.8766	1.3400e-003		0.0747	0.0747		0.0702	0.0702	0.0000	118.3847	118.3847	0.0290	0.0000	118.9931
Total	**0.1334**	**1.1630**	**0.8766**	**1.3400e-003**		**0.0747**	**0.0747**		**0.0702**	**0.0702**	**0.0000**	**118.3847**	**118.3847**	**0.0290**	**0.0000**	**118.9931**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0426	0.4247	0.5925	1.2100e-003	0.0345	6.6700e-003	0.0411	9.8400e-003	6.1300e-003	0.0160	0.0000	106.8481	106.8481	7.7000e-004	0.0000	106.8643
Worker	0.0461	0.0690	0.7157	1.9300e-003	0.1569	1.2500e-003	0.1581	0.0417	1.1600e-003	0.0428	0.0000	136.0707	136.0707	6.7800e-003	0.0000	136.2130
Total	**0.0888**	**0.4936**	**1.3083**	**3.1400e-003**	**0.1914**	**7.9200e-003**	**0.1993**	**0.0515**	**7.2900e-003**	**0.0588**	**0.0000**	**242.9187**	**242.9187**	**7.5500e-003**	**0.0000**	**243.0773**

3.6 Paving - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0161	0.1716	0.1449	2.2000e-004		9.3900e-003	9.3900e-003		8.6400e-003	8.6400e-003	0.0000	20.3687	20.3687	6.3400e-003	0.0000	20.5019
Paving	8.1600e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0243**	**0.1716**	**0.1449**	**2.2000e-004**		**9.3900e-003**	**9.3900e-003**		**8.6400e-003**	**8.6400e-003**	**0.0000**	**20.3687**	**20.3687**	**6.3400e-003**	**0.0000**	**20.5019**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.8000e-004	7.2000e-004	7.5100e-003	2.0000e-005	1.6500e-003	1.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.4273	1.4273	7.0000e-005	0.0000	1.4288
Total	**4.8000e-004**	**7.2000e-004**	**7.5100e-003**	**2.0000e-005**	**1.6500e-003**	**1.0000e-005**	**1.6600e-003**	**4.4000e-004**	**1.0000e-005**	**4.5000e-004**	**0.0000**	**1.4273**	**1.4273**	**7.0000e-005**	**0.0000**	**1.4288**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0161	0.1716	0.1449	2.2000e-004		9.3900e-003	9.3900e-003		8.6400e-003	8.6400e-003	0.0000	20.3687	20.3687	6.3400e-003	0.0000	20.5019
Paving	8.1600e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0243**	**0.1716**	**0.1449**	**2.2000e-004**		**9.3900e-003**	**9.3900e-003**		**8.6400e-003**	**8.6400e-003**	**0.0000**	**20.3687**	**20.3687**	**6.3400e-003**	**0.0000**	**20.5019**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.8000e-004	7.2000e-004	7.5100e-003	2.0000e-005	1.6500e-003	1.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.4273	1.4273	7.0000e-005	0.0000	1.4288
Total	**4.8000e-004**	**7.2000e-004**	**7.5100e-003**	**2.0000e-005**	**1.6500e-003**	**1.0000e-005**	**1.6600e-003**	**4.4000e-004**	**1.0000e-005**	**4.5000e-004**	**0.0000**	**1.4273**	**1.4273**	**7.0000e-005**	**0.0000**	**1.4288**

3.7 Architectural Coating - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.7164					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.9900e-003	0.0201	0.0185	3.0000e-005		1.5100e-003	1.5100e-003		1.5100e-003	1.5100e-003	0.0000	2.5533	2.5533	2.4000e-004	0.0000	2.5584
Total	**0.7194**	**0.0201**	**0.0185**	**3.0000e-005**		**1.5100e-003**	**1.5100e-003**		**1.5100e-003**	**1.5100e-003**	**0.0000**	**2.5533**	**2.5533**	**2.4000e-004**	**0.0000**	**2.5584**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.8400e-003	2.7500e-003	0.0285	8.0000e-005	6.2500e-003	5.0000e-005	6.3000e-003	1.6600e-003	5.0000e-005	1.7100e-003	0.0000	5.4238	5.4238	2.7000e-004	0.0000	5.4295
Total	**1.8400e-003**	**2.7500e-003**	**0.0285**	**8.0000e-005**	**6.2500e-003**	**5.0000e-005**	**6.3000e-003**	**1.6600e-003**	**5.0000e-005**	**1.7100e-003**	**0.0000**	**5.4238**	**5.4238**	**2.7000e-004**	**0.0000**	**5.4295**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.7164					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.9900e-003	0.0201	0.0185	3.0000e-005		1.5100e-003	1.5100e-003		1.5100e-003	1.5100e-003	0.0000	2.5533	2.5533	2.4000e-004	0.0000	2.5584
Total	**0.7194**	**0.0201**	**0.0185**	**3.0000e-005**		**1.5100e-003**	**1.5100e-003**		**1.5100e-003**	**1.5100e-003**	**0.0000**	**2.5533**	**2.5533**	**2.4000e-004**	**0.0000**	**2.5584**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.8400e-003	2.7500e-003	0.0285	8.0000e-005	6.2500e-003	5.0000e-005	6.3000e-003	1.6600e-003	5.0000e-005	1.7100e-003	0.0000	5.4238	5.4238	2.7000e-004	0.0000	5.4295
Total	**1.8400e-003**	**2.7500e-003**	**0.0285**	**8.0000e-005**	**6.2500e-003**	**5.0000e-005**	**6.3000e-003**	**1.6600e-003**	**5.0000e-005**	**1.7100e-003**	**0.0000**	**5.4238**	**5.4238**	**2.7000e-004**	**0.0000**	**5.4295**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated					1.3370	0.0000	1.3370	0.3282	0.0000	0.3282	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated					1.3370	0.0000	1.3370	0.3282	0.0000	0.3282	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Manufacturing	1,176.56	458.92	190.96	4,132,646	4,132,646
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	1,176.56	458.92	190.96	4,132,646	4,132,646

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Manufacturing	16.60	8.40	6.90	59.00	28.00	13.00	92	5	3
Other Non-Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH

0.744000	0.000000	0.000000	0.000000	0.084000	0.000000	0.046000		0.000000	0.000000	0.000000	0.000582	0.002128

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	2,193.7841	2,193.7841	0.0480	9.9300e-003	2,197.8700
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	2,193.7841	2,193.7841	0.0480	9.9300e-003	2,197.8700
NaturalGas Mitigated	0.0553	0.5026	0.4222	3.0200e-003		0.0382	0.0382		0.0382	0.0382	0.0000	547.1562	547.1562	0.0105	0.0100	550.4861
NaturalGas Unmitigated	0.0553	0.5026	0.4222	3.0200e-003		0.0382	0.0382		0.0382	0.0382	0.0000	547.1562	547.1562	0.0105	0.0100	550.4861

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Manufacturing	1.02533e+007	0.0553	0.5026	0.4222	3.0200e-003		0.0382	0.0382		0.0382	0.0382	0.0000	547.1562	547.1562	0.0105	0.0100	550.4861
Total		**0.0553**	**0.5026**	**0.4222**	**3.0200e-003**		**0.0382**	**0.0382**		**0.0382**	**0.0382**	**0.0000**	**547.1562**	**547.1562**	**0.0105**	**0.0100**	**550.4861**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Manufacturing	1.02533e+007	0.0553	0.5026	0.4222	3.0200e-003		0.0382	0.0382		0.0382	0.0382	0.0000	547.1562	547.1562	0.0105	0.0100	550.4861
Total		**0.0553**	**0.5026**	**0.4222**	**3.0200e-003**		**0.0382**	**0.0382**		**0.0382**	**0.0382**	**0.0000**	**547.1562**	**547.1562**	**0.0105**	**0.0100**	**550.4861**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use		Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	tons/yr	MT/yr			
Manufacturing	3.40956e+006		2,050.1845	0.0449	9.2800e-003	2,054.0030
Other Non-Asphalt Surfaces	0		0.0000	0.0000	0.0000	0.0000
Parking Lot	238813		143.5996	3.1400e-003	6.5000e-004	143.8670
Total			**2,193.7841**	**0.0480**	**9.9300e-003**	**2,197.8700**

Mitigated

	Electricity Use		Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	tons/yr	MT/yr			
Manufacturing	3.40956e+006		2,050.1845	0.0449	9.2800e-003	2,054.0030
Other Non-Asphalt Surfaces	0		0.0000	0.0000	0.0000	0.0000
Parking Lot	238813		143.5996	3.1400e-003	6.5000e-004	143.8670
Total			**2,193.7841**	**0.0480**	**9.9300e-003**	**2,197.8700**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	2.9452	5.0000e-005	5.3600e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0103	0.0103	3.0000e-005	0.0000	0.0109
Unmitigated	2.9452	5.0000e-005	5.3600e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0103	0.0103	3.0000e-005	0.0000	0.0109

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.4841					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.4607					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	5.1000e-004	5.0000e-005	5.3600e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0103	0.0103	3.0000e-005	0.0000	0.0109
Total	**2.9452**	**5.0000e-005**	**5.3600e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0103**	**0.0103**	**3.0000e-005**	**0.0000**	**0.0109**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.4841					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.4607					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	5.1000e-004	5.0000e-005	5.3600e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0103	0.0103	3.0000e-005	0.0000	0.0109
Total	**2.9452**	**5.0000e-005**	**5.3600e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0103**	**0.0103**	**3.0000e-005**	**0.0000**	**0.0109**

7.0 Water Detail

7.1 Mitigation Measures Water

		Total CO2	CH4	N2O	CO2e
Category	tons/yr	MT/yr			
Mitigated		600.1766	0.6709	0.0573	632.0292
Unmitigated		600.1766	0.6713	0.0574	632.0694

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use		Total CO2	CH4	N2O	CO2e
Land Use	Mgal	tons/yr	MT/yr			
Manufacturing	71.225 / 2.59181		600.1766	0.6713	0.0574	632.0694
Other Non-Asphalt Surfaces	0 / 0		0.0000	0.0000	0.0000	0.0000
Parking Lot	0 / 0		0.0000	0.0000	0.0000	0.0000
Total			**600.1766**	**0.6713**	**0.0574**	**632.0694**

Mitigated

	Indoor/Outdoor Use		Total CO2	CH4	N2O	CO2e
Land Use	Mgal	tons/yr	MT/yr			
Manufacturing	71.225 / 2.59181		600.1766	0.6709	0.0573	632.0292
Other Non-Asphalt Surfaces	0 / 0		0.0000	0.0000	0.0000	0.0000
Parking Lot	0 / 0		0.0000	0.0000	0.0000	0.0000
Total			**600.1766**	**0.6709**	**0.0573**	**632.0292**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

		Total CO2	CH4	N2O	CO2e
	tons/yr	MT/yr			
Mitigated		38.7632	2.2908	0.0000	86.8707
Unmitigated		38.7632	2.2908	0.0000	86.8707

8.2 Waste by Land Use

Unmitigated

	Waste Disposed		Total CO2	CH4	N2O	CO2e
Land Use	tons	tons/yr	MT/yr			
Manufacturing	190.96		38.7632	2.2908	0.0000	86.8707
Other Non-Asphalt Surfaces	0		0.0000	0.0000	0.0000	0.0000
Parking Lot	0		0.0000	0.0000	0.0000	0.0000
Total			**38.7632**	**2.2908**	**0.0000**	**86.8707**

Mitigated

	Waste Disposed		Total CO2	CH4	N2O	CO2e
Land Use	tons	tons/yr	MT/yr			
Manufacturing	190.96		38.7632	2.2908	0.0000	86.8707
Other Non-Asphalt Surfaces	0		0.0000	0.0000	0.0000	0.0000
Parking Lot	0		0.0000	0.0000	0.0000	0.0000
Total			**38.7632**	**2.2908**	**0.0000**	**86.8707**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Forklifts	3	8.00	260	89	0.20	CNG
Generator Sets	1	1.67	12	84	0.74	Diesel

UnMitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio-CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	tons/yr										MT/yr					
Forklifts	0.0624	0.5570	0.4657	6.0000e-004		0.0432	0.0432		0.0397	0.0397	0.0000	53.5375	53.5375	0.0169	0.0000	53.8932
Generator Sets	5.6000e-004	4.7300e-003	4.6600e-003	1.0000e-005		2.8000e-004	2.8000e-004		2.8000e-004	2.8000e-004	0.0000	0.7079	0.7079	4.0000e-005	0.0000	0.7089
Total	**0.0629**	**0.5618**	**0.4704**	**6.1000e-004**		**0.0434**	**0.0434**		**0.0400**	**0.0400**	**0.0000**	**54.2454**	**54.2454**	**0.0170**	**0.0000**	**54.6020**

10.0 Vegetation

Center Street Warehouse

South Coast Air Basin, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Manufacturing	308.00	1000sqft	7.07	308,000.00	0
Other Non-Asphalt Surfaces	101.59	1000sqft	2.33	101,590.00	0
Parking Lot	6.23	Acre	6.23	271,378.80	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2019
Utility Company	Riverside Public Utilities				
CO2 Intensity (lb/MWhr)	1325.65	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Demolition -

Architectural Coating - Use of Low-VOC Paints

Vehicle Trips -

Vechicle Emission Factors - Fleet Mix Per Traffic Study

Vechicle Emission Factors - Fleet Mix Per Traffic Study

Vechicle Emission Factors - Fleet Mix Per SCAQMD Recommendation

Water And Wastewater - Include Landscape Water Demand using State Water Budget Worksheet

Solid Waste - 50% Mandatory Recycling Requirement

Construction Off-road Equipment Mitigation - Water 3 times daily

Operational Off-Road Equipment - Assume Forklifts and Generator Set Equipment per ERG/ARB 2005 Survey
Generators Operatiosn Based on SCE Outage Data

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	250.00	37.00
tblArchitecturalCoating	EF_Nonresidential_Interior	250.00	37.00
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	12.00
tblOperationalOffRoadEquipment	OperFuelType	Diesel	CNG
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	1.67
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	3.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblProjectCharacteristics	OperationalYear	2014	2019
tblSolidWaste	SolidWasteGenerationRate	381.92	190.96
tblVehicleEF	HHD	0.03	0.13
tblVehicleEF	HHD	0.03	0.13
tblVehicleEF	LDA	0.51	0.74
tblVehicleEF	LDA	0.51	0.74
tblVehicleEF	LDA	0.51	0.74
tblVehicleEF	LDT1	0.06	0.00
tblVehicleEF	LDT1	0.06	0.00
tblVehicleEF	LDT1	0.06	0.00
tblVehicleEF	LDT2	0.18	0.00
tblVehicleEF	LDT2	0.18	0.00
tblVehicleEF	LDT2	0.18	0.00

tblVehicleEF	LHD1	0.04	0.08
tblVehicleEF	LHD1	0.04	0.08
tblVehicleEF	LHD1	0.04	0.09
tblVehicleEF	LHD2	6.6660e-003	0.00
tblVehicleEF	LHD2	6.6660e-003	0.00
tblVehicleEF	LHD2	6.6660e-003	0.00
tblVehicleEF	MCY	4.3770e-003	0.00
tblVehicleEF	MCY	4.3770e-003	0.00
tblVehicleEF	MCY	4.3770e-003	0.00
tblVehicleEF	MDV	0.14	0.00
tblVehicleEF	MDV	0.14	0.00
tblVehicleEF	MDV	0.14	0.00
tblVehicleEF	MH	2.1280e-003	0.00
tblVehicleEF	MH	2.1280e-003	0.00
tblVehicleEF	MHD	0.02	0.05
tblVehicleEF	MHD	0.02	0.05
tblVehicleEF	MHD	0.02	0.05
tblVehicleEF	OBUS	1.9400e-003	0.00
tblVehicleEF	OBUS	1.9400e-003	0.00
tblVehicleEF	OBUS	1.9400e-003	0.00
tblVehicleEF	SBUS	5.8200e-004	0.00
tblVehicleEF	SBUS	5.8200e-004	0.00
tblVehicleEF	UBUS	2.4960e-003	0.00
tblVehicleEF	UBUS	2.4960e-003	0.00
tblVehicleEF	UBUS	2.4960e-003	0.00
tblWater	AerobicPercent	87.46	97.79

tblWater	AerobicPercent	87.46	97.79
tblWater	AerobicPercent	87.46	97.79
tblWater	OutdoorWaterUseRate	0.00	2,591,811.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2017	6.1740	69.6860	47.9791	0.0917	18.2675	3.3190	21.0233	9.9840	3.0535	12.5194	0.0000	8,316.0820	8,316.0820	1.9457	0.0000	8,356.9409
2018	72.1298	32.6138	42.7975	0.0916	3.8970	1.6522	5.5491	1.0472	1.5501	2.5974	0.0000	8,124.1481	8,124.1481	0.8050	0.0000	8,141.0521
Total	**78.3038**	**102.2998**	**90.7766**	**0.1832**	**22.1645**	**4.9711**	**26.5724**	**11.0313**	**4.6036**	**15.1168**	**0.0000**	**16,440.2301**	**16,440.2301**	**2.7506**	**0.0000**	**16,497.9930**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2017	6.1740	69.6860	47.9791	0.0917	7.2470	3.3190	10.0029	3.9263	3.0535	6.4617	0.0000	8,316.0820	8,316.0820	1.9457	0.0000	8,356.9409
2018	72.1298	32.6138	42.7975	0.0916	3.8970	1.6522	5.5491	1.0472	1.5501	2.5974	0.0000	8,124.1481	8,124.1481	0.8050	0.0000	8,141.0521
Total	**78.3038**	**102.2998**	**90.7766**	**0.1832**	**11.1440**	**4.9711**	**15.5520**	**4.9736**	**4.6036**	**9.0591**	**0.0000**	**16,440.2301**	**16,440.2301**	**2.7506**	**0.0000**	**16,497.9930**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**

Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**49.72**	**0.00**	**41.47**	**54.91**	**0.00**	**40.07**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	16.1396	4.0000e-004	0.0429	0.0000		1.5000e-004	1.5000e-004		1.5000e-004	1.5000e-004		0.0910	0.0910	2.5000e-004		0.0962
Energy	0.3030	2.7541	2.3134	0.0165		0.2093	0.2093		0.2093	0.2093		3,304.8574	3,304.8574	0.0633	0.0606	3,324.9702
Mobile	3.8982	29.0779	52.2474	0.1877	11.2164	0.5031	11.7195	3.0090	0.4632	3.4722		15,825.3325	15,825.3325	0.3507		15,832.6981
Offroad	0.5725	5.0736	4.3598	5.9500e-003		0.3791	0.3791		0.3525	0.3525		584.0197	584.0197	0.1519		587.2089
Total	**20.9133**	**36.9059**	**58.9634**	**0.2102**	**11.2164**	**1.0917**	**12.3081**	**3.0090**	**1.0252**	**4.0342**		**19,714.3005**	**19,714.3005**	**0.5662**	**0.0606**	**19,744.9734**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	16.1396	4.0000e-004	0.0429	0.0000		1.5000e-004	1.5000e-004		1.5000e-004	1.5000e-004		0.0910	0.0910	2.5000e-004		0.0962
Energy	0.3030	2.7541	2.3134	0.0165		0.2093	0.2093		0.2093	0.2093		3,304.8574	3,304.8574	0.0633	0.0606	3,324.9702
Mobile	3.8982	29.0779	52.2474	0.1877	11.2164	0.5031	11.7195	3.0090	0.4632	3.4722		15,825.3325	15,825.3325	0.3507		15,832.6981
Offroad	0.5725	5.0736	4.3598	5.9500e-003		0.3791	0.3791		0.3525	0.3525		584.0197	584.0197	0.1519		587.2089
Total	**20.9133**	**36.9059**	**58.9634**	**0.2102**	**11.2164**	**1.0917**	**12.3081**	**3.0090**	**1.0252**	**4.0342**		**19,714.3005**	**19,714.3005**	**0.5662**	**0.0606**	**19,744.9734**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**2.74**	**13.75**	**7.39**	**2.83**	**0.00**	**34.73**	**3.08**	**0.00**	**34.39**	**8.74**	**0.00**	**2.96**	**2.96**	**26.82**	**0.00**	**2.97**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2017	1/27/2017	5	20	
2	Site Preparation	Site Preparation	1/28/2017	2/10/2017	5	10	
3	Grading	Grading	2/11/2017	3/24/2017	5	30	
4	Building Construction	Building Construction	3/25/2017	5/18/2018	5	300	
5	Paving	Paving	5/19/2018	6/15/2018	5	20	
6	Architectural Coating	Architectural Coating	6/16/2018	7/13/2018	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 75

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 626,597; Non-Residential Outdoor: 208,866 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	162	0.38

Demolition	Rubber Tired Dozers	2	8.00	255	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Scrapers	2	8.00	361	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	226	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	125	0.42
Paving	Paving Equipment	2	8.00	130	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	733.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	286.00	112.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

Architectural Coating	1	57.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.0482	42.6971	33.8934	0.0399		2.1252	2.1252		1.9797	1.9797		4,036.4674	4,036.4674	1.1073		4,059.7211
Total	**4.0482**	**42.6971**	**33.8934**	**0.0399**		**2.1252**	**2.1252**		**1.9797**	**1.9797**		**4,036.4674**	**4,036.4674**	**1.1073**		**4,059.7211**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.5973	9.3086	6.8405	0.0270	0.6386	0.1436	0.7822	0.1749	0.1321	0.3070		2,682.2557	2,682.2557	0.0192		2,682.6579
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0561	0.0705	0.8806	2.1200e-003	0.1677	1.3500e-003	0.1690	0.0445	1.2400e-003	0.0457		171.6086	171.6086	8.4400e-003		171.7859
Total	**0.6534**	**9.3791**	**7.7210**	**0.0292**	**0.8062**	**0.1450**	**0.9512**	**0.2193**	**0.1334**	**0.3527**		**2,853.8643**	**2,853.8643**	**0.0276**		**2,854.4439**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.0482	42.6971	33.8934	0.0399		2.1252	2.1252		1.9797	1.9797	0.0000	4,036.4674	4,036.4674	1.1073		4,059.7211
Total	**4.0482**	**42.6971**	**33.8934**	**0.0399**		**2.1252**	**2.1252**		**1.9797**	**1.9797**	**0.0000**	**4,036.4674**	**4,036.4674**	**1.1073**		**4,059.7211**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.5973	9.3086	6.8405	0.0270	0.6386	0.1436	0.7822	0.1749	0.1321	0.3070		2,682.2557	2,682.2557	0.0192		2,682.6579
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0561	0.0705	0.8806	2.1200e-003	0.1677	1.3500e-003	0.1690	0.0445	1.2400e-003	0.0457		171.6086	171.6086	8.4400e-003		171.7859
Total	**0.6534**	**9.3791**	**7.7210**	**0.0292**	**0.8062**	**0.1450**	**0.9512**	**0.2193**	**0.1334**	**0.3527**		**2,853.8643**	**2,853.8643**	**0.0276**		**2,854.4439**

3.3 Site Preparation - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.8382	51.7535	39.3970	0.0391		2.7542	2.7542		2.5339	2.5339		4,003.0859	4,003.0859	1.2265		4,028.8432
Total	**4.8382**	**51.7535**	**39.3970**	**0.0391**	**18.0663**	**2.7542**	**20.8205**	**9.9307**	**2.5339**	**12.4646**		**4,003.0859**	**4,003.0859**	**1.2265**		**4,028.8432**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0674	0.0846	1.0567	2.5500e-003	0.2012	1.6200e-003	0.2028	0.0534	1.4900e-003	0.0549		205.9304	205.9304	0.0101		206.1431
Total	**0.0674**	**0.0846**	**1.0567**	**2.5500e-003**	**0.2012**	**1.6200e-003**	**0.2028**	**0.0534**	**1.4900e-003**	**0.0549**		**205.9304**	**205.9304**	**0.0101**		**206.1431**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.0458	0.0000	7.0458	3.8730	0.0000	3.8730			0.0000			0.0000
Off-Road	4.8382	51.7535	39.3970	0.0391		2.7542	2.7542		2.5339	2.5339	0.0000	4,003.0859	4,003.0859	1.2265		4,028.8432
Total	**4.8382**	**51.7535**	**39.3970**	**0.0391**	**7.0458**	**2.7542**	**9.8001**	**3.8730**	**2.5339**	**6.4069**	**0.0000**	**4,003.0859**	**4,003.0859**	**1.2265**		**4,028.8432**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0674	0.0846	1.0567	2.5500e-003	0.2012	1.6200e-003	0.2028	0.0534	1.4900e-003	0.0549		205.9304	205.9304	0.0101		206.1431
Total	**0.0674**	**0.0846**	**1.0567**	**2.5500e-003**	**0.2012**	**1.6200e-003**	**0.2028**	**0.0534**	**1.4900e-003**	**0.0549**		**205.9304**	**205.9304**	**0.0101**		**206.1431**

3.4 Grading - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	6.0991	69.5920	46.8050	0.0617		3.3172	3.3172		3.0518	3.0518		6,313.3690	6,313.3690	1.9344		6,353.9915
Total	**6.0991**	**69.5920**	**46.8050**	**0.0617**	**8.6733**	**3.3172**	**11.9905**	**3.5965**	**3.0518**	**6.6483**		**6,313.3690**	**6,313.3690**	**1.9344**		**6,353.9915**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0749	0.0940	1.1741	2.8300e-003	0.2236	1.8000e-003	0.2254	0.0593	1.6600e-003	0.0610		228.8115	228.8115	0.0113		229.0479
Total	**0.0749**	**0.0940**	**1.1741**	**2.8300e-003**	**0.2236**	**1.8000e-003**	**0.2254**	**0.0593**	**1.6600e-003**	**0.0610**		**228.8115**	**228.8115**	**0.0113**		**229.0479**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.3826	0.0000	3.3826	1.4026	0.0000	1.4026			0.0000			0.0000
Off-Road	6.0991	69.5920	46.8050	0.0617		3.3172	3.3172		3.0518	3.0518	0.0000	6,313.3690	6,313.3690	1.9344		6,353.9915
Total	**6.0991**	**69.5920**	**46.8050**	**0.0617**	**3.3826**	**3.3172**	**6.6998**	**1.4026**	**3.0518**	**4.4545**	**0.0000**	**6,313.3690**	**6,313.3690**	**1.9344**		**6,353.9915**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0749	0.0940	1.1741	2.8300e-003	0.2236	1.8000e-003	0.2254	0.0593	1.6600e-003	0.0610		228.8115	228.8115	0.0113		229.0479
Total	**0.0749**	**0.0940**	**1.1741**	**2.8300e-003**	**0.2236**	**1.8000e-003**	**0.2254**	**0.0593**	**1.6600e-003**	**0.0610**		**228.8115**	**228.8115**	**0.0113**		**229.0479**

3.5 Building Construction - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1024	26.4057	18.1291	0.0268		1.7812	1.7812		1.6730	1.6730		2,639.8053	2,639.8053	0.6497		2,653.4490
Total	**3.1024**	**26.4057**	**18.1291**	**0.0268**		**1.7812**	**1.7812**		**1.6730**	**1.6730**		**2,639.8053**	**2,639.8053**	**0.6497**		**2,653.4490**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.8576	8.8566	10.5067	0.0244	0.7002	0.1409	0.8411	0.1994	0.1296	0.3291		2,404.2722	2,404.2722	0.0170		2,404.6282
Worker	1.0704	1.3447	16.7892	0.0405	3.1968	0.0257	3.2225	0.8478	0.0237	0.8715		3,272.0046	3,272.0046	0.1610		3,275.3848
Total	**1.9280**	**10.2013**	**27.2959**	**0.0648**	**3.8970**	**0.1667**	**4.0636**	**1.0472**	**0.1534**	**1.2006**		**5,676.2767**	**5,676.2767**	**0.1779**		**5,680.0130**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1024	26.4057	18.1291	0.0268		1.7812	1.7812		1.6730	1.6730	0.0000	2,639.8053	2,639.8053	0.6497		2,653.4490
Total	**3.1024**	**26.4057**	**18.1291**	**0.0268**		**1.7812**	**1.7812**		**1.6730**	**1.6730**	**0.0000**	**2,639.8053**	**2,639.8053**	**0.6497**		**2,653.4490**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.8576	8.8566	10.5067	0.0244	0.7002	0.1409	0.8411	0.1994	0.1296	0.3291		2,404.2722	2,404.2722	0.0170		2,404.6282
Worker	1.0704	1.3447	16.7892	0.0405	3.1968	0.0257	3.2225	0.8478	0.0237	0.8715		3,272.0046	3,272.0046	0.1610		3,275.3848
Total	**1.9280**	**10.2013**	**27.2959**	**0.0648**	**3.8970**	**0.1667**	**4.0636**	**1.0472**	**0.1534**	**1.2006**		**5,676.2767**	**5,676.2767**	**0.1779**		**5,680.0130**

3.5 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6687	23.2608	17.5327	0.0268		1.4943	1.4943		1.4048	1.4048		2,609.9390	2,609.9390	0.6387		2,623.3517
Total	**2.6687**	**23.2608**	**17.5327**	**0.0268**		**1.4943**	**1.4943**		**1.4048**	**1.4048**		**2,609.9390**	**2,609.9390**	**0.6387**		**2,623.3517**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.8045	8.1330	10.0102	0.0243	0.7002	0.1328	0.8330	0.1994	0.1222	0.3216		2,363.9547	2,363.9547	0.0169		2,364.3086
Worker	0.9650	1.2199	15.2546	0.0405	3.1968	0.0250	3.2218	0.8478	0.0232	0.8710		3,150.2545	3,150.2545	0.1494		3,153.3918
Total	**1.7694**	**9.3529**	**25.2648**	**0.0648**	**3.8970**	**0.1579**	**4.0549**	**1.0472**	**0.1454**	**1.1926**		**5,514.2091**	**5,514.2091**	**0.1663**		**5,517.7004**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6687	23.2608	17.5327	0.0268		1.4943	1.4943		1.4048	1.4048	0.0000	2,609.9389	2,609.9389	0.6387		2,623.3517
Total	**2.6687**	**23.2608**	**17.5327**	**0.0268**		**1.4943**	**1.4943**		**1.4048**	**1.4048**	**0.0000**	**2,609.9389**	**2,609.9389**	**0.6387**		**2,623.3517**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Vendor	0.8045	8.1330	10.0102	0.0243	0.7002	0.1328	0.8330	0.1994	0.1222	0.3216		2,363.9547	2,363.9547	0.0169		2,364.3086
Worker	0.9650	1.2199	15.2546	0.0405	3.1968	0.0250	3.2218	0.8478	0.0232	0.8710		3,150.2545	3,150.2545	0.1494		3,153.3918
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.7694**	**9.3529**	**25.2648**	**0.0648**	**3.8970**	**0.1579**	**4.0549**	**1.0472**	**0.1454**	**1.1926**		**5,514.2091**	**5,514.2091**	**0.1663**		**5,517.7004**

3.6 Paving - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6114	17.1628	14.4944	0.0223		0.9386	0.9386		0.8635	0.8635		2,245.2695	2,245.2695	0.6990		2,259.9481
Paving	0.8161					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.4275**	**17.1628**	**14.4944**	**0.0223**		**0.9386**	**0.9386**		**0.8635**	**0.8635**		**2,245.2695**	**2,245.2695**	**0.6990**		**2,259.9481**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0506	0.0640	0.8001	2.1200e-003	0.1677	1.3100e-003	0.1690	0.0445	1.2100e-003	0.0457		165.2231	165.2231	7.8400e-003		165.3877
Total	**0.0506**	**0.0640**	**0.8001**	**2.1200e-003**	**0.1677**	**1.3100e-003**	**0.1690**	**0.0445**	**1.2100e-003**	**0.0457**		**165.2231**	**165.2231**	**7.8400e-003**		**165.3877**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6114	17.1628	14.4944	0.0223		0.9386	0.9386		0.8635	0.8635	0.0000	2,245.2695	2,245.2695	0.6990		2,259.9481
Paving	0.8161					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.4275**	**17.1628**	**14.4944**	**0.0223**		**0.9386**	**0.9386**		**0.8635**	**0.8635**	**0.0000**	**2,245.2695**	**2,245.2695**	**0.6990**		**2,259.9481**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0506	0.0640	0.8001	2.1200e-003	0.1677	1.3100e-003	0.1690	0.0445	1.2100e-003	0.0457		165.2231	165.2231	7.8400e-003		165.3877
Total	**0.0506**	**0.0640**	**0.8001**	**2.1200e-003**	**0.1677**	**1.3100e-003**	**0.1690**	**0.0445**	**1.2100e-003**	**0.0457**		**165.2231**	**165.2231**	**7.8400e-003**		**165.3877**

3.7 Architectural Coating - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	71.6389					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2986	2.0058	1.8542	2.9700e-003		0.1506	0.1506		0.1506	0.1506		281.4485	281.4485	0.0267		282.0102
Total	**71.9375**	**2.0058**	**1.8542**	**2.9700e-003**		**0.1506**	**0.1506**		**0.1506**	**0.1506**		**281.4485**	**281.4485**	**0.0267**		**282.0102**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1923	0.2431	3.0403	8.0700e-003	0.6371	4.9900e-003	0.6421	0.1690	4.6200e-003	0.1736		627.8479	627.8479	0.0298		628.4732
Total	**0.1923**	**0.2431**	**3.0403**	**8.0700e-003**	**0.6371**	**4.9900e-003**	**0.6421**	**0.1690**	**4.6200e-003**	**0.1736**		**627.8479**	**627.8479**	**0.0298**		**628.4732**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	71.6389					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2986	2.0058	1.8542	2.9700e-003		0.1506	0.1506		0.1506	0.1506	0.0000	281.4485	281.4485	0.0267		282.0102
Total	**71.9375**	**2.0058**	**1.8542**	**2.9700e-003**		**0.1506**	**0.1506**		**0.1506**	**0.1506**	**0.0000**	**281.4485**	**281.4485**	**0.0267**		**282.0102**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1923	0.2431	3.0403	8.0700e-003	0.6371	4.9900e-003	0.6421	0.1690	4.6200e-003	0.1736		627.8479	627.8479	0.0298		628.4732
Total	**0.1923**	**0.2431**	**3.0403**	**8.0700e-003**	**0.6371**	**4.9900e-003**	**0.6421**	**0.1690**	**4.6200e-003**	**0.1736**		**627.8479**	**627.8479**	**0.0298**		**628.4732**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	3.8982	29.0779	52.2474	0.1877	11.2164	0.5031	11.7195	3.0090	0.4632	3.4722		15,825.3325	15,825.3325	0.3507		15,832.6981
Unmitigated	3.8982	29.0779	52.2474	0.1877	11.2164	0.5031	11.7195	3.0090	0.4632	3.4722		15,825.3325	15,825.3325	0.3507		15,832.6981

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Manufacturing	1,176.56	458.92	190.96	4,132,646	4,132,646
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	1,176.56	458.92	190.96	4,132,646	4,132,646

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Manufacturing	16.60	8.40	6.90	59.00	28.00	13.00	92	5	3
Other Non-Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH

0.744000	0.000000	0.000000	0.000000	0.084000	0.000000	0.046000	0.126000	0.000000	0.000000	0.000000	0.000000	0.000000

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.3030	2.7541	2.3134	0.0165		0.2093	0.2093		0.2093	0.2093		3,304.8574	3,304.8574	0.0633	0.0606	3,324.9702
NaturalGas Unmitigated	0.3030	2.7541	2.3134	0.0165		0.2093	0.2093		0.2093	0.2093		3,304.8574	3,304.8574	0.0633	0.0606	3,324.9702

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Manufacturing	28091.3	0.3030	2.7541	2.3134	0.0165		0.2093	0.2093		0.2093	0.2093		3,304.8574	3,304.8574	0.0633	0.0606	3,324.9702
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.3030**	**2.7541**	**2.3134**	**0.0165**		**0.2093**	**0.2093**		**0.2093**	**0.2093**		**3,304.8574**	**3,304.8574**	**0.0633**	**0.0606**	**3,324.9702**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Manufacturing	28.0913	0.3030	2.7541	2.3134	0.0165		0.2093	0.2093		0.2093	0.2093		3,304.8574	3,304.8574	0.0633	0.0606	3,324.9702
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.3030**	**2.7541**	**2.3134**	**0.0165**		**0.2093**	**0.2093**		**0.2093**	**0.2093**		**3,304.8574**	**3,304.8574**	**0.0633**	**0.0606**	**3,324.9702**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	16.1396	4.0000e-004	0.0429	0.0000		1.5000e-004	1.5000e-004		1.5000e-004	1.5000e-004		0.0910	0.0910	2.5000e-004		0.0962
Unmitigated	16.1396	4.0000e-004	0.0429	0.0000		1.5000e-004	1.5000e-004		1.5000e-004	1.5000e-004		0.0910	0.0910	2.5000e-004		0.0962

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.6523					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	13.4832					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	4.0600e-003	4.0000e-004	0.0429	0.0000		1.5000e-004	1.5000e-004		1.5000e-004	1.5000e-004		0.0910	0.0910	2.5000e-004		0.0962
Total	**16.1396**	**4.0000e-004**	**0.0429**	**0.0000**		**1.5000e-004**	**1.5000e-004**		**1.5000e-004**	**1.5000e-004**		**0.0910**	**0.0910**	**2.5000e-004**		**0.0962**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.6523					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	13.4832					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	4.0600e-003	4.0000e-004	0.0429	0.0000		1.5000e-004	1.5000e-004		1.5000e-004	1.5000e-004		0.0910	0.0910	2.5000e-004		0.0962
Total	**16.1396**	**4.0000e-004**	**0.0429**	**0.0000**		**1.5000e-004**	**1.5000e-004**		**1.5000e-004**	**1.5000e-004**		**0.0910**	**0.0910**	**2.5000e-004**		**0.0962**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Forklifts	3	8.00	260	89	0.20	CNG
Generator Sets	1	1.67	12	84	0.74	Diesel

UnMitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio-CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	lb/day										lb/day					
Forklifts	0.4799	4.2849	3.5826	4.5800e-003		0.3320	0.3320		0.3054	0.3054		453.9612	453.9612	0.1436		456.9774
Generator Sets	0.0927	0.7886	0.7772	1.3700e-003		0.0471	0.0471		0.0471	0.0471		130.0585	130.0585	8.2400e-003		130.2315
Total	**0.5725**	**5.0736**	**4.3598**	**5.9500e-003**		**0.3791**	**0.3791**		**0.3525**	**0.3525**		**584.0197**	**584.0197**	**0.1519**		**587.2089**

10.0 Vegetation

Center Street Warehouse

South Coast Air Basin, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Manufacturing	308.00	1000sqft	7.07	308,000.00	0
Other Non-Asphalt Surfaces	101.59	1000sqft	2.33	101,590.00	0
Parking Lot	6.23	Acre	6.23	271,378.80	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2019
Utility Company	Riverside Public Utilities				
CO2 Intensity (lb/MWhr)	1325.65	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Demolition -

Architectural Coating - Use of Low-VOC Paints

Vehicle Trips -

Vechicle Emission Factors - Fleet Mix Per Traffic Study

Vechicle Emission Factors - Fleet Mix Per Traffic Study

Vechicle Emission Factors - Fleet Mix Per SCAQMD Recommendation

Water And Wastewater - Include Landscape Water Demand using State Water Budget Worksheet

Solid Waste - 50% Mandatory Recycling Requirement

Construction Off-road Equipment Mitigation - Water 3 times daily

Operational Off-Road Equipment - Assume Forklifts and Generator Set Equipment per ERG/ARB 2005 Survey
Generators Operatiosn Based on SCE Outage Data

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	250.00	37.00
tblArchitecturalCoating	EF_Nonresidential_Interior	250.00	37.00
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	12.00
tblOperationalOffRoadEquipment	OperFuelType	Diesel	CNG
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	1.67
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	3.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblProjectCharacteristics	OperationalYear	2014	2019
tblSolidWaste	SolidWasteGenerationRate	381.92	190.96
tblVehicleEF	HHD	0.03	0.13
tblVehicleEF	HHD	0.03	0.13
tblVehicleEF	LDA	0.51	0.74
tblVehicleEF	LDA	0.51	0.74
tblVehicleEF	LDA	0.51	0.74
tblVehicleEF	LDT1	0.06	0.00
tblVehicleEF	LDT1	0.06	0.00
tblVehicleEF	LDT1	0.06	0.00
tblVehicleEF	LDT2	0.18	0.00
tblVehicleEF	LDT2	0.18	0.00
tblVehicleEF	LDT2	0.18	0.00

tblVehicleEF	LHD1	0.04	0.08
tblVehicleEF	LHD1	0.04	0.08
tblVehicleEF	LHD1	0.04	0.09
tblVehicleEF	LHD2	6.6660e-003	0.00
tblVehicleEF	LHD2	6.6660e-003	0.00
tblVehicleEF	LHD2	6.6660e-003	0.00
tblVehicleEF	MCY	4.3770e-003	0.00
tblVehicleEF	MCY	4.3770e-003	0.00
tblVehicleEF	MCY	4.3770e-003	0.00
tblVehicleEF	MDV	0.14	0.00
tblVehicleEF	MDV	0.14	0.00
tblVehicleEF	MDV	0.14	0.00
tblVehicleEF	MH	2.1280e-003	0.00
tblVehicleEF	MH	2.1280e-003	0.00
tblVehicleEF	MHD	0.02	0.05
tblVehicleEF	MHD	0.02	0.05
tblVehicleEF	MHD	0.02	0.05
tblVehicleEF	OBUS	1.9400e-003	0.00
tblVehicleEF	OBUS	1.9400e-003	0.00
tblVehicleEF	OBUS	1.9400e-003	0.00
tblVehicleEF	SBUS	5.8200e-004	0.00
tblVehicleEF	SBUS	5.8200e-004	0.00
tblVehicleEF	UBUS	2.4960e-003	0.00
tblVehicleEF	UBUS	2.4960e-003	0.00
tblVehicleEF	UBUS	2.4960e-003	0.00
tblWater	AerobicPercent	87.46	97.79

tblWater	AerobicPercent	87.46	97.79
tblWater	AerobicPercent	87.46	97.79
tblWater	OutdoorWaterUseRate	0.00	2,591,811.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2017	6.1755	69.6953	47.8835	0.0889	18.2675	3.3190	21.0233	9.9840	3.0535	12.5194	0.0000	8,092.2198	8,092.2198	1.9457	0.0000	8,133.0787
2018	72.1332	32.9295	43.7048	0.0889	3.8970	1.6534	5.5504	1.0472	1.5513	2.5985	0.0000	7,907.7589	7,907.7589	0.8055	0.0000	7,924.6743
Total	**78.3087**	**102.6248**	**91.5883**	**0.1778**	**22.1645**	**4.9724**	**26.5737**	**11.0313**	**4.6048**	**15.1179**	**0.0000**	**15,999.9787**	**15,999.9787**	**2.7512**	**0.0000**	**16,057.7530**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2017	6.1755	69.6953	47.8835	0.0889	7.2470	3.3190	10.0029	3.9263	3.0535	6.4617	0.0000	8,092.2198	8,092.2198	1.9457	0.0000	8,133.0787
2018	72.1332	32.9295	43.7048	0.0889	3.8970	1.6534	5.5504	1.0472	1.5513	2.5985	0.0000	7,907.7589	7,907.7589	0.8055	0.0000	7,924.6743
Total	**78.3087**	**102.6248**	**91.5883**	**0.1778**	**11.1440**	**4.9724**	**15.5533**	**4.9736**	**4.6048**	**9.0602**	**0.0000**	**15,999.9787**	**15,999.9787**	**2.7512**	**0.0000**	**16,057.7530**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**49.72**	**0.00**	**41.47**	**54.91**	**0.00**	**40.07**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	16.1396	4.0000e-004	0.0429	0.0000		1.5000e-004	1.5000e-004		1.5000e-004	1.5000e-004		0.0910	0.0910	2.5000e-004		0.0962
Energy	0.3030	2.7541	2.3134	0.0165		0.2093	0.2093		0.2093	0.2093		3,304.8574	3,304.8574	0.0633	0.0606	3,324.9702
Mobile	4.0536	30.2464	55.1822	0.1820	11.2199	0.5055	11.7254	3.0104	0.4654	3.4757		15,410.3488	15,410.3488	0.3529		15,417.7594
Offroad	0.5725	5.0736	4.3598	5.9500e-003		0.3791	0.3791		0.3525	0.3525		584.0197	584.0197	0.1519		587.2089
Total	**21.0686**	**38.0744**	**61.8982**	**0.2045**	**11.2199**	**1.0940**	**12.3139**	**3.0104**	**1.0274**	**4.0377**		**19,299.3168**	**19,299.3168**	**0.5684**	**0.0606**	**19,330.0346**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	16.1396	4.0000e-004	0.0429	0.0000		1.5000e-004	1.5000e-004		1.5000e-004	1.5000e-004		0.0910	0.0910	2.5000e-004		0.0962
Energy	0.3030	2.7541	2.3134	0.0165		0.2093	0.2093		0.2093	0.2093		3,304.8574	3,304.8574	0.0633	0.0606	3,324.9702
Mobile	4.0536	30.2464	55.1822	0.1820	11.2199	0.5055	11.7254	3.0104	0.4654	3.4757		15,410.3488	15,410.3488	0.3529		15,417.7594
Offroad	0.5725	5.0736	4.3598	5.9500e-003		0.3791	0.3791		0.3525	0.3525		584.0197	584.0197	0.1519		587.2089
Total	**21.0686**	**38.0744**	**61.8982**	**0.2045**	**11.2199**	**1.0940**	**12.3139**	**3.0104**	**1.0274**	**4.0377**		**19,299.3168**	**19,299.3168**	**0.5684**	**0.0606**	**19,330.0346**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**2.72**	**13.33**	**7.04**	**2.91**	**0.00**	**34.65**	**3.08**	**0.00**	**34.31**	**8.73**	**0.00**	**3.03**	**3.03**	**26.72**	**0.00**	**3.04**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2017	1/27/2017	5	20	
2	Site Preparation	Site Preparation	1/28/2017	2/10/2017	5	10	
3	Grading	Grading	2/11/2017	3/24/2017	5	30	
4	Building Construction	Building Construction	3/25/2017	5/18/2018	5	300	
5	Paving	Paving	5/19/2018	6/15/2018	5	20	
6	Architectural Coating	Architectural Coating	6/16/2018	7/13/2018	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 75

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 626,597; Non-Residential Outdoor: 208,866 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	162	0.38

Demolition	Rubber Tired Dozers	2	8.00	255	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Scrapers	2	8.00	361	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	226	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	125	0.42
Paving	Paving Equipment	2	8.00	130	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	733.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	286.00	112.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

Architectural Coating	1	57.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.0482	42.6971	33.8934	0.0399		2.1252	2.1252		1.9797	1.9797		4,036.4674	4,036.4674	1.1073		4,059.7211
Total	**4.0482**	**42.6971**	**33.8934**	**0.0399**		**2.1252**	**2.1252**		**1.9797**	**1.9797**		**4,036.4674**	**4,036.4674**	**1.1073**		**4,059.7211**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.6283	9.6450	7.8877	0.0270	0.6386	0.1439	0.7825	0.1749	0.1324	0.3073		2,675.8805	2,675.8805	0.0194		2,676.2883
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0573	0.0775	0.8088	1.9900e-003	0.1677	1.3500e-003	0.1690	0.0445	1.2400e-003	0.0457		160.9269	160.9269	8.4400e-003		161.1042
Total	**0.6856**	**9.7224**	**8.6965**	**0.0290**	**0.8062**	**0.1453**	**0.9515**	**0.2193**	**0.1336**	**0.3530**		**2,836.8074**	**2,836.8074**	**0.0279**		**2,837.3925**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.0482	42.6971	33.8934	0.0399		2.1252	2.1252		1.9797	1.9797	0.0000	4,036.4674	4,036.4674	1.1073		4,059.7211
Total	**4.0482**	**42.6971**	**33.8934**	**0.0399**		**2.1252**	**2.1252**		**1.9797**	**1.9797**	**0.0000**	**4,036.4674**	**4,036.4674**	**1.1073**		**4,059.7211**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.6283	9.6450	7.8877	0.0270	0.6386	0.1439	0.7825	0.1749	0.1324	0.3073		2,675.8805	2,675.8805	0.0194		2,676.2883
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0573	0.0775	0.8088	1.9900e-003	0.1677	1.3500e-003	0.1690	0.0445	1.2400e-003	0.0457		160.9269	160.9269	8.4400e-003		161.1042
Total	**0.6856**	**9.7224**	**8.6965**	**0.0290**	**0.8062**	**0.1453**	**0.9515**	**0.2193**	**0.1336**	**0.3530**		**2,836.8074**	**2,836.8074**	**0.0279**		**2,837.3925**

3.3 Site Preparation - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.8382	51.7535	39.3970	0.0391		2.7542	2.7542		2.5339	2.5339		4,003.0859	4,003.0859	1.2265		4,028.8432
Total	**4.8382**	**51.7535**	**39.3970**	**0.0391**	**18.0663**	**2.7542**	**20.8205**	**9.9307**	**2.5339**	**12.4646**		**4,003.0859**	**4,003.0859**	**1.2265**		**4,028.8432**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0687	0.0929	0.9706	2.3900e-003	0.2012	1.6200e-003	0.2028	0.0534	1.4900e-003	0.0549		193.1123	193.1123	0.0101		193.3250
Total	**0.0687**	**0.0929**	**0.9706**	**2.3900e-003**	**0.2012**	**1.6200e-003**	**0.2028**	**0.0534**	**1.4900e-003**	**0.0549**		**193.1123**	**193.1123**	**0.0101**		**193.3250**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.0458	0.0000	7.0458	3.8730	0.0000	3.8730			0.0000			0.0000
Off-Road	4.8382	51.7535	39.3970	0.0391		2.7542	2.7542		2.5339	2.5339	0.0000	4,003.0859	4,003.0859	1.2265		4,028.8432
Total	**4.8382**	**51.7535**	**39.3970**	**0.0391**	**7.0458**	**2.7542**	**9.8001**	**3.8730**	**2.5339**	**6.4069**	**0.0000**	**4,003.0859**	**4,003.0859**	**1.2265**		**4,028.8432**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0687	0.0929	0.9706	2.3900e-003	0.2012	1.6200e-003	0.2028	0.0534	1.4900e-003	0.0549		193.1123	193.1123	0.0101		193.3250
Total	**0.0687**	**0.0929**	**0.9706**	**2.3900e-003**	**0.2012**	**1.6200e-003**	**0.2028**	**0.0534**	**1.4900e-003**	**0.0549**		**193.1123**	**193.1123**	**0.0101**		**193.3250**

3.4 Grading - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	6.0991	69.5920	46.8050	0.0617		3.3172	3.3172		3.0518	3.0518		6,313.3690	6,313.3690	1.9344		6,353.9915
Total	**6.0991**	**69.5920**	**46.8050**	**0.0617**	**8.6733**	**3.3172**	**11.9905**	**3.5965**	**3.0518**	**6.6483**		**6,313.3690**	**6,313.3690**	**1.9344**		**6,353.9915**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0764	0.1033	1.0784	2.6500e-003	0.2236	1.8000e-003	0.2254	0.0593	1.6600e-003	0.0610		214.5692	214.5692	0.0113		214.8056
Total	**0.0764**	**0.1033**	**1.0784**	**2.6500e-003**	**0.2236**	**1.8000e-003**	**0.2254**	**0.0593**	**1.6600e-003**	**0.0610**		**214.5692**	**214.5692**	**0.0113**		**214.8056**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.3826	0.0000	3.3826	1.4026	0.0000	1.4026			0.0000			0.0000
Off-Road	6.0991	69.5920	46.8050	0.0617		3.3172	3.3172		3.0518	3.0518	0.0000	6,313.3690	6,313.3690	1.9344		6,353.9915
Total	**6.0991**	**69.5920**	**46.8050**	**0.0617**	**3.3826**	**3.3172**	**6.6998**	**1.4026**	**3.0518**	**4.4545**	**0.0000**	**6,313.3690**	**6,313.3690**	**1.9344**		**6,353.9915**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0764	0.1033	1.0784	2.6500e-003	0.2236	1.8000e-003	0.2254	0.0593	1.6600e-003	0.0610		214.5692	214.5692	0.0113		214.8056
Total	**0.0764**	**0.1033**	**1.0784**	**2.6500e-003**	**0.2236**	**1.8000e-003**	**0.2254**	**0.0593**	**1.6600e-003**	**0.0610**		**214.5692**	**214.5692**	**0.0113**		**214.8056**

3.5 Building Construction - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1024	26.4057	18.1291	0.0268		1.7812	1.7812		1.6730	1.6730		2,639.8053	2,639.8053	0.6497		2,653.4490
Total	**3.1024**	**26.4057**	**18.1291**	**0.0268**		**1.7812**	**1.7812**		**1.6730**	**1.6730**		**2,639.8053**	**2,639.8053**	**0.6497**		**2,653.4490**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.9367	9.0751	12.7296	0.0242	0.7002	0.1423	0.8425	0.1994	0.1309	0.3303		2,384.0753	2,384.0753	0.0175		2,384.4425
Worker	1.0918	1.4767	15.4217	0.0379	3.1968	0.0257	3.2225	0.8478	0.0237	0.8715		3,068.3392	3,068.3392	0.1610		3,071.7194
Total	**2.0285**	**10.5518**	**28.1513**	**0.0621**	**3.8970**	**0.1680**	**4.0650**	**1.0472**	**0.1546**	**1.2019**		**5,452.4145**	**5,452.4145**	**0.1784**		**5,456.1619**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1024	26.4057	18.1291	0.0268		1.7812	1.7812		1.6730	1.6730	0.0000	2,639.8053	2,639.8053	0.6497		2,653.4490
Total	**3.1024**	**26.4057**	**18.1291**	**0.0268**		**1.7812**	**1.7812**		**1.6730**	**1.6730**	**0.0000**	**2,639.8053**	**2,639.8053**	**0.6497**		**2,653.4490**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.9367	9.0751	12.7296	0.0242	0.7002	0.1423	0.8425	0.1994	0.1309	0.3303		2,384.0753	2,384.0753	0.0175		2,384.4425
Worker	1.0918	1.4767	15.4217	0.0379	3.1968	0.0257	3.2225	0.8478	0.0237	0.8715		3,068.3392	3,068.3392	0.1610		3,071.7194
Total	**2.0285**	**10.5518**	**28.1513**	**0.0621**	**3.8970**	**0.1680**	**4.0650**	**1.0472**	**0.1546**	**1.2019**		**5,452.4145**	**5,452.4145**	**0.1784**		**5,456.1619**

3.5 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6687	23.2608	17.5327	0.0268		1.4943	1.4943		1.4048	1.4048		2,609.9390	2,609.9390	0.6387		2,623.3517
Total	**2.6687**	**23.2608**	**17.5327**	**0.0268**		**1.4943**	**1.4943**		**1.4048**	**1.4048**		**2,609.9390**	**2,609.9390**	**0.6387**		**2,623.3517**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.8757	8.3294	12.2153	0.0241	0.7002	0.1341	0.8343	0.1994	0.1234	0.3228		2,344.0544	2,344.0544	0.0174		2,344.4197
Worker	0.9820	1.3393	13.9568	0.0379	3.1968	0.0250	3.2218	0.8478	0.0232	0.8710		2,953.7655	2,953.7655	0.1494		2,956.9028
Total	**1.8576**	**9.6687**	**26.1721**	**0.0621**	**3.8970**	**0.1591**	**4.0561**	**1.0472**	**0.1465**	**1.1938**		**5,297.8199**	**5,297.8199**	**0.1668**		**5,301.3225**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6687	23.2608	17.5327	0.0268		1.4943	1.4943		1.4048	1.4048	0.0000	2,609.9389	2,609.9389	0.6387		2,623.3517
Total	**2.6687**	**23.2608**	**17.5327**	**0.0268**		**1.4943**	**1.4943**		**1.4048**	**1.4048**	**0.0000**	**2,609.9389**	**2,609.9389**	**0.6387**		**2,623.3517**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.8757	8.3294	12.2153	0.0241	0.7002	0.1341	0.8343	0.1994	0.1234	0.3228		2,344.0544	2,344.0544	0.0174		2,344.4197
Worker	0.9820	1.3393	13.9568	0.0379	3.1968	0.0250	3.2218	0.8478	0.0232	0.8710		2,953.7655	2,953.7655	0.1494		2,956.9028
Total	**1.8576**	**9.6687**	**26.1721**	**0.0621**	**3.8970**	**0.1591**	**4.0561**	**1.0472**	**0.1465**	**1.1938**		**5,297.8199**	**5,297.8199**	**0.1668**		**5,301.3225**

3.6 Paving - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6114	17.1628	14.4944	0.0223		0.9386	0.9386		0.8635	0.8635		2,245.2695	2,245.2695	0.6990		2,259.9481
Paving	0.8161					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.4275**	**17.1628**	**14.4944**	**0.0223**		**0.9386**	**0.9386**		**0.8635**	**0.8635**		**2,245.2695**	**2,245.2695**	**0.6990**		**2,259.9481**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0515	0.0702	0.7320	1.9900e-003	0.1677	1.3100e-003	0.1690	0.0445	1.2100e-003	0.0457		154.9178	154.9178	7.8400e-003		155.0823
Total	**0.0515**	**0.0702**	**0.7320**	**1.9900e-003**	**0.1677**	**1.3100e-003**	**0.1690**	**0.0445**	**1.2100e-003**	**0.0457**		**154.9178**	**154.9178**	**7.8400e-003**		**155.0823**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6114	17.1628	14.4944	0.0223		0.9386	0.9386		0.8635	0.8635	0.0000	2,245.2695	2,245.2695	0.6990		2,259.9481
Paving	0.8161					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.4275**	**17.1628**	**14.4944**	**0.0223**		**0.9386**	**0.9386**		**0.8635**	**0.8635**	**0.0000**	**2,245.2695**	**2,245.2695**	**0.6990**		**2,259.9481**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0515	0.0702	0.7320	1.9900e-003	0.1677	1.3100e-003	0.1690	0.0445	1.2100e-003	0.0457		154.9178	154.9178	7.8400e-003		155.0823
Total	**0.0515**	**0.0702**	**0.7320**	**1.9900e-003**	**0.1677**	**1.3100e-003**	**0.1690**	**0.0445**	**1.2100e-003**	**0.0457**		**154.9178**	**154.9178**	**7.8400e-003**		**155.0823**

3.7 Architectural Coating - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	71.6389					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2986	2.0058	1.8542	2.9700e-003		0.1506	0.1506		0.1506	0.1506		281.4485	281.4485	0.0267		282.0102
Total	**71.9375**	**2.0058**	**1.8542**	**2.9700e-003**		**0.1506**	**0.1506**		**0.1506**	**0.1506**		**281.4485**	**281.4485**	**0.0267**		**282.0102**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1957	0.2669	2.7816	7.5600e-003	0.6371	4.9900e-003	0.6421	0.1690	4.6200e-003	0.1736		588.6875	588.6875	0.0298		589.3128
Total	**0.1957**	**0.2669**	**2.7816**	**7.5600e-003**	**0.6371**	**4.9900e-003**	**0.6421**	**0.1690**	**4.6200e-003**	**0.1736**		**588.6875**	**588.6875**	**0.0298**		**589.3128**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	71.6389					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2986	2.0058	1.8542	2.9700e-003		0.1506	0.1506		0.1506	0.1506	0.0000	281.4485	281.4485	0.0267		282.0102
Total	**71.9375**	**2.0058**	**1.8542**	**2.9700e-003**		**0.1506**	**0.1506**		**0.1506**	**0.1506**	**0.0000**	**281.4485**	**281.4485**	**0.0267**		**282.0102**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1957	0.2669	2.7816	7.5600e-003	0.6371	4.9900e-003	0.6421	0.1690	4.6200e-003	0.1736		588.6875	588.6875	0.0298		589.3128
Total	**0.1957**	**0.2669**	**2.7816**	**7.5600e-003**	**0.6371**	**4.9900e-003**	**0.6421**	**0.1690**	**4.6200e-003**	**0.1736**		**588.6875**	**588.6875**	**0.0298**		**589.3128**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	4.0536	30.2464	55.1822	0.1820	11.2199	0.5055	11.7254	3.0104	0.4654	3.4757		15,410.3488	15,410.3488	0.3529		15,417.7594
Unmitigated	4.0536	30.2464	55.1822	0.1820	11.2199	0.5055	11.7254	3.0104	0.4654	3.4757		15,410.3488	15,410.3488	0.3529		15,417.7594

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Manufacturing	1,176.56	458.92	190.96	4,132,646	4,132,646
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	1,176.56	458.92	190.96	4,132,646	4,132,646

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Manufacturing	16.60	8.40	6.90	59.00	28.00	13.00	92	5	3
Other Non-Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH

0.744000	0.000000	0.000000	0.000000	0.086000	0.000000	0.046000	0.126000	0.000000	0.000000	0.000000	0.000000	0.000000

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.3030	2.7541	2.3134	0.0165		0.2093	0.2093		0.2093	0.2093		3,304.8574	3,304.8574	0.0633	0.0606	3,324.9702
NaturalGas Unmitigated	0.3030	2.7541	2.3134	0.0165		0.2093	0.2093		0.2093	0.2093		3,304.8574	3,304.8574	0.0633	0.0606	3,324.9702

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Manufacturing	28091.3	0.3030	2.7541	2.3134	0.0165		0.2093	0.2093		0.2093	0.2093		3,304.8574	3,304.8574	0.0633	0.0606	3,324.9702
Total		**0.3030**	**2.7541**	**2.3134**	**0.0165**		**0.2093**	**0.2093**		**0.2093**	**0.2093**		**3,304.8574**	**3,304.8574**	**0.0633**	**0.0606**	**3,324.9702**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Manufacturing	28.0913	0.3030	2.7541	2.3134	0.0165		0.2093	0.2093		0.2093	0.2093		3,304.8574	3,304.8574	0.0633	0.0606	3,324.9702
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.3030**	**2.7541**	**2.3134**	**0.0165**		**0.2093**	**0.2093**		**0.2093**	**0.2093**		**3,304.8574**	**3,304.8574**	**0.0633**	**0.0606**	**3,324.9702**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	16.1396	4.0000e-004	0.0429	0.0000		1.5000e-004	1.5000e-004		1.5000e-004	1.5000e-004		0.0910	0.0910	2.5000e-004		0.0962
Unmitigated	16.1396	4.0000e-004	0.0429	0.0000		1.5000e-004	1.5000e-004		1.5000e-004	1.5000e-004		0.0910	0.0910	2.5000e-004		0.0962

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.6523					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	13.4832					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	4.0600e-003	4.0000e-004	0.0429	0.0000		1.5000e-004	1.5000e-004		1.5000e-004	1.5000e-004		0.0910	0.0910	2.5000e-004		0.0962
Total	**16.1396**	**4.0000e-004**	**0.0429**	**0.0000**		**1.5000e-004**	**1.5000e-004**		**1.5000e-004**	**1.5000e-004**		**0.0910**	**0.0910**	**2.5000e-004**		**0.0962**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.6523					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	13.4832					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	4.0600e-003	4.0000e-004	0.0429	0.0000		1.5000e-004	1.5000e-004		1.5000e-004	1.5000e-004		0.0910	0.0910	2.5000e-004		0.0962
Total	**16.1396**	**4.0000e-004**	**0.0429**	**0.0000**		**1.5000e-004**	**1.5000e-004**		**1.5000e-004**	**1.5000e-004**		**0.0910**	**0.0910**	**2.5000e-004**		**0.0962**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Forklifts	3	8.00	260	89	0.20	CNG
Generator Sets	1	1.67	12	84	0.74	Diesel

UnMitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio-CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	lb/day										lb/day					
Forklifts	0.4799	4.2849	3.5826	4.5800e-003		0.3320	0.3320		0.3054	0.3054		453.9612	453.9612	0.1436		456.9774
Generator Sets	0.0927	0.7886	0.7772	1.3700e-003		0.0471	0.0471		0.0471	0.0471		130.0585	130.0585	8.2400e-003		130.2315
Total	**0.5725**	**5.0736**	**4.3598**	**5.9500e-003**		**0.3791**	**0.3791**		**0.3525**	**0.3525**		**584.0197**	**584.0197**	**0.1519**		**587.2089**

10.0 Vegetation

Appendix B
EMFAC2014 Results

PM10 Running

HHDT

	Baseline	Mitigated	Delta	%
2018	0.19	0.01	-0.19	0.96
2045	0.12	0.01	-0.11	0.95

MHDT

	Baseline	Mitigated	Delta	%
2018	0.21	0.00	-0.21	0.98
2045	0.10	0.00	-0.10	0.96

PM10 Idling

HHDT

	Baseline	Mitigated	Delta	%
2018	0.55	0.00	-0.54	0.99
2045	0.35	0.00	-0.34	0.99

MHDT

	Baseline	Mitigated	Delta	%
2018	0.11	0.00	-0.11	1.00
2045	0.06	0.00	-0.06	1.00

PM10 Running

HHDT

	Baseline	Mitigated	Delta	%
2018	193.37	8.21	-185.16	0.96
2045	117.60	5.43	-112.17	0.95

MHDT

	Baseline	Mitigated	Delta	%
2018	214.74	4.06	-210.68	0.98
2045	100.42	3.62	-96.80	0.96

PM10 Idling

HHDT

	Baseline	Mitigated	Delta	%
2018	548.56	3.59	-544.97	0.99
2045	346.03	2.44	-343.58	0.99

MHDT

	Baseline	Mitigated	Delta	%
2018	107.82	0.13	-107.69	1.00
2045	61.56	0.13	-61.43	1.00

EMFAC2014 (v1.0.7) Emission Rates
Region Type: Sub-Area
Region: Riverside (SC)
Calendar Year: 2018
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for VMT, trips/day for Trips, g/mile for RUNEX, PMBW and PMTW, g/trip for STREX, HTSK and RUNLS, g/vehicle/day for IDLEX, RESTL and DIURN

Region	CalYr	VehClass	MdlYr	Speed	Fuel	PM10_RUNEX	PM10_IDLEX
Riverside (SC)	2018	HHDT	1974	Aggregated	DSL	0.339580421	1.424784096
Riverside (SC)	2018	HHDT	1975	Aggregated	DSL	0.309086943	1.33948867
Riverside (SC)	2018	HHDT	1976	Aggregated	DSL	0.070516539	1.17619745
Riverside (SC)	2018	HHDT	1977	Aggregated	DSL	0.347934822	1.278258022
Riverside (SC)	2018	HHDT	1978	Aggregated	DSL	0.17163622	1.224488441
Riverside (SC)	2018	HHDT	1979	Aggregated	DSL	0.3014317	1.294006823
Riverside (SC)	2018	HHDT	1980	Aggregated	DSL	0.248428206	1.262562289
Riverside (SC)	2018	HHDT	1981	Aggregated	DSL	0.377117006	1.31575757
Riverside (SC)	2018	HHDT	1982	Aggregated	DSL	0.433743328	1.306282124
Riverside (SC)	2018	HHDT	1983	Aggregated	DSL	0.510976964	1.333317735
Riverside (SC)	2018	HHDT	1984	Aggregated	DSL	0.405367111	1.30735173
Riverside (SC)	2018	HHDT	1985	Aggregated	DSL	0.457076901	1.301139528
Riverside (SC)	2018	HHDT	1986	Aggregated	DSL	0.466260428	1.309037489
Riverside (SC)	2018	HHDT	1987	Aggregated	DSL	0.54716514	0.689737443
Riverside (SC)	2018	HHDT	1988	Aggregated	DSL	0.521168979	0.677700322
Riverside (SC)	2018	HHDT	1989	Aggregated	DSL	0.430455919	0.661397826
Riverside (SC)	2018	HHDT	1990	Aggregated	DSL	0.500132437	0.672770518
Riverside (SC)	2018	HHDT	1991	Aggregated	DSL	0.18479219	0.510553182
Riverside (SC)	2018	HHDT	1992	Aggregated	DSL	0.211736292	0.524432801
Riverside (SC)	2018	HHDT	1993	Aggregated	DSL	0.253676216	0.550167661
Riverside (SC)	2018	HHDT	1994	Aggregated	DSL	0.158664339	0.403569209
Riverside (SC)	2018	HHDT	1995	Aggregated	DSL	0.175724325	0.412735104
Riverside (SC)	2018	HHDT	1996	Aggregated	DSL	0.1188319	0.358206615
Riverside (SC)	2018	HHDT	1997	Aggregated	DSL	0.128985295	0.352930817
Riverside (SC)	2018	HHDT	1998	Aggregated	DSL	0.125104923	0.263449851
Riverside (SC)	2018	HHDT	1999	Aggregated	DSL	0.09761396	0.247813889
Riverside (SC)	2018	HHDT	2000	Aggregated	DSL	0.087724922	0.232812823
Riverside (SC)	2018	HHDT	2001	Aggregated	DSL	0.084771721	0.2447187
Riverside (SC)	2018	HHDT	2002	Aggregated	DSL	0.084263892	0.277696831
Riverside (SC)	2018	HHDT	2003	Aggregated	DSL	0.101677873	0.220178436
Riverside (SC)	2018	HHDT	2004	Aggregated	DSL	0.126205815	0.262411559
Riverside (SC)	2018	HHDT	2005	Aggregated	DSL	0.125939213	0.241892715
Riverside (SC)	2018	HHDT	2006	Aggregated	DSL	0.123446535	0.231465057
Riverside (SC)	2018	HHDT	2007	Aggregated	DSL	0.086577964	0.235455895
Riverside (SC)	2018	HHDT	2008	Aggregated	DSL	0.055123223	0.050600678
Riverside (SC)	2018	HHDT	2009	Aggregated	DSL	0.044034238	0.002589372
Riverside (SC)	2018	HHDT	2010	Aggregated	DSL	0.037630318	0.002762422
Riverside (SC)	2018	HHDT	2011	Aggregated	DSL	0.012881023	0.002922484
Riverside (SC)	2018	HHDT	2012	Aggregated	DSL	0.006284406	0.003842831
Riverside (SC)	2018	HHDT	2013	Aggregated	DSL	0.00536237	0.003175574
Riverside (SC)	2018	HHDT	2014	Aggregated	DSL	0.004322408	0.003441434
Riverside (SC)	2018	HHDT	2015	Aggregated	DSL	0.003845544	0.003548693
Riverside (SC)	2018	HHDT	2016	Aggregated	DSL	0.003497027	0.003575278
Riverside (SC)	2018	HHDT	2017	Aggregated	DSL	0.003144231	0.003684579
Riverside (SC)	2018	HHDT	2018	Aggregated	DSL	0.00276489	0.003495803
Riverside (SC)	2018	HHDT	2019	Aggregated	DSL	0.002360264	0.005480458
						0.193371008	0.548562801

Region	CalYr	VehClass	MdlYr	Speed	Fuel	PM10_RUNEX	PM10_IDLEX
Riverside (SC)	2018	MHDT	1974	Aggregated	DSL	0.60143572	0.452585847
Riverside (SC)	2018	MHDT	1975	Aggregated	DSL	0.299540436	0.224260932
Riverside (SC)	2018	MHDT	1976	Aggregated	DSL	0.202093502	0.162952946
Riverside (SC)	2018	MHDT	1977	Aggregated	DSL	0.2600571	0.189436712
Riverside (SC)	2018	MHDT	1978	Aggregated	DSL	0.413111396	0.297032154
Riverside (SC)	2018	MHDT	1979	Aggregated	DSL	1.079067223	0.719076004
Riverside (SC)	2018	MHDT	1980	Aggregated	DSL	0.207016538	0.163409698
Riverside (SC)	2018	MHDT	1981	Aggregated	DSL	0.181984875	0.150689313
Riverside (SC)	2018	MHDT	1982	Aggregated	DSL	0.204528238	0.167495445
Riverside (SC)	2018	MHDT	1983	Aggregated	DSL	0.203546894	0.169141288
Riverside (SC)	2018	MHDT	1984	Aggregated	DSL	0.366080564	0.293059458
Riverside (SC)	2018	MHDT	1985	Aggregated	DSL	0.241742808	0.202686108
Riverside (SC)	2018	MHDT	1986	Aggregated	DSL	0.218756888	0.187754647
Riverside (SC)	2018	MHDT	1987	Aggregated	DSL	0.204953986	0.077337411
Riverside (SC)	2018	MHDT	1988	Aggregated	DSL	0.215711089	0.08348071
Riverside (SC)	2018	MHDT	1989	Aggregated	DSL	0.245502164	0.096269365
Riverside (SC)	2018	MHDT	1990	Aggregated	DSL	0.21319018	0.084508973
Riverside (SC)	2018	MHDT	1991	Aggregated	DSL	0.085033603	0.049146305
Riverside (SC)	2018	MHDT	1992	Aggregated	DSL	0.110170817	0.06335547
Riverside (SC)	2018	MHDT	1993	Aggregated	DSL	0.120055563	0.070818441
Riverside (SC)	2018	MHDT	1994	Aggregated	DSL	0.087060167	0.061036333
Riverside (SC)	2018	MHDT	1995	Aggregated	DSL	0.08036678	0.056176196
Riverside (SC)	2018	MHDT	1996	Aggregated	DSL	0.084722606	0.063264387
Riverside (SC)	2018	MHDT	1997	Aggregated	DSL	0.090398824	0.070096423
Riverside (SC)	2018	MHDT	1998	Aggregated	DSL	0.086331296	0.041787915
Riverside (SC)	2018	MHDT	1999	Aggregated	DSL	0.336026464	0.099767195
Riverside (SC)	2018	MHDT	2000	Aggregated	DSL	0.315405174	0.093941476
Riverside (SC)	2018	MHDT	2001	Aggregated	DSL	0.308171261	0.093668087
Riverside (SC)	2018	MHDT	2002	Aggregated	DSL	0.294798078	0.090566637
Riverside (SC)	2018	MHDT	2003	Aggregated	DSL	0.521233655	0.075795832
Riverside (SC)	2018	MHDT	2004	Aggregated	DSL	0.534383821	0.079764769
Riverside (SC)	2018	MHDT	2005	Aggregated	DSL	0.523750289	0.080051853
Riverside (SC)	2018	MHDT	2006	Aggregated	DSL	0.504808288	0.079101261
Riverside (SC)	2018	MHDT	2007	Aggregated	DSL	0.345594347	0.065885984
Riverside (SC)	2018	MHDT	2008	Aggregated	DSL	0.029559247	0.002806113
Riverside (SC)	2018	MHDT	2009	Aggregated	DSL	0.021266349	0.000132354
Riverside (SC)	2018	MHDT	2010	Aggregated	DSL	0.01785778	0.000132354
Riverside (SC)	2018	MHDT	2011	Aggregated	DSL	0.006096323	0.000132354
Riverside (SC)	2018	MHDT	2012	Aggregated	DSL	0.002933926	0.000132354
Riverside (SC)	2018	MHDT	2013	Aggregated	DSL	0.00266385	0.000132354
Riverside (SC)	2018	MHDT	2014	Aggregated	DSL	0.002245171	0.000132354
Riverside (SC)	2018	MHDT	2015	Aggregated	DSL	0.002045193	0.000132354
Riverside (SC)	2018	MHDT	2016	Aggregated	DSL	0.001900339	0.000132354
Riverside (SC)	2018	MHDT	2017	Aggregated	DSL	0.001753631	0.000132354
Riverside (SC)	2018	MHDT	2018	Aggregated	DSL	0.001608018	0.000132354
Riverside (SC)	2018	MHDT	2019	Aggregated	DSL	0.001462138	0.000132354
						0.214739622	0.107818774

EMFAC2014 (v1.0.7) Emission Rates
Region Type: Sub-Area
Region: Riverside (SC)
Calendar Year: 2018
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for VMT, trips/day for Trips, g/mile for RUNEX, PMBW and PMTW, g/trip for STREX, HTSK and RUNLS, g/vehicle/day for IDLEX, RESTL and DIURN

Region	CalYr	VehClass	MdlYr	Speed	Fuel	PM10_RUNEX	PM10_IDLEX
Riverside (S	2018	HHDT	2010	Aggregated	DSL	0.037630318	0.002762422
Riverside (S	2018	HHDT	2011	Aggregated	DSL	0.012881023	0.002922484
Riverside (S	2018	HHDT	2012	Aggregated	DSL	0.006284406	0.003842831
Riverside (S	2018	HHDT	2013	Aggregated	DSL	0.00536237	0.003175574
Riverside (S	2018	HHDT	2014	Aggregated	DSL	0.004322408	0.003441434
Riverside (S	2018	HHDT	2015	Aggregated	DSL	0.003845544	0.003548693
Riverside (S	2018	HHDT	2016	Aggregated	DSL	0.003497027	0.003575278
Riverside (S	2018	HHDT	2017	Aggregated	DSL	0.003144231	0.003684579
Riverside (S	2018	HHDT	2018	Aggregated	DSL	0.00276489	0.003495803
Riverside (S	2018	HHDT	2019	Aggregated	DSL	0.002360264	0.005480458
						0.008209248	0.003592956

Region	CalYr	VehClass	MdlYr	Speed	Fuel	PM10_RUNEX	PM10_IDLEX
Riverside (SC)	2018	MHDT	2010	Aggregated	DSL	0.01785778	0.000132354
Riverside (SC)	2018	MHDT	2011	Aggregated	DSL	0.006096323	0.000132354
Riverside (SC)	2018	MHDT	2012	Aggregated	DSL	0.002933926	0.000132354
Riverside (SC)	2018	MHDT	2013	Aggregated	DSL	0.00266385	0.000132354
Riverside (SC)	2018	MHDT	2014	Aggregated	DSL	0.002245171	0.000132354
Riverside (SC)	2018	MHDT	2015	Aggregated	DSL	0.002045193	0.000132354
Riverside (SC)	2018	MHDT	2016	Aggregated	DSL	0.001900339	0.000132354
Riverside (SC)	2018	MHDT	2017	Aggregated	DSL	0.001753631	0.000132354
Riverside (SC)	2018	MHDT	2018	Aggregated	DSL	0.001608018	0.000132354
Riverside (SC)	2018	MHDT	2019	Aggregated	DSL	0.001462138	0.000132354
						0.004056637	0.000132354

EMFAC2014 (v1.0.7) Emission Rates
Region Type: Sub-Area
Region: Riverside (SC)
Calendar Year: 2045
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for VMT, trips/day for Trips, g/mile for RUNEX, PMBW and PMTW, g/trip for STREX, HTSK and RUNLS, g/vehicle/day for IDLEX, RESTL and DIURN

Region	CalYr	VehClass	MdlYr	Speed	Fuel	PM10_RUNEX	PM10_IDLEX	Region	CalYr	VehClass	MdlYr	Speed	Fuel	PM10_RUNEX	PM10_IDLEX
Riverside (S	2018	HHDT	1974	Aggregated	DSL	0.339580421	1.424784096	Riverside (SC)	2018	MHDT	1974	Aggregated	DSL	0.60143572	0.452585847
Riverside (S	2018	HHDT	1975	Aggregated	DSL	0.309086943	1.33948867	Riverside (SC)	2018	MHDT	1975	Aggregated	DSL	0.299540436	0.224260932
Riverside (S	2018	HHDT	1976	Aggregated	DSL	0.070516539	1.17619745	Riverside (SC)	2018	MHDT	1976	Aggregated	DSL	0.202093502	0.162952946
Riverside (S	2018	HHDT	1977	Aggregated	DSL	0.347934822	1.278258022	Riverside (SC)	2018	MHDT	1977	Aggregated	DSL	0.2600571	0.189436712
Riverside (S	2018	HHDT	1978	Aggregated	DSL	0.17163622	1.224488441	Riverside (SC)	2018	MHDT	1978	Aggregated	DSL	0.413111396	0.297032154
Riverside (S	2018	HHDT	1979	Aggregated	DSL	0.3014317	1.294006823	Riverside (SC)	2018	MHDT	1979	Aggregated	DSL	1.079067223	0.719076004
Riverside (S	2018	HHDT	1980	Aggregated	DSL	0.248428206	1.262562289	Riverside (SC)	2018	MHDT	1980	Aggregated	DSL	0.207016538	0.163409698
Riverside (S	2018	HHDT	1981	Aggregated	DSL	0.377117006	1.31575757	Riverside (SC)	2018	MHDT	1981	Aggregated	DSL	0.181984875	0.150689313
Riverside (S	2018	HHDT	1982	Aggregated	DSL	0.433743328	1.306282124	Riverside (SC)	2018	MHDT	1982	Aggregated	DSL	0.204528238	0.167495445
Riverside (S	2018	HHDT	1983	Aggregated	DSL	0.510976964	1.333317735	Riverside (SC)	2018	MHDT	1983	Aggregated	DSL	0.203546894	0.169141288
Riverside (S	2018	HHDT	1984	Aggregated	DSL	0.405367111	1.30735173	Riverside (SC)	2018	MHDT	1984	Aggregated	DSL	0.366080564	0.293059458
Riverside (S	2018	HHDT	1985	Aggregated	DSL	0.457076901	1.301139528	Riverside (SC)	2018	MHDT	1985	Aggregated	DSL	0.241742808	0.202686108
Riverside (S	2018	HHDT	1986	Aggregated	DSL	0.466260428	1.309037489	Riverside (SC)	2018	MHDT	1986	Aggregated	DSL	0.218756888	0.187754647
Riverside (S	2018	HHDT	1987	Aggregated	DSL	0.54716514	0.689737443	Riverside (SC)	2018	MHDT	1987	Aggregated	DSL	0.204953986	0.077337411
Riverside (S	2018	HHDT	1988	Aggregated	DSL	0.521168979	0.677700322	Riverside (SC)	2018	MHDT	1988	Aggregated	DSL	0.215711089	0.08348071
Riverside (S	2018	HHDT	1989	Aggregated	DSL	0.430455919	0.661397826	Riverside (SC)	2018	MHDT	1989	Aggregated	DSL	0.245502164	0.096269365
Riverside (S	2018	HHDT	1990	Aggregated	DSL	0.500132437	0.672770518	Riverside (SC)	2018	MHDT	1990	Aggregated	DSL	0.21319018	0.084508973
Riverside (S	2018	HHDT	1991	Aggregated	DSL	0.18479219	0.510553182	Riverside (SC)	2018	MHDT	1991	Aggregated	DSL	0.085033603	0.049146305
Riverside (S	2018	HHDT	1992	Aggregated	DSL	0.211736292	0.524432801	Riverside (SC)	2018	MHDT	1992	Aggregated	DSL	0.110170817	0.06335547
Riverside (S	2018	HHDT	1993	Aggregated	DSL	0.253676216	0.550167661	Riverside (SC)	2018	MHDT	1993	Aggregated	DSL	0.120055563	0.070818441
Riverside (S	2018	HHDT	1994	Aggregated	DSL	0.158664339	0.403569209	Riverside (SC)	2018	MHDT	1994	Aggregated	DSL	0.087060167	0.061036333
Riverside (S	2018	HHDT	1995	Aggregated	DSL	0.175724325	0.412735104	Riverside (SC)	2018	MHDT	1995	Aggregated	DSL	0.08036678	0.056176196
Riverside (S	2018	HHDT	1996	Aggregated	DSL	0.1188319	0.358206615	Riverside (SC)	2018	MHDT	1996	Aggregated	DSL	0.084722606	0.063264387
Riverside (S	2018	HHDT	1997	Aggregated	DSL	0.128985295	0.352930817	Riverside (SC)	2018	MHDT	1997	Aggregated	DSL	0.090398824	0.070096423
Riverside (S	2018	HHDT	1998	Aggregated	DSL	0.125104923	0.263449851	Riverside (SC)	2018	MHDT	1998	Aggregated	DSL	0.086331296	0.041787915
Riverside (S	2018	HHDT	1999	Aggregated	DSL	0.09761396	0.247813889	Riverside (SC)	2018	MHDT	1999	Aggregated	DSL	0.336026464	0.099767195
Riverside (S	2018	HHDT	2000	Aggregated	DSL	0.087724922	0.232812823	Riverside (SC)	2018	MHDT	2000	Aggregated	DSL	0.315405174	0.093941476
Riverside (S	2045	HHDT	2001	Aggregated	DSL	0.035435204	0.248298366	Riverside (SC)	2045	MHDT	2001	Aggregated	DSL	0.038794895	0.015983116
Riverside (S	2045	HHDT	2002	Aggregated	DSL	0.042730957	0.293269047	Riverside (SC)	2045	MHDT	2002	Aggregated	DSL	0.038549873	0.015983116
Riverside (S	2045	HHDT	2003	Aggregated	DSL	0.057747584	0.209689408	Riverside (SC)	2045	MHDT	2003	Aggregated	DSL	0.068482784	0.013043803
Riverside (S	2045	HHDT	2004	Aggregated	DSL	0.074448533	0.244159924	Riverside (SC)	2045	MHDT	2004	Aggregated	DSL	0.068172151	0.013043803
Riverside (S	2045	HHDT	2005	Aggregated	DSL	0.0616017	0.223800916	Riverside (SC)	2045	MHDT	2005	Aggregated	DSL	0.0678726	0.013043803
Riverside (S	2045	HHDT	2006	Aggregated	DSL	0.048927059	0.211635735	Riverside (SC)	2045	MHDT	2006	Aggregated	DSL	0.067598993	0.013043803
Riverside (S	2045	HHDT	2007	Aggregated	DSL	0.038398217	0.267812674	Riverside (SC)	2045	MHDT	2007	Aggregated	DSL	0.048408897	0.011401834
Riverside (S	2045	HHDT	2008	Aggregated	DSL	0.027488716	0.038075872	Riverside (SC)	2045	MHDT	2008	Aggregated	DSL	0.025726474	0.002806113
Riverside (S	2045	HHDT	2009	Aggregated	DSL	0.016000227	0.001795764	Riverside (SC)	2045	MHDT	2009	Aggregated	DSL	0.019371098	0.000132354
Riverside (S	2045	HHDT	2010	Aggregated	DSL	0.010939172	0.00179486	Riverside (SC)	2045	MHDT	2010	Aggregated	DSL	0.017167795	0.000132354
Riverside (S	2045	HHDT	2011	Aggregated	DSL	0.00441977	0.001793505	Riverside (SC)	2045	MHDT	2011	Aggregated	DSL	0.006037911	0.000132354
Riverside (S	2045	HHDT	2012	Aggregated	DSL	0.00767415	0.001781295	Riverside (SC)	2045	MHDT	2012	Aggregated	DSL	0.004862532	0.000132354
Riverside (S	2045	HHDT	2013	Aggregated	DSL	0.007315117	0.00143459	Riverside (SC)	2045	MHDT	2013	Aggregated	DSL	0.004707631	0.000132354
Riverside (S	2045	HHDT	2014	Aggregated	DSL	0.006091599	0.001756711	Riverside (SC)	2045	MHDT	2014	Aggregated	DSL	0.003923612	0.000132354
Riverside (S	2045	HHDT	2015	Aggregated	DSL	0.005827247	0.001629336	Riverside (SC)	2045	MHDT	2015	Aggregated	DSL	0.003741706	0.000132354
Riverside (S	2045	HHDT	2016	Aggregated	DSL	0.005759388	0.001829322	Riverside (SC)	2045	MHDT	2016	Aggregated	DSL	0.003744844	0.000132354
Riverside (S	2045	HHDT	2017	Aggregated	DSL	0.00582758	0.0018337	Riverside (SC)	2045	MHDT	2017	Aggregated	DSL	0.003741489	0.000132354
Riverside (S	2045	HHDT	2018	Aggregated	DSL	0.005611642	0.001740459	Riverside (SC)	2045	MHDT	2018	Aggregated	DSL	0.003722217	0.000132354
Riverside (S	2045	HHDT	2019	Aggregated	DSL	0.00558994	0.001720289	Riverside (SC)	2045	MHDT	2019	Aggregated	DSL	0.003723805	0.000132354
Riverside (S	2045	HHDT	2020	Aggregated	DSL	0.005588417	0.001706976	Riverside (SC)	2045	MHDT	2020	Aggregated	DSL	0.003724806	0.000132354
Riverside (S	2045	HHDT	2021	Aggregated	DSL	0.00558363	0.001678615	Riverside (SC)	2045	MHDT	2021	Aggregated	DSL	0.00372634	0.000132354
Riverside (S	2045	HHDT	2022	Aggregated	DSL	0.005621675	0.001686608	Riverside (SC)	2045	MHDT	2022	Aggregated	DSL	0.003727916	0.000132354
Riverside (S	2045	HHDT	2023	Aggregated	DSL	0.005613629	0.001691297	Riverside (SC)	2045	MHDT	2023	Aggregated	DSL	0.003729168	0.000132354
Riverside (S	2045	HHDT	2024	Aggregated	DSL	0.005597044	0.00169657	Riverside (SC)	2045	MHDT	2024	Aggregated	DSL	0.003671005	0.000132354
Riverside (S	2045	HHDT	2025	Aggregated	DSL	0.005599477	0.00171768	Riverside (SC)	2045	MHDT	2025	Aggregated	DSL	0.003610344	0.000132354
Riverside (S	2045	HHDT	2026	Aggregated	DSL	0.005606957	0.001752632	Riverside (SC)	2045	MHDT	2026	Aggregated	DSL	0.003548234	0.000132354
Riverside (S	2045	HHDT	2027	Aggregated	DSL	0.005618639	0.001807955	Riverside (SC)	2045	MHDT	2027	Aggregated	DSL	0.003486108	0.000132354
Riverside (S	2045	HHDT	2028	Aggregated	DSL	0.005625613	0.001888678	Riverside (SC)	2045	MHDT	2028	Aggregated	DSL	0.003423401	0.000132354
Riverside (S	2045	HHDT	2029	Aggregated	DSL	0.005639891	0.001976009	Riverside (SC)	2045	MHDT	2029	Aggregated	DSL	0.003360276	0.000132354
Riverside (S	2045	HHDT	2030	Aggregated	DSL	0.005657294	0.002072636	Riverside (SC)	2045	MHDT	2030	Aggregated	DSL	0.003296751	0.000132354
Riverside (S	2045	HHDT	2031	Aggregated	DSL	0.005673914	0.002161786	Riverside (SC)	2045	MHDT	2031	Aggregated	DSL	0.003234969	0.000132354
Riverside (S	2045	HHDT	2032	Aggregated	DSL	0.005681137	0.002260572	Riverside (SC)	2045	MHDT	2032	Aggregated	DSL	0.003162808	0.000132354
Riverside (S	2045	HHDT	2033	Aggregated	DSL	0.005690356	0.002365316	Riverside (SC)	2045	MHDT	2033	Aggregated	DSL	0.003082384	0.000132354
Riverside (S	2045	HHDT	2034	Aggregated	DSL	0.005692275	0.002475435	Riverside (SC)	2045	MHDT	2034	Aggregated	DSL	0.002995432	0.000132354
Riverside (S	2045	HHDT	2035	Aggregated	DSL	0.005590931	0.002595989	Riverside (SC)	2045	MHDT	2035	Aggregated	DSL	0.002902062	0.000132354
Riverside (S	2045	HHDT	2036	Aggregated	DSL	0.005464408	0.002727849	Riverside (SC)	2045	MHDT	2036	Aggregated	DSL	0.002802618	0.000132354
Riverside (S	2045	HHDT	2037	Aggregated	DSL	0.00533664	0.002884562	Riverside (SC)	2045	MHDT	2037	Aggregated	DSL	0.002696898	0.000132354
Riverside (S	2045	HHDT	2038	Aggregated	DSL	0.005134355	0.003081722	Riverside (SC)	2045	MHDT	2038	Aggregated	DSL	0.002584151	0.000132354
Riverside (S	2045	HHDT	2039	Aggregated	DSL	0.0049104	0.003341645	Riverside (SC)	2045	MHDT	2039	Aggregated	DSL	0.002464535	0.000132354
Riverside (S	2045	HHDT	2040	Aggregated	DSL	0.004642747	0.003659059	Riverside (SC)	2045	MHDT	2040	Aggregated	DSL	0.002337577	0.000132354
Riverside (S	2045	HHDT	2041	Aggregated	DSL	0.004306081	0.003798251	Riverside (SC)	2045	MHDT	2041	Aggregated	DSL	0.002203536	0.000132354
Riverside (S	2045	HHDT	2042	Aggregated	DSL	0.003959495	0.003968424	Riverside (SC)	2045	MHDT	2042	Aggregated	DSL	0.002063076	0.000132354
Riverside (S	2045	HHDT	2043	Aggregated	DSL	0.003564188	0.003815205	Riverside (SC)	2045	MHDT	2043	Aggregated	DSL	0.001917658	0.000132354
Riverside (S	2045	HHDT	2044	Aggregated	DSL	0.00320201	0.004184393	Riverside (SC)	2045	MHDT	2044	Aggregated	DSL	0.001769533	0.000132354
Riverside (S	2045	HHDT	2045	Aggregated	DSL	0.002808033	0.004311138	Riverside (SC)	2045	MHDT	2045	Aggregated	DSL	0.001621893	0.000132354
Riverside (S	2045	HHDT	2046	Aggregated	DSL	0.002372991	0.005807099	Riverside (SC)	2045	MHDT	2046	Aggregated	DSL	0.001474756	0.000132354
						0.117596568	0.346026245							0.100422746	0.061560904

EMFAC2014 (v1.0.7) Emission Rates
Region Type: Sub-Area
Region: Riverside (SC)
Calendar Year: 2045
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for VMT, trips/day for Trips, g/mile for RUNEX, PMBW and PMTW, g/trip for STREX, HTSK and RUNLS, g/vehicle/day for IDLEX, RESTL and DIURN

Region	CalYr	VehClass	MdlYr	Speed	Fuel	PM10_RUNEX	PM10_IDLEX
Riverside (S	2045	HHDT	2010	Aggregated	DSL	0.010939172	0.00179486
Riverside (S	2045	HHDT	2011	Aggregated	DSL	0.00441977	0.001793505
Riverside (S	2045	HHDT	2012	Aggregated	DSL	0.00767415	0.001781295
Riverside (S	2045	HHDT	2013	Aggregated	DSL	0.007315117	0.00143459
Riverside (S	2045	HHDT	2014	Aggregated	DSL	0.006091599	0.001756711
Riverside (S	2045	HHDT	2015	Aggregated	DSL	0.005827247	0.001629336
Riverside (S	2045	HHDT	2016	Aggregated	DSL	0.005759388	0.001829322
Riverside (S	2045	HHDT	2017	Aggregated	DSL	0.00582758	0.0018337
Riverside (S	2045	HHDT	2018	Aggregated	DSL	0.005611642	0.001740459
Riverside (S	2045	HHDT	2019	Aggregated	DSL	0.00558994	0.001720289
Riverside (S	2045	HHDT	2020	Aggregated	DSL	0.005588417	0.001706976
Riverside (S	2045	HHDT	2021	Aggregated	DSL	0.00558363	0.001678615
Riverside (S	2045	HHDT	2022	Aggregated	DSL	0.005621675	0.001686608
Riverside (S	2045	HHDT	2023	Aggregated	DSL	0.005613629	0.001691297
Riverside (S	2045	HHDT	2024	Aggregated	DSL	0.005597044	0.00169657
Riverside (S	2045	HHDT	2025	Aggregated	DSL	0.005599477	0.00171768
Riverside (S	2045	HHDT	2026	Aggregated	DSL	0.005606957	0.001752632
Riverside (S	2045	HHDT	2027	Aggregated	DSL	0.005618639	0.001807955
Riverside (S	2045	HHDT	2028	Aggregated	DSL	0.005625613	0.001888678
Riverside (S	2045	HHDT	2029	Aggregated	DSL	0.005639891	0.001976009
Riverside (S	2045	HHDT	2030	Aggregated	DSL	0.005657294	0.002072636
Riverside (S	2045	HHDT	2031	Aggregated	DSL	0.005673914	0.002161786
Riverside (S	2045	HHDT	2032	Aggregated	DSL	0.005681137	0.002260572
Riverside (S	2045	HHDT	2033	Aggregated	DSL	0.005690356	0.002365316
Riverside (S	2045	HHDT	2034	Aggregated	DSL	0.005692275	0.002475435
Riverside (S	2045	HHDT	2035	Aggregated	DSL	0.005590931	0.002595989
Riverside (S	2045	HHDT	2036	Aggregated	DSL	0.005464408	0.002727849
Riverside (S	2045	HHDT	2037	Aggregated	DSL	0.00533664	0.002884562
Riverside (S	2045	HHDT	2038	Aggregated	DSL	0.005134355	0.003081722
Riverside (S	2045	HHDT	2039	Aggregated	DSL	0.0049104	0.003341645
Riverside (S	2045	HHDT	2040	Aggregated	DSL	0.004642747	0.003659059
Riverside (S	2045	HHDT	2041	Aggregated	DSL	0.004306081	0.003798251
Riverside (S	2045	HHDT	2042	Aggregated	DSL	0.003959495	0.003968424
Riverside (S	2045	HHDT	2043	Aggregated	DSL	0.003564188	0.003815205
Riverside (S	2045	HHDT	2044	Aggregated	DSL	0.00320201	0.004184393
Riverside (S	2045	HHDT	2045	Aggregated	DSL	0.002808033	0.004311138
Riverside (S	2045	HHDT	2046	Aggregated	DSL	0.002372991	0.005807099
						0.005428049	0.002444005

Region	CalYr	VehClass	MdlYr	Speed	Fuel	PM10_RUNEX	PM10_IDLEX
Riverside (SC)	2045	MHDT	2010	Aggregated	DSL	0.017167795	0.000132354
Riverside (SC)	2045	MHDT	2011	Aggregated	DSL	0.006037911	0.000132354
Riverside (SC)	2045	MHDT	2012	Aggregated	DSL	0.004862532	0.000132354
Riverside (SC)	2045	MHDT	2013	Aggregated	DSL	0.004707631	0.000132354
Riverside (SC)	2045	MHDT	2014	Aggregated	DSL	0.003923612	0.000132354
Riverside (SC)	2045	MHDT	2015	Aggregated	DSL	0.003741706	0.000132354
Riverside (SC)	2045	MHDT	2016	Aggregated	DSL	0.003744844	0.000132354
Riverside (SC)	2045	MHDT	2017	Aggregated	DSL	0.003741489	0.000132354
Riverside (SC)	2045	MHDT	2018	Aggregated	DSL	0.003722217	0.000132354
Riverside (SC)	2045	MHDT	2019	Aggregated	DSL	0.003723805	0.000132354
Riverside (SC)	2045	MHDT	2020	Aggregated	DSL	0.003724806	0.000132354
Riverside (SC)	2045	MHDT	2021	Aggregated	DSL	0.00372634	0.000132354
Riverside (SC)	2045	MHDT	2022	Aggregated	DSL	0.003727916	0.000132354
Riverside (SC)	2045	MHDT	2023	Aggregated	DSL	0.003729168	0.000132354
Riverside (SC)	2045	MHDT	2024	Aggregated	DSL	0.003671005	0.000132354
Riverside (SC)	2045	MHDT	2025	Aggregated	DSL	0.003610344	0.000132354
Riverside (SC)	2045	MHDT	2026	Aggregated	DSL	0.003548234	0.000132354
Riverside (SC)	2045	MHDT	2027	Aggregated	DSL	0.003486108	0.000132354
Riverside (SC)	2045	MHDT	2028	Aggregated	DSL	0.003423401	0.000132354
Riverside (SC)	2045	MHDT	2029	Aggregated	DSL	0.003360276	0.000132354
Riverside (SC)	2045	MHDT	2030	Aggregated	DSL	0.003296751	0.000132354
Riverside (SC)	2045	MHDT	2031	Aggregated	DSL	0.003234969	0.000132354
Riverside (SC)	2045	MHDT	2032	Aggregated	DSL	0.003162808	0.000132354
Riverside (SC)	2045	MHDT	2033	Aggregated	DSL	0.003082384	0.000132354
Riverside (SC)	2045	MHDT	2034	Aggregated	DSL	0.002995432	0.000132354
Riverside (SC)	2045	MHDT	2035	Aggregated	DSL	0.002902062	0.000132354
Riverside (SC)	2045	MHDT	2036	Aggregated	DSL	0.002802618	0.000132354
Riverside (SC)	2045	MHDT	2037	Aggregated	DSL	0.002696898	0.000132354
Riverside (SC)	2045	MHDT	2038	Aggregated	DSL	0.002584151	0.000132354
Riverside (SC)	2045	MHDT	2039	Aggregated	DSL	0.002464535	0.000132354
Riverside (SC)	2045	MHDT	2040	Aggregated	DSL	0.002337577	0.000132354
Riverside (SC)	2045	MHDT	2041	Aggregated	DSL	0.002203536	0.000132354
Riverside (SC)	2045	MHDT	2042	Aggregated	DSL	0.002063076	0.000132354
Riverside (SC)	2045	MHDT	2043	Aggregated	DSL	0.001917658	0.000132354
Riverside (SC)	2045	MHDT	2044	Aggregated	DSL	0.001769533	0.000132354
Riverside (SC)	2045	MHDT	2045	Aggregated	DSL	0.001621893	0.000132354
Riverside (SC)	2045	MHDT	2046	Aggregated	DSL	0.001474756	0.000132354
						0.003621399	0.000132354

Appendix B Health Risk Assessment

Center Street Commerce Building

Health Risk Assessment

June 2016 (13432)

Prepared for:

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Center Street Commerce Building

Health Risk Assessment

June 2016

City of Riverside

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1.1 Project Description

The project includes the construction of a 308,000-square-foot warehouse on 15.63 acres. The warehouse includes 110,591 square feet of landscaping, the potential for up to 282 parking stalls, and 47 loading docks. Diesel particulate matter emissions will occur from truck movement along proposed drive aisles, truck movement along local roadways, and from truck idling at loading/unloading docks. The project is located south of Center Street and north of Placentia Lane in the City of Riverside, California, Universal Transverse Mercator coordinates Zone 11 N, 467247 Easting, 3764194 Northing, World Geodetic System 1984.

1.2 Risk Assessment

Discrete and grid receptor cancer risks are detailed in the AERMOD and HARP-RAST output files included in the appendix of this report. No thresholds for cancer or non-cancer risk will be exceeded by the project. The results of the study are summarized below:

Receptor (Exposure Time)	Exposure Level	Threshold	Potentially Significant?
Resident (30 Years) Cancer Risk	0.000002870	0.00001	No
Worker (25 Years) Cancer Risk	0.000001090	0.00001	No
Community Level (70 Years) Cancer Risk	0.002500000	0.50000	No
Non-Cancer Hazard index	0.007120000	1.00000	No

2 Introduction

This health risk assessment includes operations-related emissions estimates of diesel particulate matter from the proposed Center Street Commerce Building. Analysis of the emission projections was conducted by MIG environmental specialists to provide information to a Lead Agency (as defined in the California Environmental Quality Act (CEQA)) in evaluating the project and making a determination of significance. The project includes the construction of a 308,000-square-foot warehouse on 15.63 acres located south of Center Street and north of Placentia Lane in the City of Riverside, California. The project includes 110,591 square feet of landscaping, the potential for up to 282 parking stalls, and 47 loading docks.

This health risk assessment was prepared using guidance found in the South Coast Air Quality Management District (SCAQMD) *Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis* (SCAQMD, 2003) and the state Office of Environmental Health Hazard Assessment (OEHHA) *2015 Guidance Manual for the Preparation of Health Risk Assessments* (OEHHA, 2015).

The assessment was further informed by the SCAQMD *Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics Hot Spots Information and Assessment Act* (SCAQMD, 2015), although it should be noted that the project at this time is not subject to the requirements of the Hot Spots Act and it is not known at this time if any future tenant will be subject to assessment and possible notification requirements pursuant to the Hot Spots Act. Modeling of diesel particulate matter emissions and subsequent health risk evaluation was facilitated through us of the following computer software:

- EMFAC2014
- BPIPPRM (DATED 04274)
- AERMOD v 15181
- HARP2-RAST (HARPCalc v 16088)

This report has been prepared for use by the Lead Agency to assess potential project-related impacts resulting from exhaust emissions containing diesel particulate matter in compliance with the State CEQA Statutes and Guidelines, particularly with respect to the sensitive receptors issues identified in Appendix G of the State CEQA Guidelines. The report preparers do not make or record any determinations of significance in this report. Such determinations are required to be made solely in the purview of the Lead Agency, through independent judgement, pursuant to CEQA.

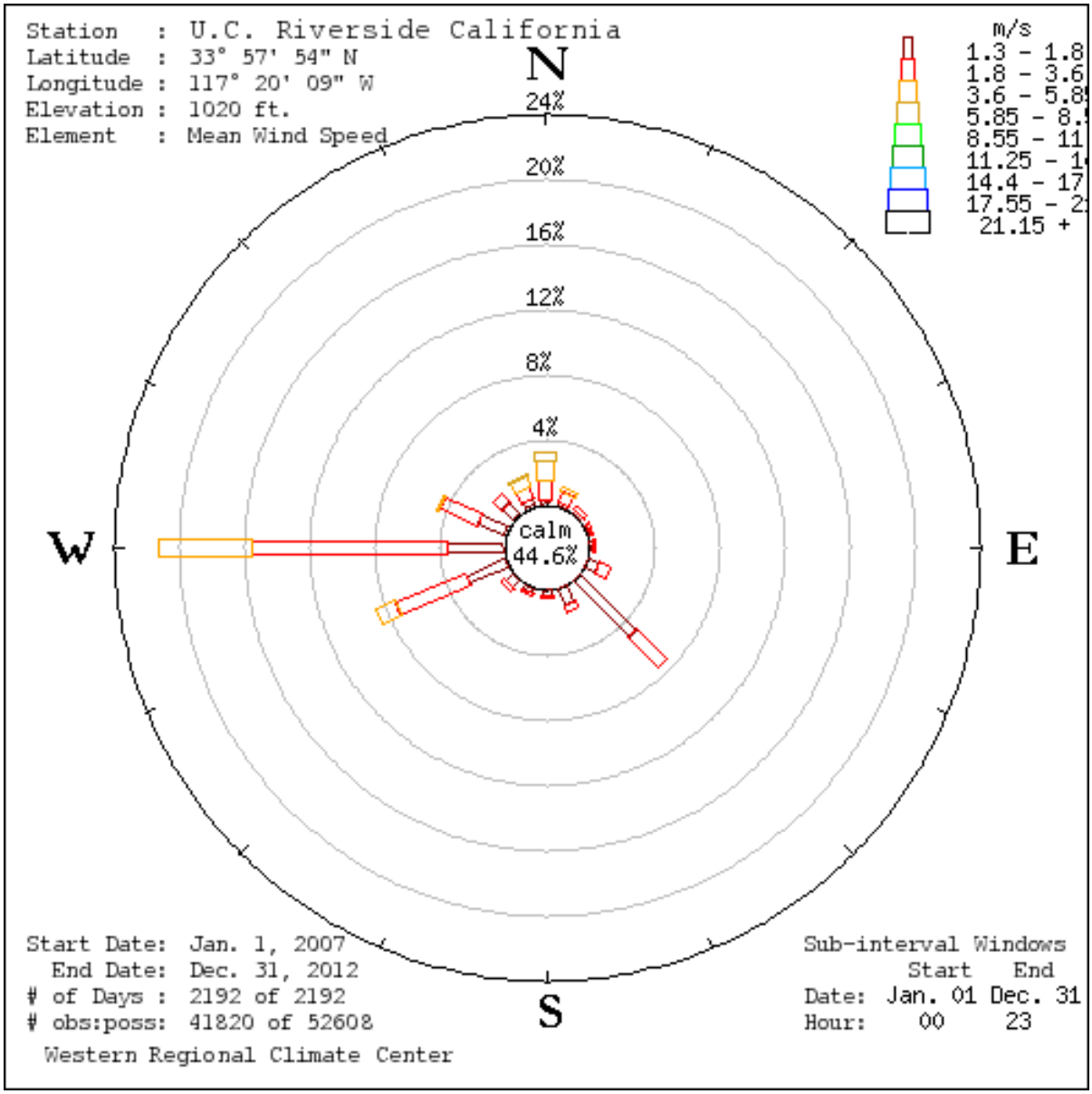
This report was prepared under the direction of Christopher Brown (Director of Environmental Services) with assistance provided by Cameron Hile (Assistant Analyst) of MIG under contract to Transition Properties, LP.

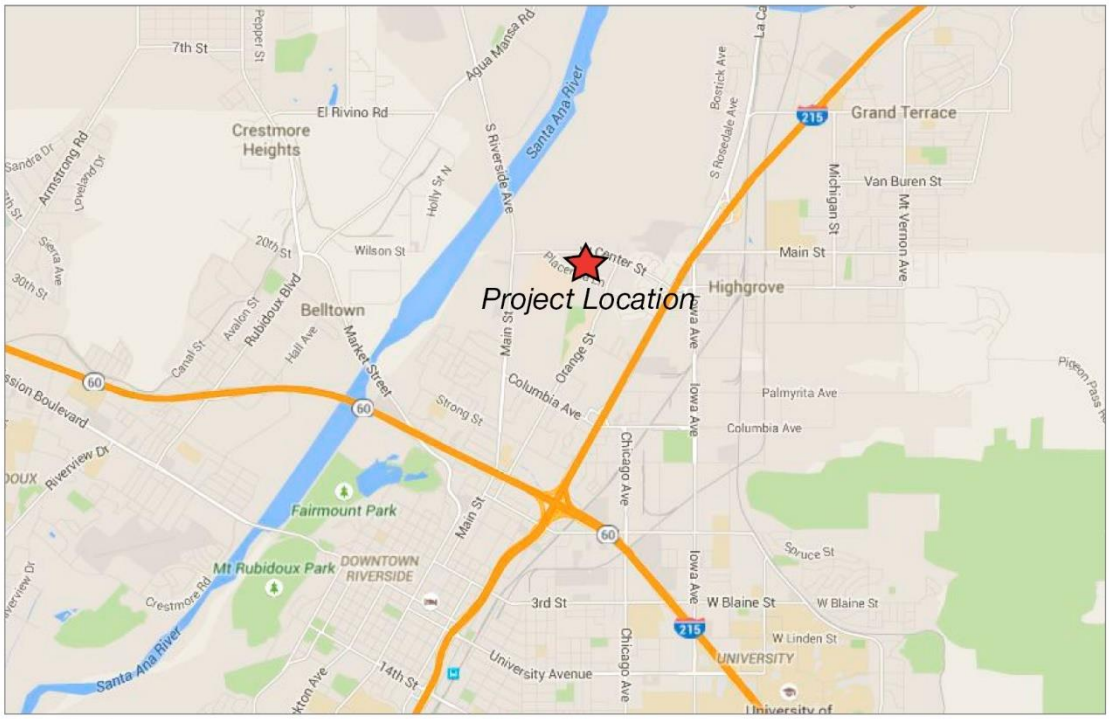
Christopher Brown Director of Environmental Services	Cameron Hile Assistant Analyst

3 Environmental Setting

The project is located in the City of Riverside. The City of Riverside and the broader Inland Empire are defined by a semi-arid, Mediterranean climate with mild winters and warm summers. Annual rainfall averages 9.86 inches with the rainy season occurring during the winter (WRCC, 2009). The coolest month of the year is December with an average monthly low of 41.3° Fahrenheit (F). The warmest month is August with an average monthly high of 94.4° F. Riverside is located at an elevation of approximately 700 feet to 1,400 feet above mean sea level (AMSL) (USGS, 1942). The project site is located at an approximate elevation of 830 AMSL. Wind generally blows from the west (WRCC, 2002).

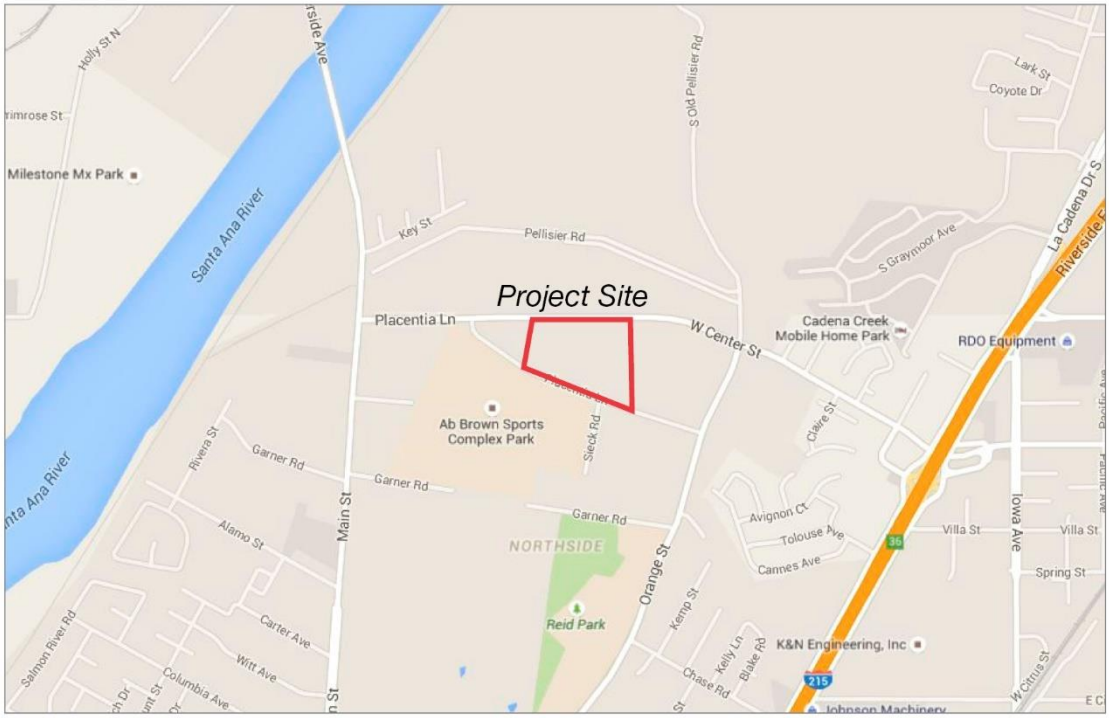
Figure 1
Riverside Wind Rose





Source: Google Maps, 2015

Regional



Source: Google Maps, 2015

Vicinity

Not to Scale

Exhibit 1 Regional and Vicinity Map

Center Street Commerce Building Project
6550 Center Street, Riverside, California

4.1 Air Toxics

State requirements specifically address air toxics issues through Assembly Bill (AB) 1807 (known as the Tanner Bill) that established the State air toxics program and the Air Toxics Hot Spots Information and Assessment Act (AB 2588). The air quality regulations developed from these bills have been modified recently to incorporate the Federal regulations associated with the Federal Clean Air Act Amendments of 1990. The Air Toxics Hot Spots Information and Assessment Act (Hot Spots Act) was enacted in September 1987. Under this bill, stationary sources of emissions are required to report the types and quantities of certain substances that their facilities routinely release into the air.

The SCAQMD is required to prepare an annual report on the status and forecast of air toxic *hotspots* pursuant to Section 44363 of the California Health and Safety Code. SCAQMD monitors facilities that are not exempt from the fee and reporting requirements of AB 2588.

Some facilities are covered under *umbrella* permits that address industry-wide categories. SCAQMD has issued general permits for the following seven activities:

- Retail gasoline dispensing
- Perchloroethylene dry cleaning
- Auto body shops
- Fiberglass molding
- Printing
- Metal plating
- Wood stripping and finishing

Emissions inventories and risk assessment guidelines have been prepared for the seven industry-wide categories. Approximately 1,400 auto body shops, 3,200 gasoline stations, and 1,400 perchloroethylene dry cleaners within the District are covered under these umbrella permits.

Depending on the severity of the facilities' toxic air contaminant (TAC) releases, SCAQMD requires either public notification of toxic hot spots or preparation of a risk reduction plan, as identified in Table 1 (AB2588 Action Release Levels).

Table 1 (AB2588 Action Release Levels)

	Cancer Risk (per million)	Acute Risk	Chronic Risk
Action Risk Level	>= 25	>= 3.0	>= 3.0
Public Notification Level	>= 10	>= 1.0	>= 1.0
Exempt	<1	<0.1	<0.1

It is unknown at this time if future tenants will include use of stationary emergency or prime compression ignition internal combustion engines, portable diesel engines, or other equipment subject to AB 2588 considering it is a speculative building without a known tenant.

4.2 Risk Assessment Guidelines

In order to perform health risk assessments (HRAs) under the Air Toxics Hot Spots Information and Assessment Act of 1987, OEHHA promulgates the *Guidance Manual for Preparation of Health Risk Assessments* (OEHHA, 2015) that includes the algorithms, exposure variants, cancer and non-cancer health values, and air modeling protocols to prepare HRAs. Although these guidelines are designed for point-source, facility-specific emissions, AQMD has decided to recommend use of these guidelines for land use projects that are subject to CEQA and may emit DPM in amounts that could result in significant impacts to the environment. The latest version of these guidelines were approved in February 2015. The guidelines included a number of updates including the recommendation to calculate cancer risk by accounting for *Early Life Exposure* adjustments to account for the presumed sensitivity to carcinogens and differences in intake rates. Using the point-estimate approach, cancer risk at residential receptors is calculated with consideration of receptor dose, toxic potency, age sensitively, exposure duration, average risk, and the amount of time the

receptor is home for the age the age groups ranging from third-trimester to 9 years, to thirty years, and to seventy years. Cancer risk at non-residential receptors accounts for similar criteria for a 25-year assumed exposure duration.

It should be noted that early-life exposure was recognized by the EPA as a necessity for mutagenic carcinogens. OEHHA has discussed this fact in their support documentation and include 3 (of 23) non-mutagenic carcinogens (DDT, DES, and TCDD) in their meta-analysis of multi-stage life cancer exposure; however, the ultimate conclusion was that the available data and modes of action were not sufficient in supporting adjustments to non-mutagenic carcinogens. Mutagens cause changes to genetic material (DNA) that increase the frequency of mutations that produce carcinogenic effects. DPM is not carcinogenic through a mutagenic mode of action. The EPA meta-analysis included several hundred studies for 67 chemicals, compared to OEHHA's "subset" of 145 studies for 23 carcinogens. As mentioned, the Hotspots program applies to facilities and the guidance manual specifically states that the document should not to be applied to roadways because the program only addresses stationary sources. As the AQMD continues to incorporate OEHHA's new Guidelines into its programs, it should be further noted that mobile-source toxics have yet to be officially addressed in the documentation, although AQMD staff is recommending it be used as such. The staff presentations include mention of possible application of the Guidelines to DPM emissions or mobile-source toxics; however, analysis of the applicability of the Guidelines to mobile-source toxics or the economic impact that could result have not been analyzed or released to the public. Rule modifications have not been presented that would apply the Guidelines to mobile-source toxics and the AQMD's primary documentation for assessing DPM emissions (*http://www.aqmd.gov/docs/default-source/ceqa/handbook/mobile-source-toxics-analysis.doc?sfvrsn=2*) has not been updated to incorporate the changes reflected in the guidelines.

4.2.1 Truck and Bus Regulation

In December 2008, the California Air Resources Board (ARB) approved the *Truck and Bus Regulations* as part of their rulemaking authority and adopted in Title 13 (Motor Vehicles) of the California Code of Regulations (CCR). These regulations are applicable to all diesel-fueled trucks and buses with a gross vehicle weight rating (GVWR) of 14,000 pounds or more (Class 4 or greater) that are privately or federally owned and for privately and publically owned school buses (ARB, 2011). These regulations are designed to reduce emissions of particulate matter and oxides of nitrogen from existing diesel vehicles operating in California. Compliance scheduling is phased for light and heavy vehicles depending on the age of the vehicle engine. Full compliance across vehicle ratings is set in 2023. Regulations affect the following areas:

- Auxiliary Power Units
- Port and Rail Yard Trucks
- Emissions Control Label Inspection
- Greenhouse Gas Emissions Reductions
- Heavy-Duty Diesel Vehicle Inspection
- Idling Reduction
- Periodic Smoke Inspection
- Public and Utility Agencies
- Public Transit Agencies
- School Bus Fleets
- Solid Waste Collection Vehicles
- Transport Refrigeration Units

Starting in 2015, lighter trucks (between 14,000 and 26,000 gross vehicle weight rating (GVWR)) will be required to replace the vehicle and/or engine if the engine manufacture date is from 1995 or earlier. Newer engines will be required to be replaced on a graduated scale until 2023 when all engines will be required to meet model year 2010 emissions or equivalent. Heavier truck operators (greater than 26,000 GVWR) have options for meeting the regulation requirements through 2023. Vehicles with engine years earlier than 1994 and 1995 will be required to be replaced in 2015 and 2016, respectively. Operators with engine years between 1996 and 2006 have the option to install a particulate filter before being required to replace the engine towards the compliance deadline. Later engines are considered compliant in 2023 when they demonstrate 2010 emissions levels or equivalent.

Idling restrictions were established in 2008 and apply to vehicles greater than 10,000 GVWR (Class 3 or greater). These restrictions limit idling to five minutes or less before manual or automatic shutdown must be initiated at a location (facility). Engine models manufactured in 2008 and thereafter are required to be equipped with a non-programmable engine shutdown mechanism that automatically shuts off the engine after five minutes of idling.

5 Exposure Assessment

The following discussion summarizes the *Required Source Information* identified in Table 1 of the SCAQMD health risk assessment guidance.

5.1 Facility and Surroundings

5.1.1 Location

The project is located south of Center Street and north of Placentia Lane in the City of Riverside, California, Universal Transverse Mercator (UTM) coordinates Zone 11 N, 467247 Easting, 3764194 Northing, World Geodetic System (WGS) 1984 (see Exhibit 1, Regional Context and Vicinity Map).

5.1.2 Local Land Use

Some populations are more susceptible to the effects of air pollution than the population at large; these populations are defined as sensitive receptors. Sensitive receptors include children, the elderly, the sick, and the athletic. Land uses associated with sensitive receptors include residences, schools, playgrounds, childcare centers, athletic facilities, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes. Sensitive receptors are located north, east, and south of the project. The AB Brown Sports Complex Park is located directly south of the project site. Residential uses are located north and west of the project site. Exhibit 2 (Radius Map) identifies existing development in the project vicinity based on recent assessor's parcel data.

5.1.3 Facility Plot Plan

The project includes the construction of a 308,000-square-foot building on 15.63 acres. Diesel particulate matter (DPM)emissions will occur from truck movement along proposed drive aisles , truck movement along local roadways, and from truck idling at loading/unloading docks.

5.1.4 Operating Schedule

The tenant for the proposed building is unknown at this time, thus, the operating schedule is assumed at 24 hours a day, 365 days a year, as a worst-case scenario. Note that this means there will be no opening or start of day delay that could result in vehicle queuing at this location.

5.2 Mobile Emissions Sources

5.2.1 Hazard Identification

The proposed project will result in the generation of heavy diesel truck traffic that has been identified as a gross-emitter of DPM (CARB, 2014). DPM was identified as a toxic air contaminant (TAC) because of its potential to cause cancer, premature deaths, and other health problems. DPM was identified as a toxic air contaminant (TAC) because of its potential to cause cancer, premature deaths, and other health problems. Health hazards associated with DPM are especially hazardous for children because their lungs are still developing, and the elderly who may have other serious health problems. Health risks from DPM occur exclusively through the inhalation pathway.

5.2.2 Hourly Emissions Rate

Table 2 (Trip Generation) **Error! Reference source not found.**summarizes the estimated average daily traffic (ADT) volumes generated by the project based on the Institute of Transportation Engineers 9th edition *Trip Generation Manual* (ITE, 2012) at the request of the City of Riverside Engineering Department . It should be noted that while this building was proposed as a high-cube warehouse and is anticipated to accommodate future tenants for that purpose, the City felt it appropriate to analyze a "worst-case" scenario by modeling trip generation as a manufacturing uses, thus, the analysis found herein is conservative in that trips generation has been inflated by 232 percent. The proposed project was modeled with an estimated daily trip rate of 3.82 per 1,000 square feet. The survey and analytical data found in the City of Fontana *Truck Trip Generation Study* (Neustaedter, Neustaedter, Garnatero, & Fuller, 2003) was used in the project *Traaffic Impact Analysis* (Kunzman, Ballard, & Crawford, 2016). Passenger vehicles were modeled as 74.45 percent of the fleet mix, light-duty trucks as 8.4 percent of the fleet mix, medium-heavy duty trucks as 4.6 percent of the truck trips, and heavy-heavy duty truck trips as 25.6 percent of the fleet mix. For this analysis, it is assumed that the building will operate 24 hours a day.

Table 2 (Trip Generation)

Vehicle Type	Average Daily Trips	Average Hourly Trips	Average Hourly Trucks
Passenger	729.5	30.4	--
Light-Duty Trucks	70.6	2.9	--
Medium-Heavy Duty Trucks	105.9	4.4	2.2
Heavy-Heavy Duty Trucks	270.6	11.3	5.65
Source: Kunzman Associates 2015			

Running and idling emissions rates for diesel particulate matter were modeled using EMFAC2014 (see Appendix A). EMFAC2014 was run for calendar year 2018, based on a 2018 opening year for the proposed project. The EMFAC emissions database combines aggregate emissions for multiple model years based on the project opening year. If the construction and operation of the proposed project were to be delayed, the emissions factors included in this report would be considered a worst-case scenario because emissions rates improve as newer model years become available and older vehicles are retired. EMFAC2014 was executed for ten miles per hour (mph) for medium-heavy duty (MHD) and heavy-heavy duty (HHD) trucks using an aggregate of model years to generate the emissions factors for on-site truck movement. Idling emissions for MHD (labeled T6 in the EMFAC emissions database) and HHD (labeled T7 in the EMFAC emissions database) trucks were also modeled for calendar year 2018. Note that State law limits idling to five minutes *per location* without exception for entry and exits; therefore, idling emissions were modeled using EMFAC2014 and adjusted to account for the five-minute idling limitation.

EMFAC2014 was used for on-road emissions factors at 25 MPH on Center Street. Emissions factors were converted into units of grams per second per square meter of area for drive aisle movement and on-road movement for input to the American Meteorological Society/Environmental Protection Agency Regulatory Model (EPA, 2004) using the formula provided in Equation 1 (Running Exhaust Emissions).

Equation 1 (Running Exhaust Emissions)

$$E_R = (\left[\left\{EMFAC_{g/mph} \times T \times D\right\} \div 60\right] \div 60) \div A$$

where,

E = Emissions (grams per second per square meter)
R = Emissions Type: Running Exhaust
EMFAC = EMFAC2014 Output (grams per hour)
g = grams
mph = mile per hour
T = Trucks
D = Travel Distance (two-way) (miles)
A = Area (square meters)

Equation 2 (Idling Exhaust Emissions)

$$E_I = [\{(EMFAC_{g/h} \times T) \div 60\} \div 60] \times L_I$$

where,

E = Emissions (grams per second per square meter)
I = Emissions Type: Idling Exhaust
EMFAC = EMFAC2014 Output (grams per hour)
g = grams
h = hour
T = Trucks
L = Limitation Coefficient (0.08)

Idling emissions are presented in grams per second and were calculated using Equation 2 (Idling Exhaust Emissions). Trucks will idle for a maximum of five total minutes. Trip distribution is based on the traffic impact analysis prepared by Kunzman Associates

(see Appendix B, Traffic Impact analysis). Table 3 ((Emissions Factors) summarizes the emissions factors for each area of the on- and off-site area.

Table 3 (Emissions Factors)

Source	Emissions Factor*
Building	
Truck Bay (DOC1)	0.000059122861
Truck Bay (DOC2)	0.000109799599
Drive Aisle (AIS1)	0.000000003175
Drive Aisle (AIS2)	0.000000008525
Streets	
Center Street (CEN1)	0.000000000881
Center Street (CEN2)	0.000000001028
Center Street (CEN3)	0.000000003824
* grams per second per square meters (g/s/m^2) for vehicle movement and grams per second (g/s) for idling emissions	

5.2.3 Source Location

On-site emissions sources are identified in Exhibit 3 (On-Site Emissions) and Exhibit 4 (Off-Site Emissions). Table 4 (Source Locations) provides the Universal Transverse Mercator (UTM) coordinates for the southwest corner of each area source. Although SCAQMD recommends emissions be modeled as area or volume sources, the idling sources were input a point source from the center of the docking bay to account for building downwash.

Table 4 (Source Locations)

Source	UTM (Zone 11N)	
Building	*Easting*	*Northing*
Truck Bay (DOC1)	467186	3764204
Truck Bay (DOC2)	467308	3764204
Drive Aisle (AIS1)	467091	3764194
Drive Aisle (AIS2)	467247	3764194
Streets		
Center Street (CEN1)	466678	3764350
Center Street (CEN2)	467099	3764351
Center Street (CEN3)	467383	3464351

5.2.4 Source Treatment

The source height for all emissions sources is 14 feet (4.2 meters), the approximate height of a truck exhaust. On- and off-site vehicle movement was modeled as AREAPOLY sources using the AERMOD command for irregular polygons and idling emissions were modeled as POINT sources. Idling exhaust release characteristics were assumed with an exit temperature of 366.48° Kelvin, exit velocity of 50 meters per second (m/s), and an exhaust diameter of 0.1016 meters.

5.3 Area Dimensions

All off-site vehicle movement emissions sources are modeled as a polygon area (AREAPOLY) source in AERMOD. On-site vehicle movement was modeled as also modeled as irregular polygon area sources to account for truck movement into trailer parking, on drive aisles, and into docking bays. Table 5 ((Area Dimensions) identifies the dimensions used in the model.

Table 5 (Area Dimensions)

Source	Length (m)	Width (m)	Travel Distance (miles)*
Building			
Drive Aisle (AIS1)	--	--	0.18 (0.36)
Drive Aisle (AIS2)	--	--	0.17 (0.34)
Streets			
Center Street (CEN1)	--	--	0.26 (0.52)
Center Street (CEN2)	--	--	0.18 (0.36)
Center Street (CEN3)	--	--	0.23 (0.46)
( ) Length of area source doubled to account for total trip length -- Irregular Area Source			

5.4 Air Dispersion Modeling

Cancer risk and non-cancer health risks to sensitive receptors within one-quarter mile of the project site were estimated using the EPA AERMOD model and guidance provided by SCAQMD in the *Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Emissions* white paper (SCAQMD, 2003). AERMOD is the EPA regulatory dispersion model that provides multiple source Gaussian plume models with maximum ground-level concentrations for point, area, flare, and volume sources. AERMOD replaced the Industrial Source Complex (ISC3) model in 2005 as the EPA regulatory model. The composite emissions factor for idling trucks and on-site truck movement was estimated using Emissions Factor 2014 (EMFAC2014). EMFAC2014 was developed by ARB to calculate emissions inventories for mobile vehicles operating in California based on raw vehicle data. The dimensions of the proposed buildings were modeled using Building Profile Input Program Prime (BPIPPRM) (see Appendix C).

5.4.1 Meteorological Data

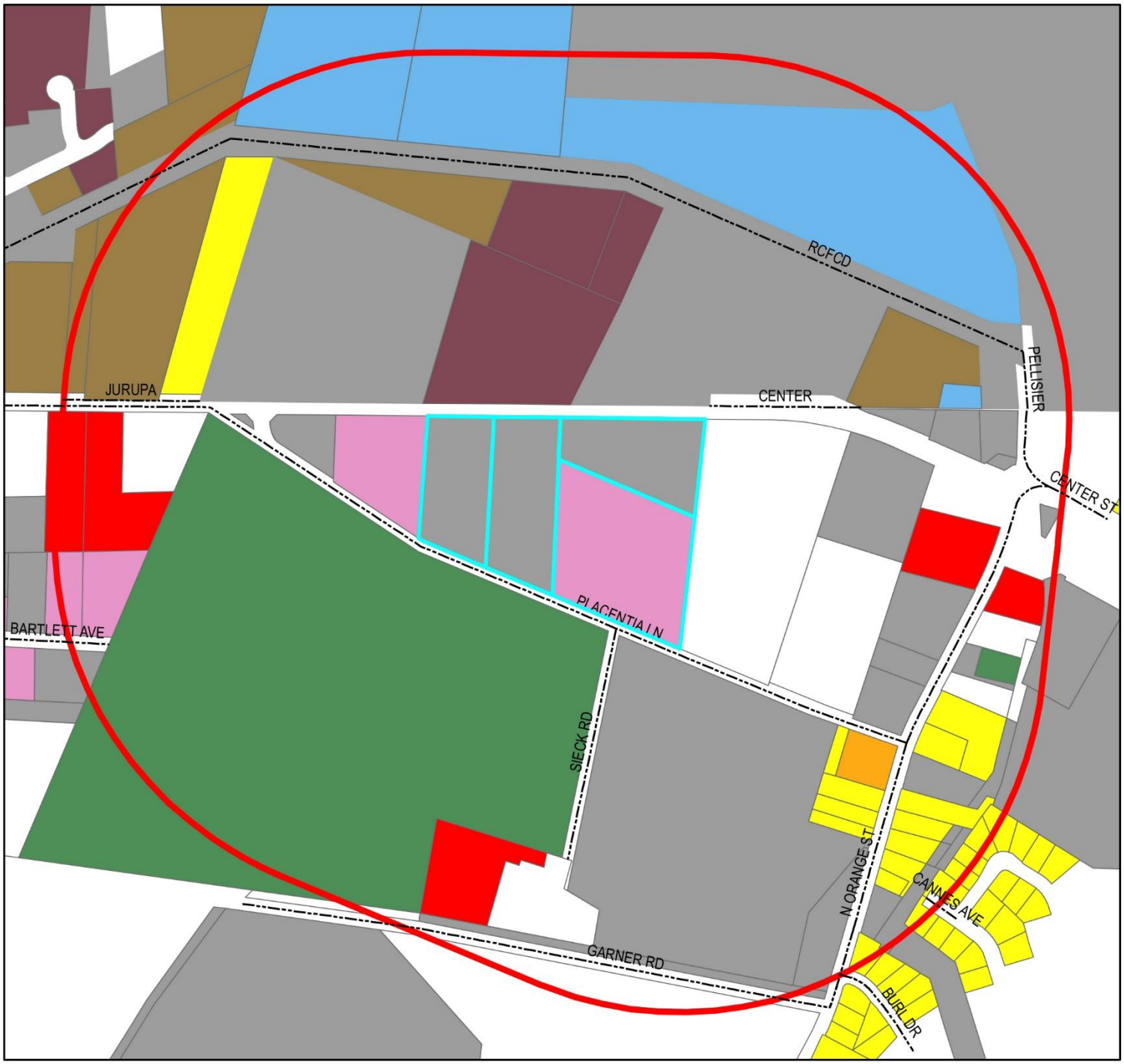
Meteorological data was prepared by SCAQMD for the Riverside station using AERMET version 12345 (available at http://www.aqmd.gov/home/library/air-quality-data-studies/meteorological-data/aermod-table-1). Surface characteristics for the Riverside station include a surface albedo of 0.19, surface roughness of 0.314 meters, and a Bowen ratio of 1.0. The station is located at UTM Zone 11 North, 461.64 kilometers (km) easting and 33762.10 km northing at an elevation of 250 meters above sea level.

5.4.2 Discrete Receptors

Thirty-five discrete receptors within one-quarter mile of the project site were input into the model. Twenty-four of the discrete receptors were identified as residential uses or potential residential uses and thus have the potential to house sensitive receptors. The remainder were identified as commercial or industrial uses and although not considered sensitive receptors they are included in the worker cancer and health risk elevation provided herein.

5.4.3 Receptor Grid

Emissions were modeled in a 1,000-meter receptor grid network at 100 meter transects around the project site. This resulted in a 100-point grid identifying concentrations around the project site at an approximately one-quarter mile buffer around the project site.



Legend

- Project Site
- 0.25 Mile Radius

0 0.03 0.06 0.12 0.18 0.24 Miles

N

Land Uses

- Unknown
- Vacant
- Commercial
- Storage
- Light Industrial
- Residential Use in Commercial Zone
- Single Family Residential
- Multi-Family Residential
- Miscellaneous Structures
- Electric Power Transmissions

Exhibit 2 Radius Map

Center Street Commerce Building Project

6550 Center Street, Riverside, California

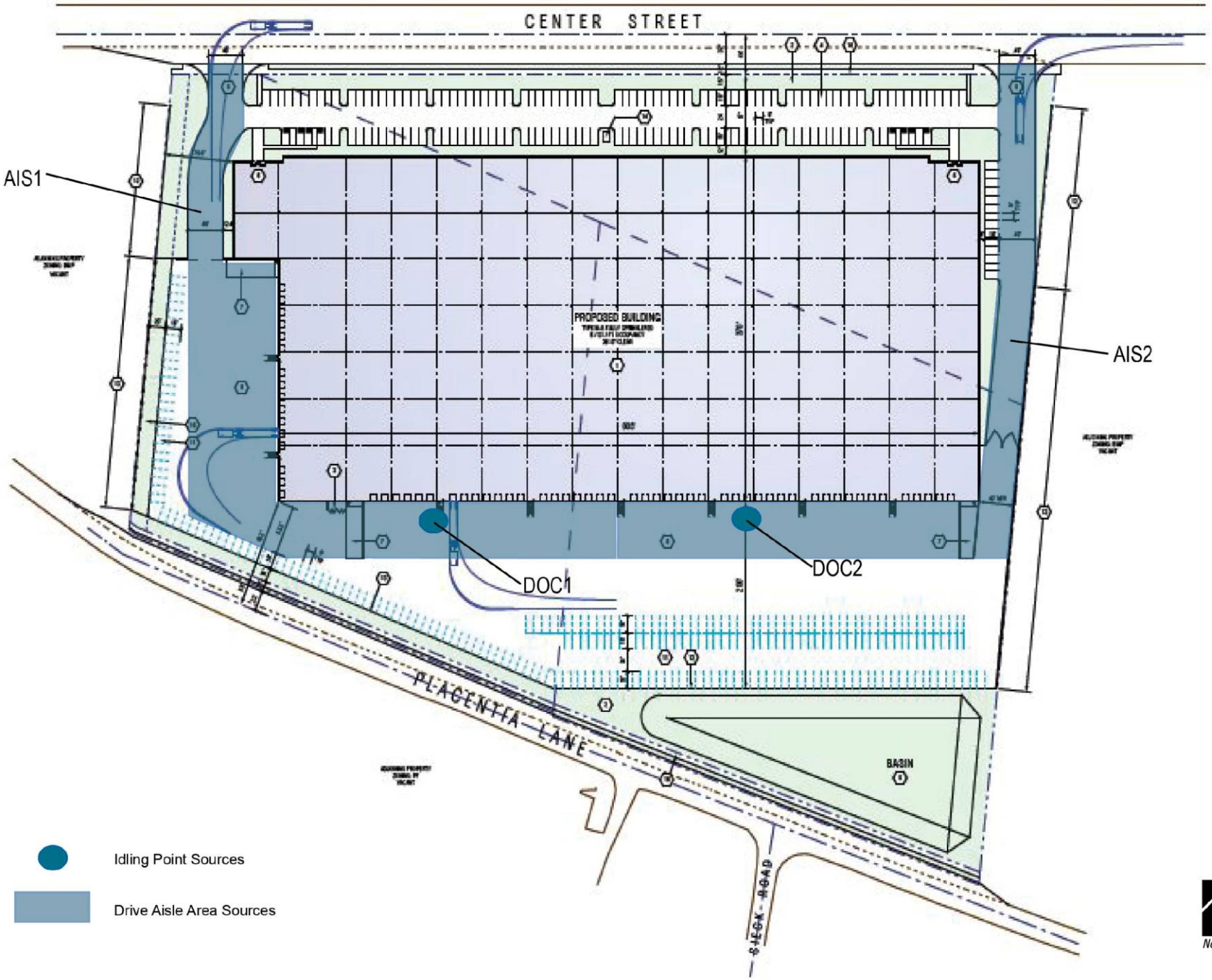


Exhibit 3 On-Site Emissions

Center Street Commerce Building Project
6550 Center Street, Riverside, California

- - - - - Project Site

Off-Site Emission Sources

Not to Scale

Exhibit 4 Off-Site Emissions

Center Street Commerce Building Project

6550 Center Street, Riverside, California

6 Risk Assessment

Cancer risk and non-cancer health risks to receptors within one-quarter mile of on-site sources were estimated using the EPA AERMOD model and guidance provided by SCAQMD in the *Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Emissions* white paper and the *2015 Guidance Manual for the Preparation of Health Risk Assessment*.

6.1 Cancer Risk

SCAQMD has established thresholds for emissions of toxic air contaminants. Toxic air emissions from a project are considered potentially significant if maximum incremental cancer risk (MICR) is greater than ten persons in 1,000,000 (1E-05). Cancer risk is determined by calculating the combinatory effects of the cancer potency factor (CPF) when inhaling the toxic, the daily inhalation dose, the age group the receptor is cohort to, the duration of exposure over a lifetime (25, 30, or 70 years depending on the analysis), and the amount of time spent at the location of exposure (see Appendix C). Cancer risk was assessed for three specific locations within one-quarter mile of the proposed project, as recommended by OEHHA: the maximum exposed individual resident (MEIR) over a 30-year exposure duration that characterizes the maximum residency tendency in California, the maximum exposed individual worker (MEIW) over a 25-year exposure duration characterizing the maximum job tenure tendency in California, and the point of maximum impact (PMI) irrespective of receptor type. Cancer risk for exposed residential and worker receptors was calculated using Equation 3 (Residential Cancer Risk) and Equation 4 ((Worker Cancer Risk). Residential risk calculations account for presumed sensitivity to carcinogens and differences in intake rates for the third-trimester to birth, birth to two-years, two-years to nine-years, two-years to nine-years, two-years to 16-years, 16-year to 30-years, and 16-years to 70 years' age bins.

Equation 3 (Residential Cancer Risk)

$$RISK_{INH.RES} = DOSE_{AIR.RES} \times CPF \times ASF \times \frac{ED}{AT} \times FAH$$

Equation 4 (Worker Cancer Risk)

$$RISK_{INH.WORK} = DOSE_{AIR.WORK} \times CPF \times ASF \times \frac{ED}{AT}$$

Where:

$DOSE_{AIR}$	=	Daily Inhalation Dose (mg/kg-day)
CPF	=	Cancer Potency Factor for Inhalants (mg/kg-day). CPF is expressed as the 95th percent upper confidence limit of the slope of the dose response curve under continuous lifetime exposure conditions. The CPF for diesel exhaust is 1.1 mg/kg-day.
ASF	=	Age Sensitivity Factor (ASF. ASF is a coefficient that inflates overall cancer risk for younger receptors based on data that suggests younger animals may be more susceptible when exposed to carcinogens. The recommended coefficients are 10 for the third-trimester to birth and two-year age bins, three for the two-year to nine-year and 16-year age bins, and one for receptors over 16 years of age.
ED	=	Exposure Duration (years). Exposure duration characterizes the length of residency or employment of the receptor. As discussed above, MEIR over a 30-year exposure duration is used to characterize the upper limit of residency in California while residential 9-year and 70-year exposure durations and included to characterize average residency tendency and lifetime exposure scenarios, respectively. MEIW over a 25-year exposure is used to characterize the upper limit of job tenure in California.
AT	=	Averaging Time (years). A 70-year (lifetime) averaging time is used to characterize to total risk as a factor of average risk over a typical lifespan.

FAH = Fraction at Home. FAH is the percentage of time the receptor is physically at the receptor location. The recommended percentages are 85 percent for the third-trimester to birth and two-year age bins, 72 percent for the two-year to nine-year and 16-year age bins, and 73 for receptors over 16 years of age.

Equation 5 (Residential Dose)

$$DOSE_{AIR.RES} = C_{AIr} \times \frac{BR}{BW} \times A \times EF \times 10^{-6}$$

Equation 6 (Worker Dose)

$$DOSE_{AIR.WORK} = C_{AIr} \times WAF \times \frac{BR}{BW} \times A \times EF \times 10^{-6}$$

Where:

C_{AIR} = Concentration of TAC in air (μg/m^3). Concentration of toxic in micrograms per one cubic meter of air. The AERMOD program is used in the study to determine concentrations of diesel particulate matter at surrounding discrete and grid receptor points.

WAF = Worker Air Concentration Adjustment Factor. The WAF is a coefficient designed to characterize the overlap of offsite worker schedules with the operations of a land use under study.

$\frac{BR}{BW}$ = *Breathing Rate ÷ Body Weight (L*/kg/day). Daily breathing rate normalized to body weight. The 95th percentile breathing rate to body weight ratios are used in this study with a recommended 361 L/kg/day for the third-trimester to birth age bin, 1,090 L/kg/day for the birth to two-years age bin, 861 L/kg/day for the two-years to nine-years age bin, 745 for the two-years to 16-years age bin, 335 L/kg/day for the 16-years to 30-years age bin, and 290 L/kg/day for the 16-years to 70-years age bin.

A = *Inhalation Absorption Factor.* Is a coefficient that reflects the fraction of chemical absorbed in studies used in the development of CPF and Reference Exposure Levels (RELs). An absorption factor of one is recommended for all chemicals.

EF = *Exposure* Frequency. EF is the ratio of days in a year that a receptor is receiving the dose. The recommended EF is 0.96 characterizing an assumed 350 days a year that a residential receptor is home for some portion of the day.

Equation 7 (Worker Adjustment Factor)

$$WAF = \frac{H_{RES}}{H_{SOURCE}} \times \frac{D_{RES}}{D_{SOURCE}} \times DF$$

Where:

H_{RES} = *Residential Hours.* Daily Hours by that the Annual Average Residential Air Concentration is Calculated.

H_{SOURCE} = *Source Operational Hours.* For this study it was assumed that the facilities will operate 24 hours a day.

D_{RES} = *Residential Days.* Weekly Days by that the Annual Average Residential Air Concentration is Calculated.

D_{SOURCE} = *Weekly Operational Days of the Source.* For this study it was assumed that the facilities will operate seven days a week.

DF = *Discount Factor.* Coefficient for Partial Overlap of Work Schedule and Source Operations. No discount factor was applied in this study

Concentrations were modeled using AERMOD and then input into the Hot Spots and Reporting Program (HARP) Health Risk Assessment Standalone Tool (RAST) computer software to calculate cancer risk based on the methods and recommendations found in the HRA Guidelines. The results of the HARP evaluation of cancer risk for residential 9-years, 30 years, and 70 years, and worker 25-years exposure scenarios for grid receptors and discrete receptors are summarized in the following tables and detailed program results are included as Appendix D.

Table 6 (30 Year (Maximum) Residential Cancer Risk (Discrete Receptors))

Index	Easting	Northing	Concentration	Cancer Risk
6	467546	3763993	0.00421	2.87E-06
7	467561	3763987	0.00403	2.75E-06
18	467652	3764011	0.00365	2.49E-06
19	467658	3763981	0.00334	2.28E-06
9	467567	3763930	0.00325	2.22E-06
10	467569	3763901	0.00294	2.00E-06
15	467614	3763915	0.00294	2.00E-06
8	467565	3763885	0.0028	1.91E-06
16	467621	3763893	0.00272	1.85E-06
14	467613	3763872	0.00258	1.76E-06
13	467603	3763849	0.00243	1.66E-06
23	467702	3763877	0.00234	1.60E-06
12	467595	3763829	0.00232	1.58E-06
24	467721	3763881	0.0023	1.57E-06
22	467691	3763858	0.00226	1.54E-06
21	467680	3763839	0.00218	1.49E-06
20	467665	3763821	0.00211	1.44E-06
17	467635	3763787	0.002	1.36E-06
11	467575	3763756	0.00195	1.33E-06
3	466818	3764404	0.00156	1.06E-06

Index	Easting	Northing	Concentration	Cancer Risk
4	466906	3764000	0.00149	1.02E-06
5	467244	3763650	0.0013	8.86E-07
2	466724	3764152	0.00121	8.25E-07
1	466699	3764107	0.00107	7.30E-07

Table 7 (70 Years (Lifetime) Population-Wide Cancer Burden)

Index	Easting	Northing	Concentration	Cancer Risk
76	467291	3764194	0.03558	3.18E-05
86	467391	3764194	0.02631	2.35E-05
85	467391	3764294	0.02097	1.87E-05
66	467191	3764194	0.01852	1.66E-05
75	467291	3764294	0.00001	8.94E-06
77	467291	3764094	0.00934	8.35E-06
65	467191	3764294	0.00932	8.33E-06
87	467391	3764094	0.00895	8.00E-06
95	467491	3764294	0.00851	7.61E-06
96	467491	3764194	0.00826	7.38E-06
55	467091	3764294	0.00772	6.90E-06
15	467591	3764294	0.00759	6.78E-06
97	467491	3764094	0.00725	6.48E-06
56	467091	3764194	0.00679	6.07E-06
84	467391	3764394	0.00678	6.06E-06
67	467191	3764094	0.00064	5.72E-06
74	467291	3764394	0.00615	5.50E-06
94	467491	3764394	0.00061	5.45E-06
64	467191	3764394	0.00052	4.65E-06
16	467591	3764194	0.00517	4.62E-06
17	467591	3764094	0.00502	4.49E-06
98	467491	3763994	0.00447	3.99E-06
88	467391	3763994	0.00432	3.86E-06
78	467291	3763994	0.00423	3.78E-06
14	467591	3764394	0.00421	3.76E-06
54	467091	3764394	0.00396	3.54E-06
18	467591	3763994	0.00395	3.53E-06
57	467091	3764094	0.00338	3.02E-06
68	467191	3763994	0.00332	2.97E-06
45	466991	3764294	0.0033	2.95E-06
46	466991	3764194	0.00314	2.81E-06
99	467491	3763894	0.00302	2.70E-06
89	467391	3763894	0.00291	2.60E-06

Index	Easting	Northing	Concentration	Cancer Risk
19	467591	3763894	0.00282	2.52E-06
79	467291	3763894	0.00275	2.46E-06
44	466991	3764394	0.00272	2.43E-06
73	467291	3764494	0.00268	2.40E-06
83	467391	3764494	0.00255	2.28E-06
63	467191	3764494	0.00243	2.17E-06
47	466991	3764094	0.00237	2.12E-06
69	467191	3763894	0.00235	2.10E-06
58	467091	3763994	0.00231	2.06E-06
35	466891	3764294	0.00228	2.04E-06
93	467491	3764494	0.00228	2.04E-06
90	467391	3763794	0.00218	1.95E-06
20	467591	3763794	0.00212	1.89E-06
36	466891	3764194	0.00209	1.87E-06
13	467591	3764494	0.002	1.79E-06
80	467291	3763794	0.002	1.79E-06
53	467091	3764494	0.00199	1.78E-06
34	466891	3764394	0.00198	1.77E-06
59	467091	3763894	0.0018	1.61E-06
48	466991	3763994	0.00179	1.60E-06
70	467191	3763794	0.00177	1.58E-06
37	466891	3764094	0.00175	1.56E-06
25	466791	3764294	0.00174	1.56E-06
72	467291	3764594	0.00172	1.54E-06
43	466991	3764494	0.0016	1.43E-06
62	467191	3764594	0.0016	1.43E-06
82	467391	3764594	0.0016	1.43E-06
24	466791	3764394	0.00155	1.39E-06
26	466791	3764194	0.00153	1.37E-06
60	467091	3763794	0.00147	1.31E-06
38	466891	3763994	0.00142	1.27E-06
49	466991	3763894	0.00142	1.27E-06
92	467491	3764594	0.00141	1.26E-06
52	467091	3764594	0.00137	1.22E-06
27	466791	3764094	0.00134	1.20E-06
33	466891	3764494	0.00132	1.18E-06
12	467591	3764594	0.00127	1.14E-06
5	466691	3764294	0.00125	1.12E-06
71	467291	3764694	0.00122	1.09E-06
4	466691	3764394	0.00118	1.05E-06

Index	Easting	Northing	Concentration	Cancer Risk
50	466991	3763794	0.00118	1.05E-06
42	466991	3764594	0.00117	1.05E-06
6	466691	3764194	0.00115	1.03E-06
39	466891	3763894	0.00115	1.03E-06
61	467191	3764694	0.00115	1.03E-06
81	467391	3764694	0.00114	1.02E-06
28	466791	3763994	0.00113	1.01E-06
23	466791	3764494	0.00108	9.65E-07
7	466691	3764094	0.00103	9.21E-07
51	467091	3764694	0.00102	9.12E-07
91	467491	3764694	0.00101	9.03E-07
32	466891	3764594	0.00099	8.85E-07
40	466891	3763794	0.00096	8.58E-07
29	466791	3763894	0.00094	8.40E-07
8	466691	3763994	0.0009	8.04E-07
11	467591	3764694	0.0009	8.04E-07
41	466991	3764694	0.00089	7.95E-07
3	466691	3764494	0.00088	7.86E-07
22	466791	3764594	0.00084	7.51E-07
30	466791	3763794	0.00079	7.06E-07
31	466891	3764694	0.00078	6.97E-07
9	466691	3763894	0.00076	6.79E-07
2	466691	3764594	0.00071	6.35E-07
21	466791	3764694	0.00067	5.99E-07
10	466691	3763794	0.00065	5.81E-07
1	466691	3764694	0.00057	5.09E-07

Table 8 (25 Years (Maximum) Worker Cancer Risk (Discrete Receptors))

Index	Easting	Northing	Concentration	Cancer Risk
8	467409	3764230	0.01766	1.09E-06
9	467550	3764077	0.00563	3.48E-07
11	467687	3764217	0.00433	2.68E-07
10	467600	3764395	0.004	2.48E-07
12	467747	3764156	0.00323	2.00E-07
5	467125	3764458	0.00257	1.59E-07
7	467253	3764509	0.00241	1.49E-07
4	467110	3763852	0.00172	1.06E-07
6	467142	3764560	0.00169	1.05E-07
2	466721	3764309	0.00146	9.04E-08

Index	Easting	Northing	Concentration	Cancer Risk
3	466773	3764400	0.00143	8.85E-08
1	466685	3764396	0.00114	7.06E-08

6.2 Cancer Risk and Cancer Burden

The breadth of averaging options was included in this study to provide the broadest depth of information regarding cancer risk to the public and local decision makers. In regards to the health risk assessment and CEQA, identifying the MICR is based on the greater of the MEIW and MEIR using the appropriate scenario for those receptors categories and PMI is assessed through community exposure. The lifetime exposure scenario is appropriate for determining cancer burden in those areas that may be exposed to cancer risk greater than one in one million cases. Evaluation of these scenarios will identify any receptors that exceed the MICR of 10 in one million or the 0.5 increased cancer burden thresholds promulgated by SCAQMD.

The site of the MEIR is the residential dwelling unit located at 3610 Placentia Lane, east of the project site. The incremental increase in cancer risk at this property is 2.87 in one million as identified as Index 6 of Table 6. The location of the MEIW is at the Brothers Towing of Riverside site directly east of the project site at 3655 Placentia Ln. The incremental increase in cancer risk at this business is 1.09 in one million and is identified as Index 8 of Table 8.

Cancer burden is the product of public cancer risk and the population exposed to the carcinogen. There are 25 residential properties located within ¼-mile of the project site. Census data indicates that the average owner-occupied household size in the city is 3.10 persons per dwelling unit, thus, an estimated population of 78 people live within one-quarter mile of the project site. The average cancer risk based on the lifetime exposure scenario is 3.34E-06 (approximately 3.34 cases per million people). The product of the cancer risk and the estimated population is 0.0003. This does not exceed the SCAQMD threshold of 0.5 excess cancer cases. Under a worst-case scenario, the PMI calculated as cancer burden of 0.0025 cases is located at the Brothers Towing of Riverside site. This point on the receptor grid is identified as Index 76 of Table 7. Under neither scenario would cancer burden exceed the applicable threshold.

6.3 Non-Cancer Risk

Chronic non-cancer risks are considered significant if the project toxic air contaminant emissions result in a hazard index greater than or equal to one. The hazard index is determined by calculating the average annual toxic concentration (μg/m^3) divided by the reference exposure level (REL) for a particular toxic. The REL is the concentration at which no adverse health impacts are anticipated and is established by OEHHA. The chronic REL for DPM was established by OEHHA as 5 μg/m^3. Non-cancer risk is estimated using Equation 8 (Chronic Hazard Quotient). Chronic non-cancer risk was evaluated using HARP and identified the highest hazard index or 0.00712, identified as Index 76 of the lifetime receptor grid. This does not exceed the hazard index threshold of one promulgated by SCAQMD.

Equation 8 (Chronic Hazard Quotient)

$$HI_{DPM} = \frac{C_{DPM}}{REL_{AAC}}$$

Where:

HI_{DPM} Hazard Index; an expression of the potential for non-cancer health effects.
C_{DPM} Annual average DPM concentration (μg/m^3)
REL_{DPM} Reference exposure level (REL) for DPM; the DPM concentration at which no adverse health effects are anticipated.

6.4 Conclusion

Discrete and grid receptor cancer risks are detailed in the AERMOD and HARP-RAST output files included in the appendix of this report. No thresholds for cancer or non-cancer risk will be exceeded by the project. The results of the study are summarized in Table 9 ((Cancer and Non-Cancer Risk Summary).

Table 9 (Cancer and Non-Cancer Risk Summary)

Receptor (Exposure Time)	Exposure Level	Threshold	Potentially Significant?
Resident (30 Years) Cancer Risk	0.000002870	0.00001	No
Worker (25 Years) Cancer Risk	0.000001090	0.00001	No
Community Level (70 Years) Cancer Risk	0.002500000	0.50000	No
Non-Cancer Hazard index	0.007120000	1.00000	No

Center Street Building

70-Year Cancer Burden

Created at 3:12 AM on June 10, 2016 by NMPlot 4.967
Center Street Health Risk Assessment

0 100 200 300 400 500 600 700 800

Scale in Meters 1:8,860 (1 cm. = 88.6 meters)

N

7 Index of Acronyms

µg
micrograms 24
AB
Assembly Bill 9
ADT
Average Daily Traffic 13
AMSL
Above Mean Sea Level 5
ARB
California Air Resources Board 10
ASF
Age Sensitivity Factor 23
CCR
California Code of Regulations 10
CEQA
California Environmental Quality Act 3
CPF
Cancer Potency Factor 23
DNA
Deoxyribonucleic Acid 10
F
Fahrenheit 5
GVWR
Gross Vehicle Weight Rating 10
HARP
Hot Spots and Reporting Program 25
HHD
Heavy-Heavy Duty Trucks 14
HRA
Health Risk Assessment 9
kg
kilograms 23
L
Liters 24
m^3
cubic milligrams 1, 29
Maximum Exposed Individual Worker 23
MEIR
Maximum Exposed Individual Resident 23
mg
milligrams 23
MHD
Medium-Heavy Duty Trucks 14
MICR
Maximum Increased in Cancer Risk 23
mph
Miles Per Hour 14
OEHHA
Office of Environmental Health & Hazard Assessment . 3
PMI
Point of Maximum Impact 23
RAST
Health Risk Assessment Standalone Tool 25
REL
Reference Exposure Level 24, 29
SCAQMD
South Coast Air Quality Management District 3
TAC
Toxic Air Contaminant 9, 13
UTM
Universal Transverse Mercator 13
WGS
World Geodetic System 13

8 Bibliography

ARB. (2011). Facts About Truck and Bus Regulation Compliance Requirements Summary. Sacramento, CA: California Air Resources Board.

ARB. (2014, July 1). California's Plan to Reduce Diesel Particulate Matter Emissions Fact Sheet. *California's Plan to Reduce Diesel Particulate Matter Emissions Fact Sheet*. Sacramento, CA, USA: California Air Resources Board.

EPA. (2004). *User's Guide for the AMS/EPA Regulatory Model: AERMOD*. Washintgon, DC: United States Environmental Protection Agency.

ITE. (2012). *Trip Generation Manual* (9th ed.). Washington DC: Institute of Transportation Engineers.

Kunzman, W., Ballard, C., & Crawford, B. (2016). *Center Street Warehouse Project Traffic Impact Analysis*. Tustin: Kunzman Associates.

Neustaedter, C., Neustaedter, N., Garnatero, C., & Fuller, L. (2003). *Truck Trip Generation Study*. City of Fontan, Redevelopment & Special Projects. Fontana: City of Fontana.

OEHHA. (2015). *Guidance Manual for the Preparation of Health Risk Assessments*. Sacramento, CA, USA: Office of Environmental Health Hazards Assessment.

SCAQMD. (2003). *Health Risk Guidance for Analysing Cancer Risk from Mobile Source Diesel Emissions*. Diamond Bar, CA: South Coast Air Quality Management District.

SCAQMD. (2014). *Warehouse Truck Trip Study Data Results and Usage*. Diamond Bar, CA: South Coast Air Quality Management District.

SCAQMD. (2015). *Guidance Manual for the Preparation of Health Risk Assessment*. Diamond Bar, CA: South Coast Air Quality management District.

USGS. (1942). Riverside Quadrangle 15-Minute Series. United States Geological Survey.

WRCC. (2002, January 01). *Prevailing Wind Direction*. Retrieved October 2014, from Wetern Regional Cliumate Center: http://www.wrcc.dri.edu/htmlfiles/westwinddir.html

WRCC. (2009, April 23). *Riverside Citrus Exp, California (047473)*. Retrieved October 2014, from Western Regional Climate Center: http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca7473

Appendix A. EMFAC2015 Results

calendar_year	season_month	sub_area	vehicle_class	fuel	temperature	relative_humidity	process	speed_time	pollutant	emission_rate
2018	Annual	Riverside (SC)	HHDT	Dsl	79	38	RUNEX	10	PM	0.053097344
2018	Annual	Riverside (SC)	HHDT	Dsl	79	38	RUNEX	25	PM	0.030758347
2018	Annual	Riverside (SC)	MHDT	Dsl	79	38	RUNEX	10	PM	0.228727645
2018	Annual	Riverside (SC)	MHDT	Dsl	79	38	RUNEX	25	PM	0.105783846
2018	Annual	Riverside (SC)	HHDT	Dsl			IDLEX		PM	0.03324648
2018	Annual	Riverside (SC)	MHDT	Dsl			IDLEX		PM	0.320429071

```
Center Street

                              BPIP (Dated: 04274)
DATE :  6/12/2015
TIME : 15: 6:23
Center Street

============================
BPIP PROCESSING INFORMATION:
============================

  The P  flag has been set for preparing downwash related data
         for a model run utilizing the PRIME algorithm.

  Inputs entered in METERS     will be converted to meters using
   a conversion factor of    1.0000.  Output will be in meters.

  The UTMP variable is set to UTMY.  The input is assumed to be in
    UTM coordinates.  BPIP will move the UTM origin to the first pair of
    UTM coordinates read.  The UTM coordinates of the new origin will
    be subtracted from all the other UTM coordinates entered to form
    this new local coordinate system.

  The new local coordinates will be displayed in parentheses just below
    the UTM coordinates they represent.

  Plant north is set to   0.00 degrees with respect to True North.



==============
INPUT SUMMARY:
==============


Number of buildings to be processed :   1


BLD      has 1 tier(s) with a base elevation of    0.00 METERS
BUILDING  TIER  BLDG-TIER  TIER   NO. OF      CORNER   COORDINATES
  NAME   NUMBER   NUMBER  HEIGHT  CORNERS        X           Y

BLD         1        1     12.00     6
                                              467124.00  3764208.00 meters
                                         (        0.00        0.00) meters
                                              467369.00  3764208.00 meters
                                         (      245.00        0.00) meters
                                              467369.00  3764321.00 meters
                                         (      245.00      113.00) meters
                                              467107.00  3764321.00 meters
                                         (      -17.00      113.00) meters
                                              467107.00  3764287.00 meters
                                         (      -17.00       79.00) meters
                                              467124.00  3764287.00 meters
                                         (        0.00       79.00) meters

Number of stacks to be processed :   2

                   STACK            STACK   COORDINATES
 STACK NAME     BASE  HEIGHT          X           Y

 DOC1           0.00    4.12 METERS
```

```
                                467186.00  3764204.00 meters
                            (       62.00       -4.00) meters
 DOC2           0.00    4.12 METERS
                                467308.00  3764204.00 meters
                            (      184.00       -4.00) meters

   No stacks have been detected as being atop any structures.


                    Overall GEP Summary Table
                         (Units: meters)


StkNo:  1  Stk Name:DOC1     Stk Ht:   4.12 Prelim. GEP Stk.Ht:   65.00
           GEP:  BH:  12.00  PBW:  129.82             *Eqn1 Ht:   30.00
         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  1  Direction occurred:   94.00
  Bldg-Tier nos. contributing to GEP:   1


StkNo:  2  Stk Name:DOC2     Stk Ht:   4.12 Prelim. GEP Stk.Ht:   65.00
           GEP:  BH:  12.00  PBW:  129.82             *Eqn1 Ht:   30.00
         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  1  Direction occurred:   94.00
  Bldg-Tier nos. contributing to GEP:   1



                    Summary By Direction Table
                         (Units:  meters)

Dominate stand alone tiers:


Drtcn:  10.00

StkNo:  1  Stk Name:DOC1                              Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 277.64  PBL: 153.83  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ:   -6.83  YADJ:  -40.70

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                              Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 277.64  PBL: 153.83  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ:  -28.01  YADJ:   79.44

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn:  20.00

StkNo:  1  Stk Name:DOC1                              Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 284.85  PBL: 189.98  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ:  -17.45  YADJ:  -28.17

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                              Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
```

```
    Single tier MAX:  BH:  12.00  PBW: 284.85  PBL: 189.98  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ:  -59.17  YADJ:   86.47

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn:  30.00

StkNo:  1  Stk Name:DOC1                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 283.40  PBL: 220.36  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ:  -27.54  YADJ:  -14.78

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 283.40  PBL: 220.36  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ:  -88.54  YADJ:   90.87

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn:  40.00

StkNo:  1  Stk Name:DOC1                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 273.34  PBL: 244.05  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ:  -36.79  YADJ:   -0.95

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 273.34  PBL: 244.05  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -115.21  YADJ:   92.51

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn:  50.00

StkNo:  1  Stk Name:DOC1                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 254.97  PBL: 260.32  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ:  -44.92  YADJ:   12.92

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 254.97  PBL: 260.32  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -138.38  YADJ:   91.34

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn:  60.00

StkNo:  1  Stk Name:DOC1                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 228.86  PBL: 268.68  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ:  -51.69  YADJ:   26.39
```

```
         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 228.86  PBL: 268.68  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -157.35  YADJ:   87.39

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn:  70.00

StkNo:  1  Stk Name:DOC1                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 195.79  PBL: 268.87  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ:  -56.89  YADJ:   39.07

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 195.79  PBL: 268.87  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -171.54  YADJ:   80.79

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn:  80.00

StkNo:  1  Stk Name:DOC1                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 156.78  PBL: 263.92  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ:  -63.39  YADJ:   50.55

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 156.78  PBL: 263.92  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -183.53  YADJ:   71.74

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn:  90.00

StkNo:  1  Stk Name:DOC1                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 113.00  PBL: 262.00  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ:  -79.00  YADJ:   60.50

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 113.00  PBL: 262.00  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -201.00  YADJ:   60.50

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn: 100.00
```

```
StkNo:  1  Stk Name:DOC1                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 153.83  PBL: 277.64  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ:  -98.12  YADJ:   70.09

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 153.83  PBL: 277.64  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -218.26  YADJ:   48.90

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn: 110.00

StkNo:  1  Stk Name:DOC1                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 189.98  PBL: 284.85  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -114.25  YADJ:   77.54

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 189.98  PBL: 284.85  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -228.89  YADJ:   35.82

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn: 120.00

StkNo:  1  Stk Name:DOC1                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 220.36  PBL: 283.40  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -126.92  YADJ:   82.64

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 220.36  PBL: 283.40  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -232.57  YADJ:   21.64

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn: 130.00

StkNo:  1  Stk Name:DOC1                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 244.05  PBL: 273.34  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -135.72  YADJ:   85.23

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 244.05  PBL: 273.34  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -229.18  YADJ:    6.81
```

```
         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn: 140.00

StkNo:  1  Stk Name:DOC1                              Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 260.32  PBL: 254.97  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -140.41  YADJ:   85.23

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                              Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 260.32  PBL: 254.97  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -218.83  YADJ:   -8.22

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn: 150.00

StkNo:  1  Stk Name:DOC1                              Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 268.68  PBL: 228.86  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -140.82  YADJ:   82.64

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                              Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 268.68  PBL: 228.86  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -201.82  YADJ:  -23.01

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn: 160.00

StkNo:  1  Stk Name:DOC1                              Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 268.87  PBL: 195.79  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -136.96  YADJ:   77.54

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                              Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 268.87  PBL: 195.79  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -178.69  YADJ:  -37.10

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn: 170.00

StkNo:  1  Stk Name:DOC1                              Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 263.92  PBL: 156.78  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -128.94  YADJ:   68.57

         *adjusted for a Stack-Building elevation difference of    0.00
```

```
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 263.92  PBL: 156.78  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -150.13  YADJ:  -51.57

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn: 180.00

StkNo:  1  Stk Name:DOC1                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 262.00  PBL: 113.00  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -117.00  YADJ:   52.00

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 262.00  PBL: 113.00  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -117.00  YADJ:  -70.00

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn: 190.00

StkNo:  1  Stk Name:DOC1                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 277.64  PBL: 153.83  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -147.00  YADJ:   40.70

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 277.64  PBL: 153.83  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -125.82  YADJ:  -79.44

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn: 200.00

StkNo:  1  Stk Name:DOC1                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 284.85  PBL: 189.98  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -172.53  YADJ:   28.17

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 284.85  PBL: 189.98  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -130.81  YADJ:  -86.47

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn: 210.00

StkNo:  1  Stk Name:DOC1                                Stack Ht:    4.12
```

```
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 283.40  PBL: 220.36  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -192.83  YADJ:   14.78

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                              Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 283.40  PBL: 220.36  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -131.82  YADJ:  -90.87

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn: 220.00

StkNo:  1  Stk Name:DOC1                              Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 273.34  PBL: 244.05  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -207.26  YADJ:    0.95

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                              Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 273.34  PBL: 244.05  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -128.84  YADJ:  -92.51

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn: 230.00

StkNo:  1  Stk Name:DOC1                              Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 254.97  PBL: 260.32  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -215.39  YADJ:  -12.92

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                              Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 254.97  PBL: 260.32  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -121.93  YADJ:  -91.34

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn: 240.00

StkNo:  1  Stk Name:DOC1                              Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 228.86  PBL: 268.68  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -216.98  YADJ:  -26.39

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                              Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 228.86  PBL: 268.68  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -111.33  YADJ:  -87.39

         *adjusted for a Stack-Building elevation difference of    0.00
```

```
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn: 250.00

StkNo:  1  Stk Name:DOC1                              Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 195.79  PBL: 268.87  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -211.98  YADJ:  -39.07

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                              Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 195.79  PBL: 268.87  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ:  -97.34  YADJ:  -80.79

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn: 260.00

StkNo:  1  Stk Name:DOC1                              Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 156.78  PBL: 263.92  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -200.54  YADJ:  -50.55

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                              Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 156.78  PBL: 263.92  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ:  -80.39  YADJ:  -71.74

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn: 270.00

StkNo:  1  Stk Name:DOC1                              Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 113.00  PBL: 262.00  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -183.00  YADJ:  -60.50

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                              Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 113.00  PBL: 262.00  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ:  -61.00  YADJ:  -60.50

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn: 280.00

StkNo:  1  Stk Name:DOC1                              Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 153.83  PBL: 277.64  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -179.53  YADJ:  -70.09

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                              Stack Ht:    4.12
```

```
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 153.83  PBL: 277.64  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ:  -59.38  YADJ:  -48.90

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn: 290.00

StkNo:  1  Stk Name:DOC1                              Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 189.98  PBL: 284.85  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -170.60  YADJ:  -77.54

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                              Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 189.98  PBL: 284.85  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ:  -55.95  YADJ:  -35.82

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn: 300.00

StkNo:  1  Stk Name:DOC1                              Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 220.36  PBL: 283.40  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -156.48  YADJ:  -82.64

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                              Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 220.36  PBL: 283.40  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ:  -50.83  YADJ:  -21.64

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn: 310.00

StkNo:  1  Stk Name:DOC1                              Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 244.05  PBL: 273.34  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ: -137.61  YADJ:  -85.23

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                              Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 244.05  PBL: 273.34  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ:  -44.16  YADJ:   -6.81

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn: 320.00

StkNo:  1  Stk Name:DOC1                              Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 260.32  PBL: 254.97  *Wake Effect Ht:   30.00
```

```
    Relative Coordinates of Projected Width Mid-point: XADJ: -114.57  YADJ:  -85.23

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 260.32  PBL: 254.97  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ:  -36.15  YADJ:    8.22

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn: 330.00

StkNo:  1  Stk Name:DOC1                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 268.68  PBL: 228.86  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ:  -88.04  YADJ:  -82.64

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 268.68  PBL: 228.86  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ:  -27.04  YADJ:   23.01

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn: 340.00

StkNo:  1  Stk Name:DOC1                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 268.87  PBL: 195.79  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ:  -58.83  YADJ:  -77.54

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 268.87  PBL: 195.79  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ:  -17.10  YADJ:   37.10

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1

Drtcn: 350.00

StkNo:  1  Stk Name:DOC1                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 263.92  PBL: 156.78  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ:  -27.84  YADJ:  -68.57

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 263.92  PBL: 156.78  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ:   -6.65  YADJ:   51.57

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
```

```
Drtcn: 360.00

StkNo:  1  Stk Name:DOC1                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 262.00  PBL: 113.00  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ:    4.00  YADJ:  -52.00

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1
StkNo:  2  Stk Name:DOC2                                Stack Ht:    4.12
                GEP:  BH:  12.00  PBW: 129.82   *Equation 1 Ht:   30.00
    Single tier MAX:  BH:  12.00  PBW: 262.00  PBL: 113.00  *Wake Effect Ht:   30.00
    Relative Coordinates of Projected Width Mid-point: XADJ:    4.00  YADJ:   70.00

         *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:  1  Bld Name:BLD       TierNo:  1


Dominant combined buildings:  None
```

```
CO STARTING
   TITLEONE  13432 Center Street (v3)
   MODELOPT  CONC FLAT FASTALL
   AVERTIME  PERIOD
   URBANOPT  2100516 Riverside
   POLLUTID  PM
   RUNORNOT  RUN
CO FINISHED

SO STARTING
   ELEVUNIT  METERS

**                      E     N      Z
**                      ------ ------- -
   LOCATION  AIS1 AREAPOLY 467124 3764187 0
   URBANSRC  AIS1

   LOCATION  AIS2 AREAPOLY 467247 3764187 0
   URBANSRC  AIS2

   LOCATION  CEN1 AREAPOLY 466677 3764351 0
   URBANSRC  CEN1

   LOCATION  CEN2 AREAPOLY 467111 3764350 0
   URBANSRC  CEN2

   LOCATION  CEN3 AREAPOLY 467374 3764346 0
   URBANSRC  CEN3

   LOCATION  DOC1 POINT   467186 3764204 0
   URBANSRC  DOC1

   LOCATION  DOC2 POINT   467308 3764204 0
   URBANSRC  DOC2

** Poly Source   EF           HT   V
** Parameters:   -------------- ---- --
   SRCPARAM  AIS1 0.000000003175 4.12 13
   AREAVERT  AIS1 467124 3764187
   AREAVERT  AIS1 467247 3764187
   AREAVERT  AIS1 467247 3764208
   AREAVERT  AIS1 467124 3764208
   AREAVERT  AIS1 467124 3764287
   AREAVERT  AIS1 467102 3764287
   AREAVERT  AIS1 467102 3764314
   AREAVERT  AIS1 467111 3764329
   AREAVERT  AIS1 467111 3764350
   AREAVERT  AIS1 467100 3764350
   AREAVERT  AIS1 467100 3764333
   AREAVERT  AIS1 467090 3764315
   AREAVERT  AIS1 467090 3764315

   SRCPARAM  AIS2 0.000000008525 4.12 8
   AREAVERT  AIS2 467247 3764187
   AREAVERT  AIS2 467374 3764187
   AREAVERT  AIS2 467389 3764285
   AREAVERT  AIS2 467386 3764346
   AREAVERT  AIS2 467374 3764346
   AREAVERT  AIS2 467374 3764278
```

```
   AREAVERT  AIS2 467364 3764207
   AREAVERT  AIS2 467247 3764208

   SRCPARAM  CEN1 0.000000000881 4.12 12
   AREAVERT  CEN1 466677 3764351
   AREAVERT  CEN1 466827 3764352
   AREAVERT  CEN1 466858 3764356
   AREAVERT  CEN1 467100 3764355
   AREAVERT  CEN1 467100 3764350
   AREAVERT  CEN1 467111 3764350
   AREAVERT  CEN1 467111 3764369
   AREAVERT  CEN1 466986 3764369
   AREAVERT  CEN1 466978 3764364
   AREAVERT  CEN1 466858 3764364
   AREAVERT  CEN1 466830 3764360
   AREAVERT  CEN1 466677 3764358

   SRCPARAM  CEN2 0.000000001403 4.12 4
   AREAVERT  CEN2 467111 3764350
   AREAVERT  CEN2 467374 3764346
   AREAVERT  CEN2 467374 3764368
   AREAVERT  CEN2 467111 3764369

   SRCPARAM  CEN3 0.000000003824 4.12 12
   AREAVERT  CEN3 467374 3764346
   AREAVERT  CEN3 467386 3764346
   AREAVERT  CEN3 467479 3764348
   AREAVERT  CEN3 467516 3764344
   AREAVERT  CEN3 467554 3764336
   AREAVERT  CEN3 467579 3764333
   AREAVERT  CEN3 467737 3764267
   AREAVERT  CEN3 467740 3764281
   AREAVERT  CEN3 467573 3764350
   AREAVERT  CEN3 467532 3764361
   AREAVERT  CEN3 467485 3764367
   AREAVERT  CEN3 467374 3764368

** Point Source   EF           HT   TMP    V  D
** Parameters:   -------------- ---- ------- -- ------
   SRCPARAM  DOC1 0.000059122861 4.12 366.483 50 0.1016
   SRCPARAM  DOC2 0.000109799599 4.12 366.483 50 0.1016

** Building Downwash
SO BUILDHGT DOC1      12.00   12.00   12.00   12.00   12.00   12.00
SO BUILDHGT DOC1      12.00   12.00   12.00   12.00   12.00   12.00
SO BUILDHGT DOC1      12.00   12.00   12.00   12.00   12.00   12.00
SO BUILDHGT DOC1      12.00   12.00   12.00   12.00   12.00   12.00
SO BUILDHGT DOC1      12.00   12.00   12.00   12.00   12.00   12.00
SO BUILDHGT DOC1      12.00   12.00   12.00   12.00   12.00   12.00
SO BUILDWID DOC1     277.64  284.85  283.40  273.34  254.97  228.86
SO BUILDWID DOC1     195.79  156.78  113.00  153.83  189.98  220.36
SO BUILDWID DOC1     244.05  260.32  268.68  268.87  263.92  262.00
SO BUILDWID DOC1     277.64  284.85  283.40  273.34  254.97  228.86
SO BUILDWID DOC1     195.79  156.78  113.00  153.83  189.98  220.36
SO BUILDWID DOC1     244.05  260.32  268.68  268.87  263.92  262.00
SO BUILDLEN DOC1     153.83  189.98  220.36  244.05  260.32  268.68
SO BUILDLEN DOC1     268.87  263.92  262.00  277.64  284.85  283.40
SO BUILDLEN DOC1     273.34  254.97  228.86  195.79  156.78  113.00
SO BUILDLEN DOC1     153.83  189.98  220.36  244.05  260.32  268.68
```

```
SO BUILDLEN DOC1     268.87  263.92  262.00  277.64  284.85  283.40
SO BUILDLEN DOC1     273.34  254.97  228.86  195.79  156.78  113.00
SO XBADJ   DOC1      -6.83  -17.45  -27.54  -36.79  -44.92  -51.69
SO XBADJ   DOC1     -56.89  -63.39  -79.00  -98.12 -114.25 -126.92
SO XBADJ   DOC1    -135.72 -140.41 -140.82 -136.96 -128.94 -117.00
SO XBADJ   DOC1    -147.00 -172.53 -192.83 -207.26 -215.39 -216.98
SO XBADJ   DOC1    -211.98 -200.54 -183.00 -179.53 -170.60 -156.48
SO XBADJ   DOC1    -137.61 -114.57  -88.04  -58.83  -27.84    4.00
SO YBADJ   DOC1     -40.70  -28.17  -14.78   -0.95   12.92   26.39
SO YBADJ   DOC1      39.07   50.55   60.50   70.09   77.54   82.64
SO YBADJ   DOC1      85.23   85.23   82.64   77.54   68.57   52.00
SO YBADJ   DOC1      40.70   28.17   14.78    0.95  -12.92  -26.39
SO YBADJ   DOC1     -39.07  -50.55  -60.50  -70.09  -77.54  -82.64
SO YBADJ   DOC1     -85.23  -85.23  -82.64  -77.54  -68.57  -52.00

SO BUILDHGT DOC2      12.00   12.00   12.00   12.00   12.00   12.00
SO BUILDHGT DOC2      12.00   12.00   12.00   12.00   12.00   12.00
SO BUILDHGT DOC2      12.00   12.00   12.00   12.00   12.00   12.00
SO BUILDHGT DOC2      12.00   12.00   12.00   12.00   12.00   12.00
SO BUILDHGT DOC2      12.00   12.00   12.00   12.00   12.00   12.00
SO BUILDHGT DOC2      12.00   12.00   12.00   12.00   12.00   12.00
SO BUILDWID DOC2     277.64  284.85  283.40  273.34  254.97  228.86
SO BUILDWID DOC2     195.79  156.78  113.00  153.83  189.98  220.36
SO BUILDWID DOC2     244.05  260.32  268.68  268.87  263.92  262.00
SO BUILDWID DOC2     277.64  284.85  283.40  273.34  254.97  228.86
SO BUILDWID DOC2     195.79  156.78  113.00  153.83  189.98  220.36
SO BUILDWID DOC2     244.05  260.32  268.68  268.87  263.92  262.00
SO BUILDLEN DOC2     153.83  189.98  220.36  244.05  260.32  268.68
SO BUILDLEN DOC2     268.87  263.92  262.00  277.64  284.85  283.40
SO BUILDLEN DOC2     273.34  254.97  228.86  195.79  156.78  113.00
SO BUILDLEN DOC2     153.83  189.98  220.36  244.05  260.32  268.68
SO BUILDLEN DOC2     268.87  263.92  262.00  277.64  284.85  283.40
SO BUILDLEN DOC2     273.34  254.97  228.86  195.79  156.78  113.00
SO XBADJ   DOC2     -28.01  -59.17  -88.54 -115.21 -138.38 -157.35
SO XBADJ   DOC2    -171.54 -183.53 -201.00 -218.26 -228.89 -232.57
SO XBADJ   DOC2    -229.18 -218.83 -201.82 -178.69 -150.13 -117.00
SO XBADJ   DOC2    -125.82 -130.81 -131.82 -128.84 -121.93 -111.33
SO XBADJ   DOC2     -97.34  -80.39  -61.00  -59.38  -55.95  -50.83
SO XBADJ   DOC2     -44.16  -36.15  -27.04  -17.10   -6.65    4.00
SO YBADJ   DOC2      79.44   86.47   90.87   92.51   91.34   87.39
SO YBADJ   DOC2      80.79   71.74   60.50   48.90   35.82   21.64
SO YBADJ   DOC2       6.81   -8.22  -23.01  -37.10  -51.57  -70.00
SO YBADJ   DOC2     -79.44  -86.47  -90.87  -92.51  -91.34  -87.39
SO YBADJ   DOC2     -80.79  -71.74  -60.50  -48.90  -35.82  -21.64
SO YBADJ   DOC2      -6.81    8.22   23.01   37.10   51.57   70.00

   SRCGROUP  ALL
SO FINISHED

RE STARTING
RE GRIDCART NET1 STA
              XYINC 466691 10 100 3763794 10 100
RE GRIDCART NET1 END

**        E     N
**        ------ -------
RE DISCCART 467687 3764217
RE DISCCART 466721 3764309
RE DISCCART 467110 3763852
```

```
RE DISCCART 467747 3764156
RE DISCCART 467409 3764230
RE DISCCART 467550 3764077
RE DISCCART 467600 3764395
RE DISCCART 466773 3764400
RE DISCCART 466685 3764396
RE DISCCART 467142 3764560
RE DISCCART 467253 3764509
RE DISCCART 467125 3764458
RE DISCCART 466818 3764404
RE DISCCART 466724 3764152
RE DISCCART 466699 3764107
RE DISCCART 466906 3764000
RE DISCCART 467546 3763993
RE DISCCART 467561 3763987
RE DISCCART 467567 3763930
RE DISCCART 467569 3763901
RE DISCCART 467565 3763885
RE DISCCART 467652 3764011
RE DISCCART 467658 3763981
RE DISCCART 467614 3763915
RE DISCCART 467621 3763893
RE DISCCART 467613 3763872
RE DISCCART 467603 3763849
RE DISCCART 467595 3763829
RE DISCCART 467575 3763756
RE DISCCART 467721 3763881
RE DISCCART 467702 3763877
RE DISCCART 467691 3763858
RE DISCCART 467680 3763839
RE DISCCART 467665 3763821
RE DISCCART 467635 3763787
RE DISCCART 467244 3763650

RE FINISHED

ME STARTING
   SURFFILE  rivr8.sfc
   PROFFILE  rivr8.pfl
"   SURFDATA  0    2008 RIVERSIDE,CA"
"   UAIRDATA  3190  2008 RIVERSIDE,CA"
   PROFBASE  0.0  METERS
ME FINISHED

OU STARTING
   RECTABLE  ALLAVE  FIRST-THIRD
   MAXTABLE  ALLAVE  50
   SUMMFILE  13432_3.SUM
   PLOTFILE  PERIOD ALL 13432_3.PLT
OU FINISHED

 ***********************************
 *** SETUP Finishes Successfully ***
 ***********************************
```

**MODELOPTs: NonDFAULT CONC   FLAT   FASTALL   URBAN

***   MODEL SETUP OPTIONS SUMMARY   ***

- -

**Model Is Setup For Calculation of Average CONCentration Values.

-- DEPOSITION LOGIC --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION. DRYDPLT = F
**Model Uses NO WET DEPLETION. WETDPLT = F

" **Model Uses URBAN Dispersion Algorithm for the SBL for   7 Source(s),"
for Total of   1 Urban Area(s):
Urban Population = 2100516.0 ; Urban Roughness Length = 1.000 m

**Model Allows User-Specified Options:
1. Stack-tip Downwash.
2. Model Assumes Receptors on FLAT Terrain.
3. Use Calms Processing Routine.
4. Use Missing Data Processing Routine.
5. No Exponential Decay.
6. Urban Roughness Length of 1.0 Meter Used.

**Other Options Specified:
FASTALL - Use effective sigma-y to optimize meander for
"   POINT and VOLUME sources, and hybrid approach"
to optimize AREA sources (formerly TOXICS option)
TEMP_Sub - Meteorological data includes TEMP substitutions

**Model Assumes No FLAGPOLE Receptor Heights.

**The User Specified a Pollutant Type of: PM

**Model Calculates PERIOD Averages Only

**This Run Includes: 7 Source(s);   1 Source Group(s); and   136 Receptor(s)

"   with: 2 POINT(s), including"
0 POINTCAP(s) and   0 POINTHOR(s)
and: 0 VOLUME source(s)
and: 5 AREA type source(s)
and: 0 LINE source(s)
and: 0 OPENPIT source(s)

**Model Set To Continue RUNning After the Setup Testing.

**The AERMET Input Meteorological Data Version Date: 14134

**Output Options Selected:
Model Outputs Tables of PERIOD Averages by Receptor
Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
Model Outputs Tables of Overall Maximum Short Term Values (MAXTABLE Keyword)
Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)

Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

```
**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =    0.00 ;  Decay Coef. =   0.000    ;  Rot. Angle =    0.0
              Emission Units = GRAMS/SEC                          ;  Emission Rate Unit Factor =  0.10000E+07
              Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =     3.5 MB of RAM.

**File for Summary of Results:  13432_3.SUM
```

**MODELOPTs: NonDFAULT CONC FLAT FASTALL URBAN

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BLDG EXISTS	URBAN SOURCE	CAP/ HOR	EMIS RATE SCALAR VARY BY
DOC1	0	0.59123E-04	467186.0	3764204.0	0.0	4.12	366.48	50.00	0.10	YES	YES	NO	
DOC2	0	0.10980E-03	467308.0	3764204.0	0.0	4.12	366.48	50.00	0.10	YES	YES	NO	

**MODELOPTs: NonDFAULT CONC FLAT FASTALL URBAN

*** AREAPOLY SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC /METER**2)	LOCATION OF AREA X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	NUMBER OF VERTS.	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
AIS1	0	0.31750E-08	467124.0	3764187.0	0.0	4.12	13	0.00	YES	
AIS2	0	0.85250E-08	467247.0	3764187.0	0.0	4.12	8	0.00	YES	
CEN1	0	0.88100E-09	466677.0	3764351.0	0.0	4.12	12	0.00	YES	
CEN2	0	0.14030E-08	467111.0	3764350.0	0.0	4.12	4	0.00	YES	
CEN3	0	0.38240E-08	467374.0	3764346.0	0.0	4.12	12	0.00	YES	

**MODELOPTs: NonDFAULT CONC FLAT FASTALL URBAN

*** SOURCE IDs DEFINING SOURCE GROUPS ***

SRCGROUP ID	SOURCE IDs
ALL	AIS1 , AIS2 , CEN1 , CEN2 , CEN3 , DOC1 , DOC2 ,

**MODELOPTs: NonDFAULT CONC FLAT FASTALL URBAN

*** SOURCE IDs DEFINED AS URBAN SOURCES ***

URBAN ID	URBAN POP	SOURCE IDs
"	2100516.	AIS1 , AIS2 , CEN1 , CEN2 , CEN3 , DOC1 , DOC2 ,"

**MODELOPTs: NonDFAULT CONC FLAT FASTALL URBAN

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: DOC1

IFV	BH	BW	BL	XADJ	YADJ	IFV	BH	BW	BL	XADJ	YADJ
" 1	12.0,	277.6,	153.8,	-6.8,	-40.7,	2	12.0,	284.9,	190.0,	-17.4,	-28.2,"
" 3	12.0,	283.4,	220.4,	-27.5,	-14.8,	4	12.0,	273.3,	244.1,	-36.8,	-1.0,"
" 5	12.0,	255.0,	260.3,	-44.9,	12.9,	6	12.0,	228.9,	268.7,	-51.7,	26.4,"
" 7	12.0,	195.8,	268.9,	-56.9,	39.1,	8	12.0,	156.8,	263.9,	-63.4,	50.5,"
" 9	12.0,	113.0,	262.0,	-79.0,	60.5,	10	12.0,	153.8,	277.6,	-98.1,	70.1,"
" 11	12.0,	190.0,	284.9,	-114.2,	77.5,	12	12.0,	220.4,	283.4,	-126.9,	82.6,"
" 13	12.0,	244.1,	273.3,	-135.7,	85.2,	14	12.0,	260.3,	255.0,	-140.4,	85.2,"
" 15	12.0,	268.7,	228.9,	-140.8,	82.6,	16	12.0,	268.9,	195.8,	-137.0,	77.5,"
" 17	12.0,	263.9,	156.8,	-128.9,	68.6,	18	12.0,	262.0,	113.0,	-117.0,	52.0,"
" 19	12.0,	277.6,	153.8,	-147.0,	40.7,	20	12.0,	284.9,	190.0,	-172.5,	28.2,"
" 21	12.0,	283.4,	220.4,	-192.8,	14.8,	22	12.0,	273.3,	244.1,	-207.3,	1.0,"
" 23	12.0,	255.0,	260.3,	-215.4,	-12.9,	24	12.0,	228.9,	268.7,	-217.0,	-26.4,"
" 25	12.0,	195.8,	268.9,	-212.0,	-39.1,	26	12.0,	156.8,	263.9,	-200.5,	-50.5,"
" 27	12.0,	113.0,	262.0,	-183.0,	-60.5,	28	12.0,	153.8,	277.6,	-179.5,	-70.1,"
" 29	12.0,	190.0,	284.9,	-170.6,	-77.5,	30	12.0,	220.4,	283.4,	-156.5,	-82.6,"
" 31	12.0,	244.1,	273.3,	-137.6,	-85.2,	32	12.0,	260.3,	255.0,	-114.6,	-85.2,"
" 33	12.0,	268.7,	228.9,	-88.0,	-82.6,	34	12.0,	268.9,	195.8,	-58.8,	-77.5,"
" 35	12.0,	263.9,	156.8,	-27.8,	-68.6,	36	12.0,	262.0,	113.0,	4.0,	-52.0,"

SOURCE ID: DOC2

IFV	BH	BW	BL	XADJ	YADJ	IFV	BH	BW	BL	XADJ	YADJ
" 1	12.0,	277.6,	153.8,	-28.0,	79.4,	2	12.0,	284.9,	190.0,	-59.2,	86.5,"
" 3	12.0,	283.4,	220.4,	-88.5,	90.9,	4	12.0,	273.3,	244.1,	-115.2,	92.5,"
" 5	12.0,	255.0,	260.3,	-138.4,	91.3,	6	12.0,	228.9,	268.7,	-157.4,	87.4,"
" 7	12.0,	195.8,	268.9,	-171.5,	80.8,	8	12.0,	156.8,	263.9,	-183.5,	71.7,"
" 9	12.0,	113.0,	262.0,	-201.0,	60.5,	10	12.0,	153.8,	277.6,	-218.3,	48.9,"
" 11	12.0,	190.0,	284.9,	-228.9,	35.8,	12	12.0,	220.4,	283.4,	-232.6,	21.6,"
" 13	12.0,	244.1,	273.3,	-229.2,	6.8,	14	12.0,	260.3,	255.0,	-218.8,	-8.2,"
" 15	12.0,	268.7,	228.9,	-201.8,	-23.0,	16	12.0,	268.9,	195.8,	-178.7,	-37.1,"
" 17	12.0,	263.9,	156.8,	-150.1,	-51.6,	18	12.0,	262.0,	113.0,	-117.0,	-70.0,"
" 19	12.0,	277.6,	153.8,	-125.8,	-79.4,	20	12.0,	284.9,	190.0,	-130.8,	-86.5,"
" 21	12.0,	283.4,	220.4,	-131.8,	-90.9,	22	12.0,	273.3,	244.1,	-128.8,	-92.5,"
" 23	12.0,	255.0,	260.3,	-121.9,	-91.3,	24	12.0,	228.9,	268.7,	-111.3,	-87.4,"
" 25	12.0,	195.8,	268.9,	-97.3,	-80.8,	26	12.0,	156.8,	263.9,	-80.4,	-71.7,"
" 27	12.0,	113.0,	262.0,	-61.0,	-60.5,	28	12.0,	153.8,	277.6,	-59.4,	-48.9,"
" 29	12.0,	190.0,	284.9,	-55.9,	-35.8,	30	12.0,	220.4,	283.4,	-50.8,	-21.6,"
" 31	12.0,	244.1,	273.3,	-44.2,	-6.8,	32	12.0,	260.3,	255.0,	-36.1,	8.2,"
" 33	12.0,	268.7,	228.9,	-27.0,	23.0,	34	12.0,	268.9,	195.8,	-17.1,	37.1,"
" 35	12.0,	263.9,	156.8,	-6.6,	51.6,	36	12.0,	262.0,	113.0,	4.0,	70.0,"

**MODELOPTs: NonDFAULT CONC FLAT FASTALL URBAN

*** GRIDDED RECEPTOR NETWORK SUMMARY ***

*** NETWORK ID: NET1 ; NETWORK TYPE: GRIDCART ***

*** X-COORDINATES OF GRID ***
(METERS)

" 466691.0, 466791.0, 466891.0, 466991.0, 467091.0, 467191.0, 467291.0, 467391.0, 467491.0, 467591.0,"

*** Y-COORDINATES OF GRID ***
(METERS)

" 3763794.0, 3763894.0, 3763994.0, 3764094.0, 3764194.0, 3764294.0, 3764394.0, 3764494.0, 3764594.0, 3764694.0,"

**MODELOPTs: NonDFAULT CONC FLAT FASTALL URBAN

*** DISCRETE CARTESIAN RECEPTORS ***
" (X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)"
(METERS)

```
"    ( 467687.0, 3764217.0,      0.0,      0.0,      0.0);        ( 466721.0, 3764309.0,      0.0,      0.0,      0.0);     "
"    ( 467110.0, 3763852.0,      0.0,      0.0,      0.0);        ( 467747.0, 3764156.0,      0.0,      0.0,      0.0);     "
"    ( 467409.0, 3764230.0,      0.0,      0.0,      0.0);        ( 467550.0, 3764077.0,      0.0,      0.0,      0.0);     "
"    ( 467600.0, 3764395.0,      0.0,      0.0,      0.0);        ( 466773.0, 3764400.0,      0.0,      0.0,      0.0);     "
"    ( 466685.0, 3764396.0,      0.0,      0.0,      0.0);        ( 467142.0, 3764560.0,      0.0,      0.0,      0.0);     "
"    ( 467253.0, 3764509.0,      0.0,      0.0,      0.0);        ( 467125.0, 3764458.0,      0.0,      0.0,      0.0);     "
"    ( 466818.0, 3764404.0,      0.0,      0.0,      0.0);        ( 466724.0, 3764152.0,      0.0,      0.0,      0.0);     "
"    ( 466699.0, 3764107.0,      0.0,      0.0,      0.0);        ( 466906.0, 3764000.0,      0.0,      0.0,      0.0);     "
"    ( 467546.0, 3763993.0,      0.0,      0.0,      0.0);        ( 467561.0, 3763987.0,      0.0,      0.0,      0.0);     "
"    ( 467567.0, 3763930.0,      0.0,      0.0,      0.0);        ( 467569.0, 3763901.0,      0.0,      0.0,      0.0);     "
"    ( 467565.0, 3763885.0,      0.0,      0.0,      0.0);        ( 467652.0, 3764011.0,      0.0,      0.0,      0.0);     "
"    ( 467658.0, 3763981.0,      0.0,      0.0,      0.0);        ( 467614.0, 3763915.0,      0.0,      0.0,      0.0);     "
"    ( 467621.0, 3763893.0,      0.0,      0.0,      0.0);        ( 467613.0, 3763872.0,      0.0,      0.0,      0.0);     "
"    ( 467603.0, 3763849.0,      0.0,      0.0,      0.0);        ( 467595.0, 3763829.0,      0.0,      0.0,      0.0);     "
"    ( 467575.0, 3763756.0,      0.0,      0.0,      0.0);        ( 467721.0, 3763881.0,      0.0,      0.0,      0.0);     "
"    ( 467702.0, 3763877.0,      0.0,      0.0,      0.0);        ( 467691.0, 3763858.0,      0.0,      0.0,      0.0);     "
"    ( 467680.0, 3763839.0,      0.0,      0.0,      0.0);        ( 467665.0, 3763821.0,      0.0,      0.0,      0.0);     "
"    ( 467635.0, 3763787.0,      0.0,      0.0,      0.0);        ( 467244.0, 3763650.0,      0.0,      0.0,      0.0);     "
```

**MODELOPTs: NonDFAULT CONC FLAT FASTALL URBAN

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

```
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

" 1.54, 3.09, 5.14, 8.23, 10.80,"

**MODELOPTs: NonDFAULT CONC FLAT FASTALL URBAN

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: rivr8.sfc Met Version: 14134
Profile file: rivr8.pfl
Surface format: FREE
Profile format: FREE
Surface station no.: 0 Upper air station no.: 3190
" Name: RIVERSIDE,CA Name: RIVERSIDE,CA "
Year: 2008 Year: 2008

First 24 hours of scalar data

YR	MO	DY	JDY	HR	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS	WD	HT	REF TA	HT
08	01	01	1	01	-64.0	0.616	-9.000	-9.000	-999.	1157.	319.6	0.31	1.00	1.00	5.40	27.	9.1	287.5	5.5
08	01	01	1	02	-54.0	0.502	-9.000	-9.000	-999.	866.	204.9	0.31	1.00	1.00	4.50	40.	9.1	287.5	5.5
08	01	01	1	03	-16.4	0.152	-9.000	-9.000	-999.	347.	18.8	0.31	1.00	1.00	2.20	62.	9.1	287.0	5.5
08	01	01	1	04	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.31	1.00	1.00	3.10	67.	9.1	287.0	5.5
08	01	01	1	05	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.31	1.00	1.00	4.90	96.	9.1	286.4	5.5
08	01	01	1	06	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.31	1.00	1.00	3.10	342.	9.1	286.4	5.5
08	01	01	1	07	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.31	1.00	1.00	4.00	38.	9.1	287.0	5.5
08	01	01	1	08	-35.7	0.448	-9.000	-9.000	-999.	719.	220.9	0.31	1.00	0.53	4.00	62.	9.1	287.0	5.5
08	01	01	1	09	26.7	0.649	0.357	0.005	59.	1253.	-895.5	0.31	1.00	0.32	5.40	294.	9.1	288.1	5.5
08	01	01	1	10	76.5	0.503	0.700	0.009	157.	879.	-146.3	0.31	1.00	0.25	4.00	42.	9.1	289.2	5.5
08	01	01	1	11	123.5	0.418	1.124	0.012	404.	655.	-51.7	0.31	1.00	0.22	3.10	30.	9.1	290.9	5.5
08	01	01	1	12	130.9	0.715	1.311	0.005	605.	1451.	-245.0	0.31	1.00	0.21	5.80	37.	9.1	290.9	5.5
08	01	01	1	13	81.1	0.560	1.174	0.006	701.	1033.	-189.8	0.31	1.00	0.21	4.50	4.	9.1	290.9	5.5
08	01	01	1	14	76.4	0.604	1.171	0.005	739.	1124.	-252.5	0.31	1.00	0.23	4.90	13.	9.1	290.9	5.5
08	01	01	1	15	52.3	0.805	1.043	0.005	762.	1730.	-875.8	0.31	1.00	0.26	6.70	39.	9.1	290.9	5.5
08	01	01	1	16	11.1	0.377	0.624	0.011	767.	800.	-422.2	0.31	1.00	0.35	3.10	346.	9.1	290.4	5.5
08	01	01	1	17	-43.3	0.441	-9.000	-9.000	-999.	705.	173.6	0.31	1.00	0.63	4.00	9.	9.1	290.4	5.5
08	01	01	1	18	-29.0	0.400	-9.000	-9.000	-999.	608.	192.9	0.31	1.00	1.00	3.60	45.	9.1	289.9	5.5
08	01	01	1	19	-49.6	0.505	-9.000	-9.000	-999.	860.	227.3	0.31	1.00	1.00	4.50	25.	9.1	289.9	5.5
08	01	01	1	20	-64.0	0.730	-9.000	-9.000	-999.	1496.	533.1	0.31	1.00	1.00	6.30	60.	9.1	289.9	5.5
08	01	01	1	21	-29.1	0.400	-9.000	-9.000	-999.	736.	192.1	0.31	1.00	1.00	3.60	238.	9.1	288.8	5.5
08	01	01	1	22	-41.2	0.562	-9.000	-9.000	-999.	1010.	378.5	0.31	1.00	1.00	4.90	87.	9.1	287.5	5.5
08	01	01	1	23	-53.8	0.733	-9.000	-9.000	-999.	1504.	642.6	0.31	1.00	1.00	6.30	95.	9.1	287.0	5.5
08	01	01	1	24	-29.5	0.399	-9.000	-9.000	-999.	738.	189.5	0.31	1.00	1.00	3.60	37.	9.1	285.4	5.5

First hour of profile data

YR	MO	DY	HR	HEIGHT	F	WDIR	WSPD	AMB_TMP	sigmaA	sigmaW	sigmaV
08	01	01	01	5.5	0	-999.	-99.00	287.6	99.0	-99.00	-99.00
08	01	01	01	9.1	1	27.	5.40	-999.0	99.0	-99.00	-99.00

F indicates top of profile (=1) or below (=0)

**MODELOPTs: NonDFAULT CONC FLAT FASTALL URBAN

*** THE PERIOD (43848 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
" INCLUDING SOURCE(S): AIS1 , AIS2 , CEN1 , CEN2 , CEN3 , "
" DOC1 , DOC2 , "

*** NETWORK ID: NET1 ; NETWORK TYPE: GRIDCART ***

** CONC OF PM IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS) 466691.00	466791.00	466891.00	466991.00	467091.00	467191.00	467291.00	467391.00	467491.00
3764694.00	0.00057	0.00067	0.00078	0.00089	0.00102	0.00115	0.00122	0.00114	0.00101
3764594.00	0.00071	0.00084	0.00099	0.00117	0.00137	0.00160	0.00172	0.00160	0.00141
3764494.00	0.00088	0.00108	0.00132	0.00160	0.00199	0.00243	0.00268	0.00255	0.00228
3764394.00	0.00118	0.00155	0.00198	0.00272	0.00396	0.00520	0.00615	0.00678	0.00610
3764294.00	0.00125	0.00174	0.00228	0.00330	0.00772	0.00932	0.01000	0.02097	0.00851
3764194.00	0.00115	0.00153	0.00209	0.00314	0.00679	0.01852	0.03558	0.02631	0.00826
3764094.00	0.00103	0.00134	0.00175	0.00237	0.00338	0.00640	0.00934	0.00895	0.00725
3763994.00	0.00090	0.00113	0.00142	0.00179	0.00231	0.00332	0.00423	0.00432	0.00447
3763894.00	0.00076	0.00094	0.00115	0.00142	0.00180	0.00235	0.00275	0.00291	0.00302
3763794.00	0.00065	0.00079	0.00096	0.00118	0.00147	0.00177	0.00200	0.00218	0.00224

**MODELOPTs: NonDFAULT CONC FLAT FASTALL URBAN

*** THE PERIOD (43848 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
" INCLUDING SOURCE(S): AIS1 , AIS2 , CEN1 , CEN2 , CEN3 , "
" DOC1 , DOC2 , "

*** NETWORK ID: NET1 ; NETWORK TYPE: GRIDCART ***

** CONC OF PM IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS) 467591.00
3764694.00	0.00090
3764594.00	0.00127
3764494.00	0.00200
3764394.00	0.00421
3764294.00	0.00759
3764194.00	0.00517
3764094.00	0.00502
3763994.00	0.00395
3763894.00	0.00282
3763794.00	0.00212

**MODELOPTs: NonDFAULT CONC FLAT FASTALL URBAN

*** THE PERIOD (43848 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
" INCLUDING SOURCE(S): AIS1 , AIS2 , CEN1 , CEN2 , CEN3 , "
" DOC1 , DOC2 , "

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF PM IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
467687.00	3764217.00	0.00433	466721.00	3764309.00	0.00146
467110.00	3763852.00	0.00172	467747.00	3764156.00	0.00323
467409.00	3764230.00	0.01766	467550.00	3764077.00	0.00563
467600.00	3764395.00	0.00400	466773.00	3764400.00	0.00143
466685.00	3764396.00	0.00114	467142.00	3764560.00	0.00169
467253.00	3764509.00	0.00241	467125.00	3764458.00	0.00257
466818.00	3764404.00	0.00156	466724.00	3764152.00	0.00121
466699.00	3764107.00	0.00107	466906.00	3764000.00	0.00149
467546.00	3763993.00	0.00421	467561.00	3763987.00	0.00403
467567.00	3763930.00	0.00325	467569.00	3763901.00	0.00294
467565.00	3763885.00	0.00280	467652.00	3764011.00	0.00365
467658.00	3763981.00	0.00334	467614.00	3763915.00	0.00294
467621.00	3763893.00	0.00272	467613.00	3763872.00	0.00258
467603.00	3763849.00	0.00243	467595.00	3763829.00	0.00232
467575.00	3763756.00	0.00195	467721.00	3763881.00	0.00230
467702.00	3763877.00	0.00234	467691.00	3763858.00	0.00226
467680.00	3763839.00	0.00218	467665.00	3763821.00	0.00211
467635.00	3763787.00	0.00200	467244.00	3763650.00	0.00130

**MODELOPTs: NonDFAULT CONC FLAT FASTALL URBAN

*** THE SUMMARY OF MAXIMUM PERIOD (43848 HRS) RESULTS ***

** CONC OF PM IN MICROGRAMS/M**3 **

"GROUP ID	AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	NETWORK OF TYPE	GRID-ID"
"ALL	1ST HIGHEST VALUE IS	0.03558 AT (467291.00, 3764194.00, 0.00, 0.00, 0.00)	GC	NET1 "
"	2ND HIGHEST VALUE IS	0.02631 AT (467391.00, 3764194.00, 0.00, 0.00, 0.00)	GC	NET1 "
"	3RD HIGHEST VALUE IS	0.02097 AT (467391.00, 3764294.00, 0.00, 0.00, 0.00)	GC	NET1 "
"	4TH HIGHEST VALUE IS	0.01852 AT (467191.00, 3764194.00, 0.00, 0.00, 0.00)	GC	NET1 "
"	5TH HIGHEST VALUE IS	0.01766 AT (467409.00, 3764230.00, 0.00, 0.00, 0.00)	DC	"
"	6TH HIGHEST VALUE IS	0.01000 AT (467291.00, 3764294.00, 0.00, 0.00, 0.00)	GC	NET1 "
"	7TH HIGHEST VALUE IS	0.00934 AT (467291.00, 3764094.00, 0.00, 0.00, 0.00)	GC	NET1 "
"	8TH HIGHEST VALUE IS	0.00932 AT (467191.00, 3764294.00, 0.00, 0.00, 0.00)	GC	NET1 "
"	9TH HIGHEST VALUE IS	0.00895 AT (467391.00, 3764094.00, 0.00, 0.00, 0.00)	GC	NET1 "
"	10TH HIGHEST VALUE IS	0.00851 AT (467491.00, 3764294.00, 0.00, 0.00, 0.00)	GC	NET1 "

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

**MODELOPTs: NonDFAULT CONC FLAT FASTALL URBAN

*** Message Summary : AERMOD Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)
A Total of 0 Warning Message(s)
A Total of 2006 Informational Message(s)

A Total of 43848 Hours Were Processed

A Total of 7 Calm Hours Identified

A Total of 1999 Missing Hours Identified (4.56 Percent)

******** FATAL ERROR MESSAGES ********
*** NONE ***

******** WARNING MESSAGES ********
*** NONE ***

****
*** AERMOD Finishes Successfully ***
****

HARP2 - HRACalc (dated 16088) 6/6/2016 12:26:32 PM - Output Log

GLCs loaded successfully
Pollutants loaded successfully
****
RISK SCENARIO SETTINGS

Receptor Type: Worker
Scenario: Cancer
Calculation Method: Derived

****
EXPOSURE DURATION PARAMETERS FOR CANCER

Start Age: 16
Total Exposure Duration: 25

Exposure Duration Bin Distribution
3rd Trimester Bin: 0
0<2 Years Bin: 0
2<9 Years Bin: 0
2<16 Years Bin: 0
16<30 Years Bin: 0
16 to 70 Years Bin: 25

****
PATHWAYS ENABLED

NOTE: Inhalation is always enabled and used for all assessments. The remaining pathways are only used for cancer and noncancer chronic assessments.

Inhalation: True
Soil: True
Dermal: True
Mother's milk: False
Water: False
Fish: False
Homegrown crops: False
Beef: False
Dairy: False
Pig: False
Chicken: False
Egg: False

****
INHALATION

Daily breathing rate: Moderate8HR

Worker Adjustment Factors
Worker adjustment factors enabled: NO

Fraction at time at home

3rd Trimester to 16 years: OFF
16 years to 70 years: OFF

****
SOIL & DERMAL PATHWAY SETTINGS

Deposition rate (m/s): 0.05
Soil mixing depth (m): 0.01
Dermal climate: Mixed

****
TIER 2 SETTINGS
Tier2 not used.

****

Calculating cancer risk
Cancer risk saved to: C:\Users\cbrown\Google Drive\13432 Center Street\Final Submittal\HARP\13432_25YR_CancerRisk.csv
HRA ran successfully

**HARP - Health Risk Assessment Module v16057
**6/6/2016

INDEX	GRP1	GRP2	POLID	POLABBREV	CONC	RISK_SUM	SCENARIO	DETAILS	INH_RISK
8	467409	3764230	9901	DieselExhPM	0.01766	1.09E-06	25YrCancerDerived	*	1.09E-06
9	467550	3764077	9901	DieselExhPM	0.00563	3.48E-07	25YrCancerDerived	*	3.48E-07
11	467687	3764217	9901	DieselExhPM	0.00433	2.68E-07	25YrCancerDerived	*	2.68E-07
10	467600	3764395	9901	DieselExhPM	0.004	2.48E-07	25YrCancerDerived	*	2.48E-07
12	467747	3764156	9901	DieselExhPM	0.00323	2.00E-07	25YrCancerDerived	*	2.00E-07
5	467125	3764458	9901	DieselExhPM	0.00257	1.59E-07	25YrCancerDerived	*	1.59E-07
7	467253	3764509	9901	DieselExhPM	0.00241	1.49E-07	25YrCancerDerived	*	1.49E-07
4	467110	3763852	9901	DieselExhPM	0.00172	1.06E-07	25YrCancerDerived	*	1.06E-07
6	467142	3764560	9901	DieselExhPM	0.00169	1.05E-07	25YrCancerDerived	*	1.05E-07
2	466721	3764309	9901	DieselExhPM	0.00146	9.04E-08	25YrCancerDerived	*	9.04E-08
3	466773	3764400	9901	DieselExhPM	0.00143	8.85E-08	25YrCancerDerived	*	8.85E-08
1	466685	3764396	9901	DieselExhPM	0.00114	7.06E-08	25YrCancerDerived	*	7.06E-08

SOIL_RISK	DERMAL_RISK	MMILK_RISK	WATER_RISK	FISH_RISK	CROP_RISK	BEEF_RISK	DAIRY_RISK	PIG_RISK
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0

CHICKEN_RISK	EGG_RISK	1ST_DRIVER	2ND_DRIVER	PASTURE_CONC	FISH_CONC	WATER_CONC	
0	0	INHALATION		0	0	0	
0	0	INHALATION		0	0	0	
0	0	INHALATION		0	0	0	
0	0	INHALATION		0	0	0	
0	0	INHALATION		0	0	0	
0	0	INHALATION		0	0	0	
0	0	INHALATION		0	0	0	
0	0	INHALATION		0	0	0	
0	0	INHALATION		0	0	0	
0	0	INHALATION		0	0	0	
0	0	INHALATION		0	0	0	
0	0	INHALATION		0	0	0	

HARP2 - HRACalc (dated 16088) 6/7/2016 6:33:04 PM - Output Log

GLCs loaded successfully
Pollutants loaded successfully
****
RISK SCENARIO SETTINGS

Receptor Type: Resident
Scenario: Cancer
Calculation Method: Derived

****
EXPOSURE DURATION PARAMETERS FOR CANCER

Start Age: -0.25
Total Exposure Duration: 30

Exposure Duration Bin Distribution
3rd Trimester Bin: 0.25
0<2 Years Bin: 2
2<9 Years Bin: 0
2<16 Years Bin: 14
16<30 Years Bin: 14
16 to 70 Years Bin: 0

****
PATHWAYS ENABLED

NOTE: Inhalation is always enabled and used for all assessments. The remaining pathways are only used for cancer and noncancer chronic assessments.

Inhalation: True
Soil: False
Dermal: False
Mother's milk: False
Water: False
Fish: False
Homegrown crops: False
Beef: False
Dairy: False
Pig: False
Chicken: False
Egg: False

****
INHALATION

Daily breathing rate: LongTerm24HR

Worker Adjustment Factors
Worker adjustment factors enabled: NO

Fraction at time at home

3rd Trimester to 16 years: OFF
16 years to 70 years: ON

****
TIER 2 SETTINGS
Tier2 not used.

****

Calculating cancer risk
Cancer risk saved to: C:\Users\cbrown\Google Drive\13432 Center Street\Final Submittal\HARP\13432_30YR_CancerRisk.csv
HRA ran successfully

**HARP - Health Risk Assessment Module v16057
**6/6/2016

INDEX	GRP1	GRP2	POLID	POLABBREV	CONC	RISK_SUM	SCENARIO	DETAILS	INH_RISK
6	467546	3763993	9901	DieselExhPM	0.00421	2.87E-06	30YrCancerDerived	*	2.87E-06
7	467561	3763987	9901	DieselExhPM	0.00403	2.75E-06	30YrCancerDerived	*	2.75E-06
18	467652	3764011	9901	DieselExhPM	0.00365	2.49E-06	30YrCancerDerived	*	2.49E-06
19	467658	3763981	9901	DieselExhPM	0.00334	2.28E-06	30YrCancerDerived	*	2.28E-06
9	467567	3763930	9901	DieselExhPM	0.00325	2.22E-06	30YrCancerDerived	*	2.22E-06
10	467569	3763901	9901	DieselExhPM	0.00294	2.00E-06	30YrCancerDerived	*	2.00E-06
15	467614	3763915	9901	DieselExhPM	0.00294	2.00E-06	30YrCancerDerived	*	2.00E-06
8	467565	3763885	9901	DieselExhPM	0.0028	1.91E-06	30YrCancerDerived	*	1.91E-06
16	467621	3763893	9901	DieselExhPM	0.00272	1.85E-06	30YrCancerDerived	*	1.85E-06
14	467613	3763872	9901	DieselExhPM	0.00258	1.76E-06	30YrCancerDerived	*	1.76E-06
13	467603	3763849	9901	DieselExhPM	0.00243	1.66E-06	30YrCancerDerived	*	1.66E-06
23	467702	3763877	9901	DieselExhPM	0.00234	1.60E-06	30YrCancerDerived	*	1.60E-06
12	467595	3763829	9901	DieselExhPM	0.00232	1.58E-06	30YrCancerDerived	*	1.58E-06
24	467721	3763881	9901	DieselExhPM	0.0023	1.57E-06	30YrCancerDerived	*	1.57E-06
22	467691	3763858	9901	DieselExhPM	0.00226	1.54E-06	30YrCancerDerived	*	1.54E-06
21	467680	3763839	9901	DieselExhPM	0.00218	1.49E-06	30YrCancerDerived	*	1.49E-06
20	467665	3763821	9901	DieselExhPM	0.00211	1.44E-06	30YrCancerDerived	*	1.44E-06
17	467635	3763787	9901	DieselExhPM	0.002	1.36E-06	30YrCancerDerived	*	1.36E-06
11	467575	3763756	9901	DieselExhPM	0.00195	1.33E-06	30YrCancerDerived	*	1.33E-06
3	466818	3764404	9901	DieselExhPM	0.00156	1.06E-06	30YrCancerDerived	*	1.06E-06
4	466906	3764000	9901	DieselExhPM	0.00149	1.02E-06	30YrCancerDerived	*	1.02E-06
5	467244	3763650	9901	DieselExhPM	0.0013	8.86E-07	30YrCancerDerived	*	8.86E-07
2	466724	3764152	9901	DieselExhPM	0.00121	8.25E-07	30YrCancerDerived	*	8.25E-07
1	466699	3764107	9901	DieselExhPM	0.00107	7.30E-07	30YrCancerDerived	*	7.30E-07

SOIL_RISK	DERMAL_RISK	MMILK_RISK	WATER_RISK	FISH_RISK	CROP_RISK	BEEF_RISK	DAIRY_RISK
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0

PIG_RISK	CHICKEN_RISK	EGG_RISK	1ST_DRIVER	2ND_DRIVER	PASTURE_CONC	FISH_CONC	WATER_CONC
0	0	0	INHALATION		0	0	0
0	0	0	INHALATION		0	0	0
0	0	0	INHALATION		0	0	0
0	0	0	INHALATION		0	0	0
0	0	0	INHALATION		0	0	0
0	0	0	INHALATION		0	0	0
0	0	0	INHALATION		0	0	0
0	0	0	INHALATION		0	0	0
0	0	0	INHALATION		0	0	0
0	0	0	INHALATION		0	0	0
0	0	0	INHALATION		0	0	0
0	0	0	INHALATION		0	0	0
0	0	0	INHALATION		0	0	0
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0	0	0	INHALATION		0	0	0

HARP2 - HRACalc (dated 16088) 6/6/2016 12:31:17 PM - Output Log

GLCs loaded successfully
Pollutants loaded successfully
****
RISK SCENARIO SETTINGS

Receptor Type: Population
Scenario: Cancer
Calculation Method: Derived

****
EXPOSURE DURATION PARAMETERS FOR CANCER

Start Age: -0.25
Total Exposure Duration: 70

Exposure Duration Bin Distribution
3rd Trimester Bin: 0.25
0<2 Years Bin: 2
2<9 Years Bin: 0
2<16 Years Bin: 14
16<30 Years Bin: 0
16 to 70 Years Bin: 54

****
PATHWAYS ENABLED

NOTE: Inhalation is always enabled and used for all assessments. The remaining pathways are only used for cancer and noncancer chronic assessments.

Inhalation: True
Soil: False
Dermal: False
Mother's milk: False
Water: False
Fish: False
Homegrown crops: False
Beef: False
Dairy: False
Pig: False
Chicken: False
Egg: False

****
INHALATION

Daily breathing rate: RMP

Worker Adjustment Factors
Worker adjustment factors enabled: NO

Fraction at time at home

3rd Trimester to 16 years: OFF
16 years to 70 years: OFF

****
TIER 2 SETTINGS
Tier2 not used.

****

Calculating cancer risk
Cancer risk saved to: C:\Users\cbrown\Google Drive\13432 Center Street\Final Submittal\HARP\13432_70YR_CancerRisk.csv
HRA ran successfully

**HARP - Health Risk Assessment Module v16057
**6/6/2016

INDEX	GRP1	GRP2	POLID	POLABBREV	CONC	RISK_SUM	SCENARIO	DETAILS	INH_RISK
1	466691	3764694	9901	DieselExhPM	0.00057	5.09E-07	70YrCancerRMP	*	5.09E-07
2	466691	3764594	9901	DieselExhPM	0.00071	6.35E-07	70YrCancerRMP	*	6.35E-07
3	466691	3764494	9901	DieselExhPM	0.00088	7.86E-07	70YrCancerRMP	*	7.86E-07
4	466691	3764394	9901	DieselExhPM	0.00118	1.05E-06	70YrCancerRMP	*	1.05E-06
5	466691	3764294	9901	DieselExhPM	0.00125	1.12E-06	70YrCancerRMP	*	1.12E-06
6	466691	3764194	9901	DieselExhPM	0.00115	1.03E-06	70YrCancerRMP	*	1.03E-06
7	466691	3764094	9901	DieselExhPM	0.00103	9.21E-07	70YrCancerRMP	*	9.21E-07
8	466691	3763994	9901	DieselExhPM	0.0009	8.04E-07	70YrCancerRMP	*	8.04E-07
9	466691	3763894	9901	DieselExhPM	0.00076	6.79E-07	70YrCancerRMP	*	6.79E-07
10	466691	3763794	9901	DieselExhPM	0.00065	5.81E-07	70YrCancerRMP	*	5.81E-07
11	467591	3764694	9901	DieselExhPM	0.0009	8.04E-07	70YrCancerRMP	*	8.04E-07
12	467591	3764594	9901	DieselExhPM	0.00127	1.14E-06	70YrCancerRMP	*	1.14E-06
13	467591	3764494	9901	DieselExhPM	0.002	1.79E-06	70YrCancerRMP	*	1.79E-06
14	467591	3764394	9901	DieselExhPM	0.00421	3.76E-06	70YrCancerRMP	*	3.76E-06
15	467591	3764294	9901	DieselExhPM	0.00759	6.78E-06	70YrCancerRMP	*	6.78E-06
16	467591	3764194	9901	DieselExhPM	0.00517	4.62E-06	70YrCancerRMP	*	4.62E-06
17	467591	3764094	9901	DieselExhPM	0.00502	4.49E-06	70YrCancerRMP	*	4.49E-06
18	467591	3763994	9901	DieselExhPM	0.00395	3.53E-06	70YrCancerRMP	*	3.53E-06
19	467591	3763894	9901	DieselExhPM	0.00282	2.52E-06	70YrCancerRMP	*	2.52E-06
20	467591	3763794	9901	DieselExhPM	0.00212	1.89E-06	70YrCancerRMP	*	1.89E-06
21	466791	3764694	9901	DieselExhPM	0.00067	5.99E-07	70YrCancerRMP	*	5.99E-07
22	466791	3764594	9901	DieselExhPM	0.00084	7.51E-07	70YrCancerRMP	*	7.51E-07
23	466791	3764494	9901	DieselExhPM	0.00108	9.65E-07	70YrCancerRMP	*	9.65E-07
24	466791	3764394	9901	DieselExhPM	0.00155	1.39E-06	70YrCancerRMP	*	1.39E-06
25	466791	3764294	9901	DieselExhPM	0.00174	1.56E-06	70YrCancerRMP	*	1.56E-06
26	466791	3764194	9901	DieselExhPM	0.00153	1.37E-06	70YrCancerRMP	*	1.37E-06
27	466791	3764094	9901	DieselExhPM	0.00134	1.20E-06	70YrCancerRMP	*	1.20E-06
28	466791	3763994	9901	DieselExhPM	0.00113	1.01E-06	70YrCancerRMP	*	1.01E-06
29	466791	3763894	9901	DieselExhPM	0.00094	8.40E-07	70YrCancerRMP	*	8.40E-07
30	466791	3763794	9901	DieselExhPM	0.00079	7.06E-07	70YrCancerRMP	*	7.06E-07
31	466891	3764694	9901	DieselExhPM	0.00078	6.97E-07	70YrCancerRMP	*	6.97E-07
32	466891	3764594	9901	DieselExhPM	0.00099	8.85E-07	70YrCancerRMP	*	8.85E-07
33	466891	3764494	9901	DieselExhPM	0.00132	1.18E-06	70YrCancerRMP	*	1.18E-06
34	466891	3764394	9901	DieselExhPM	0.00198	1.77E-06	70YrCancerRMP	*	1.77E-06

35	466891	3764294	9901	DieselExhPM	0.00228	2.04E-06	70YrCancerRMP	*	2.04E-06
36	466891	3764194	9901	DieselExhPM	0.00209	1.87E-06	70YrCancerRMP	*	1.87E-06
37	466891	3764094	9901	DieselExhPM	0.00175	1.56E-06	70YrCancerRMP	*	1.56E-06
38	466891	3763994	9901	DieselExhPM	0.00142	1.27E-06	70YrCancerRMP	*	1.27E-06
39	466891	3763894	9901	DieselExhPM	0.00115	1.03E-06	70YrCancerRMP	*	1.03E-06
40	466891	3763794	9901	DieselExhPM	0.00096	8.58E-07	70YrCancerRMP	*	8.58E-07
41	466991	3764694	9901	DieselExhPM	0.00089	7.95E-07	70YrCancerRMP	*	7.95E-07
42	466991	3764594	9901	DieselExhPM	0.00117	1.05E-06	70YrCancerRMP	*	1.05E-06
43	466991	3764494	9901	DieselExhPM	0.0016	1.43E-06	70YrCancerRMP	*	1.43E-06
44	466991	3764394	9901	DieselExhPM	0.00272	2.43E-06	70YrCancerRMP	*	2.43E-06
45	466991	3764294	9901	DieselExhPM	0.0033	2.95E-06	70YrCancerRMP	*	2.95E-06
46	466991	3764194	9901	DieselExhPM	0.00314	2.81E-06	70YrCancerRMP	*	2.81E-06
47	466991	3764094	9901	DieselExhPM	0.00237	2.12E-06	70YrCancerRMP	*	2.12E-06
48	466991	3763994	9901	DieselExhPM	0.00179	1.60E-06	70YrCancerRMP	*	1.60E-06
49	466991	3763894	9901	DieselExhPM	0.00142	1.27E-06	70YrCancerRMP	*	1.27E-06
50	466991	3763794	9901	DieselExhPM	0.00118	1.05E-06	70YrCancerRMP	*	1.05E-06
51	467091	3764694	9901	DieselExhPM	0.00102	9.12E-07	70YrCancerRMP	*	9.12E-07
52	467091	3764594	9901	DieselExhPM	0.00137	1.22E-06	70YrCancerRMP	*	1.22E-06
53	467091	3764494	9901	DieselExhPM	0.00199	1.78E-06	70YrCancerRMP	*	1.78E-06
54	467091	3764394	9901	DieselExhPM	0.00396	3.54E-06	70YrCancerRMP	*	3.54E-06
55	467091	3764294	9901	DieselExhPM	0.00772	6.90E-06	70YrCancerRMP	*	6.90E-06
56	467091	3764194	9901	DieselExhPM	0.00679	6.07E-06	70YrCancerRMP	*	6.07E-06
57	467091	3764094	9901	DieselExhPM	0.00338	3.02E-06	70YrCancerRMP	*	3.02E-06
58	467091	3763994	9901	DieselExhPM	0.00231	2.06E-06	70YrCancerRMP	*	2.06E-06
59	467091	3763894	9901	DieselExhPM	0.0018	1.61E-06	70YrCancerRMP	*	1.61E-06
60	467091	3763794	9901	DieselExhPM	0.00147	1.31E-06	70YrCancerRMP	*	1.31E-06
61	467191	3764694	9901	DieselExhPM	0.00115	1.03E-06	70YrCancerRMP	*	1.03E-06
62	467191	3764594	9901	DieselExhPM	0.0016	1.43E-06	70YrCancerRMP	*	1.43E-06

63	467191	3764494	9901	DieselExhPM	0.00243	2.17E-06	70YrCancerRMP	*	2.17E-06
64	467191	3764394	9901	DieselExhPM	0.0052	4.65E-06	70YrCancerRMP	*	4.65E-06
65	467191	3764294	9901	DieselExhPM	0.00932	8.33E-06	70YrCancerRMP	*	8.33E-06
66	467191	3764194	9901	DieselExhPM	0.01852	1.66E-05	70YrCancerRMP	*	1.66E-05
67	467191	3764094	9901	DieselExhPM	0.0064	5.72E-06	70YrCancerRMP	*	5.72E-06
68	467191	3763994	9901	DieselExhPM	0.00332	2.97E-06	70YrCancerRMP	*	2.97E-06
69	467191	3763894	9901	DieselExhPM	0.00235	2.10E-06	70YrCancerRMP	*	2.10E-06
70	467191	3763794	9901	DieselExhPM	0.00177	1.58E-06	70YrCancerRMP	*	1.58E-06
71	467291	3764694	9901	DieselExhPM	0.00122	1.09E-06	70YrCancerRMP	*	1.09E-06
72	467291	3764594	9901	DieselExhPM	0.00172	1.54E-06	70YrCancerRMP	*	1.54E-06
73	467291	3764494	9901	DieselExhPM	0.00268	2.40E-06	70YrCancerRMP	*	2.40E-06
74	467291	3764394	9901	DieselExhPM	0.00615	5.50E-06	70YrCancerRMP	*	5.50E-06
75	467291	3764294	9901	DieselExhPM	0.01	8.94E-06	70YrCancerRMP	*	8.94E-06
76	467291	3764194	9901	DieselExhPM	0.03558	3.18E-05	70YrCancerRMP	*	3.18E-05
77	467291	3764094	9901	DieselExhPM	0.00934	8.35E-06	70YrCancerRMP	*	8.35E-06
78	467291	3763994	9901	DieselExhPM	0.00423	3.78E-06	70YrCancerRMP	*	3.78E-06
79	467291	3763894	9901	DieselExhPM	0.00275	2.46E-06	70YrCancerRMP	*	2.46E-06
80	467291	3763794	9901	DieselExhPM	0.002	1.79E-06	70YrCancerRMP	*	1.79E-06
81	467391	3764694	9901	DieselExhPM	0.00114	1.02E-06	70YrCancerRMP	*	1.02E-06
82	467391	3764594	9901	DieselExhPM	0.0016	1.43E-06	70YrCancerRMP	*	1.43E-06
83	467391	3764494	9901	DieselExhPM	0.00255	2.28E-06	70YrCancerRMP	*	2.28E-06
84	467391	3764394	9901	DieselExhPM	0.00678	6.06E-06	70YrCancerRMP	*	6.06E-06
85	467391	3764294	9901	DieselExhPM	0.02097	1.87E-05	70YrCancerRMP	*	1.87E-05
86	467391	3764194	9901	DieselExhPM	0.02631	2.35E-05	70YrCancerRMP	*	2.35E-05
87	467391	3764094	9901	DieselExhPM	0.00895	8.00E-06	70YrCancerRMP	*	8.00E-06
88	467391	3763994	9901	DieselExhPM	0.00432	3.86E-06	70YrCancerRMP	*	3.86E-06
89	467391	3763894	9901	DieselExhPM	0.00291	2.60E-06	70YrCancerRMP	*	2.60E-06
90	467391	3763794	9901	DieselExhPM	0.00218	1.95E-06	70YrCancerRMP	*	1.95E-06
91	467491	3764694	9901	DieselExhPM	0.00101	9.03E-07	70YrCancerRMP	*	9.03E-07
92	467491	3764594	9901	DieselExhPM	0.00141	1.26E-06	70YrCancerRMP	*	1.26E-06
93	467491	3764494	9901	DieselExhPM	0.00228	2.04E-06	70YrCancerRMP	*	2.04E-06
94	467491	3764394	9901	DieselExhPM	0.0061	5.45E-06	70YrCancerRMP	*	5.45E-06
95	467491	3764294	9901	DieselExhPM	0.00851	7.61E-06	70YrCancerRMP	*	7.61E-06
96	467491	3764194	9901	DieselExhPM	0.00826	7.38E-06	70YrCancerRMP	*	7.38E-06
97	467491	3764094	9901	DieselExhPM	0.00725	6.48E-06	70YrCancerRMP	*	6.48E-06
98	467491	3763994	9901	DieselExhPM	0.00447	3.99E-06	70YrCancerRMP	*	3.99E-06
99	467491	3763894	9901	DieselExhPM	0.00302	2.70E-06	70YrCancerRMP	*	2.70E-06
						3.34E-06			

SOIL_RISK	DERMAL_RISK	MMILK_RISK	WATER_RISK	FISH_RISK	CROP_RISK	BEEF_RISK	DAIRY_RISK	PIG_RISK
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CHICKEN_RISK	EGG_RISK	1ST_DRIVER	2ND_DRIVER	PASTURE_CONC	FISH_CONC	WATER_CONC
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0	0	INHALATION		0	0	0
0	0	INHALATION		0	0	0
0	0	INHALATION		0	0	0
0	0	INHALATION		0	0	0
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HARP2 - HRACalc (dated 16088) 6/6/2016 3:59:46 PM - Output Log

GLCs loaded successfully
Pollutants loaded successfully
****
RISK SCENARIO SETTINGS

Receptor Type: Population
Scenario: NCChronic
Calculation Method: Derived

****
EXPOSURE DURATION PARAMETERS FOR CANCER
Exposure duration are only adjusted for cancer assessments

****
PATHWAYS ENABLED

NOTE: Inhalation is always enabled and used for all assessments. The remaining pathways are only used for cancer and noncancer chronic assessments.

Inhalation: True
Soil: False
Dermal: False
Mother's milk: False
Water: False
Fish: False
Homegrown crops: False
Beef: False
Dairy: False
Pig: False
Chicken: False
Egg: False

****
INHALATION

Daily breathing rate: LongTerm24HR

Worker Adjustment Factors
Worker adjustment factors enabled: NO

Fraction at time at home
NOTE: Exposure duration (i.e., start age, end age, ED, & FAH) are only adjusted for cancer assessments.

****
TIER 2 SETTINGS
Tier2 not used.

****

Calculating chronic risk
Chronic risk saved to: C:\Users\cbrown\Google Drive\13432 Center Street\Final

Submittal\HARP\13432_CHR_NCChronicRisk.csv
HRA ran successfully

*HARP - HRACalc v16088 6/6/2016 3:59:46 PM - Chronic Risk

INDEX	GRP1	GRP2	POLID	POLABBREV	CONC	SCENARIO	CV	CNS	IMMUN
76	467291	3764194	9901	DieselExhPM	0.03558	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
86	467391	3764194	9901	DieselExhPM	0.02631	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
85	467391	3764294	9901	DieselExhPM	0.02097	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
66	467191	3764194	9901	DieselExhPM	0.01852	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
112	467409	3764230	9901	DieselExhPM	0.01766	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
75	467291	3764294	9901	DieselExhPM	0.01	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
77	467291	3764094	9901	DieselExhPM	0.00934	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
65	467191	3764294	9901	DieselExhPM	0.00932	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
87	467391	3764094	9901	DieselExhPM	0.00895	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
95	467491	3764294	9901	DieselExhPM	0.00851	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
96	467491	3764194	9901	DieselExhPM	0.00826	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
55	467091	3764294	9901	DieselExhPM	0.00772	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
15	467591	3764294	9901	DieselExhPM	0.00759	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
97	467491	3764094	9901	DieselExhPM	0.00725	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
56	467091	3764194	9901	DieselExhPM	0.00679	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
84	467391	3764394	9901	DieselExhPM	0.00678	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
67	467191	3764094	9901	DieselExhPM	0.0064	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
74	467291	3764394	9901	DieselExhPM	0.00615	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
94	467491	3764394	9901	DieselExhPM	0.0061	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
114	467550	3764077	9901	DieselExhPM	0.00563	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
64	467191	3764394	9901	DieselExhPM	0.0052	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
16	467591	3764194	9901	DieselExhPM	0.00517	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
17	467591	3764094	9901	DieselExhPM	0.00502	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
98	467491	3763994	9901	DieselExhPM	0.00447	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
131	467687	3764217	9901	DieselExhPM	0.00433	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
88	467391	3763994	9901	DieselExhPM	0.00432	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
78	467291	3763994	9901	DieselExhPM	0.00423	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
14	467591	3764394	9901	DieselExhPM	0.00421	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
113	467546	3763993	9901	DieselExhPM	0.00421	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
115	467561	3763987	9901	DieselExhPM	0.00403	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
121	467600	3764395	9901	DieselExhPM	0.004	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
54	467091	3764394	9901	DieselExhPM	0.00396	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
18	467591	3763994	9901	DieselExhPM	0.00395	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
127	467652	3764011	9901	DieselExhPM	0.00365	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
57	467091	3764094	9901	DieselExhPM	0.00338	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
128	467658	3763981	9901	DieselExhPM	0.00334	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00

68	467191	3763994	9901	DieselExhPM	0.00332	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
45	466991	3764294	9901	DieselExhPM	0.0033	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
117	467567	3763930	9901	DieselExhPM	0.00325	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
135	467747	3764156	9901	DieselExhPM	0.00323	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
46	466991	3764194	9901	DieselExhPM	0.00314	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
99	467491	3763894	9901	DieselExhPM	0.00302	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
118	467569	3763901	9901	DieselExhPM	0.00294	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
124	467614	3763915	9901	DieselExhPM	0.00294	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
89	467391	3763894	9901	DieselExhPM	0.00291	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
19	467591	3763894	9901	DieselExhPM	0.00282	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
116	467565	3763885	9901	DieselExhPM	0.0028	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
79	467291	3763894	9901	DieselExhPM	0.00275	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
44	466991	3764394	9901	DieselExhPM	0.00272	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
125	467621	3763893	9901	DieselExhPM	0.00272	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
73	467291	3764494	9901	DieselExhPM	0.00268	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
123	467613	3763872	9901	DieselExhPM	0.00258	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
108	467125	3764458	9901	DieselExhPM	0.00257	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
83	467391	3764494	9901	DieselExhPM	0.00255	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
63	467191	3764494	9901	DieselExhPM	0.00243	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
122	467603	3763849	9901	DieselExhPM	0.00243	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
111	467253	3764509	9901	DieselExhPM	0.00241	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
47	466991	3764094	9901	DieselExhPM	0.00237	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
69	467191	3763894	9901	DieselExhPM	0.00235	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
133	467702	3763877	9901	DieselExhPM	0.00234	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
120	467595	3763829	9901	DieselExhPM	0.00232	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
58	467091	3763994	9901	DieselExhPM	0.00231	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
134	467721	3763881	9901	DieselExhPM	0.0023	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
35	466891	3764294	9901	DieselExhPM	0.00228	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
93	467491	3764494	9901	DieselExhPM	0.00228	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
132	467691	3763858	9901	DieselExhPM	0.00226	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
90	467391	3763794	9901	DieselExhPM	0.00218	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
130	467680	3763839	9901	DieselExhPM	0.00218	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
20	467591	3763794	9901	DieselExhPM	0.00212	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
129	467665	3763821	9901	DieselExhPM	0.00211	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
36	466891	3764194	9901	DieselExhPM	0.00209	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
13	467591	3764494	9901	DieselExhPM	0.002	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
80	467291	3763794	9901	DieselExhPM	0.002	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
126	467635	3763787	9901	DieselExhPM	0.002	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00

53	467091	3764494	9901	DieselExhPM	0.00199	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
34	466891	3764394	9901	DieselExhPM	0.00198	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
119	467575	3763756	9901	DieselExhPM	0.00195	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
59	467091	3763894	9901	DieselExhPM	0.0018	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
48	466991	3763994	9901	DieselExhPM	0.00179	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
70	467191	3763794	9901	DieselExhPM	0.00177	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
37	466891	3764094	9901	DieselExhPM	0.00175	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
25	466791	3764294	9901	DieselExhPM	0.00174	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
72	467291	3764594	9901	DieselExhPM	0.00172	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
107	467110	3763852	9901	DieselExhPM	0.00172	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
109	467142	3764560	9901	DieselExhPM	0.00169	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
43	466991	3764494	9901	DieselExhPM	0.0016	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
62	467191	3764594	9901	DieselExhPM	0.0016	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
82	467391	3764594	9901	DieselExhPM	0.0016	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
105	466818	3764404	9901	DieselExhPM	0.00156	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
24	466791	3764394	9901	DieselExhPM	0.00155	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
26	466791	3764194	9901	DieselExhPM	0.00153	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
106	466906	3764000	9901	DieselExhPM	0.00149	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
60	467091	3763794	9901	DieselExhPM	0.00147	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
102	466721	3764309	9901	DieselExhPM	0.00146	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
104	466773	3764400	9901	DieselExhPM	0.00143	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
38	466891	3763994	9901	DieselExhPM	0.00142	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
49	466991	3763894	9901	DieselExhPM	0.00142	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
92	467491	3764594	9901	DieselExhPM	0.00141	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
52	467091	3764594	9901	DieselExhPM	0.00137	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
27	466791	3764094	9901	DieselExhPM	0.00134	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
33	466891	3764494	9901	DieselExhPM	0.00132	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
110	467244	3763650	9901	DieselExhPM	0.0013	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
12	467591	3764594	9901	DieselExhPM	0.00127	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
5	466691	3764294	9901	DieselExhPM	0.00125	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
71	467291	3764694	9901	DieselExhPM	0.00122	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
103	466724	3764152	9901	DieselExhPM	0.00121	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
4	466691	3764394	9901	DieselExhPM	0.00118	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
50	466991	3763794	9901	DieselExhPM	0.00118	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
42	466991	3764594	9901	DieselExhPM	0.00117	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
6	466691	3764194	9901	DieselExhPM	0.00115	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
39	466891	3763894	9901	DieselExhPM	0.00115	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
61	467191	3764694	9901	DieselExhPM	0.00115	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00

81	467391	3764694	9901	DieselExhPM	0.00114	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
100	466685	3764396	9901	DieselExhPM	0.00114	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
28	466791	3763994	9901	DieselExhPM	0.00113	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
23	466791	3764494	9901	DieselExhPM	0.00108	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
101	466699	3764107	9901	DieselExhPM	0.00107	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
7	466691	3764094	9901	DieselExhPM	0.00103	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
51	467091	3764694	9901	DieselExhPM	0.00102	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
91	467491	3764694	9901	DieselExhPM	0.00101	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
32	466891	3764594	9901	DieselExhPM	0.00099	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
40	466891	3763794	9901	DieselExhPM	0.00096	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
29	466791	3763894	9901	DieselExhPM	0.00094	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
8	466691	3763994	9901	DieselExhPM	0.0009	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
11	467591	3764694	9901	DieselExhPM	0.0009	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
41	466991	3764694	9901	DieselExhPM	0.00089	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
3	466691	3764494	9901	DieselExhPM	0.00088	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
22	466791	3764594	9901	DieselExhPM	0.00084	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
30	466791	3763794	9901	DieselExhPM	0.00079	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
31	466891	3764694	9901	DieselExhPM	0.00078	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
9	466691	3763894	9901	DieselExhPM	0.00076	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
2	466691	3764594	9901	DieselExhPM	0.00071	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
21	466791	3764694	9901	DieselExhPM	0.00067	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
10	466691	3763794	9901	DieselExhPM	0.00065	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00
1	466691	3764694	9901	DieselExhPM	0.00057	NonCancerChronicDerived	0.00E+00	0.00E+00	0.00E+00

KIDNEY	GILV	REPRO/DEVEL	RESP	SKIN	EYE	BONE/TEETH	ENDO	BLOOD	ODOR	GENERAL
0.00E+00	0.00E+00	0.00E+00	7.12E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	5.26E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	4.19E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	3.70E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	3.53E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	2.00E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	1.87E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	1.86E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	1.79E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	1.70E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	1.65E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	1.54E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	1.52E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	1.45E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	1.36E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	1.36E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	1.28E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	1.23E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	1.22E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	1.13E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	1.04E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	1.03E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	1.00E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	8.94E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	8.66E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	8.64E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	8.46E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	8.42E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	8.42E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	8.06E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	8.00E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	7.92E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	7.90E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	7.30E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	6.76E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	6.68E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

0.00E+00	0.00E+00	0.00E+00	6.64E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	6.60E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	6.50E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	6.46E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	6.28E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	6.04E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	5.88E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	5.88E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	5.82E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	5.64E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	5.60E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	5.50E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	5.44E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	5.44E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	5.36E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	5.16E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	5.14E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	5.10E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	4.86E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	4.86E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	4.82E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	4.74E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	4.70E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	4.68E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	4.64E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	4.62E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	4.60E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	4.56E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	4.56E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	4.52E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	4.36E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	4.36E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	4.24E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	4.22E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	4.18E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	4.00E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	4.00E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	4.00E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

0.00E+00	0.00E+00	0.00E+00	3.98E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	3.96E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	3.90E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	3.60E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	3.58E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	3.54E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	3.50E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	3.48E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	3.44E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	3.44E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	3.38E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	3.20E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	3.20E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	3.20E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	3.12E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	3.10E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	3.06E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	2.98E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	2.94E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	2.92E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	2.86E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	2.84E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	2.84E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	2.82E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	2.74E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	2.68E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	2.64E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	2.60E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	2.54E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	2.50E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	2.44E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	2.42E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	2.36E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	2.36E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	2.34E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	2.30E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	2.30E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	2.30E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

0.00E+00	0.00E+00	0.00E+00	2.28E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	2.28E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	2.26E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	2.16E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	2.14E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	2.06E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	2.04E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	2.02E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	1.98E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	1.92E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	1.88E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	1.80E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	1.80E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	1.78E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	1.76E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	1.68E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	1.58E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	1.56E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	1.52E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	1.42E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	1.34E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	1.30E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	1.14E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

DETAILS	INH_CONC	SOIL_DOSE	DERMAL_DOSE	MMILK_DOSE	WATER_DOSE	FISH_DOSE	CROP_DOSE	BEEF_DOSE	DAIRY_DOSE
*	3.56E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.63E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.10E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.85E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.77E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	9.34E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	9.32E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	8.95E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	8.51E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	8.26E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	7.72E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	7.59E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	7.25E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	6.79E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	6.78E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	6.40E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	6.15E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	6.10E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	5.63E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	5.20E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	5.17E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	5.02E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	4.47E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	4.33E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	4.32E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	4.23E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	4.21E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	4.21E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	4.03E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	4.00E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	3.96E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	3.95E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	3.65E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	3.38E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	3.34E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

*	3.32E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	3.30E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	3.25E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	3.23E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	3.14E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	3.02E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.94E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.94E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.91E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.82E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.80E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.72E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.72E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.68E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.58E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.57E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.55E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.43E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.43E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.41E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.37E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.35E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.34E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.32E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.31E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.30E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.28E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.28E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.26E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.18E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.18E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.12E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.11E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.09E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.00E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.00E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	2.00E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

*	1.99E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.98E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.95E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.80E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.79E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.77E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.74E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.72E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.72E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.69E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.60E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.60E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.60E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.56E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.55E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.53E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.49E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.47E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.46E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.43E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.42E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.42E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.41E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.37E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.34E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.32E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.30E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.27E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.25E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.22E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.21E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.18E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.18E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.17E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.15E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.15E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.15E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

*	1.14E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.14E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.13E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.08E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.07E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.03E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.02E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	1.01E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	9.90E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	9.60E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	9.40E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	9.00E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	9.00E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	8.90E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	8.80E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	8.40E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	7.90E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	7.80E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	7.60E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	7.10E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	6.70E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	6.50E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	5.70E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

PIG_DOSE	CHICKEN_DOSE	EGG_DOSE	1ST_DRIVER	2ND_DRIVER	3RD_DRIVER	PASTURE_CONC	FISH_CONC	WATER_CONC
0.00E+00	0.00E+00	0.00E+00	INHALATION			0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION			0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION			0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION			0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION			0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION			0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION			0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION			0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION			0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION			0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION			0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION			0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION			0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION			0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION			0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION			0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION			0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION			0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION			0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION			0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION			0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION			0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION			0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION			0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION			0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION			0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION			0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION			0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION			0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION			0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION			0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION			0.00E+00	0.00E+00	0.00E+00

0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00

0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	INHALATION	0.00E+00	0.00E+00	0.00E+00
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Appendix C Biological Resources Assessment

Center Street Commerce Building Biological Resources Assessment

Prepared for:
City of Riverside
Community Development Department
3900 Main Street
Riverside, CA 92522

Prepared by:
MIG | Hogle-Ireland
1500 Iowa Avenue
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Riverside, CA 92507

Date:
June 12, 2015

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List of Abbreviated Terms

BRA	Biological Resources Assessment
CDFW	California Department of Fish and Wildlife
CESA	California Endangered Species Act
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
FESA	Federal Endangered Species Act
HCP	Habitat Conservation Plan
MBTA	Migratory Bird Treaty Act
MSHCP	Multi Species Habitat Conservation Plan
NCCP	Natural Community Conservation Planning
NOAA Fisheries	National Oceanic and Atmospheric Administrations' National Marine Fisheries Service
NPPA	Native Plant Protection Act
NRCS	Natural Resource Conservation Service
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service

1 Introduction

This report presents the results of MIG | Hogle-Ireland's biological resources assessment of the approximately 15.63 acre project site located at 6550 Center Street (APNs 246-040-027, 246-040-028, 246-040-002, and 246-070-017) in the City of Riverside, Riverside County, California.

The project consists of the proposed construction of a 308,000-square-foot warehouse. The City of Riverside, as the lead agency for the project, required this report in compliance with the Western Riverside County Multi-Species Habitat Conservation Plan (MSHCP). The City of Riverside indicated that, according to the MSHCP, burrowing owl and narrow endemic plant species San Diego ambrosia (*Ambrosia pumila*), Brand's star phacelia (*Phacelia stellaris*), and San Miguel Savory (*Clinopodium chandleri*) may be present on-site.

The purpose of this assessment is to verify the type, location and extent of potential sensitive biological resources within the project site and vicinity. MIG | Hogle-Ireland conducted a field survey of the project site on April 7, 2015. This Biological Resources Assessment (BRA) provides information regarding the location, extent and condition of biological resources occurring on the project site. The BRA provides a thorough description of the biological setting of the site and surrounding area, as well as a description of the vegetation communities, wildlife (including potential movement/migration corridors), special status species, sensitive natural communities, and potentially jurisdictional waters and wetlands. An assessment of project impacts and recommended mitigation measures to avoid, minimize, or compensate for potential adverse impacts to sensitive habitats and species is also included in the report. The evaluation of potential project impacts follows the checklist items from Appendix G of the California Environmental Quality Act (CEQA) guidelines and has been prepared in a format suitable to support CEQA review and to submit with any future regulatory application packages that might be required.

1.1 Regional and Local Setting

The City of Riverside is located in northwest Riverside County. The Santa Ana River is adjacent to the northeastern boundary of the City. The project site is located south of Interstate 10, west of Interstate 215 Freeway, east of Riverside Avenue, between Center Street and Placentia Lane in the City of Riverside, Riverside County, California. Specifically, the project site is located north of the intersection of Sieck Road and Placentia Lane and southeast of the intersection of Center Street and Placentia Lane (See Figure 1, Regional and Vicinity Map and Figure 2, Aerial Map). The project site is within Section 12, T2S, R5W, of the U.S. Geological Survey (USGS) 7.5-minute San Bernardino South Quadrangle. The project site is relatively flat with an elevation of approximately 835 feet above mean sea level.

The project site is comprised of three currently undeveloped vacant parcels and one partially developed parcel located between Center Street and Placentia Lane. Land uses surrounding the project site include commercial and industrial facilities to the north, west, and east (e.g., multiple towing companies), and recreational uses to the south (i.e., A.B. Brown Sports Complex Park).

1.2 Project Summary

Mr. Art Day is proposing to develop a 308,000-square-foot warehouse on the 15.63 acre project site (See Figure 3, Proposed Site Plan). According to the proposed site plan, the building footprint will be 302,500-square-feet and the mezzanine area will be 5,500-square-feet. The proposed landscape area

will be 104,371-square-feet. A total of 368 parking stalls are proposed. One entrance to the project site is proposed via Center Street.

2 Regulatory Setting

The following discussion identifies federal, state, and local environmental regulations that serve to protect sensitive biological resources relevant to the proposed project site and CEQA review process.

2.1 Federal

2.1.1 Federal Endangered Species Act

The Federal Endangered Species Act (FESA) of 1973, as amended, provides the regulatory framework for the protection of plant and animal species (and their associated critical habitats), which are formally listed, proposed for listing, or candidates for listing as endangered or threatened under the FESA. The FESA has the following four major components: (1) provisions for listing species, (2) requirements for consultation with the United States Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries), (3) prohibitions against "taking" (meaning harassing, harming, hunting, shooting, wounding, killing, trapping, capturing, or collecting, or attempting to engage in any such conduct) of listed species, and (4) provisions for permits that allow incidental "take". The FESA also discusses recovery plans and the designation of critical habitat for listed species. Section 7 requires Federal agencies, in consultation with, and with the assistance of the USFWS or NOAA Fisheries, as appropriate, to insure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of critical habitat for these species. Both the USFWS and NOAA Fisheries share the responsibility for administration of the FESA.

2.1.2 The Migratory Bird Treaty Act

The Federal Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703 et seq.), Title 50 Code of Federal Regulations (CFR) Part 10, prohibits taking, killing, possessing, transporting, and importing of migratory birds, parts of migratory birds, and their eggs and nests, except when specifically authorized by the Department of the Interior. As used in the act, the term "take" is defined as meaning, "to pursue, hunt, capture, collect, kill or attempt to pursue, hunt, shoot, capture, collect or kill, unless the context otherwise requires." With a few exceptions, most birds are considered migratory under the MBTA. Disturbances that causes nest abandonment and/or loss of reproductive effort or loss of habitat upon which these birds depend would be in violation of the MBTA.

2.2 State

2.2.1 California Endangered Species Act

The State of California enacted similar laws to the FESA, the California Native Plant Protection Act (NPPA) in 1977, and the California Endangered Species Act (CESA) in 1984. The CESA expanded upon the original NPPA and enhanced legal protection for plants, but the NPPA remains part of the California Fish and Game Code. To align with the FESA, CESA created the categories of "threatened" and "endangered" species. It converted all "rare" animals into the CESA as threatened species, but did not do so for rare plants. Thus, these laws provide the legal framework for protection of California-listed rare, threatened, and endangered plant and animal species. The California Department of Fish and Wildlife (CDFW) implements NPPA and CESA, and its Wildlife and Habitat Data Analysis Branch maintains the California Natural Diversity Database (CNDDB), a computerized inventory of information on the general location and status of California's rarest plants, animals, and natural communities. During the CEQA review

process, the CDFW is given the opportunity to comment on the potential of the proposed Project to affect listed plants and animals.

2.2.2 Native Plant Protection Act

The NPPA of 1977 (California Fish and Game Code, §§ 1900 through 1913) directed the CDFW to carry out the Legislature's intent to "preserve, protect and enhance rare and endangered plants in this State." The NPPA is administered by the CDFW, which has the authority to designate native plants as endangered or rare and to protect them from "take."

2.2.3 California Environmental Quality Act

CEQA was enacted in 1970 to provide for full disclosure of environmental impacts to the public before issuance of a permit by state and local public agencies. CEQA (Public Resources Code Sections 21000 et. seq.) requires public agencies to review activities which may affect the quality of the environment so that consideration is given to preventing damage to the environment. When a lead agency issues a permit for development that could affect the environment, it must disclose the potential environmental effects of the project. This is done with an Initial Study and Negative Declaration (or Mitigated Negative Declaration) or with an Environmental Impact Report. Certain classes of projects are exempt from detailed analysis under CEQA. CEQA Guidelines Section 15380 defines endangered, threatened, and rare species for purposes of CEQA and clarifies that CEQA review extends to other species that are not formally listed under the state or federal Endangered Species Acts but that meet specified criteria.

2.2.4 Fully Protected Species and Species of Special Concern

The classification of "fully protected" was the CDFW's initial effort to identify and provide additional protection to those animals that were rare or faced possible extinction. Lists were created for fish, amphibian and reptiles, birds, and mammals. Most of the species on these lists have subsequently been listed under CESA and/or FESA. The Fish and Game Code sections (fish at §5515, amphibian and reptiles at §5050, birds at §3511, and mammals at §4700) dealing with "fully protected" species states that these species "…may not be taken or possessed at any time and no provision of this code or any other law shall be construed to authorize the issuance of permits or licenses to take any fully protected species," (CDFW Fish and Game Commission 1998) although take may be authorized for necessary scientific research. This language makes the "fully protected" designation the strongest and most restrictive regarding the "take" of these species. In 2003, the code sections dealing with fully protected species were amended to allow the CDFW to authorize take resulting from recovery activities for state-listed species.

Species of special concern are broadly defined as animals not listed under the FESA or CESA, but which are nonetheless of concern to the CDFW because they are declining at a rate that could result in listing or historically occurred in low numbers and known threats to their persistence currently exist. This designation is intended to result in special consideration for these animals by the CDFW, land managers, consulting biologist, and others, and is intended to focus attention on the species to help avert the need for costly listing under FESA and CESA and cumbersome recovery efforts that might ultimately be required. This designation also is intended to stimulate collection of additional information on the biology, distribution, and status of poorly known at-risk species, and focus research and management attention on them. Although these species generally have no special legal status, they are given special consideration under the CEQA during project review.

2.2.5 California Fish and Wildlife Code Sections 3503 and 3513

According to Section 3503 of the California Fish and Wildlife Code, it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird (except English sparrow (*Passer domesticus*) and European Starling (*Sturnus vulgaris*)). Section 3503.5 specifically protects birds in the orders Falconiformes and Strigiformes (birds-of-prey). Section 3513 essentially overlaps with the MBTA, prohibiting the take or possession of any migratory non-game bird. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered "take" by the CDFW.

2.2.6 Other Sensitive Plants – California Native Plant Society

The California Native Plant Society (CNPS), a non-profit plant conservation organization, publishes and maintains an Inventory of Rare and Endangered Vascular Plants of California in both hard copy and electronic version (www.cnps.org/rareplants/inventory/6thedition.htm).

The Inventory assigns plants to the following categories:

1A Presumed extinct in California;
1B Rare, threatened, or endangered in California and elsewhere;
2 Rare, threatened, or endangered in California, but more common elsewhere;
3 Plants for which more information is needed – A review list; and
4 Plants of limited distribution – A watch list.

Additional endangerment codes are assigned to each taxon as follows:

1 Seriously endangered in California (over 80% of occurrences threatened/high degree of immediacy of threat).
2 Fairly endangered in California (20-80% occurrences threatened).
3 Not very endangered in California (<20% of occurrences threatened or no current threats known).

Plants on Lists 1A, 1B, and 2 of the CNPS Inventory consist of plants that may qualify for listing, and the CDFW, as well as other state agencies (e.g., California Department of Forestry and Fire Protection). As part of the CEQA process, such species should be fully considered, as they meet the definition of threatened or endangered under the NPPA and Sections 2062 and 2067 of the California Fish and Game Code. California Rare Plant Rank 3 and 4 species are considered to be plants about which more information is needed or are uncommon enough that their status should be regularly monitored. Such plants may be eligible or may become eligible for state listing, and CNPS and CDFW recommend that these species be evaluated for consideration during the preparation of CEQA documents (CNPS 2001, 2015).

2.2.7 National Pollutant Discharge Elimination System (NPDES)

The NPDES program requires permitting for activities that discharge pollutants into waters of the United States. This includes discharges from municipal, industrial, and construction sources. These are considered point-sources from a regulatory standpoint. Generally, these permits are issued and monitored under the oversight of the State Water Resources Control Board (SWRCB) and administered by each regional water quality control board. Construction activities that disturb one acre or more (whether a single project or part of a larger development) are required to obtain coverage under the

state's General Permit for Dischargers of Storm Water Associated with Construction Activity. All dischargers are required to obtain coverage under the Construction General Permit. The activities covered under the Construction General Permit include clearing, grading, and other disturbances. The permit requires preparation of a Storm Water Pollution Prevention Plan (SWPPP) and implementation of Best Management Practices (BMPs) with a monitoring program. The project will require coverage under the Construction General Permit.

2.2.8 Sensitive Vegetation Communities

Sensitive vegetation communities are natural communities and habitats that are either unique in constituent components, of relatively limited distribution in the region, or of particularly high wildlife value. These communities may or may not necessarily contain special-status species. Sensitive natural communities are usually identified in local or regional plans, policies or regulations, or by the CDFW (i.e., CNDDB) or the USFWS. The CNDDB identifies a number of natural communities as rare, which are given the highest inventory priority (Holland 1986; CDFW 2015). Impacts to sensitive natural communities and habitats must be considered and evaluated under the CEQA (CCR: Title 14, Div. 6, Chap. 3, Appendix G).

2.3 Local

2.3.1 Multi-Species Habitat Conservation Plan

In June of 2003, the Riverside County Board of Supervisors adopted a comprehensive Multiple Species Habitat Conservation Plan (MSHCP) to provide a regional conservation solution to species and habitat issues that have historically threatened to stall infrastructure and land use development. The MSHCP is a multi-jurisdictional effort that encompasses approximately 1.26 million acres (1,966 square miles) and includes all unincorporated Riverside County land west of the San Jacinto Mountains to the Orange County line, and fourteen cities, including the City of Riverside (City of Riverside General Plan, 2007). The project site is located within the MSHCP area.

2.3.2 City of Riverside General Plan

The City of Riverside General Plan contains an Open Space and Conservation Element. The following objectives and policies pertain to the protection of biological resources.

Objective OS-5	Protect biotic communities and critical habitats for endangered species throughout the General Plan Area.
Policy OS-5.2	Continue to participate in the MSHCP Program and ensure all projects comply with applicable requirements.

3 Methods

The analysis of potential biological resources impacts associated with the development of the project involved a review of available background information pertaining to biological resources on and in the vicinity of the project site and completion of a field survey. The methods of the background review and field survey are summarized below. In addition, the specific methods used to assess the existing conditions of the project site described in Section 4 (Existing Conditions) (i.e., assessment of the plant communities and wildlife habitats and their potential to support special-status species and sensitive natural communities) are described below.

3.1 Literature Review

Prior to conducting field surveys, MIG | Hogle-Ireland reviewed available background information pertaining to the biological resources on and in the vicinity of the project. Available literature and resource mapping reviewed included the occurrence records for special-status species and sensitive natural communities and numerous other information sources listed below:

- CDFW's CNDDB record search of the Devore, San Bernardino North, Harrison Mountain, Fontana, San Bernardino South, Redlands, Riverside West, Riverside East, and Sunnymead USGS 7.5-Minute Quadrangles (CDFW 2015);
- CNPS Electronic Inventory search of USGS 7.5-Minute Quadrangles listed above (CNPS 2001, CNPS 2015);
- United States Department of Agricultural (USDA) Natural Resource Conservation Service (NRCS) web soil survey (USDA NRCS 2015);
- USFWS's Federal Endangered and Threatened Species in Riverside County and San Bernardino South USGS 7.5-Minute Quadrangle (USFWS 2015);
- USFWS's National Wetlands Inventory (USFWS 2015);
- The Jepson Manual: Vascular Plants of California, Second Edition (Baldwin, B.G., et al. 2012); and

3.2 Field Surveys

A biological field survey was conducted by biologist Lauren Huff (Senior Biologist) and Savannah Richards (Project Ecologist) on April 7, 2015. The biological field survey was conducted to assess the existing conditions of the project site, including recording observed plant and wildlife species, characterizing and delineating the vegetation communities and associated wildlife habitats, and evaluating the potential for these habitats to support special-status species and sensitive communities.

3.2.1 Plant Communities and Wildlife Habitats

Plant communities on-site were mapped in the field onto a color aerial photograph (See Figure 4, Vegetation Communities Map) and were evaluated to determine if they are considered sensitive under federal, state, or local regulations or policies.

3.2.2 Sensitive Habitats and Aquatic Features

Habitats were assessed to determine if any wetlands and "waters" potentially subject to jurisdiction by the U.S. Army Corps of Engineers, Regional Water Quality Control Board, or CDFW were present. The project site was evaluated for the presence of wetland indicators including dominance by hydrophytic plant species and presence of wetland hydrology. The site was also inspected for the presence of drainages, streams, and other aquatic features, including those that support stream-dependent (riparian) plant species that may be considered jurisdictional by CDFW (See Figure 5, Wetlands Map). In addition, plant communities were evaluated to determine if they are considered sensitive under federal, state, or local regulations or policies.

3.2.3 Special-Status Species Habitat Assessment

During the biological field survey, MIG | Hogle-Ireland biologists traversed the entire project site by foot, in order to evaluate the suitability of all vegetation communities to support special status species documented for the project site vicinity. For the purposes of this assessment, special-status species include those plant and animals listed, proposed for listing or candidates for listing as threatened or endangered by the USFWS or NOAA Fisheries under the FESA, those listed or proposed for listing as rare, threatened or endangered by the CDFW under the CESA, animals designated as Fully Protected or Species of Special Concern by the CDFW, birds protected by the USFWS under the MTBA and/or by the CDFW under Fish and Game Code Sections 3503 and 3513, and plants occurring on List 1A, List 1B, List 2, List 3, and List 4 of the CNPS Inventory.

The potential occurrence of special-status plant and animal species on the project site was initially evaluated by developing a list of special-status species that are known to or have the potential to occur in the vicinity of the project site based on a review of past studies including species-specific studies; search of current database records (e.g., CNDDB and CNPS Electronic Inventory records); and review of the USFWS list of federal endangered and threatened species (See Appendix D). The potential for occurrence of those species included on the list were then evaluated based on the habitat requirements of each species relative to the conditions observed during the field survey conducted by MIG | Hogle-Ireland. Each species was evaluated for its potential to occur on or in the immediate vicinity of the project site according to the following criteria.

> *Not Expected:* There is no suitable habitat present on the project site (i.e., habitats on the project site are clearly unsuitable for the species requirements [e.g., foraging, breeding, cover, substrate, elevation, hydrology, plant community, disturbance regime, etc.]). Additionally, there are no recent known records of occurrence in the vicinity of the project site. The species has no potential of being found on the project site.
>
> *Low Potential:* Limited suitable habitat is present on the project site (i.e., few of the habitat components meeting the species requirements are present and/or the majority of habitat on the project site is unsuitable or of very low quality). Additionally, there are no or few recent known records of occurrence in the vicinity of the project site. The species has a low probability of being found on the project site.
>
> *Moderate Potential*. Suitable habitat is present on the project site (i.e., some of the habitat components meeting the species requirements are present and/or the majority of the habitat on the project site is suitable or of marginal quality). Additionally, there are few or many recent

known records of occurrences in the vicinity of the project site. The species has a moderate probability of being found on the project site.

High Potential: Highly suitable habitat is present on the project site (i.e., all habitat components meeting the species requirements are present and/or all of the habitat on the project site is highly suitable or of high quality). Additionally, there are few or many recent known records of occurrences in the vicinity of the project site. This species has a high probability of being found on the project site.

Present. Species was observed on the project site (i.e., species was either observed during recent surveys or has a recorded observation in the CNDDB on the project site).

Appendix A presents the list of special-status plants and animals (respectively) that have the potential to occur in the vicinity of the project site, their habitat requirements, and a ranking of potential for occurrence on the project site. Nomenclature used for plant names follows the Second Edition of The Jepson Manual (Baldwin, B.G., et al. 2012). Nomenclature for wildlife follows CDFW's Complete List of Amphibian, Reptile, Bird, And Mammal Species in California (2011) and any changes made to species nomenclature as published in scientific journals since the publication of CDFW's list.

4 Existing Conditions

The following provides a description of the physical characteristics, vegetation communities and associated wildlife habitats, wildlife movement corridors, sensitive natural communities, special-status species, and jurisdictional wetlands and other waters present or potentially present on the project site. Representative photographs of the project site and vicinity are included in Appendix B of this report.

4.1 General Description

The project site is bounded on the north by Center Street, on the south by Placentia Lane, on the east by a towing company, and on the west by vacant land.

4.2 Physical Characteristics

The project site is located north of the intersection of Sieck Road and Placentia Lane and southeast of the intersection of Center Street and Placentia Lane on four parcels (APNs 246-040-027, 246-040-028, 246-070-002, and 246-070-017). One vacant house is located on the southern portion of the project site. Several dilapidated sheds are located in the central portion of the project site north west of the vacant house. Approximately four dilapidated mobile homes are located in the southeast portion of the project site.

The site is located within the Santa Ana watershed (HUC 18070203) which is a subbasin of the South Coast watershed. The project site is situated in a valley on alluvial soils with the La Loma Hills located approximately 0.6 miles to the north, the Santa Ana River located approximately 0.8 miles to the west, and the Jurupa Mountains located approximately 2.7 miles to the west. The project site topography is relatively flat with an elevation of 835 feet above mean sea level.

According to the NRCS Web Soil Survey, a total of four soil series are present within the project site (See Figure 6, Soil Map): 1) Grangeville fine sandy loam, saline-alkali (Gs); 2) San Emigdio fine sandy loam, deep, 0 to 2 percent slopes (SfA); 3) Tujunga loamy sand, 0 to 5 percent slopes (TuB); and 4) Grangeville fine sandy loam, drained, 0 to 2 percent slopes (GtA). The Grangeville series consists of very deep, somewhat poorly drained soils that formed in moderate coarse textured alluvium dominantly from granitic rock sources. Grangeville soils are on alluvial fans and floodplains and have slopes ranging from 0 to 2 percent. The San Emigdio series consists of very deep, well drained soils that formed in dominantly sedimentary alluvium. San Emigdio soils are on fans and floodplains and have slopes of 0 to 15 percent. The Tujunga series consists of very deep, somewhat excessively drained soils that formed in alluvium from granitic sources. Tujunga soils are on alluvial fans and floodplains, including urban areas. Slopes range from 0 to 9 percent (USDA NRCS 2015).

The most prominent surface water feature in the vicinity of the project site is the Santa Ana River, located approximately 0.8 miles to the west. The annual average rainfall for Riverside is approximately 10.21 inches (WRCC 2015).

4.3 Plant Communities & Associated Wildlife Habitats

As described in Section 3 (Methods), plant communities on-site were mapped in the field onto a color aerial photograph (See Figure 4, Vegetation Communities Map) and were evaluated to determine if they are considered sensitive under federal, state, or local regulations or policies. Biological communities

were classified as sensitive or non-sensitive as defined by CEQA and other applicable laws and regulations.

4.3.1 Vegetation Communities

Portions of the project site are developed. Disturbed/ruderal habitat, as well as native and ornamental vegetation was observed on the project site during the biological field survey on April 7, 2015. These vegetation communities are described in more detail below.

Ornamental Vegetation (0.2 acres)
The site contains several ornamental tree species. Chinaberry trees (*Melia azedarach*) are located along the fence line near the project site's southwest corner, south of the vacant home, and adjacent to the dilapidated sheds. Peruvian Peppertrees (*Schinus molle*) are located adjacent to the vacant home and adjacent to the dilapidated sheds.

Native Trees and Shrubs (0.25 acres)
The site contains several native tree and shrub species interspersed throughout the disturbed and ruderal habitat areas. A group of cottonwood trees and a hackberry tree are located near the southeast corner of the project site. Several elderberry shrubs are located adjacent to the dilapidated sheds and along the fence line in the southwest corner of the project site. With the exception of these remnant trees and shrubs, no other native vegetation or habitat occurs on site.

Developed (0.5 acres)
One vacant house and several vacant, dilapidated sheds are located in the south-central portion of the project site. In addition, approximately four vacant, dilapidated mobile homes are located in the southeastern portion of the project site.

Disturbed/Ruderal (14.68 acres)
This vegetation type typically includes areas cleared of natural vegetation as a result of disturbance activities and either lack vegetation completely or support various non-native ruderal plant species. On-site disturbed/ruderal includes those areas previously disturbed from fill activities of the water recharge basins. This habitat type covers 94%. This community is characterized by bare dirt areas supporting no vegetation or areas supporting a dominance of non-native ruderal plant species (e.g., *Bromus* sp. and *Hordeum* sp.). Plant species that were observed are included in Appendix C.

4.3.2 Jurisdictional Waters/Wetlands

No potential jurisdictional waters, wetlands or streambeds were noted to occur on site (See Figure 5).

4.3.3 Wildlife

Wildlife species that were encountered on site include Black-chinned hummingbird (*Archilochus alexandri*), Black phoebe (*Sayornis nigricans*), Chicken (*Gallus* sp.) from neighboring towing company, Common raven (*Corvus corax*), European starling (*Sturnus vulgaris*), House finch (*Carpodacus mexicanus*), House sparrow (*Passer domesticus*), Lesser goldfinch (*Spinus psaltria*), Mourning dove (*Zenaida macroura*), Northern mockingbird (*Mimus polyglottus*), Unknown blackbird (*Euphagus* sp.), and White-crowned sparrow (*Zonotrichia leucophrys*). In addition, several small burrows were observed throughout the site likely belonging to gophers (*Thomomys bottae*). No ground squirrel

(*Otospermophilius beecheyi*) burrows were observed on the project site. No special status species or their habitat was identified on the project site.

4.3.4 Sensitive Plant Communities

CDFW and CNPS have identified several native plant communities that are rare and unique to California. While they have no legal, protective status, impacts to these plant communities may be considered "significant" under CEQA. Sensitive plant communities identified by CDFW in Riverside County in the vicinity of the project site include Southern Riparian Scrub, Southern Sycamore Alder Riparian Woodland, Southern Coast Live Oak Riparian Forest, Southern mixed Riparian Forest, and Southern Riparian Forest (CNDDB 2015). No sensitive plant communities were observed on the project site.

4.4 Wildlife Movement Corridors

Providing functional habitat connectivity between natural areas is essential to sustaining healthy wildlife populations and allowing for the continued dispersal of native plant and animal species. The regional movement and migration of wildlife species has been substantially altered due to habitat fragmentation over the past century. This fragmentation is most commonly caused by development of open areas, which can result in large patches of land becoming inaccessible and forming a virtual barrier between undeveloped areas. Additional roads associated with development, although narrow, may result in barriers to smaller or less mobile wildlife species. Habitat fragmentation results in isolated islands of habitat, which affects wildlife behavior, foraging activity, reproductive patterns, immigration and emigration or dispersal capabilities, and survivability. Wildlife corridors can consist of a sequence of stepping-stones across the landscape (i.e., discontinuous areas of habitat such as isolated wetlands), continuous lineal strips of vegetation and habitat (e.g., riparian strips and ridge lines), or they may be parts of larger habitat areas selected for its known or likely importance to local wildlife.

The project site is comprised of three currently undeveloped vacant parcels and one partially developed parcel located between two busy roads (Center Street and Placentia Lane). Land uses bordering the project site include commercial and industrial facilities to the north, west, and east (e.g., multiple towing companies), and recreational uses to the south (i.e., A.B. Brown Sports Complex Park). Therefore, the movement of wildlife species at the project site is substantially limited due to the habitat fragmentation caused by development and the project site does not serve as a continuous regional connection for wildlife species. In addition, the project site is outside of any species movement corridors identified by local or regional plans.

4.5 Special-Status Plants

Based upon a review of species occurrence databases, it was determined that no special-status plant species have been documented in the vicinity of the project site or have the potential to occur on the project site (CNDDB, CNPS, USFWS 2015). Since no special-status plant species are expected to occur on the project site or in the vicinity, no narrow endemic species are expected to occur on the project site. This determination was made due to the absence of essential habitat requirements for the species, the absence of known occurrences within 5 miles of the project site, and/or the project site is outside the species known range of distribution. A table presenting all special-status plant species considered and evaluated for their potential occurrence on the project site, including plant species' habitat requirements and reported blooming periods, is provided in Appendix A2.

4.6 Special-Status Animals

A number of bird, mammal, amphibian, and invertebrate species with special-status are known or suspected to occur in Riverside County, and have varying potential for occurrence in the project site vicinity. 54 special-status animal species are known to or have the potential to occur in the vicinity of the project site (CNDDB 2015). Of these animal species, 50 are not expected to occur on the project site (species ranked as "Not Expected" or "Low Potential"). Reasons include the absence of essential habitat requirements for the species, the distance to known occurrences and/or the species distributional range, the limited availability of foraging and nesting habitat, amount of site disturbance from past and present land uses, and/or the proximity of human-related disturbances. Based on the CNDDB, and the biological field survey and habitat suitability analysis conducted by MIG | Hogle-Ireland's biologists on April 7, 2015, only four of the species listed in Appendix A1 (i.e., Coastal whiptail (*Aspidoscelis tigris stejnegeri*), Coast horned lizard (*Phrynosoma blainvillii*), Loggerhead shrike (*Lanius ludovicianus*), and California horned lark (*Eremophila alpestris actia*)) have a moderate to high potential for use or occurrence in the site vicinity. These species and their potential to occur on site are discussed in detail below. In addition, the Riverside MSHCP identifies the project site as occurring within a burrowing owl (*Athene cunicularia*) survey area. Therefore, the potential for burrowing owl to occur on the project site is also discussed in more detail below.

The Coastal whiptail (*Aspidoscelis tigris stejnegeri*), Coast horned lizard (*Phrynosoma blainvillii*), and California horned lark (*Eremophila alpestris actia*) have a moderate potential to occur on the project site. Suitable habitat for the Coastal whiptail and Coast horned lizard exists in the form of disturbed/ruderal habitat which provides open areas and sandy soil. Suitable habitat for the Loggerhead shrike exists in the form of open areas with perches for scanning and hunting. Suitable habitat for the California horned lark exists in the form of disturbed/ruderal habitat which provides open grassy areas. The Coastal whiptail and the California horned lark have no legal protection status. However, the Coast horned lizard and the Loggerhead shrike are identified as California Species of Special Concern and are discussed in further detail below.

<u>Coast Horned Lizard</u>

The coast horned lizard is a CDFW Species of Special Concern that occupies open habitat consisting of sandy soil and low vegetation in valleys, foothills and semiarid mountains. It is found in grasslands, coniferous forests, woodlands, and chaparral, with open areas and patches of loose soil and is often found in lowlands along sandy washes with scattered shrubs and along dirt roads, and frequently found near ant hills. The coast horned lizard is a diurnal lizard. Most activity occurs during the middle of the day in the spring and fall but is restricted to morning and late afternoon during mid-summer. Nocturnal activity may occur during particularly warm periods (CDFG 1990).

Little is known about habitat requirements for breeding and egg-laying. Males may use elevated "viewing platforms" such as cow dung to locate females during the reproductive season. Eggs are apparently laid in nests constructed by females in loose soil. The reproductive season for the coast horned lizard varies from year to year and geographically depending on local conditions. Egg-laying has been reported in southern California extending from late May through June with a mean clutch size of 13 eggs. A range of six to 16 eggs has been reported and hatching probably occurs after two months. The coast horned lizard is apparently unique among lizards in using a belly-to-belly position during copulation (CDFG 1990).

Loggerhead Shrike

The Loggerhead shrike, a CDFW Species of Special Concern, is a common resident and winter visitor in lowlands and foothills throughout California. It prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches. The Loggerhead shrike eats mostly large insects; however, it also takes small birds, mammals, amphibians, reptiles, fish, carrion, and various other invertebrates. It searches for prey from a perch at least two feet above ground, often much higher. It typically builds its nest on a stable branch in densely-foliaged shrub or tree that is well-concealed. In California, the Loggerhead shrike lays eggs from March into May, and young become independent in July or August. It is a monogamous, solitary nester with a clutch size of 4 to 8 (CDFW 1990).

Burrowing Owl

The burrowing owl is a CDFW Species of Special Concern that occupies open habitats such as grasslands, agricultural fields, savannahs and sparse brush lands. The burrowing owl lives in the abandoned burrows of ground squirrels and other burrowing animals, modifying the burrows to suit their needs by digging. It is one of the few owl species often seen during the day and early evening hours, perched on fence posts or at the entrance to their burrows. Their diet is predominantly large insects and small rodents, but they will also take small birds, reptiles, amphibians, fish, scorpions and other available prey. Burrowing owls typically breed between early March and late August. After the breeding season, secondary burrows may be used for cover and roost sites. During winter, attachment to a particular burrow is reduced (CDFG 2012).

The burrowing owl typically favors flat, open grassland or gentle slopes and sparse-shrub land ecosystems. These owls prefer annual or perennial grasslands, typically with sparse or nonexistent tree or shrub canopies; however, they also colonize man-made structures, such as cement culverts, asphalt, debris piles, or openings beneath cement or asphalt pavement. In California, burrowing owls are found in close association with California ground squirrels. Burrowing owl can forage up to 1,000 meters (3,280 feet) from the burrow, but generally stay within 600 meters (1,968 feet). Evidence of owl use of a burrow includes sign such as molted feathers, cast pellets, prey remains, eggshell fragments or excrement at or near a burrow entrance (California BUOW Consortium 1993).

Burrowing owl and/or evidence of burrowing owl were not observed during the April 7 biological field survey, which corresponded with the nesting period. In addition, no burrows or manmade structures suitable for burrowing owl were observed on the project site during the April 7 biological field survey. Due to the absence of suitable habitat, burrowing owl has a low potential to occur on the project site.

Other Protected Bird Species

The existing trees on the project site support suitable nesting habitat for songbirds. Although no active nests were observed during the field surveys, there is potential for ground-, tree-, and shrub-nesting birds to establish nests on the project site in the future. These species are protected under the MBTA and would be protected under the California Fish and Game Code when actively nesting.

Bats

Dilapidated sheds and trees on the project site could provide foraging and marginal roosting habitat for several bat species. As a result, bat species have potential to occur on the project site. These species are protected under the California Fish and Game Code.

5 Environmental Impacts

This section describes potential impacts to sensitive biological resources—including special-status plants and animals, and aquatic resources—that may occur in the project site. Each impact discussion includes Avoidance and Minimization Measures (AMMs) that would be implemented during the project to avoid and/or reduce the potential for and/or level of impacts to each resource. With the implementation of the AMMs, all impacts to biological resources are anticipated to be reduced to less than significant pursuant to CEQA.

5.1 Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines, a project could have a significant environmental impact on biological resources if it would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS
- Have a substantial adverse effect on any sensitive natural community identified in local or regional plans, policies, or regulations, or by the CDFW or USFWS
- Have a substantial adverse effect on federally protected wetlands, as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrologic interruption, or other means
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance
- Conflict with the provisions of an adopted Habitat Conservation Plan (HCP), Natural Community Conservation Plant (NCCP), or other approved local, regional, or state HCP

Direct take of a federally or state-listed species is considered a significant impact. Temporary and/or permanent habitat loss is not considered a significant impact to sensitive species (other than for listed or candidate species under the FESA and CESA) unless a significant percentage of total suitable habitat throughout the species' range is degraded or somehow made unsuitable, or areas supporting a large proportion of the species' population are substantially and adversely impacted.

Potential impacts to nesting bird species will be considered significant due to their protection under the MBTA and California fish and game code, and such impacts will need to be avoided.

A specific discussion of the thresholds of significance for the project site follows.

5.2 Discussion of Thresholds of Significance

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by the CDFW or USFWS;

No special-status plant species are anticipated to occur on the project site; therefore, no impact will occur. No wildlife species listed by the State and/or Federal government as endangered or threatened were identified during the field investigations conducted on April 7, 2015.

The coastal whiptail (Aspidoscelis tigris stejnegeri), coast horned lizard (Phrynosoma blainvillii), and California horned lark (Eremophila alpestris actia) have a moderate potential to occur on the project site. Suitable habitat for the coastal whiptail and coast horned lizard exists in the form of disturbed/ruderal habitat which provides open areas and sandy soil. Suitable habitat for the California horned lark exists in the form of disturbed/ruderal habitat which provides open grassy areas. The Coastal whiptail and the California horned lark have no legal protection status. However, the coast horned lizard is a California Species of Special Concern. Thus, Mitigation Measures BIO-1 and BIO-2 have been included to reduce impacts to the coast horned lizard to less than significant levels.

The City of Riverside indicated that, according to the Western Riverside County Multi-Species Habitat Conservation Plan (MSHCP), the project site is within a burrowing owl survey area and burrowing owls may be present on-site. The April 7, 2015 biological field survey revealed that the project site is comprised of ruderal and disturbed plant communities. Burrowing owl and/or sign (e.g. whitewash at burrows) was not observed during April 7, 2015 biological field survey. Due to the absence of suitable burrow habitat, burrowing owl has a low potential to occur on the project site. Impacts to burrowing owls will be less than significant.

The trees on the project site could support suitable nesting habitat for other songbirds. Although no active nests were observed during the 2015 field surveys, there is potential for ground-, tree-, and shrub-nesting birds to establish nests on the project site in the future. Mitigation Measures BIO-1 and BIO-2 are included to reduce impacts to migratory songbirds to less than significant levels.

Several species of bats are known to occur in the vicinity of the project site. Several dilapidated sheds, mobile homes, and trees are located on the project site that could provide suitable roosting habitat for bat species. Thus, Mitigation Measure BIO-3 is included to reduce impacts to roosting bats.

<u>Mitigation Measures</u>

BIO-1 To avoid impacts to nesting birds, construction activities and construction noise should occur outside the avian nesting season (prior to February 1 or after September 1August 31). If construction and construction noise occurs within the avian nesting season (during the period from February 1 to August 31), all suitable habitats shall be thoroughly surveyed for the presence of nests by a qualified biologist no more than five days before commencement of any vegetation removal. If it is determined that the project site is occupied by nesting birds, Mitigation Measure BIO-2 shall apply. Conversely, if the project site is found to be absent of nesting birds, Mitigation Measure BIO-2 shall not be required.

BIO-2 If pre-construction nesting bird surveys result in the location of active nests, no grading or heavy equipment activity shall take place within 300 feet of sensitive bird nests and 500 feet of raptor nests, or as determined by a qualified biologist. Protective measures (e.g., sampling) shall be required to ensure compliance with the MBTA and relevant California Fish and Game Code requirements.

BIO-3 A pre-construction survey shall be conducted in suitable habitat (e.g., dilapidated sheds and trees) for roosting bats within 14 days prior to activities that remove vegetation or suitable structures. If an occupied maternity or colony roost is detected, CDFW shall be contacted about how to proceed. Typically, a buffer exclusion zone would be established around each occupied roost until bat activities have ceased. The size of the buffer would take into account:

- Proximity and noise level of project activities;
- Distance and amount of vegetation or screening between the roost and construction activities;
- Species-specific needs, if known, such as sensitivity to disturbance.

Due to restrictions of the California Health Department, direct contact by workers with any bat is not allowed. The qualified bat biologist will be contacted immediately if a bat roost is discovered during project construction.

b) *Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the CDFW or USFWS;*

The April 7, 2015 biological field survey revealed that ornamental vegetation, native vegetation, developed, and disturbed/ruderal habitats exist on the 15.63-acre project site. No sensitive natural vegetation communities or riparian habitat are present on the project site. As such, no impact to riparian habitat or other sensitive natural vegetation communities will occur.

c) *Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;*

No jurisdictional waters were observed on the project site during the April 7, 2015 field visit. Therefore, no impacts to jurisdictional aquatic resources will occur due to project implementation.

The project could have indirect impacts (e.g., inadvertent damage by construction equipment or decreased water/habitat quality due to runoff) on sensitive natural communities downstream or in the vicinity of the project site. However, with the implementation of the project SWPPP, including Best Management Practices, these impacts would be reduced to less than significant.

d) *Interfere substantially with the movement of any native resident or migratory fish and wildlife species or with established native resident or migratory wildlife corridors, or impede the use of a native wildlife nursery site;*

The project site is primarily urban and is not located within an established wildlife movement corridor. Additionally, the project is not in a known wildlife nursery site. Thus, impacts to wildlife species, migratory corridors and native wildlife nursery sites will not be impacted due to project implementation and impacts will remain less than significant.

e) *Conflict with an local polices or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or*

The City of Riverside General Plan contains an Open Space and Conservation Element. The following objectives and policies pertain to the protection of biological resources.

Objective OS-5	Protect biotic communities and critical habitats for endangered species throughout the General Plan Area.
Policy OS-5.2	Continue to participate in the MSHCP Program and ensure all projects comply with applicable requirements.

The City of Riverside does not have a tree preservation policy or ordinance. Therefore, project implementation will not conflict with any local policies or ordinances pertaining to biological resources.

f) *Conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, or state habitat conservation plan.*

The project site is located within the MSHCP area. The City of Riverside, as the lead agency for the project, requires that the project comply with the Western Riverside County MSHCP. The MSHCP identifies that the project area is located in a burrowing owl and narrow endemic plant species (i.e., San Diego ambrosia (*Ambrosia pumila*), Brand's star phacelia (*Phacelia stellaris*), and San Miguel Savory (*Clinopodium chandleri*)) survey area. Therefore, surveys were conducted in order to ensure that no burrowing owl or narrow endemic plant species have potential to occur on the project site. The biological field survey conducted on April 7, 2015 revealed that no suitable burrowing owl habitat exists on the project site. In addition, no habitat that could support narrow endemic plant species was observed on the project site during the biological field survey. The project will comply with measures identified in the MSHCP. Therefore, conflicts with the MSHCP are not anticipated.

6 References

Baldwin, B.G., et al. 2012. The Jepson Manual – Vascular Plants of California. University of California Press.

Calflora Database. 2015. Information on wild California plants for conservation, education, and appreciation. http://www.calflora.org/

California Burrowing Owl Consortium (CBOC). 1997. Burrowing Owl Survey Protocol and Mitigation Guidelines. Sacramento, California.

California Code of Federal Regulations. Title 14, Section 1.72 Stream (Includes Creeks and Rivers)

California Code of Federal Regulations. Title 14, Division 6, Chapter 3. CEQA Guidelines.

California Department of Fish and Wildlife (CDFW). 2011. Complete List of Amphibian, Reptile, Bird and Mammal Species in California. Prepared by the Biogeographic Data Branch. Accessed at: http://www.dfg.ca.gov/biogeodata/Cwhr/pdfs/species_list_2008_updated.pdf

California Department of Fish and Game (CDFG). 1990. California Wildlife Habitat Relationships System. Coast horned lizard. California Interagency Wildlife Task Group.

California Department of Fish and Game (CDFG). 1990. California Wildlife Habitat Relationships System. Loggerhead shrike. California Interagency Wildlife Task Group.

California Department of Fish and Game (CDFG). Staff Report on Burrowing Owl Mitigation. March 7, 2012

California Department of Fish and Game (CDFG). Environmental Services Division (ESD). 1994. A Field Guide to Lake and Streambed Alteration Agreements, Sections 1600-1607, California Fish and Game Code. 1994.

California Department of Fish and Wildlife (CDFW). 1994. Amphibian and Reptile Species of Special Concern in California: Western Pond Turtle. California Department of Fish and Game, Sacramento, CA.

CDFW. Fish and Game Commission. 1998. Fish and Game Code. January 1, 1998.

CDFW. 2015. California Natural Diversity Database in BIOS 5. Commercial version. Accessed May 29, 2015.

California Native Plant Society (CNPS). 2015. Inventory of Rare and Endangered Plants (online edition, v8-02). California Native Plant Society, Sacramento. Available online at *http://cnps.org/inventory*. (Accessed: May 29, 2015).

California Native Plant Society (CNPS). 2001. CNPS Botanical Survey Guidelines, CNPS Inventory, 6th Ed. Revised June 2. California Native Plant Society (CNPS). June 2001. Sacramento, CA.

City of Riverside. 2025 General Plan. Adopted in 2007. Available online at: http://www.riversideca.gov/planning/gp2025program/general-plan.asp

Holland, R. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. Nongame-Heritage Program. California Department of Fish and Wildlife.

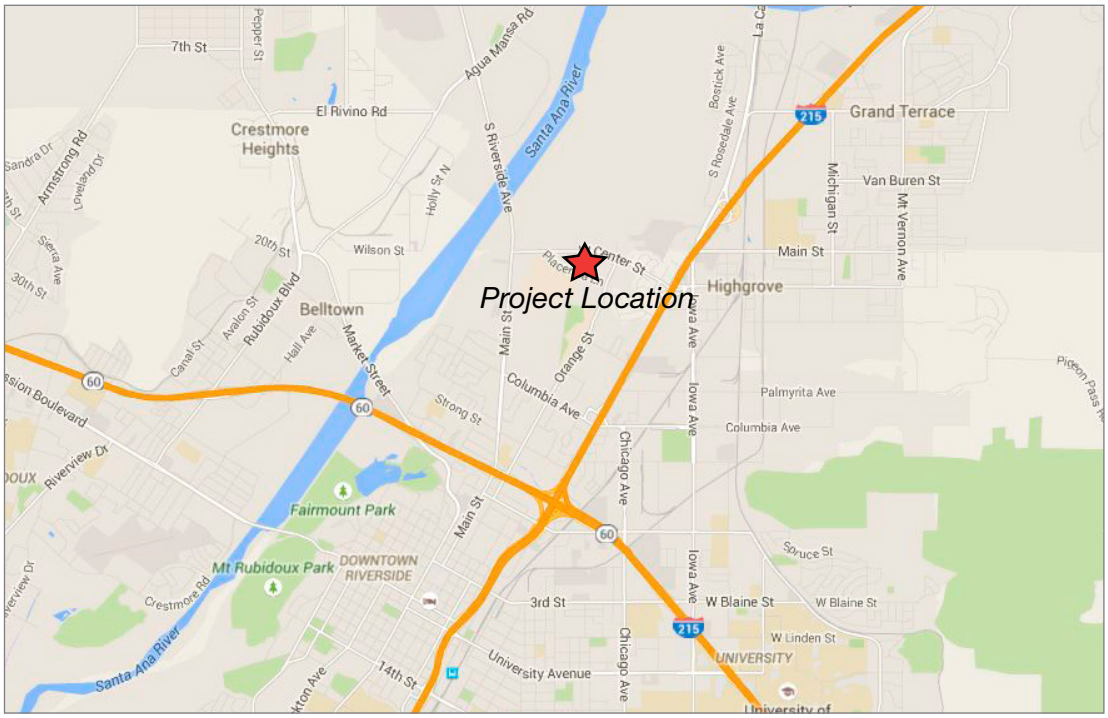
NatureServe. 2015. NatureServe Explorer: An online encyclopedia of life [web application]. NatureServe, Arlington, Virginia. Available online at http://explorer.natureserve.org/ (Accessed: June 6, 2015).

United States Department of Agriculture, Natural Resources Conservation Service (USDA, NRCS). 2015. Soil survey of Riverside County. Accessible online at: http://websoilsurvey.nrcs.usda.gov

United States Department of Agriculture, Natural Resources Conservation Service (USDA, NRCS). 2015. Official Soil Series Descriptions. Accessible online at: https://soilseries.sc.egov.usda.gov/osdname.asp

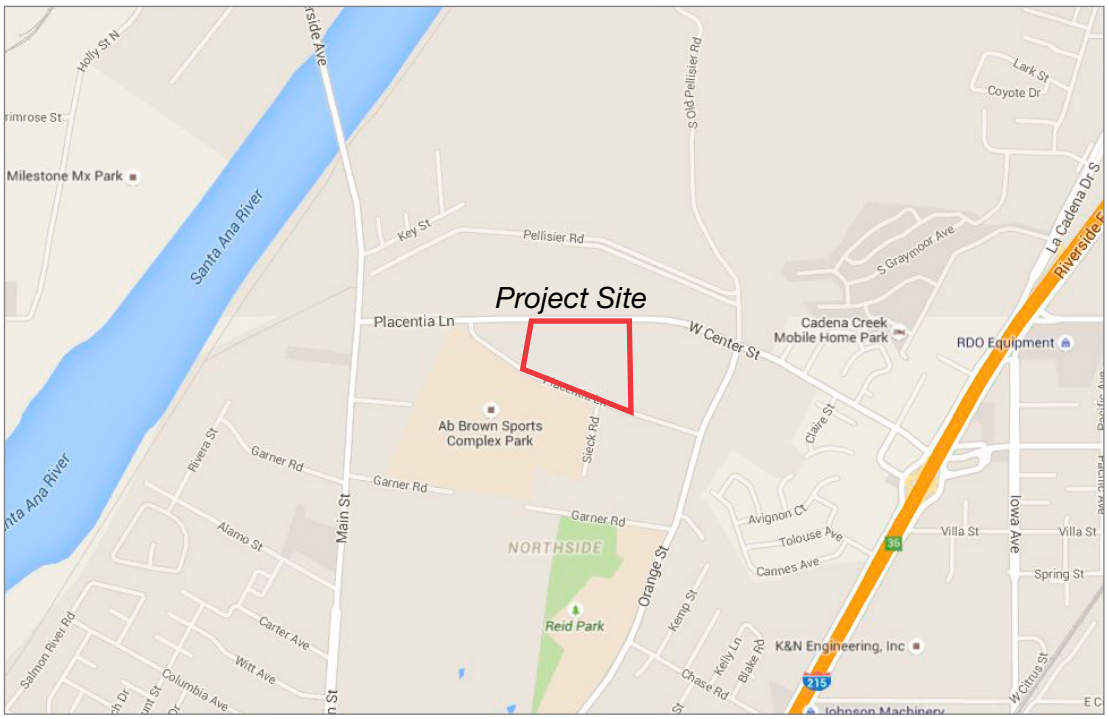
USFWS. 2015. National Wetlands Inventory. Wetlands Mapper. Accessible online at: http://www.fws.gov/wetlands/data/mapper.HTML

Western Regional Climate Center (WRCC). 2015. Climate Summaries for S. California. Accessible online at: http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca7470



Source: Google Maps, 2015

Regional



Source: Google Maps, 2015

Vicinity

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Figure 1. Regional and Vicinity Map

Center Street Commerce Building
6055 Center Street, Riverside, California

Source: Google Earth, 2015

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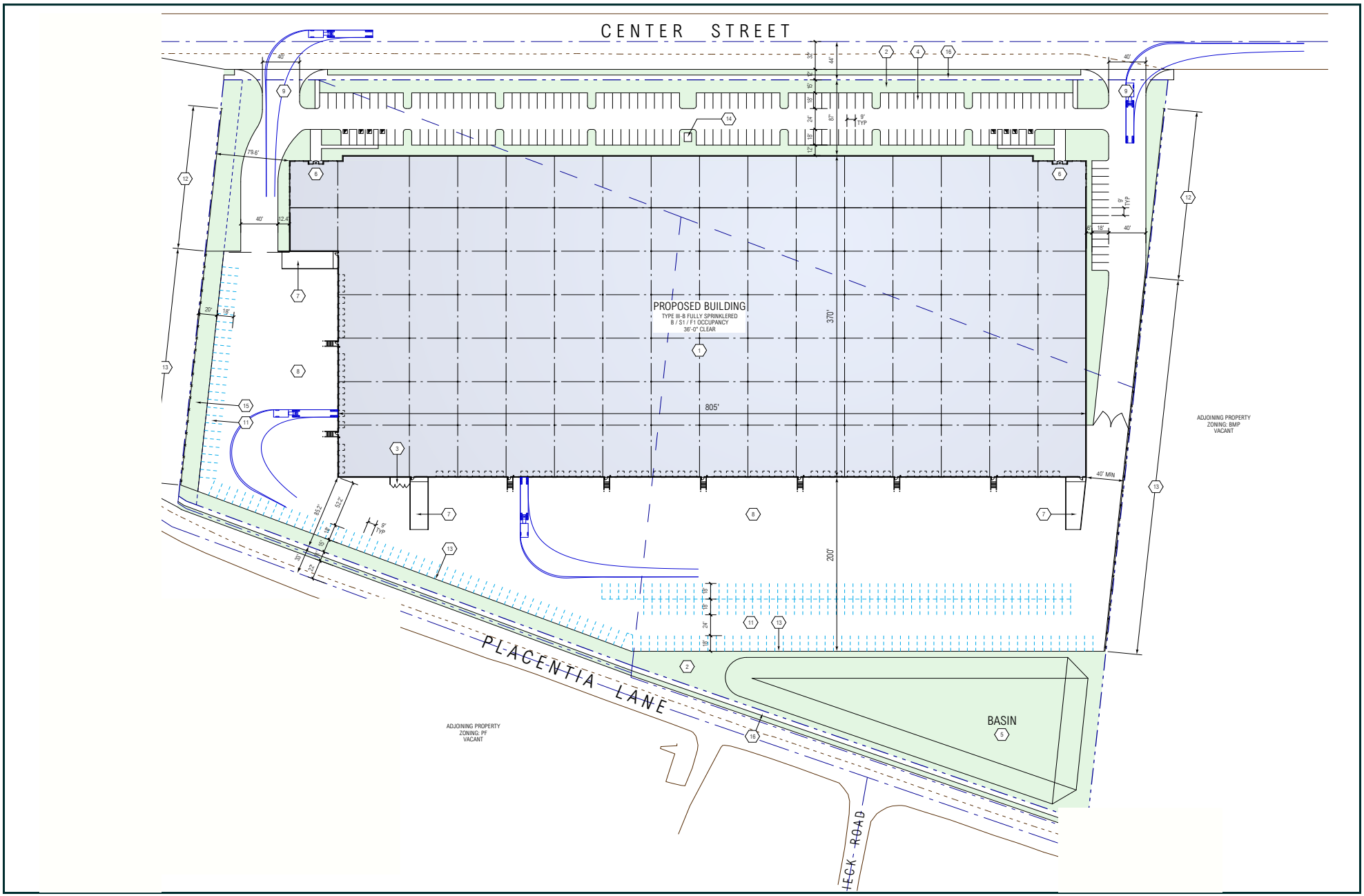
Figure 2. Aerial Map

Center Street Commerce Building
6055 Center Street, Riverside, California



Source: RGA, 2015

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Figure 3. Proposed Site Plan

Center Street Commerce Building
6055 Center Street, Riverside, California

Source: Site Visit on April 7, 2015 & Google Earth, 2015

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Figure 4. Vegetation Communities Map

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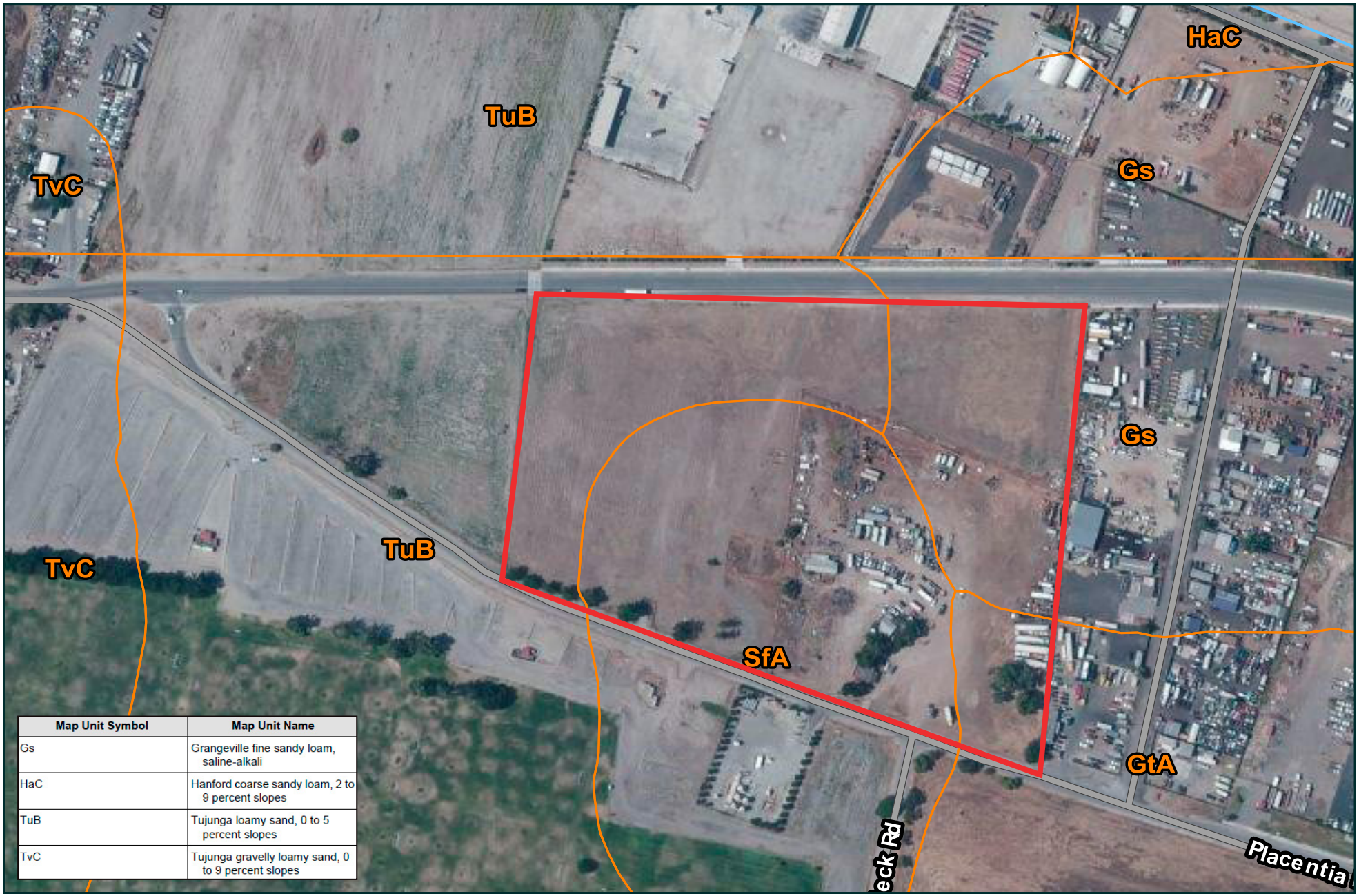
Center Street Commerce Building
6055 Center Street, Riverside, California

Source: US Fish and Wildlife Service, National Wetlands Mapper, 2015

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

Figure 5. Wetlands Map

Center Street Commerce Building
6055 Center Street, Riverside, California



Map Unit Symbol	Map Unit Name
Gs	Grangeville fine sandy loam, saline-alkali
HaC	Hanford coarse sandy loam, 2 to 9 percent slopes
TuB	Tujunga loamy sand, 0 to 5 percent slopes
TvC	Tujunga gravelly loamy sand, 0 to 9 percent slopes

Source: Natural Resources Conservation Service Web Soil Survey, 2015

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Figure 6. Soil Map

Center Street Commerce Building
6055 Center Street, Riverside, California

Appendix A1: Special-status animal species with Potential to Occur on the project site.

Species	Status		Habitat Requirements	Potential for Occurrence
	Federal	State		
INVERTEBRATES				
Busck's gallmoth *Carolella busckana*	--	--	No habitat information available.	**Not Expected.** There are no recent known records of occurrence in the vicinity of the project site. The species has an extremely low probability of being found on the project site.
Desert cuckoo wasp *Ceratochrysis longimala*	--	--	No habitat information available.	**Not Expected.** There are no recent known records of occurrence in the vicinity of the project site. The species has an extremely low probability of being found on the project site.
Greenest tiger beetle *Cicindela tranquebarica viridissima*	--	--	Inhabits riparian woodland. Found in the woodlands adjacent to the Santa Ana River basin and usually occurs in open spots between trees and in sand flats along streams.	**Not Expected.** There is no suitable habitat present on the project site. The Santa Ana River is located approximately 0.8 miles west of the project site. In addition, there are no recent known records of occurrence in the vicinity of the project site. The species has an extremely low probability of being found on the project site.
Andrew's marble butterfly *Euchloe hyantis andrewsi*	--	--	Inhabits lower montane coniferous forest, hills, and washes. Found in yellow pine forest near Lake Arrowhead and Big Bear Lake, San Bernardino Mountains, San Bernardino County at elevations of 5,000-6,000 feet.	**Not Expected.** There is no suitable habitat present on the project site. The project site has an approximate elevation of 835 feet; therefore, the project site is outside this species known elevation range. In addition, there are no recent known records of occurrence in the vicinity of the project site. The species has an extremely low probability of being found on the project site.

Species	Status		Habitat Requirements	Potential for Occurrence
	Federal	State		
Delhi Sands flower-loving fly *Rhaphiomidas terminatus abdominalis*	FE	--	Found only in areas of the Delhi Sands formation in southwestern San Bernardino and northwestern Riverside counties. Requires fine, sandy soils, often with wholly or partly consolidated dunes and sparse vegetation.	**Not Expected.** There is no suitable habitat present on the project site. The Delhi soil series is not present on the project site. The species has an extremely low probability of being found on the project site.
Riverside fairy shrimp *Streptocephalus woottoni*	FE	--	Inhabits coastal scrub, valley and foothill grassland, vernal pool, wetland. Found in seasonally astatic pools filled by winter/spring rains. Hatch in warm water later in the season.	**Not Expected.** No water bodies are present on the project site; therefore, there is no suitable habitat present on the project site. The species has an extremely low probability of being found on the project site.
FISHES				
Santa Ana sucker *Catostomus santaanae*	FT	CSC	Endemic to Los Angeles Basin south coastal streams. Habitat generalists, but prefer sand-rubble-boulder bottoms, cool, clear water, and algae.	**Not Expected.** No water bodies are present on the project site; therefore, there is no suitable habitat present on the project site. The species has an extremely low probability of being found on the project site.
Arroyo chub *Gila orcuttii*	--	CSC	Native to streams from Malibu Creek to San Luis Rey River basin. Introduced into streams in Santa Clara, Ventura, Santa Ynez, Mohave and San Diego river basins. Inhabits slow water stream sections with mud or sand bottoms. Feeds heavily on aquatic vegetation and associated invertebrates.	**Not Expected.** No water bodies are present on the project site; therefore, there is no suitable habitat present on the project site. The species has an extremely low probability of being found on the project site.
Santa Ana speckled dace *Rhinichthys osculus ssp. 3*	--	CSC	Inhabits headwaters of the Santa Ana and San Gabriel rivers. May be extirpated from the Los Angeles River system. Requires permanent flowing streams with summer water temps of 17-20 Celsius. Usually inhabits shallow cobble and gravel riffles.	**Not Expected.** No water bodies are present on the project site; therefore, there is no suitable habitat present on the project site. The species has an extremely low probability of being found on the project site.

Species	Status		Habitat Requirements	Potential for Occurrence
	Federal	State		
AMPHIBIANS				
San Gabriel slender salamander *Batrachoseps gabrieli*	--	--	Known only from the San Gabriel Mountains. Found under rocks, wood, fern fronds and on soil at the base of talus slopes.	**Not Expected.** The project site topography is relatively flat and no talus slopes are present; therefore, there is no suitable habitat present on the project site. The species has an extremely low probability of being found on the project site.
California red-legged frog *Rana draytonii*	FT	CSC	Inhabits lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation. Requires 11-20 weeks of permanent water for larval development. Must have access to nearby estivation habitat.	**Not Expected.** No water bodies are present on the project site; therefore, there is no suitable habitat present on the project site. No suitable dispersal or estivation habitat is present on the project site. The species has an extremely low probability of being found on the project site.
Southern mountain yellow-legged frog *Rana muscosa*	FE	SE, CSC	Typically found in steep gradient streams in the chaparral belt and may range into small meadow streams at higher elevations. In southern California, USFWS (2006) concluded that *Rana muscosa* require water source(s) found between 1,214 to 7,546 feet in elevation that are permanent.	**Not Expected.** No water bodies are present on the project site; therefore, there is no suitable habitat present on the project site. In addition, the project site is located at an approximate elevation of 835 feet; therefore, the project site is located outside this species known elevation range. The species has an extremely low probability of being found on the project site.
Western spadefoot *Spea hammondii*	--	CSC	Inhabits cismontane woodland, coastal scrub, valley and foothill grassland, vernal pool, wetland. Occurs primarily in grassland habitats, but can be found in valley-foothill hardwood woodlands. Vernal pools are essential for breeding and egg-laying.	**Not Expected.** There is no suitable habitat present on the project site. No vernal pools are present on the project site. The species has an extremely low probability of being found on the project site.
REPTILES				
Silvery legless lizard *Anniella pulchra pulchra*	--	CSC	Inhabits chaparral, coastal dunes, coastal scrub. Found in sandy or loose loamy soils under sparse vegetation. Soil moisture is essential. Prefer soils with high moisture content.	**Not Expected.** There is no suitable habitat present on the project site. The project site does not have high soil moisture content. The species has an extremely low probability of being found on the project site.

Species	Status		Habitat Requirements	Potential for Occurrence
	Federal	State		
Orangethroat whiptail *Aspidoscelis hyperythra*	--	CSC	Inhabits low-elevation coastal scrub, chaparral, and valley-foothill hardwood habitats. Prefers washes and other sandy areas with patches of brush and rocks. Perennial plants necessary for its major food (i.e,termites).	**Low Potential.** Low-quality suitable habitat is present on the project site. The project site consists of disturbed/ruderal habitat with some small shrubs and sandy areas. It does not contain coastal scrub, chaparral, valley-foothill hardwood habitat, or washes. The species has a low probability of being found on the project site.
Coastal whiptail *Aspidoscelis tigris stejnegeri*	--	--	Found in deserts and semiarid areas with sparse vegetation and open areas. Also found in woodland and riparian areas. Ground may be firm soil, sandy, or rocky.	**Moderate Potential.** There is no suitable habitat present on the project site. Additionally, there are few recent known records of occurrence in the vicinity of the project site. The species has an extremely low probability of being found on the project site.
Rosy boa *Charina trivirgata*	--	--	Inhabits chaparral, Mojavean desert scrub, and Sonoran desert scrub. Prefers moderate to dense vegetation and rocky cover. Prefers habitats with a mix of brushy cover and rocky soil such as coastal canyons and hillsides, desert canyons, washes and mountains	**Not Expected.** There is no suitable habitat present on the project site. The project site consists of disturbed/ruderal habitat and does not contain chaparral or Mojavean and Sonoran desert scrub habitat. The species has an extremely low probability of being found on the project site.
Southern rubber boa *Charina umbratica*	--	ST	Inhabits meadow and seep, riparian forest, riparian woodland, upper montane coniferous forest, wetland habitats. Known from the San Bernardino and San Jacinto mountains. Found in vicinity of streams or wet meadows. Requires loose, moist soil for burrowing; seeks cover in rotting logs, rock outcrops, and under surface litter.	**Not Expected.** There is no suitable habitat present on the project site. The project site consists of disturbed/ruderal habitat and does not contain montane forest habitat or contain moist soil or suitable refuge habitat. The species has an extremely low probability of being found on the project site.

Species	Status		Habitat Requirements	Potential for Occurrence
	Federal	State		
Red-diamond rattlesnake *Crotalus ruber*	--	CSC	Inhabits chaparral, Mojavean desert scrub, and Sonoran desert scrub from coastal San Diego County to the eastern slopes of the mountains. Occurs in rocky areas and dense vegetation. Needs rodent burrows, cracks in rocks, or surface cover objects.	**Not Expected.** There is no suitable habitat present on the project site. The project site consists of disturbed/ruderal habitat and does not contain chaparral, woodland, grassland, rocky, or desert habitat. In addition, there are no recent known records of occurrence in the vicinity of the project site. The species has an extremely low probability of being found on the project site.
San Bernardino ringneck snake *Diadophis punctatus modestus*	--	--	Most common in open, relatively rocky areas. Often in somewhat moist microhabitats near intermittent streams. Avoids moving through open or barren areas.	**Not Expected.** There is no suitable habitat present on the project site. The project site consists of disturbed/ruderal habitat and does not contain rocky or moist areas near intermittent streams. Additionally, the project site is dominated by open or barren areas; therefore, this species is unlikely to move through the project area. The species has an extremely low probability of being found on the project site.
Coast horned lizard *Phrynosoma blainvillii*	--	CSC	Frequents a wide variety of habitats, most common in lowlands along sandy washes with scattered low bushes. Requires open areas for sunning, bushes for cover, patches of loose soil for refuge, and abundant supply of insects.	**Moderate Potential.** Suitable habitat is present on the project site. The species has a moderate probability of being found on the project site.
Two-striped garter snake *Thamnophis hammondii*	--	CSC	Inhabits marsh and swamp, riparian scrub, riparian woodland, wetland habitats in coastal California from Salinas to northwest Baja California. Highly aquatic, found in or near permanent fresh water. Often along streams with rocky beds and riparian growth.	**Not Expected.** No water bodies are present on the project site; therefore, there is no suitable habitat present on the project site. The species has an extremely low probability of being found on the project site.

Species	Status		Habitat Requirements	Potential for Occurrence
	Federal	State		
BIRDS				
Cooper's hawk *Accipiter cooperii*	--	--	Inhabits cismontane woodland, riparian forest, riparian woodland, and upper montane, coniferous forest. Found in chiefly of open, interrupted or marginal type woodlands. Nest sites occur mainly in riparian growths of deciduous trees, as in canyon bottoms on river flood-plains; also, live oaks.	**Low Potential.** There are some trees on the project site that could be used for nesting; however, the habitat is low-quality since it is not located near water or within a woodland. The species has a low probability of being found on the project site.
Tricolored blackbird *Agelaius tricolor*	--	CSC	Inhabits freshwater marsh, marsh and swamp, swamp, and wetland habitats. Highly colonial species, most numerous in Central Valley and vicinity. Largely endemic to California. Requires open water, protected nesting substrate, and foraging area with insect prey within a few kilometers of the colony.	**Not Expected.** No water bodies are present on the project site; therefore, there is no suitable habitat present on the project site. The species has an extremely low probability of being found on the project site.
Southern California rufous-crowned sparrow *Aimophila ruficeps canescens*	--	--	Resident in Southern California coastal sage scrub and sparse mixed chaparral. Frequents relatively steep, often rocky hillsides with grass and forb patches.	**Not Expected.** There is no suitable habitat present on the project site. The project site has relatively flat topography and consists of disturbed/ruderal habitat. The species has an extremely low probability of being found on the project site.
Bell's sage sparrow *Artemisiospiza belli belli*	--	--	Nests in chaparral dominated by fairly dense stands of chamise. Found in coastal sage scrub in south of range.	**Not Expected.** There is no suitable habitat present on the project site. The project site consists of disturbed/ruderal habitat and no chaparral or coastal scrub habitat exists on the project site. The species has an extremely low probability of being found on the project site.

Species	Status		Habitat Requirements	Potential for Occurrence
	Federal	State		
Burrowing owl *Athene cunicularia*	--	CSC	Inhabits open, dry annual or perennial grasslands, deserts and scrublands characterized by low-growing vegetation. Subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel (*Otospermophilius beecheyi*).	**Low Potential.** Although, disturbed/ruderal open habitat is present on the project site, no California ground squirrel burrows were observed within the project site during the field visit. In addition, no evidence of this species (e.g., feathers, whitewash, pellets) were observed during the field visit. The species has a low probability of being found on the project site.
Ferruginous hawk *Buteo regalis*	--	--	Inhabits open grasslands, sagebrush flats, desert scrub, low foothills and fringes of pinyon-juniper habitats. Feeds on ground squirrels and mice.	**Low Potential.** Some marginal suitable habitat is present for this species; however, this species is not known to nest in California. No ground squirrel burrows were observed on the project site. The species has a low probability of being found on the project site.
Swainson's hawk *Buteo swainsoni*	--	ST	Occurs in Great Basin grassland, riparian forest, riparian woodland, valley and foothill grassland habitats. Breeds in grasslands with scattered trees, juniper-sage flats, riparian areas, savannahs, and agricultural or ranch lands with groves or lines of trees. Requires adjacent suitable foraging areas such as grasslands, or alfalfa or grain fields supporting rodent populations.	**Not Expected.** There is no suitable habitat present on the project site. The project site consists of disturbed/ruderal habitat and is surrounding by urban development. The species has an extremely low probability of being found on the project site.
Western yellow-billed cuckoo *Coccyzus americanus occidentalis*	FT	SE	Riparian forest nester, along the broad, lower flood-bottoms of larger river systems. Nests in riparian jungles of willow (*Salix* sp.) often mixed with cottonwoods (*Populus* sp.), with lower story of blackberry (*Rubus sp.*), nettles (*Urtica sp.*), or wild grape (*Vitis girdiana*).	**Not Expected.** There is no suitable habitat present on the project site. The Santa Ana River, which provides suitable habitat, is located approximately 0.8 miles west of the project site. The species has an extremely low probability of being found on the project site.

Species	Status		Habitat Requirements	Potential for Occurrence
	Federal	State		
Southwestern willow flycatcher *Empidonax traillii extimus*	FE	SE	Riparian woodland in Southern California.	**Not Expected.** There is no suitable habitat present on the project site. The Santa Ana River, which provides suitable habitat, is located approximately 0.8 miles west of the project site. The species has an extremely low probability of being found on the project site.
California horned lark *Eremophila alpestris actia*	--	--	Inhabits open areas, including short-grass prairies, "bald" hills, mountain meadows, open coastal plains, fallow grain fields, alkali flats.	**Moderate Potential.** Suitable habitat is present on the project site. The species has a moderate probability of being found on the project site.
Bald eagle *Haliaeetus leucocephalus*	FD	SE	Inhabits ocean shore, lake margins and rivers for both nesting and wintering. Nests in large, old-growth, or dominant live tree with open branches, especially ponderosa pine. Roosts communally in winter.	**Not Expected.** No water bodies are present on the project site; therefore, there is no suitable habitat present on the project site. The species has an extremely low probability of being found on the project site.
Yellow-breasted chat *Icteria virens*	--	CSC	Summer resident; inhabits riparian thickets of willow and other brushy tangles near watercourses. Nests in low, dense riparian, consisting of willow, blackberry, wild grape.	**Not Expected.** There is no suitable habitat present on the project site. The Santa Ana River, which provides suitable habitat, is located approximately 0.8 miles west of the project site. The species has an extremely low probability of being found on the project site.
Loggerhead shrike *Lanius ludovicianus*	--	CSC	Inhabits broken woodlands, savannah, pinyon-juniper, Joshua tree, and riparian woodlands, desert oases, scrub and washes. Prefers open country for hunting, with perches for scanning, and fairly dense shrubs and brush for nesting.	**Moderate Potential.** Suitable habitat is present on the project site. The species has a moderate probability of being found on the project site.

Species	Status		Habitat Requirements	Potential for Occurrence
	Federal	State		
Coastal California gnatcatcher *Polioptila californica californica*	FT	CSC	Obligate, permanent resident of coastal sage scrub below 2,500 feet in Southern California. Inhabits low, coastal sage scrub in arid washes, on mesas and slopes. Not all areas classified as coastal sage scrub are occupied.	**Not Expected.** There is no suitable habitat present on the project site. The species has an extremely low probability of being found on the project site.
Yellow warbler *Setophaga petechia*	--	CSC	Inhabits riparian areas in close proximity to water. Frequently found nesting and foraging in willow shrubs and thickets, and in other riparian plants including cottonwoods, sycamores, ash, and alders.	**Not Expected.** There is no suitable habitat present on the project site. The Santa Ana River, which provides suitable habitat, is located approximately 0.8 miles west of the project site. The species has an extremely low probability of being found on the project site.
Lawrence's goldfinch *Spinus lawrencei*	--	--	Nests in open oak or other arid woodland and chaparral, near water. Nearby herbaceous habitats used for feeding. Closely associated with oaks.	**Not Expected.** There is no suitable habitat present on the project site. The project site consists of disturbed/ruderal habitat and no oak trees or water exists on the project site. The species has an extremely low probability of being found on the project site.
Least Bell's vireo *Vireo bellii pusillus*	FE	SE	Summer resident of Southern California in low riparian in vicinity of water or in dry river bottoms below 2,000 feet. Nests placed along margins of bushes or on twigs projecting into pathways (usually *salix*, *baccharis*, *Prosopis*).	**Not Expected.** There is no suitable habitat present on the project site. The Santa Ana River, which provides suitable habitat, is located approximately 0.8 miles west of the project site. The species has an extremely low probability of being found on the project site.
MAMMALS				
Pallid bat *Antrozous pallidus*	--	CSC	Inhabits deserts, grasslands, shrublands, woodlands and forests. Most common in open, dry habitats with rocky areas for roosting. Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	**Low Potential.** Limited suitable habitat (e.g., trees and dilapidated sheds)is present on the project site. The project site is highly disturbed with some small residences present; therefore, pallid bats are unlikely to roost in this area. In addition, there are no recent known records of occurrence in the vicinity of the project site. The species has a low probability of being found on the project site.

Species	Status		Habitat Requirements	Potential for Occurrence
	Federal	State		
Northwestern San Diego pocket mouse *Chaetodipus fallax fallax*	--	CSC	Inhabits chaparral, coastal scrub. Coastal scrub, chaparral, grasslands, and sagebrush habitats in western San Diego County. Found in sandy, herbaceous areas, usually in association with rocks or coarse gravel.	**Low Potential.** Low-quality suitable habitat is present on the project site. The project site consists of disturbed/ruderal habitat and few shrubs, rocks, or gravel areas are present on the project site. The species has a low probability of being found on the project site.
Pallid San Diego pocket mouse *Chaetodipus fallax pallidus*	--	CSC	Inhabits desert border areas in eastern San Diego County in desert wash, desert scrub, desert succulent scrub, pinyon-juniper habitats. Found in sandy herbaceous areas, usually in association with rocks or coarse gravel.	**Not Expected.** Low-quality suitable habitat is present on the project site. The project site consists of disturbed/ruderal habitat and few shrubs, rocks, or gravel areas are present on the project site. There are no recent known records of occurrence in the vicinity of the project site. The species has an extremely low probability of being found on the project site.
San Bernardino kangaroo rat *Dipodomys merriami parvus*	FE	CSC	Inhabits alluvial scrub vegetation on sandy loam substrates characteristic of alluvial fans and flood plains.	**Not Expected.** No suitable habitat is present on the project site. The project site consists of disturbed/ruderal habitat and does not contain coastal or alluvial scrub habitat. The species has an extremely low probability of being found on the project site.
Stephens' kangaroo rat *Dipodomys stephensi*	FE	ST	Inhabits primarily annual and perennial grasslands, but also occurs in coastal scrub and sagebrush with sparse canopy cover. Prefers buckwheat (*Eriogonum sp.*), chamise (*Adenostoma fasciculatum*), brome grass (*Bromus sp.*) and filaree (*Erodium sp.*). Will burrow into firm soil.	**Not Expected.** No suitable habitat is present on the project site. The project site consists of disturbed/ruderal habitat and does not contain coastal scrub or sagebrush habitat. The species has an extremely low probability of being found on the project site.
Western mastiff bat *Eumops perotis californicus*	--	CSC	Inhabits many open, semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, valley and foothill grasslands, and chaparral. Roosts in crevices in cliff faces, high buildings, trees and tunnels.	**Low Potential.** Limited suitable roosting habitat is present on the project site within the trees on-site. The species has a low probability of being found on the project site.

Species	Status		Habitat Requirements	Potential for Occurrence
	Federal	State		
San Bernardino flying squirrel *Glaucomys sabrinus californicus*	--	CSC	Known from black oak (*Quercus kelloggii*) or white fir (*Abies concolor*) dominated woodlands between 5,200 – 8,500 feet in the San Bernardino and San Jacinto ranges. May be extirpated from San Jacinto range. Need cavities in trees/snags for nests and cover and nearby water.	**Not Expected.** There is no suitable habitat present on the project site. In addition, the project site is located at approximately 835 feet, which is outside this species known elevation range. The species has an extremely low probability of being found on the project site.
Western yellow bat *Lasiurus xanthinus*	--	CSC	Found in valley foothill riparian, desert riparian, desert wash, and palm oasis habitats. Roosts in trees, particularly palms. Forages over water and among trees.	**Low Potential.** Limited suitable roosting habitat is present on the project site within the trees on-site; however, no riparian or aquatic resources are located on the project site. The Santa Ana River is approximately miles west of the project site. The species has a low probability of being found on the project site.
San Diego black-tailed jackrabbit *Lepus californicus bennettii*	--	CSC	Found in intermediate canopy stages of shrub habitats and open shrub/herbaceous and tree/herbaceous edges. Inhabits coastal sage scrub habitats in Southern California.	**Low Potential.** There is low-quality suitable habitat present on the project site since very few shrubs are present on the project site. The species has a low probability of being found on the project site.
San Diego desert woodrat *Neotoma lepida intermedia*	--	CSC	Inhabits coastal scrub of Southern California from San Diego County to San Luis Obispo County. Moderate to dense canopies preferred. They are particularly abundant in rock outcrops and rocky cliffs and slopes.	**Not Expected.** There is no suitable scrub habitat present on the project site. The species has an extremely low probability of being found on the project site.
Pocketed free-tailed bat *Nyctinomops femorosaccus*	--	CSC	Inhabits a variety of arid areas in Southern California, including pine-juniper woodlands, desert scrub, palm oasis, desert wash, and desert riparian. Prefers rocky areas with high cliffs.	**Not Expected.** No suitable habitat for this species is present in the project area. In addition, there are no recent known records of occurrence in the vicinity of the project. The species has an extremely low probability of being found on the project site.

Species	Status		Habitat Requirements	Potential for Occurrence
	Federal	State		
Southern grasshopper mouse *Onychomys torridus ramona*	--	CSC	Inhabits desert areas, especially scrub habitats with friable soils for digging. Prefers low to moderate shrub cover.	**Not Expected.** There is no suitable scrub habitat present on the project site. In addition, there are no recent known records of occurrence in the vicinity of the project. The species has an extremely low probability of being found on the project site.
White-eared pocket mouse *Perognathus alticolus alticolus*	--	CSC	Inhabits ponderosa and Jeffrey pine habitats. Also found in mixed chaparral and sagebrush habitats in the San Bernardino Mountains. Burrows are constructed in loose soil.	**Not Expected.** There is no suitable habitat present on the project site. In addition, there are no recent known records of occurrence in the vicinity of the project. The species has an extremely low probability of being found on the project site.
Los Angeles pocket mouse *Perognathus longimembris brevinasus*	--	CSC	Inhabits lower elevation grasslands and coastal sage communities in and around the Los Angeles Basin. Found in open ground with fine sandy soils. May not dig extensive burrows, hiding under weeds and dead leaves instead.	**Not Expected.** There is no suitable grassland or sage habitat present on the project site. The species has an extremely low probability of being found on the project site.
American badger *Taxidea taxus*	--	CSC	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils. Needs sufficient food, friable soils and open, uncultivated ground. Preys on burrowing rodents. Digs burrows.	**Not Expected.** There is no suitable habitat present on the project site and no burrows of suitable size were observed on the project site during the April field visit. In addition, there are no recent known records of occurrence in the vicinity of the project. The species has an extremely low probability of being found on the project site.

KEY:
(nesting and/or wintering) = For most taxa, the CNDDB is interested in information that indicates the presence of a resident population. For some species (primarily birds), the CNDDB only tracks certain parts of the species range or life history (e.g., nesting locations).

STATUS:

Federal	State
FE: Federally-listed Endangered	SE: State-listed Endangered
FT: Federally-listed Threatened	ST: State-listed Threatened
FD: Federally-delisted	CSC: State Species of Special Concern

SOURCES:
1 California Natural Diversity Database (CNDDB), BIOS 5 Data Viewer, and NatureServe.org Explorer were used to identify preferred habitat for each species
2 CNDDB records are from CNDDB 2015

Appendix A2: Special status plant species With Potential to Occur on the Project Site.

Species	Status			Habitat Requirements	Elevation Range; Life Form; Blooming Period	Potential Occurrence in the Project Area[1]
	Federal	State	CNPS			
Dicots						
Singlewhorl burrobrush *Ambrosia monogyra*	--	--	2B.2	Chaparral, Sonoran desert scrub. Sandy soils.	10-500 m; Native shrub; Blooms August to November	**Not Expected.** Although sandy soils are present, there is no suitable scrub habitat present on the project site. In addition, there are no recent known records of occurrence in the vicinity of the project. The species has an extremely low probability of being found on the project site.
San Diego ambrosia *Ambrosia pumila*	FE	--	1B.1	Chaparral, coastal scrub, valley and foothill grassland. Sandy loam or clay soil in valleys; persists where disturbance has been superficial. Sometimes on margins or near vernal pools.	20-415 m; Perennial herb; Blooms April to October	**Not Expected.** There is no suitable habitat present on the project site. Not observed during the April 2015 field survey; however, focused surveys were not conducted. In addition, there are no recent known records of occurrence in the vicinity of the project. The species has an extremely low probability of being found on the project site.
Marsh sandwort *Arenaria paludicola*	FE	SE	1B.1	Freshwater marsh, marsh and swamp, wetland. Growing up through dense mats of *Typha, Juncus,* and *Scirpus* in freshwater marsh habitat.	10-170 m; Perennial herb; Blooms from May to August	**Not Expected.** There is no suitable aquatic habitat present on the project site. The project site is above the known elevation range for the species. The species has an extremely low probability of being found on the project site.

[1] The potential for occurrence is based on occurrences recorded in the CNDDB, knowledge of species requirements, and site inspections during 2015 field surveys

Species	Status			Habitat Requirements	Elevation Range; Life Form; Blooming Period	Potential Occurrence in the Project Area[1]
	Federal	State	CNPS			
Horn's milk-vetch *Astragalus hornii* var. *hornii*	--	--	1B.1	Meadows and seeps, playas. Lake margins, alkaline sites.	60-850 m; Annual herb; Blooms from May to October	**Not Expected.** There is no suitable aquatic habitat present on the project site. In addition, there are no recent known records of occurrence in the vicinity of the project. The species has an extremely low probability of being found on the project site.
Nevin's barberry *Berberis nevinii*	FE	SE	1B.1	Chaparral, cismontane woodland, coastal scrub, riparian scrub. On steep, north-facing slopes or in low grade sandy washes.	290-1,575 m; Shrub; Blooms March to June	**Not Expected.** There is no suitable habitat present on the project site. The project site is below the known elevation range for this species. Not observed during April 2015 field survey; however, focused surveys were not conducted. The species has an extremely low probability of being found on the project site.
Round-leaved filaree *California macrophylla*	--	--	1B.1	Cismontane woodland, valley and foothill grassland. Clay soils.	15-1,200 m; Annual herb; Blooms March to May	**Not Expected.** There is no suitable habitat present on the project site. Not observed during April 2015 field survey; however, focused surveys were not conducted. In addition, there are no recent known records of occurrence in the vicinity of the project. The species has an extremely low probability of being found on the project site.

Species	Status			Habitat Requirements	Elevation Range; Life Form; Blooming Period	Potential Occurrence in the Project Area[1]
	Federal	State	CNPS			
San Bernardino Mountains owl's-clover *Castilleja lasiorhyncha*	--	--	1B.2	Meadows and seeps, pebble plain, upper montane coniferous forest, chaparral, riparian woodland. Mesic to drying soils in open areas of stream and meadow margins or of vernally wet areas.	1,300-2,390 m; Annual herb; Blooms May to August	**Not Expected.** There is no suitable habitat present on the project site. The project site is below the known elevation range for the species. In addition, there are no recent known records of occurrence in the vicinity of the project. The species has an extremely low probability of being found on the project site.
Smooth tarplant *Centromadia pungens* ssp. *laevis*	--	--	1B.1	Valley and foothill grassland, chenopod scrub, meadows, playas, riparian woodland. Alkali meadow, alkali scrub; also in disturbed places.	0-640 m; Annual herb; Blooms April to September	**Low Potential.** The project site does not contain valley or foothill grassland, chenopod scrub, meadow, playa, riparian woodland, alkali meadow, or alkali scrub habitat. The project site consists of disturbed/ruderal habitat and although the species can occur in disturbed places no aquatic resources are located on or adjacent to the project site. In addition, it was not observed during April 2015 field survey; however, focused surveys were not conducted. The species has a low probability of being found on the project site.

Species	Status			Habitat Requirements	Elevation Range; Life Form; Blooming Period	Potential Occurrence in the Project Area[1]
	Federal	State	CNPS			
Salt marsh bird's-beak *Chloropyron maritimum* ssp. *maritimum*	FE	SE	1B.2	Coastal salt marsh, coastal dunes. Limited to the higher zones of the salt marsh habitat.	0-30 m; Annual herb; Blooms May to October	**Not Expected.** There is no suitable habitat present on the project site. The project site is above the known elevation range for the species. In addition, there are no recent known records of occurrence in the vicinity of the project. The species has an extremely low probability of being found on the project site.
Parry's spineflower *Chorizanthe parryi* var. *parryi*	--	--	1B.1	Coastal scrub, chaparral, cismontane woodland, valley and foothill grassland. Dry slopes and flats; sometimes at interface of two vegetation types, such as chaparral and oak woodland; dry, sandy soils.	225-1,220 m; Annual herb; Blooms April to June	**Not Expected.** There is no suitable habitat present on the project site. In addition, it was not observed during April 2015 field survey; however, focused surveys were not conducted. The species has an extremely low probability of being found on the project site.
White-bracted spineflower *Chorizanthe xanti* var. *leucotheca*	--	--	1B.2	Mojavean desert scrub, pinyon-juniper woodland, coastal scrub (alluvial fans). Sandy or gravelly places.	300-1,200 m; Annual herb; Blooms April to June	**Not Expected.** There is no suitable habitat present on the project site. The project site is below the known elevation range for the species. In addition, it was not observed during April 2015 field survey; however, focused surveys were not conducted. The species has an extremely low probability of being found on the project site.

Species	Status			Habitat Requirements	Elevation Range; Life Form; Blooming Period	Potential Occurrence in the Project Area[1]
	Federal	State	CNPS			
San Miguel savory *Clinopodium chandleri*	--	--	1B.2	Chaparral, cismontane woodland, coastal scrub, riparian woodland, valley and foothill grassland.	120-1,005 m; Perennial herb; Blooms March to July	**Not Expected.** There is no suitable habitat present on the project site. In addition, it was not observed during April 2015 field survey; however, focused surveys were not conducted. The species has an extremely low probability of being found on the project site.
Peruvian dodder *Cuscuta obtusiflora* var. *glandulosa*	--	--	2B.2	Marshes and swamps (freshwater).	15-280 m; Annual herb, vine (parasitic); Blooms July to October	**Not Expected.** There is no suitable aquatic habitat present on the project site. In addition, there are no recent known records of occurrence in the vicinity of the project. The species has an extremely low probability of being found on the project site.
Slender-horned spineflower *Dodecahema leptoceras*	FE	SE	1B.1	Chaparral, cismontane woodland, coastal scrub (alluvial fan sage scrub). Flood deposited terraces and washes; associates include *Encelia, Dalea*, and *Lepidospartum*. Sandy soils.	200-760 m; Annual herb; Blooms April to June	**Not Expected.** There is no suitable habitat present on the project site. It was not observed during April 2015 field survey; however, focused surveys were not conducted. The species has an extremely low probability of being found on the project site.
Santa Ana River woollystar *Eriastrum densifolium* ssp. *sanctorum*	FE	SE	1B.1	Coastal scrub, chaparral. In sandy soils on river floodplains or terraced fluvial deposits.	90-610 m; Perennial herb; Blooms May to September	**Not Expected.** There is no suitable river floodplain habitat present on the project site. The species has an extremely low probability of being found on the project site.

Species	Status			Habitat Requirements	Elevation Range; Life Form; Blooming Period	Potential Occurrence in the Project Area[1]
	Federal	State	CNPS			
Alvin Meadow bedstraw *Galium californicum* ssp. *primum*	--	--	1B.2	Chaparral, lower montane coniferous forest. Grows in shade of trees and shrubs at the lower edge of the pine belt, in pine forest-chaparral ecotone.	1,300-1,700 m; Perennial herb; Blooms May to July	**Not Expected.** There is no suitable coniferous forest or chaparral habitat present on the project site. The project site is below the known elevation range for the species. In addition, there are no recent known records of occurrence in the vicinity of the project. The species has an extremely low probability of being found on the project site.
Los Angeles sunflower *Helianthus nuttallii* ssp. *parishii*	--	--	1A	Marshes and swamps (coastal salt and freshwater).	10-1,675 m; Perennial herb; Blooms August to October	**Not Expected.** There is no suitable aquatic habitat present on the project site. In addition, there are no recent known records of occurrence in the vicinity of the project. The species has an extremely low probability of being found on the project site.
Parish's alumroot *Heuchera parishii*	--	--	1B.3	Lower montane coniferous forest, subalpine coniferous forest, upper montane coniferous forest, alpine boulder & rock field. Rocky places. Sometimes on carbonate.	1,500-3,800 m; Perennial herb; Blooms June to August	**Not Expected.** There is no suitable habitat present on the project site. The project site is below the known elevation range for the species. In addition, there are no recent known records of occurrence in the vicinity of the project. The species has an extremely low probability of being found on the project site.

Species	Status			Habitat Requirements	Elevation Range; Life Form; Blooming Period	Potential Occurrence in the Project Area[1]
	Federal	State	CNPS			
Mesa horkelia *Horkelia cuneata* var. *puberula*	--	--	1B.1	Chaparral, cismontane woodland, coastal scrub. Sandy or gravelly sites.	70-810 m; Perennial herb; Blooms February to July	**Not Expected.** There is no suitable habitat present on the project site. It was not observed during April 2015 field survey; however, focused surveys were not conducted. In addition, there are no recent known records of occurrence in the vicinity of the project. The species has an extremely low probability of being found on the project site.
Silver-haired ivesia *Ivesia argyrocoma* var. *argyrocoma*	--	--	1B.2	Meadows, pebble plains, upper montane coniferous forest.	1,460-2,960 m; Perennial herb; Blooms June to August	**Not Expected.** There is no suitable habitat present on the project site. The project site is below the known elevation range for the species. The species has an extremely low probability of being found on the project site.
Coulter's goldfields *Lasthenia glabrata* ssp. *coulteri*	--	--	1B.1	Coastal salt marshes, playas, vernal pools. Usually found on alkaline soils in playas, sinks, and grasslands.	1-1,200 m; Annual herb; Blooms February to June	**Not Expected.** There is no suitable aquatic habitat present on the project site. It was not observed during April 2015 field survey; however, focused surveys were not conducted. In addition, there are no recent known records of occurrence in the vicinity of the project. The species has an extremely low probability of being found on the project site.

Species	Status			Habitat Requirements	Elevation Range; Life Form; Blooming Period	Potential Occurrence in the Project Area[1]
	Federal	State	CNPS			
Robinson's pepper-grass *Lepidium virginicum* var. *robinsonii*	--	--	4.3	Chaparral, coastal scrub. Dry soils, shrubland.	1-885 m; Annual herb; Blooms January to July	**Not Expected.** There is no suitable chaparral or scrub habitat present on the project site. It was not observed during April 2015 field survey; however, focused surveys were not conducted. The species has an extremely low probability of being found on the project site.
Parish's desert-thorn *Lycium parishii*	--	--	2B.3	Coastal scrub, Sonoran desert scrub.	135-1,000 m; Shrub; Blooms March to April	**Not Expected.** There is no suitable scrub habitat present on the project site. It was not observed during April 2015 field survey; however, focused surveys were not conducted. In addition, there are no recent known records of occurrence in the vicinity of the project. The species has an extremely low probability of being found on the project site.
Parish's bush-mallow *Malacothamnus parishii*	--	--	1A	Chaparral, coastal sage scrub. In a wash.	305-455 m; Shrub; Blooms June to July	**Not Expected.** There is no suitable chaparral or scrub habitat present on the project site. The project site is below the known elevation range for the species In addition, there are no recent known records of occurrence in the vicinity of the project. The species has an extremely low probability of being found on the project site.

Species	Status			Habitat Requirements	Elevation Range; Life Form; Blooming Period	Potential Occurrence in the Project Area[1]
	Federal	State	CNPS			
Hall's monardella *Monardella macrantha* ssp. *hallii*	--	--	1B.3	Broadleaved upland forest, chaparral, lower montane coniferous forest, cismontane woodland, valley and foothill grassland. Dry slopes and ridges in openings within the above communities.	730-2,195 m; Perennial herb; Blooms June to October	**Not Expected.** There is no suitable habitat present on the project site. The project site is below the known elevation range for the species The species has an extremely low probability of being found on the project site.
Pringle's monardella *Monardella pringlei*	--	--	1A	Coastal scrub. Sandy hills.	300-400 m; Annual herb; Blooms May to June	**Not Expected.** There is no suitable scrub habitat present on the project site. The project site is below the known elevation range for the species. In addition, there are no recent known records of occurrence in the vicinity of the project. The species has an extremely low probability of being found on the project site.
Gambel's water cress *Nasturtium gambelii*	FE	ST	1B.1	Marshes and swamps. Freshwater and brackish marshes at the margins of lakes and along streams, in or just above the water level.	5-330 m; Perennial herb; Blooms April to October	**Not Expected.** There is no suitable aquatic habitat present on the project site. In addition, there are no recent known records of occurrence in the vicinity of the project. The species has an extremely low probability of being found on the project site.

Species	Status			Habitat Requirements	Elevation Range; Life Form; Blooming Period	Potential Occurrence in the Project Area[1]
	Federal	State	CNPS			
Short-joint beavertail *Opuntia basilaris* var. *brachyclada*	--	--	1B.2	Chaparral, Joshua tree woodland, Mojavean desert scrub, pinyon-juniper woodland, riparian woodland. Sandy soil or coarse, granitic loam.	425-1,800 m; Shrub; Blooms April to June	**Not Expected.** There is no suitable habitat present on the project site. The project site is below the known elevation range for the species. It was not observed during April 2015 field survey; however, focused surveys were not conducted. The species has an extremely low probability of being found on the project site.
Parish's yampah *Perideridia parishii* ssp. *parishii*	--	--	2B.2	Lower montane coniferous forest, meadows, upper montane coniferous forest. Damp meadows or along streambeds-prefers an open pine canopy.	1,465-3,000 m; Perennial herb; Blooms June to August	**Not Expected.** There is no suitable aquatic habitat present on the project site. The project site is below the known elevation range for the species. The species has an extremely low probability of being found on the project site.
Brand's star phacelia *Phacelia stellaris*	--	--	1B.1	Coastal scrub, coastal dunes. Open areas.	1-400 m; Annual herb, Blooms March to June	**Not Expected.** There is no suitable scrub or dune habitat present on the project site. It was not observed during April 2015 field survey; however, focused surveys were not conducted. The species has an extremely low probability of being found on the project site.
Parish's gooseberry *Ribes divaricatum* var. *parishii*	--	--	1A	Riparian woodland. *Salix* swales in riparian habitats.	65-300 m; Shrub; Blooms February to April	**Not Expected.** There is no suitable riparian habitat present on the project site. In addition, there are no recent known records of occurrence in the vicinity of the project. The species has an extremely low probability of being found on the project site.

Species	Status			Habitat Requirements	Elevation Range; Life Form; Blooming Period	Potential Occurrence in the Project Area[1]
	Federal	State	CNPS			
Chaparral ragwort *Senecio aphanactis*	--	--	2B.2	Chaparral, cismontane woodland, coastal scrub. Drying alkaline flats.	15-800 m; Annual herb; Blooms January to April	**Not Expected.** There is no suitable habitat present on the project site. It was not observed during April 2015 field survey; however, focused surveys were not conducted. In addition, there are no recent known records of occurrence in the vicinity of the project.. The species has an extremely low probability of being found on the project site.
Bear Valley checkerbloom *Sidalcea malviflora ssp. dolosa*	--	--	1B.2	Meadows and seeps, riparian woodland, lower montane coniferous forest, upper montane coniferous forest. Known from wet areas within forested habitats. Affected by hydrological changes.	1,495-2,685 m; Perennial herb; Blooms May to August	**Not Expected.** There is no suitable habitat present on the project site. The project site is below the known elevation range for the species. In addition, there are no recent known records of occurrence in the vicinity of the project. The species has an extremely low probability of being found on the project site.
Salt Spring checkerbloom *Sidalcea neomexicana*	--	--	2B.2	Playas, chaparral, coastal scrub, lower montane coniferous forest, Mojavean desert scrub. Alkali springs and marshes.	0-1,530 m; Perennial herb; Blooms March to June	**Not Expected.** There is no suitable habitat present on the project site. It was not observed during April 2015 field survey; however, focused surveys were not conducted. The species has an extremely low probability of being found on the project site.

Species	Status			Habitat Requirements	Elevation Range; Life Form; Blooming Period	Potential Occurrence in the Project Area[1]
	Federal	State	CNPS			
Laguna Mountains jewelflower *Streptanthus bernardinus*	--	--	4.3	Chaparral, lower montane coniferous forest. Clay or decomposed granite soils; sometimes in disturbed areas such as streamsides or roadcuts.	1,440-2,500 m; Perennial herb; Blooms May to August	**Not Expected.** There is no suitable habitat present on the project site. The project site is below the known elevation range for the species. The species has an extremely low probability of being found on the project site.
Southern jewelflower *Streptanthus campestris*	--	--	1B.3	Chaparral, lower montane coniferous forest, pinyon-juniper woodland. Open, rocky areas.	900-2,300 m; Perennial herb; Blooms July to November	**Not Expected.** There is no suitable habitat present on the project site. The project site is below the known elevation range for the species. The species has an extremely low probability of being found on the project site.
San Bernardino aster *Symphyotrichum defoliatum*	--	--	1B.2	Meadows and seeps, marshes and swamps, coastal scrub, cismontane woodland, lower montane coniferous forest, grassland. Vernally mesic grassland or near ditches, streams and springs; disturbed areas.	2-2,040 m; Perennial herb; Blooms July to November	**Not Expected.** There is no suitable aquatic habitat present on the project site. In addition, there are no recent known records of occurrence in the vicinity of the project. The species has an extremely low probability of being found on the project site.
Sonoran maiden fern *Thelypteris puberula* var. *sonorensis*	--	--	2B.2	Meadows and seeps. Along streams, seepage areas.	50-610 m; Fern; Blooms January to September	**Not Expected.** There is no suitable aquatic habitat present on the project site. The species has an extremely low probability of being found on the project site.

Species	Status			Habitat Requirements	Elevation Range; Life Form; Blooming Period	Potential Occurrence in the Project Area[1]
	Federal	State	CNPS			
Monocots						
Thread-leaved brodiaea *Brodiaea filifolia*	FT	SE	1B.1	Chaparral (openings), cismontane woodland, coastal scrub, playas, valley and foothill grassland, vernal pools. Usually associated with annual grassland and vernal pools; often surrounded by shrubland habitats. Occurs in openings on clay soils.	25-1,120 m; Perennial herb; Blooms March to June	**Not Expected.** There is no suitable habitat present on the project site. It was not observed during April 2015 field survey; however, focused surveys were not conducted. The species has an extremely low probability of being found on the project site.
Palmer's mariposa-lily *Calochortus palmeri* var. *palmeri*	--	--	1B.2	Meadows and seeps, chaparral, lower montane coniferous forest. Vernally moist places in yellow-pine forest, chaparral.	1,000-2,390 m; Perennial herb; Blooms April to July	**Not Expected.** There is no suitable moist habitat present on the project site. The project site is below the known elevation range for the species. In addition, there are no recent known records of occurrence in the vicinity of the project. The species has an extremely low probability of being found on the project site.
Plummer's mariposa-lily *Calochortus plummerae*	--	--	4.2	Coastal scrub, chaparral, valley and foothill grassland, cismontane woodland, lower montane coniferous forest. Occurs on rocky and sandy sites, usually of granitic or alluvial material. Can be very common after fire.	100-1,700 m; Perennial herb; Blooms May to July	**Low Potential.** There is limited suitable habitat present on the project site. The species has an extremely low probability of being found on the project site.
Bristly sedge *Carex comosa*	--	--	2B.1	Marshes and swamps. Lake margins, wet places; site below sea level is on a Delta island.	-5-1,005 m; Perennial herb; Blooms May to September	**Not Expected.** There is no suitable aquatic habitat present on the project site. In addition, there are no recent known records of occurrence in the vicinity of the project. The species has an extremely low probability of being found on the project site.

Species	Status			Habitat Requirements	Elevation Range; Life Form; Blooming Period	Potential Occurrence in the Project Area[1]
	Federal	State	CNPS			
Hot springs fimbristylis *Fimbristylis thermalis*	--	--	2B.2	Meadows (alkaline). Near hot springs.	110-1,340 m; Perennial herb, Blooms July to September	**Not Expected.** There is no suitable habitat present on the project site. The species has an extremely low probability of being found on the project site.
California satintail *Imperata brevifolia*	--	--	2B.1	Coastal scrub, chaparral, riparian scrub, Mojavean scrub, meadows and seeps (alkali), riparian scrub. Mesic sites, alkali seeps, riparian areas.	0-1,215 m; Perennial herb; Blooms September to May	**Not Expected.** There is no suitable mesic, alkali seep, or riparian habitat present on the project site. The species has an extremely low probability of being found on the project site.
Lemon lily *Lilium parryi*	--	--	1B.2	Lower montane coniferous forest, meadows and seeps, riparian forest, upper montane coniferous forest. Wet, mountainous terrain; generally in forested areas; on shady edges of streams, in open boggy meadows and seeps.	1,220-2,745 m; Perennial herb; Blooms July to August	**Not Expected.** There is no suitable aquatic habitat present on the project site. The project site is below the known elevation range for the species. The species has an extremely low probability of being found on the project site.
Black bog-rush *Schoenus nigricans*	--	--	2B.2	Marshes and swamps. Often in alkaline marshes.	150-2,000 m; Perennial herb; Blooms August to September	**Not Expected.** There is no suitable aquatic habitat present on the project site. The species has an extremely low probability of being found on the project site.
Prairie wedge grass *Sphenopholis obtusata*	--	--	2B.2	Cismontane woodland, meadows and seeps. Open moist sites, along rivers and springs, alkaline desert seeps.	300-2,000 m; Perennial herb; Blooms April to July	**Not Expected.** There is no suitable moist or alkaline habitat present on the project site. The project site is below the known elevation range for the species. In addition, there are no recent known records of occurrence in the vicinity of the project. The species has an extremely low probability of being found on the project site.

STATUS KEY:

Federal

FE: Federally-listed Endangered

FT: Federally-listed Threatened

State

CE: California-listed Endangered

CT: California-listed Threatened

California Native Plant Society (CNPS)**:**

1B: Plants listed as rare, threatened, or endangered in California and elsewhere

2B: Plants rare, threatened, or endangered in California, but more common elsewhere

3: Plants about which we need more information

CNPS added a decimal threat rank to the List rank to parallel that used by the CNDDB. This extension replaces the E (Endangerment) value from the R-E-D Code. CNPS ranks therefore read like this : 1B.1, 1B.2, etc. Threat code extensions and their meanings are as follows:

.1 – Seriously endangered in California (over 80% of occurrences threatened / high degree of immediacy of threat)

.2 – Fairly endangered in California (20-80% occurrences threatened)

.3 – Not very endangered in California (<20% of occurrences threatened or no current threats known)

SOURCES:

1 Calflora and the California Native Plant Society Rare and Endangered Plant Inventory was used to identify preferred habitat for each species

2 CNDDB records are from CNDDB 2015

Source: Site Visit on April 7, 2015 & Google Earth, 2015

Appendix B: Representative Photographs

Center Street Commerce Building
6055 Center Street, Riverside, California

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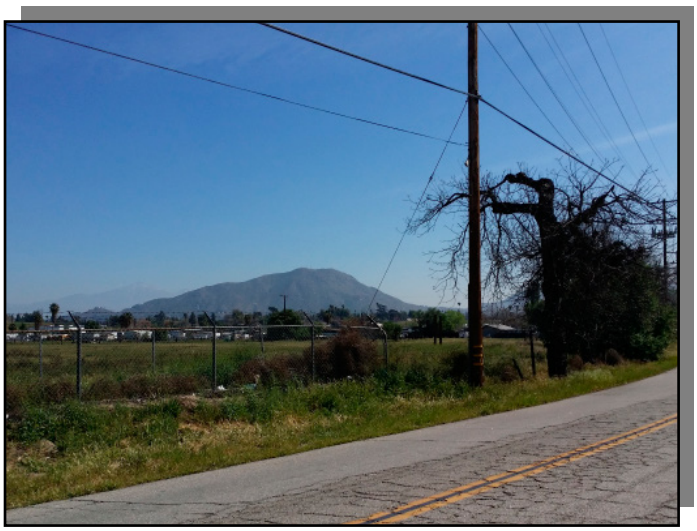

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Birds

Blackchinned hummingbird (*Archilochus alexandri*)
Black phoebe (*Sayornis nigricans*)
Chicken (*Gallus sp.*)
Common raven (*Corvus corax*)
European starling (*Sturnus vulgaris*)
House finch (*Carpodacus mexicanus*)
House sparrow (*Passer domesticus*)
Lesser goldfinch (*Spinus psaltria*)
Mourning dove (*Zenaida macroura*)
Northern mockingbird (*Mimus polyglottus*)
Unknown blackbird (*Euphagus sp.*)
White-crowned sparrow (*Zonotrichia leucophrys*)

Plants

Black mustard (*Brassica nigra*)
Bromus (*Bromus sp.*)
Brazilian peppertree (*Schinus molle*)
Chinaberry tree (*Melia azedarach*)
Cheeseweed (*Malva parviflora*)
Cottonwood tree (*Populus sp.*)
Elderberry (*Sambucus mexicana*)
Fiddleneck (*Amsinckia menzi esii* var. *intermedia)*
Hackberry tree (*Celtis sp.*)
Hordeum (*Hordeum sp.*)
Medusa head (*Elymus caput-medusae*)
Napa star thistle (*Centaurea melitensis*)

Appendix D: USFWS Official Species List

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Carlsbad Fish and Wildlife Office
2177 SALK AVENUE - SUITE 250
CARLSBAD, CA 92008
PHONE: (760)431-9440 FAX: (760)431-5901
URL: www.fws.gov/carlsbad/

Consultation Code: 08ECAR00-2015-SLI-0474 June 11, 2015
Event Code: 08ECAR00-2015-E-00916
Project Name: Placentia Lane and Center Street

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, and proposed species, designated critical habitat, and candidate species that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment

United States Department of Interior
Fish and Wildlife Service

Project name: Placentia Lane and Center Street

Official Species List

Provided by:

Carlsbad Fish and Wildlife Office
2177 SALK AVENUE - SUITE 250
CARLSBAD, CA 92008
(760) 431-9440
http://www.fws.gov/carlsbad/

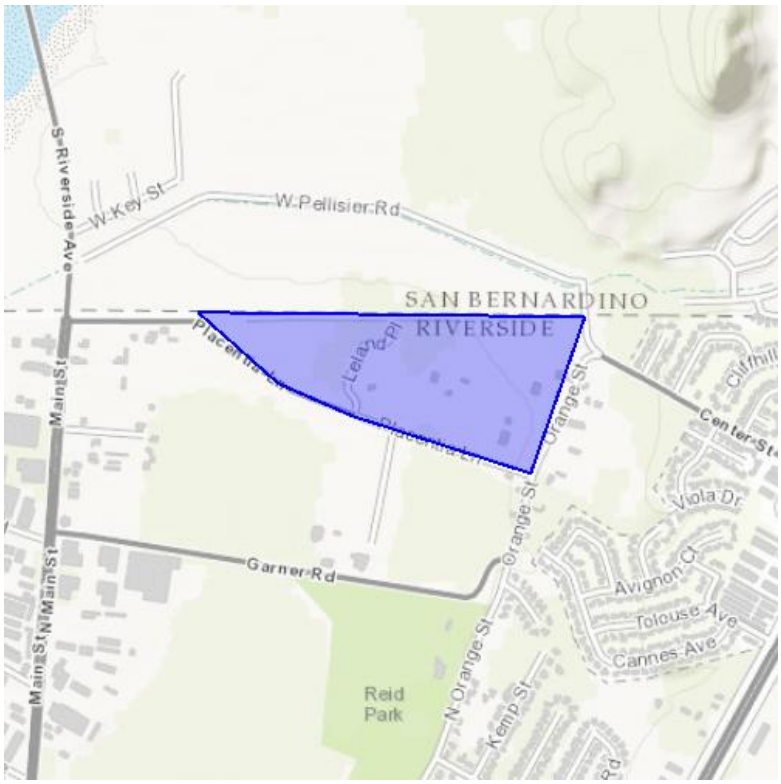
Consultation Code: 08ECAR00-2015-SLI-0474
Event Code: 08ECAR00-2015-E-00916

Project Type: DEVELOPMENT

Project Name: Placentia Lane and Center Street
Project Description: Warehouse

Please Note: The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.

Project Location Map:



Project Coordinates: MULTIPOLYGON (((-117.3592185974121 34.01949663128572, -117.35718011856079 34.01798488157339, -117.35527038574217 34.01729124622434, -117.35078573226929 34.01609960303349, -117.34941244125366 34.01938992042448, -117.3592185974121 34.01949663128572)))

Project Counties: Riverside, CA | San Bernardino, CA

United States Department of Interior
Fish and Wildlife Service

Project name: Placentia Lane and Center Street

Endangered Species Act Species List

There are a total of 11 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

Birds	**Status**	**Has Critical Habitat**	**Condition(s)**
Coastal California gnatcatcher *(Polioptila californica californica)* Population: Entire	Threatened	Final designated	
Least Bell's vireo *(Vireo bellii pusillus)* Population: Entire	Endangered	Final designated	
Southwestern Willow flycatcher *(Empidonax traillii extimus)* Population: Entire	Endangered	Final designated	
Fishes			
Santa Ana sucker *(Catostomus santaanae)* Population: 3 CA river basins	Threatened	Final designated	
Flowering Plants			
Gambel's watercress *(Rorippa gambellii)*	Endangered		
San Diego ambrosia *(Ambrosia pumila)*	Endangered	Final designated	

Santa Ana River woolly-star *(Eriastrum densifolium ssp. sanctorum)*	Endangered		
Slender-Horned spineflower *(Dodecahema leptoceras)*	Endangered		
Insects			
Delhi Sands flower-loving fly *(Rhaphiomidas terminatus abdominalis)* Population: Entire	Endangered		
Mammals			
San Bernardino Merriam's kangaroo rat *(Dipodomys merriami parvus)* Population: Entire	Endangered	Final designated	
Stephens' kangaroo rat *(Dipodomys stephensi)* Population: Entire	Endangered		

Critical habitats that lie within your project area

There are no critical habitats within your project area.

Appendix D Historical/Archaeological Resources Survey Report

HISTORICAL/ARCHAEOLOGICAL RESOURCES SURVEY REPORT

CENTER STREET COMMERCE BUILDING PROJECT

APNs 246-040-027, 246-040-028, 246-070-002, and 246-070-017
City of Riverside, Riverside County, California

For Submittal to:

Planning Division
Community Development Department
City of Riverside
3900 Main Street
Riverside, CA 92522

Prepared for:

MIG/Hogle-Ireland
1500 Iowa Avenue, Suite 110
Riverside, CA 92501

Prepared by:

CRM TECH
1016 E. Cooley Drive, Suite A/B
Colton, CA 92324

Bai "Tom" Tang, Principal Investigator
Michael Hogan, Principal Investigator

June 15, 2015
CRM TECH Contract No. 2901

Title: Historical/Archaeological Resources Survey Report: Center Street Commerce Building Project, APNs 246-040-027, 246-040-028, 246-070-002, and 246-070-017, City of Riverside, Riverside County, California

Author(s): Bai "Tom" Tang, Principal Investigator
Terri Jacquemain, Historian/Architectural Historian
Daniel Ballester, Archaeologist

Consulting Firm: CRM TECH
1016 E. Cooley Drive, Suite A/B
Colton, CA 92324
(909) 824-6400

Date: June 15, 2015

For Submittal to: Planning Division
Community Development Department
City of Riverside
3900 Main Street
Riverside, CA 92522
(951) 826-5371

Prepared for: Christopher Brown
MIG/Hogle-Ireland
1500 Iowa Avenue, Suite 110
Riverside, CA 92501
(951) 787-9222, ext. 838

USGS Quadrangle: San Bernardino South, Calif., 7.5' quadrangle; T2S R5W, San Bernardino Baseline and Meridian; within the Rancho Jurupa (Stearns) land grant

Project Size: Approximately 15.63 acres

Keywords: Northeast Riverside; Phase I cultural resources survey; 3667 Placentia Lane; Site 33-006973; circa 1920s Spanish Eclectic-style single-family residence with a secondary residence, garage, metal barn, wooden shed, and animal hutch; no "historical resources" under CEQA provisions

MANAGEMENT SUMMARY

In March and April 2015, at the request of MIG/Hogle-Ireland, CRM TECH performed a cultural resources study on approximately 15.63 acres of mostly undeveloped land in the northeastern portion of the City of Riverside, Riverside County, California. The subject property of the study consists of Assessor's Parcel Nos. 246-040-027, 246-040-028, 246-070-002, and 246-070-017, located to the west of Orange Street and between Placentia Lane and Center Street, in a portion of the Rancho Jurupa (Stearns) land grant lying within T2S R5W, San Bernardino Baseline and Meridian.

The study is part of the environmental review process for the proposed construction of a 308,000-square-foot commercial building on the property, which will require the removal of all existing buildings and structures. The City of Riverside, as the lead agency for the project, required the study in compliance with the California Environmental Quality Act (CEQA) and the City's Cultural Resources Ordinance. The purpose of the study is to provide the City with the necessary information and analysis to determine whether the proposed project would cause substantial adverse changes to any "historical resources," as defined by CEQA, that may exist in or around the project area. In order to identify such resources, CRM TECH conducted a cultural resources records search, pursued historical background research, contacted Native American representatives, and carried out a systematic field survey.

The results of these research procedures indicate that 33-006973, a previous recorded historic-period site in the California Historical Resources Inventory, is located within the project area. The site was first recorded in 1982 as a circa 1920s Spanish Eclectic-style single-family residence located at 3667 Placentia Lane. During this study, Site 33-006973 was expanded to include five other associated buildings. The site does not appear to meet any of the criteria for listing in the National Register of Historic Places or the California Register of Historical Resources, nor for local designation by the City of Riverside. Therefore, Site 33-006973 does not meet CEQA's definition of a "historical resource."

No other potential "historical resources" were encountered during the course of this study. Based on these findings, CRM TECH recommends to the City of Riverside a determination of *No Impact* regarding cultural resources. No further cultural resources investigation is recommended for the project unless development plans undergo such changes as to include areas not covered by this study. However, if buried cultural materials are encountered during earth-moving operations associated with the project, all work in that area should be halted or diverted until a qualified archaeologist can evaluate the nature and significance of the finds.

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INTRODUCTION

In March and April 2015, at the request of MIG/Hogle-Ireland, CRM TECH performed a cultural resources study on approximately 15.63 acres of mostly undeveloped land in the northeastern portion of the City of Riverside, Riverside County, California (Fig. 1). The subject property of the study consists of Assessor's Parcel Nos. (APN) 246-040-027, 246-040-028, 246-070-002, and 246-070-017, located to the west of Orange Street and between Placentia Lane and Center Street, in a portion of the Rancho Jurupa (Stearns) land grant lying within T2S R5W, San Bernardino Baseline and Meridian (Fig. 2).

The study is part of the environmental review process for the proposed construction of a 308,000-square-foot commercial building on the property (Fig. 3), which will require the removal of all existing buildings and structures. The City of Riverside, as the lead agency for the project, required the study in compliance with the California Environmental Quality Act (CEQA; PRC §21000, et seq.) and the City's Cultural Resources Ordinance (Title 20, Riverside Municipal Code). The purpose of the study is to provide the City with the necessary information and analysis to determine whether the proposed project would cause substantial adverse changes to any "historical resources," as defined by CEQA, that may exist in or around the project area.

In order to identify such resources, CRM TECH conducted a cultural resources records search, pursued historical background research, contacted Native American representatives, and carried out a systematic field survey. The following report is a complete account of the methods, results, and final conclusion of the study.

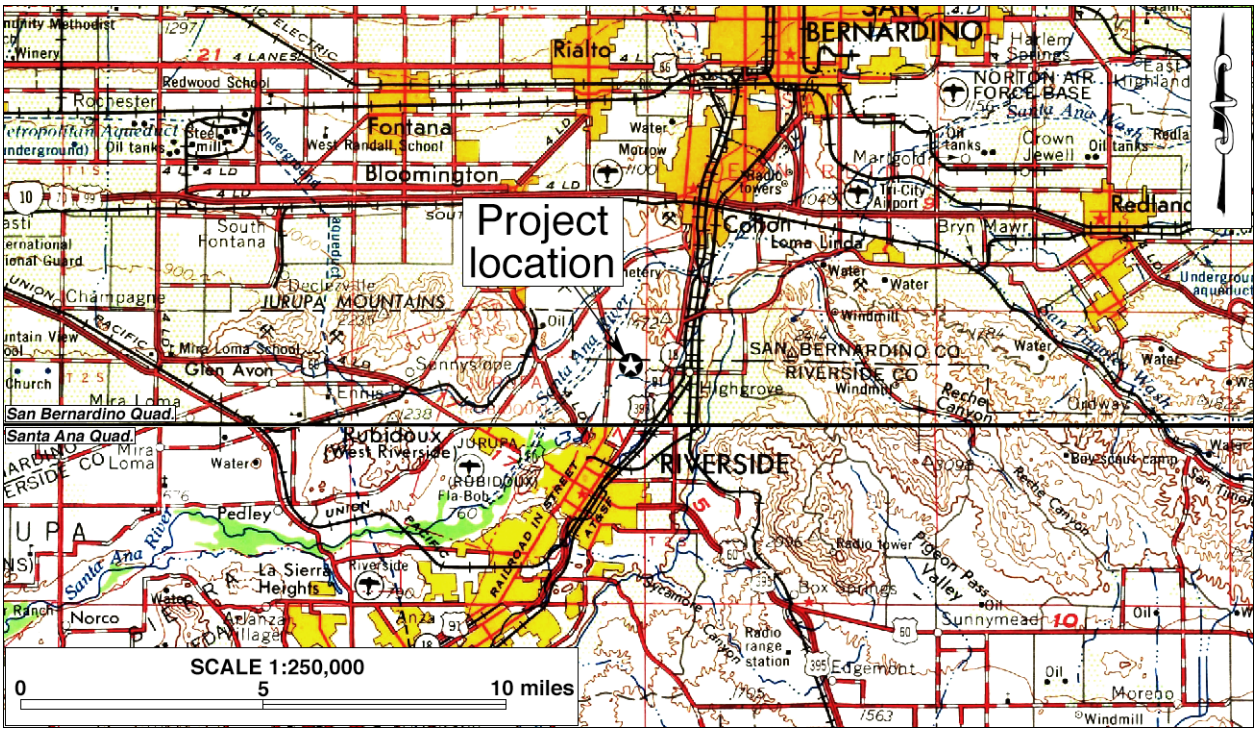

Figure 1. Project vicinity. (Based on USGS San Bernardino and Santa Ana, Calif., 1:250,000 quadrangles [USGS 1969; 1979])

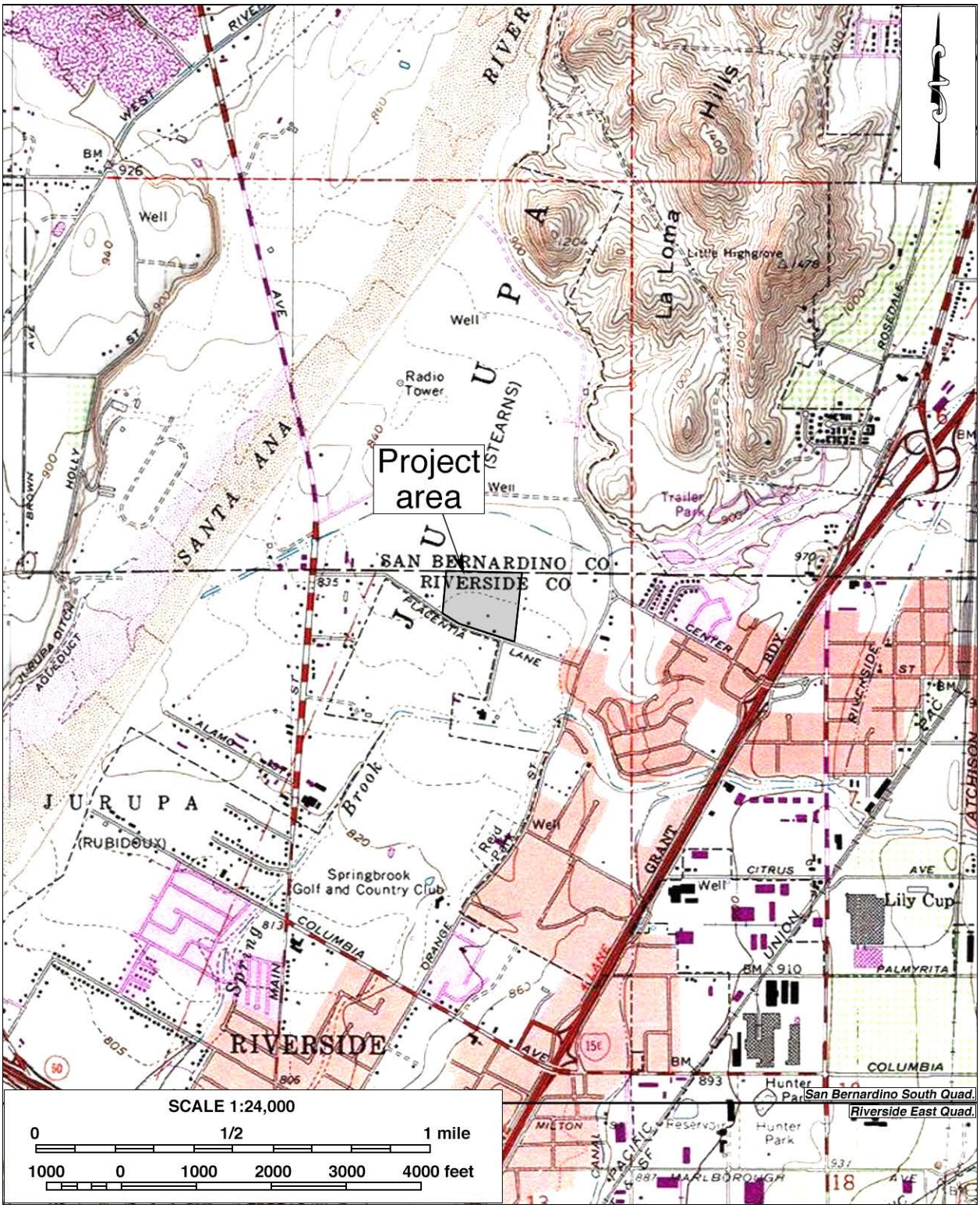

Figure 2. Project location. (Based on USGS Riverside East and San Bernardino South, Calif., 1:24,000 quadrangles [USGS 1980a; 1980b])

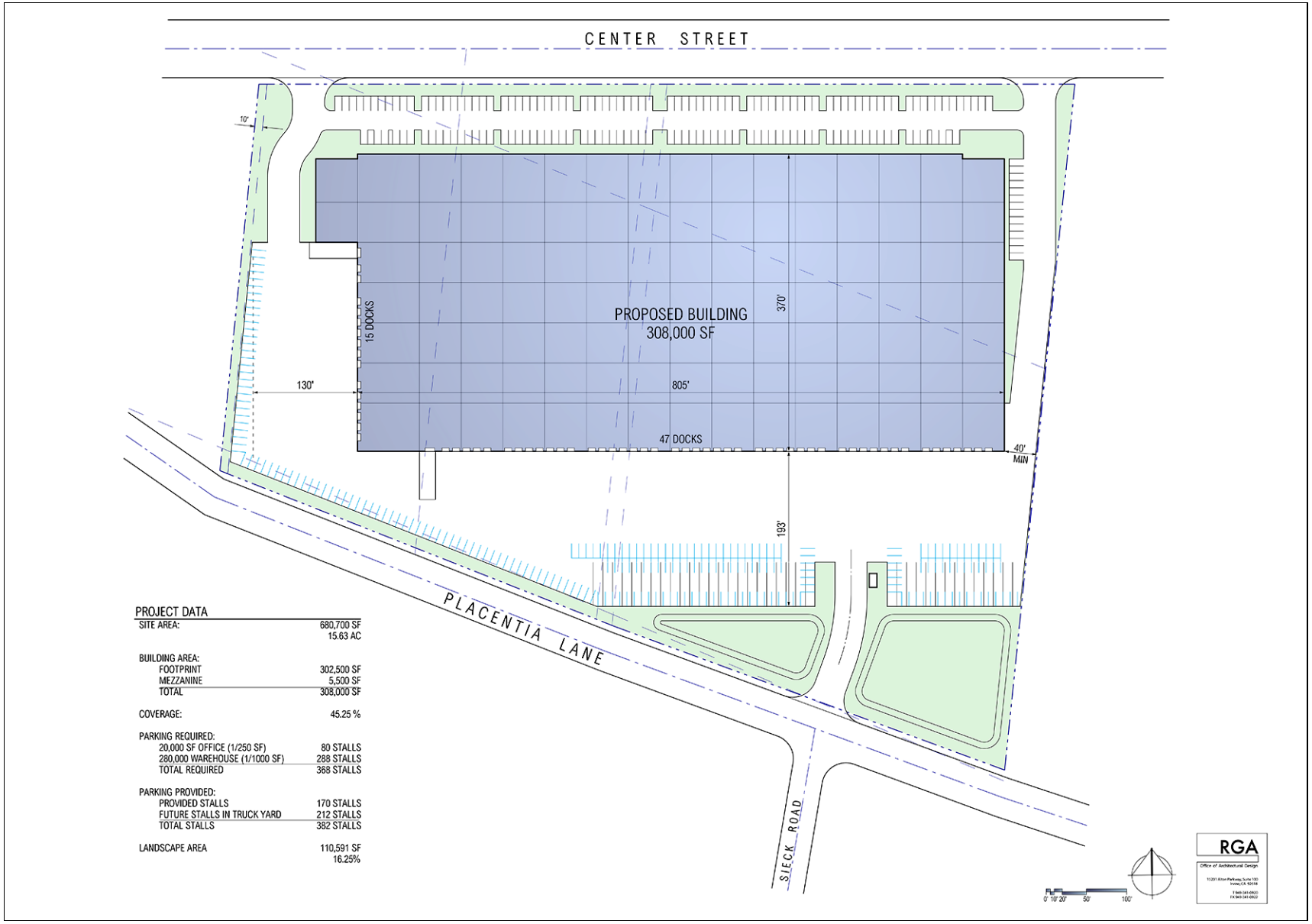

Figure 3. Project site plan.

SETTING

CURRENT NATURAL SETTING

The City of Riverside is situated within the Transverse Ranges geomorphic province, which features broad inland valleys separated by groups of rolling hills and rocky knolls. The province is surrounded by the Santa Ana Mountains on the southwest, the San Jacinto Mountains on the southeast, and the convergence of the San Gabriel and San Bernardino Mountain Ranges on the north. The prevailing Mediterranean climate is characterized by hot, dry summers and mild, wet winters.

The project is situated in a rural area on the northern edge of the city and in close proximity to the unincorporated community of Highgrove, bounded by Center Street on the north and Placentia Lane on the south. Adjacent land uses include a towing yard on the east, a materials storage yard on the north, a pumping station and a sports park on the south, and large stretches of vacant land on the west and the south. Several dilapidated structures are present on the southeast portion of the property, including two residences, a garage, a large metal barn, a small wooden shed, and a partially collapsed animal hutch. The terrain is relatively level, with elevations ranging around 830-850 feet above mean sea level. Vegetation observed in the vicinity consisted of foxtails, sycamores, pepper trees, tumbleweeds, and small grasses and brush (Fig. 4).

CULTURAL SETTING

Prehistoric Context

It is widely acknowledged that human occupation in what is now the State of California began 8,000-12,000 years ago. In attempting to describe and understand the cultural processes that occurred in the ensuing years, archaeologists have developed chronological frameworks that endeavor to correlate the technological and cultural changes that are observable in archaeological records to distinct time periods. Unfortunately, none of these chronological frameworks has been widely accepted, and none has been developed specifically for the Inland Empire region, the nearest ones being for the Colorado Desert and Peninsular Ranges area (Warren 1984) and for the Mojave Desert (Warren and Crabtree 1986).

Figure 4. Overview of the project area, view to the south *(left)* and to the west (*right)*. (Photographs taken on March 12, 2015)

The development of an overall chronological framework for the region is hindered by the lack of distinct stratigraphic layers of cultural sequences that could be dated by absolute dating methods to provide reliable dates. Since results from archaeological investigations in this region have yet to be synthesized into an overall chronological framework, most archaeologists tend to follow a chronology adapted from a scheme developed by William J. Wallace in 1955 and modified by others (Wallace 1955; 1978; Warren 1968; Chartkoff and Chartkoff 1984; Moratto 1984). Although the beginning and ending dates of the different horizons or periods may vary, the general framework of prehistory in this region under this chronology consists of the following four periods:

- Early Hunting Stage (ca. 10000 BC-6000 BC), which was characterized by human reliance on big game animals, as evidenced by large, archaic-style projectile points and the relative lack of plant-processing artifacts;
- Millingstone Horizon (ca. 6000 BC-1000 AD), when plant foods and small game animals came to the forefront of subsistence strategy, and from which a large number of millingstones, especially well-made, deep-basin metates, were left;
- Late Prehistoric Period (ca. 1000-1500 AD), during which a more complex social organization, a more diversified subsistence base—as evidenced by smaller projectile points, expedient millingstones and, later, pottery—and regional cultures and tribal territories began to develop;
- Protohistoric Period (ca. 1500-1700s AD), which ushered in long-distance contact with Europeans, and thereby led to the Historic Period.

Ethnohistoric Context

The City of Riverside lies in an area where, at least during the Late Prehistoric and Protohistoric periods, the traditional territories of three Native American groups overlap: the Serrano of the San Bernardino Mountains, the Luiseño of the Perris-Elsinore region, and the Gabrielino of the San Gabriel Valley. Kroeber (1925:Plate 57) suggests that the Native Americans of the Riverside area were probably Luiseño, Reid (1968:8-9) states that they were Serrano, and Strong (1929:7-9, 275) claims that they were Gabrielino. In any case, there also occurred a late influx of Cahuilla during the 19th century (Bean 1978).

Whatever the linguistic affiliation, Native Americans in the Riverside area exhibited similar social organization and resource procurement strategies. Villages were based on clan or lineage groups. Their home/base sites are marked by midden deposits, often with bedrock mortar features. During their seasonal rounds to exploit plant resources, small groups would migrate within their traditional territory in search of specific plants and animals. Their gathering strategies often left behind signs of special use sites, usually grinding slicks on bedrock boulders, at the locations of the resources.

Historic Context

The present-day Riverside area received its first European visitors during the early and mid-1770s, shortly after the beginning of Spanish colonization of Alta California in 1769. After the establishment of Mission San Gabriel in 1771, the area became one of the mission's principal *rancherías*, known at the time as Jurupa. Despite these early contacts, no Europeans are known to have settled in the area until after the creation of the Rancho Jurupa land grant in 1838, during secularization of the mission system.

The land grant, which encompassed what is now the northern portion of the City of Riverside, including the project area, was awarded to Juan Bandini, who served as the administrator of Mission San Gabriel and all its lands at the time. Within a few years, Bandini divided his vast domain into two parts and sold them to two prominent Yankee-turned-*ranchéros*. As a result, after the annexation of Alta California by the United States in 1848, the original land grant was confirmed as two separate entities, the 6,750-acre Rancho Jurupa (Rubidoux) and the 25,519-acre Rancho Jurupa (Stearns). As mentioned above, the project area lies within the boundaries of Rancho Jurupa (Stearns).

The town of Riverside was founded in 1870 on portions of both Rancho Jurupa (Rubidoux) and Rancho Jurupa (Stearns), and incorporated as a city in 1883. Highgrove was initially conceived as Riverside Heights during the mid-1880s, but later became known by a host of other short-lived names, including Merrill, Citrus, and East Riverside, before the current name was finally adopted in 1897. Both communities owe much of their early growth to the successful introduction of the naval orange in Riverside in the mid-1870s, which quickly turned citrus fruits into the leading staple crop in southern California and propelled Riverside to the forefront of the citrus industry.

Historically, the project area is part of La Placita de los Trujillos ("the little village of the Trujillos"), the earliest community in what is now Riverside County. The village was founded in 1845 when a group of hispanicized Indian families from New Mexico, led by Lorenzo Trujillo, settled on land donated by Juan Bandini in exchange of protection from hostile Indian raiders. Later, La Placita and Agua Mansa, its twin community founded in 1846 on the opposite side of the Santa Ana River, became known collectively as San Salvador, after the name of the local Catholic parish, but were more commonly referred to by Anglo-American settlers' as Spanishtown. In 1862, both villages were destroyed by flood, and were subsequently rebuilt on higher ground.

By 1893, the young city of Riverside had grown into enough of a local political force to split itself from San Bernardino County, bringing the southern portions of Highgrove and La Placita into the newly created Riverside County. For much of the century since then, Highgrove has maintained its citrus-dominated economy and life-style on the rural periphery of the gradually urbanizing Riverside. La Placita, in the meantime, all but disappeared as a distinctive community, as its residents gradually moved away and its land eventually consolidated into a few larger ranches. During the recent decades, the forces of urbanization have irreversibly begun to transform the landscape in the vicinity of the project area, much as elsewhere throughout southern California.

RESEARCH METHODS

RECORDS SEARCH

On March 5 and 6, 2015, CRM TECH archaeologist Nina Gallardo (see App. 1 for qualifications) completed the records search at the Eastern Information Center (EIC), University of California, Riverside, and the Archaeological Information Center(AIC), San Bernardino County Museum, Redlands. The EIC and the AIC are the State of California's official repositories of cultural resources records for the Counties of Riverside and San Bernardino, respectively, and the dual-county records search was necessitated by the project location adjacent to the county line.

During the records search, Gallardo examined maps and records on file at the EIC and the AIC for previously identified cultural resources in or near the project area and existing cultural resources reports pertaining to the vicinity. Previously identified cultural resources include properties designated as California Historical Landmarks, Points of Historical Interest, Riverside or San Bernardino County Landmarks, as well as those listed in the National Register of Historic Places, the California Register of Historical Resources, or the California Historical Resources Inventory.

NATIVE AMERICAN PARTICIPATION

On March 5, 2015, CRM TECH submitted a written request to the State of California's Native American Heritage Commission for a records search in the commission's sacred lands file. Following the commission's recommendations, on March 18 CRM TECH further contacted a total of 26 tribal representatives in the region in writing to solicit local Native American input regarding any potential cultural resources concerns over the proposed project. The correspondences between CRM TECH and the Native American representatives are attached to this report in Appendix 2.

HISTORICAL RESEARCH

Historical background research for this study was conducted by CRM TECH historian/architectural historian Terri Jacquemain (see App. 1 for qualifications) on the basis of published literature in local and regional history and historic maps of the Riverside area. Among maps consulted for this study were the U.S. General Land Office's (GLO) land survey plat map dated 1873-1886 and the U.S. Geological Survey's (USGS) topographic maps dated 1901-1980. These maps are collected at the Science Library of the University of California, Riverside, and the California Desert District of the U.S. Bureau of Land Management, located in Moreno Valley.

After the identification of historic-era buildings in the project area, Jacquemain pursued more specific and in-depth research on the history of these buildings. Sources consulted during this phase of the research included primarily the archival records of the County of Riverside and the City of Riverside, particularly property tax assessment records, building safety records, cultural resources records maintained by the City, along with materials on file at the local history section of the Riverside Public Library, Central Branch.

FIELD SURVEY

On March 12, 2015, CRM TECH archaeologist Daniel Ballester (see App. 1 for qualifications) carried out the archaeological field survey of the project area. Most of the survey was completed at an intensive level by walking parallel north-south and east-west transects spaced 15 meters (approx. 50 feet) apart wherever possible. Areas of exceptionally dense vegetation were spot-checked. In this way, the ground surface in the project area was carefully examined for any evidence of human activities dating to the prehistoric or historic period (i.e., 45 years or older). Ground visibility was poor (0-50%) at the time of the survey due to dense vegetation growth on most of the property.

On March 30, Terri Jacquemain conducted a field inspection of all existing buildings in the project area and performed field recordation procedures on those that appeared to be more than 45 years old and retained at least a recognizable level of historical characteristics. In order to facilitate the proper

recordation and evaluation of the historic-period buildings, Jacquemain made detailed notations and preliminary photo-documentation of their structural and architectural characteristics and current conditions. The resulting field data were then compiled into the appropriate site record forms and submitted to the EIC for inclusion in the California Historical Resources Inventory.

RESULTS AND FINDINGS

RECORDS SEARCH

According to EIC and AIC records, the project area had not been surveyed systematically for cultural resources prior to this study, but was included in the scope of a large-scale archaeological sensitivity assessment in 2003. Based on background research and a reconnaissance-level field survey, that study concluded that undeveloped or sparsely developed land in the project vicinity–i.e., along the Santa Ana River–should be considered sensitive for archaeological resources from both the prehistoric and the historic periods (Doan et al. 2003:17).

Outside the project boundaries but within a one-mile radius, AIC and EIC records show more than 40 other previous studies covering various tracts of land and linear features. As a result of these and other similar studies in the vicinity, 7 prehistoric sites, 27 historic-period sites, 3 "pending" sites, and 5 isolates–i.e, localities with fewer than three artifacts–were previously identified within the scope of the records search. One of the historic-period sites, designated 33-006973, represents a residence at 3667 Placentia Lane, which is located within the project area on APN 246-070-002. Described as being "typical of smaller houses in the Mediterranean/Spanish Revival style," the residence was recorded in 1982 during a countywide cultural resources reconnaissance sponsored by the Riverside County Historical Commission (Newman 1982).

All of the prehistoric sites recorded within the one-mile radius consisted of bedrock-milling features clustered around the La Loma Hills, to the northeast of the project location. The historic-period sites, including the "pending" sites, comprised single-family residences, irrigation canals, wells, and refuse scatters. Of the five isolates, three were prehistoric groundstone artifacts and two were historic-period refuse items. Site 33-006973 will be discussed further below. None the other recorded cultural resources was located within or adjacent to the project area, and thus none of them requires further consideration during this study.

NATIVE AMERICAN PARTICIPATION

In response to CRM TECH's inquiry, the Native American Heritage Commission reports in a letter dated March 17, 2015, that the sacred lands record search identified no Native American cultural resources within the project area, but recommends that local Native American groups be contacted for further information. For that purpose, the commission provided a list of potential contacts in the region (see App. 2).

Upon receiving the NAHC's response, CRM TECH sent written requests for comments to all 23 individuals on the referral list and the organizations they represent (see App. 2). In addition, as referred by these tribal representatives or appropriate tribal government staff, the following individuals were also contacted:

- Rob Roy, Environmental Director, La Jolla Band of Luiseño Indians;
- Raymond Huaute, Cultural Resource Specialist, Morongo Band of Mission Indians;
- Jim McPherson, Manager, Culture Resources Department of the Rincon Band of Luiseño Indians.

As of this time, three of the tribal representatives contacted have provided written responses (see App. 2). In a letter dated March 23, 2015, Raymond Huaute states that the tribe is not aware of any cultural resources within the project boundaries, but requests the implementation of the tribe's "Standard Development Conditions" to ensure proper treatment of Native American cultural remains, including human remains, encountered during the project (see App. 2).

Shasta Gaughen, Tribal Historic Preservation Officer for the Pala Band of Mission Indians and Assistant Director of the Kupa Cultural Center, states in a letter dated March 25 that the Pala Band will defer to other tribes in closer proximity to the project area. Responding on behalf of the Pauma Band of Luiseño Indians by e-mail on March 31, Tribal Cultural Clerk Chris Devers states that the Pauma Band has no specific information on any cultural in the project vicinity, but recommends archaeological and Native American monitoring of all ground-disturbing activities during the project (see App. 2).

HISTORICAL RESEARCH

As mentioned above, La Placita de Los Trujillos, the community that the project location is traditionally considered a part of, was established in 1845, destroyed by flood in 1862, and subsequently rebuilt on higher ground. The re-born village of La Placita extended across both sides of the line between San Bernardino and Riverside Counties when the latter county was created in 1893 (Gunther 1984:285). In the 1890s, a total of 19 houses were known to be in the Riverside County portion of the village, mostly to the east of the project area and scattered along present-day Orange Street (County Assessor 1892-1895; Fig. 5). By 1905, however, the Spanish-speaking community of La Placita had lost much of its separate community character (Patterson 1996:357).

Archival records of the Riverside County Assessor's Office reveal that building first occurred in the project area around 1912, when owner Henry Camp was assessed $50 for improvements on APN 246-070-002, the only parcel in the project to have been taxed for improvement value (see Table 1). Newman (1982:1) estimates that the main residence on that parcel (Site 33-006973) was built in 1922, but a significant increase in improvement value between 1924 and 1926 suggests a more likely construction date in the mid-1920s, when the parcel was under the ownership of C.G. Martini (County Assessor 1921-1926). In any case, two buildings were known to be present at the location of Site 33-006973 on the north side of Placentia Lane by the mid-1930s, when Martha Milford was listed as the property owner (Fig. 6; Table 1).

Neither Martini nor Milford appears to have resided at this location, according to local directories. In fact, of the owners listed in Table 1, only three were found in local directories, namely Densmore, Field, and Martini, and among these only Densmore was listed as a resident at this address (Directory 1915-1926). The density of development in the La Placita area gradually increased during the ensuing decades, but despite being annexed by the City of Riverside in 1990, the rural character of the project vicinity has remained largely changed to the present time (Figs. 2, 7, 8).

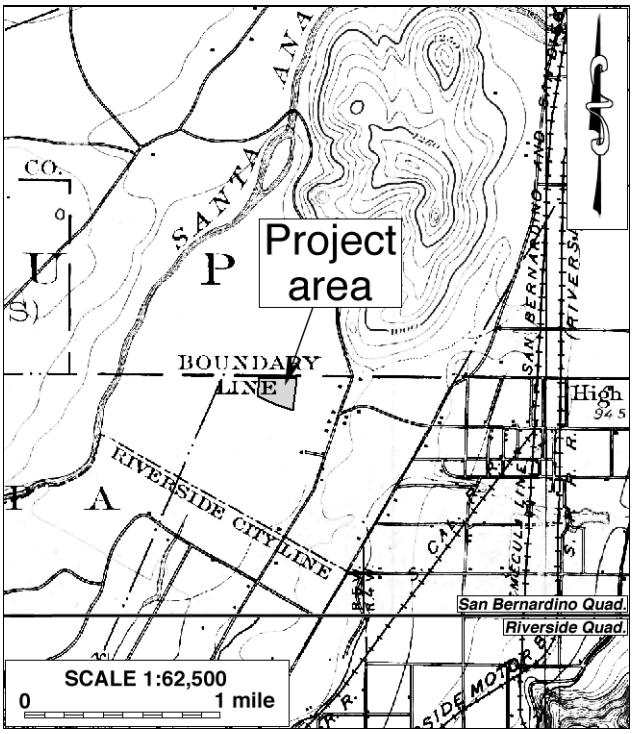

Figure 5. The project area and vicinity in 1893-1897. (Source: USGS 1901a; 1901b)

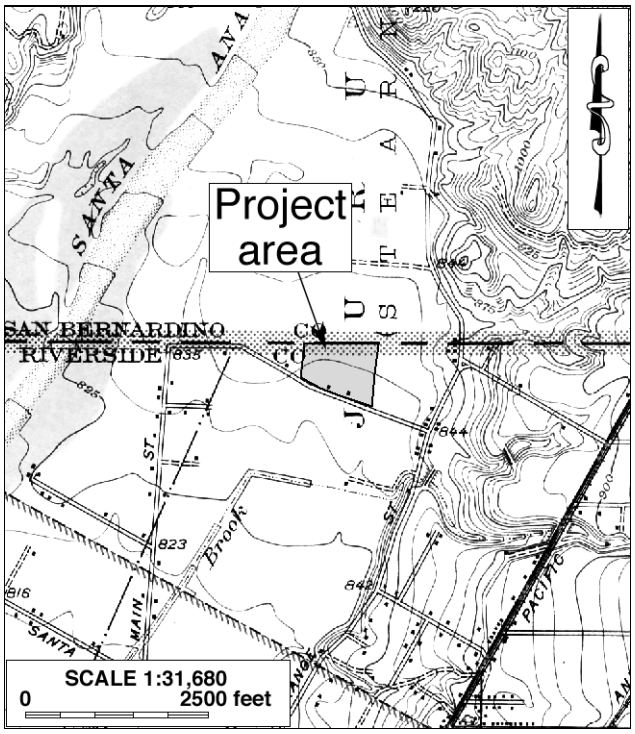

Figure 6. The project area and vicinity in 1936-1938. (Source: USGS 1943)

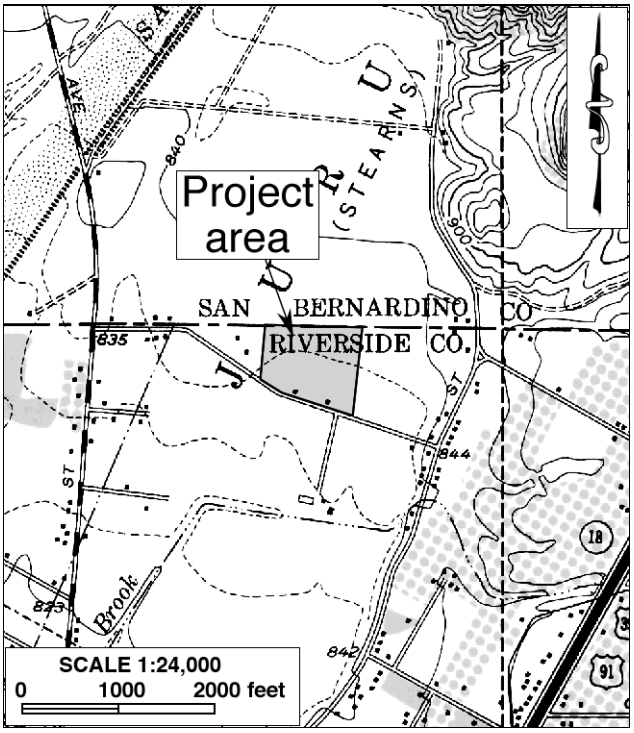

Figure 7. The project area and vicinity in 1952-1954. (Source: USGS 1954)

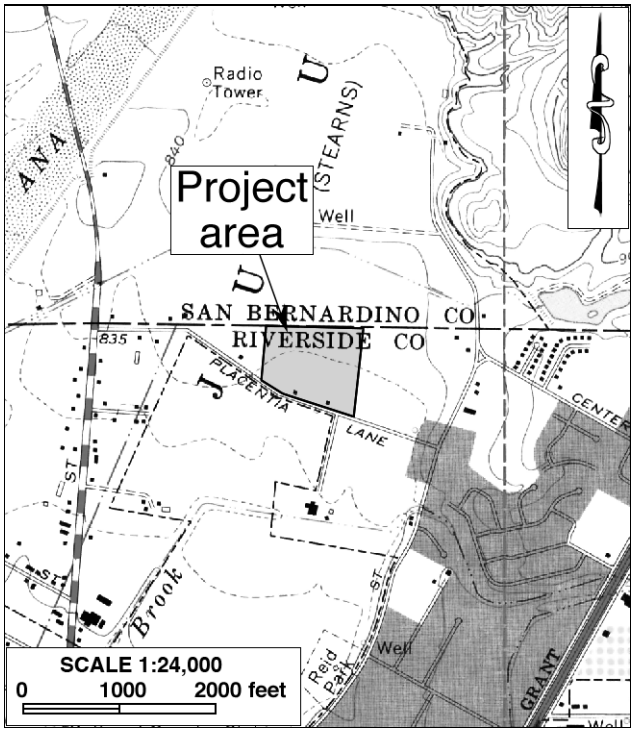

Figure 8. The project area and vicinity in 1966-1967. (Source: USGS 1967)

Table 1. Real Property Tax Assessment History for APN 246-070-002*			
Year	**Owner**	**Value of Land**	**Value of Improvements**
1907	Luz Atencio Trujillo	$90	$0
1908	J.C. Merritt	$90	$0
1909	Henry J. Camp	$90	$0
1910	Henry J. Camp	$120	$0
1911	Henry J. Camp	$120	$0
1912-1914	Henry J. Camp	$360	$50
1915	C.S. Densmore	$360	$50
1916	Nettie R. Stratten	$360	$50
1917-1920	Myrtle A. Field	$360	$80
1920	Roy P. Storie	$360	$80
1921-1922	Jose Palmerie (?)	$360	$80
1923	Robert J. McArthur	$360	$80
1924-1926	C.G. Martini	$360	$130-$660
1927-1928	David Forrest	$200	$660
1929	F.J. Tacharner	$280	$660
1930	J.P. Ramsey	$250	$660
1931	J.L. Dodson and L.I. Meyer	$250	$600.
1932-1944	Martha C. Milford	$200	$450-$660
1945	George J. and Irene Morgenstern	$300	$720
1946-1949	George J. Morgenstern and Cornelia A. Hill	$300	$1190-$1200-$2060
1950-1961	Robert J. Hanchett	$720	$2060-$2310

*Source: Riverside County Assessor's real property tax assessment records

FIELD SURVEY

The field survey of the project area confirmed that the building previously recorded as Site 33-006973, a 1920s-era Spanish Eclectic-style single-family residence, remains in existence in the project area at 3667 Placentia Lane. In 1982, Newman (1982:1) offered the following description of the residence:

> Sitting in the middle of farmland is this flat-roofed Mediterranean/Spanish Revival style house in fair condition. Two rooms in the front of the house project forward, each covered with a gable roof. The roofing is of red tiles. Arched windows enhance the appearance of this house.

Newman (1982:2) further noted that the residence had undergone major alterations and that it was accompanied by at least one shed. During the current field survey, this one-story stucco building was found to be suffering the effects of neglect, including boarded windows, crumbling stucco and concrete, missing roof tiles, and evidence of efflorescence stemming from rainwater runoff (Fig. 9). It is no longer occupied.

Located behind the main residence were a garage of the same design and constructed of similar materials, along with a secondary residence (Fig. 9). The secondary residence is a wood-framed, single-story building of vernacular character, featuring stucco walls, steel-framed windows, and a medium-pitched front-gable roof sheathed with composition sheet. This building appears to remain occupied. Three ancillary buildings are located to the west of the two residences and the garage, including a large metal barn, a small wooden shed, and a partially collapsed animal hutch (Fig. 9). All of the buildings are in a dilapidated condition.

Figure 9. Buildings at Site 33-006973. *Clockwise from top left*: main residence, garage, secondary residence, metal barn, wooden shed, and animal hutch. (Photographs taken on March 12 and 30, 2015)

All six buildings in this group are situated on APN 246-070-002. Since they all appear to be at least 45 years old and share a common property history, Site 33-06973 was expanded to include the five newly recorded buildings (see App. 3). No other buildings, structures, objects, sites, features, or artifact deposits more than 45 years of age were encountered within the project boundaries. Site 33-006973, therefore, represents the only potential "historical resource" in the project area that requires evaluation under CEQA and the City ordinance.

MANAGEMENT CONSIDERATIONS

The purpose of this study is to identify any cultural resources within or adjacent to the project area, and to assist the City of Riverside in determining whether such resources meet the official definition of "historical resources," as provided in the California Public Resources Code, in particular CEQA.

DEFINITION

According to PRC §5020.1(j), "'historical resource' includes, but is not limited to, any object, building, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California." More specifically, CEQA guidelines state that the term "historical resources" applies to any such resources listed in or determined to be eligible for listing in the California Register of Historical Resources, included in a local register of historical resources, or determined to be historically significant by the Lead Agency (Title 14 CCR §15064.5(a)(1)-(3)).

Regarding the proper criteria of historical significance, CEQA guidelines mandate that "generally a resource shall be considered by the lead agency to be 'historically significant' if the resource meets the criteria for listing on the California Register of Historical Resources" (Title 14 CCR §15064.5(a)(3)). A resource may be listed in the California Register if it meets any of the following criteria:

(1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
(2) Is associated with the lives of persons important in our past.
(3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.
(4) Has yielded, or may be likely to yield, information important in prehistory or history. (PRC §5024.1(c))

A local register of historical resources, as defined by PRC §5020.1(k), "means a list of properties officially designated or recognized as historically significant by a local government pursuant to a local ordinance or resolution." For individual properties within the City of Riverside, the City's Cultural Resources Ordinance provides two categories of historical significance designation, "Landmarks" and "Structures or Resources of Merit," the criteria for which are outlined in Riverside Municipal Code §20.50.010(T) and §20.50.010(DD), respectively. A "Landmark," according to the ordinance:

> means any Improvement or Natural Feature that is an exceptional example of a historical, archaeological, cultural, architectural, community, aesthetic or artistic heritage of the City, retains a high degree of integrity, and:
> 1. Exemplifies or reflects special elements of the City's cultural, social, economic, political, aesthetic, engineering, architectural, or natural history;
> 2. Is identified with persons or events significant in local, state or national history;
> 3. Embodies distinctive characteristics of a style, type, period or method of construction, or is a valuable example of the use of indigenous materials or craftsmanship;
> 4. Represents the work of a notable builder, designer, or architect, or important creative individual;

5. Embodies elements that possess high artistic values or represents a significant structural or architectural achievement or innovation;
6. Reflects significant geographical patterns, including those associated with different eras of settlement and growth, particular transportation modes, or distinctive examples of park or community planning, or cultural landscape;
7. Is one of the last remaining examples in the City, region, State, or nation possessing distinguishing characteristics of an architectural or historical type or specimen; or
8. Has yielded or may be likely to yield, information important in history or prehistory. (RMC §20.50.010(T))

For the status of "Structure or Resource of Merit," the ordinance set forth the definition and criteria as follows:

> "Structure or Resource of Merit" means any Improvement or Natural Feature which contributes to the broader understanding of the historical, archaeological, cultural, architectural, community, aesthetic or artistic heritage of the City, retains sufficient integrity, and:
> 1. Has a unique location or singular physical characteristics or is a view or vista representing an established and familiar visual feature of a neighborhood community or of the City;
> 2. Is an example of a type of building which was once common but is now rare in its neighborhood, community or area;
> 3. Is connected with a business or use which was once common but is now rare;
> 4. A Cultural Resource that could be eligible under Landmark Criteria no longer exhibiting a high level of integrity, however, retaining sufficient integrity to convey significance under one or more of the Landmark Criteria;
> 5. Has yielded or may be likely to yield, information important in history or prehistory; or
> 6. An improvement or resource that no longer exhibits the high degree of integrity sufficient for Landmark designation, yet still retains sufficient integrity under one or more of the Landmark criteria to convey cultural resource significance as a Structure or Resource of Merit. (RMC §20.50.010(DD))

In addition, City of Riverside policies also require potential "historical resources" identified within the City's jurisdiction to be evaluated for listing in the National Register of Historic Places. The eligibility for inclusion in the National Register is determined by applying the Secretary of the Interior's criteria, developed by the National Park Service as per provision of the National Historic Preservation Act, which are essentially identical to the California Register criteria. Federal regulations provide the National Register criteria as follows:

> The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and
> (a) that are associated with events that have made a significant contribution to the broad patterns of our history; or
> (b) that are associated with the lives of persons significant in our past; or
> (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
> (d) that have yielded, or may be likely to yield, information important in prehistory or history. (36 CFR 60.4)

Pursuant to these regulatory guidelines, the potential significance of Site 33-006973 is evaluated against the criteria for the National Register, the California Register, and local designation.

SITE EVALUATION

Site 33-006973, as re-recorded during this study, consists of a mid-1920s Spanish Eclectic-style single-family residence and five associated buildings, including a secondary residence, a garage, a metal barn, a wooden shed, and an animal hutch. All of the buildings have been altered to some extent, but they still exhibit a recognizable level of historical characteristics.

The construction of these buildings postdates the era when the area retained an independent community identity as the Spanish-speaking village of La Placita, or "Spanishtown," and is more closely associated with a time when the area underwent a prolonged period of slow, agrarian growth as a sparsely populated outskirt of Riverside. The buildings at Site 33-006973 belong to property types reflective of this episode in local history and retain sufficient historic integrity to relate to that period, but they do not demonstrate a particularly close or important association with this pattern of events, or with any other established historic themes.

The historical background research has not identified any persons or specific events of recognized historic significance in close association with these buildings, nor has any prominent architect, designer, or builder been identified in their construction history. In terms of architectural or aesthetic merits, these buildings represent designs and building practices that are common among properties of similar types and vintages, and none of them constitutes an important example of any style, type, period, region, or method of construction, nor do they embody any particular architectural ideals or artistic pursuits.

Based on these considerations, and in light of the criteria listed above, the present study concludes that Site 33-006973 does not appear eligible for listing in the National Register of Historic Places or the California Register of Historical Resources, or for local designation by the City of Riverside. Therefore, it does not meet the definition of a "historical resource," as provided by CEQA and associated regulations.

CONCLUSION AND RECOMMENDATIONS

CEQA establishes that "a project that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment" (PRC §21084.1). "Substantial adverse change," according to PRC §5020.1(q), "means demolition, destruction, relocation, or alteration such that the significance of a historical resource would be impaired."

In summary of the research results outlined above, Site 33-006973, consisting of a circa 1920s residence with five associated buildings, has been identified within the project area, but it does not appear to qualify as a "historical resource," as defined by CEQA. No archaeological sites or other potential "historical resources" were encountered throughout the course of the study. In light of these findings, CRM TECH presents the following recommendations to the City of Riverside:

- No historical resources exist within or adjacent to the project area, and thus the project as currently proposed will not cause a substantial adverse change to any known historical resources.

- Because of the lack of indication for potentially significant subsurface cultural remains, archaeological monitoring does not appear necessary during the proposed project.
- No further cultural resources investigation is necessary for the proposed project unless development plans undergo such changes as to include areas not covered by this study.
- If buried cultural materials are discovered during any earth-moving operations associated with the project, all work in that area should be halted or diverted until a qualified archaeologist can evaluate the nature and significance of the finds.

REFERENCES

Bean, Lowell John

1978 Cahuilla. In *Handbook of North American Indians*, Vol. 8: *California*, edited by Robert F. Heizer; pp. 575-587. Smithsonian Institution, Washington, D.C.

Chartkoff, Joseph L., and Kerry Kona Chartkoff

1984 *The Archaeology of California*. Stanford University Press, Palo Alto, California.

County Assessor, Riverside

1892-1895 Real property tax assessment records, Book 5, Map 16. Microfiches on file, Riverside County Assessor's Office, Riverside.

1921-1926 Real property tax assessment records, Book 6, Map 13. Microfiches on file, Riverside County Assessor's Office, Riverside.

Directory

1915-1926 Riverside City and County Directory. Microfiches on file, Local History Collection, Riverside Public Library, Central Branch, Riverside.

Doan, Uyen K., Michael Hogan, and Bai "Tom" Tang

2003 Archaeological Sensitivity Assessment: Hunter Park Redevelopment Plan Amendment, City of Riverside, Riverside County, California. On file, Eastern Information Center, University of California, Riverside.

Gunther, Jane Davies

1984 *Riverside County, California, Place Names: Their Origins and Their Stories*. Jane Davies Gunther, Riverside, California.

Kroeber, Alfred L.

1925 *Handbook of the Indians of California*. Bureau of American Ethnology Bulletin 78. Government Printing Office, Washington, D.C.

Moratto, Michael J. (ed.)

1984 *California Archaeology*. Academic Press, Orlando, Florida.

Newman, Thelma

1982 California Historical Resources Inventory site record, 33-006793. On file, Eastern Information Center, University of California, Riverside.

Patterson, Tom

1996 *A Colony for California*. The Museum Press, Riverside, California.

Strong, William Duncan

1929 *Aboriginal Society in Southern California*. University of California Publications in American Archaeology and Ethnology, Vol. 26. Reprinted by Malki Museum Press, Banning, California, 1972.

USGS (United States Geological Survey, U.S. Department of the Interior)

1901a Map: Riverside, Calif. (15', 1:62,500); surveyed in 1897.

1901b Map: San Bernardino, Calif. (15', 1:62,500); surveyed in 1893-1894.

1943 Map: Colton, Calif. (1:31,680); surveyed in 1936-1938.

1954 Map: San Bernardino South, Calif. (7.5', 1:24,000); aerial photographs taken in 1952, field-checked in 1954.

1967 Map: San Bernardino South, Calif. (7.5', 1:24,000); 1954 edition photorevised in 1966, field-checked in 1967.

1969 Map: San Bernardino, Calif. (1:250,000); 1958 edition revised.

1979 Map: Santa Ana, Calif. (1:250,000); 1959 edition revised.

1980a Map: Riverside East, Calif. (7.5', 1:24,000); 1967 edition photorevised in 1978.
1980b Map: San Bernardino South, Calif. (7.5', 1:24,000); 1967 edition photorevised in 1979.

Wallace, William J.
1955 A Suggested Chronology for Southern California Coastal Archaeology. *Southwestern Journal of Archaeology* 11(3):214-230.
1978 Post-Pleistocene Archeology, 9,000 to 2,000 BC. In *Handbook of North American Indians*; Vol. 8, *California*, edited by Robert F. Heizer; pp. 25-36. Smithsonian Institution, Washington, D.C.

Warren, Claude N.
1968 Cultural Traditions and Ecological Adaptations on the Southern California Coast. In *Archaic Prehistory in Western United States*, edited by Cynthia Irwin-Williams; pp. 1-14. Eastern New Mexico University Contributions in Anthropology 1(3). Portales, New Mexico.
1984 The Desert Region. In *California Archaeology*, edited by Michael J. Moratto, pp. 339-430. Academic Press, Orlando, Florida.

Warren, Claude N., and Robert H. Crabtree
1986 Prehistory of the Southwestern Area. In *Handbook of North American Indians*, Vol. 11: *Great Basin*, edited by Warren L. D'Azevedo; pp. 183-193. Smithsonian Institution, Washington, D.C.

APPENDIX 1:
PERSONNEL QUALIFICATIONS

PRINCIPAL INVESTIGATOR/HISTORIAN
Bai "Tom" Tang, M.A.

Education

1988-1993	Graduate Program in Public History/Historic Preservation, UC Riverside.
1987	M.A., American History, Yale University, New Haven, Connecticut.
1982	B.A., History, Northwestern University, Xi'an, China.

2000	"Introduction to Section 106 Review," presented by the Advisory Council on Historic Preservation and the University of Nevada, Reno.
1994	"Assessing the Significance of Historic Archaeological Sites," presented by the Historic Preservation Program, University of Nevada, Reno.

Professional Experience

2002-	Principal Investigator, CRM TECH, Riverside/Colton, California.
1993-2002	Project Historian/Architectural Historian, CRM TECH, Riverside, California.
1993-1997	Project Historian, Greenwood and Associates, Pacific Palisades, California.
1991-1993	Project Historian, Archaeological Research Unit, UC Riverside.
1990	Intern Researcher, California State Office of Historic Preservation, Sacramento.
1990-1992	Teaching Assistant, History of Modern World, UC Riverside.
1988-1993	Research Assistant, American Social History, UC Riverside.
1985-1988	Research Assistant, Modern Chinese History, Yale University.
1985-1986	Teaching Assistant, Modern Chinese History, Yale University.
1982-1985	Lecturer, History, Xi'an Foreign Languages Institute, Xi'an, China.

Honors and Awards

1988-1990	University of California Graduate Fellowship, UC Riverside.
1985-1987	Yale University Fellowship, Yale University Graduate School.
1980, 1981	President's Honor List, Northwestern University, Xi'an, China.

Cultural Resources Management Reports

Preliminary Analyses and Recommendations Regarding California's Cultural Resources Inventory System (With Special Reference to Condition 14 of NPS 1990 Program Review Report). California State Office of Historic Preservation working paper, Sacramento, September 1990.

Numerous cultural resources management reports with the Archaeological Research Unit, Greenwood and Associates, and CRM TECH, since October 1991.

PRINCIPAL INVESTIGATOR/ARCHAEOLOGIST
Michael Hogan, Ph.D., RPA*

Education

1991	Ph.D., Anthropology, University of California, Riverside.
1981	B.S., Anthropology, University of California, Riverside; with honors.
1980-1981	Education Abroad Program, Lima, Peru.
2002	Section 106—National Historic Preservation Act: Federal Law at the Local Level. UCLA Extension Course #888.
2002	"Recognizing Historic Artifacts," workshop presented by Richard Norwood, Historical Archaeologist.
2002	"Wending Your Way through the Regulatory Maze," symposium presented by the Association of Environmental Professionals.
1992	"Southern California Ceramics Workshop," presented by Jerry Schaefer.
1992	"Historic Artifact Workshop," presented by Anne Duffield-Stoll.

Professional Experience

2002-	Principal Investigator, CRM TECH, Riverside/Colton, California.
1999-2002	Project Archaeologist/Field Director, CRM TECH, Riverside.
1996-1998	Project Director and Ethnographer, Statistical Research, Inc., Redlands.
1992-1998	Assistant Research Anthropologist, University of California, Riverside
1992-1995	Project Director, Archaeological Research Unit, U. C. Riverside.
1993-1994	Adjunct Professor, Riverside Community College, Mt. San Jacinto College, U.C. Riverside, Chapman University, and San Bernardino Valley College.
1991-1992	Crew Chief, Archaeological Research Unit, U. C. Riverside.
1984-1998	Archaeological Technician, Field Director, and Project Director for various southern California cultural resources management firms.

Research Interests

Cultural Resource Management, Southern Californian Archaeology, Settlement and Exchange Patterns, Specialization and Stratification, Culture Change, Native American Culture, Cultural Diversity.

Cultural Resources Management Reports

Author and co-author of, contributor to, and principal investigator for numerous cultural resources management study reports since 1986.

Memberships

* Register of Professional Archaeologists; Society for American Archaeology; Society for California Archaeology; Pacific Coast Archaeological Society; Coachella Valley Archaeological Society.

PROJECT HISTORIAN/ARCHITECTURAL HISTORIAN
Terri Jacquemain, M.A.

Education

2004 M.A., Public History and Historic Resource Management, University of California, Riverside.
- M.A. thesis: Managing Cultural Outreach, Public Affairs and Tribal Policies of the Cabazon Band of Mission Indians, Indio, California; internship served as interim Public Information Officer, Cabazon Band of Mission Indians, June-October, 2002.

2002 B.S., Anthropology, University of California, Riverside.
2001 Archaeological Field School, University of California, Riverside.
1991 A.A., Riverside Community College, Norco Campus.

Professional Experience

2003- Historian/Architectural Historian/Report Writer, CRM TECH, Riverside/ Colton, California.
- Author/co-author of legally defensible cultural resources reports for CEQA and NHPA Section 106;
- Historic context development, historical/archival research, oral historical interviews, consultation with local communities and historical organizations;
- Historic building surveys and recordation, research in architectural history; architectural description

2002-2003 Teaching Assistant, Religious Studies Department, University of California, Riverside.
2002 Interim Public Information Officer, Cabazon Band of Mission Indians.
2000 Administrative Assistant, Native American Student Programs, University of California, Riverside.
1997-2000 Reporter, *Inland Valley Daily Bulletin*, Ontario, California.
1991-1997 Reporter, *The Press-Enterprise*, Riverside, California.

Membership

California Preservation Foundation.

PROJECT ARCHAEOLOGIST
Daniel Ballester, M.S.

Education

2013	M.S., Geographic Information System (GIS), University of Redlands, California.
1998	B.A., Anthropology, California State University, San Bernardino.
1997	Archaeological Field School, University of Las Vegas and University of California, Riverside.
1994	University of Puerto Rico, Rio Piedras, Puerto Rico.
2007	Certificate in Geographic Information Systems (GIS), California State University, San Bernardino.
2002	"Historic Archaeology Workshop," presented by Richard Norwood, Base Archaeologist, Edwards Air Force Base; presented at CRM TECH, Riverside, California.

Professional Experience

2002-	Field Director/GIS Specialist, CRM TECH, Riverside/Colton, California.
1999-2002	Project Archaeologist, CRM TECH, Riverside, California.
1998-1999	Field Crew, K.E.A. Environmental, San Diego, California.
1998	Field Crew, A.S.M. Affiliates, Encinitas, California.
1998	Field Crew, Archaeological Research Unit, University of California, Riverside.

PROJECT ARCHAEOLOGIST
Nina Gallardo, B.A.

Education

2004	B.A., Anthropology/Law and Society, University of California, Riverside.

Professional Experience

2004-	Project Archaeologist, CRM TECH, Riverside/Colton, California.

Honors and Awards

2000-2002	Dean's Honors List, University of California, Riverside.

APPENDIX 2

CORRESPONDENCE WITH NATIVE AMERICAN REPRESENTATIVES*

* A total of 26 local Native American representatives were contacted; a sample letter is included in this report.

SACRED LANDS FILE & NATIVE AMERICAN CONTACTS LIST REQUEST

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd, Suite 100
West Sacramento, CA 95691
(916) 373-3710
(916) 373-5471 – Fax
nahc@nahc.ca.gov

Project: 308K Placentia Lane Warehouse (CRM TECH Contract No. 2901)

County: Riverside

USGS Quadrangle Name: Riverside East and San Bernardino South, Calif.

Township 2 South **Range** 5 West SB **BM; Section(s)** 12 (projected)

Company/Firm/Agency: CRM TECH

Contact Person: Nina Gallardo

Street Address: 1016 E. Cooley Drive, Suite A/B

City: Colton, CA **Zip:** 92324

Phone: (909) 824-6400 **Fax:** (909) 824-6405

Email: ngallardo@crmtech.us

Project Description: The primary component of the project is to construct a 308,000-square-foot warehouse. The project area is located to the southeast of the intersection of Center Street and Placentia Lane, in the City of Riverside, Riverside County, California.

March 5, 2015

STATE OF CALIFORNIA Edmund G. Brown, Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd., ROOM 100
West SACRAMENTO, CA 95691
(916) 373-3710
Fax (916) 373-5471

March 17, 2015

Nina Gallardo
CRM Tech
1016 E. Cooley Drive, Suite A/B
Colton, CA 92324

Sent by Fax: (909) 824-6405
Number of Pages: 4

Re: 308K Placentia Lane Warehouse (CRM TECH Contract No. 2901), Riverside County.

Dear Ms. Gallardo,

A record search of the sacred land file has failed to indicate the presence of Native American cultural resources in the immediate project area. The absence of specific site information in the sacred lands file does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Enclosed is a list of Native Americans individuals/organizations who may have knowledge of cultural resources in the project area. The Commission makes no recommendation or preference of a single individual, or group over another. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated, if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe or group. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact me at (916) 373-3712.

Sincerely,

Katy Sanchez

Katy Sanchez
Associate Government Program Analyst

Native American Contact List
Riverside County
March 17, 2015

Pala Band of Mission Indians
Shasta Gaughen, PhD, THPO
PMB 50, 35008 Pala-Temecula Luiseno
Pala , CA 92059 Cupeno
sgaughen@palatribe.com
(760) 891-3515

(760) 742-3189 Fax

Pauma & Yuima Reservation
Randall Majel, Chairperson
P.O. Box 369 Luiseno
Pauma Valley CA 92061
(760) 742-1289 ext 317

(760) 742-3422 Fax

Pechanga Band of Mission Indians
Paul Macarro, Cultural Resources Manager
P.O. Box 1477 Luiseno
Temecula , CA 92593
pmacarro@pechanga-nsn.gov
(951) 770-8100

(951) 506-9491 Fax

Rincon Band of Mission Indians
Vincent Whipple, Tribal Historic Pres. Officer
1 West Tribal Road Luiseno
Valley Center, CA 92082
vwhipple@rincontribe.org
(760) 297-2635

(760) 297-2639 Fax

San Manuel Band of Mission Indians
Lynn Valbuena, Chairwoman
26569 Community Center Serrano
Highland , CA 92346
(909) 864-8933

(909) 864-3370 Fax

Soboba Band of Mission Indians
Rosemary Morillo, Chairperson; Attn: Carrie Garcia
P.O. Box 487 Luiseno
San Jacinto , CA 92581
carrieg@soboba-nsn.gov
(951) 654-2765

(951) 654-4198 Fax

Morongo Band of Mission Indians
Denisa Torres, Cultural Resources Manager
12700 Pumarra Road Cahuilla
Banning , CA 92220 Serrano
dtorres@morongo-nsn.gov
(951) 572-6004 Fax

San Manuel Band of Mission Indians
Daniel McCarthy, M.S.., Director-CRM Dept.
26569 Community Center Drive Serrano
Highland , CA 92346
dmccarthy@sanmanuel-nsn.gov
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(909) 862-5152 Fax

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting locative Americans with regard to cultural resources for the proposed 308K Placentia Lane Warehouse (CRM TECH Contract No. 2901), Riverside County.

Native American Contact List
Riverside County
March 17, 2015

Pauma Valley Band of Luiseño Indians
Bennae Calac
P.O. Box 369 Luiseno
Pauma Valley CA 92061
bennaecalac@aol.com
(760) 617-2872

(760) 742-3422 Fax

Pauma & Yuima
ATTN: EPA
P.O. Box 369 Luiseno
Pauma Valley CA 92061
kymberli_peters@yahoo.com
(760) 742-1289

(760) 742-3422 Fax

Rincon Band of Mission Indians
Bo Mazzetti, Chairperson
1 West Tribal Road Luiseno
Valley Center, CA 92082
bomazzetti@aol.com
(760) 749-1051

(760) 749-8901 Fax

San Luis Rey Band of Mission Indians
Tribal Council
1889 Sunset Drive Luiseno
Vista , CA 92081
cjmojado@slrmissionindians.org
(760) 724-8505

(760) 724-2172 Fax

San Luis Rey Band of Mission Indians
Cultural Department
1889 Sunset Drive Luiseno
Vista , CA 92081 Cupeno
cjmojado@slrmissionindians.org
(760) 724-8505

(760) 724-2172 Fax

Kupa Cultural Center (Pala Band)
Shasta Gaughen, Assistant Director
PMB 50, 35008 Pala-Temecula Luiseno
Pala , CA 92059
sgaughen@palatribe.com
(760) 891-3515

(760) 742-4543 Fax

Morongo Band of Mission Indians
Robert Martin, Chairperson
12700 Pumarra Rroad Cahuilla
Banning , CA 92220 Serrano
(951) 849-8807
(951) 755-5200
(951) 922-8146 Fax

Pechanga Band of Mission Indians
Mark Macarro, Chairperson
P.O. Box 1477 Luiseno
Temecula , CA 92593
mgoodhart@pechanga-nsn.
(951) 770-6100

(951) 695-1778 Fax

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This list is only applicable for contacting locative Americans with regard to cultural resources for the proposed 308K Placentia Lane Warehouse (CRM TECH Contract No. 2901), Riverside County.

Native American Contact List
Riverside County
March 17, 2015

William J. Pink
48310 Pechanga Road Luiseno
Temecula , CA 92592
wjpink@hotmail.com
(909) 936-1216
Prefers e-mail contact

La Jolla Band of Mission Indians
Lavonne Peck, Chairwoman
22000 Highway 76 Luiseno
Pauma Valley CA 92061
Rob.roy@lajolla-nsn.gov
(760) 742-3771

(760) 742-1704 Fax

Serrano Nation of Mission Indians
Goldie Walker, Chairwoman
P.O. Box 343 Serrano
Patton , CA 92369

(909) 528-9027
(909) 528-9032

Pauma & Yuima Reservation
Charles Devers, Cultural Committee
P.O. Box 369 Luiseno
Pauma Valley CA 92061
(760) 742-1289

(760) 742-3422 Fax

Pechanga Cultural Resources Department
Anna Hoover, Cultural Analyst
P.O. Box 2183 Luiseño
Temecula , CA 92593
ahoover@pechanga-nsn.gov
(951) 770-8104

(951) 694-0446 Fax

Ernest H. Siva
Morongo Band of Mission Indians Tribal Elder
9570 Mias Canyon Road Serrano
Banning , CA 92220 Cahuilla
siva@dishmail.net
(951) 849-4676

Soboba Band of Luiseno Indians
Joseph Ontiveros, Cultural Resource Department
P.O. BOX 487 Luiseno
San Jacinto , CA 92581
jontiveros@soboba-nsn.gov
(951) 663-5279
(951) 654-5544, ext 4137
(951) 654-4198 Fax

Pala Band of Mission Indians
Robert H. Smith, Chairperson
PMB 50, 35008 Pala-Temecula Luiseno
Pala , CA 92059 Cupeno
dhuss@palatribe.com
(760) 891-3500

(760) 742-3189 Fax

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting locative Americans with regard to cultural resources for the proposed 308K Placentia Lane Warehouse (CRM TECH Contract No. 2901), Riverside County.

March 18, 2015

Bennae Calac, Tribal Council Member
Pauma Valley Band of Luiseño Indians
P. O. Box 369
Pauma Valley, CA 92061

RE: 308K Placentia Lane Warehouse Project
Approximately 16 Acres in the City of Riverside
Riverside County, California
CRM TECH Contract #2901

Dear Ms. Calac:

MIG/Hogle-Ireland Inc. will be conducting environmental studies under CEQA for the 308K Placentia Lane Warehouse Project in the City of Riverside, Riverside County, California. The project area encompasses approximately 16 acres of mostly undeveloped land in APNs 246-040-027, 246-040-028, 246-070-002, and 246-070-017, located north of the intersection of Placentia Lane and Sieck Road.

The proposed project entails the construction of a 308,000-square-foot warehouse, 5,500-square-foot mezzanine, 388 parking stalls, and 47 docks. The accompanying map, based on the USGS Riverside East and San Bernardino South, Calif., 7.5' quadrangles, depict the location of the project area within the Rancho Jurupa (Sterns) land grant, T2S R5W, SBBM. CRM TECH has been hired to conduct a cultural resource study, including the Native American scoping, for this project.

According to records on file at the Eastern Information Center and the San Bernardino Archaeological Information Center, there is one known historic site within the boundaries of the project area. Site 33-006973 consists of a Mediterranean/Spanish Revival style house with associated structures, built in circa 1922, and is located at 3667 Placentia Lane, in the southeast portion of the project area.

Outside the project boundaries but within a one-mile radius, AIC and EIC records indicate that seven prehistoric sites, 27 historic-period sites, five isolates, and three pending sites were previously identified. All of the prehistoric sites consist of bedrock-milling features and are clustered to the northeast around the La Loma Hills. The historic-period sites recorded within the scope of the records search include canals, wells, single-family residences, and refuse scatters. A systematic field survey of the project area on March 12, 2015, confirmed the presence of the buildings at Site 33-006973, but no other potential historical/archaeological resources were encountered.

In a letter dated March 17, 2015, the Native American Heritage Commission reports that the sacred lands record search identified no Native American cultural resources within the project area, but recommends that local Native American groups be contacted for further information. Therefore, as part of the cultural resources study for this project, I am writing to request your input on potential Native American cultural resources in or near the project area.

Please respond at your earliest convenience if you have any specific knowledge of sacred/religious sites or other sites of Native American traditional cultural value within or near the project area that need to be taken into consideration as part of the cultural resources investigation. Any information or concerns may be forwarded to CRM TECH by telephone, e-mail, facsimile, or standard mail. Requests for documentation or information we cannot provide will be forwarded to our client and/or the lead agency, which is the City of Riverside for CEQA-compliance purposes. We would also like to clarify that CRM TECH, as the cultural resources consultant for the project, is not the appropriate entity to initiate government-to-government consultations. Thank you for the time and effort in addressing this important matter.

Respectfully,

Nina Gallardo
CRM TECH
Email: ngallardo@crmtech.us

Encl.: project area ma

Morongo Band of Mission Indians

Cultural Heritage Program
12700 Pumarra Road, Banning, CA 92220
Phone (951)755-5025
Fax (951)572-6004

Date: March 23, 2015

Re: 308K Placentia Lane Warehouse Project
CRM TECH Contract #2901

Dear Nina Gallardo,

Thank you for contacting the Morongo Band of Mission Indians regarding the above referenced project(s). The tribe greatly appreciates the opportunity to comment on the project. After reviewing our records and consulting with our tribal elders and cultural experts, we would like to respectfully offer the following comments and/or recommendations:

___ The project is outside of the Tribe's current reservation boundaries and is not within an area considered to be a traditional use area or one in which the Tribe has cultural ties (i.e. Cahuilla or Serrano Territory). We recommend contacting the appropriate tribes who have cultural affiliation to the project area. We have no further comments at this time.

_X_ The project is outside of the Tribe's current reservation boundaries but within in an area considered to be a traditional use area or one in which the Tribe has cultural ties (i.e. Cahuilla or Serrano Territory). At this time, we are not aware of any cultural resources on the property; however, that is not to say there is nothing present. At this time, we ask that you impose specific conditions regarding all cultural and/or archaeological resources and buried cultural materials on any development plans or entitlement applications (see Standard Development Conditions attachment).

___ The project is outside of the Tribe's current reservation boundaries but within in an area considered to be a traditional use area or one in which the Tribe has cultural ties (i.e. Cahuilla or Serrano Territory). At this time we ask that you impose specific conditions regarding all cultural and/or archaeological resources and buried cultural materials on any development plans or entitlement applications (see Standard Development Conditions attachment). Furthermore, we would like to formally request the following:

1. A thorough records search be conducted by contacting one of the CHRIS (California Historical Resources Information System) Archaeological Information Centers and have a copy of the search results be provided to the tribe.

2. A comprehensive cultural survey be conducted of the proposed project property and any APE's (Areas of Potential Effect) within the property. We would also like to request that a tribal monitor be present during the cultural survey and that a copy of the results be provided to the tribe as soon as it can be made available.

3. Morongo would like to request that our tribal monitors be present during any test excavations or subsequent ground disturbing activities during the construction phase of the project.

___ The project is located with the current boundaries of the Morongo Band of Mission Indians Reservation. Please contact the Morongo Band of Mission Indians planning department for further details.

Once again, the Morongo Band of Mission Indians appreciates the opportunity to comment on this project. Please be aware that receipt of this letter does not constitute "meaningful" tribal consultation nor does it conclude the consultation process. This letter is merely intended to initiate consultation between the tribe and lead agency, which may be followed up with additional emails, phone calls or face-to-face consultation if deemed necessary. If you should have any further questions with regard to this matter, please do not hesitate to contact me at your convenience.

Very truly yours,

Raymond Huaute
Cultural Resource Specialist
Morongo Band of Mission Indians
Email: rhuaute@morongo-nsn.gov
Phone: (951) 755-5025

MORONGO BAND OF MISSION INDIANS

A SOVEREIGN NATION

Standard Development Conditions

The Morongo Band of Mission Indians asks that you impose specific conditions regarding cultural and/or archaeological resources and buried cultural materials on any development plans or entitlement applications as follows:

1. If human remains are encountered during grading and other construction excavation, work in the immediate vicinity shall cease and the County Coroner shall be contacted pursuant to State Health and Safety Code §7050.5.

2. In the event that Native American cultural resources are discovered during project development/construction, all work in the immediate vicinity of the find shall cease and a qualified archaeologist meeting Secretary of Interior standards shall be hired to assess the find. Work on the overall project may continue during this assessment period.

    a. If significant Native American cultural resources are discovered, for which a Treatment Plan must be prepared, the developer or his archaeologist shall contact the Morongo Band of Mission Indians.

    b. If requested by the Tribe[1], the developer or the project archaeologist shall, in good faith, consult on the discovery and its disposition (e.g. avoidance, preservation, return of artifacts to tribe, etc.).

[1] The Morongo Band of Mission Indians realizes that there may be additional tribes claiming cultural affiliation to the area; however, Morongo can only speak for itself. The Tribe has no objection if the archaeologist wishes to consult with other tribes and if the city wishes to revise the condition to recognize other tribes.

PALA TRIBAL HISTORIC PRESERVATION OFFICE

PMB 50, 35008 Pala Temecula Road
Pala, CA 92059
760-891-3510 Office | 760-742-3189 Fax

PALA THPO

March 25, 2015

Nina Gallardo
CRM Tech
1016 E. Cooley Drive, Suite A/B
Colton, CA 92324

Re: 308K Placentia Lane Warehouse Project- CRM Tech Contract #2901

Dear Mrs. Gallardo:

The Pala Band of Mission Indians Tribal Historic Preservation Office has received your notification of the project referenced above. This letter constitutes our response on behalf of Robert Smith, Tribal Chairman.

We have consulted our maps and determined that the project as described is not within the boundaries of the recognized Pala Indian Reservation. The project is also beyond the boundaries of the territory that the tribe considers its Traditional Use Area (TUA). Therefore, we have no objection to the continuation of project activities as currently planned and we defer to the wishes of Tribes in closer proximity to the project area.

We appreciate involvement with your initiative and look forward to working with you on future efforts. If you have questions or need additional information, please do not hesitate to contact me by telephone at 760-891-3515 or by e-mail at sgaughen@palatribe.com.

Sincerely,

Shasta C. Gaughen, PhD
Tribal Historic Preservation Officer
Pala Band of Mission Indians

ATTENTION: THE PALA TRIBAL HISTORIC PRESERVATION OFFICE IS RESPONSIBLE FOR ALL REQUESTS FOR CONSULTATION. PLEASE ADDRESS CORRESPONDENCE TO **SHASTA C. GAUGHEN** AT THE ABOVE ADDRESS. IT IS NOT NECESSARY TO ALSO SEND NOTICES TO PALA TRIBAL CHAIRMAN ROBERT SMITH.

From: Cultural <Cultural@pauma-nsn.gov>
Sent: Tuesday, March 31, 2015 10:42 AM
To: Nina Gallardo
Cc: Dixon, Patti; Jeremy Zagarella
Subject: RE: NA Scoping Letter for the 308K Placentia Lane Warehouse Project, City of Riverside, Riverside County (CRM TECH #2901)

Ms. Gallardo,

The Pauma Band of Luiseno Indians has received the hard copy of the 308K Placentia Lane Warehouse Project. We are unaware of any site specific cultural sites or resources on the proposed project property. With the information you provided, we would urge the developer to have an archaeologist and Native monitor onsite for all ground disturbing activities. If there are any questions, please contact us.

Thank you,

Chris Devers
Cultural Clerk
Pauma Band of Luiseno Indians

APPENDIX 3

CALIFORNIA HISTORICAL RESOURCES INVENTORY SITE RECORD FORMS, 33-006973

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

HISTORIC RESOURCES INVENTORY

Ser. No. 33-2507-51.
HABS ____ HAER ____ NR 6 SHL ____ Loc ____
UTM: A 467360/3763930 B ____
C ____ D ____

IDENTIFICATION

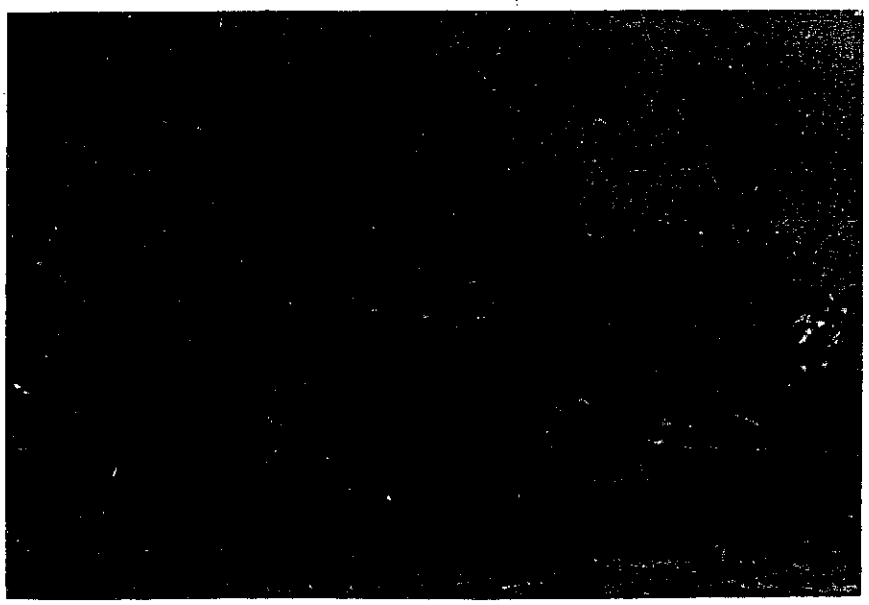
1. Common name: None 33-6973
2. Historic name: None
3. Street or rural address: 3667 Placentia Lane
   City Highgrove Zip 92501 County Riverside
4. Parcel number: 246-070-002-5
5. Present Owner: Robert J. Hanchett Address: P.O. Box 5577
   City Riverside Zip 92517 Ownership is: Public ____ Private X
6. Present Use: Residential Original use: Residential

DESCRIPTION

7a. Architectural style: Mediterranean/Spanish Rv.

7b. Briefly describe the present *physical description* of the site or structure and describe any major alterations from its original condition:

Sitting in the middle of farm land is this flat-roofed Mediterranean/ Spanish Revival style house in fair condition. Two rooms in the front of the house project forward, each covered with a gable roof. The roofing is of red tiles. Arched windows enhance the appearance of this home.



8. Construction date:
   Estimated 1922 Factual ____
9. Architect ____
10. Builder ____
11. Approx. property size (in feet)
    Frontage 526' Depth 521'
    or approx. acreage 6.00 acres
12. Date(s) of enclosed photograph(s)
    January 18, 1982
    3-67-09-09

DPR

13. Condition: Excellent ____ Good ____ Fair X Deteriorated ____ No longer in existence ____

14. Alterations: Major

33-6973

15. Surroundings: (Check more than one if necessary) Open land ____ Scattered buildings X Densely built-up ____
Residential ____ Industrial ____ Commercial ____ Other: Agricultural

16. Threats to site: None known X Private development ____ Zoning ____ Vandalism ____
Public Works project ____ Other: ____

17. Is the structure: On its original site? X Moved? ____ Unknown? ____

18. Related features: Shed

SIGNIFICANCE

19. Briefly state historical and/or architectural importance (include dates, events, and persons associated with the site.)

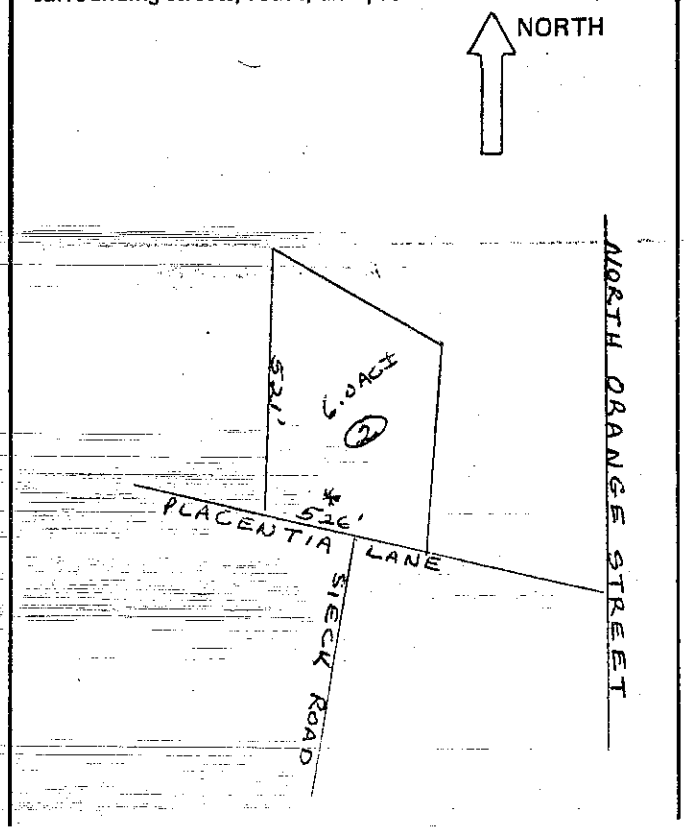
This home is typical of smaller houses in the Mediterranean/Spanish Revival style.

20. Main theme of the historic resource: (If more than one is checked, number in order of importance.)
Architecture X Arts & Leisure ____
Economic/Industrial ____ Exploration/Settlement ____
Government ____ Military ____
Religion ____ Social/Education ____

21. Sources (List books, documents, surveys, personal interviews and their dates).

22. Date form prepared June 18, 1982
By (name) Thelma Newman
Organization Riv. Co. Historical Comm.
Address: 4600 Crestmore Rd.
City Rubidoux Zip 92519
Phone: (714) 787-2551

Locational sketch map (draw and label site and surrounding streets, roads, and prominent landmarks):



Recorded by: Terri Jacquemain
***Date:** March 30, 2015 ___Continuation √ Update

During a field inspection on March 30, 2015, the residence recorded in 1982 at Site 33-006973 was found to be suffering the effects of neglect, including boarded windows, crumbling stucco and concrete, missing roof tiles, and evidence of efflorescence stemming from rainwater runoff. It is no longer occupied. Noted behind the residence were a garage of the same design and constructed of similar materials, along with a secondary residence. The secondary residence is a wood-framed, single-story building of vernacular character, featuring stucco walls, steel-framed windows, and a medium-pitched front-gable roof sheathed with composition sheet. This building appears to remain occupied. Three ancillary buildings are located to the west of the two residences and the garage, including a large metal barn, a small wooden shed, and a partially collapsed animal hutch. All of the buildings are in a dilapidated condition. All six buildings in this group are situated on APN 246-070-002. Since they all appear to be at least 45 years old and share a common property history, Site 33-06973 was expanded to include the five newly recorded buildings.

Archival records of the Riverside County Assessor's Office reveal building first occurred on APN 246-070-002 around 1912, when owner Henry Camp was assessed $50 for improvements (see Table 1). The 1982 site record estimates that the main residence was built in 1922, but a significant increase in improvement value between 1924 and 1926 suggests a more likely construction date in the mid-1920s, when the parcel was under the ownership of C.G. Martini. In any case, two buildings were known to be present at this location by the mid-1930s, when Martha Milford was listed as the property owner. Neither Martini nor Milford appears to have resided at this location, according to local directories. In fact, of the owners listed in Table 1, only three were found in local directories, namely Densmore, Field, and Martini, and among these only Densmore was listed as a resident at this address.

Table 1. Real Property Tax Assessment History for APN 246-070-002*

Year	Owner	Value of Land	Value of Improvements
1907	Luz Atencio Trujillo	$90	$0
1908	J.C. Merritt	$90	$0
1909	Henry J. Camp	$90	$0
1910	Henry J. Camp	$120	$0
1911	Henry J. Camp	$120	$0
1912-1914	Henry J. Camp	$360	$50
1915	C.S. Densmore	$360	$50
1916	Nettie R. Stratten	$360	$50
1917-1920	Myrtle A. Field	$360	$80
1920	Roy P. Storie	$360	$80
1921-1922	Jose Palmerie(?)	$360	$80
1923	Robert J. McArthur	$360	$80
1924-1926	C.G. Martini	$360	$130-$660
1927-1928	David Forrest	$200	$660
1929	F.J. Tacharner	$280	$660
1930	J.P. Ramsey	$250	$660
1931	J.L. Dodson & L.I. Meyer	$250	$600.
1932-1944	Martha C. Milford	$200	$450-$660
1945	George J. & Irene Morgenstern	$300	$720
1946-1949	George J. Morgenstern & Cornelia A. Hill	$300	$1190-$1200-$2060
1950-1961	Robert J. Hanchett	$720	$2060-$2310

*Source: Riverside County Assessor

The construction of these buildings postdates the era when the area retained an independent community identity as the Spanish-speaking village of La Placita, or "Spanishtown," and is more closely associated with a time when the area underwent a prolonged period of slow, agrarian growth as a sparsely populated outskirt of Riverside. The buildings at Site 33-006973 belong to property types reflective of this episode in local history and retain sufficient historic integrity to relate to that period, but they do not demonstrate a particularly close or important association with this pattern of events, or with any other established historic themes.

The historical background research has not identified any persons or specific events of recognized historic significance in close association with these buildings, nor has any prominent architect, designer, or builder been identified in their construction history. In terms of architectural or aesthetic merits, these buildings represent designs and building practices that are common among properties of similar types and vintages, and none of them constitutes an important example of any style, type, period, region, or method of construction, nor do they embody any particular architectural ideals or artistic pursuits.

Based on these considerations, and in light of the criteria listed above, the present study concludes that Site 33-006973 does not appear eligible for listing in the National Register of Historic Places or the California Register of Historical Resources, or for local designation by the City of Riverside.

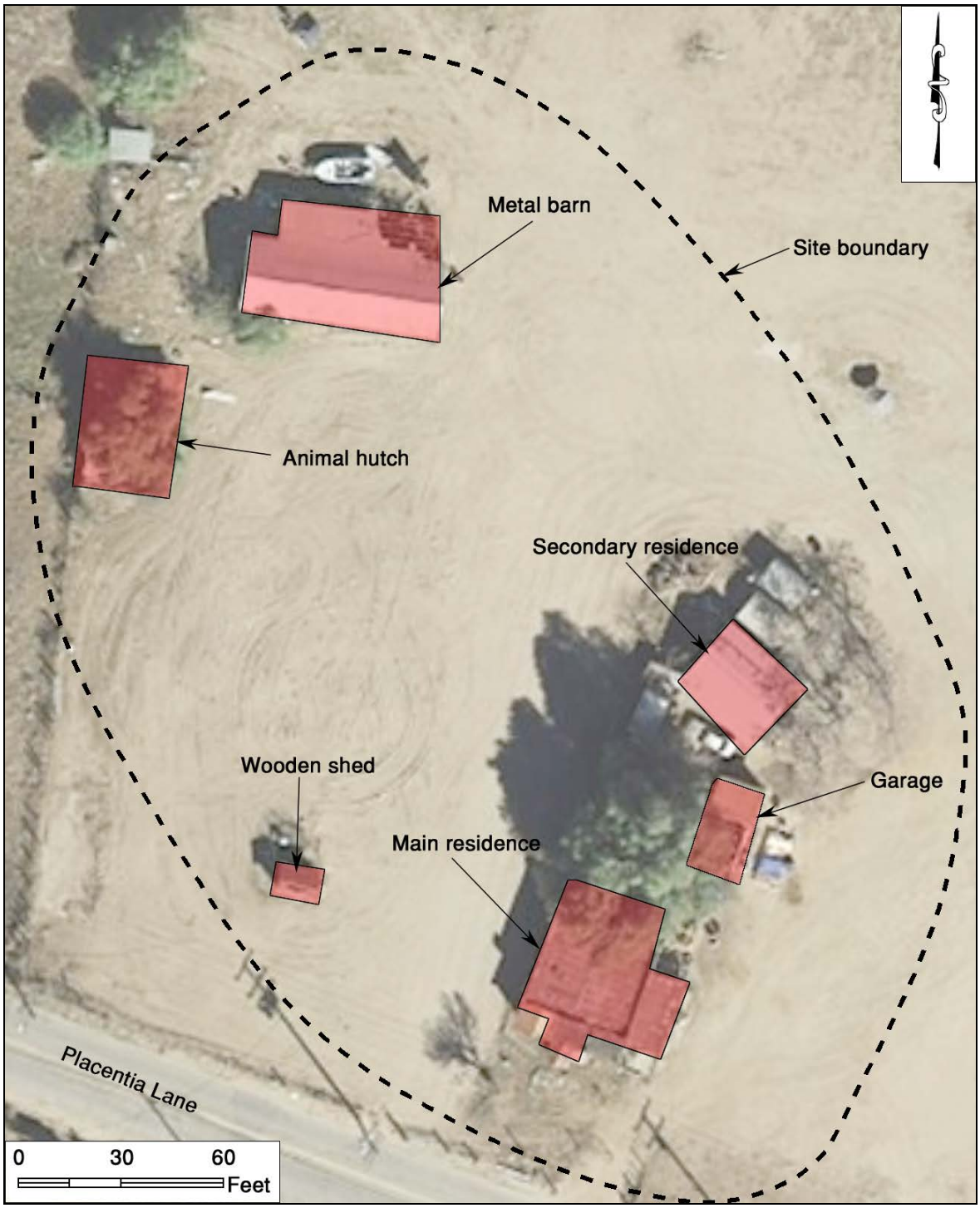
Report Citation:

Bai "Tom" Tang, Terri Jacquemain, and Daniel Ballester
2015 Historical/Archaeological Resources Survey Report: Placentia Lane Warehouse Project, APNs 246-040-027, 246-040-028, 246-070-002, and 246-070-017, City of Riverside, Riverside County, California.

Recorded by: Terri Jacquemain
***Date:** March 30, 2015 ___Continuation √ Update

Buildings at Site 33-006973. *Clockwise from top left*: main residence, garage, secondary residence, metal barn, wooden shed, and animal hutch. (Photographs taken on March 12 and 30, 2015)

Recorded by: Terri Jacquemain
*Date: March 30, 2015 Continuation √ Update



Site Sketch map

Appendix E Geotechnical Engineering Investigation

Geotechnical Engineering Investigation

Proposed Industrial Warehouse Development
Southeast Corner of Placentia Lane and Center Street
Riverside, California

Transition Properties L.P.
P.O. Box 1010
Blue Jay, California 92317

Attn.: Mr. Art Day

Project Number 17745-14
November 21, 2014

NorCal Engineering

Soils and Geotechnical Consultants
10641 Humbolt Street Los Alamitos, CA 90720
(562) 799-9469 Fax (562) 799-9459

November 21, 2014 Project Number 17745-14

Transition Properties L.P.
P.O. Box 1010
Blue Jay, California 92317

Attn.: Mr. Art Day

RE: **Geotechnical Engineering Investigation** - Proposed Industrial Warehouse Development - Located at the Southeast Corner of Placentia Lane and Center Street, in the City of Riverside, California

Dear Mr. Day:

Pursuant to your request, this firm has performed a Geotechnical Engineering Investigation in accordance with your authorization of our proposal dated July 10, 2014 for the above referenced project. The purpose of this investigation is to evaluate the subsurface conditions of the subject site and to provide recommendations for the proposed industrial warehouse development.

d

The scope of work included the following: 1) site reconnaissance; 2) subsurface geotechnical exploration and sampling; 3) laboratory testing; 4) engineering analysis of field and laboratory data; 5) and preparation of a geotechnical engineering report. It is the opinion of this firm that the proposed development is feasible from a geotechnical standpoint provided that the recommendations presented in this report are followed in the design and construction of the project.

1.0 Project Description

It is proposed to construct an industrial warehouse development consisting of a concrete tilt-up building totaling 308,000 square feet on the 15.63-acre subject property as shown on the attached Site Plan. The proposed concrete tilt-up building will be supported by a conventional slab-on-grade foundation system with perimeter-spread footings and isolated interior footings. Other improvements will consist of new concrete and/or asphalt pavement and hardscape. It is assumed that the proposed grading for the development will include minor cut and fill procedures. Final building plans shall be reviewed by this firm prior to submittal for city approval to determine the need for any additional study and revised recommendations pertinent to the proposed development, if necessary.

2.0 Site Description

The subject property is located at the southeast corner of Placentia Lane and Center Street, in the City of Riverside. The generally rectangular-shaped parcel is elongated in an east to west direction with topography of the relatively level property descending gradually from north to south on the order of a few feet. A majority of the site is currently undeveloped land covered with a low growth of vegetation cover consisting of natural grasses and weeds. The southeast corner of the site is occupied by a single family residence.

3.0 Site Exploration

The investigation consisted of the placement of eleven (11) subsurface exploratory trenches by a backhoe to depths ranging from 5 to 15 feet and (1) subsurface exploratory boring by a truckmounted hollowstem auger to a depth of 50 feet below current ground elevations. The explorations were visually classified and logged by a field engineer with locations of the subsurface explorations shown on the attached Site Plan. The exploratory excavations revealed the existing earth materials to consist of a disturbed top soil/fill and natural soil. A detailed description of the subsurface conditions are listed on the excavation logs in Appendix A.

Fill: A fill/disturbed soil classifying as brown, fine grained, silty SAND was encountered across the site and ranged in depth from 1 to 2 feet. These soils were noted to be loose and damp.

Natural: An undisturbed alluvium soil classifying as a brown, fine to medium grained, silty SAND was encountered beneath the upper surface soils. These native soils were observed to be medium dense and damp to moist. Deeper soils consisted of a light brown, fine to coarse grained, gravelly SAND, which were noted to be medium dense to dense and damp.

The overall engineering characteristics of the earth material were relatively uniform with each excavation. Groundwater was encountered at a depth of 31 feet below ground surface and some caving occurred in the deeper cohesionless soils.

4.0 Laboratory Tests

Relatively undisturbed samples of the subsurface soils were obtained to perform laboratory testing and analysis for direct shear, consolidation tests, and to determine in-place moisture/densities. These relatively undisturbed ring samples were obtained by driving a thin-walled steel sampler lined with one inch long brass rings with an inside diameter of 2.42 inches into the undisturbed soils.

Standard penetration tests were obtained by driving a steel sampler unlined with an inside diameter of 1.5 inches into the soils. This standard penetrometer sampler was driven a total of eighteen inches with blow counts tallied every six inches. Blow count data is given on the Boring Logs in Appendix A.

Bulk bag samples were obtained in the upper soils for expansion index tests and maximum density tests. Wall loadings on the order of 4,000 lbs./lin.ft. and maximum compression loads on the order of 100 kips were utilized for testing and design purposes. All test results are included in Appendix B, unless otherwise noted.

4.1 **Field moisture content** (ASTM: D 2216) and the dry density of the ring samples were determined in the laboratory. This data is listed on the logs of explorations.

4.2 **Maximum density tests** (ASTM: D-1557-07) were performed on typical samples of the upper soils. Results of these tests are shown on Table I.

4.3 **Expansion index tests** (ASTM: D 4829-07) were performed on remolded samples of the upper soils. Results of these tests are provided on Table II.

4.4 **Corrosion tests** consisting of sulfate, pH, resistivity and chloride analysis to determine potential corrosive effects of soils on concrete and underground utilities were performed in the laboratory. Test results are provided on Table III.

4.5 **R-Value test** per California Test Method 301 was performed on a representative sample, which may be anticipated to be near subgrade to determine pavement design. Result provided within pavement section design section of report.

4.6 **Direct shear tests** (ASTM: D-3080) were performed on undisturbed and disturbed samples of the subsurface soils. The test is performed under saturated conditions at loads of 1,000 lbs./sq.ft., 2,000 lbs./sq.ft., and 3,000 lbs./sq.ft. with results shown on Plates A and B.

4.7 **Consolidation tests** (ASTM: D-2435) were performed on undisturbed samples to determine the differential and total settlement which may be anticipated based upon the proposed loads. Water was added to the samples at a surcharge of one KSF and the settlement curves are plotted on Plates C to F.

5.0 Seismicity Evaluation

The proposed development lies just outside of the Alquist Priolo Special Studies Zone and the potential for damage due to direct fault rupture is considered very remote. The site is located in an area of high regional seismicity and the San Jacinto fault is located approximately 6 kilometers from the site. Ground shaking originating from earthquakes along other active faults in the region is expected to induce lower horizontal accelerations due to smaller anticipated earthquakes and/or greater distances to other faults.

The seismic design of the project has been updated to the latest 2010 ASCE 7-10 (with July 2013 errata) standards and the mapped seismic ground motions were provided by using the Java based program available from the United States Geological Survey (USGS) website: http://geohazards.usgs.gov/designmaps/us/application.php. The earthquake design parameters are in accordance with the 2013 California Building Code (CBC) and are listed below.

Seismic Design Parameters

Site Location	Latitude	34.019°
	Longitude	-117.356°
Site Class		D
Maximum Spectral Response Acceleration	S_S	1.524g
	S_1	0.657g
Adjusted Maximum Acceleration	S_{MS}	1.524g
	S_{M1}	0.985g
Design Spectral Response Acceleration Parameters	S_{DS}	1.016g
	S_{D1}	0.657g

6.0 Liquefaction Evaluation

The site is expected to experience ground shaking and earthquake activity that is typical of Southern California area. It is during severe ground shaking that loose, granular soils below the groundwater table can liquefy. A review of the exploratory boring log and the laboratory test results on selected soil samples obtained indicate the following soil classifications, field blowcounts and amounts of fines passing through the No. 200 sieve.

Field Blowcount and Gradation Data

Location	Classification	Blowcounts (blows/ft)	Relative Density	% Passing No. 200 Sieve
B-1 @ 5'	SM	10	Medium Dense	32
B-1 @ 10'	SM	7	Medium Dense	22
B-1 @ 15'	SM	23	Dense	12
B-1 @ 20'	SW	28	Dense	7
B-1 @ 25'	SM	32	Dense	18
B-1 @ 30'	SW	33	Dense	5
B-1 @ 35'	SW	35	Dense	4
B-1 @ 40'	SW	32	Dense	9
B-1 @ 45'	SM	34	Dense	17
B-1 @ 50'	SW	40	Dense	8

Our analysis indicates the potential for liquefaction at this site is considered to be low, due to the very dense granular soils below a historic groundwater depth of 30 feet, based on review of ground water maps of the Upper Santa Ana River Basin. (Carson and Matti, 1982). Seismic-induced settlements would be less than one inch and should occur rather uniformly across the site. Differential settlements from a nearby magnitude 6.7 earthquake would be one-half inch over a 100 feet (horizontal) distance in the building pad area. Thus, the design of the proposed construction in conformance with the latest Building Code provisions for earthquake design is expected to provide mitigation of ground shaking hazards that are typical to Southern California.

7.0 Conclusions and Recommendations

Based upon our evaluations, the proposed development is acceptable from a geotechnical engineering standpoint. By following the recommendations and guidelines set forth in our report, the structures will be safe from excessive settlements under the anticipated design loadings and conditions. The proposed development shall meet all requirements of the City Building Ordinance and will not impose any adverse effect on existing adjacent structures.

The following recommendations are based upon geotechnical conditions encountered in our field investigation and laboratory data. Therefore, these surface and subsurface conditions could vary across the site. Variations in these conditions may not become evident until the commencement of grading operations and any unusual conditions which may be encountered in the course of the project development may require the need for additional study and revised recommendations.

It is recommended that site inspections be performed by a representative of this firm during all grading and construction of the development to verify the findings and recommendations documented in this report. The following sections present a discussion of geotechnical related requirements for specific design recommendations of different aspects of the project.

7.1 Site Grading Recommendations

Any vegetation shall be removed and hauled from proposed grading areas prior to the start of grading operations. Existing vegetation shall not be mixed or disced into the soils. Any removed soils may be reutilized as compacted fill once any deleterious material or oversized materials (in excess of eight inches) is removed. Grading operations shall be performed in accordance with the attached "Specifications for Compacted Fill Operations".

7.1.1 Removal and Recompaction Recommendations

All upper fill/disturbed soils (about 1 to 2 feet) shall be removed to competent native material, the exposed surface scarified to a depth of six inches, brought to within 2% of optimum moisture content and compacted to a minimum of 90% of the laboratory standard (ASTM: D-1557-07) prior to placement of any additional compacted fill soils, foundations, slabs-on-grade and pavement. Grading shall extend a minimum of five horizontal feet outside the edges of foundations or equidistant to the depth of fill placed, whichever is greater.

It is possible that isolated areas of undiscovered fill, not described in this report are present on site. If found, these areas should be treated as discussed earlier. A diligent search shall also be conducted during grading operations in an effort to uncover any underground structures, irrigation or utility lines. If encountered, these structures and lines shall be either removed or properly abandoned prior to the proposed construction.

Any imported fill material should be preferably soil similar to the upper soils encountered at the subject site. All soils shall be approved by this firm prior to importing at the site and will be subjected to additional laboratory testing to assure concurrence with the recommendations stated in this report.

Care should be taken to provide or maintain adequate lateral support for all adjacent improvements and structures at all times during the grading operations and construction phase. Adequate drainage away from the structures, pavement and slopes should be provided at all times.

If placement of slabs-on-grade and pavement is not completed immediately upon completion of grading operations, additional testing and grading of the areas may be necessary prior to continuation of construction operations. Likewise, if adverse weather conditions occur which may damage the subgrade soils, additional assessment by the geotechnical engineer as to the suitability of the supporting soils may be needed.

7.1.2 **Fill Blanket Recommendations**

Due to the potential for differential settlement of foundations placed on compacted fill and the medium dense native materials, it is recommended that all foundations be underlain by a uniform compacted fill blanket at least two feet in thickness. This fill blanket shall extend a minimum of five horizontal feet outside the edges of foundations or equidistant to the depth of fill placed, whichever is greater.

7.2 Shrinkage and Subsidence

Results of our in-place density tests reveal that the soil shrinkage will be on the order of 10 to 15% due to excavation and recompaction, based upon the assumption that the fill is compacted to 92% of the maximum dry density per ASTM standards. Subsidence should be 0.2 feet due to earthwork operations. The volume change does not include any allowance for vegetation or organic stripping, removal of subsurface improvements or topographic approximations.

Although these values are only approximate, they represent our best estimate of lost yardage, which will likely occur during grading. If more accurate shrinkage and subsidence factors are needed, it is recommended that field testing using the actual equipment and grading techniques should be conducted.

7.3 Temporary Excavations

Temporary unsurcharged excavations in the existing site materials less than 4 feet high may be made at a vertical gradient unless cohesionless soils are encountered. In areas where soils with little or no binder are encountered, where adverse geological conditions are exposed, or where excavations are adjacent to existing structures, shoring, slot-cutting, or flatter excavations may be required. The temporary cut slope gradients given do not preclude local raveling and sloughing. All excavations shall be made in accordance with the requirements of CAL-OSHA and other public agencies having jurisdiction. Care should be taken to provide or maintain adequate lateral support for all adjacent improvements and structures at all times during the grading operations and construction phase.

7.4 Foundation Design

All foundations may be designed utilizing the following safe bearing capacities for an embedded depth of 18 inches into approved fill materials with the corresponding widths:

Allowable Safe Bearing Capacity (psf)

Width (ft)	Continuous Foundation	Isolated Foundation
1.5	2000	2500
2.0	2050	2550
4.0	2300	2800
6.0	2500	3000

The bearing value may be increased by 500 psf for each additional foot of depth in excess of the 18-inch minimum depth, up to a maximum of 4,000 psf. A one third increase may be used when considering short term loading and seismic forces. Any foundations located along the property lines or where lateral overexcavation is not possible may utilize a safe bearing capacity of 1,500 psf. A representative of this firm shall inspect all foundation excavations prior to pouring concrete.

7.5 Settlement Analysis

Resultant pressure curves for the consolidation tests are shown on Plates C to F. Computations utilizing these curves and the recommended safe bearing capacities reveal that the foundations will experience settlements on the order of 3/4 inch and differential settlements of less than 1/4 inch.

7.6 Lateral Resistance

The following values may be utilized in resisting lateral loads imposed on the structure. Requirements of the California Building Code should be adhered to when the coefficient of friction and passive pressures are combined.

Coefficient of Friction – 0.40

Equivalent Passive Fluid Pressure = 250 lbs./cu.ft.

Maximum Passive Pressure = 2,500 lbs./cu.ft.

The passive pressure recommendations are valid only for approved compacted fill soils.

7.7 Retaining Wall Design Parameters

Active earth pressures against retaining wall will be equal to the pressures developed by the following fluid densities. These values are for **granular backfill material** placed behind the walls at various ground slopes above the walls.

Surface Slope of Retained Materials (Horizontal to Vertical)	Equivalent Fluid Density (lb./cu.ft.)
Level	30
5 to 1	35
4 to 1	38
3 to 1	40
2 to 1	45

Any applicable short-term construction surcharges and seismic forces should be added to the above lateral pressure values. A backfill zone of non-expansive material shall consist of a wedge beginning a minimum of one horizontal foot from the base of the wall extending upward at an inclination no less than 1/4 to 1 (horizontal to vertical). All walls shall be waterproofed as needed and protected from hydrostatic pressure by a reliable permanent subdrain system.

7.8 Slab Design

All concrete slabs-on-grade shall be at least four inches in office and six inches in warehouse and placed on approved subgrade soils. Additional reinforcement requirements and an increase in thickness of the slabs-on-grade may be necessary based upon soils expansion potential and proposed loading conditions in the structures and should be evaluated further by the project engineers and/or architect.

A vapor retarder should be utilized in areas which would be sensitive to the infiltration of moisture. This retarder shall meet requirements of ASTM E 96, *Water Vapor Transmission of Materials* and ASTM E 1745, *Standard Specification for Water Vapor Retarders used in Contact with Soil or Granular Fill Under Concrete Slabs.* The vapor retarder shall be installed in accordance with procedures stated in ASTM E 1643, *Standard practice for Installation of Water Vapor Retarders used in Contact with Earth or Granular Fill Under Concrete Slabs.*

The moisture retarder may be placed directly upon approved subgrade soils conditioned to optimum moisture levels, although one to two inches of sand beneath the membrane is desirable. The subgrade upon which the retarder is placed shall be smooth and free of rocks, gravel or other protrusions which may damage the retarder. Use of sand above the retarder is under the purview of the structural engineer; if sand is used over the retarder, it should be placed in a dry condition.

7.9 Pavement Section Design

The table below provides a preliminary pavement design based upon an R-Value of 47 for the proposed pavement areas. Final pavement design may need to be based on R-Value testing of the subgrade soils near the conclusion of rough grading to assure that these soils are consistent with those assumed in this preliminary design.

Type of Traffic	Traffic Index	Asphaltic Concrete (in)	Base Material (in)
Automobile Parking and Drive Circulation Areas	4.0/5.0	3.0	4.0
Heavy Truck Access Areas (GVW < 90,000 lbs.; 5 axle)	7.0	4.0	8.0

All concrete slabs to be utilized for pavement shall be a minimum of six inches in thickness and placed on approved subgrade soils. In addition, the above recommendations are based upon estimated traffic loads. Client should submit anticipated traffic loadings, when available, so that pavement sections may be reviewed to determine adequacy to support these loads.

All pavement areas shall have positive drainage toward an approved outlet from the site. Drain lines behind curbs and/or adjacent to landscape areas should be considered by client and the appropriate design engineers to prevent water from infiltrating beneath pavement. If such infiltration occurs, damage to pavement, curbs and flow lines, especially on sites with expansive soils, may occur during the life of the project.

Any approved base material shall consist of a Class II aggregate or equivalent and should be compacted to a minimum of 95% relative compaction. All pavement materials shall conform to the requirements set forth by the City of Riverside. The base material and asphaltic concrete should be tested prior to delivery to the site and during placement to determine conformance with the project specifications. A pavement engineer shall designate the specific asphalt mix design to meet the required project specifications.

7.10 Utility Trench and Excavation Backfill

Trenches from installation of utility lines and other excavations may be backfilled with on-site soils or approved imported soils compacted to a minimum of 90% relative compaction. All utility lines shall be properly bedded with clean sand having a sand equivalency rating of 30 (SE > 30) or more. This bedding material shall be thoroughly water jetted around the pipe structure prior to placement of compacted backfill soils.

7.11 Corrosion Design Criteria

Representative samples of the surficial soils, typical of the subgrade soils expected to be encountered within foundation excavations and underground utilities were tested for corrosion potential. Representative samples of the surficial soils, typical of the subgrade soils expected to be encountered within foundation excavations and underground utilities were tested for corrosion potential.

The minimum resistivity value obtained for the samples tested is representative of an environment that may be severely corrosive to metals. The soil pH value was considered mildly acidic and may not have a significant effect on soil corrosivity. Consideration should be given to corrosion protection systems for buried metal such as protective coatings, wrappings or the use of PVC where permitted by local building codes.

According to Table 4.3.1, ACI 318 Building Code and Commentary, these contents revealed negligible levels of sulfate exposure. Therefore, a Type II cement according to latest CBC specifications may be utilized for building foundations at this time. Additional sulfate tests shall be performed at the completion of site grading to assure that these soils are consistent with the recommendations stated in this design. Sulfate test results may be found on the attached Table III.

7.12 Expansive Soil

If any expansive soils are encountered, special attention should be given to the project design and maintenance. The attached *Expansive Soil Guidelines* should be reviewed by the engineers, architects, owner, maintenance personnel and other interested parties and considered during the design of the project and future property maintenance.

8.0 Closure

The recommendations and conclusions contained in this report are based upon the soil conditions uncovered in our test excavations. No warranty of the soil condition between our excavations is implied. NorCal Engineering should be notified for possible further recommendations if unexpected to unfavorable conditions are encountered during construction phase. It is the responsibility of the owner to ensure that all information within this report is submitted to the Architect and appropriate Engineers for the project. This firm should have the opportunity to review the final plans to verify that all our recommendations are incorporated. This report and all conclusions are subject to the review of the controlling authorities for the project.

A preconstruction conference should be held between the developer, general contractor, grading contractor, city inspector, architect, and soil engineer to clarify any questions relating to the grading operations and subsequent construction. Our representative should be present during the grading operations and construction phase to certify that such recommendations are complied within the field.

This geotechnical investigation has been conducted in a manner consistent with the level of care and skill exercised by members of our profession currently practicing under similar conditions in the Southern California area. No other warranty, expressed or implied is made.

We appreciate this opportunity to be of service to you. If you have any further questions, please do not hesitate to contact the undersigned.

Respectfully submitted,
NORCAL ENGINEERING

Keith D. Tucker
Project Engineer
R.G.E. 841

REGISTERED PROFESSIONAL ENGINEER
KEITH D. TUCKER
No. 841
Exp. 12/31/14
GEOTECHNICAL
STATE OF CALIFORNIA

Scott D. Spensiero
Project Manager

SPECIFICATIONS FOR PLACEMENT OF COMPACTED FILL

Excavation

Any existing low-density soils and/or saturated soils shall be removed to competent natural soil under the inspection of the Soils Engineering Firm. After the exposed surface has been cleansed of debris and/or vegetation, it shall be scarified until it is uniform in consistency, brought to the proper moisture content and compacted to a minimum of 90% relative compaction (in accordance with ASTM: D-1557). In any area where a transition between fill and native soil or between bedrock and soil are encountered or other areas as required in this report, additional excavation beneath foundations and slabs will be necessary in order to provide uniform support and avoid differential settlement of the structure. Verification of elevations during this work and all grading operations will be the responsibility of the owner or his designated representative and not NorCal Engineering.

Material For Fill

The on-site soils or approved import soils may be utilized for the compacted fill provided they are free of any deleterious materials and shall not contain any rocks, brick, asphaltic concrete, concrete or other hard materials greater than eight inches in maximum dimensions. Any import soil must be approved by the Soils Engineering firm a minimum of 24 hours prior to importation of site.

Placement of Compacted Fill Soils

The approved fill soils shall be placed in layers not excess of six inches in thickness. Each lift shall be uniform in thickness and thoroughly blended. The fill soils shall be brought to within 2% of the optimum moisture content, unless otherwise specified by the Soils Engineering firm. Each lift shall be compacted to a minimum of 90% relative compaction (in accordance with ASTM: D-1557) and approved prior to the placement of the next layer of soil. Compaction tests shall be obtained at the discretion of the Soils Engineering firm but to a minimum of one test for every 500 cubic yards placed and/or for every 2 feet of compacted fill placed.

The minimum relative compaction shall be obtained in accordance with accepted methods in the construction industry. The final grade of the structural areas shall be in a dense and smooth condition prior to placement of slabs-on-grade or pavement areas. No fill soils shall be placed, spread or compacted during unfavorable weather conditions. When the grading is interrupted by heavy rains, compaction operations shall not be resumed until approved by the Soils Engineering firm.

Grading Observations

The controlling governmental agencies should be notified prior to commencement of any grading operations. This firm recommends that the grading operations be conducted under the observation of a Soils Engineering firm as deemed necessary. A 24 hour notice must be provided to this firm prior to the time of our initial inspection.

Observation shall include the clearing and grubbing operations to assure that all unsuitable materials have been properly removed; approve the exposed subgrade in areas to receive fill and in areas where excavation has resulted in the desired finished grade and designate areas of overexcavation; and perform field compaction tests to determine relative compaction achieved during fill placement. In addition, all foundation excavations shall be observed by the Soils Engineering firm to confirm that appropriate bearing materials are present at the design grades and recommend any modifications to construct footings.

Expansive Soil Guidelines

The following expansive soil guidelines are provided for your project. The intent of these guidelines is to inform you, the client, of the importance of proper design and maintenance of projects supported on expansive soils. ***You, as the owner or other interested party, should be warned that you have a duty to provide the information contained in the soil report including these guidelines to your design engineers, architects, landscapers and other design parties in order to enable them to provide a design that takes into consideration expansive soils.***

In addition, you should provide the soil report with these guidelines to any property manager, lessee, property purchaser or other interested party that will have or assume the responsibility of maintaining the development in the future.

Expansive soils are fine-grained silts and clays which are subject to swelling and contracting. The amount of this swelling and contracting is subject to the amount of fine-grained clay materials present in the soils and the amount of moisture either introduced or extracted from the soils. Expansive soils are divided into five categories ranging from "very low" to "very high". Expansion indices are assigned to each classification and are included in the laboratory testing section of this report. *If the expansion index of the soils on your site, as stated in this report, is 21 or higher, you have expansive soils.* The classifications of expansive soils are as follows:

Classification of Expansive Soil*

Expansion Index	Potential Expansion
0-20	Very Low
21-50	Low
51-90	Medium
91-130	High
Above 130	Very High

*From Table 18A-I-B of California Building Code (1988)

When expansive soils are compacted during site grading operations, care is taken to place the materials at or slightly above optimum moisture levels and perform proper compaction operations. Any subsequent excessive wetting and/or drying of expansive soils will cause the soil materials to expand and/or contract. These actions are likely to cause distress of foundations, structures, slabs-on-grade, sidewalks and pavement over the life of the structure. ***It is therefore imperative that even after construction of improvements, the moisture contents are maintained at relatively constant levels, allowing neither excessive wetting or drying of soils.***

Evidence of excessive wetting of expansive soils may be seen in concrete slabs, both interior and exterior. Slabs may lift at construction joints producing a trip hazard or may crack from the pressure of soil expansion. Wet clays in foundation areas may result in lifting of the structure causing difficulty in the opening and closing of doors and windows, as well as cracking in exterior and interior wall surfaces. In extreme wetting of soils to depth, settlement of the structure may eventually result. Excessive wetting of soils in landscape areas adjacent to concrete or asphaltic pavement areas may also result in expansion of soils beneath pavement and resultant distress to the pavement surface.

Excessive drying of expansive soils is initially evidenced by cracking in the surface of the soils due to contraction. Settlement of structures and on-grade slabs may also eventually result along with problems in the operation of doors and windows.

Projects located in areas of expansive clay soils will be subject to more movement and "hairline" cracking of walls and slabs than similar projects situated on non-expansive sandy soils. There are, however, measures that developers and property owners may take to reduce the amount of movement over the life the development. The following guidelines are provided to assist you in both design and maintenance of projects on expansive soils:

- Drainage away from structures and pavement is essential to prevent excessive wetting of expansive soils. Grades of at least 3% should be designed and maintained to allow flow of irrigation and rain water to approved drainage devices or to the street. Any "ponding" of water adjacent to buildings, slabs and pavement after rains is evidence of poor drainage; the installation of drainage devices or regrading of the area may be required to assure proper drainage. Installation of rain gutters is also recommended to control the introduction of moisture next to buildings. Gutters should discharge into a drainage device or onto pavement which drains to roadways.

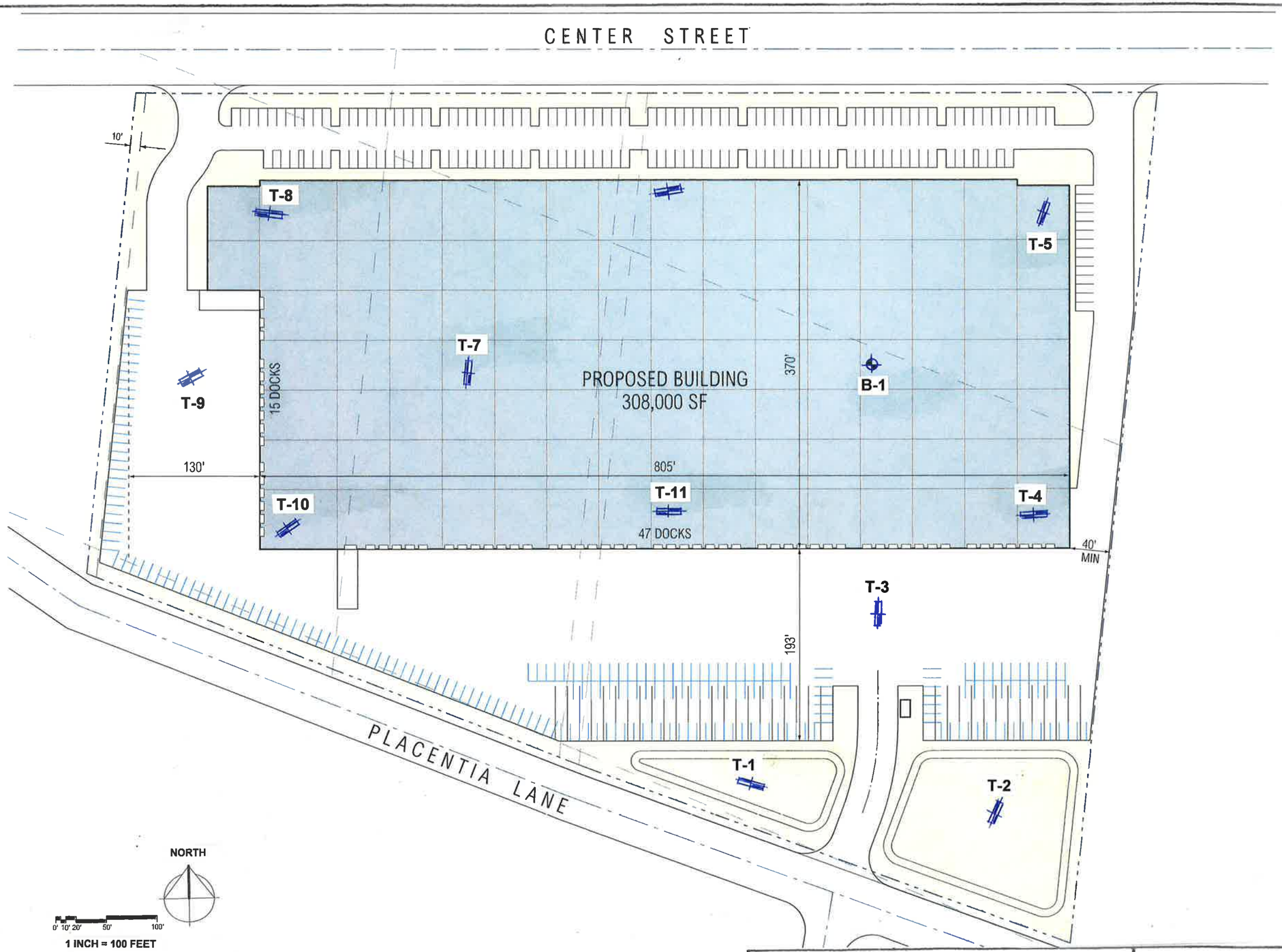
- Irrigation should be strictly controlled around building foundations, slabs and pavement and may need to be adjusted depending upon season. This control is essential to maintain a relatively uniform moisture content in the expansive soils and to prevent swelling and contracting. Over-watering adjacent to improvements may result in damage to those improvements. NorCal Engineering makes no specific recommendations regarding landscape irrigation schedules.

- Planting schemes for landscaping around structures and pavement should be analyzed carefully. Plants (including sod) requiring high amounts of water may result in excessive wetting of soils. Trees and large shrubs may actually extract moisture from the expansive soils, thus causing contraction of the fine-grained soils.

- Thickened edges on exterior slabs will assist in keeping excessive moisture from entering directly beneath the concrete. A six-inch thick or greater deepened edge on slabs may be considered. Underlying interior and exterior slabs with 6 to 12 inches or more of non-expansive soils and providing presaturation of the underlying clayey soils as recommended in the soil report will improve the overall performance of on-grade slabs.

- Increase the amount of steel reinforcing in concrete slabs, foundations and other structures to resist the forces of expansive soils. The precise amount of reinforcing should be determined by the appropriate design engineers and/or architects.

- Recommendations of the soil report should always be followed in the development of the project. Any recommendations regarding presaturation of the upper subgrade soils in slab areas should be performed in the field and verified by the Soil Engineer.



NorCal Engineering
SOILS AND GEOTECHNICAL CONSULTANTS

PROJECT 17745-14 | DATE NOVEMBER 2014

SITE PLAN

List of Appendices

(in order of appearance)

Appendix A - Log of Excavations

- Log of Boring B-1
- Log of Trenches T-1 to T-11

- **Appendix B - Laboratory Tests**
- Table I - Maximum Dry Density
- Table II – Expansion
- Table III - Corrosion

- Plates A and B - Direct Shear
- Plates C to F – Consolidation

Appendix A

MAJOR DIVISION			GRAPHIC SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL, SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SAND (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINE (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

UNIFIED SOIL CLASSIFICATION SYSTEM

KEY:

- ■ Indicates 2.5-inch Inside Diameter. Ring Sample.
- ☒ Indicates 2-inch OD Split Spoon Sample (SPT).
- ⧅ Indicates Shelby Tube Sample.
- ◫ Indicates No Recovery.
- ◧ Indicates SPT with 140# Hammer 30 in. Drop.
- ✉ Indicates Bulk Sample.
- ◩ Indicates Small Bag Sample.
- ◨ Indicates Non-Standard
- ⧗ Indicates Core Run.

COMPONENT PROPORTIONS

DESCRIPTIVE TERMS	RANGE OF PROPORTION
Trace	1 - 5%
Few	5 - 10%
Little	10 - 20%
Some	20 - 35%
And	35 - 50%

COMPONENT DEFINITIONS

COMPONENT	SIZE RANGE
Boulders	Larger than 12 in
Cobbles	3 in to 12 in
Gravel	3 in to No 4 (4.5mm)
Coarse gravel	3 in to 3/4 in
Fine gravel	3/4 in to No 4 (4.5mm)
Sand	No. 4 (4.5mm) to No. 200 (0.074mm)
Coarse sand	No. 4 (4.5 mm) to No. 10 (2.0 mm)
Medium sand	No. 10 (2.0 mm) to No. 40 (0.42 mm)
Fine sand	No. 40 (0.42 mm) to No. 200 (0.074 mm)
Silt and Clay	Smaller than No. 200 (0.074 mm)

MOISTURE CONTENT

DRY	Absence of moisture, dusty, dry to the touch.
DAMP	Some perceptible moisture; below optimum
MOIST	No visible water; near optimum moisture content
WET	Visible free water, usually soil is below water table.

RELATIVE DENSITY OR CONSISTENCY VERSUS SPT N -VALUE

COHESIONLESS SOILS		COHESIVE SOILS		
Density	N (blows/ft)	Consistency	N (blows/ft)	Approximate Undrained Shear Strength (psf)
Very Loose	0 to 4	Very Soft	0 to 2	< 250
Loose	4 to 10	Soft	2 to 4	250 - 500
Medium Dense	10 to 30	Medium Stiff	4 to 8	500 - 1000
Dense	30 to 50	Stiff	8 to 15	1000 - 2000
Very Dense	over 50	Very Stiff	15 to 30	2000 - 4000
		Hard	over 30	> 4000

Transition Partners, L.P. 17745-14	Log of Boring B-1

Boring Location: Placentia & Center, Riverside	
Date of Drilling: 11/6/14	Groundwater Depth: 31'
Drilling Method: Simco 2800HS	
Hammer Weight: 140 lbs	Drop: 30"
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: % Passing 200 Sieve
0		FILL Silty (fine grained) SAND Brown, loose, damp					
		NATURAL Silty (fine grained) SAND Brown, medium dense, damp to moist					
5			X	4/5/5	2.7		32
10			X	3/3/4	10.0		22
		Gravelly (fine to coarse grained) SAND Light brown, medium dense to dense, wet; slightly silty					
15			X	10/11/12	3.6		12
20			X	11/13/15	7.1		7
25			X	13/15/18	8.2		18
30		Groundwater @ 31' bgs	X	12/13/20	4.8		5
35							

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECT\17745-14.log Date: 11/19/2014

NorCal Engineering

Transition Partners, L.P. 17745-14	Log of Boring B-1

Boring Location: Placentia & Center, Riverside	
Date of Drilling: 11/6/14	Groundwater Depth: 31'
Drilling Method: Simco 2800HS	
Hammer Weight: 140 lbs	Drop: 30"
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples Type	Samples Blow Counts	Laboratory Moisture	Laboratory Dry Density	Laboratory % Passing 200 Sieve
35		Gravelly (fine to coarse grained) SAND Light brown, medium dense to dense, wet; slightly silty	X	15/17/18	16.9		4
40			X	11/15/17	19.2		9
45			X	14/15/19	25.7		17
50			X	16/18/22	21.7		8
		Groundwater @ 31' bgs Boring completed at depth of 51.5'					
55							
60							
65							
70							

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Transition Partners, L.P. 17745-14	Log of Trench T-1

Boring Location: Placentia & Center, Riverside	
Date of Drilling: 11/6/14	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: % Passing 200 Sieve
0		FILL Silty (fine grained) SAND Brown, loose, dry; with occasional gravel and rootlets					
		GWT not encountered					
		NATURAL Silty (fine grained) SAND Brown, medium dense, damp					
5		Boring completed at depth of 5'					
10							
15							
20							
25							
30							
35							

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Transition Partners, L.P. 17745-14	Log of Trench T-2

Boring Location: Placentia & Center, Riverside	
Date of Drilling: 11/6/14	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: % Passing 200 Sieve
0		FILL Silty (fine grained) SAND Brown, loose, dry; with occasional gravel and rootlets					
		NATURAL Silty (fine grained) SAND Brown, medium dense, damp					
5		GWT not encountered					
		Gravelly (fine to coarse grained) SAND Light brown, medium dense, damp					
10		Boring completed at depth of 10'					
15							
20							
25							
30							
35							

Date: 11/19/2014 File: C:\Superlog4\PROJECT\17745-14.log SuperLog CivilTech Software, USA www.civiltech.com

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Transition Partners, L.P. 17745-14	Log of Trench T-3

Boring Location: Placentia & Center, Riverside	
Date of Drilling: 11/6/14	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: % Passing 200 Sieve
0		FILL Silty (fine grained) SAND Brown, loose, dry; with occasional gravel and rootlets					
		NATURAL Silty (fine to medium grained) SAND Brown to light brown, medium dense, damp					
5		Boring completed at depth of 5'					
10							
15							
20							
25							
30							
35							

GWT not encountered

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECT\17745-14.log Date: 11/19/2014

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Transition Partners, L.P.
17745-14

Log of Trench T-4

Boring Location: Placentia & Center, Riverside	
Date of Drilling: 11/6/14	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples Type	Samples Blow Counts	Laboratory Moisture	Laboratory Dry Density	Laboratory % Passing 200 Sieve
0		FILL Silty (fine grained) SAND Brown, loose, dry; with occasional gravel and rootlets	■		2.1	97.4	
		NATURAL Silty (fine grained) SAND Brown, medium dense, slightly damp					
5		Silty (fine to medium grained) SAND Light brown, medium dense, damp; slightly silty	■		1.6	101.2	
		Silty (fine grained) SAND Brown, medium dense, moist					
10		Boring completed at depth of 10'	■		9.8	96.3	
15							
20							
25							
30							
35							

GWT not encountered

Date: 11/19/2014 File: C:\Superlog4\PROJECT\17745-14.log www.civiltech.com SuperLog CivilTech Software, USA

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Transition Partners, L.P. 17745-14	Log of Trench T-5

Boring Location: Placentia & Center, Riverside	
Date of Drilling: 11/6/14	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: % Passing 200 Sieve
0		FILL Silty (fine grained) SAND Brown, loose, dry; with occasional gravel and rootlets					
		NATURAL Silty (fine grained) SAND Brown, medium dense, damp					
5		Silty (fine to medium grained) SAND Light brown, medium dense, damp; slightly silty	■		5.4	100.8	
10			■		5.9	103.7	
15		Boring completed at depth of 15'	■		3.6	104.8	
20							
25							
30							
35							

GWT not encountered

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECT\17745-14.log Date: 11/19/2014

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Transition Partners, L.P. 17745-14	Log of Trench T-6

Boring Location: Placentia & Center, Riverside	
Date of Drilling: 11/6/14	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples Type	Samples Blow Counts	Laboratory Moisture	Laboratory Dry Density	Laboratory % Passing 200 Sieve
0		FILL Silty (fine grained) SAND Brown, loose, dry; with occasional gravel and rootlets					
		NATURAL Silty (fine grained) SAND Brown, medium dense, damp	■		3.7	99.1	
5		Gravelly (medium to coarse grained) SAND Light brown, medium dense, slightly damp; slightly silty					
			■		1.7	101.7	
10		Boring completed at depth of 10'					
15							
20							
25							
30							
35							

GWT not encountered

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECT\17745-14.log Date: 11/19/2014

NorCal Engineering

Transition Partners, L.P.
17745-14

Log of Trench T-7

Boring Location: Placentia & Center, Riverside	
Date of Drilling: 11/6/14	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: % Passing 200 Sieve
0		FILL Silty (fine grained) SAND Brown, loose, dry; with occasional gravel and rootlets					
		NATURAL Silty (fine to medium grained) SAND Brown to light brown, medium dense, damp	■		3.1	102.2	
5			■		2.7	104.0	
10		Boring completed at depth of 10'					
15							
20							
25							
30							
35							

GWT not encountered

Date: 11/19/2014 File: C:\Superlog4\PROJECT\17745-14.log SuperLog CivilTech Software, USA www.civiltech.com

NorCal Engineering

Transition Partners, L.P.
17745-14

Log of Trench T-8

Boring Location: Placentia & Center, Riverside	
Date of Drilling: 11/6/14	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: % Passing 200 Sieve
0		FILL Silty (fine grained) SAND Brown, loose, dry; with occasional gravel and rootlets	■		2.6	98.8	
		NATURAL Silty (fine grained) SAND Brown, medium dense, damp					
5		Silty (fine to medium grained) SAND Light brown, medium dense, damp	■		1.4	105.7	
10			■		2.5	97.1	
		Gravelly (fine to coarse grained) SAND Light brown, medium dense, damp; slightly silty with occasional cobbles					
15		Boring completed at depth of 15'	■		2.5	108.1	
20							
25							
30							
35							

GWT not encountered

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NorCal Engineering

Transition Partners, L.P.

17745-14

Log of Trench T-9

Boring Location: Placentia & Center, Riverside	
Date of Drilling: 11/6/14	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: % Passing 200 Sieve
0		FILL Silty (fine grained) SAND Brown, loose, dry; with occasional gravel and rootlets					
		NATURAL Silty (fine to medium grained) SAND Brown, medium dense, damp					
5		GWT not encountered					
		Boring completed at depth of 7'					
10							
15							
20							
25							
30							
35							

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Transition Partners, L.P.

17745-14

Log of Trench T-10

Boring Location: Placentia & Center, Riverside	
Date of Drilling: 11/6/14	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: % Passing 200 Sieve
0		FILL Silty (fine grained) SAND Brown, loose, dry; with occasional gravel and rootlets					
		NATURAL Silty (fine to medium grained) SAND Brown, medium dense, damp	■		1.9	97.7	
5		Gravelly (fine to coarse grained) SAND Light brown, medium dense, damp; slightly silty	■		2.2	101.1	
10		Boring completed at depth of 10'					
15							
20							
25							
30							
35							

GWT not encountered

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECT\17745-14.log Date: 11/19/2014

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Transition Partners, L.P. 17745-14	Log of Trench T-11

Boring Location: Placentia & Center, Riverside	
Date of Drilling: 11/6/14	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples Type	Samples Blow Counts	Laboratory Moisture	Laboratory Dry Density	Laboratory % Passing 200 Sieve
0		FILL Silty (fine grained) SAND Brown, loose, dry; with occasional gravel and rootlets					
		NATURAL Silty (fine grained) SAND Brown, medium dense, damp	■		1.7	102.5	
5		Boring completed at depth of 5'					
			■		1.4	109.0	
10							
15							
20							
25							
30							
35							

GWT not encountered

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECT\17745-14.log Date: 11/19/2014

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Appendix B

TABLE I
MAXIMUM DENSITY TESTS

Sample	Classification	Optimum Moisture	Maximum Dry Density (lbs./cu.ft.)
T-4 @ 2'	Silty SAND	11.0	123.0
T-8 @ 2'	Silty SAND	10.0	120.0

TABLE II
EXPANSION INDEX TESTS

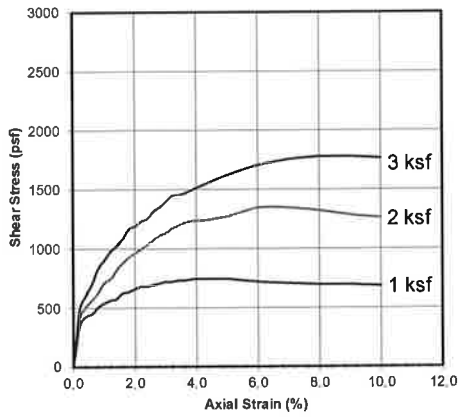
Soil Type	Classification	Expansion Index
T-4 @ 2'	Silty SAND	7
T-8 @ 2'	Silty SAND	3

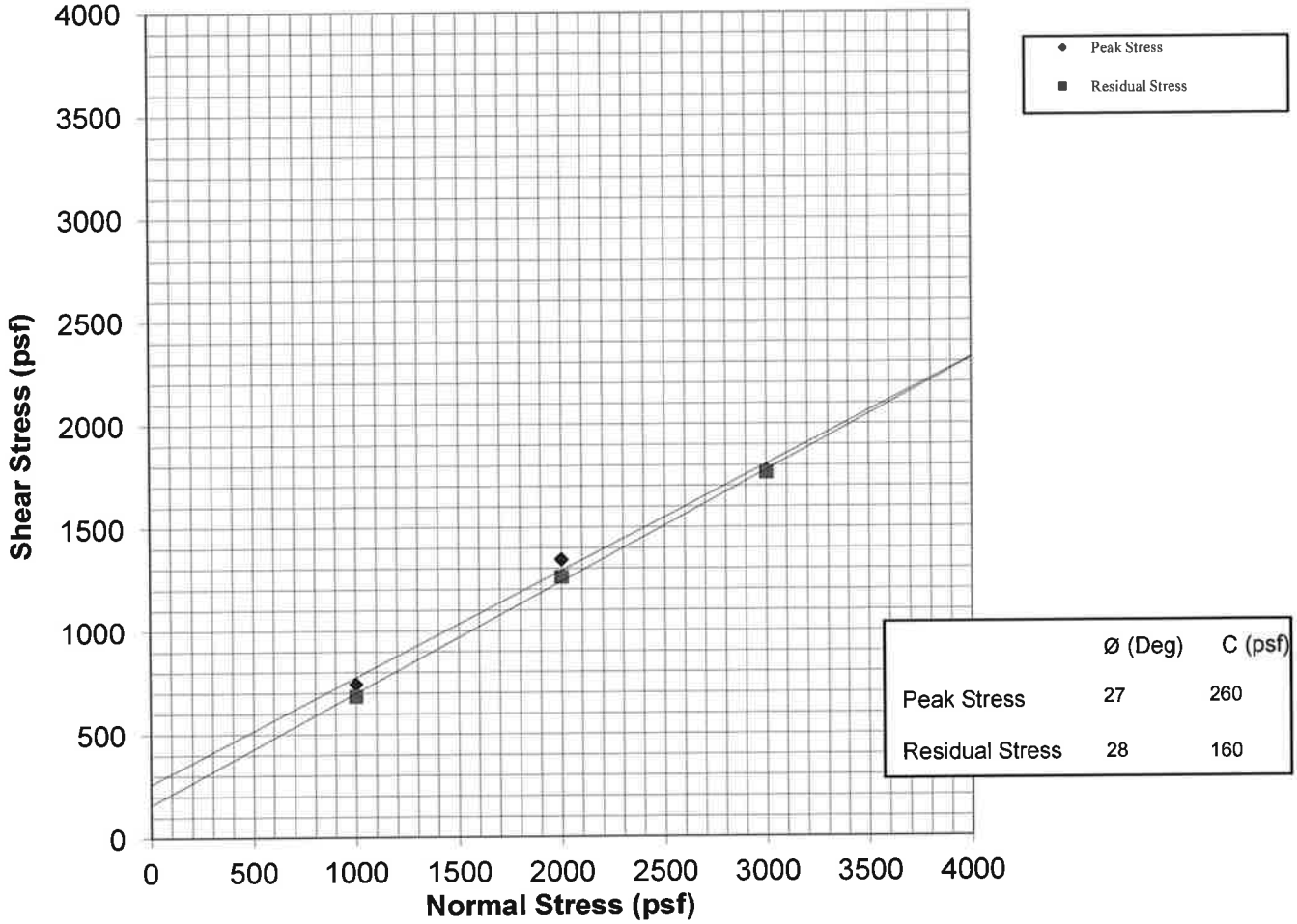
TABLE III
CORROSION TESTS

Sample	pH	Electrical Resistivity (ohm-cm)	Sulfate (%)	Chloride (ppm)
T-4 @ 2'	6.7	1,397	0.006	254
T-8 @ 2'	6.7	1,986	0.008	213

ND denotes not detected
% by weight
ppm – mg/kg

Sample No.		T4@2'		
Sample Type:		Undisturbed/Saturated		
Soil Description:		Silty Fine-Medium Grained Sand w/ Some Small Gravel		
		1	2	3
Normal Stress	(psf)	1000	2000	3000
Peak Stress	(psf)	744	1344	1776
Displacement	(in)	0.100	0.150	0.200
Residual Stress	(psf)	684	1260	1764
Displacement	(in.)	0.250	0.250	0.250
In Situ Dry Density	(pcf)	98.7	98.7	98.7
In Situ Water Content	(%)	1.8	1.8	1.8
Saturated Water Content	(%)	26.3	26.3	26.3
Strain Rate	(in/min)	0.020	0.020	0.020





	Ø (Deg)	C (psf)
Peak Stress	27	260
Residual Stress	28	160

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SOILS AND GEOTECHNICAL CONSULTANTS

Transition Properties, LP

PROJECT NUMBER: 17745-14 DATE: 11/21/2014

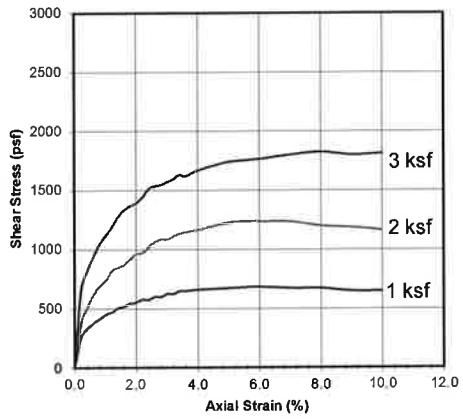
DIRECT SHEAR TEST

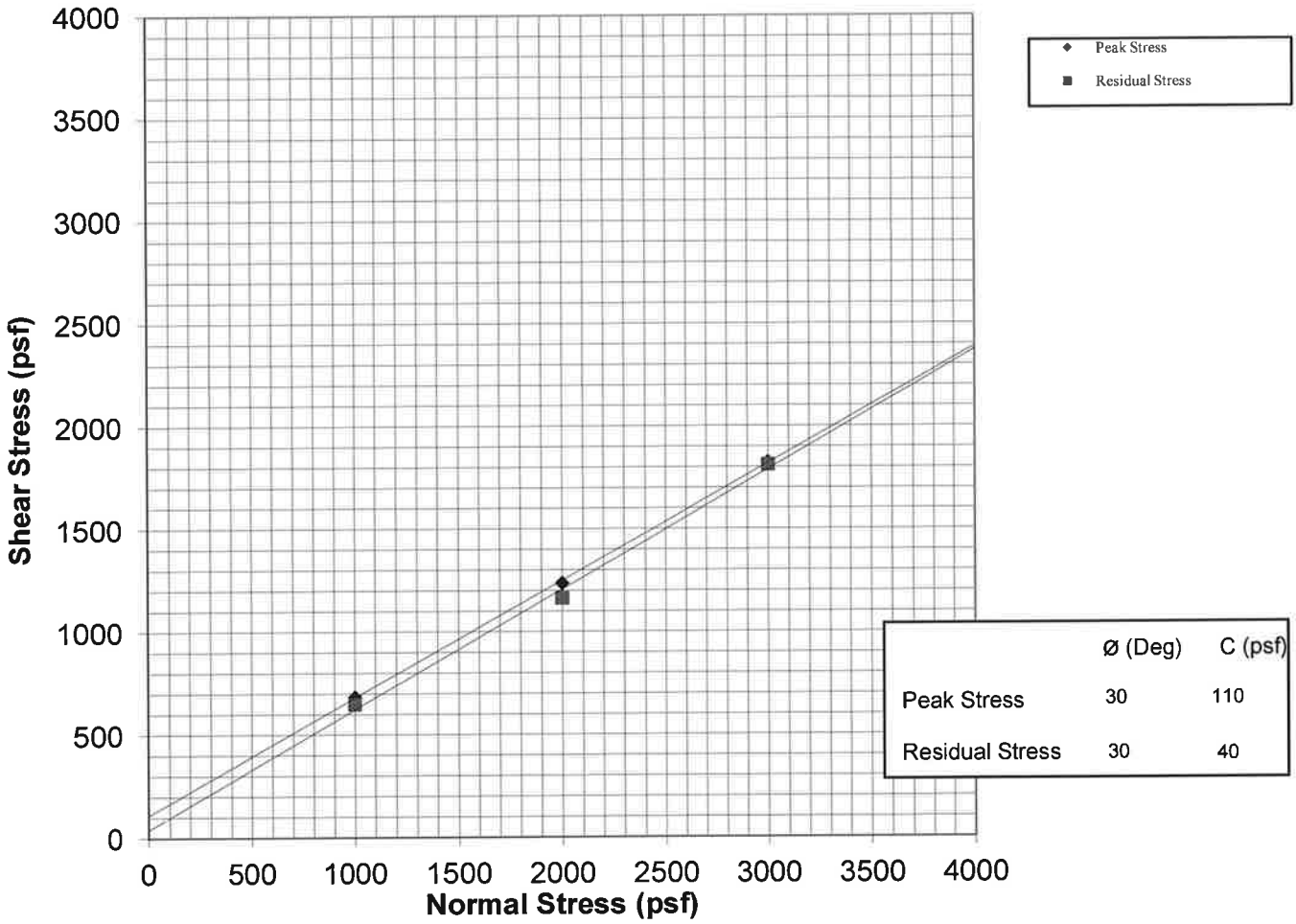
ASTM D3080

Plate A

Sample No.	T8@2'
Sample Type:	Undisturbed/Saturated
Soil Description:	Silty Fine-Medium Grained Sand

		1	2	3
Normal Stress	(psf)	1000	2000	3000
Peak Stress	(psf)	684	1236	1824
Displacement	(in.)	0.150	0.150	0.200
Residual Stress	(psf)	648	1164	1812
Displacement	(in.)	0.250	0.250	0.250
In Situ Dry Density	(pcf)	98.8	98.8	98.8
In Situ Water Content	(%)	2.6	2.6	2.6
Saturated Water Content	(%)	26.1	26.1	26.1
Strain Rate	(in/min)	0.020	0.020	0.020





	Ø (Deg)	C (psf)
Peak Stress	30	110
Residual Stress	30	40

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SOILS AND GEOTECHNICAL CONSULTANTS

Transition Properties, LP

PROJECT NUMBER: 17745-14 DATE: 11/21/2014

DIRECT SHEAR TEST

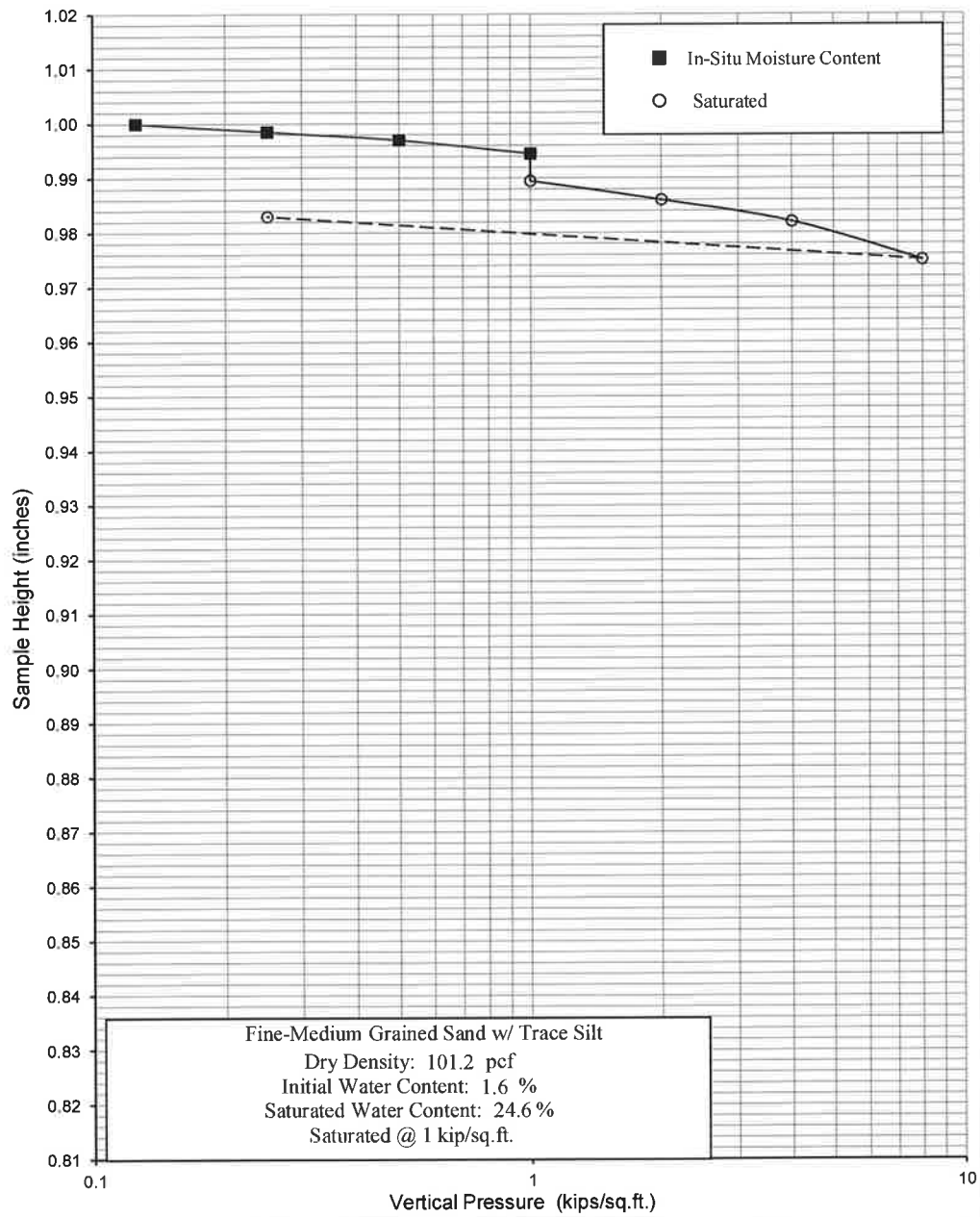
ASTM D3080

Plate B

Vertical Pressure (kips/sq.ft.)	Sample Height (inches)	Consolidation (percent)	
0.125	1.0000	0.0	
0.25	0.9985	0.2	
0.5	0.9970	0.3	
1	0.9945	0.6	
1	0.9895	1.1	
2	0.9860	1.4	
4	0.9820	1.8	
8	0.9750	2.5	Saturated
0.25	0.9830	1.7	

Sample No.	T4	Depth	5'	Date	11/21/2014

Date Tested: 11/18/2014
Sample: T4
Depth: 5'



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SOILS AND GEOTECHNICAL CONSULTANTS

Transition Properties, LP

PROJECT NUMBER: 17745-14 DATE: 11/21/2014

CONSOLIDATION TEST

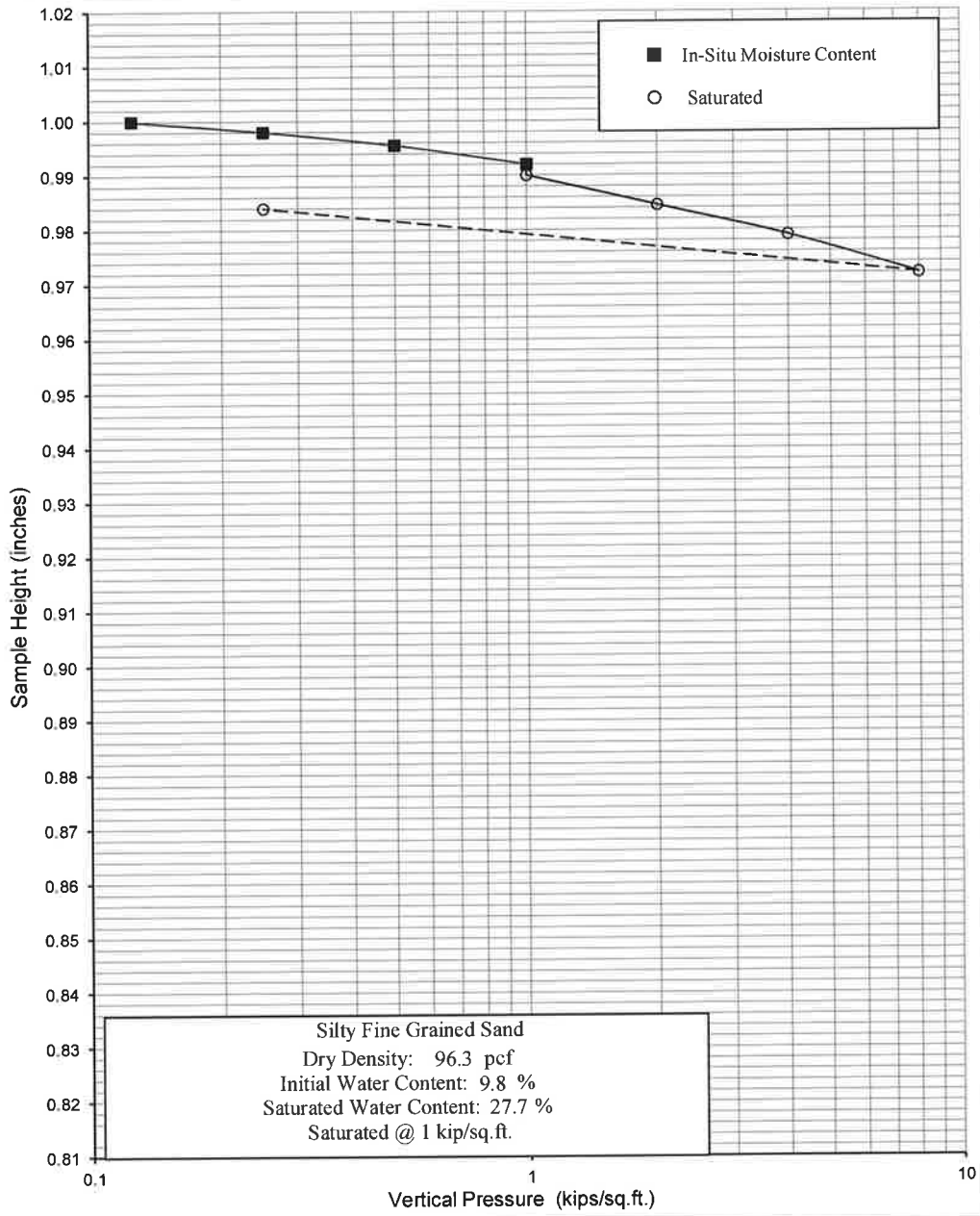
ASTM D2435

Plate C

Vertical Pressure (kips/sq.ft.)	Sample Height (inches)	Consolidation (percent)	
0.125	1.0000	0.0	
0.25	0.9980	0.2	
0.5	0.9955	0.4	
1	0.9920	0.8	
1	0.9900	1.0	
2	0.9845	1.6	
4	0.9790	2.1	
8	0.9720	2.8	
0.25	0.9840	1.6	Saturated

Sample No.	T4	Depth	10'	Date	11/21/2014

Date Tested: 11/18/2014
Sample: T4
Depth: 10'



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Transition Properties, LP

PROJECT NUMBER: 17745-14 DATE: 11/21/2014

CONSOLIDATION TEST

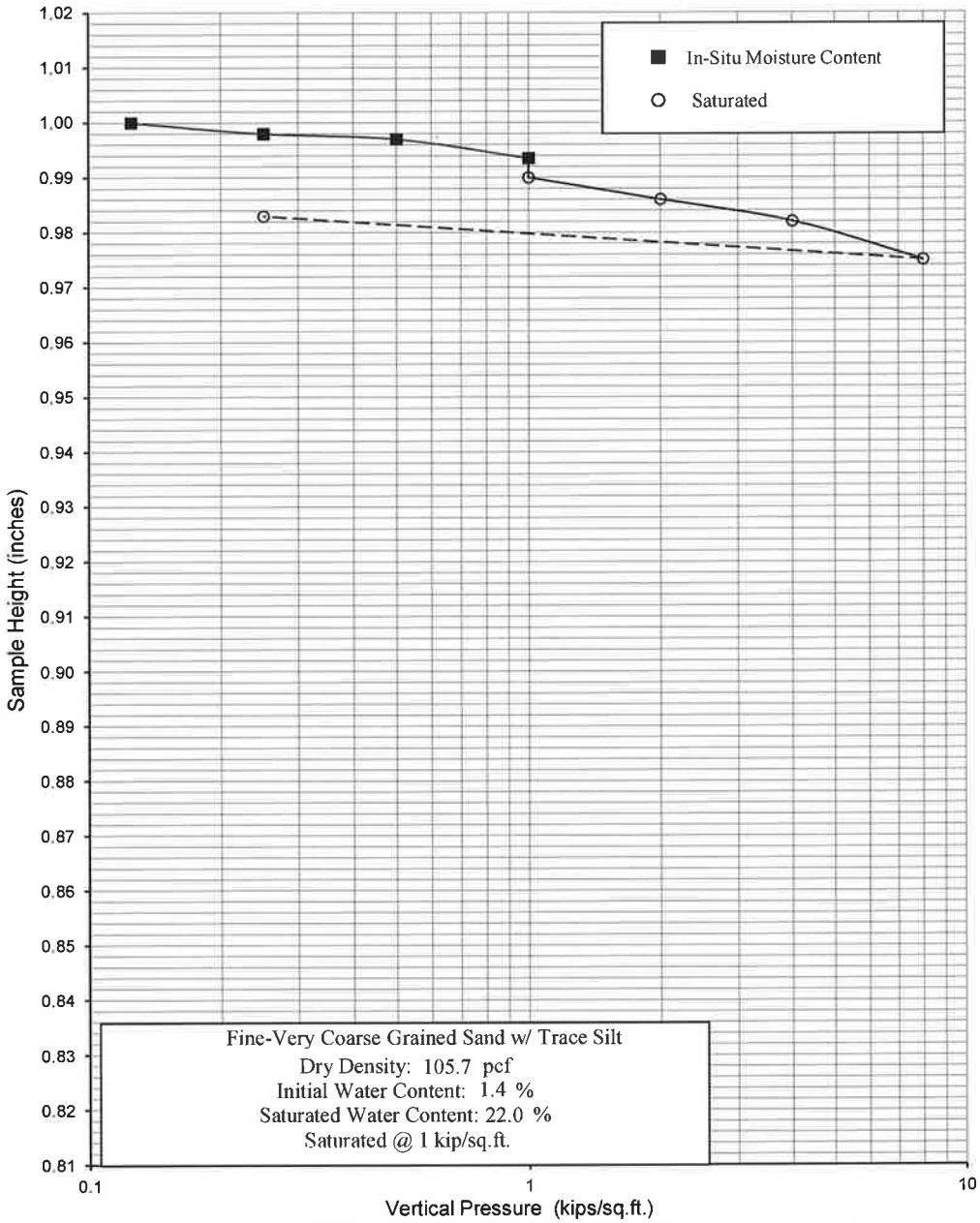
ASTM D2435

Plate D

Vertical Pressure (kips/sq.ft.)	Sample Height (inches)	Consolidation (percent)	
0.125	1.0000	0.0	
0.25	0.9980	0.2	
0.5	0.9970	0.3	
1	0.9935	0.6	
1	0.9900	1.0	
2	0.9860	1.4	
4	0.9820	1.8	
8	0.9750	2.5	Saturated
0.25	0.9830	1.7	

Sample No.	T8	Depth	5'	Date	11/21/2014

Date Tested: 11/19/2014
Sample: T8
Depth: 5'



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SOILS AND GEOTECHNICAL CONSULTANTS

Transition Properties, LP

PROJECT NUMBER: 17745-14 DATE: 11/21/2014

CONSOLIDATION TEST

ASTM D2435

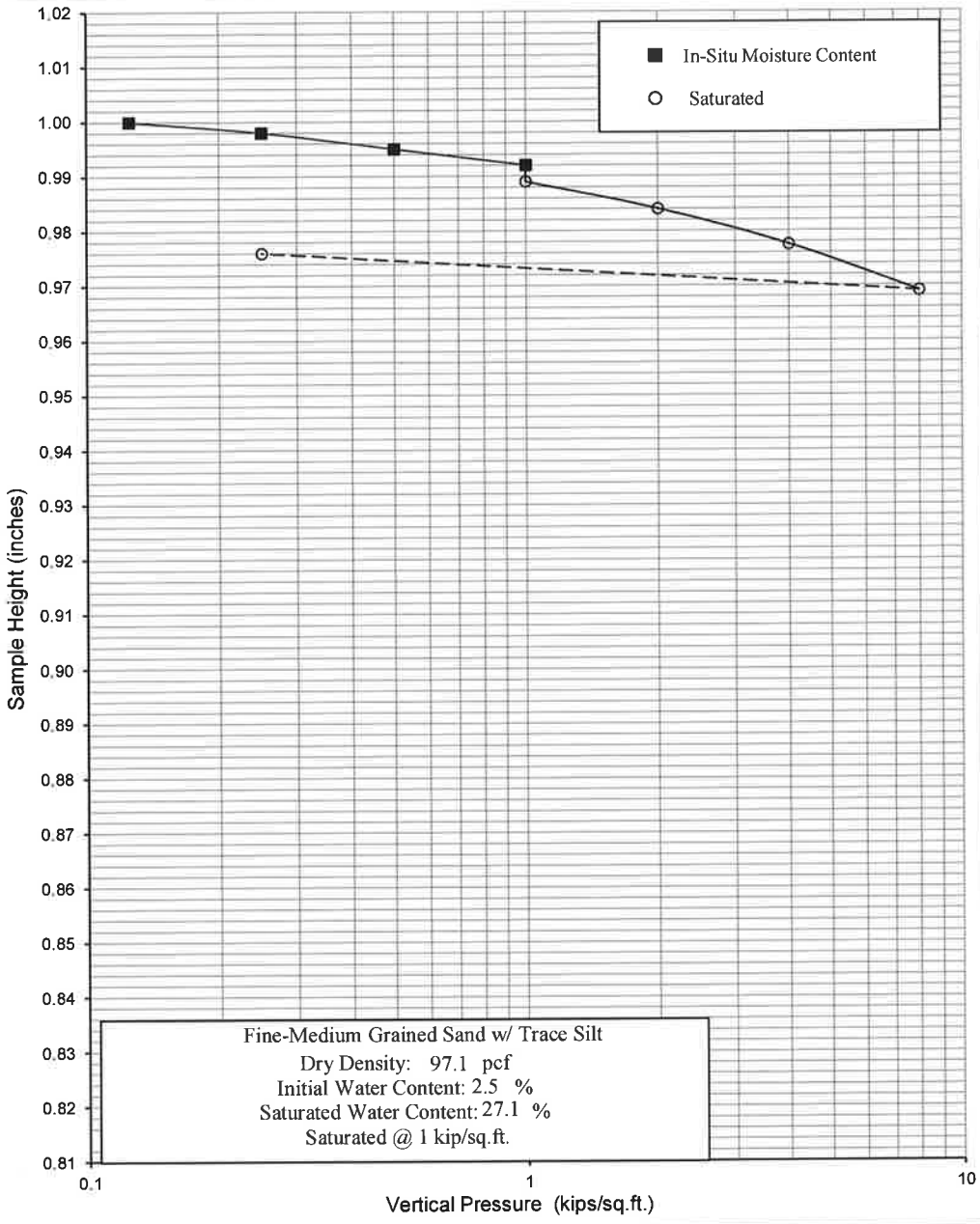
Plate E

Vertical Pressure (kips/sq.ft.)	Sample Height (inches)	Consolidation (percent)
0.125	1.0000	0.0
0.25	0.9980	0.2
0.5	0.9950	0.5
1	0.9920	0.8
1	0.9890	1.1
2	0.9840	1.6
4	0.9775	2.3
8	0.9690	3.1
0.25	0.9760	2.4

Saturated

Date Tested: 11/19/2014
Sample: T8
Depth: 10'

Sample No.	T8	Depth	10'	Date	11/21/2014



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SOILS AND GEOTECHNICAL CONSULTANTS

Transition Properties, LP

PROJECT NUMBER: 17745-14 DATE: 11/21/2014

CONSOLIDATION TEST

ASTM D2435

Plate F

Appendix FWater Quality Management Plan

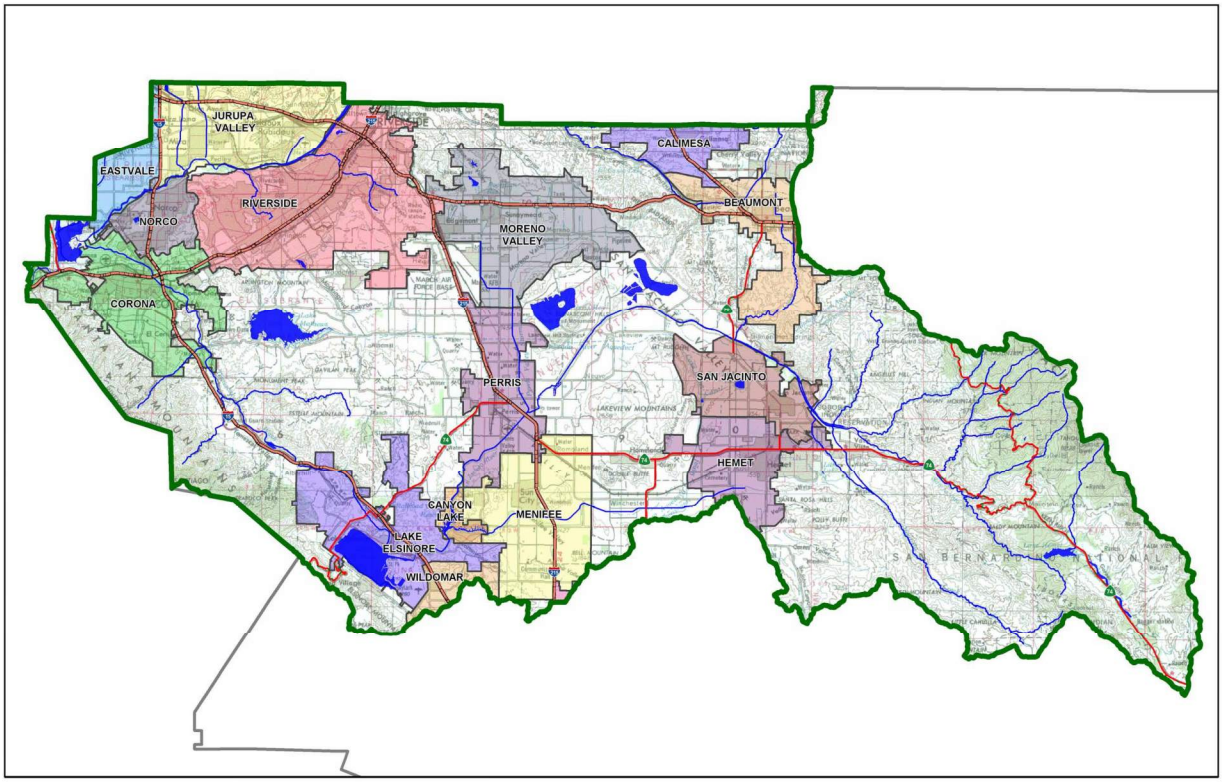
Project Specific Water Quality Management Plan

*A Template for Projects located within the **Santa Ana Watershed** Region of Riverside County*

Project Title: Center Street Industrial Block

Public Works No: _____

Design Review/Case No: P14-1033



Contact Information:

Prepared for: Transition Properties
PO Box 1010 Blue Jay, CA 92317
ATTN: Art Day

Prepared by: Psomas
1500 Iowa Avenue, Suite 210
Riverside, CA 92507
Attn: Andrew Woodard, PE

☒ **Preliminary**
☐ **Final**

Original Date Prepared: October 9, 2014

Revision Date(s): N/A

Prepared for Compliance with
Regional Board Order No. **R8-2010-0033**

OWNER'S CERTIFICATION

This Project-Specific Water Quality Management Plan (WQMP) has been prepared for Transition Properties by Psomas. for the Center Street Industrial Block project.

This WQMP is intended to comply with the requirements of the City of Riverside for design review of the proposed 308,000 SF industrial complex, Planning Case No. P14-1033 which includes the requirement for the preparation and implementation of a Project-Specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation and funding of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. In addition, the property owner accepts responsibility for interim operation and maintenance of Stormwater BMPs until such time as this responsibility is formally transferred to a subsequent owner. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity. The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under the City of Riverside Water Quality Ordinance (Municipal Code Section 14.12.315).

"I, the undersigned, certify under penalty of law that the provisions of this WQMP have been reviewed and accepted and that the WQMP will be transferred to future successors in interest."

Owner's Signature	Date
Owner's Printed Name	Owner's Title/Position

PREPARER'S CERTIFICATION

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control measures in this plan meet the requirements of Regional Water Quality Control Board Order No. **R8-2010-0033** and any subsequent amendments thereto."

Preparer's Signature	Date
Andrew Woodard, PE	Project Engineer
Preparer's Printed Name	Preparer's Title/Position

Preparer's Licensure:

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Section A: Project and Site Information

This project is a proposal to build a new industrial building and adjoining parking lot on APNs 246-070-002, 017, 246-040-026, and 027. Stormwater from the site will be treated by an infiltration basin at the Southeast corner of the site.

PROJECT INFORMATION	
Type of Project:	Commercial warehouse
Planning Area:	Ward 1, City of Riverside, County of Riverside
Community Name:	Northside
Development Name:	Center Street Industrial Block
PROJECT LOCATION	
Latitude & Longitude (DMS): 34° 01' 07"N, 117° 21' 18"W	
Project Watershed and Sub-Watershed: Santa Ana; Santa Ana River, Reach 3	
APN(s): 246-070-002, 017, 246-040-026, and 027	
Map Book and Page No.: Book 1, Page 20 of Maps, Riverside County Records	
PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s)	Industrial Warehouse
Proposed or Potential SIC Code(s)	4225
Area of Impervious Project Footprint (SF)	582,839 SF
Total Area of proposed Impervious Surfaces within the Project Limits (SF)/or Replacement	582,839 SF
Does the project consist of offsite road improvements?	☒ Y ☐ N
Does the project propose to construct unpaved roads?	☐ Y ☒ N
Is the project part of a larger common plan of development (phased project)?	☐ Y ☒ N
EXISTING SITE CHARACTERISTICS	
Total area of existing Impervious Surfaces within the project limits (SF)	0 SF
Is the project located within any MSHCP Criteria Cell?	☐ Y ☒ N
If so, identify the Cell number:	N/A
Are there any natural hydrologic features on the project site?	☐ Y ☒ N
Is a Geotechnical Report attached?	☒ Y ☐ N
If no Geotech. Report, list the NRCS soils type(s) present on the site (A, B, C and/or D)	N/A
What is the Water Quality Design Storm Depth for the project?	0.65 in

A.1 Maps and Site Plans

Appendix 1 includes a map of the local vicinity and existing site. In addition, WQMP Site Plan, located in Appendix 1, includes the following:

- Drainage Management Areas
- Proposed Structural BMPs
- Drainage Path
- Drainage Infrastructure, Inlets, Overflows
- Source Control BMPs
- Buildings, Roof Lines, Downspouts
- Impervious Surfaces
- Standard Labeling

A.2 Receiving Waters

In order of upstream to downstream, the receiving waters the project site is tributary to are as follows:

Table A.1 Identification of Receiving Waters

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Lake Evans (801.27)	**None**	**REC1, REC2, WARM, COLD, WILD**	**Not a water body classified as RARE**
Santa Ana River, Reach 3 (801.21)	**Pathogens**	**AGR, GWR, REC1, REC2, WILD, WARM, RARE**	**2.5 Miles**
Prado Basin Management Zone (801.11)	None	REC1, REC2, WARM, WILD, RARE	19 Miles
Santa Ana River, Reach 2 (801.11)	None	AGR, GWR, REC1, REC2, WILD, WARM, RARE	21 Miles
Santa Ana River, Reach 1 (801.11)	None	REC1, REC2, WILD, WARM	Not a water body classified as RARE
Tidal Prism of Santa Ana River (to within 1000' of Victoria Street) and Newport Slough (801.11)	None	REC1, REC2, COMM, WILD, RARE, MAR	45 Miles
Pacific Ocean Nearshore Zone (801.11)	None	IND, NAV, REC1, REC2, COMM, WILD, RARE, SPWN, MAR, SHEL	49 Miles
Pacific Ocean Offshore Zone (---)	None	IND, NAV, REC1, REC2, COMM, WILD, RARE, SPWN, MAR	52 Miles

Note: Proximate receiving waters are identified in bold.

See Receiving Waters Diagram in Appendix 1

A.3 Additional Permits/Approvals required for the Project:

Table A.2 Other Applicable Permits

Agency	Permit Required	
State Department of Fish and Game, 1602 Streambed Alteration Agreement	☐ Y	☒ N
State Water Resources Control Board, Clean Water Act (CWA) Section 401 Water Quality Cert.	☐ Y	☒ N
US Army Corps of Engineers, CWA Section 404 Permit	☐ Y	☒ N
US Fish and Wildlife, Endangered Species Act Section 7 Biological Opinion	☐ Y	☒ N
Statewide Construction General Permit Coverage	☒ Y	☐ N
Statewide Industrial General Permit Coverage	☐ Y	☒ N
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	☐ Y	☒ N
Other *(please list in the space below as required)*		
City of Riverside Conditional Use Permit	☐ Y	☒ N
City of Riverside Design Review	☒ Y	☐ N
City of Riverside Building Permit	☒ Y	☐ N
City of Riverside Grading Permit	☒ Y	☐ N
City of Riverside Construction Permit	☒ Y	☐ N

Section B: Optimize Site Utilization (LID Principles)

Site Optimization

Does the project identify and preserve existing drainage patterns? If so, how? If not, why?

Yes, this site strives to keep the drainage proceeding to the south westerly corner of the site, which is where the historical flows have always gone. In addition, there are historic tributary flows that are entering this site from the north westerly corner of the site in a concentrated manner. The existing drainage pattern included ponding on Center Street. The proposed site will included a 20 foot wide drainage easement to carry the offsite flows through the site and outlet into Placentia Lane.

Does the project identify and protect existing vegetation? If so, how? If not, why?

No, the existing site is in a rural area and what little vegetation that is place does not lend itself to the development standards. New landscaping is proposed and will be integrated into the proposed parking lot and street adjacent landscaped areas.

Does the project identify and preserve natural infiltration capacity? If so, how? If not, why?

Yes, the current infiltration capacity is comprised of the existing soils natural infiltration ability. The proposed site layout includes an infiltration basin that will serve to mimic and exceed the existing infiltration capacity.

Does the project identify and minimize impervious area? If so, how? If not, why?

Yes, landscaped areas are distributed equally throughout the parking lot and the south easterly corner of the site will serve as a landscaped infiltration basin.

Does the project identify and disperse runoff to adjacent pervious areas? If so, how? If not, why?

Yes, the proposed building will have roof drains that are directed over proposed landscaped areas before being routed to the landscaped infiltration basin.

Section C: Delineate Drainage Management Areas (DMAs)

Table C.1 DMA Classifications

DMA Name or ID	Surface Type(s)	Area (Sq. Ft.)	DMA Type
1-A	Concrete	5917	D
1-B	Landscape	51098	D
1-C	Roofs	303591	D
1-D	Asphalt	194632	D
1-E	Landscaped Infiltration Basin	20210	D
2-B	Natural Soil (C)	11745	A
3-A	Concrete	5355	D
3-B	Landscape	4308	D
3-D	Roofs	22992	D
3-E	Infiltration Trench	803	D
4-A	Concrete	7419	D
4-B	Landscape	9418	D
4-D	Roofs	30720	D
4-E	Infiltration Trench	925	D
5-F	Landscape	11647	A

Table C.2 Type 'A', Self-Treating Areas

DMA Name or ID	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)
2-B	11745	Natural Channel with Depressed Overflow Outlet	N/A
3-F	11647	Ornamental Landscape	Per approved Landscape Architects Plan

Table C.3 Type 'B', Self-Retaining Areas

Self-Retaining Area				**Type 'C' DMAs that are draining to the Self-Retaining Area**		
DMA Name/ ID	**Post-project surface type**	**Area (square feet)** [A]	**Storm Depth (inches)** [B]	**DMA Name / ID**	**[C] from Table C.4 =** [C]	**Required Retention Depth (inches)** [D]
1-E	Landscaped Infiltration Basin	20210	0.65	1-Total	455337.1	15.3
3-E	Infiltration Trench	803	0.65	3-Total	25761.5	21.5

Self-Retaining Area				Type 'C' DMAs that are draining to the Self-Retaining Area		
DMA Name/ ID	Post-project surface type	Area (square feet) [A]	Storm Depth (inches) [B]	DMA Name / ID	[C] from Table C.4 = [C]	Required Retention Depth (inches) [D]
4-E	Infiltration Trench	925	0.65	4-Total	35060.2	25.3

$$[D] = [B] + \frac{[B] \cdot [C]}{[A]}$$

Table C.4 Type 'C', Areas that Drain to Self-Retaining Areas

DMA					Receiving Self-Retaining DMA		
DMA Name/ ID	Area (square feet) [A]	Post-project surface type	Runoff factor [B]	Product [C] = [A] x [B]	DMA name /ID	Area (square feet) [D]	Ratio [C]/[D]
1-A	5917	Concrete	0.89	5278	1-E	20210	22.5:1*
1-B	51098	Landscape	0.11	5644.2			
1-C	303591	Roofs	0.89	270803.2			
1-D	194632	Asphalt	0.89	173611.7			
Total	**555238**	---	---	**455337.1**			
3-A	5355	Concrete	0.89	4776.7	3-E	803	32:1*
3-B	4308	Landscape	0.11	475.9			
3-D	22992	Asphalt	0.89	20508.9			
3-Total	**32655**	---	---	**25761.5**			

DMA					Receiving Self-Retaining DMA		
DMA Name/ ID	Area (square feet) [A]	Post-project surface type	Runoff factor [B]	Product [C] = [A] x [B]	DMA name /ID	Area (square feet) [D]	Ratio [C]/[D]
4-A	7419	Concrete	0.89	6617.7	4-E	925	37.9:1*
4-B	9418	Landscape	0.11	1040.3			
4-D	30720	Asphalt	0.89	27402.2			
4-Total	**47557**	**---**	**---**	**35060.2**			

*Does not meet 2:1 Criteria, Area will drain to Type 'D' BMP.

Table C.5 Type 'D', Areas Draining to BMPs

DMA Name or ID	BMP Name or ID
1-E	1-All
3-E	2-All
4-E	3-All

Section D: Implement LID BMPs

D.1 Infiltration Applicability

Is there an approved downstream 'Highest and Best Use' for stormwater runoff (ref: Chapter 2.4.4 of the WQMP Guidance Document)? ☐ Y ☒ N

Geotechnical Report

A Geotechnical Report is required by the City of Riverside to confirm present and past site characteristics that may affect the use of Infiltration BMPs, see Appendix 3.

Is this project classified as a small project consistent with the requirements of Chapter 2 of the WQMP Guidance Document? ☐ Y ☒ N

Infiltration Feasibility

Table D.1 Infiltration Feasibility

Does the project site…	YES	NO
…have any DMAs with a seasonal high groundwater mark shallower than 10 feet?		X
If Yes, list affected DMAs:		
…have any DMAs located within 100 feet of a water supply well?		X
If Yes, list affected DMAs:		
…have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact?		X
If Yes, list affected DMAs:		
…have measured in-situ infiltration rates of less than 1.6 inches / hour?		X
If Yes, list affected DMAs:		
…have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?		X
If Yes, list affected DMAs:		
…geotechnical report identify other site-specific factors that would preclude effective and safe infiltration?		X
Describe here:		

D.2 Harvest and Use Assessment

The following conditions apply*:*

☐ Reclaimed water will be used for the non-potable water demands for the project.

☐ Downstream water rights may be impacted by Harvest and Use as approved by the Regional Board (verified with the City of Riverside).

☐ The Design Capture Volume will be addressed using Infiltration Only BMPs. (Harvest and Use BMPs are still encouraged, but are not required as the Design Capture Volume will be infiltrated or evapotranspired).

☒ None of the above.

Harvest and Use BMPs need not be assessed for the site.

D.3 Bioretention and Biotreatment Assessment

Other LID Bioretention and Biotreatment BMPs as described in Chapter 2.4.7 of the WQMP Guidance Document are feasible on nearly all development sites with sufficient advance planning.

For the project, the following applies:

☐ LID Bioretention/Biotreatment BMPs will be used for some or all DMAs of the project as noted below in Section D.4

☐ A site-specific analysis demonstrating the technical infeasibility of all LID BMPs has been performed and is included in Appendix 5.

☒ None of the above.

D.4 Feasibility Assessment Summaries

Table D.2 LID Prioritization Summary Matrix

DMA Name/ID	LID BMP Hierarchy				No LID (Alternative Compliance)
	1. Infiltration	2. Harvest and use	3. Bioretention	4. Biotreatment	
1-A	☒	☐	☐	☐	☐
1-B	☒	☐	☐	☐	☐
1-C	☒	☐	☐	☐	☐
1-D	☒	☐	☐	☐	☐
1-E	☒	☐	☐	☐	☐
2-B	☒	☐	☐	☐	☐

D.5 LID BMP Sizing

Table D.3 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*DMA 1*		
	[A]		[B]	[C]	[A] x [C]			
1-A	5917	Concrete	*1*	*0.89*	5278	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
1-B	51098	Landscape	*0.1*	*0.11*	5644.2			
1-C	303591	Roofs	*1*	*0.89*	270803.2			
1-D	194632	Asphalt	*1*	*0.89*	173611.7			
1-E	20210	Landscaped Infiltration Basin	*0.1*	*0.11*	*2232.4*			
	$A_T = \Sigma[A]$				$\Sigma = [D]$	[E]	$[F] = \frac{[D]x[E]}{12}$	[G]
	575448				457569.5	0.65	24785	101050

[B], [C] are obtained from Section 2.3.1 of the WQMP Guidance Document
[E] is obtained from Exhibit A of the WQMP Guidance Document
[G] is obtained from LID BMP design procedure sheet, placed in Appendix 6

Table D.4 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*DMA 2*		
	[A]		[B]	[C]	[A] x [C]			
2-B	*11745*	Natural Soil (C)	*0.3*	*0.23*	*2644.6*	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
	$A_T = \Sigma[A]$				$\Sigma = [D]$	[E]	$[F] = \frac{[D]x[E]}{12}$	[G]
	11745				2644.5	0.65	143.2	2500

[B], [C] are obtained from Section 2.3.1 of the WQMP Guidance Document
[E] is obtained from Exhibit A of the WQMP Guidance Document
[G] is obtained from LID BMP design procedure sheet, placed in Appendix 6

Table D.5 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*DMA 3*		
	[A]		[B]	[C]	[A] x [C]			
3-A	5355	Concrete	*1*	*0.89*	4776.7	*Design Storm Depth (in)*	*Design Capture Volume,* V_{BMP} *(cubic feet)*	*Proposed Volume on Plans (cubic feet)*
3-B	4308	Landscape	*0.1*	*0.11*	475.9			
3-D	22992	Asphalt	*1*	*0.89*	20508.9			
3-E	803	Infiltration Trench	*0.1*	*0.11*	*88.7*			
	$A_T = \Sigma[A]$				Σ= [D]	[E]	$[F] = \frac{[D]x[E]}{12}$	[G]
	33458				25850.2	0.65	1400.2	1767

[B], [C] are obtained from Section 2.3.1 of the WQMP Guidance Document
[E] is obtained from Exhibit A of the WQMP Guidance Document
[G] is obtained from LID BMP design procedure sheet, placed in Appendix 6

Table D.6 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*DMA 4*		
	[A]		[B]	[C]	[A] x [C]			
4-A	7419	Concrete	*1*	*0.89*	6617.7	*Design Storm Depth (in)*	*Design Capture Volume,* V_{BMP} *(cubic feet)*	*Proposed Volume on Plans (cubic feet)*
4-B	9418	Landscape	*0.1*	*0.11*	1040.3			
4-D	30720	Asphalt	*1*	*0.89*	27402.2			
4-E	925	Infiltration Trench	*0.1*	*0.11*	*102.2*			
	$A_T = \Sigma[A]$				Σ= [D]	[E]	$[F] = \frac{[D]x[E]}{12}$	[G]
	48482				35162.4	0.65	1904.6	2035

[B], [C] are obtained from Section 2.3.1 of the WQMP Guidance Document
[E] is obtained from Exhibit A of the WQMP Guidance Document
[G] is obtained from LID BMP design procedure sheet, placed in Appendix 6

Section E: Alternative Compliance (LID Waiver Program)

LID BMPs are expected to be feasible on virtually all projects. Where LID BMPs have been demonstrated to be infeasible as documented in Section D, other Treatment Control BMPs must be used (subject to confirmation of LID waiver approval by the Regional Board). For the project, the following applies:

☒ LID Principles and LID BMPs have been incorporated into the site design to fully address all Drainage Management Areas. No alternative compliance measures are required for this project and thus this Section is not required to be completed.

- *Or* -

☐ The following Drainage Management Areas are unable to be addressed using LID BMPs. A site-specific analysis demonstrating technical infeasibility of LID BMPs has been approved by the Regional Board and included in Appendix 5. Additionally, no downstream regional and/or sub-regional LID BMPs exist or are available for use by the project. The alternative compliance measures on the following pages are being implemented to ensure that any pollutant loads expected to be discharged by not incorporating LID BMPs, are fully mitigated.

Section F: Hydromodification

F.1 Hydrologic Conditions of Concern (HCOC) Analysis

The project does not create a Hydrologic Condition of Concern, meeting the criteria for HCOC Exemption as shown below:

HCOC EXEMPTION 1: The Priority Development Project disturbs less than one acre. The Copermittee has the discretion to require a Project-Specific WQMP to address HCOCs on projects less than one acre on a case by case basis. The disturbed area calculation should include all disturbances associated with larger common plans of development.

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

HCOC EXEMPTION 2: The volume and time of concentration[1] of storm water runoff for the post-development condition is not significantly different from the pre-development condition for a 2-year return frequency storm (a difference of 5% or less is considered insignificant) using one of the following methods to calculate:

- Riverside County Hydrology Manual
- Technical Release 55 (TR-55): Urban Hydrology for Small Watersheds (NRCS 1986), or derivatives thereof, such as the Santa Barbara Urban Hydrograph Method
- Other methods acceptable to the Co-Permittee

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

Results included in Table F.1 below and hydrologic analysis included in Appendix 7.

Table F.1 Hydrologic Conditions of Concern Summary

	2 year – 24 hour		
	Pre-condition	**Post-condition**	**% Difference**
Time of Concentration	22.5	13	-42.2
Flow (CFS)	6.14	16.5	168.7
Volume (Cubic Feet)	12044	18728*	55.5

[1] Time of concentration is defined as the time after the beginning of the rainfall when all portions of the drainage basin are contributing to flow at the outlet.

*Post-condition volume is less than the design capture volume of the infiltration basin.

HCOC EXEMPTION 3: All downstream conveyance channels that will receive runoff from the project are engineered and regularly maintained to ensure design flow capacity; no sensitive stream habitat areas will be adversely affected; or are not identified on Hydromodification Sensitivity Maps.

Does the project qualify for this HCOC Exemption? ☒ Y ☐ N

F.2 HCOC Mitigation

As an alternative to the HCOC Exemption Criteria above, HCOC criteria is considered mitigated if the project meets one of the following conditions, as indicated:

☐ a. Additional LID BMPS are implemented onsite or offsite to mitigate potential erosion or habitat impacts as a result of HCOCs. This can be conducted by an evaluation of site-specific conditions utilizing accepted professional methodologies published by entities such as the California Stormwater Quality Association (CASQA), the Southern California Coastal Water Research Project (SCCRWP), or other Co-Permittee approved methodologies for site-specific HCOC analysis.

☐ b. The project is developed consistent with an approved Watershed Action Plan that addresses HCOC in Receiving Waters.

☐ c. Mimicking the pre-development hydrograph with the post-development hydrograph, for a 2-year return frequency storm. Generally, the hydrologic conditions of concern are not significant, if the post-development hydrograph is no more than 10% greater than pre-development hydrograph. In cases where excess volume cannot be infiltrated or captured and reused, discharge from the site must be limited to a flow rate no greater than 110% of the pre-development 2-year peak flow.

☒ d. None of the above.

Note: The HCOC mitigation is not applicable due to the project meeting the HCOC exemption criteria.

Section G: Source Control BMPs

Table G.1 Permanent and Operational Source Control Measures

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
D2. Landscape/ Outdoor Pesticide Use	-Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. -Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. Consider using pest-resistant plants, especially adjacent to hardscape.	-Maintain landscaping using minimum or no pesticides. See applicable operational BMPs in "What you should know for Landscape and Gardening" at http://rcflood.org/stormwater
G. Refuse areas	-Refuse area shall have a sign posted stating "Do not dump hazardous materials here" or similar.	- Sweep refuse area regularly to prevent accumulation of litter and debris.
M. Loading Docks	-Loading area shall have a roof overhang or door skirts (cowling) at each bay that enclose the end of the trailer.	-Move loaded and unloaded items indoors as soon as possible.
P. Plazas, sidewalks, and parking lots.		-Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect wash water containing any cleaning agent or degreaser and discharge to the sanitary sewer, not to a storm drain.

Section H: Construction Plan Checklist

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Plan Sheet Number(s)	Latitude / Longitude
1-E	Infiltration Basin		34°01’01.0”N 117°21’13.0”W
2-B	Unlined Channel		34° 1'04.5"N 117°21'24.0"W
3-E	Infiltration Trench		34° 1'06"N 117°21'22.0"W
4-E	Infiltration Trench		34° 1'06"N 117°21'13.0"W

Section I: Operation, Maintenance and Funding

As required by the City of Riverside, the following Operation, Maintenance and Funding details are provided as summarized:

1. A means to finance and implement facility maintenance in perpetuity, including replacement cost.
2. Acceptance of responsibility for maintenance from the time the BMPs are constructed until responsibility for operation and maintenance is legally transferred.
3. An outline of general maintenance requirements for the Stormwater BMPs selected.
4. Figures delineating and designating pervious and impervious areas, location, and type of Stormwater BMP, and tables of pervious and impervious areas served by each facility.
5. A separate list and location of self-retaining areas or areas addressed by LID Principles that do not require specialized O&M or inspections but will require typical landscape maintenance as noted in Chapter 5, pages 85-86, in the WQMP Guidance.

See Appendix 9 for a detailed Stormwater BMP Operation and Maintenance Plan that sets forth a maintenance schedule for each of the Stormwater BMPs built on site, and an agreement assigning responsibility for maintenance and providing for inspections and certification.

Maintenance Mechanism: **Covenant & Agreement**

Will the proposed BMPs be maintained by a Home Owners' Association (HOA) or Property Owners Association (POA)?

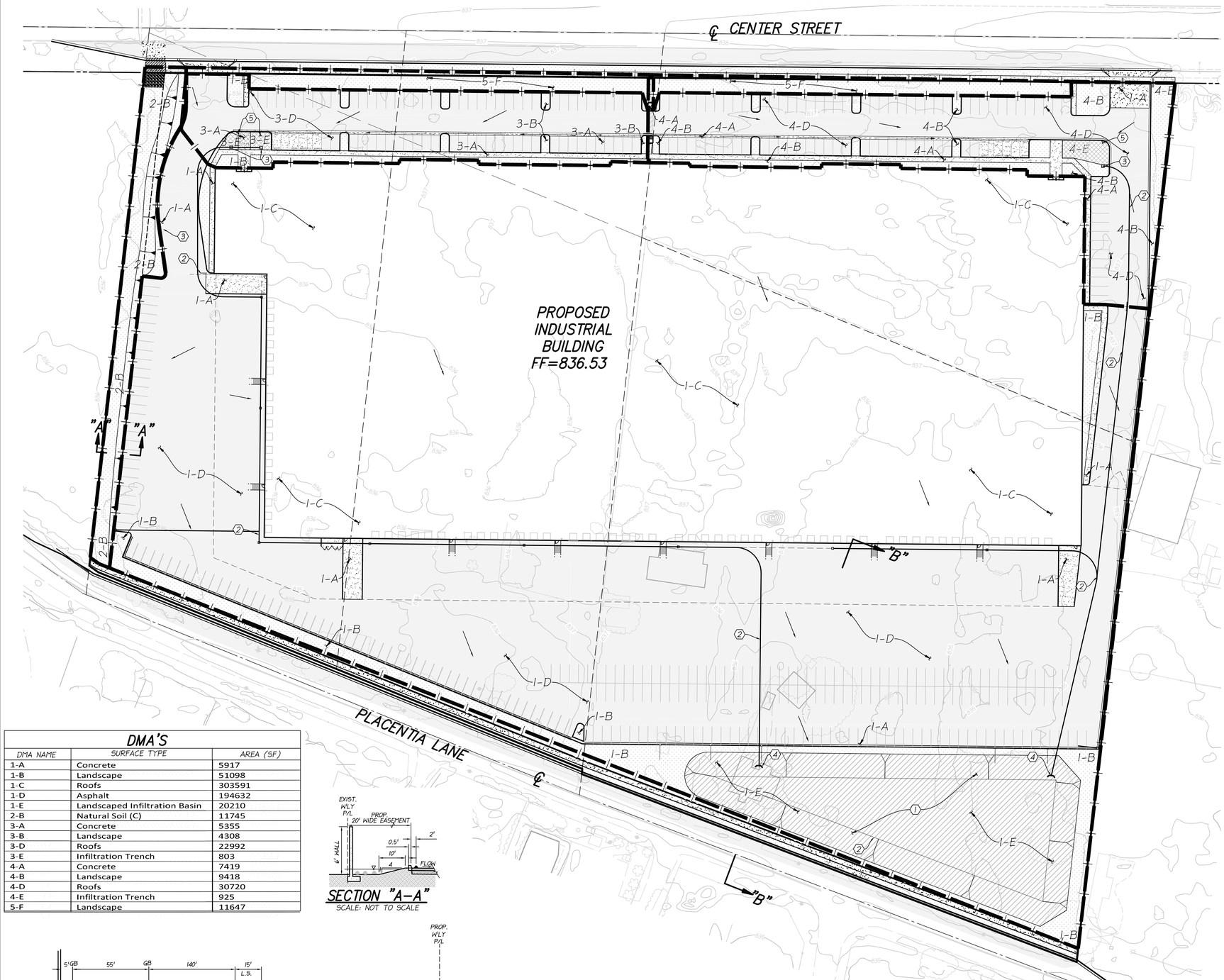
☐ Y ☒ N **Property Owner is Responsible**

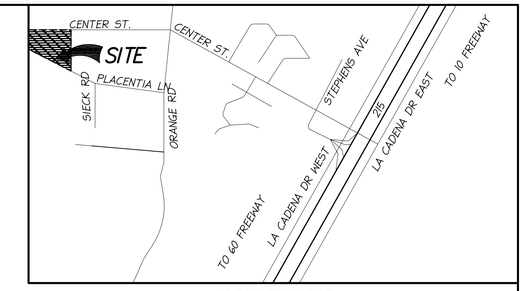
Operation and Maintenance Plan and Maintenance Mechanism are included in Appendix 9. Educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP are included in Appendix 10.

Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map

WQMP EXHIBIT
CITY OF RIVERSIDE
JULY 2015





VICINITY MAP

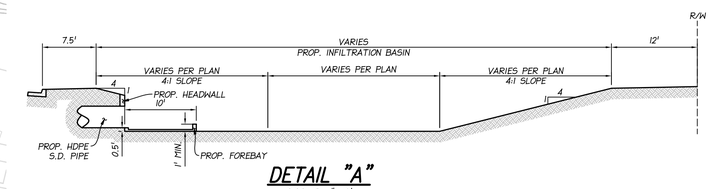
THOMAS GUIDE - PAGE 645, J-6 (2005 EDITION)
SECTION 12, TOWNSHIP 2 SOUTH RANGE 5 WEST
NOT TO SCALE

BMP LEGEND

- (1) PROPOSED INFILTRATION TRENCH PER DETAIL HEREON
- (2) PROPOSED HDPE STORM DRAIN PIPE
- (3) PROPOSED CATCH BASIN
- (4) PROPOSED HEADWALL AND FOREBAY
- (5) PROPOSED INFILTRATION TRENCH PER DETAIL HEREON
- DIRECTION OF FLOW
- PROPOSED DRAINAGE MANAGEMENT AREA BOUNDARY
- PROPOSED LANDSCAPED
- CONCRETE SIDEWALK
- PROPOSED AC PAVING

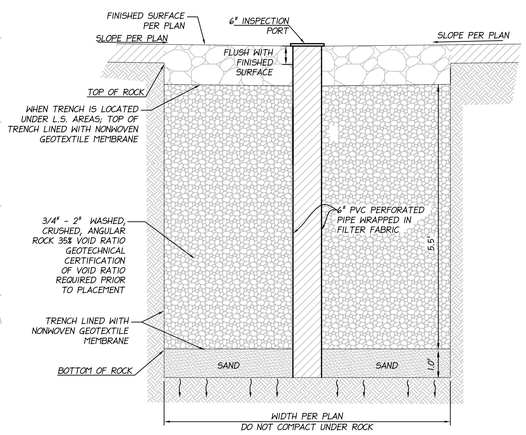
LEGEND

- EXISTING PROPERTY LINE
- PROPOSED RIGHT OF WAY
- EXISTING RIGHT OF WAY
- EXISTING CENTERLINE
- PROPOSED CURB
- EXISTING CURB
- PROPOSED SIDEWALK
- EXISTING SIDEWALK
- EXISTING DIRT ROAD
- PROPOSED PARKING STRIPE
- EXISTING EASEMENT
- EXISTING CONTOUR MAJOR
- EXISTING CONTOUR MINOR
- EXISTING FENCE
- EXISTING BUILDING
- EXISTING CONCRETE
- EXISTING EDGE OF PAVEMENT
- PROPOSED EDGE OF PAVEMENT
- EXISTING CONTOUR ELEVATION
- EXISTING SPOT ELEVATION
- EP EDGE OF PAVEMENT
- R/W RIGHT OF WAY
- P/L PROPERTY LINE
- EXIST. EXISTING
- PROP. PROPOSED
- S.F. SQUARE FEET
- D/W DRIVEWAY
- S/W SIDEWALK



DETAIL "A"

SCALE: 1"=10'



TYPICAL INFILTRATION TRENCH

NTS (PVT)

50' 25' 0' 50' 100'

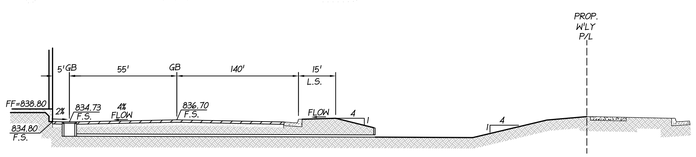
GRAPHIC SCALE
SCALE: 1" = 50'

DMA'S

DMA NAME	SURFACE TYPE	AREA (SF)
1-A	Concrete	5917
1-B	Landscape	51098
1-C	Roofs	303591
1-D	Asphalt	194632
1-E	Landscaped Infiltration Basin	20210
2-B	Natural Soil (C)	11745
3-A	Concrete	5355
3-B	Landscape	4308
3-D	Roofs	22992
3-E	Infiltration Trench	803
4-A	Concrete	7419
4-B	Landscape	9418
4-D	Roofs	30720
4-E	Infiltration Trench	925
5-F	Landscape	11647

SECTION "A-A"

SCALE: NOT TO SCALE



SECTION "B-B"

SCALE: NOT TO SCALE

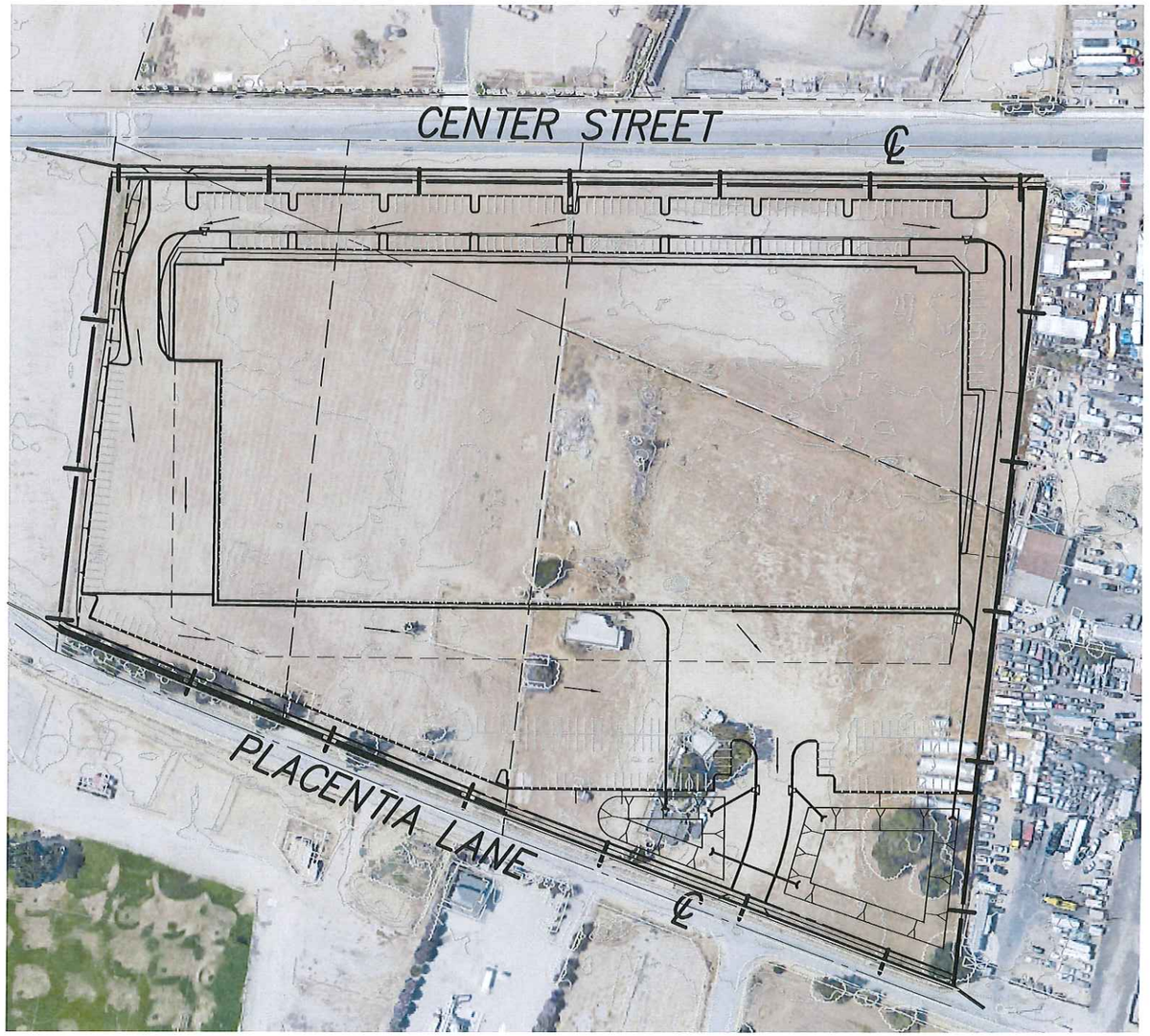
PREPARED BY:

PSOMAS
1500 IOWA AVENUE, SUITE 210
RIVERSIDE, CA 92507
(951) 787-8421 WWW.PSOMAS.COM

CITY OF RIVERSIDE
WQMP SITE PLAN
CENTER STREET

Drawing: G:\RIV\001\Drawings\Plans\Hydrology\001001-WQMP-2701.dwg Plotted By: andrew.escalera Layout: WQMP Last Saved: Sat Jul 11, 2015 - 1:54pm Last Plotted: Sat Jul 11, 2015 - 2:22pm

CENTER ST. INDUSTRIAL BLOCK
POST-DEVELOPMENT HYDROLOGY KEY MAP
CITY OF RIVERSIDE



150 75 0' 150 300

GRAPHIC SCALE
SCALE: 1" = 150

LEGEND

DRAINAGE AREA DESIGNATION

DIRECTION OF FLOW

PREPARED BY:

PSOMAS

1500 IOWA AVENUE, SUITE 210
RIVERSIDE, CA 92507
(951) 787-8421 WWW.PSOMAS.COM

CITY OF RIVERSIDE
CENTER ST. INDUSTRIAL BLOCK
POST-DEVELOPMENT
HYDROLOGY KEY MAP

Drawing: G:\491.001\Drawings\Prelim\Hydrology\491001-POST_DEV_HYD.dwg Plotted By: andrew.woodard Layout: 11x17 L Last Saved: Tue Nov 25, 2014 - 11:32am Last Plotted: Thu Dec 04, 2014 - 10:39am

CENTER ST. INDUSTRIAL BLOCK
PRE-DEVELOPMENT HYDROLOGY KEY MAP
CITY OF RIVERSIDE

150 75 0' 150 300

GRAPHIC SCALE
SCALE: 1" = 150

LEGEND

DRAINAGE AREA DESIGNATION

DIRECTION OF FLOW

PREPARED BY:

PSOMAS

1500 IOWA AVENUE, SUITE 210
RIVERSIDE, CA 92507
(951) 787-8421 WWW.PSOMAS.COM

CITY OF RIVERSIDE
CENTER ST. INDUSTRIAL BLOCK
PRE-DEVELOPMENT
HYDROLOGY KEY MAP

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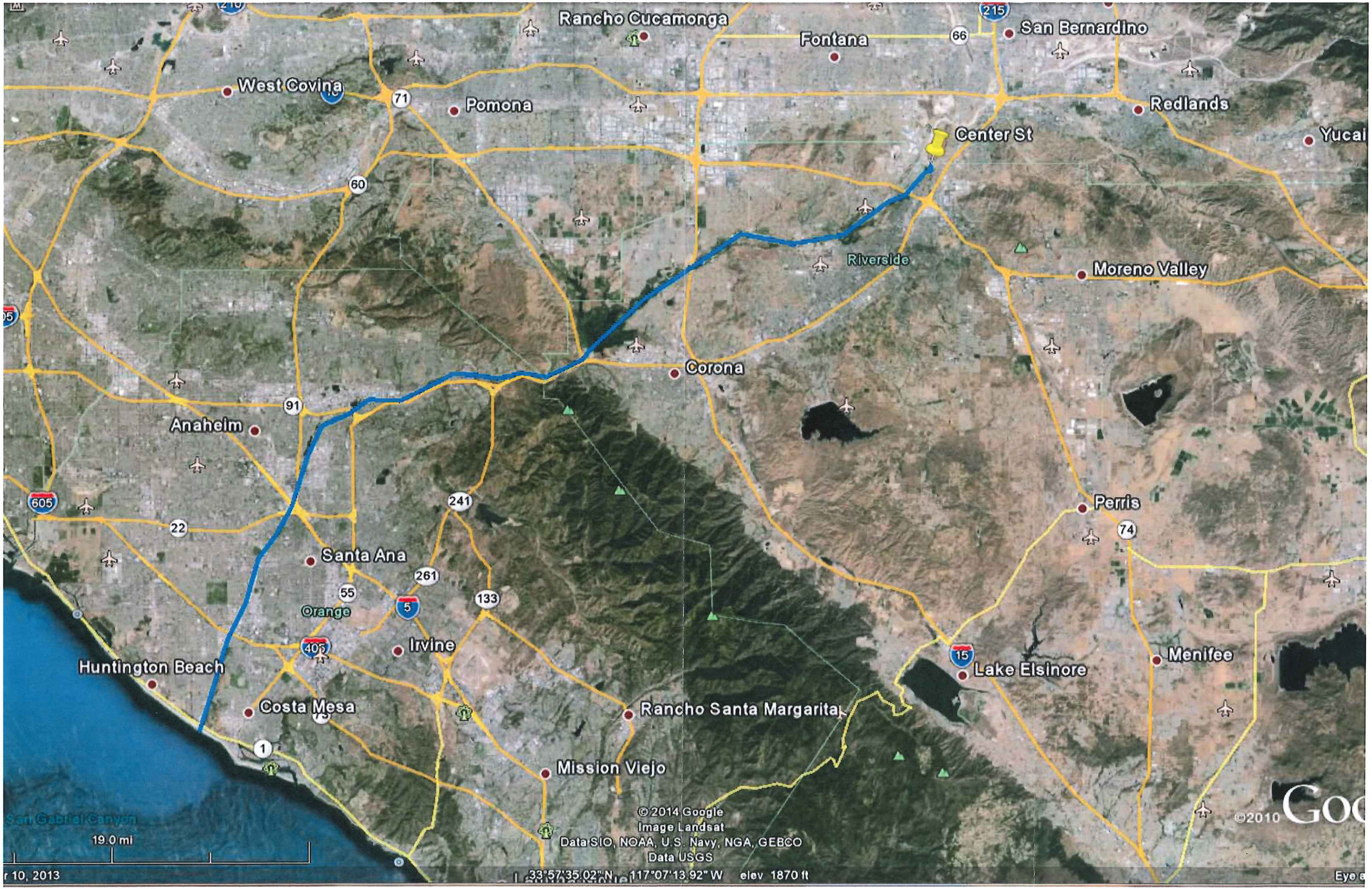
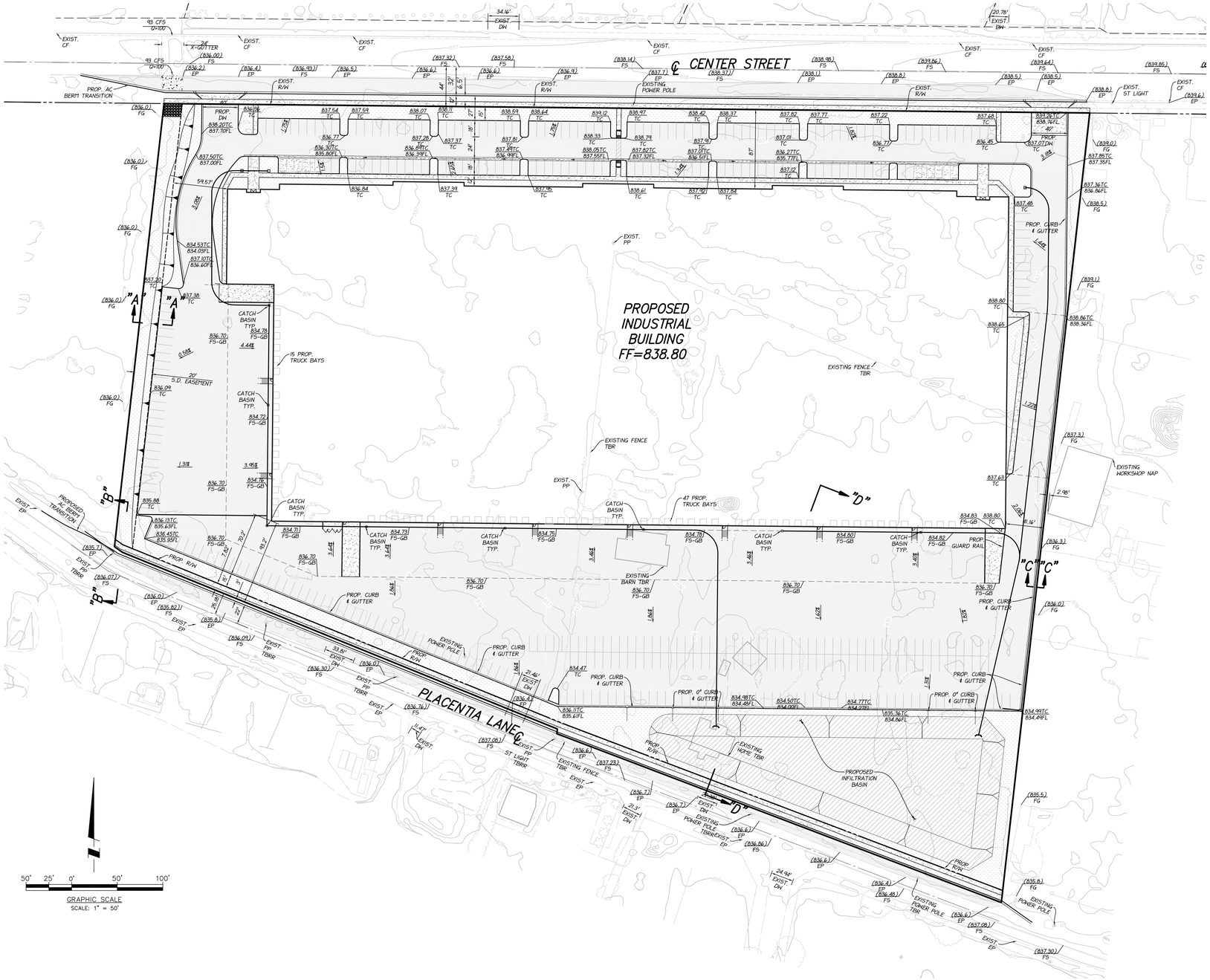
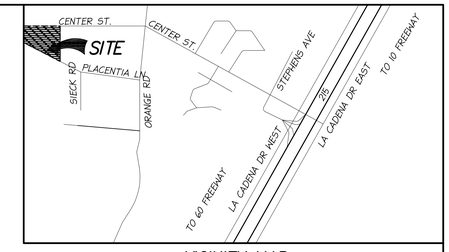

Rancho Cucamonga
Fontana
San Bernardino
West Covina
Pomona
Redlands
Center St
Yucai
Riverside
Moreno Valley
Corona
Anaheim
Perris
Santa Ana
Orange
Irvine
Huntington Beach
Lake Elsinore
Menifee
Costa Mesa
Rancho Santa Margarita
Mission Viejo
San Gabriel Canyon
19.0 mi
© 2014 Google
Image Landsat
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Data USGS
33°57'35.02" N 117°07'13.92" W elev 1870 ft
©2010 Goo
r 10, 2013
Eye a

Appendix 2: Construction Plans

Grading and Drainage Plans

CONCEPTUAL GRADING PLAN
CENTER STREET INDUSTRIAL BLOCK
CITY OF RIVERSIDE





VICINITY MAP

THOMAS GUIDE - PAGE 645, J-6 (2005 EDITION)
SECTION 12, TOWNSHIP 2 SOUTH RANGE 5 WEST
NOT TO SCALE

LEGEND

	EXISTING PROPERTY LINE
	PROPOSED RIGHT OF WAY
	EXISTING RIGHT OF WAY
	EXISTING CENTERLINE
	PROPOSED CURB
	EXISTING CURB
	PROPOSED SIDEWALK
	EXISTING SIDEWALK
	PROPOSED PARKING STRIPE
	EXISTING EASEMENT
	EXISTING CONTOUR MAJOR
	EXISTING CONTOUR MINOR
	EXISTING FENCE
	EXISTING BUILDING
	EXISTING CONCRETE
	EXISTING EDGE OF PAVEMENT
915	EXISTING CONTOUR ELEVATION
×901.5	EXISTING SPOT ELEVATION
EP	EDGE OF PAVEMENT
R/W	RIGHT OF WAY
P/L	PROPERTY LINE
EXIST.	EXISTING
PROP.	PROPOSED
D/W	DRIVEWAY
S/W	SIDEWALK
FS	FINISH SURFACE
TC	TOP OF CURB
FL	FLOW LINE
FG	FINISH GRADE
TG	TOP OF GRATE
INV.	INVERT
C.F.	CURB FACE

PROPOSED LANDSCAPE
CONCRETE SIDEWALK
PROPOSED AC PAVING
PROPOSED INFILTRATION BASIN

OWNER/APPLICANT

TRANSITION PROPERTIES
ART DAY
P.O BOX 1010 BLUE JAY, CA 92317
PHONE:909-418-2010
FAX:909-418-2011

ENGINEER

PSOMAS
1500 IOWA AVENUE, SUIT 210
RIVERSIDE, CA 92507
PHONE: (951) 787-8421
FAX: (951) 682-3379

ARCHITECT

RGA OFFICE OF ARCHITECTURAL DESIGN
DENNIS ROY
15231 ALTON PARKWAY, SUITE 100
IRVINE, CA 92618
PHONE: (949) 341-0920
FAX: (949) 341-0922

TOPOGRAPHY SOURCE

EXISTING TOPOGRAPHY IS BASED UPON AN AERIAL SURVEY BY ANALYTICAL PHOTOGRAMMETRIC SURVEYS, INC.
3544 UNIVERSITY AVENUE, SUITE B
RIVERSIDE, CA 92501
PHONE: (951) 686-5103
PERFORMED SEPTEMBER, 2014

LEGAL DESCRIPTION

LOT 1 OF RESURVEY AND SUBDIVISION OF LOT 19 OF THE ADDITION TO BANDINI DONATION, AS SHOWN BY MAP OF SAID SUBDIVISION RECORDED IN BOOK 1 PAGE 20 OF MAPS, RIVERSIDE COUNTY RECORDS.

ASSESSOR PARCEL NO

BOOK	PAGE	PARCELS
246	070	017
246	070	002
246	040	027
246	040	026

ACREAGE

APN: 246-070-017, 002 ..... 9.05 ACRES
APN: 246-040-026,027 ..... 6.82 ACRES
GROSS CONVEYED PARCEL ..... 15.88 ACRES
NET CONVEYED PARCEL ..... 15.55 ACRES

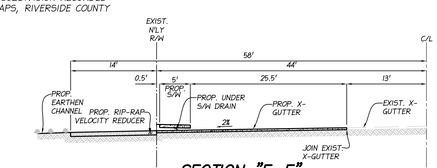
DISTURBED AREA ..... 15 ACRES

ZONING/LAND USE/GENERAL PLAN

EXISTING ZONING: ..... BMP
EXISTING LAND USE: ..... RESIDENTIAL
EXISTING GENERAL PLAN: ..... BMP
PROPOSED ZONING: ..... BMP
PROPOSED LAND USE: ..... WAREHOUSE
PROPOSED GENERAL PLAN: .....

UTILITY PROVIDERS

WATER: ..... CITY OF RIVERSIDE
SEWER: ..... CITY OF RIVERSIDE
ELECTRICITY: ..... CITY OF RIVERSIDE
GAS: ..... THE GAS COMPANY
TELEPHONE: ..... VERIZON
TELEVISION: ..... AIR WAVES / CHARTER COMMUNICATIONS



SECTION "E-E"
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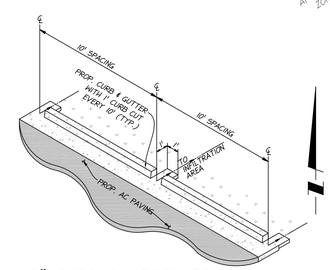
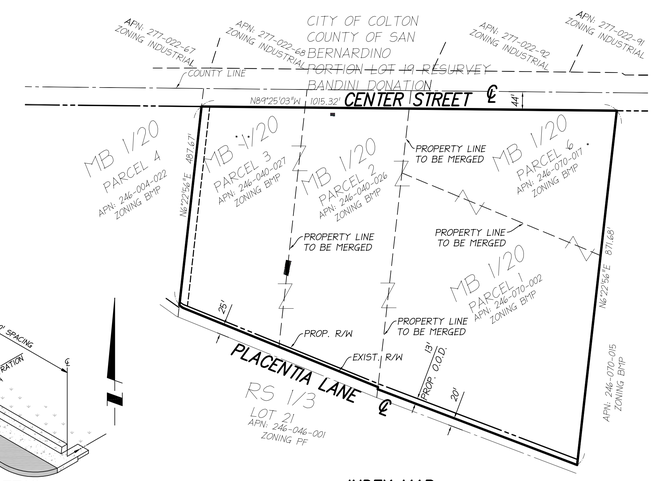
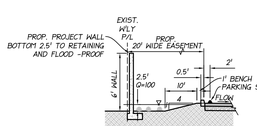


0" CURB & APRON DETAIL
NOT TO SCALE



INDEX MAP
SCALE 1"=150'



SECTION "A-A"
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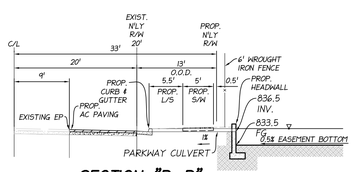

SECTION "B-B"
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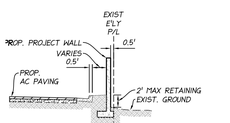
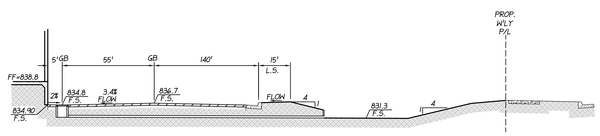


SECTION "C-C"
SCALE: NOT TO SCALE



SECTION "D-D"
SCALE: NOT TO SCALE

PROP. CURB & GUTTER

MARK	REVISIONS	DATE	BY

CITY OF RIVERSIDE
CONCEPTUAL GRADING AND DRAINAGE PLAN
CENTER STREET INDUSTRIAL BLOCK

FOR: TRANSITION PROPERTIES

SCALE	1" = 50'
DATE	07/2015
DESIGNED DRB	
CHECKED AW	
PLN CK REF:	
F.B.	

PSOMAS
1500 IOWA AVENUE, SUITE 210
RIVERSIDE, CA 92507
(951) 787-8421 WWW.PSOMAS.COM

W.O. 491.001
SHEET 1 OF 1 SHEETS
DWG. NO. 491.001

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

Appendix 4: Historical Site Conditions

Phase I Environmental Site Assessment or Other Information on Past Site Use

N/A

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

N/A

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

Santa Ana Watershed - BMP Design Volume, V_{BMP}
(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Psomas	Date	7/9/2015
Designed by	AW	Case No	P14-1033
Company Project Number/Name	491.001		

BMP Identification

BMP NAME / ID: 1-E

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85}= 0.65 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
1-A	*5917*	*Concrete or Asphalt*	*1*	*0.89*	*5278*			
1-B	*51098*	*Ornamental Landscaping*	*0.1*	*0.11*	*5644.2*			
1-C	*303591*	*Roofs*	*1*	*0.89*	*270803.2*			
1-D	*194632*	*Concrete or Asphalt*	*1*	*0.89*	*173611.7*			
1-E	*20210*	*Ornamental Landscaping*	*0.1*	*0.11*	*2232.4*			
	575448		***Total***		**457569.5**	**0.65**	***24785***	***101050***

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name: Psomas | Date: 7/9/2015

Designed by: AW | Case No: P14-1033

Company Project Number/Name: 491.001

BMP Identification

BMP NAME / ID: 2-E

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85}= 0.65 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
2-B	*11745*	*Natural (C Soil)*	*0.3*	*0.23*	*2644.6*			
	11745	**Total**			**2644.6**	**0.65**	**143.2**	**2500**

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Psomas	Date	7/9/2015
Designed by	AW	Case No	P14-1033
Company Project Number/Name	491.001		

BMP Identification

BMP NAME / ID: 3-E

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85}= 0.65 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
3-A	*5355*	*Concrete or Asphalt*	*1*	*0.89*	*4776.7*			
3-B	*4308*	*Ornamental Landscaping*	*0.1*	*0.11*	*475.9*			
3-D	*22992*	*Concrete or Asphalt*	*1*	*0.89*	*20508.9*			
3-E	*803*	*Ornamental Landscaping*	*0.1*	*0.11*	*88.7*			
	33458	***Total***			**25850.2**	**0.65**	***1400.2***	***1767***

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}
(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Psomas	Date	7/9/2015
Designed by	AW	Case No	P14-1033
Company Project Number/Name	491.001		

BMP Identification

BMP NAME / ID: 4-E

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth,
from the Isohyetal Map in Handbook Appendix E

D_{85}= 0.65 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
4-A	*7419*	*Concrete or Asphalt*	*1*	*0.89*	*6617.7*			
4-B	*9418*	*Ornamental Landscaping*	*0.1*	*0.11*	*1040.3*			
4-D	*30720*	*Concrete or Asphalt*	*1*	*0.89*	*27402.2*			
4-E	*925*	*Ornamental Landscaping*	*0.1*	*0.11*	*102.2*			
	48482	***Total***			**35162.4**	**0.65**	***1904.6***	***2035***

Notes:

Infiltration Basin - Design Procedure (Rev. 03-2012)	BMP ID 1-E	Legend:	Required Entries / Calculated Cells

Company Name:	Psomas	Date:	7/10/2015
Designed by:	ACW	County/City Case No.:	P14-1033

Design Volume

a) Tributary area (BMP subarea)	A_T =	13.2	acres
b) Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	24,709	ft^3

Maximum Depth

a) Infiltration rate	I =	10	in/hr
b) Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" from this BMP Handbook)	FS =	12	
c) Calculate D_1 $D_1 = \frac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times FS}$	D_1 =	5.0	ft
d) Enter the depth of freeboard (at least 1 ft)		1	ft
e) Enter depth to historic high ground water (measured from **top** of basin)		31	ft
f) Enter depth to top of bedrock or impermeable layer (measured from **top** of basin)		100	ft
g) D_2 is the smaller of: Depth to groundwater - (10 ft + freeboard) and Depth to impermeable layer - (5 ft + freeboard)	D_2 =	20.0	ft
h) D_{MAX} is the smaller value of D_1 and D_2 but shall not exceed 5 feet	D_{MAX} =	5.0	ft

Basin Geometry

a) Basin side slopes (no steeper than 4:1)	z =	6	:1
b) Proposed basin depth (excluding freeboard)	d_B =	5	ft
c) Minimum bottom surface area of basin ($A_S = V_{BMP}/d_B$)	A_S =	4942	ft^2
d) Proposed Design Surface Area	A_D =	20210	ft^2

Forebay

a) Forebay volume (minimum 0.5% V_{BMP})	Volume =	124	ft^3
b) Forebay depth (height of berm/splashwall. 1 foot min.)	Depth =	1	ft
c) Forebay surface area (minimum)	Area =	124	ft^2
d) Full height notch-type weir	Width (W) =	10.0	in

Notes:

Infiltration Trench - Design Procedure	BMP ID 3-E	Legend:	Required Entries / Calculated Cells

Company Name:	Psomas	Date:	7/9/2015
Designed by:	AW	County/City Case No.:	P14-1033

Design Volume

Enter the area tributary to this feature, Max = 10 acres — A_t = 1 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook — V_{BMP} = 1,400 ft^3

Calculate Maximium Depth of the Reservoir Layer

Enter Infiltration rate — I = 10.0 in/hr

Enter Factor of Safety, FS (unitless) — FS = 5

Obtain from Table 1, Appendix A: "Infiltration Testing" of this BMP Handbook

n = 40 %

Calculate D_1.

$$D_1 = \frac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times (n/100) \times FS}$$

D_1 = 30.00 ft

Enter depth to historic high groundwater mark (measured from finished grade) — 31 ft

Enter depth to top of bedrock or impermeable layer (measured from finished grade) — 100 ft

D_2 is the smaller of:

Depth to groundwater - 11 ft; & Depth to impermeable layer - 6 ft — D_2 = 20.0 ft

D_{MAX} is the smaller value of D_1 and D_2, must be less than or equal to 8 feet. — D_{MAX} = 8.0 ft

Trench Sizing

Enter proposed reservoir layer depth D_R, must be $\leq D_{MAX}$ — D_R = 5.50 ft

Calculate the design depth of water, d_W

Design $d_W = (D_R) \times (n/100)$ — Design d_W = 2.20 ft

Minimum Surface Area, A_S

$$A_S = \frac{V_{BMP}}{d_W}$$

A_S = 636 ft^2

Proposed Design Surface Area — A_D = 803 ft^2

Minimum Width = D_R + 1 foot pea gravel — 6.50 ft

Sediment Control Provided? (Use pulldown) — Yes

Geotechnical report attached? (Use pulldown) — Yes

If the trench has been designed correctly, there should be no error messages on the spreadsheet.

Infiltration Trench - Design Procedure	BMP ID 4-E	Legend:	Required Entries / Calculated Cells

Company Name:	Psomas	Date:	7/9/2015
Designed by:	AW	County/City Case No.:	P14-1033

Design Volume

Enter the area tributary to this feature, Max = 10 acres — A_t = 1 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook — V_{BMP} = 1,905 ft^3

Calculate Maximium Depth of the Reservoir Layer

Enter Infiltration rate — I = 10.0 in/hr

Enter Factor of Safety, FS (unitless) — FS = 5

Obtain from Table 1, Appendix A: "Infiltration Testing" of this BMP Handbook

n = 40 %

Calculate D_1. $D_1 = \frac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times (n/100) \times FS}$ — D_1 = 30.00 ft

Enter depth to historic high groundwater mark (measured from finished grade) — 31 ft

Enter depth to top of bedrock or impermeable layer (measured from finished grade) — 100 ft

D_2 is the smaller of:

Depth to groundwater - 11 ft; & Depth to impermeable layer - 6 ft — D_2 = 20.0 ft

D_{MAX} is the smaller value of D_1 and D_2, must be less than or equal to 8 feet. — D_{MAX} = 8.0 ft

Trench Sizing

Enter proposed reservoir layer depth D_R, must be $\leq D_{MAX}$ — D_R = 5.50 ft

Calculate the design depth of water, d_W

Design $d_W = (D_R) \times (n/100)$ — Design d_W = 2.20 ft

Minimum Surface Area, A_S — $A_S = \frac{V_{BMP}}{d_W}$ — A_S = 866 ft^2

Proposed Design Surface Area — A_D = 925 ft^2

Minimum Width = D_R + 1 foot pea gravel — 6.50 ft

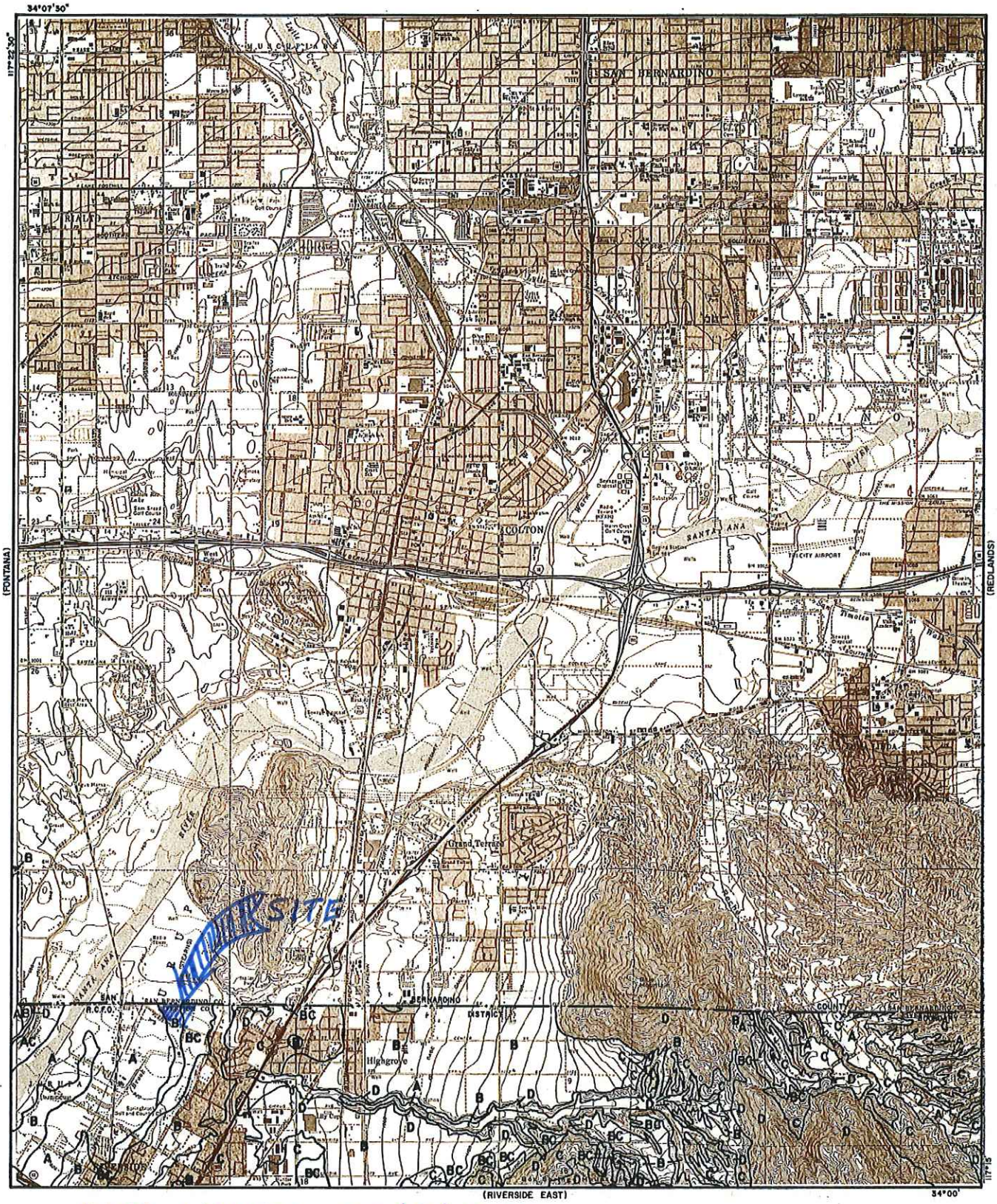
Sediment Control Provided? (Use pulldown)

Geotechnical report attached? (Use pulldown)

If the trench has been designed correctly, there should be no error messages on the spreadsheet.

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern



SITE LOCATED ON "B" SOIL

LEGEND

—— SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

RCFC&WCD

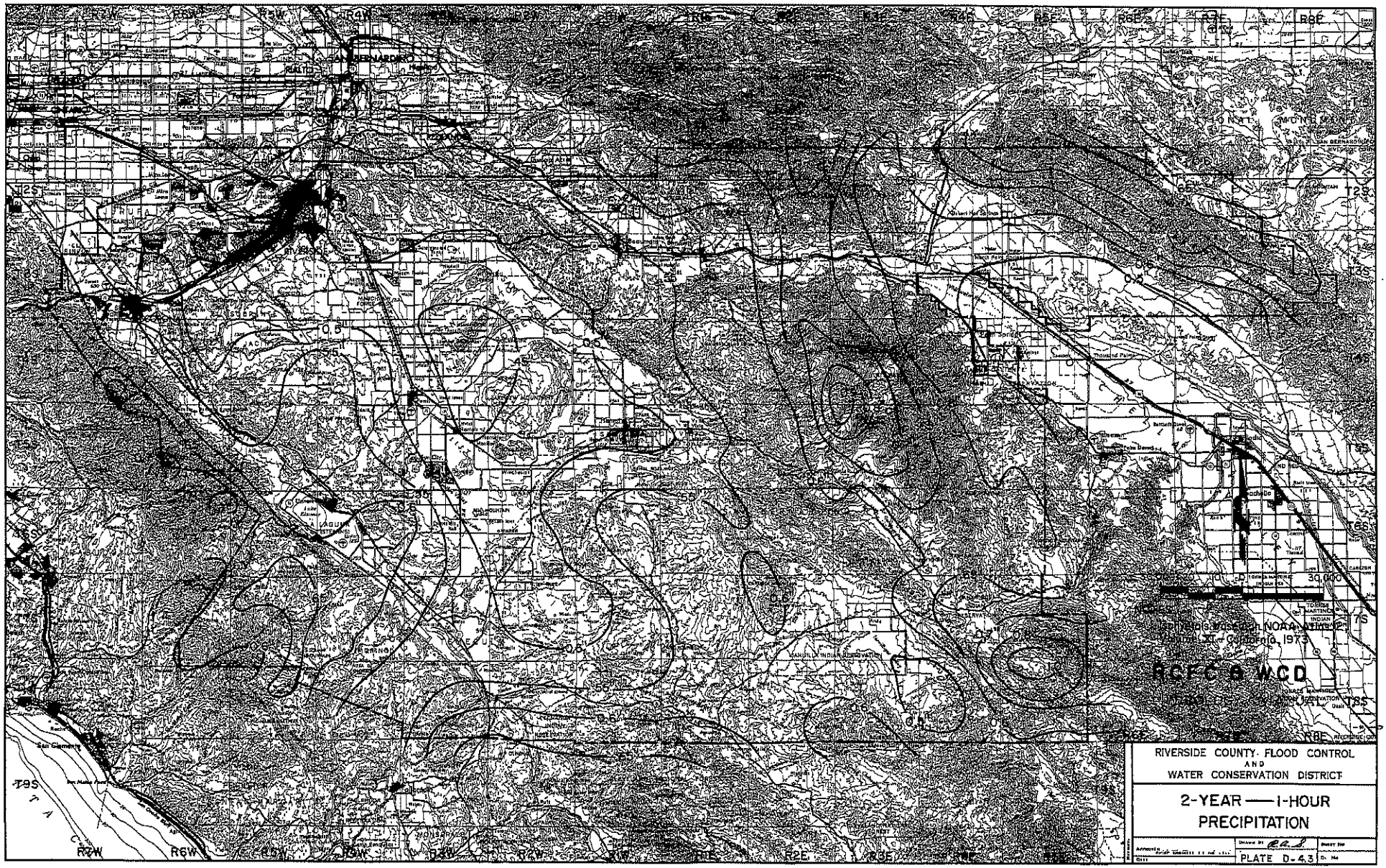
HYDROLOGY MANUAL

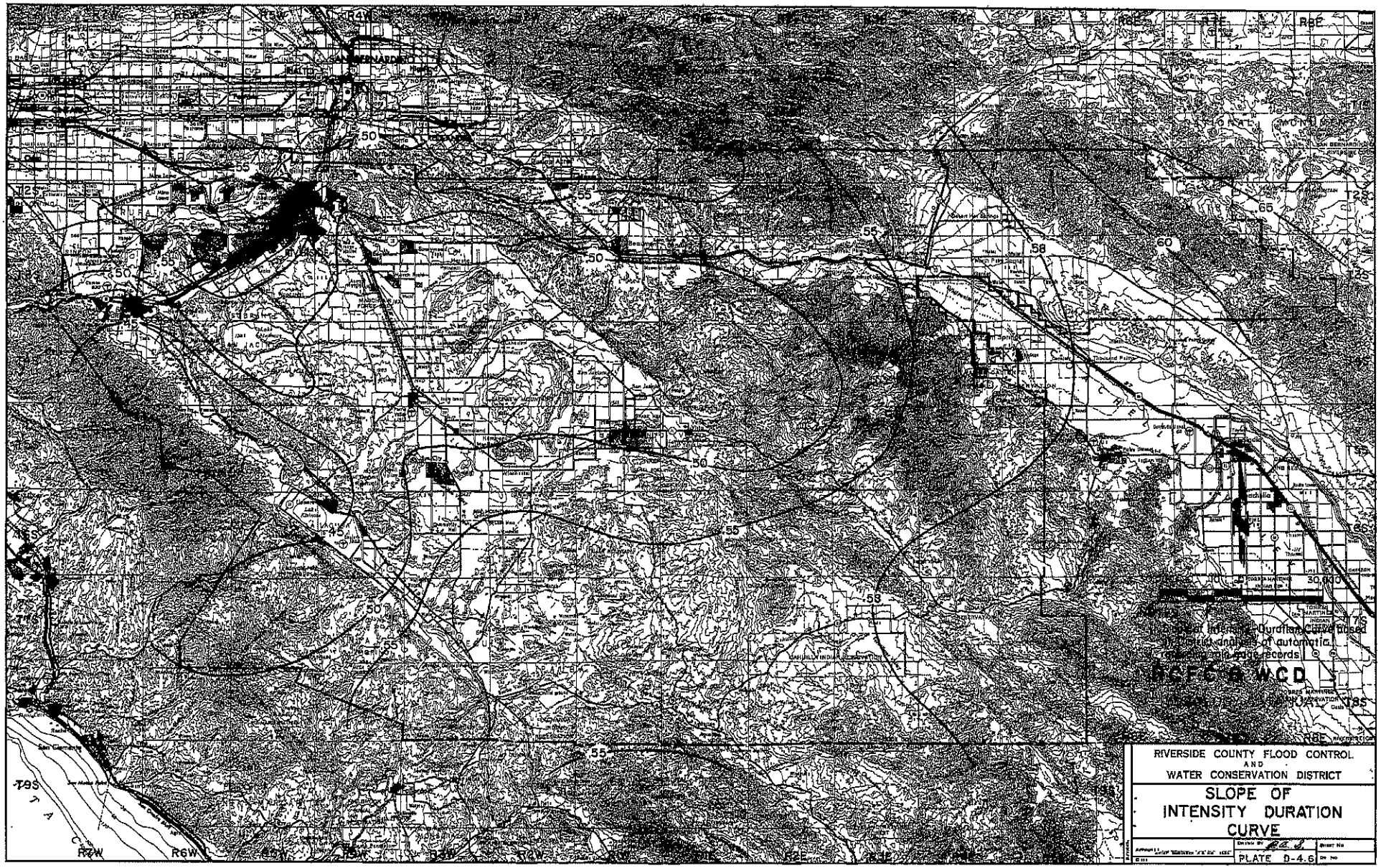
N

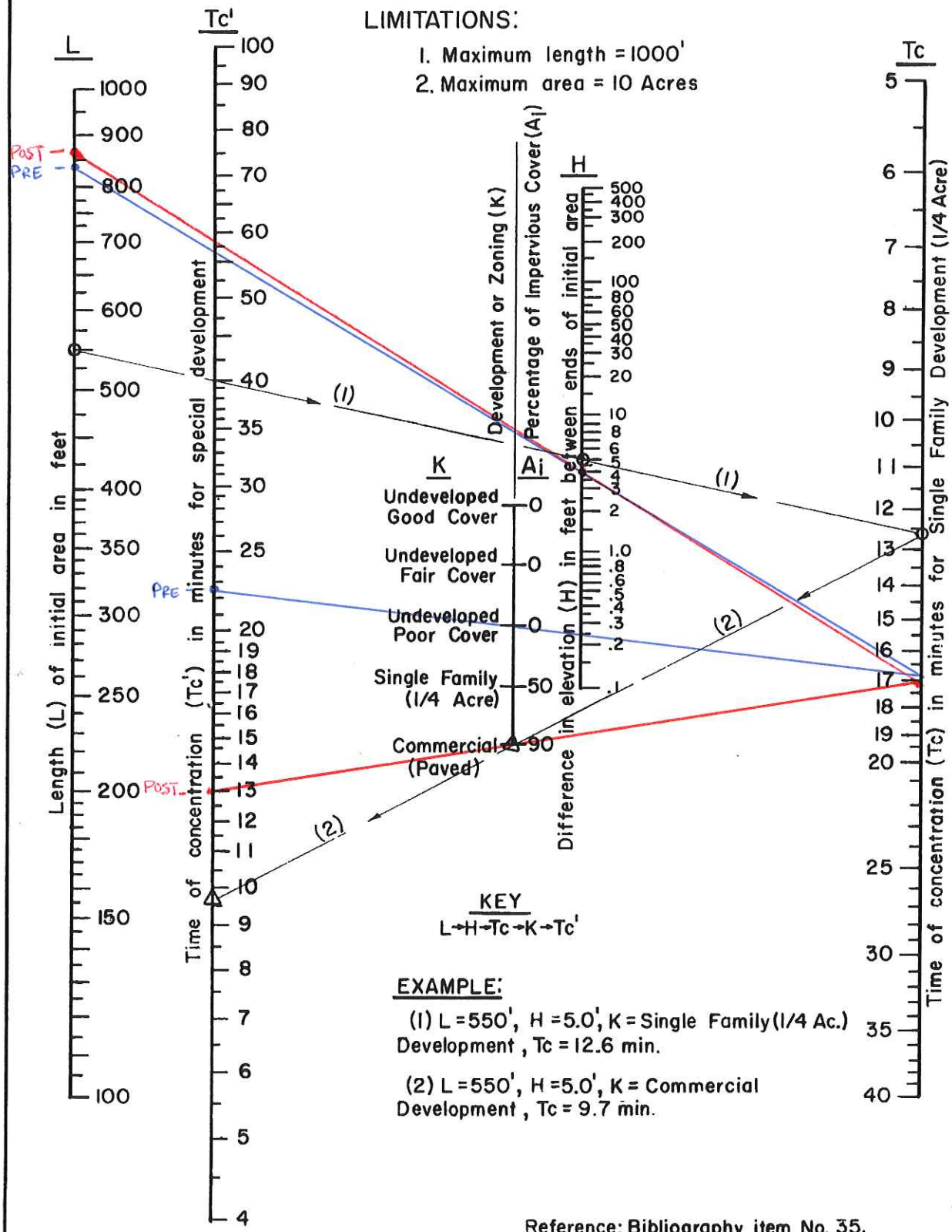
0 FEET 5000

HYDROLOGIC SOILS GROUP MAP FOR SAN BERNARDINO-SOUTH

PLATE C-1.04


RCFC & WCD
30,000
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
2-YEAR — 1-HOUR
PRECIPITATION
PLATE D-4.3


RCFC & WCD
30,000
Slope of Intensity-Duration Curve based on analysis of automatic recording rain gage records
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
SLOPE OF
INTENSITY DURATION
CURVE
PLATE D-4.6

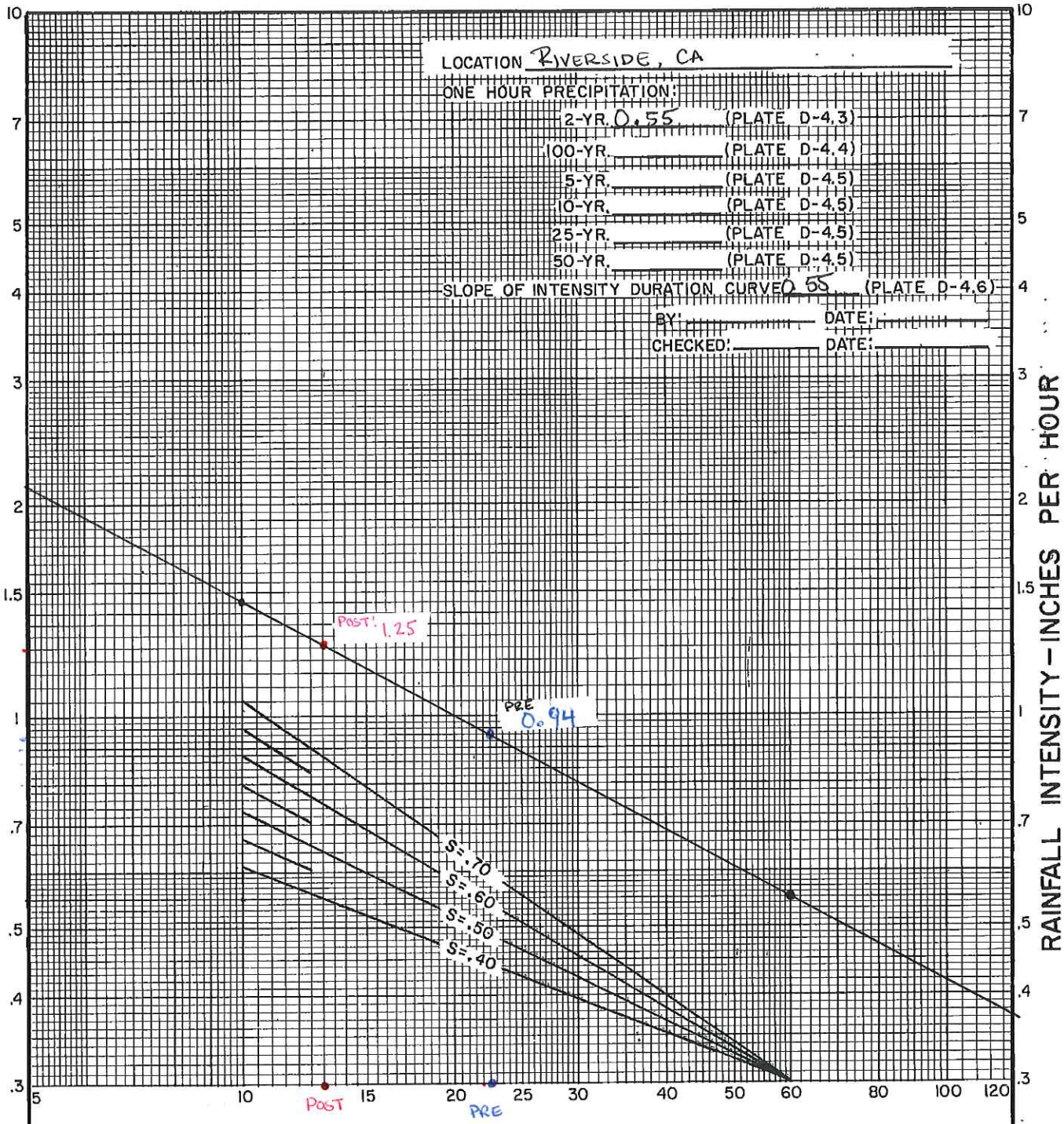


Reference: Bibliography item No. 35.

RCFC & WCD

HYDROLOGY MANUAL

TIME OF CONCENTRATION FOR INITIAL SUBAREA



RCFC & WCD

HYDROLOGY MANUAL

INTENSITY—DURATION CURVES CALCULATION SHEET

PLATE D-4.7

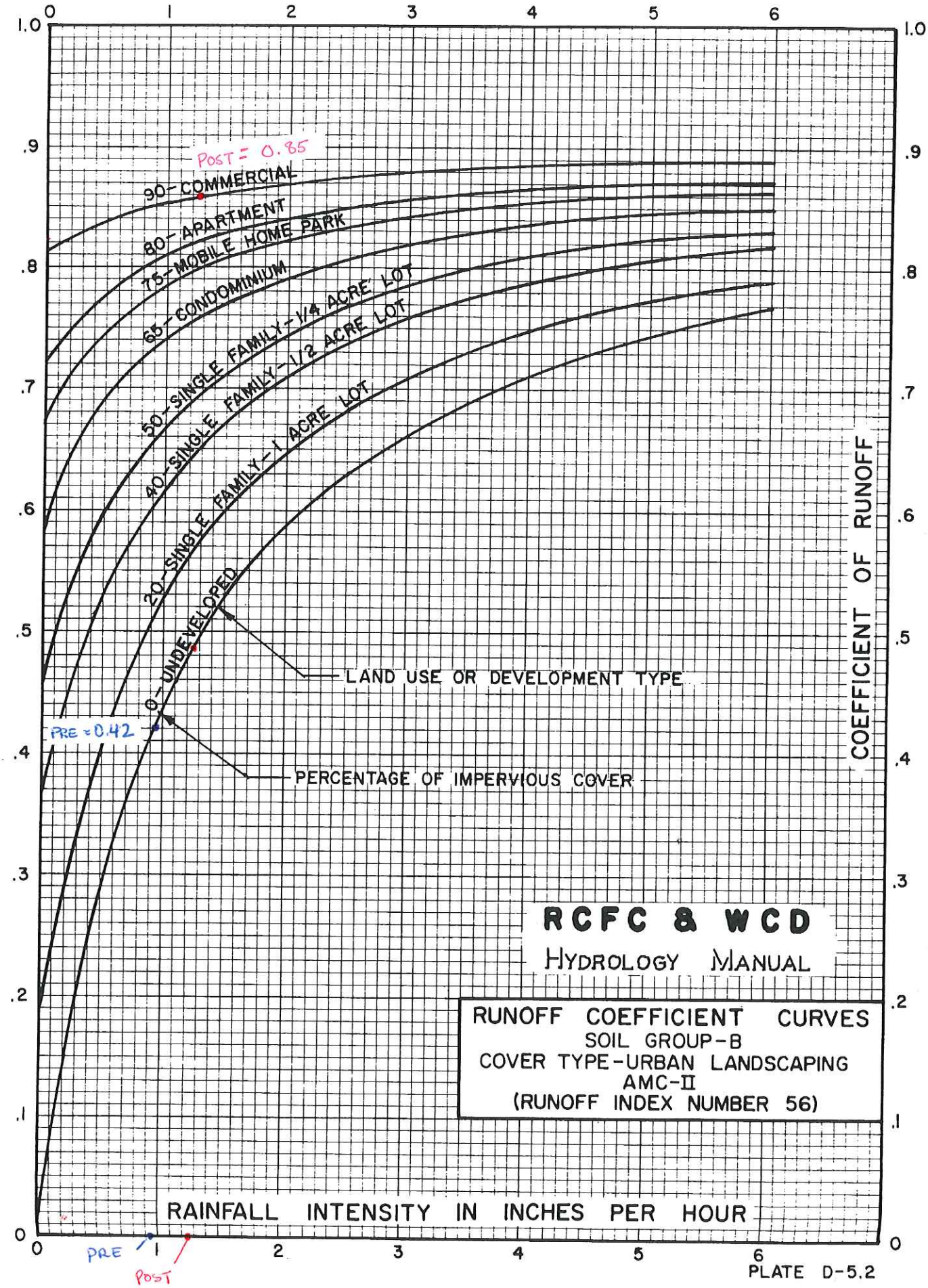

POST = 0.85
90-COMMERCIAL
80-APARTMENT
75-MOBILE HOME PARK
65-CONDOMINIUM
50-SINGLE FAMILY-1/4 ACRE LOT
40-SINGLE FAMILY-1/2 ACRE LOT
20-SINGLE FAMILY-1 ACRE LOT
0-UNDEVELOPED
PRE = 0.42
LAND USE OR DEVELOPMENT TYPE
PERCENTAGE OF IMPERVIOUS COVER
COEFFICIENT OF RUNOFF
RCFC & WCD
HYDROLOGY MANUAL
RUNOFF COEFFICIENT CURVES
SOIL GROUP-B
COVER TYPE-URBAN LANDSCAPING
AMC-II
(RUNOFF INDEX NUMBER 56)
RAINFALL INTENSITY IN INCHES PER HOUR
PRE
POST

PLATE D-5.2

RCFC & WCD HYDROLOGY MANUAL
RATIONAL METHOD CALCULATION FORM

Sheet No. ___ of ___ Sheets

PROJECT _____

Calculated by _____ DATE _____

Checked by _____ DATE _____

FREQUENCY 2yr · 1Hr

DRAINAGE AREA	Soil & Development	A Acres	I In/hr.	C	ΔQ CFS	ΣQ CFS	SLOPE	SECTION	V FPS	L FT.	T MIN.	ΣT	REMARKS
PRE	UNDEVELOPED	15.55	0.94	0.42	6.14					840	22.5		
POST	COMMERCIAL	15.55	1.25	0.85	16.52					960	13		

PLATE D-2

WO 454.001

HYDROGRAPH FOR SMALL AREAS

Tc= 22.5

2 Year Pre

Q=C*I*A C= 0.42 I= 0.94 A= 15.55 6.13914

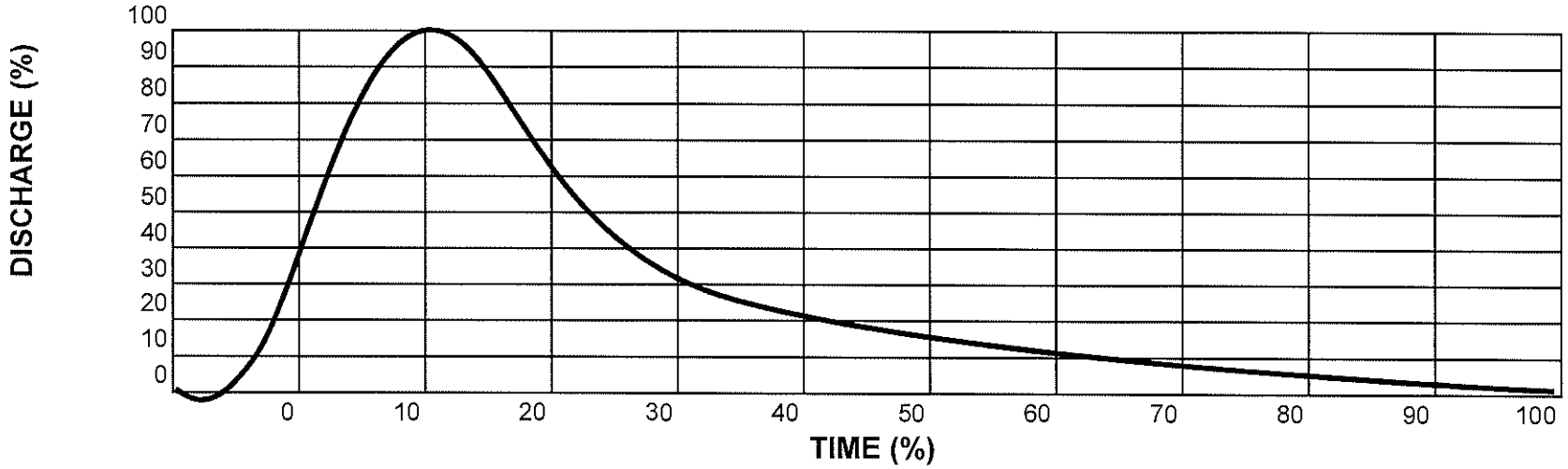
Total Time=Tc*5*60 Tc= 22.5 x 5 x 60 = 6750

Scale Factor= 1 sq. cm = Q/10 x Time/20

0.613914 x 337.5 = 207.196 CF/Sq CM

207.196 x 58.13 = 12044 CF

58.13 is a constant to convert area under the curve to cubic feet



WO 454.001

HYDROGRAPH FOR SMALL AREAS

Tc= 13

2 Year Post

Q=C*I*A C= 0.85 I= 1.25 A= 15.55 16.52188

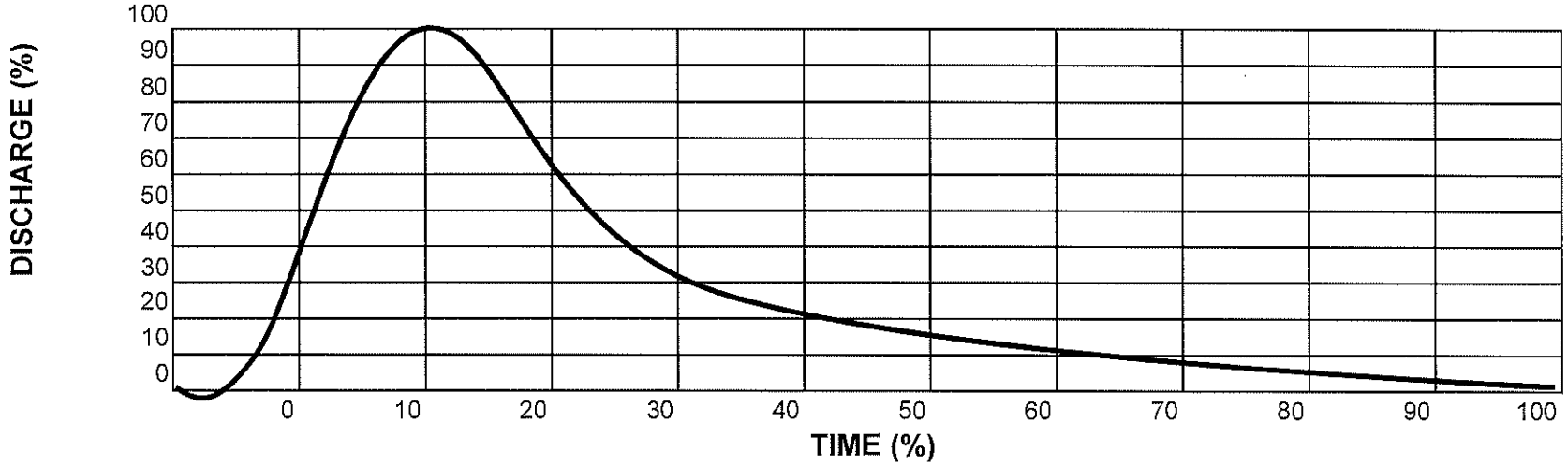
Total Time=Tc*5*60 Tc= 13 x 5 x 60 = 3900

Scale Factor= 1 sq. cm = Q/10 x Time/20

1.652188 x 195 = 322.1766 CF/Sq CM

322.1766 x 58.13 = 18728 CF

58.13 is a constant to convert area under the curve to cubic feet



Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

Appendix 9: O&M

Operation and Maintenance Plan and Documentation of Finance, Maintenance and Recording Mechanisms

Appendix 10: Educational Materials

BMP Fact Sheets, Maintenance Guidelines and Other End-User BMP Information

Educational Materials included with this WQMP are the following:

1. "A citizen's guide to understanding Stormwater" from EPA 833-B-00-002.
2. Stormwater pollution what you should know for "Outdoor Cleaning Activities and Non-point Source Discharges" from CRFC
3. "Tips for a healthy pet and healthier environment" from CRFC.
4. CASQA Handouts

SD-10 Site Design & Landscape Planning

SD-11 Roof Runoff Controls

SD-12 Efficient Irrigation

SD-13 Storm Drain Signage

SC-10 Non-Stormwater Discharges

SC-41 Building and Grounds Maintenance

SC-43 Parking/Storage Area Maintenance

SC-44 Drainage System Maintenance

TC-11 Infiltration Basin

Appendix G Noise Study

Center Street Commerce Building
Noise Study

February 2016 (13432)

Prepared for:

Transition Properties, LP
PO Box 1010
Blue Jay, California 92317

Prepared by:

MIG
1500 Iowa Avenue, Suite 110
Riverside, California 92507

This document is formatted for double-sided printing to conserve natural resources.

Center Street Commerce Building

Noise Study

February 2016

City of Riverside, California

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Appendix A Noise Measurement Data
Appendix B Construction Noise Output Data
Appendix C SoundPLAN Output Data

1 EXECUTIVE SUMMARY

Construction-related and operational noise impacts were modeled and analyzed for the proposed building located at 3667 Placentia Lane in the City of Riverside, California. This noise impact analysis contains documentation of existing noise levels as well as analysis of the impacts generated by project operation and traffic and analysis of vibration impacts. This report analyzes the project's consistency with applicable federal, State, and local regulations. The results of this report find construction-related and operational noise levels are consistent with applicable regulations.

1.1 Project Description

The project includes the development of a 308,000-square foot building located at 3667 Placentia Lane in the City of Riverside, California. The project includes 382 parking stalls, 62 trailer docks, and 110,591 square feet of landscaping.

1.2 Construction-Related Noise

Temporary noise increases will be greatest during the demolition phase. The model indicates that the use of construction equipment such as excavators, dozers, and concrete saws could expose the use located approximately 421 feet to the south of the center of the project site to a combined noise level of 71.1 dBA $L_{max.}$ Construction equipment could expose the use located 640 feet south, the industrial use located 510 feet east, and the park located 544 feet from the center of the project site to a combined noise level of 67.4 dBA L_{max}, 69.4 dBA L_{max}, and 68.8 dBA L_{max}, respectively. A noise level of 70 dBA is allowable at surrounding industrial uses and a noise level of 65 dBA is allowable at public recreation facilities. Construction activity could result in noise levels in excess of the allowable noise levels at the industrial use to the south and the public recreation use to the south of the project site. With incorporation of the Mitigation Measures N-1 and N-2, described herein, no substantial impacts will occur.

1.3 Operational Noise

The increase in vehicular traffic on area roadways will not result in noise levels exceeding the 65 dBA exterior noise standard established by the City of Colton to the north. The exterior noise levels under the Without and With project scenarios exceed allowable exterior noise levels at the residential uses to the northwest, northeast, and southeast of the project site. However, the project does not cause the exterior noise levels to exceed the 55 dBA residential threshold for receptors that are currently below the allowable noise levels. In addition, the proposed project will not result in a noticeable increase in noise levels. Therefore, no substantial impacts will occur.

1.4 Vibration

Based on the threshold criteria established by the Federal Transit Administration (FTA) and the California Department of Transportation (Caltrans), vibration from use of heavy construction equipment to construct the proposed project would be below the thresholds to cause damage to nearby structures and result in less than *barely perceptible* vibration at the receptors analyzed in the report. Therefore, no substantial impacts will occur.

1.5 Airport Noise

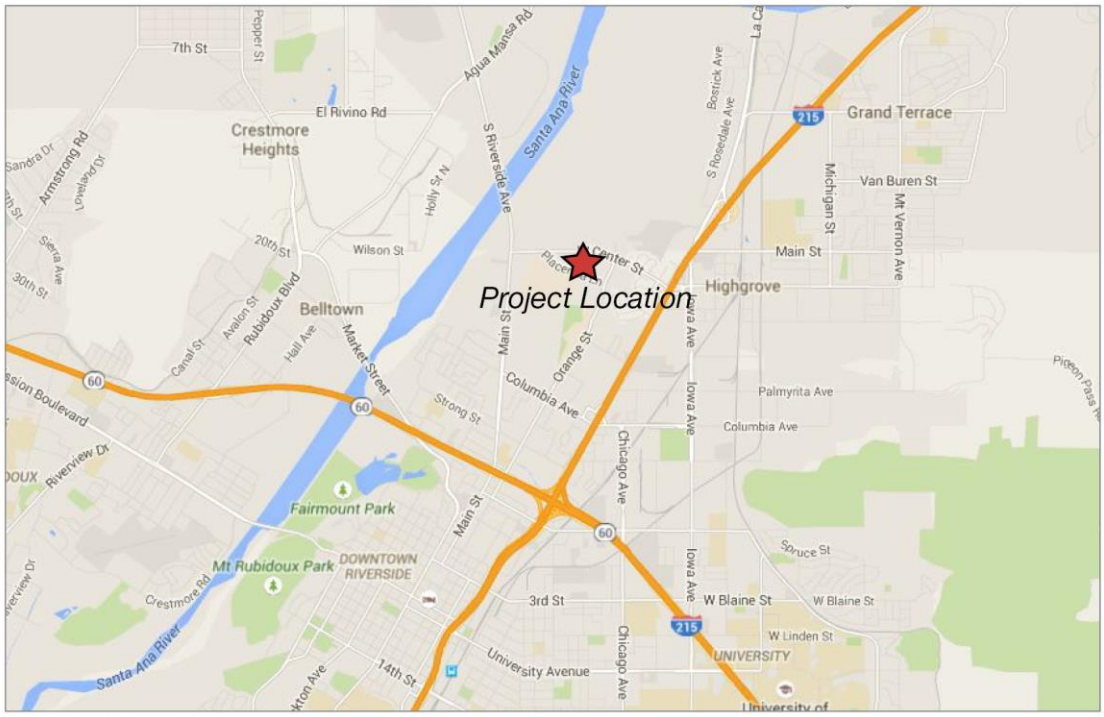
The project site is not located with two miles of a public or private use airport or helipad. Therefore, no substantial impacts will occur.

1.6 Mitigation Measures

The following mitigation measures are required to ensure that project-related short- and long-term noise levels are consistent with applicable federal, State, and local regulations.

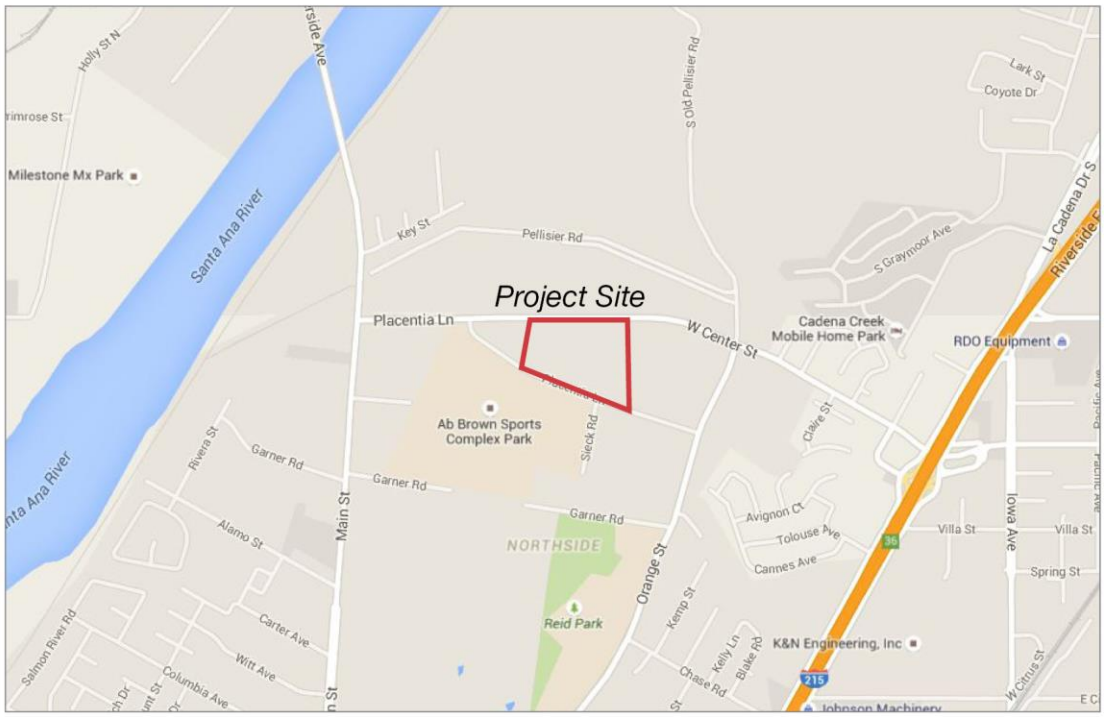
N-1 Limit construction activities to the hours of 7:00 AM to 7:00 PM Monday through Friday and the hours of 8:00 AM to 5:00 PM on Saturdays. Construction activity shall be prohibited on Sundays and federal holidays. This mitigation measure must be implemented throughout construction and may be periodically monitored by the Planning Director or designee during routine inspections.

N-2 Prior to issuance of grading permits, the Applicant shall submit a mitigation plan prepared by a qualified engineer or other acoustical expert for review and approval by the Planning Division that identifies noise control measures that achieve a minimum 10 dBA reduction in construction-related noise levels. The mitigation plan may include use of sound curtains, engineered equipment controls, or other methods. Noise control requirements shall be noted on project construction drawings and verified by the Building Department during standard inspection procedures.



Source: Google Maps, 2015

Regional



Source: Google Maps, 2015

Vicinity

Not to Scale

Exhibit 1 Regional and Vicinity Map

Center Street Commerce Building Project
6550 Center Street, Riverside, California

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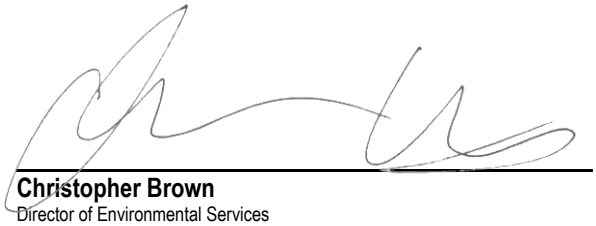
2 INTRODUCTION

This report includes modeling and analysis of construction- and operation-related noise generated from the proposed project on surrounding land uses. Vibration effects and airport noise are also discussed herein. The project includes construction of a 308,000-square foot building on 15.63 acres in the City of Riverside, California.

This report has been prepared utilizing project-specific characteristics where available. In those instances where project-specific data is not available, the analysis has been supplemented by model defaults or other standardized sources of comparable data. In any case where non-project defaults or other data have been used, a “worst-case” scenario was developed to ensure a conservative estimate of noise impacts.

This report has been prepared for use by the Lead Agency to assess potential project-related noise impacts to the environment in compliance with federal, State, or local guidelines, particularly with respect to the noise issues identified in Appendix G of the State CEQA Guidelines. This report does not make determinations of significance pursuant to CEQA because such determinations are required to be made solely in the purview of the Lead Agency.

This report has been prepared by Christopher Brown (Director of Environmental Services) and Olivia Chan (Associate Analyst II) of MIG, Inc. under contract to Transition Properties, LP.



Christopher Brown
Director of Environmental Services

Olivia Chan
Associate Analyst II

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3.1 Defining Noise

"Sound" is a vibratory disturbance created by a moving or vibrating source and is capable of being detected. "Noise" is defined as sound that is loud, unpleasant, unexpected, or undesired and may therefore be classified as a more specific group of sounds. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance and, in the extreme, hearing impairment.

THE PRODUCTION OF SOUND

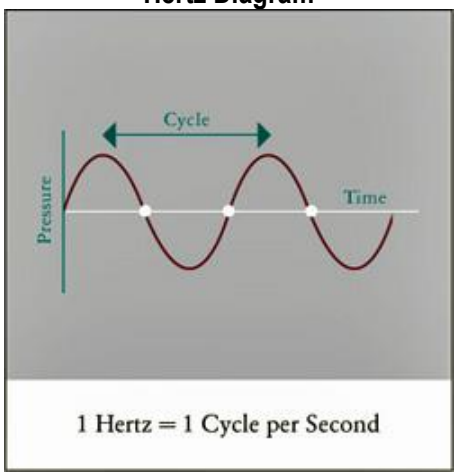
Sound has three properties: amplitude and amplitude variation of the acoustical wave (loudness), frequency (pitch), and duration of the noise. Despite the ability to measure sound, human perceptibility is subjective, and the physical response to sound complicates the analysis of its impact on people. People judge the relative magnitude of sound sensation in subjective terms such as "noisiness" or "loudness."

MEASURING SOUND

Sound pressure levels are described in logarithmic units of ratios of sound pressures to a reference pressure, squared. These units are called bels. To provide a finer description of sound, a bel is subdivided into 10 decibels, abbreviated dB. Since decibels are logarithmic units, sound pressure levels cannot be added or subtracted by ordinary arithmetic means. For example, if one automobile produces a sound pressure level of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dB. In fact, they would combine to produce 73 dB. This same principle can be applied to other traffic quantities as well. In other words, doubling the traffic volume on a street or the speed of the traffic will increase the traffic noise level by three dB. Conversely, halving the traffic volume or speed will reduce the traffic noise level by three dB. A three dB change in sound is the beginning at which humans generally notice a *barely perceptible* change in sound and a five dB change is generally *readily perceptible.*[1]

Sound pressure level alone is not a reliable indicator of loudness. The frequency or pitch of a sound also has a substantial effect on how humans will respond. While the intensity of the sound is a purely physical quantity, the loudness or human response depends on the characteristics of the human ear. Human hearing is limited not only to the range of audible frequencies but also in the way it perceives the sound pressure level in that range. In general, the healthy human ear is most sensitive to sounds between 1,000 Hertz (Hz) and 5,000 Hz, and perceives both higher and lower frequency sounds of the same magnitude with less intensity. Hertz is a unit of frequency that defines any periodic event. In the case of sound pressure, a Hertz defines one cycle of a sound wave per second (see Figure 1, Hertz Diagram). To approximate the frequency response of the human ear, a series of sound pressure level adjustments is usually applied to the sound measured by a sound level meter.

Figure 1
Hertz Diagram



STANDARDS FOR NOISE EQUIVALENT

Noise consists of pitch, loudness, and duration; therefore, a variety of methods for measuring noise have been developed. According to the California General Plan Guidelines for Noise Elements, the following are common metrics for measuring noise:[2]

L_{eq} (Equivalent Energy Noise Level): The sound level corresponding to a steady-state sound level containing the same total energy as a time-varying signal over given sample periods. L_{eq} is typically computed over 1-, 8-, and 24-hour sample periods.

CNEL (Community Noise Equivalent Level): The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of five decibels to sound levels in the evening from 7:00 PM to 10:00 PM and after addition of ten decibels to sound levels in the night from 10:00 PM to 7:00 AM.

L_{dn} (Day-Night Average Level): The average equivalent A-weighted sound level during a 24-hour day, obtained after the addition of ten decibels to sound levels in the night after 10:00 PM and before 7:00 AM.

CNEL and L_{dn} are utilized for describing ambient noise levels because they account for all noise sources over an extended period of time and account for the heightened sensitivity of people to noise during the night. L_{eq} is better utilized for describing specific and consistent sources because of the shorter reference period.

Federal and State agencies have established noise and land use compatibility guidelines that use averaging approaches to noise measurement. The State Department of Aeronautics and the California Commission on Housing and Community Development have adopted the community noise equivalent level (CNEL).

3.2 Vibration and Groundborne Noise

Vibration is the movement of mass over time. It is described in terms of frequency and amplitude and unlike sound; there is no standard way of measuring and reporting amplitude. Vibration can be described in units of velocity (inches per second) or discussed in decibel (dB) units in order to compress the range of numbers required to describe vibration. Vibration impacts to buildings are generally discussed in terms of peak particle velocity (PPV) that describes particle movement over time (in terms of physical displacement of mass). For purposes of this analysis, PPV will be used to describe all vibration for ease of reading and comparison. Vibration can impact people, structures, and sensitive equipment.[3] The primary concern related to vibration and people is the potential to annoy those working and residing in the area. Vibration with high enough amplitudes can damage structures (such as crack plaster or destroy windows). Groundborne vibration can also disrupt the use of sensitive medical and scientific instruments such as electron microscopes. Common sources of vibration within communities include construction activities and railroads.

Groundborne vibration generated by construction projects is usually highest during pile driving, rock blasting, soil compacting, jack hammering, and demolition-related activities. Next to pile driving, grading activity has the greatest potential for vibration impacts if large bulldozers, large trucks, or other heavy equipment are used.

4.1 Sensitive Receptors

The State of California defines sensitive receptors as those land uses that require serenity or are otherwise adversely affected by noise events or conditions. Schools, libraries, churches, hospitals, and residential uses make up the majority of these areas. The proposed facility is located in a generally industrial area with industrial uses to the north and east, vacant land to the west, and open space/park use to the south. There are residential uses approximately 0.14 miles to the southeast of the project site. There are no schools located within a quarter mile of the project site. Exhibit 2 (Radius Map) identifies existing development in the project vicinity based on assessor's parcel data.

4.2 Existing Noise Levels

Short-term noise measurements at the project site were conducted to identify the ambient noise in the project vicinity. An American National Standards Institute (ANSI Section SI4 1979, Type 1) Larson Davis model LxT sound level meter was used to monitor existing ambient noise levels in the project area. The noise meter was programmed in "slow" mode to record noise levels in A-weighted form. The microphone height was set at five feet. Two 10-minute daytime noise measurements were taken between 9.48 AM and 10:12 AM on Tuesday, April 7, 2015.

Ambient noise levels ranged from 58.7 to 66.9 dBA CNEL. Ambient noise levels are a composite of noise from all sources, near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location. Measurement locations are shown in Exhibit 3 (Noise Measurement Locations). Ambient noise levels are presented in Table 1 (Ambient Noise Levels) and measurement output data is included as Appendix A.

Vehicular traffic along Center Street and Placentia Lane was the dominant noise source at measurement location 001 and truck traffic entering and exiting the industrial use at the south end of Sieck Road was the dominant noise source at measurement location 002.

Table 1
Ambient Noise Levels

Location	Time Period	Measurement Period	Description	Existing Ambient Noise Levels (dBA CNEL)
001	9:48 AM – 9:58 AM	10 Minutes	Northern property boundary on the south side of Center Street	66.9
002	10:02 AM – 10:12 AM	10 Minutes	Southwestern corner of Placentia Lane and Sieck Road	58.7

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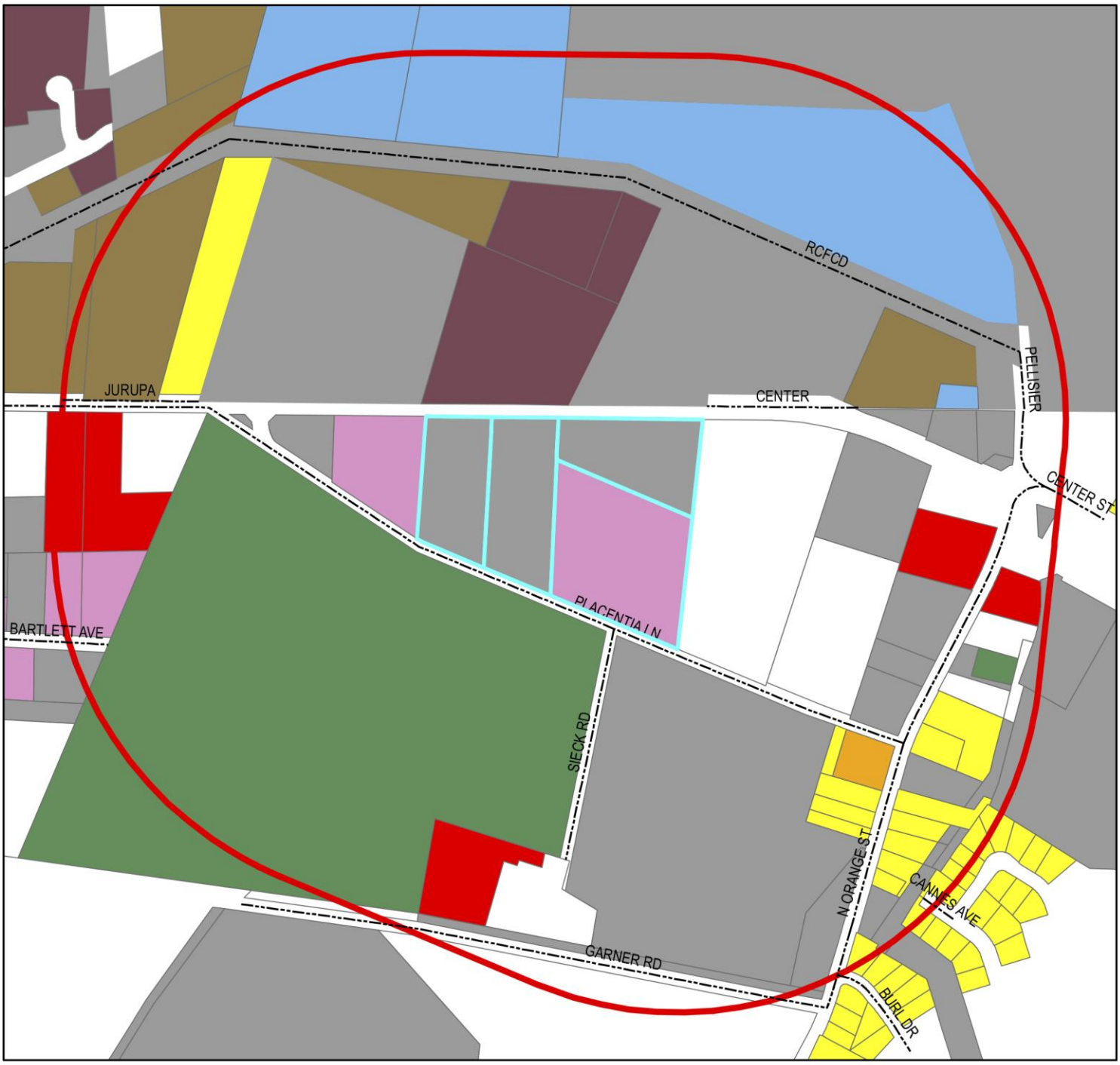

Legend

- Project Site
- 0.25 Mile Radius

0 0.03 0.06 0.12 0.18 0.24 Miles

N

Land Uses

- Unknown
- Vacant
- Commercial
- Storage
- Light Industrial
- Residential Use in Commercial Zone
- Single Family Residential
- Multi-Family Residential
- Miscellaneous Structures
- Electric Power Transmissions

Exhibit 2 Radius Map

Center Street Commerce Building Project
6550 Center Street, Riverside, California

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Source: Google Earth, 2015

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Exhibit 3 Noise Measurement Locations

Center Street Commerce Building Project
6550 Center Street, Riverside, California

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5.1 Federal Regulations

FEDERAL NOISE CONTROL ACT OF 1972

The U.S. Environmental Protection Agency (EPA) Office of Noise Abatement and Control was originally established to coordinate federal noise control activities. After its inception, EPA's Office of Noise Abatement and Control issued the Federal Noise Control Act of 1972, establishing programs and guidelines to identify and address the effects of noise on public health, welfare, and the environment. In response, the EPA published information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (Levels of Environmental Noise). The Levels of Environmental Noise recommended that the L_{dn} should not exceed 55 dBA outdoors or 45 dBA indoors to prevent significant activity interference and annoyance in noise-sensitive areas.

In addition, the Levels of Environmental Noise identified five dBA as an "adequate margin of safety" for a noise level increase relative to a baseline noise exposure level of 55 dBA L_{dn} (i.e., there would not be a noticeable increase in adverse community reaction with an increase of five dBA or less from this baseline level). The EPA did not promote these findings as universal standards or regulatory goals with mandatory applicability to all communities, but rather as advisory exposure levels below which there would be no risk to a community from any health or welfare effect of noise.

In 1981, EPA administrators determined that subjective issues such as noise would be better addressed at more localized levels of government. Consequently, in 1982 responsibilities for regulating noise control policies were transferred to State and local governments. However, noise control guidelines and regulations contained in EPA rulings in prior years remain in place by designated federal agencies, allowing more individualized control for specific issues by designated federal, State, and local government agencies.

FEDERAL TRANSIT ADMINISTRATION

The Federal Transit Administration (FTA) has developed methodology and significance criteria to evaluate incremental noise impacts from surface transportation modes (i.e., on road motor vehicles and trains) as presented in Transit Noise Impact and Vibration Assessment (FTA Guidelines). These incremental noise impact criteria are based on EPA findings and subsequent studies of annoyance in communities affected by transportation noise. The FTA extended the EPA's five dBA incremental impact criterion to higher ambient levels. As baseline ambient levels increase, smaller and smaller increments are allowed to limit expected increases in community annoyance. For example, in residential areas with a baseline ambient noise level of 50 dBA CNEL, a less-than-five dBA increase in noise levels would produce a minimal increase in community annoyance levels, while at 70 dBA CNEL, only one dBA increase could be accommodated before a significant annoyance increase would occur.

VIBRATION STANDARDS

The FTA provides guidelines for maximum-acceptable vibration criteria for different types of land uses. Groundborne vibration and noise levels associated with various types of construction equipment and activities are summarized in Table 2 (Reference Vibration Source Amplitudes for Construction Equipment). Table 3 (Groundborne Vibration and Noise Impact Criteria) shows the Federal Transit Administration's maximum acceptable vibration standard for human annoyance in residences where people normally sleep is 80 VdB (less than 70 vibration events per day).

Table 2
Reference Vibration Source Amplitudes for Construction Equipment

Equipment	Reference PPV at 25 ft (in/sec) at 25 Feet	Approximate Vibration Level (VL) at 25 Feet
Pile driver (impact)	1.518 (upper range)	112
	0.644 (typical)	104
Pile driver (sonic)	0.734 (upper range)	105
	0.170 (typical)	93
Clam shovel drop (slurry wall)	0.202	94
Hydromill	0.008 in soil	66
Slurry wall	0.017 in rock	75
Vibratory roller	0.210	94
Hoe Ram	0.089	87
Large bulldozer	0.089	87
Caisson drill	0.089	87
Loaded trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58

Notes: PPV is the peak particle velocity. Pile driver amplitude varies greatly based on equipment type and size.
Source: Federal Transit Administration. Transit Noise and Vibration Impact Assessment. 2006.

Table 3
Groundborne Vibration and Noise Impact Criteria

Land Use Category	Groundborne Vibration Impact Levels (VdB)		Groundborne Noise Impact Levels (dBA)	
	Frequent Events[1]	Infrequent Events[2]	Frequent Events[1]	Infrequent Events[2]
Category 1: Buildings where low ambient vibration is essential for interior vibrations	65 VdB[3]	65 VdB[3]	N/A	N/A
Category 2: Residences and buildings where people normally sleep	72 VdB	80 VdB	35 dBA	43 dBA
Category 3: Institutional land uses with primarily daytime use	75 VdB	83 VdB	40 dBA	48 dBA

1 Frequent Events – more than 70 vibration events per day
2 Infrequent Events – fewer than 70 vibration events per day
3 This criterion limit is based on levels that are acceptable for more moderately sensitive equipment such as optical microscopes.
Source: United States Department of Transportation, Federal Transit Administration, Transit Noise and Vibration Assessment, 1995

The FTA and Caltrans have compiled the data from numerous studies related to vibration and have developed standards for human perception and building damage. The FTA's maximum acceptable vibration standard for human annoyance is 78 VdB at nearby vibration-sensitive land uses.[4] The Caltrans maximum vibration level standard is 0.2 in/sec PPV for the prevention of structural damage to typical residential buildings.[5]

5.2 State Regulations

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

CEQA requires lead agencies to consider noise impacts. Under CEQA, lead agencies are directed to assess conformance to locally established noise standards or other agencies' noise standards; measure and identify the potentially significant exposure of people to or generation of excessive noise levels; measure and identify potentially significant permanent or temporary increase in ambient noise levels; and measure and identify potentially significant impacts associated with air traffic.

CALIFORNIA NOISE CONTROL ACT OF 1973

Sections 46000-46080 of the California Health and Safety Code, known as the California Noise Control Act of 1973, find that excessive noise is a serious hazard to public health and welfare and that exposure to certain levels of noise can result in physiological, psychological, and economic damage. It also finds that there is a continuous and increasing bombardment of noise in the urban, suburban, and rural areas. The California Noise Control Act declares that the State of California has a responsibility to protect the health and welfare of its citizens by the control, prevention, and abatement of noise. It is the policy of the State to provide an environment for all Californians free from noise that jeopardizes their health or welfare.

CALIFORNIA NOISE INSULATION STANDARDS (CCR TITLE 24)

In 1974, the California Commission on Housing and Community Development adopted noise insulation standards for multi-family residential buildings (Title 24, Part 2, California Code of Regulations). Title 24 establishes standards for interior room noise (attributable to outside noise sources). The regulations also specify that acoustical studies must be prepared whenever a residential building or structure is proposed to be located near an existing or adopted freeway route, expressway, parkway, major street, thoroughfare, rail line, rapid transit line, or industrial noise source, and where such noise source or sources create an exterior CNEL (or L_{dn}) of 60 dBA or greater. Such acoustical analysis must demonstrate that the residence has been designed to limit intruding noise to an interior CNEL (or L_{dn}) of 45 dBA or below [California's Title 24 Noise Standards, Chap. 2-35].

STATE OF CALIFORNIA GENERAL PLAN GUIDELINES 2003

Though not adopted by law, the State of California General Plan Guidelines 2003, published by the California Governor's Office of Planning and Research (OPR) (OPR Guidelines), provides guidance for the compatibility of projects within areas of specific noise exposure. The OPR Guidelines identify the suitability of various types of development relative to a range of outdoor noise levels and provide each local community some flexibility in setting local noise standards that allow for the variability in community preferences. Findings presented in the Levels of Environmental Noise Document (EPA 1974) influenced the recommendations of the OPR Guidelines, most importantly in the choice of noise exposure metrics (i.e., L_{dn} or CNEL) and in the upper limits for the normally acceptable outdoor exposure of noise-sensitive uses.

The OPR Guidelines include a Noise and Land Use Compatibility Matrix which identifies acceptable and unacceptable community noise exposure limits for various land use categories. Where the "normally acceptable" range is used, it is defined as the highest noise level that should be considered for the construction of the buildings which do not incorporate any special acoustical treatment or noise mitigation. The "conditionally acceptable" or "normally acceptable" ranges include conditions calling for detailed acoustical study or construction mitigation to reduce interior exposure levels prior to the construction or operation of the building under the listed exposure levels.

CALIFORNIA DEPARTMENT OF TRANSPORTATION

According to the Caltrans vibration manual, large bulldozers, vibratory rollers (used to compact earth), and loaded trucks utilized during grading activities can produce vibration, and depending on the level of vibration, could cause annoyance at uses within the project vicinity or damage structures. Caltrans has developed a screening tool to determine of vibration from construction equipment is substantial enough to impact surrounding uses.

The Caltrans vibration manual establishes thresholds for vibration impacts on buildings and humans. These thresholds are summarized in Tables 4 (Vibration Damage Potential Threshold Criteria) and 5 (Vibration Annoyance Potential Threshold Criteria).

Table 4
Vibration Damage Potential Threshold Criteria

Structural Integrity	Maximum PPV (in/sec)	
	Transient	Continuous
Historic and some older buildings	0.50	0.25
Older residential structures	0.50	0.30
New residential structures	1.00	0.50
Modern industrial and commercial structures	2.00	0.50
Source: Caltrans 2013		

Table 5
Vibration Annoyance Potential Threshold Criteria

Human Response	PPV Threshold (in/sec)	
	Transient	Continuous
Barely perceptible	0.035	0.012
Distinctly perceptible	0.24	0.035
Strongly perceptible	0.90	0.10
Severely perceptible	2.00	0.40
Source: Caltrans 2013		

5.3 Local Regulations

CITY OF RIVERSIDE MUNICIPAL CODE

The City of Riverside Municipal Code, under Chapter 4.25 (Nuisance Exterior Sound Level limits) Section 7.25.010 (Exterior Sound Level Limits), provides the local government ordinance relative to community noise level exposure, guidelines, and regulations.

Exterior Noise Standards

Table 7.25.010A (Exterior Noise Standards) of the Municipal Code includes exterior noise standards for daytime and nighttime noise levels for each land use category. Exterior noise levels shall not exceed 55 dBA between the hours of 7:00 AM and 10:00 PM for residential use or 70 dBA for surrounding industrial uses and 65 dBA for public recreation facilities and commercial use at any time of day.

Construction Noise Levels

Pursuant to Section 7.35.010 (General Noise Regulations), the operation or causing of any tools or equipment used in construction, drilling, repair, alteration, grading, or demolition work between the hours of 7:00 PM and 7:00 AM on Monday through Friday, between 5:00 PM and 8:00 AM on Saturdays, or any time on Sundays and federal holidays that creates a noise disturbance across residential or commercial property line or at any time exceeds the maximum permitted noise level for the underlying land use category is prohibited.

CITY OF COLTON MUNICIPAL CODE

Pursuant to Section 18.42.040 (Noise) of the Colton Municipal Code, the maximum sound level radiated by any use, when measured at the boundary line of the property of which is sound is generated, shall not be obnoxious and shall not exceed 65 dBA.

Vibration

Pursuant to Section 18.42.050 (Vibration) of the Colton Municipal Code, ground vibration shall not be generated by equipment other than motor vehicles, trains, or by temporary construction or demolition, which is perceptible by the average person at or beyond the lot line of the property containing such activities.

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The thresholds identified in Appendix G of the State CEQA Guidelines, as implemented by the City of Riverside, have been utilized to assess the significance of the potential environmental effects of the project.

6.1 Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the proposed project could result in potentially significant impacts related to noise if it results in:

A. Exposure of persons or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
B. Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.
C. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.
D. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.
E. For a project located within an airport land use plan, or where such a plan has not been adopted, within two miles of a public airport or public use airport, exposure of people residing or working in the project area to excessive noise levels.
F. For a project within a vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.

To assess construction impacts, a worst-case construction scenario was modeled using the Federal Highway Administration's Roadway Construction Noise Model (RCNM). Modeling parameters and output are provided in Appendix B. RCNM utilizes standard noise emission levels for different types of equipment and includes utilization percentage, impact, and shielding parameters.

To assess current and opening year traffic noise levels, vehicle trips associated with surrounding roadways were modeled utilizing the SoundPLAN software. SoundPLAN is a three-dimensional noise modeling software that accounts for the shielding and reflective effects associated with intervening topography and nearby buildings.

6.2 Consistency with Applicable Standards

CONSTRUCTION NOISE LEVELS

Construction noise levels were estimated for nearby receptors using the FHWA Roadway Construction Noise Model (RCNM). See Exhibit 4 (Receptors - Construction) for receptor locations. Temporary noise increases will be greatest during the demolition phase. The model indicates that the use of construction equipment such as excavators, dozers, and concrete saws could expose the industrial use located approximately 421 feet to the south of the center of the project site to a combined noise level of 71.1 dBA $L_{max.}$ Construction equipment could expose the industrial use located 640 feet south, the industrial use located 510 feet east, and the park located 544 feet from the center of the project site to a combined noise level of 67.4 dBA L_{max}, 69.4 dBA L_{max}, and 68.8 dBA L_{max}, respectively. Within the City of Riverside, a noise level of 70 dBA is allowable at surrounding industrial uses and a noise level of 65 dBA is allowable at public recreation facilities. To the north of the project site is the City of Colton. Within the City of Colton, the maximum allowable noise level is 65 dBA. Construction activity could result in noise levels in excess of the allowable noise levels at the industrial use to the south, the public recreation use to the south, and the industrial use to the north of the project site. Therefore, Mitigation Measures N-1 and N-2 have been incorporated to reduce the impact to neighboring uses during construction.

Per Section 7.35.10 (General Noise Regulations) of the Riverside Municipal Code, construction activities occurring between the hours of 7:00 PM and 7:00 AM on Mondays through Fridays, between 5:00 PM and 8:00 AM on Saturdays, and any time on Sundays and federal holidays are prohibited. Mitigation Measure N-1 limits construction activity to the hours of 7:00 AM and 7:00 PM Monday through Friday and the hours of 8:00 AM and 5:00 PM on Saturdays. Due to the

time limitations on construction activity, surrounding employees and park users will be exposed to limited construction noise. Because noise levels during construction activities are anticipated to exceed the City's exterior noise standards, mitigation measures will be necessary to minimize noise levels at nearby receptors. Mitigation Measure N-2 will be incorporated to minimize noise associated with general construction activities. Mitigation Measure N-2 requires preparation of a construction noise reduction plan to reduce temporary noise impacts by a minimum of 10 dBA which is a feasible performance standard based on available technology. Engineered controls include retrofitting equipment with improved exhaust and intake muffling, disengaging equipment fans, and installation of sound panels around equipment engines. These types of controls can achieve noise level reductions of approximately 10 dBA.[6] [7] Implementation of Mitigation Measure N-2 will reduce temporary noise impacts by a minimum of 10 dBA, resulting in a maximum construction noise level of 61.1 dBA at the project site and 58.8 dBA at the park located to the south of the project site. Therefore, with implementation of Mitigation Measures N-1 and N-2, construction noise will feasibly be reduced to unsubstantial levels.

OPERATIONAL NOISE LEVELS

The City of Riverside Municipal Code sets an allowable exterior noise level for industrial uses at 70 dBA CNEL, 65 dBA CNEL for public recreational facilities and office/commercial use, 60 dBA for community support uses, and 55 dBA for residential use. The City of Colton sets an allowable noise level of 65 dBA CNEL. Ambient noise at the project site would generally be defined by traffic on Center Street, Placentia Lane, and operational noise from neighboring industrial uses. A substantial increase in ambient noise is an increase that is *barely perceptible* (3 dBA). Operationally, the proposed project will result in periodic landscaping and other occasional noise generating activities. These activities are common in urban uses and do not represent a substantial increase in periodic noise in consideration that the project site is located in an industrialized area. Traffic noise from vehicular traffic generated by the proposed project was projected using SoundPLAN software was based on estimated trip generation and distribution provided by Kunzman Associates, Inc.[8]

Noise levels at the single family homes to the east and west, the industrial uses to the north and east, and the commercial use to the east were calculated (see Appendix C for output data) and projected at the ground floor (see Exhibit 6 (Receptors – Traffic Noise). The 2017 Opening Year Without and With Project traffic noise levels during the peak hour at neighboring uses are summarized in Table 6 (Opening Year 2017 Peak Hour Roadway Noise Levels). Opening Year Without and With Project exterior noise levels will be within the allowable exterior noise levels established by the City of Colton for the northern industrial use and within the established City of Riverside exterior noise standard for the industrial and commercial uses to the east and the residential use to the southeast of the project site on the east side of Orange Street. The exterior noise levels under the Without and With Project scenarios exceed allowable exterior noise levels at the residential uses to the northeast, southeast, and northwest of the project site. However, the project does not cause the exterior noise levels to exceed the 55 dBA residential threshold for receptors that are currently below the allowable noise levels. In addition, traffic noise levels will not increase more than 3 dBA as a result of the proposed project as shown in Table 6. Therefore, no significant impacts will result.

Table 6
Opening Year 2017 Peak Hour Roadway Noise Levels

Receptors	Without Project dBA CNEL		With Project dBA CNEL		Difference (AM / PM)	Significant? (AM / PM)
	AM	PM	AM	PM		
1 – Industrial (N)	57.0	57.8	58.2	58.8	+1.2 / +1.0	No / No
2 – Industrial (E)	61.3	62.3	63.3	64.1	+2.0 / +1.8	No / No
3 – Single Family Residential (NE)	**57.9**	**59.4**	**59.7**	**60.8**	+1.8 / +1.4	No / No
4 – Commercial (E)	57.4	58.2	58.2	59.0	+0.8 / +0.8	No / No
5 – Single Family Residential (SE)	53.3	54.0	53.6	54.4	+0.3 / +0.4	No / No
6 – Single Family Residential (SE)	**60.7**	**61.4**	**60.9**	**61.8**	+0.2 / +0.4	No / No
7 – Single Family Residential (NW)	**60.2**	**61.1**	**60.9**	**61.8**	+0.7 / +0.7	No / No
Bolded *noise levels exceed 55 dBA exterior threshold for residential uses.*						

6.3 Vibration Impacts

CONSTRUCTION VIBRATION

Construction activities that use vibratory rollers and bulldozers are repetitive sources of vibration; therefore, the *continuous* threshold is used. Industrial uses are located to the north and east of the project site. As a worst case scenario, the *historic and some older buildings* threshold is used. Based on the threshold criteria summarized in Tables 4 and 5, vibration from use of heavy construction equipment for the proposed project would be below the thresholds to cause damage to nearby structures and result in less than *barely perceptible* vibration at the four receptors shown in Table 7 (Distances to Vibration Receptors) and Table 8 (Construction Vibration Impacts).

Table 7
Distances to Vibration Receptors

Receptors	Distance from Center of Project Site (ft)
1 – Industrial (N)	640
2 – Industrial (E)	510
3 – Industrial (S)	421
4 – Park (S)	544

Construction of the project does not require rock blasting, pile driving, or the use of a jack hammer, but will use a vibratory roller, and large bulldozer, and loaded trucks. All of the receptors will experience less than *barely perceptible* vibration from construction of the proposed project. Furthermore, these construction activities will be limited to the hours of 7:00 AM to 7:00 PM Mondays through Friday and the hours of 8:00 AM to 5:00 PM on Saturdays. With regard to long-term operational impacts, activities associated with the project will not result in any vibration-related impacts to adjacent or on-site properties.

Table 8
Construction Vibration Impacts

Receptors	Equipment	PPVref	Distance (feet)	PPV
1 – Single Family Home (NE)	Vibratory Roller	0.21	640	0.0031
2 – Storage Facility (N)	Vibratory Roller	0.21	510	0.0042
3 – Single Family Home (E)	Vibratory Roller	0.21	421	0.0053
4 – Single Family Home (E)	Vibratory Roller	0.21	544	0.0038
1 – Single Family Home (NE)	Large Bulldozer	0.089	640	0.0013
2 – Storage Facility (N)	Large Bulldozer	0.089	510	0.0018
3 – Single Family Home (E)	Large Bulldozer	0.089	421	0.0023
4 – Single Family Home (E)	Large Bulldozer	0.089	544	0.0016
1 – Single Family Home (NE)	Loaded Truck	0.076	640	0.0011
2 – Storage Facility (N)	Loaded Truck	0.076	510	0.0015
3 – Single Family Home (E)	Loaded Truck	0.076	421	0.0019
4 – Single Family Home (E)	Loaded Truck	0.076	544	0.0014

OPERATIONAL VIBRATION

Operation of the proposed project will include heavy-duty truck traffic along Center Street. According to the Federal Transit Administration, it is unusual for vibration from sources such as trucks to be perceptible.[9] However, according to Caltrans heavy trucks can impart groundborne vibration when the pavement is not smooth.[10] Therefore, to provide a worst case analysis, potential building damage due to project operation has been analyzed. Currently, there is concern regarding impacts to the Adobe structure located north of Center Street to the west of Orange Street (APN 246-082-002) due to heavy trucks traveling along Center Street.

The structure is located approximately 88 feet from the centerline of the nearest lane on Center Street. According to Caltrans, the highest truck traffic vibrations generated on freeway shoulders is 2.0 PPV mm/sec (0.079 PPV in/sec). At 88 feet, the vibration level reaching the Adobe structure is 0.015 PPV. According to project trip generation as estimated by Kunzman Associates, the proposed project is anticipated to generate 64 heavy-duty trucks per day, with a maximum of five heavy-duty trucks during the PM peak hour. Although truck trips will occur periodically, the *continuous* threshold has been utilized to provide a worst case analysis. Based on the Caltrans threshold for *historic and some old buildings* as summarized in Table 4, heavy truck traffic on Center Street will not result in structure damage due to operation-related groundborne vibration. The Caltrans Transportation and Construction Vibration Guidance Manual also provides alternative thresholds, as summarized in Table 9 (Vibration Criteria for Buildings).

Table 9
Vibration Criteria for Buildings

Criteria	Building Type	Continuous Threshold PPV (in/sec)
Swiss Association of Standardization	Class IV: Construction very sensitive to vibration; objects of historic interest	0.12
Konan	Historic and Sensitive Buildings	0.12
AASHTO	Historic Sites or other critical locations	0.10
Source: Caltrans 2013		

As shown in Table 9, periodic heavy truck traffic occurring along Center Street will not exceed vibration criteria for structural damage to historic and sensitive buildings. In addition, According to the Whiffen vibration criteria for continuous vibration, vibration levels of 0.006 – 0.019 are unlikely to cause damage to buildings of any type. The 0.015 PPV resulting from heavy truck traffic will be within this continuous threshold. Therefore, no substantial impact will result.

6.4 Airport Noise

The project site is located with two miles of a public or private use airport or helipad. Therefore, no substantial impacts will occur.

Source: Google Earth, 2015

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Exhibit 4 Receptors - Construction

Center Street Commerce Building Project

6550 Center Street, Riverside, California

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Source: Google Earth, 2015

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Exhibit 5 Receptors - Traffic Noise

Center Street Commerce Building Project

6550 Center Street, Riverside, California

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7 MITIGATION MEASURES

The following mitigation measures are required to ensure that project-related noise levels will not exceed established thresholds.

N-1 Limit construction activities to the hours of 7:00 AM to 7:00 PM Monday through Friday and the hours of 8:00 AM to 5:00 PM on Saturdays. Construction activity shall be prohibited on Sundays and federal holidays. This mitigation measure must be implemented throughout construction and may be periodically monitored by the Planning Director or designee during routine inspections.

N-2 Prior to issuance of grading permits, the Applicant shall submit a mitigation plan prepared by a qualified engineer or other acoustical expert for review and approval by the Planning Division that identifies noise control measures that achieve a minimum 10 dBA reduction in construction-related noise levels. The mitigation plan may include use of sound curtains, engineered equipment controls, or other methods. Noise control requirements shall be noted on project construction drawings and verified by the Building Department during standard inspection procedures.

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8 REFERENCES

[1] California Department of Transportation. Basics of Highway Noise: Technical Noise Supplement. November 2009.

[2] California Governor's Office of Planning and Research. General Plan Guidelines. 2003

[3] California Department of Transportation. Transportation- and Construction-Induced Vibration Guidance Manual. June 2004

[4] Federal Transit Administration. *Transit Noise and Vibration Impact Assessment.* 2006

[5] California Department of Transportation. *Transportation and Construction Vibration Guidance Manual. Division of Environmental Analysis. September 2013*

[6] United States Bureau of Mines. Mining Machinery Noise Control Guidelines. 1983

[7] United States Bureau of Mines. Noise Abatement Techniques for Construction Equipment. August 1979

[8] Kunzman Associates, Inc. Center Street Warehouse Project Traffic Impact Analysis. January 19, 2016

[9] Federal Transit Administration. Transit Noise and Vibration Impact Assessment. May 2006

[10] California Department of Transportation, Transportation and Construction Vibration Guidance Manual, September 2013

Appendix A Noise Measurement Data

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Appendix B Construction Noise and Vibration Output Data

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Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 6/4/2015
Case Description: 1 Demolition

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Industrial (N)	Industrial	70	70	70

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	640	0
Excavator	No	40		80.7	640	0
Excavator	No	40		80.7	640	0
Dozer	No	40		81.7	640	0
Dozer	No	40		81.7	640	0
Concrete Saw	No	20		89.6	640	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator	58.6	54.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	58.6	54.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	58.6	54.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	59.5	55.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	59.5	55.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Saw	67.4	60.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	67.4	64.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Industrial (E)	Industrial	70	70	70

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	510	0
Excavator	No	40		80.7	510	0
Excavator	No	40		80.7	510	0
Dozer	No	40		81.7	510	0
Dozer	No	40		81.7	510	0
Concrete Saw	No	20		89.6	510	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator	60.5	56.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	60.5	56.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	60.5	56.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	61.5	57.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	61.5	57.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Saw	69.4	62.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	69.4	66.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Industrial (S)	Industrial	70	70	70

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	421	0
Excavator	No	40		80.7	421	0
Excavator	No	40		80.7	421	0
Dozer	No	40		81.7	421	0
Dozer	No	40		81.7	421	0
Concrete Saw	No	20		89.6	421	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator	62.2	58.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	62.2	58.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	62.2	58.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	63.2	59.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	63.2	59.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Saw	71.1	64.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	71.1	67.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Park (S)	Industrial	65	65	65

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	544	0
Excavator	No	40		80.7	544	0
Excavator	No	40		80.7	544	0
Dozer	No	40		81.7	544	0
Dozer	No	40		81.7	544	0
Concrete Saw	No	20		89.6	544	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator	60	56	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	60	56	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	60	56	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	60.9	57	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	60.9	57	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Saw	68.8	61.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	68.8	65.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 6/4/2015
Case Description: 2 Site Preparation

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Industrial (N)	Industrial	70	70	70

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84		640	0
Tractor	No	40	84		640	0
Backhoe	No	40		77.6	640	0
Backhoe	No	40		77.6	640	0
Dozer	No	40		81.7	640	0
Dozer	No	40		81.7	640	0
Dozer	No	40		81.7	640	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor	61.9	57.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	61.9	57.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	55.4	51.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	55.4	51.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	59.5	55.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	59.5	55.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	59.5	55.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	61.9	64.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Industrial (E)	Industrial	70	70	70

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84		510	0
Tractor	No	40	84		510	0
Backhoe	No	40		77.6	510	0
Backhoe	No	40		77.6	510	0
Dozer	No	40		81.7	510	0
Dozer	No	40		81.7	510	0
Dozer	No	40		81.7	510	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor	63.8	59.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	63.8	59.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	57.4	53.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	57.4	53.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	61.5	57.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	61.5	57.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	61.5	57.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	63.8	66.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Industrial (S)	Industrial	70	70	70

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84		421	0
Tractor	No	40	84		421	0
Backhoe	No	40		77.6	421	0
Backhoe	No	40		77.6	421	0
Dozer	No	40		81.7	421	0
Dozer	No	40		81.7	421	0
Dozer	No	40		81.7	421	0

		Results												
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor		65.5	61.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		65.5	61.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe		59.1	55.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe		59.1	55.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		63.2	59.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		63.2	59.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		63.2	59.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	65.5	67.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Park (S)	Industrial	65	65	65

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84		544	0
Tractor	No	40	84		544	0
Backhoe	No	40		77.6	544	0
Backhoe	No	40		77.6	544	0
Dozer	No	40		81.7	544	0
Dozer	No	40		81.7	544	0
Dozer	No	40		81.7	544	0

		Results												
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor		63.3	59.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		63.3	59.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe		56.8	52.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe		56.8	52.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		60.9	57	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		60.9	57	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		60.9	57	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	63.3	65.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 6/4/2015
Case Description: 3 Grading

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Industrial (N)	Industrial	70	70	70

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	640	0
Tractor	No	40	84		640	0
Backhoe	No	40		77.6	640	0
Grader	No	40	85		640	0
Excavator	No	40		80.7	640	0
Excavator	No	40		80.7	640	0
Scraper	No	40		83.6	640	0
Scraper	No	40		83.6	640	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	59.5	55.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	61.9	57.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	55.4	51.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	62.9	58.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	58.6	54.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	58.6	54.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	61.4	57.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	61.4	57.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	62.9	65.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Industrial (E)	Industrial	70	70	70

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	510	0
Tractor	No	40	84		510	0
Backhoe	No	40		77.6	510	0
Grader	No	40	85		510	0
Excavator	No	40		80.7	510	0
Excavator	No	40		80.7	510	0
Scraper	No	40		83.6	510	0
Scraper	No	40		83.6	510	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	61.5	57.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	63.8	59.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	57.4	53.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	64.8	60.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	60.5	56.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	60.5	56.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	63.4	59.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	63.4	59.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	64.8	67.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Industrial (S)	Industrial	70	70	70

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	421	0
Tractor	No	40	84		421	0
Backhoe	No	40		77.6	421	0
Grader	No	40	85		421	0
Excavator	No	40		80.7	421	0
Excavator	No	40		80.7	421	0
Scraper	No	40		83.6	421	0
Scraper	No	40		83.6	421	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	63.2	59.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	65.5	61.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	59.1	55.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	66.5	62.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	62.2	58.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	62.2	58.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	65.1	61.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	65.1	61.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	66.5	69.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Park (S)	Industrial	65	65	65

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	544	0
Tractor	No	40	84		544	0
Backhoe	No	40		77.6	544	0
Grader	No	40	85		544	0
Excavator	No	40		80.7	544	0
Excavator	No	40		80.7	544	0
Scraper	No	40		83.6	544	0
Scraper	No	40		83.6	544	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	60.9	57	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	63.3	59.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	56.8	52.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	64.3	60.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	60	56	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	60	56	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	62.8	58.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	62.8	58.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	64.3	66.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 6/4/2015
Case Description: 4 Building Construction

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Industrial (N)	Industrial	70	70	70

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	640	0
All Other Equipment > 5 HP	No	50	85		640	0
All Other Equipment > 5 HP	No	50	85		640	0
All Other Equipment > 5 HP	No	50	85		640	0
Tractor	No	40	84		640	0
Backhoe	No	40		77.6	640	0
Backhoe	No	40		77.6	640	0
Welder / Torch	No	40		74	640	0
Generator	No	50		80.6	640	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	58.4	50.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	62.9	59.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	62.9	59.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	62.9	59.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	61.9	57.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	55.4	51.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	55.4	51.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch	51.9	47.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	58.5	55.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	62.9	66.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Industrial (E)	Industrial	70	70	70

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	510	0
All Other Equipment > 5 HP	No	50	85		510	0
All Other Equipment > 5 HP	No	50	85		510	0
All Other Equipment > 5 HP	No	50	85		510	0
Tractor	No	40	84		510	0
Backhoe	No	40		77.6	510	0
Backhoe	No	40		77.6	510	0
Welder / Torch	No	40		74	510	0
Generator	No	50		80.6	510	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	60.4	52.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	64.8	61.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	64.8	61.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	64.8	61.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	63.8	59.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	57.4	53.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	57.4	53.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch	53.8	49.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	60.5	57.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	64.8	68.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Industrial (S)	Industrial	70	70	70

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	421	0
All Other Equipment > 5 HP	No	50	85		421	0
All Other Equipment > 5 HP	No	50	85		421	0
All Other Equipment > 5 HP	No	50	85		421	0
Tractor	No	40	84		421	0
Backhoe	No	40		77.6	421	0
Backhoe	No	40		77.6	421	0
Welder / Torch	No	40		74	421	0
Generator	No	50		80.6	421	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	62	54.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	66.5	63.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	66.5	63.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	66.5	63.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	65.5	61.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	59.1	55.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	59.1	55.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch	55.5	51.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	62.1	59.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	66.5	70	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Park (S)	Industrial	65	65	65

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	544	0
All Other Equipment > 5 HP	No	50	85		544	0
All Other Equipment > 5 HP	No	50	85		544	0
All Other Equipment > 5 HP	No	50	85		544	0
Tractor	No	40	84		544	0
Backhoe	No	40		77.6	544	0
Backhoe	No	40		77.6	544	0
Welder / Torch	No	40		74	544	0
Generator	No	50		80.6	544	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	59.8	51.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	64.3	61.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	64.3	61.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	64.3	61.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	63.3	59.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	56.8	52.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	56.8	52.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch	53.3	49.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	59.9	56.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	64.3	67.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 6/4/2015
Case Description: 5 Architectural Coating

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Industrial (N)	Industrial	70	70	70

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40		77.7	640	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)	55.5	51.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	55.5	51.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Industrial (E)	Industrial	70	70	70

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40		77.7	510	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)	57.5	53.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	57.5	53.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Industrial (S)	Industrial	70	70	70

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40		77.7	421	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)	59.2	55.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	59.2	55.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Park (S)	Industrial	65	65	65

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40	77.7	544	0	

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)	56.9	53	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	56.9	53	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 6/4/2015
Case Description: 6 Paving

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Industrial (N)	Industrial	70	70	70

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Paver	No	50		77.2	640	0
Paver	No	50		77.2	640	0
Roller	No	20		80	640	0
Roller	No	20		80	640	0
All Other Equipment > 5 HP	No	50	85		640	0
All Other Equipment > 5 HP	No	50	85		640	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver	55.1	52.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	55.1	52.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	57.9	50.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	57.9	50.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	62.9	59.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	62.9	59.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	62.9	64	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Industrial (E)	Industrial	70	70	70

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Paver	No	50		77.2	510	0
Paver	No	50		77.2	510	0
Roller	No	20		80	510	0
Roller	No	20		80	510	0
All Other Equipment > 5 HP	No	50	85		510	0
All Other Equipment > 5 HP	No	50	85		510	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver	60.4	52.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	64.8	61.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	64.8	61.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	64.8	61.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	63.8	59.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	57.4	53.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	64.8	68.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Industrial (S)	Industrial	70	70	70

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Paver	No	50		77.2	421	0
Paver	No	50		77.2	421	0
Roller	No	20		80	421	0
Roller	No	20		80	421	0
All Other Equipment > 5 HP	No	50	85		421	0
All Other Equipment > 5 HP	No	50	85		421	0

Equipment	Calculated (dBA) *Lmax	Leq	Results Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Noise Limit Exceedance (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Paver	62	54.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	66.5	63.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	66.5	63.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	66.5	63.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	65.5	61.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	59.1	55.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	66.5	70	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Park (S)	Industrial	65	65	65

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Paver	No	50		77.2	544	0
Paver	No	50		77.2	544	0
Roller	No	20		80	544	0
Roller	No	20		80	544	0
All Other Equipment > 5 HP	No	50	85		544	0
All Other Equipment > 5 HP	No	50	85		544	0

Equipment	Calculated (dBA) *Lmax	Leq	Results Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Noise Limit Exceedance (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Paver	59.8	51.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	64.3	61.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	64.3	61.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	64.3	61.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	63.3	59.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	56.8	52.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	64.3	67.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Center Street Warehouse

Receptors	Distance (ft)
1 – Industrial (N)	640
2 – Industrial (E)	510
3 – Industrial (S)	421
4 – Park (S)	544

Equipment	PPVref	D	n	Eref	Eequip	PPV
Vibratory Roller	0.21	640	1.3			0.0031
Vibratory Roller	0.21	510	1.3			0.0042
Vibratory Roller	0.21	421	1.3			0.0053
Vibratory Roller	0.21	544	1.3			0.0038
Large Bulldozer	0.089	640	1.3			0.0013
Large Bulldozer	0.089	510	1.3			0.0018
Large Bulldozer	0.089	421	1.3			0.0023
Large Bulldozer	0.089	544	1.3			0.0016
Loaded Truck	0.076	640	1.3			0.0011
Loaded Truck	0.076	510	1.3			0.0015
Loaded Truck	0.076	421	1.3			0.0019
Loaded Truck	0.076	544	1.3			0.0014

Table

Equipment	PPVref	Distance	PPV
Vibratory Roller	0.21	640	0.0031
Vibratory Roller	0.21	510	0.0042
Vibratory Roller	0.21	421	0.0053
Vibratory Roller	0.21	544	0.0038
Large Bulldozer	0.089	640	0.0013
Large Bulldozer	0.089	510	0.0018
Large Bulldozer	0.089	421	0.0023
Large Bulldozer	0.089	544	0.0016
Loaded Truck	0.076	640	0.0011
Loaded Truck	0.076	510	0.0015
Loaded Truck	0.076	421	0.0019
Loaded Truck	0.076	544	0.0014

Appendix C SoundPLAN Output Data

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Center Street
Opening Year 2017 Without Project
Road

Stationing km	ADT Veh/24h	Traffic values Vehicles type	Vehicle name	AM Veh/h	PM Veh/h	Speed km/h	Control device	Constr. Speed km/h	Affect. veh. %	Road surface	Gradient Min / Max %
Center Street (EB)		Traffic direction:	In entry direction								
0+000	4288	Total	-	132	272	-	none	-	-	Average (of DGAC and PCC)	0
0+000	4288	Automobiles	-	90	187	56	none	-	-	Average (of DGAC and PCC)	0
0+000	4288	Medium trucks	-	34	70	56	none	-	-	Average (of DGAC and PCC)	0
0+000	4288	Heavy trucks	-	7	13	56	none	-	-	Average (of DGAC and PCC)	0
0+000	4288	Buses	-	-	-	-	none	-	-	Average (of DGAC and PCC)	0
0+000	4288	Motorcycles	-	1	2	56	none	-	-	Average (of DGAC and PCC)	0
0+000	4288	Auxiliary Vehicle	-	-	-	-	none	-	-	Average (of DGAC and PCC)	0
0+544	4920	Total	-	166	283	-	none	-	-	Average (of DGAC and PCC)	0
0+544	4920	Automobiles	-	114	194	56	none	-	-	Average (of DGAC and PCC)	0
0+544	4920	Medium trucks	-	43	73	56	none	-	-	Average (of DGAC and PCC)	0
0+544	4920	Heavy trucks	-	8	14	56	none	-	-	Average (of DGAC and PCC)	0
0+544	4920	Buses	-	-	-	-	none	-	-	Average (of DGAC and PCC)	0
0+544	4920	Motorcycles	-	1	2	56	none	-	-	Average (of DGAC and PCC)	0
0+544	4920	Auxiliary Vehicle	-	-	-	-	none	-	-	Average (of DGAC and PCC)	0
0+794	4920	Total	-	166	283	-	none	-	-	Average (of DGAC and PCC)	0
0+794	4920	Automobiles	-	114	194	56	none	-	-	Average (of DGAC and PCC)	0
0+794	4920	Medium trucks	-	43	73	56	none	-	-	Average (of DGAC and PCC)	0
0+794	4920	Heavy trucks	-	8	14	56	none	-	-	Average (of DGAC and PCC)	0
0+794	4920	Buses	-	-	-	-	none	-	-	Average (of DGAC and PCC)	0
0+794	4920	Motorcycles	-	1	2	56	none	-	-	Average (of DGAC and PCC)	0
0+794	4920	Auxiliary Vehicle	-	-	-	-	none	-	-	Average (of DGAC and PCC)	0
0+948	4920	Total	-	166	283	-	none	-	-	Average (of DGAC and PCC)	0
0+948	4920	Automobiles	-	114	194	56	none	-	-	Average (of DGAC and PCC)	0
0+948	4920	Medium trucks	-	43	73	56	none	-	-	Average (of DGAC and PCC)	0
0+948	4920	Heavy trucks	-	8	14	56	none	-	-	Average (of DGAC and PCC)	0
0+948	4920	Buses	-	-	-	-	none	-	-	Average (of DGAC and PCC)	0
0+948	4920	Motorcycles	-	1	2	56	none	-	-	Average (of DGAC and PCC)	0
0+948	4920	Auxiliary Vehicle	-	-	-	-	none	-	-	Average (of DGAC and PCC)	0
1+184	6720	Total	-	206	428	-	Stop sign	0	-	Average (of DGAC and PCC)	0
1+184	6720	Automobiles	-	141	294	56	Stop sign	0	-	Average (of DGAC and PCC)	0
1+184	6720	Medium trucks	-	53	110	56	Stop sign	0	-	Average (of DGAC and PCC)	0
1+184	6720	Heavy trucks	-	10	21	56	Stop sign	0	-	Average (of DGAC and PCC)	0
1+184	6720	Buses	-	-	-	-	Stop sign	0	-	Average (of DGAC and PCC)	0
1+184	6720	Motorcycles	-	2	3	56	Stop sign	0	-	Average (of DGAC and PCC)	0
1+184	6720	Auxiliary Vehicle	-	-	-	-	Stop sign	0	-	Average (of DGAC and PCC)	0
1+253	6720	Total	-	206	428	-	none	-	-	Average (of DGAC and PCC)	0
1+253	6720	Automobiles	-	141	294	56	none	-	-	Average (of DGAC and PCC)	0
1+253	6720	Medium trucks	-	53	110	56	none	-	-	Average (of DGAC and PCC)	0
1+253	6720	Heavy trucks	-	10	21	56	none	-	-	Average (of DGAC and PCC)	0
1+253	6720	Buses	-	-	-	-	none	-	-	Average (of DGAC and PCC)	0
1+253	6720	Motorcycles	-	2	3	56	none	-	-	Average (of DGAC and PCC)	0
1+253	6720	Auxiliary Vehicle	-	-	-	-	none	-	-	Average (of DGAC and PCC)	0
1+516	-						-	-	-	-	-
Orange Street SB		Traffic direction:	In entry direction								
0+893	1904	Total	-	74	90	-	none	-	-	Average (of DGAC and PCC)	0

0+893	1904	Automobiles	-	50	61	56	none	-	-	Average (of DGAC and PCC)		0
0+893	1904	Medium trucks	-	19	23	56	none	-	-	Average (of DGAC and PCC)		0
0+893	1904	Heavy trucks	-	4	5	56	none	-	-	Average (of DGAC and PCC)		0
0+893	1904	Buses	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
0+893	1904	Motorcycles	-	1	1	56	none	-	-	Average (of DGAC and PCC)		0
0+893	1904	Auxiliary Vehicle	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
1+072	1904	Total	-	74	90	-	none	-	-	Average (of DGAC and PCC)		0
1+072	1904	Automobiles	-	50	61	56	none	-	-	Average (of DGAC and PCC)		0
1+072	1904	Medium trucks	-	19	23	56	none	-	-	Average (of DGAC and PCC)		0
1+072	1904	Heavy trucks	-	4	5	56	none	-	-	Average (of DGAC and PCC)		0
1+072	1904	Buses	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
1+072	1904	Motorcycles	-	1	1	56	none	-	-	Average (of DGAC and PCC)		0
1+072	1904	Auxiliary Vehicle	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
1+450	-						-	-	-	-	-	
Center Street WB		Traffic direction:	In entry direction									
0+893	4192	Total	-	190	144	-	none	-	-	Average (of DGAC and PCC)		0
0+893	4192	Automobiles	-	130	99	56	none	-	-	Average (of DGAC and PCC)		0
0+893	4192	Medium trucks	-	49	37	56	none	-	-	Average (of DGAC and PCC)		0
0+893	4192	Heavy trucks	-	10	7	56	none	-	-	Average (of DGAC and PCC)		0
0+893	4192	Buses	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
0+893	4192	Motorcycles	-	1	1	56	none	-	-	Average (of DGAC and PCC)		0
0+893	4192	Auxiliary Vehicle	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
1+228	4192	Total	-	190	144	-	Stop sign	0	-	Average (of DGAC and PCC)		0
1+228	4192	Automobiles	-	130	99	56	Stop sign	0	-	Average (of DGAC and PCC)		0
1+228	4192	Medium trucks	-	49	37	56	Stop sign	0	-	Average (of DGAC and PCC)		0
1+228	4192	Heavy trucks	-	10	7	56	Stop sign	0	-	Average (of DGAC and PCC)		0
1+228	4192	Buses	-	-	-	-	Stop sign	0	-	Average (of DGAC and PCC)		0
1+228	4192	Motorcycles	-	1	1	56	Stop sign	0	-	Average (of DGAC and PCC)		0
1+228	4192	Auxiliary Vehicle	-	-	-	-	Stop sign	0	-	Average (of DGAC and PCC)		0
1+427	4192	Total	-	190	144	-	none	-	-	Average (of DGAC and PCC)		0
1+427	4192	Automobiles	-	130	99	56	none	-	-	Average (of DGAC and PCC)		0
1+427	4192	Medium trucks	-	49	37	56	none	-	-	Average (of DGAC and PCC)		0
1+427	4192	Heavy trucks	-	10	7	56	none	-	-	Average (of DGAC and PCC)		0
1+427	4192	Buses	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
1+427	4192	Motorcycles	-	1	1	56	none	-	-	Average (of DGAC and PCC)		0
1+427	4192	Auxiliary Vehicle	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
1+603	4208	Total	-	190	146	-	none	-	-	Average (of DGAC and PCC)		0
1+603	4208	Automobiles	-	130	100	56	none	-	-	Average (of DGAC and PCC)		0
1+603	4208	Medium trucks	-	49	38	56	none	-	-	Average (of DGAC and PCC)		0
1+603	4208	Heavy trucks	-	10	7	56	none	-	-	Average (of DGAC and PCC)		0
1+603	4208	Buses	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
1+603	4208	Motorcycles	-	1	1	56	none	-	-	Average (of DGAC and PCC)		0
1+603	4208	Auxiliary Vehicle	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
1+873	4208	Total	-	190	146	-	none	-	-	Average (of DGAC and PCC)		0
1+873	4208	Automobiles	-	130	100	56	none	-	-	Average (of DGAC and PCC)		0
1+873	4208	Medium trucks	-	49	38	56	none	-	-	Average (of DGAC and PCC)		0
1+873	4208	Heavy trucks	-	10	7	56	none	-	-	Average (of DGAC and PCC)		0
1+873	4208	Buses	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
1+873	4208	Motorcycles	-	1	1	56	none	-	-	Average (of DGAC and PCC)		0
1+873	4208	Auxiliary Vehicle	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
2+414	-						-	-	-	-	-	
0+000	4208	Total	-	190	146	-	Stop sign	0	-	Average (of DGAC and PCC)		0
0+000	4208	Automobiles	-	130	100	56	Stop sign	0	-	Average (of DGAC and PCC)		0

0+000	4208	Medium trucks	-	49	38	56	Stop sign	0	-	Average (of DGAC and PCC)		0
0+000	4208	Heavy trucks	-	10	7	56	Stop sign	0	-	Average (of DGAC and PCC)		0
0+000	4208	Buses	-	-	-	-	Stop sign	0	-	Average (of DGAC and PCC)		0
0+000	4208	Motorcycles	-	1	1	56	Stop sign	0	-	Average (of DGAC and PCC)		0
0+000	4208	Auxiliary Vehicle	-	-	-	-	Stop sign	0	-	Average (of DGAC and PCC)		0
Orange Street NB	Traffic direction:	In entry direction										
0+893	360	Total	-	16	13	-	none	-	-	Average (of DGAC and PCC)		0
0+893	360	Automobiles	-	10	8	56	none	-	-	Average (of DGAC and PCC)		0
0+893	360	Medium trucks	-	4	3	56	none	-	-	Average (of DGAC and PCC)		0
0+893	360	Heavy trucks	-	1	1	56	none	-	-	Average (of DGAC and PCC)		0
0+893	360	Buses	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
0+893	360	Motorcycles	-	1	1	56	none	-	-	Average (of DGAC and PCC)		0
0+893	360	Auxiliary Vehicle	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
1+331	360	Total	-	16	13	-	Stop sign	0	-	Average (of DGAC and PCC)		0
1+331	360	Automobiles	-	10	8	56	Stop sign	0	-	Average (of DGAC and PCC)		0
1+331	360	Medium trucks	-	4	3	56	Stop sign	0	-	Average (of DGAC and PCC)		0
1+331	360	Heavy trucks	-	1	1	56	Stop sign	0	-	Average (of DGAC and PCC)		0
1+331	360	Buses	-	-	-	-	Stop sign	0	-	Average (of DGAC and PCC)		0
1+331	360	Motorcycles	-	1	1	56	Stop sign	0	-	Average (of DGAC and PCC)		0
1+331	360	Auxiliary Vehicle	-	-	-	-	Stop sign	0	-	Average (of DGAC and PCC)		0
1+450	-						-	-	-	-	-	
0+000	360	Total	-	16	13	-	none	-	-	Average (of DGAC and PCC)		0
0+000	360	Automobiles	-	10	8	56	none	-	-	Average (of DGAC and PCC)		0
0+000	360	Medium trucks	-	4	3	56	none	-	-	Average (of DGAC and PCC)		0
0+000	360	Heavy trucks	-	1	1	56	none	-	-	Average (of DGAC and PCC)		0
0+000	360	Buses	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
0+000	360	Motorcycles	-	1	1	56	none	-	-	Average (of DGAC and PCC)		0
0+000	360	Auxiliary Vehicle	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
Main Street NB	Traffic direction:	In entry direction										
1+023	21400	Total	-	877	921	-	none	-	-	Average (of DGAC and PCC)		0
1+023	21400	Automobiles	-	604	634	56	none	-	-	Average (of DGAC and PCC)		0
1+023	21400	Medium trucks	-	226	237	56	none	-	-	Average (of DGAC and PCC)		0
1+023	21400	Heavy trucks	-	42	45	56	none	-	-	Average (of DGAC and PCC)		0
1+023	21400	Buses	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
1+023	21400	Motorcycles	-	5	5	56	none	-	-	Average (of DGAC and PCC)		0
1+023	21400	Auxiliary Vehicle	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
1+559	-						-	-	-	-	-	
0+000	21400	Total	-	877	921	-	none	-	-	Average (of DGAC and PCC)		0
0+000	21400	Automobiles	-	604	634	56	none	-	-	Average (of DGAC and PCC)		0
0+000	21400	Medium trucks	-	226	237	56	none	-	-	Average (of DGAC and PCC)		0
0+000	21400	Heavy trucks	-	42	45	56	none	-	-	Average (of DGAC and PCC)		0
0+000	21400	Buses	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
0+000	21400	Motorcycles	-	5	5	56	none	-	-	Average (of DGAC and PCC)		0
0+000	21400	Auxiliary Vehicle	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
Main Street NB1	Traffic direction:	In entry direction										
1+023	19608	Total	-	740	971	-	none	-	-	Average (of DGAC and PCC)		0
1+023	19608	Automobiles	-	509	669	56	none	-	-	Average (of DGAC and PCC)		0
1+023	19608	Medium trucks	-	191	250	56	none	-	-	Average (of DGAC and PCC)		0
1+023	19608	Heavy trucks	-	36	47	56	none	-	-	Average (of DGAC and PCC)		0
1+023	19608	Buses	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
1+023	19608	Motorcycles	-	4	5	56	none	-	-	Average (of DGAC and PCC)		0
1+023	19608	Auxiliary Vehicle	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
1+560	-						-	-	-	-	-	

Center Street
Opening Year 2017 Without Project
Receivers

No.	Receiver name	Floor	Level AM	Level PM
			dB(A)	
1	1 Industrial (N)	GF	57.0	57.8
2	2 Industrial (E)	GF	61.3	62.3
3	3 Single Family Residential (NE)	GF	57.9	59.4
4	4 Commercial (EE)	GF	57.4	58.2
5	5 Single Family Home (SE)	GF	53.3	54.0
6	6 Single Family Home (SE)	GF	60.7	61.4
7	7 Single Family Home (NW)	GF	60.2	61.1

Center Street
Opening Year 2017 Without Project
Contributions

Source name		Level AM	Level PM
		dB(A)	
1 Industrial (N)	GF	57.0	57.8
Center Street (EB)		53.5	55.8
Center Street WB		54.4	53.2
Main Street NB		34.8	35.0
Main Street NB1		34.0	35.2
Orange Street NB		23.7	23.3
Orange Street SB		29.8	30.7
2 Industrial (E)	GF	61.3	62.3
Center Street (EB)		58.4	60.8
Center Street WB		58.1	56.8
Main Street NB		33.1	33.3
Main Street NB1		32.3	33.5
Orange Street NB		27.7	27.4
Orange Street SB		33.9	34.8
3 Single Family Residential (NE)	GF	57.9	59.4
Center Street (EB)		54.8	58.0
Center Street WB		54.8	53.5
Main Street NB		29.0	29.2
Main Street NB1		28.2	29.4
Orange Street NB		34.6	34.1
Orange Street SB		40.6	41.4
4 Commercial (EE)	GF	57.4	58.2
Center Street (EB)		49.6	52.4
Center Street WB		49.8	48.4
Main Street NB		30.0	30.2
Main Street NB1		29.2	30.4
Orange Street NB		48.3	47.6
Orange Street SB		54.7	55.6
5 Single Family Home (SE)	GF	53.3	54.0
Center Street (EB)		39.0	41.8
Center Street WB		39.3	37.9
Main Street NB		30.1	30.3
Main Street NB1		29.3	30.5
Orange Street NB		46.3	45.7
Orange Street SB		51.9	52.7
6 Single Family Home (SE)	GF	60.7	61.4

Center Street (EB)		38.3	41.1
Center Street WB		38.7	37.3
Main Street NB		30.4	30.6
Main Street NB1		29.6	30.8
Orange Street NB		51.8	51.1
Orange Street SB		60.1	60.9
7 Single Family Home (NW)	GF	60.2	61.1
Center Street (EB)		55.9	58.9
Center Street WB		57.6	56.4
Main Street NB		45.8	46.0
Main Street NB1		45.0	46.2
Orange Street NB		17.8	17.2
Orange Street SB		23.7	24.6

Center Street
Opening Year 2017 Without Project
Receiver Spectra

No.	Name	Time slice	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1 kHz	1 kHz	2 kHz	2 kHz	2 kHz	3 kHz	4 kHz	5 kHz	6 kHz	8 kHz	10 kHz
1	1 Industrial (N)	AM	30.3	35.8	39.4	41.5	42.9	44.2	45	45	44.5	44.2	45.1	46.2	45.9	46.6	45.3	44.9	43.4	42.9	42.9	41.4	39.6	36.7	34	30.3
1	1 Industrial (N)	PM	30.9	36.5	40	42.1	43.5	44.8	45.7	45.7	45.3	45	45.9	46.9	46.6	47.2	46	45.8	44.3	43.7	43.7	42.2	40.4	37.6	34.8	31.2
2	2 Industrial (E)	AM	32.6	38.2	41.8	43.9	45.3	46.7	47.7	48	48.7	48.9	50.1	51.5	50.9	51.3	50	49.6	48.7	47.8	46.8	44.8	42.2	40.3	37.7	34.3
2	2 Industrial (E)	PM	33.7	39.3	42.8	44.9	46.4	47.8	48.8	49.1	49.9	49.8	51.1	52.9	52.1	52.2	50.7	50.3	49.4	48.5	47.6	45.7	43.1	41.2	38.6	35.1
3	3 Single Family Residential (NE)	AM	30.9	36.5	40	42.1	43.6	44.9	45.8	45.8	45.5	45.2	46.2	47.2	46.8	47.6	46.4	45.8	44.4	43.8	43.7	41.9	40.4	37.5	34.8	31.2
3	3 Single Family Residential (NE)	PM	32.2	37.8	41.3	43.4	44.9	46.2	47.1	47.3	46.9	46.8	47.7	48.5	48.3	49	47.9	47.5	46.1	45.3	45.2	43.3	41.8	39.1	36.4	32.8
4	4 Commercial (EE)	AM	30.2	35.7	39.3	41.4	42.8	44.2	45.1	45.1	45.2	44.6	45.6	47.4	46.7	46.9	45.4	45.1	44.1	43.6	42.9	41.3	39.1	36.5	33.7	30.2
4	4 Commercial (EE)	PM	31.1	36.6	40.2	42.3	43.7	45.1	46	46	46	45.4	46.4	48.1	47.5	47.7	46.1	45.9	44.9	44.4	43.7	42.1	40.1	37.4	34.6	31
5	5 Single Family Home (SE)	AM	26.4	31.8	35.3	37.5	38.9	40.3	41.2	40.8	40.6	40.6	41.7	42.3	41.9	42.7	41.6	40.9	40.1	39.8	39.8	38.3	36.5	33.8	31.1	27.5
5	5 Single Family Home (SE)	PM	27	32.5	36	38.1	39.6	41	41.8	41.3	41.1	41.2	42.3	42.8	42.5	43.3	42.3	41.6	40.8	40.5	40.6	39	37.2	34.6	31.8	28.2
6	6 Single Family Home (SE)	AM	30.4	35.9	39.4	41.6	43.1	44.7	46	47.5	47.7	49.3	51.2	51.5	50.7	51.1	49.9	48.8	47.7	45.7	44.3	42.1	41.1	38.5	35.8	32.4
6	6 Single Family Home (SE)	PM	31.1	36.6	40.2	42.3	43.8	45.4	46.7	48.2	48.4	50	51.9	52.2	51.4	51.8	50.6	49.5	48.4	46.4	45	42.9	41.9	39.2	36.6	33.1
7	7 Single Family Home (NW)	AM	32.5	38	41.6	43.7	45.1	46.4	47.3	47	47.5	47.6	48.8	49.9	49.5	50.1	48.4	47.7	47.2	46.5	46.4	44.7	42.3	39.9	37.2	33.7
7	7 Single Family Home (NW)	PM	33.3	38.8	42.4	44.5	45.9	47.2	48.1	48	48.3	48.6	49.8	50.6	50.2	51.1	49.6	49	48.4	47.7	47.5	45.7	43.3	40.9	38.2	34.7

Center Street
Opening Year With Project
Road

Stationing km	ADT Veh/24h	Traffic values Vehicles type	Vehicle name	AM Veh/h	PM Veh/h	Speed km/h	Control device	Constr. Speed km/h	Affect. veh. %	Road surface	Gradient Min / Max %
Center Street (EB)		Traffic direction:	In entry direction								
0+000	5360	Total	-	186	298	-	none	-	-	Average (of DGAC and PCC)	0
0+000	5360	Automobiles	-	128	205	56	none	-	-	Average (of DGAC and PCC)	0
0+000	5360	Medium trucks	-	48	77	56	none	-	-	Average (of DGAC and PCC)	0
0+000	5360	Heavy trucks	-	9	14	56	none	-	-	Average (of DGAC and PCC)	0
0+000	5360	Buses	-	-	-	-	none	-	-	Average (of DGAC and PCC)	0
0+000	5360	Motorcycles	-	1	2	56	none	-	-	Average (of DGAC and PCC)	0
0+000	5360	Auxiliary Vehicle	-	-	-	-	none	-	-	Average (of DGAC and PCC)	0
0+544	5968	Total	-	201	344	-	none	-	-	Average (of DGAC and PCC)	0
0+544	5968	Automobiles	-	138	236	56	none	-	-	Average (of DGAC and PCC)	0
0+544	5968	Medium trucks	-	52	89	56	none	-	-	Average (of DGAC and PCC)	0
0+544	5968	Heavy trucks	-	10	17	56	none	-	-	Average (of DGAC and PCC)	0
0+544	5968	Buses	-	-	-	-	none	-	-	Average (of DGAC and PCC)	0
0+544	5968	Motorcycles	-	1	2	56	none	-	-	Average (of DGAC and PCC)	0
0+544	5968	Auxiliary Vehicle	-	-	-	-	none	-	-	Average (of DGAC and PCC)	0
0+794	6920	Total	-	217	431	-	none	-	-	Average (of DGAC and PCC)	0
0+794	6920	Automobiles	-	148	296	56	none	-	-	Average (of DGAC and PCC)	0
0+794	6920	Medium trucks	-	56	111	56	none	-	-	Average (of DGAC and PCC)	0
0+794	6920	Heavy trucks	-	11	21	56	none	-	-	Average (of DGAC and PCC)	0
0+794	6920	Buses	-	-	-	-	none	-	-	Average (of DGAC and PCC)	0
0+794	6920	Motorcycles	-	2	3	56	none	-	-	Average (of DGAC and PCC)	0
0+794	6920	Auxiliary Vehicle	-	-	-	-	none	-	-	Average (of DGAC and PCC)	0
0+948	6920	Total	-	217	431	-	none	-	-	Average (of DGAC and PCC)	0
0+948	6920	Automobiles	-	148	296	56	none	-	-	Average (of DGAC and PCC)	0
0+948	6920	Medium trucks	-	56	111	56	none	-	-	Average (of DGAC and PCC)	0
0+948	6920	Heavy trucks	-	11	21	56	none	-	-	Average (of DGAC and PCC)	0
0+948	6920	Buses	-	-	-	-	none	-	-	Average (of DGAC and PCC)	0
0+948	6920	Motorcycles	-	2	3	56	none	-	-	Average (of DGAC and PCC)	0
0+948	6920	Auxiliary Vehicle	-	-	-	-	none	-	-	Average (of DGAC and PCC)	0
1+184	8536	Total	-	252	563	-	Stop sign	0	-	Average (of DGAC and PCC)	0
1+184	8536	Automobiles	-	173	388	56	Stop sign	0	-	Average (of DGAC and PCC)	0
1+184	8536	Medium trucks	-	65	145	56	Stop sign	0	-	Average (of DGAC and PCC)	0
1+184	8536	Heavy trucks	-	12	27	56	Stop sign	0	-	Average (of DGAC and PCC)	0
1+184	8536	Buses	-	-	-	-	Stop sign	0	-	Average (of DGAC and PCC)	0
1+184	8536	Motorcycles	-	2	3	56	Stop sign	0	-	Average (of DGAC and PCC)	0
1+184	8536	Auxiliary Vehicle	-	-	-	-	Stop sign	0	-	Average (of DGAC and PCC)	0
1+253	8536	Total	-	252	563	-	none	-	-	Average (of DGAC and PCC)	0
1+253	8536	Automobiles	-	173	388	56	none	-	-	Average (of DGAC and PCC)	0
1+253	8536	Medium trucks	-	65	145	56	none	-	-	Average (of DGAC and PCC)	0
1+253	8536	Heavy trucks	-	12	27	56	none	-	-	Average (of DGAC and PCC)	0
1+253	8536	Buses	-	-	-	-	none	-	-	Average (of DGAC and PCC)	0
1+253	8536	Motorcycles	-	2	3	56	none	-	-	Average (of DGAC and PCC)	0
1+253	8536	Auxiliary Vehicle	-	-	-	-	none	-	-	Average (of DGAC and PCC)	0
1+516	-						-	-	-	-	-
Orange Street SB		Traffic direction:	In entry direction								
0+893	2048	Total	-	78	100	-	none	-	-	Average (of DGAC and PCC)	0

0+893	2048	Automobiles	-	53	68	56	none	-	-	Average (of DGAC and PCC)	0
0+893	2048	Medium trucks	-	20	26	56	none	-	-	Average (of DGAC and PCC)	0
0+893	2048	Heavy trucks	-	4	5	56	none	-	-	Average (of DGAC and PCC)	0
0+893	2048	Buses	-	-	-	-	none	-	-	Average (of DGAC and PCC)	0
0+893	2048	Motorcycles	-	1	1	56	none	-	-	Average (of DGAC and PCC)	0
0+893	2048	Auxiliary Vehicle	-	-	-	-	none	-	-	Average (of DGAC and PCC)	0
1+017	2048	Total	-	78	100	-	Stop sign	0	-	Average (of DGAC and PCC)	0
1+017	2048	Automobiles	-	53	68	56	Stop sign	0	-	Average (of DGAC and PCC)	0
1+017	2048	Medium trucks	-	20	26	56	Stop sign	0	-	Average (of DGAC and PCC)	0
1+017	2048	Heavy trucks	-	4	5	56	Stop sign	0	-	Average (of DGAC and PCC)	0
1+017	2048	Buses	-	-	-	-	Stop sign	0	-	Average (of DGAC and PCC)	0
1+017	2048	Motorcycles	-	1	1	56	Stop sign	0	-	Average (of DGAC and PCC)	0
1+017	2048	Auxiliary Vehicle	-	-	-	-	Stop sign	0	-	Average (of DGAC and PCC)	0
1+072	2048	Total	-	78	100	-	none	-	-	Average (of DGAC and PCC)	0
1+072	2048	Automobiles	-	53	68	56	none	-	-	Average (of DGAC and PCC)	0
1+072	2048	Medium trucks	-	20	26	56	none	-	-	Average (of DGAC and PCC)	0
1+072	2048	Heavy trucks	-	4	5	56	none	-	-	Average (of DGAC and PCC)	0
1+072	2048	Buses	-	-	-	-	none	-	-	Average (of DGAC and PCC)	0
1+072	2048	Motorcycles	-	1	1	56	none	-	-	Average (of DGAC and PCC)	0
1+072	2048	Auxiliary Vehicle	-	-	-	-	none	-	-	Average (of DGAC and PCC)	0
1+450	-						-	-	-	-	-
Center Street WB		Traffic direction:	In entry direction								
0+893	6128	Total	-	269	228	-	none	-	-	Average (of DGAC and PCC)	0
0+893	6128	Automobiles	-	154	156	56	none	-	-	Average (of DGAC and PCC)	0
0+893	6128	Medium trucks	-	95	59	56	none	-	-	Average (of DGAC and PCC)	0
0+893	6128	Heavy trucks	-	18	11	56	none	-	-	Average (of DGAC and PCC)	0
0+893	6128	Buses	-	-	-	-	none	-	-	Average (of DGAC and PCC)	0
0+893	6128	Motorcycles	-	2	2	56	none	-	-	Average (of DGAC and PCC)	0
0+893	6128	Auxiliary Vehicle	-	-	-	-	none	-	-	Average (of DGAC and PCC)	0
1+228	7728	Total	-	369	228	-	Stop sign	0	-	Average (of DGAC and PCC)	0
1+228	7728	Automobiles	-	254	156	56	Stop sign	0	-	Average (of DGAC and PCC)	0
1+228	7728	Medium trucks	-	95	59	56	Stop sign	0	-	Average (of DGAC and PCC)	0
1+228	7728	Heavy trucks	-	18	11	56	Stop sign	0	-	Average (of DGAC and PCC)	0
1+228	7728	Buses	-	-	-	-	Stop sign	0	-	Average (of DGAC and PCC)	0
1+228	7728	Motorcycles	-	2	2	56	Stop sign	0	-	Average (of DGAC and PCC)	0
1+228	7728	Auxiliary Vehicle	-	-	-	-	Stop sign	0	-	Average (of DGAC and PCC)	0
1+427	7728	Total	-	369	228	-	none	-	-	Average (of DGAC and PCC)	0
1+427	7728	Automobiles	-	254	156	56	none	-	-	Average (of DGAC and PCC)	0
1+427	7728	Medium trucks	-	95	59	56	none	-	-	Average (of DGAC and PCC)	0
1+427	7728	Heavy trucks	-	18	11	56	none	-	-	Average (of DGAC and PCC)	0
1+427	7728	Buses	-	-	-	-	none	-	-	Average (of DGAC and PCC)	0
1+427	7728	Motorcycles	-	2	2	56	none	-	-	Average (of DGAC and PCC)	0
1+427	7728	Auxiliary Vehicle	-	-	-	-	none	-	-	Average (of DGAC and PCC)	0
1+603	5688	Total	-	260	191	-	none	-	-	Average (of DGAC and PCC)	0
1+603	5688	Automobiles	-	178	131	56	none	-	-	Average (of DGAC and PCC)	0
1+603	5688	Medium trucks	-	67	49	56	none	-	-	Average (of DGAC and PCC)	0
1+603	5688	Heavy trucks	-	13	10	56	none	-	-	Average (of DGAC and PCC)	0
1+603	5688	Buses	-	-	-	-	none	-	-	Average (of DGAC and PCC)	0
1+603	5688	Motorcycles	-	2	1	56	none	-	-	Average (of DGAC and PCC)	0
1+603	5688	Auxiliary Vehicle	-	-	-	-	none	-	-	Average (of DGAC and PCC)	0
1+873	4840	Total	-	206	193	-	none	-	-	Average (of DGAC and PCC)	0
1+873	4840	Automobiles	-	141	132	56	none	-	-	Average (of DGAC and PCC)	0
1+873	4840	Medium trucks	-	53	50	56	none	-	-	Average (of DGAC and PCC)	0

1+873	4840	Heavy trucks	-	10	10	56	none	-	-	Average (of DGAC and PCC)		0
1+873	4840	Buses	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
1+873	4840	Motorcycles	-	2	1	56	none	-	-	Average (of DGAC and PCC)		0
1+873	4840	Auxiliary Vehicle	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
2+414	-						-	-	-	-	-	
0+000	4840	Total	-	206	193	-	Stop sign	0	-	Average (of DGAC and PCC)		0
0+000	4840	Automobiles	-	141	132	56	Stop sign	0	-	Average (of DGAC and PCC)		0
0+000	4840	Medium trucks	-	53	50	56	Stop sign	0	-	Average (of DGAC and PCC)		0
0+000	4840	Heavy trucks	-	10	10	56	Stop sign	0	-	Average (of DGAC and PCC)		0
0+000	4840	Buses	-	-	-	-	Stop sign	0	-	Average (of DGAC and PCC)		0
0+000	4840	Motorcycles	-	2	1	56	Stop sign	0	-	Average (of DGAC and PCC)		0
0+000	4840	Auxiliary Vehicle	-	-	-	-	Stop sign	0	-	Average (of DGAC and PCC)		0
Orange Street NB	Traffic direction:	In entry direction										
0+893	360	Total	-	16	13	-	none	-	-	Average (of DGAC and PCC)		0
0+893	360	Automobiles	-	10	8	56	none	-	-	Average (of DGAC and PCC)		0
0+893	360	Medium trucks	-	4	3	56	none	-	-	Average (of DGAC and PCC)		0
0+893	360	Heavy trucks	-	1	1	56	none	-	-	Average (of DGAC and PCC)		0
0+893	360	Buses	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
0+893	360	Motorcycles	-	1	1	56	none	-	-	Average (of DGAC and PCC)		0
0+893	360	Auxiliary Vehicle	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
1+331	360	Total	-	16	13	-	Stop sign	0	-	Average (of DGAC and PCC)		0
1+331	360	Automobiles	-	10	8	56	Stop sign	0	-	Average (of DGAC and PCC)		0
1+331	360	Medium trucks	-	4	3	56	Stop sign	0	-	Average (of DGAC and PCC)		0
1+331	360	Heavy trucks	-	1	1	56	Stop sign	0	-	Average (of DGAC and PCC)		0
1+331	360	Buses	-	-	-	-	Stop sign	0	-	Average (of DGAC and PCC)		0
1+331	360	Motorcycles	-	1	1	56	Stop sign	0	-	Average (of DGAC and PCC)		0
1+331	360	Auxiliary Vehicle	-	-	-	-	Stop sign	0	-	Average (of DGAC and PCC)		0
1+450	-						-	-	-	-	-	
0+000	360	Total	-	16	13	-	none	-	-	Average (of DGAC and PCC)		0
0+000	360	Automobiles	-	10	8	56	none	-	-	Average (of DGAC and PCC)		0
0+000	360	Medium trucks	-	4	3	56	none	-	-	Average (of DGAC and PCC)		0
0+000	360	Heavy trucks	-	1	1	56	none	-	-	Average (of DGAC and PCC)		0
0+000	360	Buses	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
0+000	360	Motorcycles	-	1	1	56	none	-	-	Average (of DGAC and PCC)		0
0+000	360	Auxiliary Vehicle	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
Main Street NB	Traffic direction:	In entry direction										
1+023	21728	Total	-	885	946	-	none	-	-	Average (of DGAC and PCC)		0
1+023	21728	Automobiles	-	609	651	56	none	-	-	Average (of DGAC and PCC)		0
1+023	21728	Medium trucks	-	228	244	56	none	-	-	Average (of DGAC and PCC)		0
1+023	21728	Heavy trucks	-	43	46	56	none	-	-	Average (of DGAC and PCC)		0
1+023	21728	Buses	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
1+023	21728	Motorcycles	-	5	5	56	none	-	-	Average (of DGAC and PCC)		0
1+023	21728	Auxiliary Vehicle	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
1+559	-						-	-	-	-	-	
0+000	21728	Total	-	885	946	-	none	-	-	Average (of DGAC and PCC)		0
0+000	21728	Automobiles	-	609	651	56	none	-	-	Average (of DGAC and PCC)		0
0+000	21728	Medium trucks	-	228	244	56	none	-	-	Average (of DGAC and PCC)		0
0+000	21728	Heavy trucks	-	43	46	56	none	-	-	Average (of DGAC and PCC)		0
0+000	21728	Buses	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
0+000	21728	Motorcycles	-	5	5	56	none	-	-	Average (of DGAC and PCC)		0
0+000	21728	Auxiliary Vehicle	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
Main Street NB1	Traffic direction:	In entry direction										
1+023	19880	Total	-	746	993	-	none	-	-	Average (of DGAC and PCC)		0

1+023	19880	Automobiles	-	514	684	56	none	-	-	Average (of DGAC and PCC)		0
1+023	19880	Medium trucks	-	192	256	56	none	-	-	Average (of DGAC and PCC)		0
1+023	19880	Heavy trucks	-	36	48	56	none	-	-	Average (of DGAC and PCC)		0
1+023	19880	Buses	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
1+023	19880	Motorcycles	-	4	5	56	none	-	-	Average (of DGAC and PCC)		0
1+023	19880	Auxiliary Vehicle	-	-	-	-	none	-	-	Average (of DGAC and PCC)		0
1+560	-						-	-	-	-	-	

Center Street
Opening Year 2017 With Project
Receivers

No.	Receiver name	Floor	Level AM	Level PM
			dB(A)	
1	1 Industrial (N)	GF	58.2	58.8
2	2 Industrial (E)	GF	63.3	64.1
3	3 Single Family Residential (NE)	GF	59.7	60.8
4	4 Commercial (EE)	GF	58.2	59.0
5	5 Single Family Home (SE)	GF	53.6	54.4
6	6 Single Family Home (SE)	GF	60.9	61.8
7	7 Single Family Home (NW)	GF	60.9	61.8

Center Street
Opening Year 2017 With Project
Contributions

Source name		Level AM	Level PM
		dB(A)	
1 Industrial (N)	GF	58.2	58.8
Center Street (EB)		54.4	56.8
Center Street WB		55.8	54.5
Main Street NB		34.9	35.2
Main Street NB1		34.1	35.3
Orange Street NB		23.7	23.3
Orange Street SB		29.9	30.9
2 Industrial (E)	GF	63.3	64.1
Center Street (EB)		59.7	62.6
Center Street WB		60.8	58.7
Main Street NB		33.1	33.4
Main Street NB1		32.3	33.6
Orange Street NB		27.7	27.4
Orange Street SB		34.0	35.0
3 Single Family Residential (NE)	GF	59.7	60.8
Center Street (EB)		55.7	59.1
Center Street WB		57.3	55.5
Main Street NB		29.0	29.3
Main Street NB1		28.3	29.5
Orange Street NB		34.6	34.1
Orange Street SB		40.7	41.7
4 Commercial (EE)	GF	58.2	59.0
Center Street (EB)		50.7	53.9
Center Street WB		52.4	50.4
Main Street NB		30.0	30.3
Main Street NB1		29.2	30.5
Orange Street NB		48.3	47.6
Orange Street SB		54.9	55.9
5 Single Family Home (SE)	GF	53.6	54.4
Center Street (EB)		40.0	43.1
Center Street WB		41.7	39.8
Main Street NB		30.1	30.4
Main Street NB1		29.3	30.6
Orange Street NB		46.3	45.7
Orange Street SB		52.0	53.1
6 Single Family Home (SE)	GF	60.9	61.8

Center Street (EB)		39.4	42.4
Center Street WB		41.0	39.2
Main Street NB		30.4	30.7
Main Street NB1		29.6	30.9
Orange Street NB		51.8	51.1
Orange Street SB		60.2	61.3
7 Single Family Home (NW)	GF	60.9	61.8
Center Street (EB)		57.2	59.3
Center Street WB		57.9	57.7
Main Street NB		45.8	46.1
Main Street NB1		45.0	46.3
Orange Street NB		17.8	17.2
Orange Street SB		23.9	24.9

Center Street
Opening Year 2017 With Project
Receiver Spectra

No.	Name	Time slice	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1 kHz	1 kHz	2 kHz	2 kHz	2 kHz	3 kHz	4 kHz	5 kHz	6 kHz	8 kHz	10 kHz
1	1 Industrial (N)	AM	31.5	37	40.6	42.7	44.1	45.4	46.3	46.2	45.7	45.4	46.3	47.4	47	47.8	46.5	46.1	44.6	44	44	42.6	40.7	37.8	35.1	31.5
1	1 Industrial (N)	PM	32	37.5	41.1	43.2	44.6	45.9	46.8	46.8	46.3	46	47	47.9	47.6	48.2	47.1	46.8	45.4	44.7	44.8	43.3	41.4	38.6	35.9	32.2
2	2 Industrial (E)	AM	34.5	40.1	43.6	45.8	47.2	48.6	49.6	50	50.7	50.9	52.1	53.3	52.8	53.4	52.1	51.7	50.9	49.9	48.9	46.8	44.2	42.3	39.7	36.3
2	2 Industrial (E)	PM	35.5	41	44.6	46.7	48.2	49.5	50.6	50.9	51.7	51.7	52.9	54.7	53.9	54.1	52.5	52.2	51.2	50.3	49.4	47.4	44.9	43	40.3	37
3	3 Single Family Residential (NE)	AM	32.7	38.2	41.7	43.8	45.3	46.6	47.6	47.6	47.2	47	47.9	49	48.5	49.3	48	47.4	46	45.5	45.3	43.6	42.1	39.1	36.4	32.8
3	3 Single Family Residential (NE)	PM	33.6	39.2	42.7	44.8	46.3	47.6	48.5	48.6	48.3	48.2	49.1	50	49.7	50.4	49.3	48.8	47.5	46.7	46.5	44.7	43.2	40.4	37.7	34.2
4	4 Commercial (EE)	AM	31.3	36.8	40.3	42.4	43.9	45.2	46.1	46.1	45.9	45.3	46.2	48	47.3	47.7	46.2	46	45	44.5	43.8	42.2	40	37.3	34.5	30.9
4	4 Commercial (EE)	PM	32.1	37.7	41.2	43.3	44.7	46.1	46.9	46.9	46.7	46.1	47	48.8	48.1	48.5	47	46.8	45.8	45.3	44.5	43	40.9	38.2	35.4	31.8
5	5 Single Family Home (SE)	AM	26.9	32.3	35.8	37.9	39.4	40.7	41.5	41	40.8	40.8	41.9	42.4	42.1	42.9	41.8	41.1	40.4	40.1	40.2	38.8	37	34.3	31.6	27.9
5	5 Single Family Home (SE)	PM	27.6	33.1	36.6	38.7	40.2	41.5	42.3	41.7	41.5	41.5	42.6	43.1	42.8	43.6	42.6	42	41.2	41	41.1	39.6	37.7	35.1	32.3	28.7
6	6 Single Family Home (SE)	AM	30.6	36.1	39.7	41.8	43.4	44.9	46.2	47.6	47.8	49.4	51.4	51.7	50.9	51.3	50.1	49	47.9	45.9	44.5	42.4	41.4	38.7	36.1	32.6
6	6 Single Family Home (SE)	PM	31.5	37	40.6	42.7	44.3	45.8	47	48.4	48.6	50.3	52.3	52.6	51.8	52.2	51	49.9	48.7	46.8	45.3	43.2	42.3	39.6	36.9	33.5
7	7 Single Family Home (NW)	AM	33.1	38.7	42.2	44.3	45.7	47	47.9	47.8	48.2	48.4	49.5	50.5	50.2	50.9	49.2	48.5	47.9	47.2	47	45.3	42.9	40.5	37.8	34.4
7	7 Single Family Home (NW)	PM	33.9	39.5	43.1	45.1	46.6	47.9	48.8	48.7	49.1	49.3	50.5	51.3	51	51.8	50.3	49.6	49	48.3	48.1	46.3	43.9	41.5	38.9	35.4

Appendix H Traffic Impact Analysis

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Christopher Brown
Director

KUNZMAN ASSOCIATES, INC.

CENTER STREET WAREHOUSE PROJECT

TRAFFIC IMPACT ANALYSIS

January 19, 2016

Traffic Engineering | Transportation Planning | Parking | Noise/Vibration | Expert Witness
Air Quality | Global Climate Change | Health Risk Assessment

KUNZMAN ASSOCIATES, INC.

CENTER STREET WAREHOUSE PROJECT

TRAFFIC IMPACT ANALYSIS

January 19, 2016

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CENTER STREET WAREHOUSE PROJECT

TRAFFIC IMPACT ANALYSIS

This report contains the traffic impact analysis for the proposed Center Street Warehouse project. The project site is located at 6055 Center Street in the City of Riverside. The approximately 16 acre project site is proposed to be developed with 308,000 square feet of manufacturing.

The traffic report contains documentation of existing traffic conditions, trips generated by the project, distribution of the project trips to roads outside the project, calculation of existing plus project[1] traffic conditions, and an analysis of Opening Year (2017) traffic conditions without and with the project. Each of these topics is contained in a separate section of the report. The first section is "Findings", and subsequent sections expand upon the findings. In this way, information on any particular aspect of the study can be easily located by the reader.

Although this is a technical report, every effort has been made to write the report clearly and concisely. To assist the reader with those terms unique to transportation engineering, a glossary of terms is provided in Appendix A.

---

[1] The existing plus project conditions has been analyzed to comply with the Sunnyvale West Neighborhood Association v. City of Sunnyvale CEQA court case. This scenario assumes the full development of the proposed project and full absorption of the proposed project trips on the circulation system at the present time.

I. FINDINGS

This section summarizes the existing traffic conditions, project traffic impacts, and the proposed mitigation measures.

A. Definition of Deficiency and Significant Impact

The following definitions of deficiencies and significant impacts have been developed in accordance with the City of Riverside requirements:

The definition of an intersection deficiency has been obtained from the City of Riverside Traffic Impact Analysis Preparation Guide, 2012. The Guide states that peak hour intersection operations of Level of Service D or better are generally acceptable along all City roadways of Collector or higher classification. An exception to the local road standard is Level of Service E, at intersections of City Arterials that are used by regional freeway bypass traffic and at heavily traveled freeway interchanges.

B. Existing Traffic Conditions

1. The project site is currently undeveloped and is not generating significant trips.

2. Existing roadways adjacent to the project include Center Street, Placentia Lane, and Orange Street to the east of the project site.

3. The study area intersections currently operate at acceptable Levels of Service during the peak hours for Existing traffic conditions, except for the following study area intersection that currently operates at unacceptable Levels of Service during the peak hours:

   Iowa Avenue/I-215 Freeway NB Ramps (NS) at:
   La Cadena Drive (EW) - #9

4. Traffic signals appear to currently be warranted at the following study area intersections for Existing traffic conditions (see Appendix E):

   Main Street/Riverside Avenue (NS) at:
   Center Street (EW) - #1

   West La Cadena Drive (NS) at:
   Stephens Avenue/I-215 Freeway SB Ramps (EW) - #6

   Highgrove Place (NS) at:
   Center Street (EW) - #8

The unsignalized intersections have been evaluated for traffic signals using the California Department of Transportation Warrant 3 Peak Hour traffic signal warrant analysis, as specified in the California Manual of Uniform Traffic Control Devices (2014 Update).

C. Traffic Impacts

1. The proposed land use for the approximately 16 acre project site is 308,000 square feet of manufacturing and will have access to Center Street.

2. The proposed development is projected to generate approximately 1,576 daily vehicle trips in Passenger Car Equivalent's, 301 of which will occur during the morning peak hour in Passenger Car Equivalent's and 303 of which will occur during the evening peak hour in Passenger Car Equivalent's.

3. For Existing Plus Project traffic conditions, the study area intersections are projected to operate at acceptable Levels of Service during the peak hours, except for the following study area intersection that is projected to operate at unacceptable Levels of Service during the peak hours, without improvements:

   Iowa Avenue/I-215 Freeway NB Ramps (NS) at:
   La Cadena Drive (EW) - #9

4. For Opening Year (2017) Without Project traffic conditions, the study area intersections are projected to operate at acceptable Levels of Service during the peak hours, except for the following study area intersection that is projected to operate at unacceptable Levels of Service during the peak hours, without improvements:

   Iowa Avenue/I-215 Freeway NB Ramps (NS) at:
   La Cadena Drive (EW) - #9

5. For Opening Year (2017) With Project traffic conditions, the study area intersections are projected to operate at acceptable Levels of Service during the peak hours, except for the following study area intersection that is projected to operate at unacceptable Levels of Service during the peak hours, without improvements:

   Iowa Avenue/I-215 Freeway NB Ramps (NS) at:
   La Cadena Drive (EW) - #9

D. Mitigation Measures

The following measures are recommended to mitigate the impact of the project on traffic circulation:

1. Site-specific circulation and access recommendations are depicted on Figure 45.

2. As shown in Table 7, the project site does not significantly impact any study area intersections for Opening Year (2017) With Project traffic conditions.

3. Construct Center Street from the west project boundary to the east project boundary at its ultimate half-section width including landscaping and parkway improvements in conjunction with development, as necessary.

4. Construct Placentia Lane from the west project boundary to the east project boundary at its ultimate half-section width including landscaping and parkway improvements in conjunction with development, as necessary.

5. Sufficient on-site parking should be provided to meet City of Riverside parking code requirements.

6. On-site traffic signing and striping should be implemented in conjunction with detailed construction plans for the project.

7. Sight distance at the project accesses shall comply with standard California Department of Transportation and City of Riverside sight distance standards. The final grading, landscaping, and street improvement plans shall demonstrate that sight distance standards are met. Such plans must be reviewed by the City and approved as consistent with this measure prior to issue of grading permits.

8. As is the case for any roadway design, the City of Riverside should periodically review traffic operations in the vicinity of the project once the project is constructed to assure that the traffic operations are satisfactory.

9. Participate in the phased construction of off-site traffic signals through payment of traffic signal mitigation fees. The traffic signals within the study area at buildout should specifically include an interconnect of the traffic signals to function in a coordinated system.

II. CONGESTION MANGEMENT PROGRAM METHODOLOGY

This section discusses the Congestion Management Plan. The purpose, prescribed methodology, and definition of a significant traffic impact are discussed.

A. Congestion Management Plan

The Congestion Management Plan is a result of Proposition 111 which was a statewide initiative approved by the voters in June, 1990. The proposition allowed for a nine cent per gallon state gasoline tax increase over a five year period.

Proposition 111 explicitly stated that the new gas tax revenues were to be used to fix existing traffic problems and was not to be used to promote future development. For a City to get its share of the Proposition 111 gas tax, it has to follow certain procedures specified by the State Legislature. The legislation requires that a traffic impact analysis be prepared for new development. The traffic impact analysis is prepared to monitor and fix traffic problems caused by new development.

The Legislature requires that adjacent jurisdictions use a standard methodology for conducting a traffic impact analysis. To assure that adjacent jurisdictions use a standard methodology in preparing a traffic impact analysis, one common procedure is that all Cities within a County, and the County agency itself, adopt and use one standard methodology for conducting a traffic impact analysis.

Although each City has developed standards for preparing a traffic impact analysis, traffic impact analysis requirements do vary in detail from one City to another, but not in overall intent or concept. The general approach selected by each City for conducting a traffic impact analysis has common elements.

The general approach for conducting a traffic impact analysis is that existing peak hour traffic is counted and the percent of roadway capacity currently being used is determined. Then growth in traffic is accounted for and added to existing traffic and the percent of roadway capacity used is again determined. The project traffic is then added and the percent of roadway capacity used is again determined. If the new project adds traffic to an overcrowded facility, then the new project has to mitigate the traffic impact so that the facility operates at a level that is no worse than before the project traffic was added.

If the project size is below a certain minimum threshold level, then a project does not have to have a traffic impact analysis prepared, once it is shown or agreed that the project is below the minimum threshold.

If a project is bigger than the minimum threshold size, then a traffic impact analysis is required.

B. Prescribed Methodology for a Traffic Impact Analysis

The traffic impact analysis must include all monitored intersections to which the project adds traffic above a certain minimum amount.

In the City of Riverside, the minimum project added trips that are needed before an intersection has to be studied is 50 or more peak hour trips.

The City of Riverside allows Level of Service D to be used as a maximum acceptable threshold for the study area intersections.

A significant impact occurs at a study intersection when the addition of project generated trips causes either peak hour Level of Service to degrade from acceptable Level of Service (A thru D) to unacceptable Level of Service (E or F) or peak hour delay to increase as follows:

Level of Service A/B	=	By 10.0 seconds
Level of Service C	=	By 8.0 seconds
Level of Service D	=	By 5.0 seconds
Level of Service E	=	By 2.0 seconds
Level of Service F	=	By 1.0 seconds

In the City of Riverside, the technique used to assess the capacity needs of an intersection is known as the Intersection Delay Method (see Appendix D) based on the Highway Capacity Manual. To calculate delay, the volume of traffic using the intersection is compared with the capacity of the intersection. Signalized intersections are considered deficient (Level of Service F) if the overall intersection critical volume to capacity ratio equals or exceeds 1.0, even if the level of service defined by the delay value is below the defined Level of Service standard. The Volume to Capacity ratio is defined as the critical volumes divided by the intersection capacity. A Volume to Capacity ratio greater than 1.0 implies an infinite queue.

The Level of Service analysis for signalized intersections has been performed using optimized signal timing. This analysis has included an assumed lost time of four seconds per phase. Signal timing optimization has considered pedestrian safety and signal coordination requirements. Appropriate time for pedestrian crossings has also been considered in the signalized intersection analysis.

In the City of Colton, the definition of an intersection deficiency has been obtained from the City of Colton General Plan. The General Plan states that peak hour intersection operations of Level of Service D or better are generally acceptable. Therefore, any intersection operating at Level of Service E to F will be considered deficient. A traffic impact is considered significant if the project both: i) contributes measurable traffic to and ii) substantially and adversely changes the Level of Service at any off-site location projected to experience deficient operations under foreseeable cumulative conditions, where feasible improvements consistent with the City of Colton General Plan cannot be constructed.

The County of Riverside has established, as a Countywide target, a Level of Service C on all County maintained roads and conventional State Highways, except that a Level of Service E

could be allowed on Congestion Management System Highways and Roadways as specified in the County of Riverside Congestion Management Plan, 2011.

In accordance with the County of Riverside General Plan, Level of Service C should be maintained, except that a Level of Service D could be allowed on at any combination of Major Arterials, Expressways, or conventional State Highways as specified in the County of Riverside Congestion Management Plan, 2011. In addition, Level of Service E is permissible in designated transit or pedestrian-oriented community centers and at freeway ramp terminals under the jurisdiction of Caltrans.

Consistent with County of Riverside guidelines, an impact is considered significant if the proposed project causes an intersection to drop below the target Levels of Service as described above.

Project trips are generated using rates and procedures contained in the Institute of Transportation Engineers, Trip Generation Manual, 9th Edition, 2012, and the City of Fontana, Truck Trip Generation Study, August 2003.

This traffic analysis has been prepared in accordance with the traffic impact analysis requirements.

The project generated trips were added to the study area intersections, and a full intersection analysis was conducted, even when the project added traffic failed to meet the minimum thresholds that require an intersection analysis.

C. Mitigation Measures

If a project is large enough to require that a traffic impact analysis be prepared, and if the project adds traffic to an intersection above a minimum threshold, and if the intersection is operating at above an acceptable level of operation, then the project must mitigate its traffic impact.

Traffic mitigation can be in many forms including adding lanes. Lanes can sometimes be obtained through restriping or elimination of parking, and sometimes require spot roadway widening.

III. PROJECT DESCRIPTION

This section discusses the project's location and proposed development. Figure 1 shows the project location and Figure 2 illustrates the site plan.

A. Location

The project site is located at 6055 Center Street in the City of Riverside.

B. Proposed Development

The approximately 16 acre project site is proposed to be developed with 308,000 square feet of manufacturing and will have access to Center Street.

Figure 1
Project Location Map

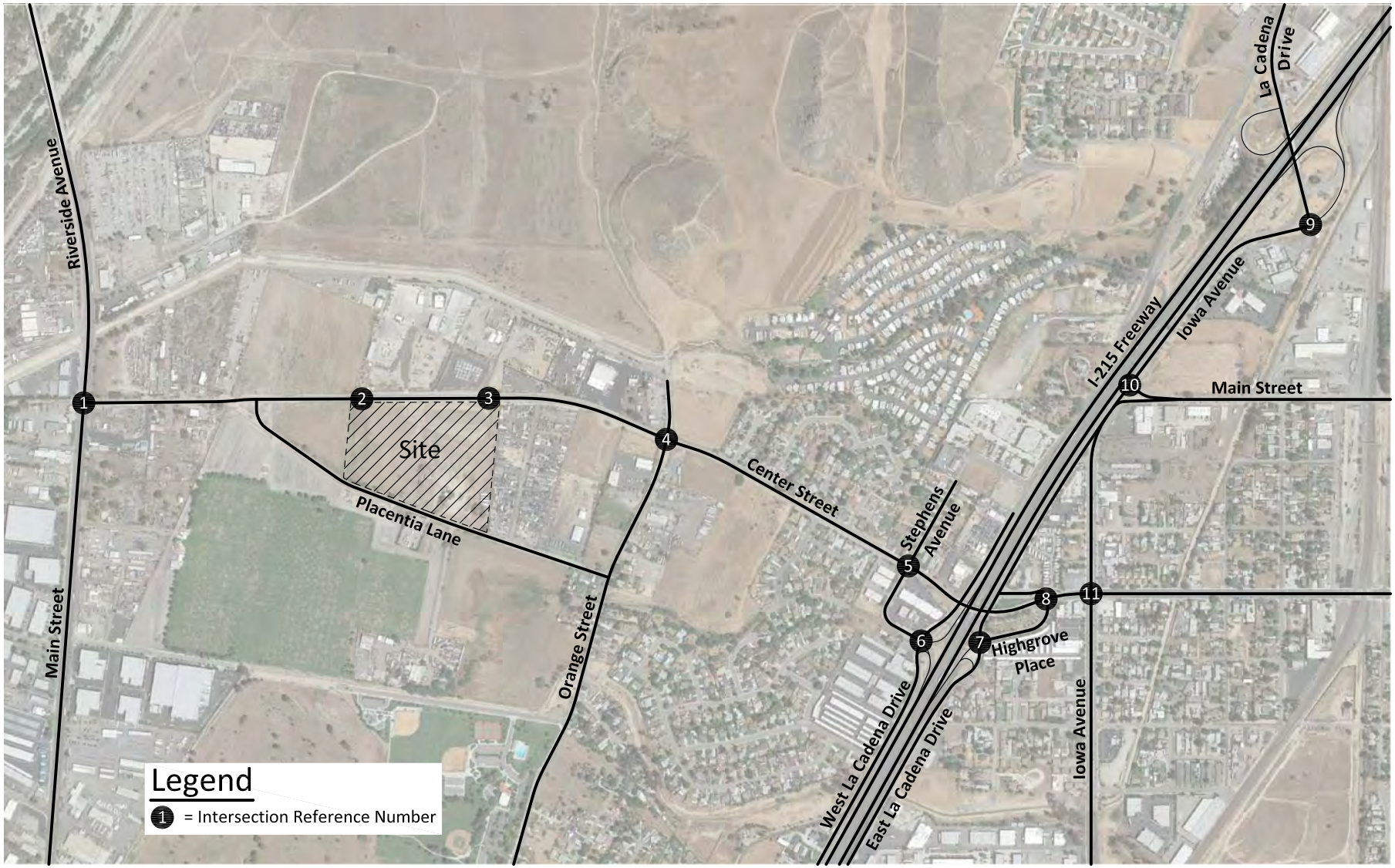

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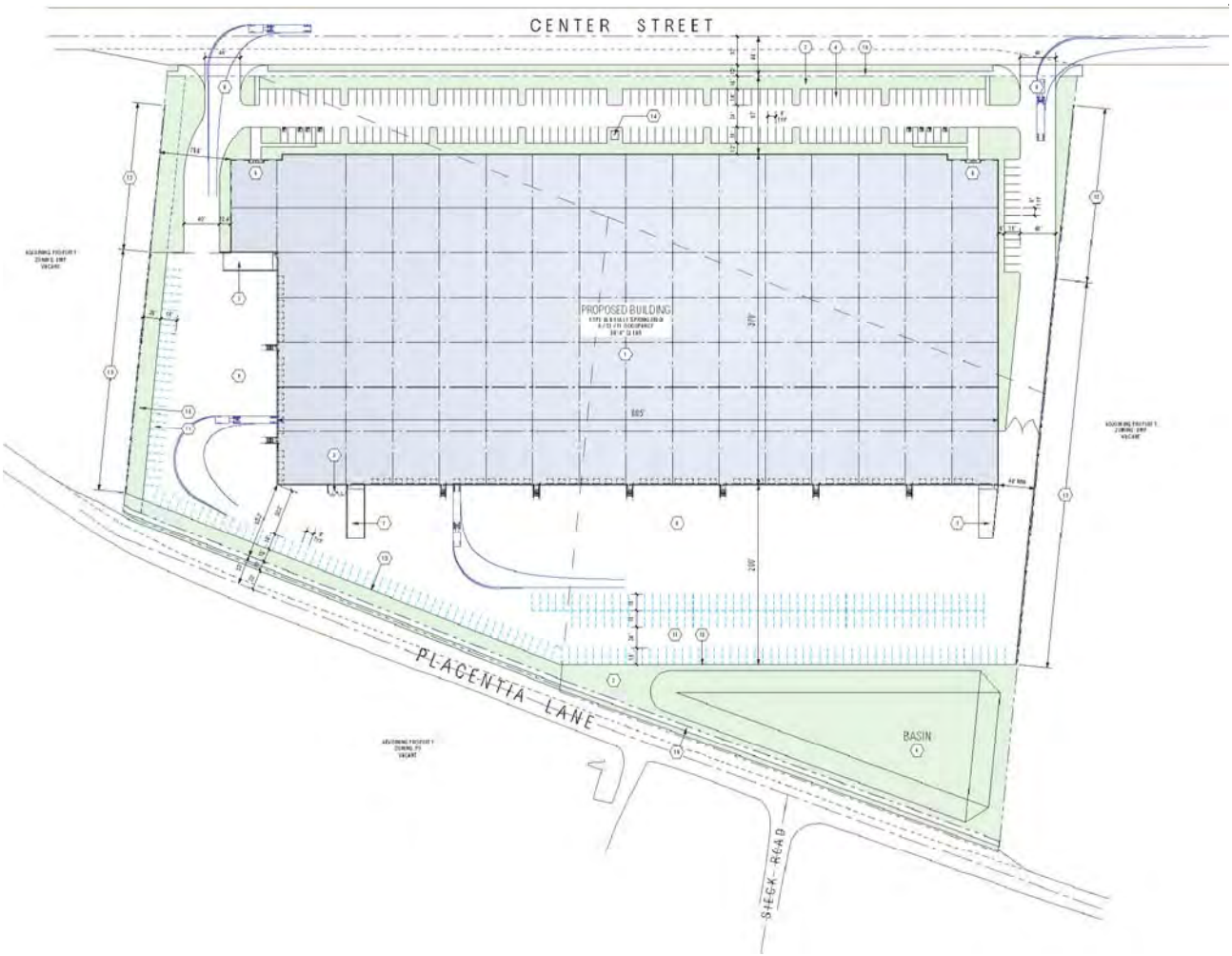
Figure 2
Site Plan



IV. EXISTING TRAFFIC CONDITIONS

The traffic conditions as they exist today are discussed below and illustrated on Figures 3 to 15.

A. Study Area

Appendix B includes the scoping agreement with City of Riverside staff. The study area includes the following intersections:

Main Street/Riverside Avenue (NS) at:
- Center Street (EW) - #1

Project West Access (NS) at:
- Center Street (EW) - #2

Project East Access (NS) at:
- Center Street (EW) - #3

Orange Street (NS) at:
- Center Street (EW) - #4

Stephens Avenue (NS) at:
- Center Street (EW) - #5

West La Cadena Drive (NS) at:
- Stephens Avenue/I-215 Freeway SB Ramps (EW) - #6

East La Cadena Drive (NS) at:
- Highgrove Place/I-215 Freeway NB Ramps (EW) - #7

Highgrove Place (NS) at:
- Center Street (EW) - #8

Iowa Avenue/I-215 Freeway NB Ramps (NS) at:
- La Cadena Drive (EW) - #9

Iowa Avenue (NS) at:
- Main Street (EW) - #10
- Center Street (EW) - #11

B. Surrounding Street System

Existing roadways within the study area include Main Street, Riverside Avenue, Orange Street, Stephens Avenue, West La Cadena Drive, East La Cadena Drive, Highgrove Place, Iowa Avenue, Center Street, La Cadena Drive, and Main Street.

Main Street (City of Riverside): This north-south four lane divided roadway is classified as an Arterial (100 foot right-of-way) on the City of Riverside General Plan Circulation Element. It currently carries approximately 20,000 vehicles per day in the study area.

Riverside Avenue: This north-south four lane divided roadway is classified as a Major Arterial (96 to 114 foot right-of-way) on the City of Colton General Plan Circulation Element. It currently carries approximately 21,600 vehicles per day in the study area.

Orange Street: This north-south two lane undivided roadway is classified as a Collector (66 foot right-of-way) on the City of Colton General Plan Circulation Element. It currently carries approximately 500 to 2,700 vehicles per day in the study area.

Stephens Avenue: This north-south two lane undivided roadway is not classified on the County of Riverside General Plan Circulation Element. It currently carries approximately 300 to 5,600 vehicles per day in the study area.

West La Cadena Drive: This north-south two lane undivided roadway is not classified on the County of Riverside General Plan Circulation Element. It currently carries approximately 8,100 to 8,400 vehicles per day in the study area.

East La Cadena Drive: This north-south two lane undivided roadway is not classified on the County of Riverside General Plan Circulation Element. It currently carries approximately 3,300 to 4,000 vehicles per day in the study area.

Highgrove Place: This north-south two lane undivided roadway is not classified on the County of Riverside General Plan Circulation Element. It currently carries approximately 400 to 3,700 vehicles per day in the study area.

Iowa Avenue: This north-south two lane divided to four lane divided roadway is classified as an Arterial (128 foot right-of-way) south of Central Avenue and is not classified north of Central Avenue on the County of Riverside General Plan Circulation Element. It currently carries approximately 19,100 to 20,200 vehicles per day in the study area.

Center Street: This east-west two lane divided to four lane undivided roadway is classified as an Arterial (88 foot right-of-way) within City of Riverside boundaries on the City of Riverside General Plan Circulation Element, as a Major Arterial (96 to 114 foot right-of-way) within City of Colton boundaries on the City of Colton General Place Circulation Element, and as a Secondary (100 foot right-of-way) within County of Riverside boundaries on the County of Riverside General Plan Circulation Element. It currently carries approximately 4,400 to 8,800 vehicles per day in the study area.

La Cadena Drive: This east-west two lane divided roadway is classified as a Secondary Arterial (88 foot right-of-way) on the City of Colton General Plan Circulation Element. It currently carries approximately 18,300 vehicles per day in the study area.

Main Street (County of Riverside): This east-west two lane divided roadway is classified as a Secondary (100 foot right-of-way) on the County of Riverside General Plan Circulation Element. It currently carries approximately 6,100 vehicles per day in the study area.

C. Existing Travel Lanes and Intersection Controls

Figure 3 identifies the existing roadway conditions and intersection geometry for study area roadways. The number of through lanes for existing roadways and the existing intersection controls are identified.

D. Existing Average Daily Traffic Volumes

Figure 4 depicts the Existing average daily traffic volumes. The Existing average daily traffic volumes have been obtained from the 2014 Traffic Volumes on California State Highways by the California Department of Transportation and factored from peak hour counts (see Appendix C) made for Kunzman Associates, Inc. in December 2015 using the following formula for each intersection leg:

PM Peak Hour (Approach Volume + Exit Volume) x 12 = Leg Volume.

This is a conservative estimate and may over estimate the average daily traffic volumes.

E. Existing Intersection Delay

The technique used to assess the capacity needs of an intersection is known as the Intersection Delay Method (see Appendix D). To calculate delay, the volume of traffic using the intersection is compared with the capacity of the intersection.

The existing delay and Level of Service for intersections in the vicinity of the project are shown in Table 1. Existing delay is based upon manual weekday morning and evening peak hour counts made for Kunzman Associates, Inc. in August 2014 (see Figures 5 and 6). Traffic count worksheets are provided in Appendix C.

There are two peak hours in a weekday. The morning peak hour is between 7 AM and 9 AM, and the evening peak hour is between 4 PM and 6 PM. The actual peak hour within the two hour interval is the four consecutive 15 minute periods with the highest total volume when all movements are added together. Thus, the evening peak hour at one intersection may be 4:45 PM to 5:45 PM if those four consecutive 15 minute periods have the highest combined volume. Explicit peak hour factors have been calculated using the data collected for this project.

The study area intersections currently operate at acceptable Levels of Service during the peak hours for Existing traffic conditions, except for the following study area intersection that currently operates at unacceptable Levels of Service during the peak hours:

Iowa Avenue/I-215 Freeway NB Ramps (NS) at:
La Cadena Drive (EW) - #9

Existing delay worksheets are provided in Appendix D.

F. Existing Traffic Signal Warrant Analysis

Traffic signals appear to currently be warranted at the following study area intersections for Existing traffic conditions (see Appendix E):

Main Street/Riverside Avenue (NS) at:
Center Street (EW) - #1

West La Cadena Drive (NS) at:
Stephens Avenue/I-215 Freeway SB Ramps (EW) - #6

Highgrove Place (NS) at:
Center Street (EW) - #8

The unsignalized intersections have been evaluated for traffic signals using the California Department of Transportation Warrant 3 Peak Hour traffic signal warrant analysis, as specified in the California Manual of Uniform Traffic Control Devices (2014 Update).

G. City of Riverside Circulation Plan

Figure 7 shows the current City of Riverside General Plan Circulation Element. Both existing and future roadways are included in the Circulation Element of the General Plan and are graphically depicted on Figure 7. This figure shows the nature and extent of arterial highways that are needed to adequately serve the ultimate development depicted by the land use element of the General Plan. The City of Riverside General Plan roadway cross-sections are illustrated on Figure 8.

H. City of Colton Circulation Plan

Figure 9 shows the current City of Colton General Plan Circulation Element. Both existing and future roadways are included in the Circulation Element of the General Plan and are graphically depicted on Figure 9. This figure shows the nature and extent of arterial highways that are needed to adequately serve the ultimate development depicted by the land use element of the General Plan. The City of Colton General Plan roadway cross-sections are illustrated on Figure 10.

I. County of Riverside Circulation Plan

Figure 11 shows the current County of Riverside General Plan Circulation Element. Both existing and future roadways are included in the Circulation Element of the General Plan and are graphically depicted on Figure 11. This figure shows the nature and extent of arterial highways that are needed to adequately serve the ultimate development depicted by the land use element of the General Plan. The County of Riverside General Plan roadway cross-sections are illustrated on Figure 12.

J. Existing Transit Service

The study area is currently served by the Riverside Transit Agency Route 12 along Main Street, Orange Street, West La Cadena Drive, and Center Street, and Route 14 along Iowa Avenue and Center Street within the study area. The existing bus routes provided within the study area are shown on Figure 13.

K. Bicycle & Pedestrian Facilities

Existing pedestrian facilities adjacent to the project site are shown on Figure 14. The City of Riverside bike paths are illustrated on Figure 15.

Table 1

Existing Intersection Delay and Level of Service

Intersection	Jurisdiction	Traffic Control[3]	Intersection Approach Lanes[1]												Peak Hour Delay-LOS[2]	
			Northbound			Southbound			Eastbound			Westbound				
			L	T	R	L	T	R	L	T	R	L	T	R	Morning	Evening
Main Street/Riverside Avenue (NS) at:																
Center Street (EW) - #1	Colton/Riverside	CSS	0	2	d	1	2	0	0	0	0	0	1	0	14.0-B	14.9-B
Orange Street (NS) at:																
Center Street (EW) - #4	Riverside	AWS	0	1	0	0	1	0	0	1	0	0	1	0	8.5-A	9.8-A
Stephens Avenue (NS) at:																
Center Street (EW) - #5	Riverside County	TS	0	1	0	0	1	0	0.5	0.5	1	0.5	0.5	d	14.0-B	11.8-B
West La Cadena Drive (NS) at:																
Stephens Avenue/I-215 Freeway SB Ramps (EW) - #6	Caltrans	AWS	0.5	0.5	1>>	0.5	0.5	d	0	1	0	0	1	0	14.1-B	19.5-C
East La Cadena Drive (NS) at:																
Highgrove Place/I-215 Freeway NB Ramps (EW) - #7	Caltrans	AWS	0	0.5	0.5	0.5	0.5	0	0.5	0.5	1>>	1	0	1>>	8.7-A	9.7-A
Highgrove Place (NS) at:																
Center Street (EW) - #8	Riverside County	CSS	0.5	0.5	1	0	1	0	0.5	0.5	1>>	0	1	0	12.2-B	12.1-B
Iowa Avenue/I-215 Freeway NB Ramps (NS) at:																
La Cadena Drive (EW) - #9	Caltrans	TS	1	1	0	0	0.5	0.5	0.5	0	0.5	0	0	0	74.9-E	99.9-F[4]
Iowa Avenue (NS) at:																
Main Street (EW) - #10	Colton/Riverside County	TS	0	1	1>>	1	1	0	0	0	0	1	0	1	16.2-B	16.9-B
Center Street (EW) - #11	Riverside County	TS	1	2	d	1	2	d	1	1.5	0.5	1	1	1	18.1-B	17.4-B

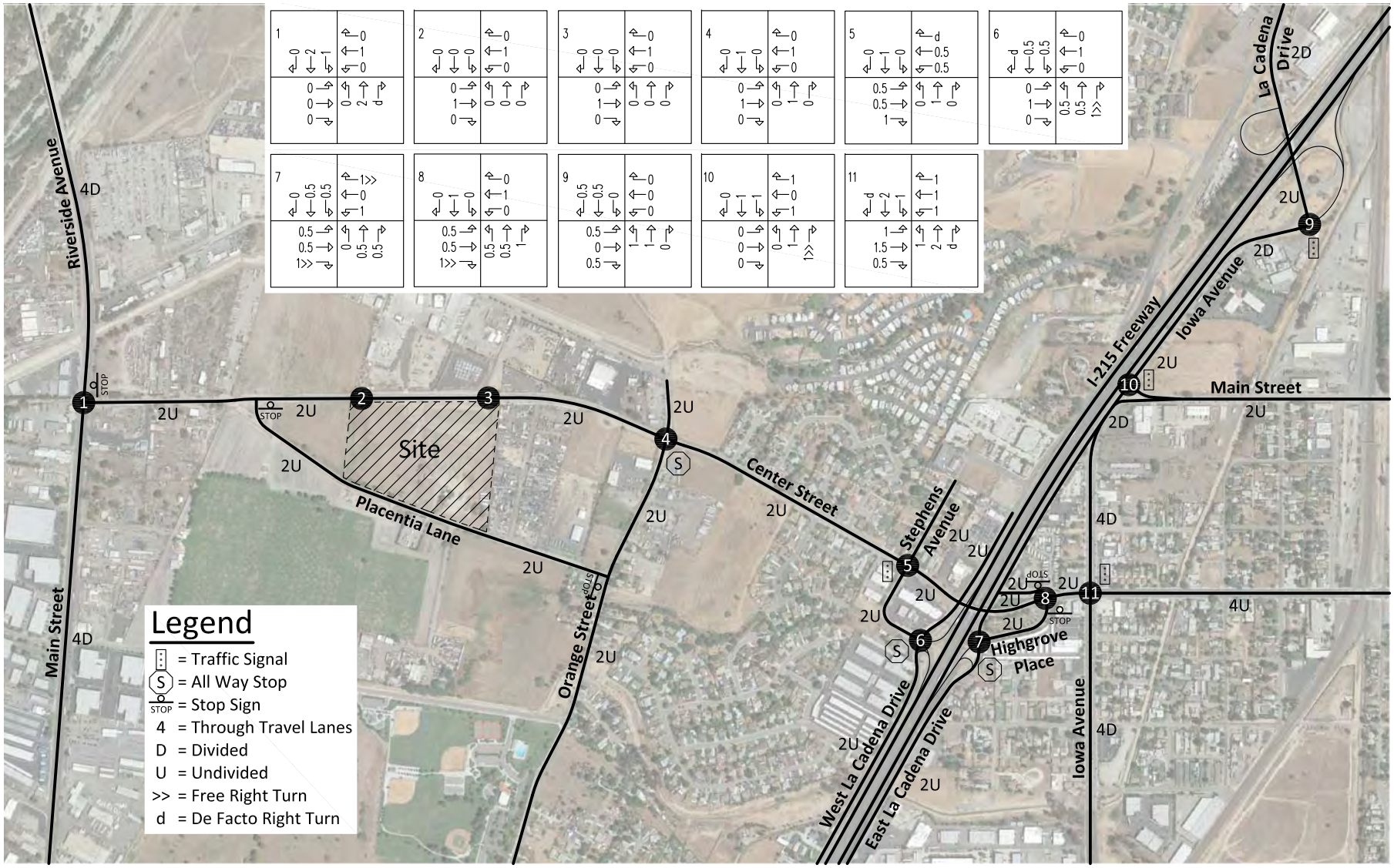
[1] When a right turn lane is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicle to travel outside the through lanes. L = Left; T = Throug R = Right; d = De Facto Right Turn Lane; >> = Free Right Turn Lane

[2] Delay and level of service has been calculated using the following analysis software: Highway Capacity Software (2010). Per the Highway Capacity Manual, overall average for intersection delay and level of service are shown for intersections with traffic signal or all way stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[3] CSS = Cross Street Stop; AWS = All Way Stop; TS = Traffic Signal

[4] 99.9-F = Delay High, Intersection Unstable, Level of Service F

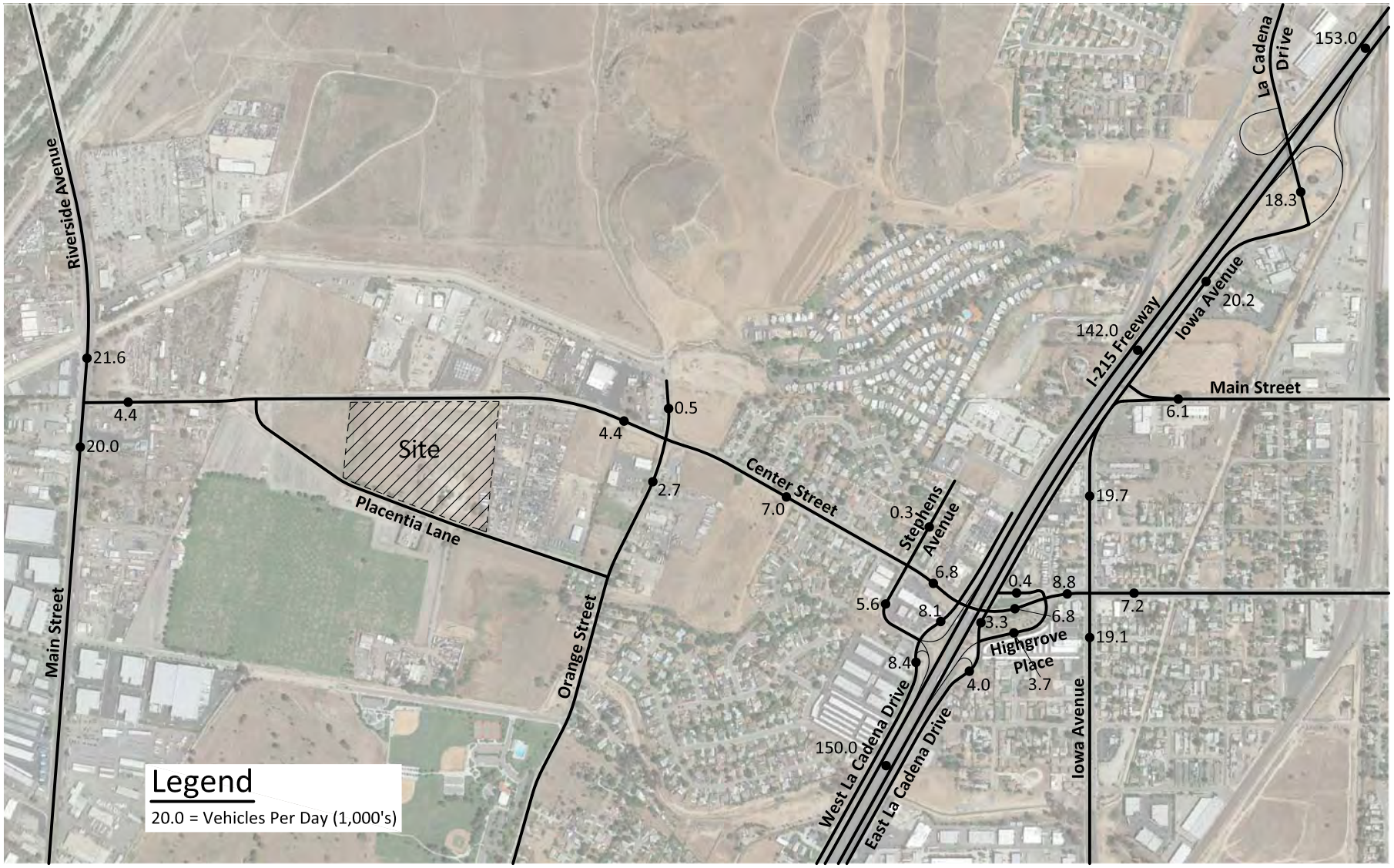
Figure 3
Existing Through Travel Lanes and Intersection Controls



KUNZMAN ASSOCIATES, INC. Intersection reference numbers are in upper left corner of turning movement boxes. JN 6055a

OVER 40 YEARS OF EXCELLENT SERVICE

Figure 4
Existing Average Daily Traffic Volumes

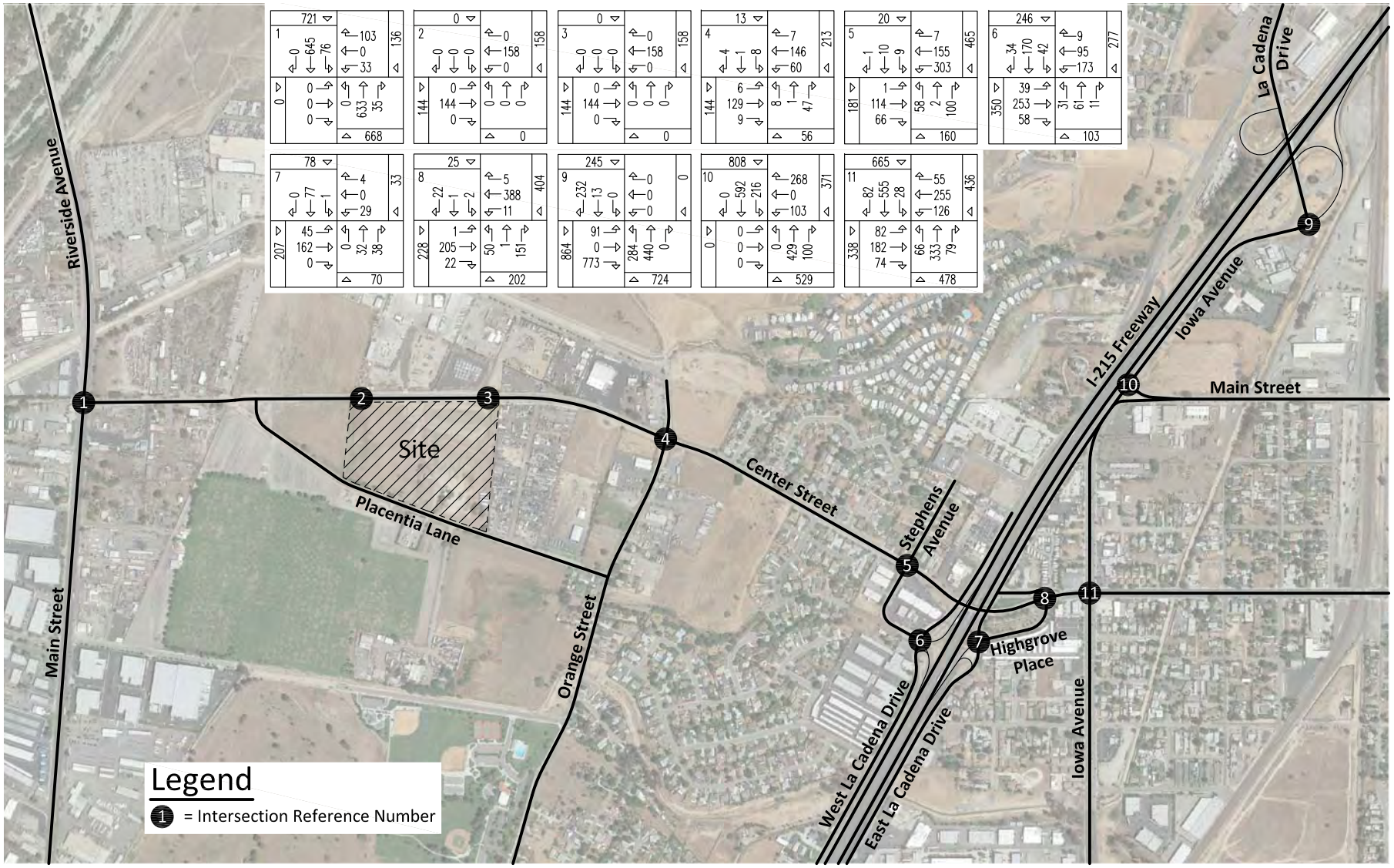


KUNZMAN ASSOCIATES, INC.

OVER 40 YEARS OF EXCELLENT SERVICE

JN 6055a

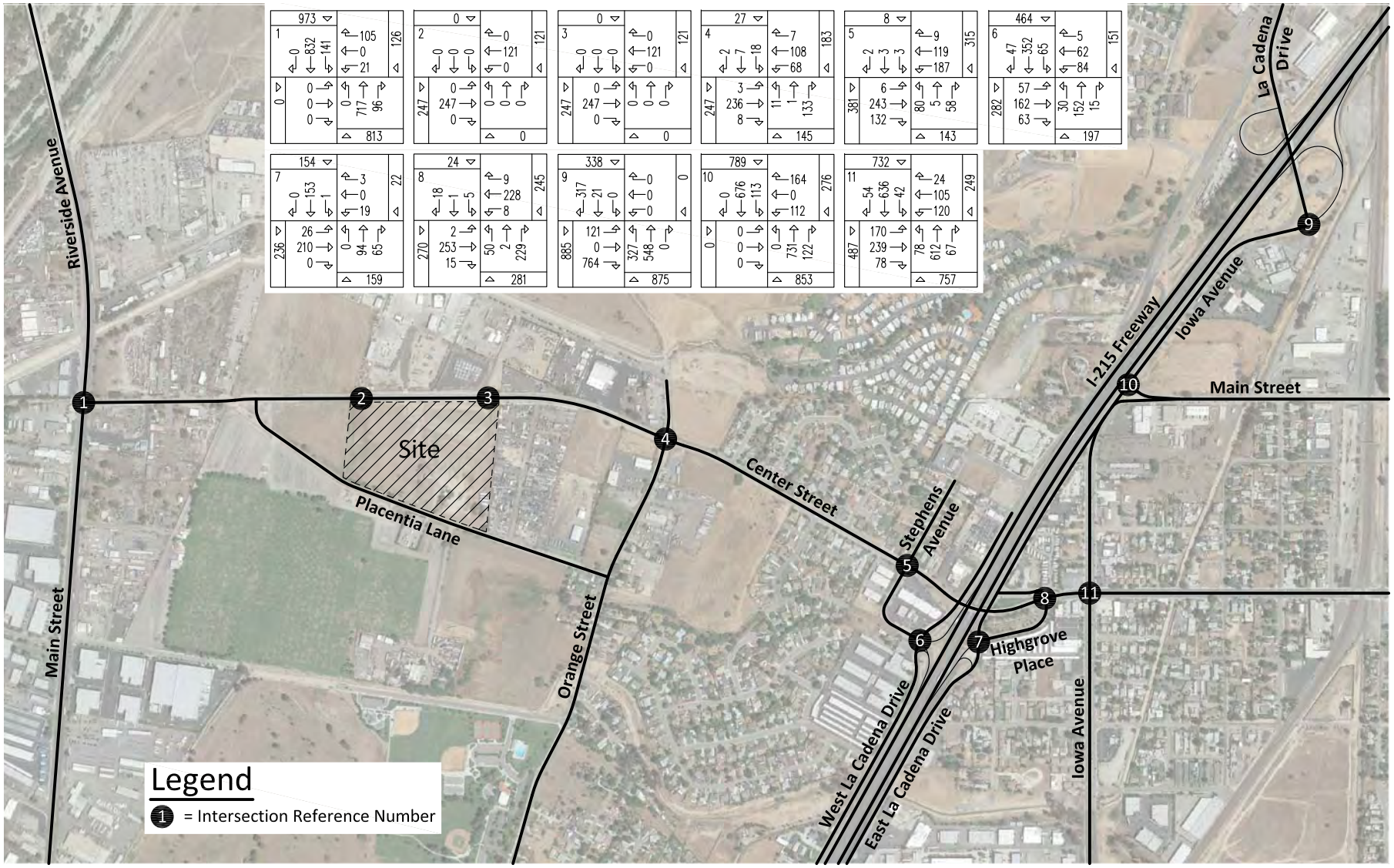
Figure 5
Existing Morning Peak Hour Intersection Turning Movement Volumes



KUNZMAN ASSOCIATES, INC. Intersection reference numbers are in upper left corner of turning movement boxes. JN 6055a

OVER 40 YEARS OF EXCELLENT SERVICE

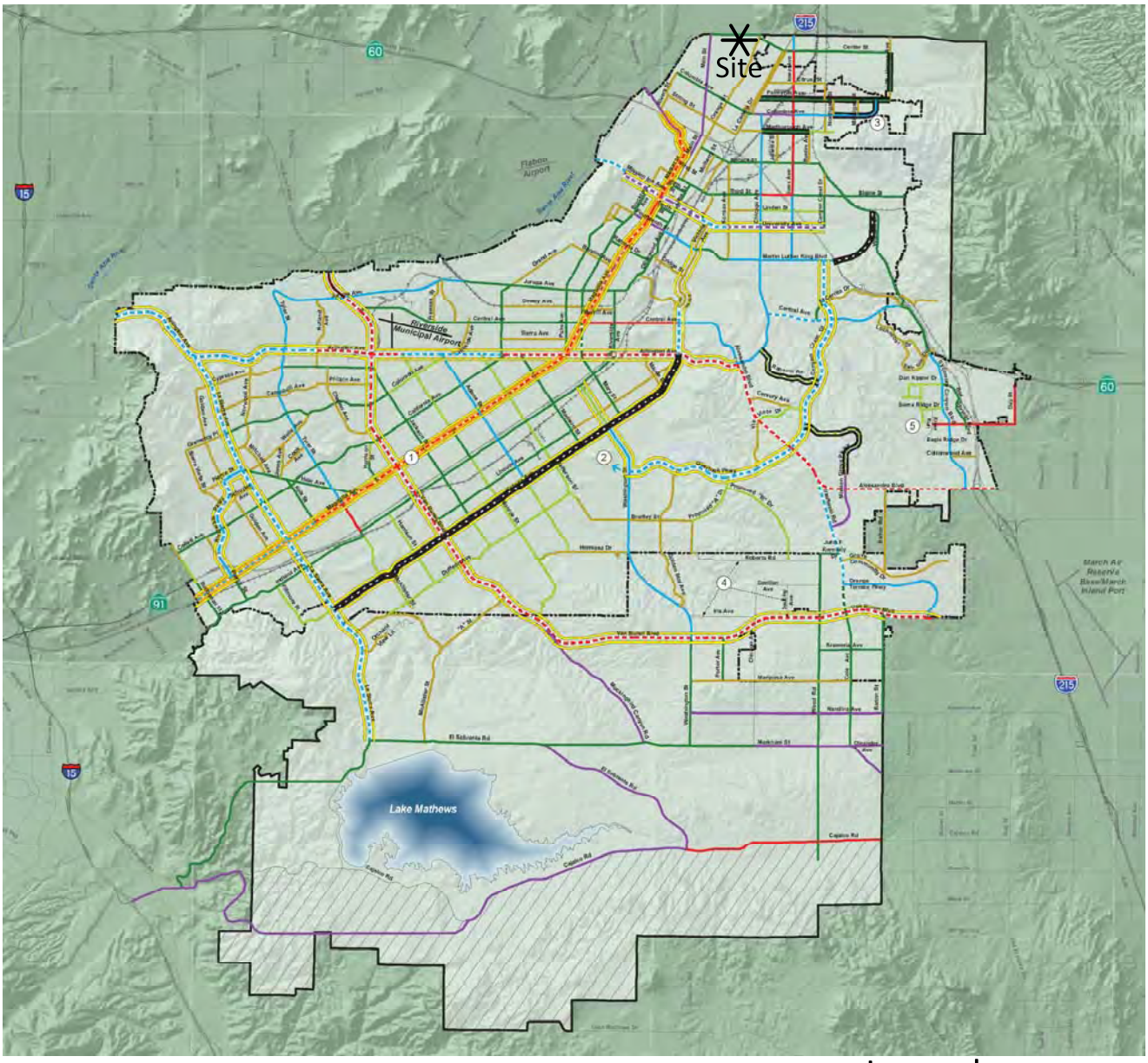
Figure 6
Existing Evening Peak Hour Intersection Turning Movement Volumes



KUNZMAN ASSOCIATES, INC. Intersection reference numbers are in upper left corner of turning movement boxes. JN 6055a

OVER 40 YEARS OF EXCELLENT SERVICE

Figure 7
City of Riverside General Plan Circulation Element



Legend

66 FT LOCAL	2 LANES *
86 FT COLLECTOR	2 LANES
80 FT COLLECTOR	2 LANES
88 FT ARTERIAL	4 LANES
100 FT ARTERIAL	4 LANES
110 FT ARTERIAL	4 LANES
120 FT ARTERIAL	6 LANES
144 FT ARTERIAL	8 LANES

SCENIC BOULEVARD
REQUIRES SPECIAL LANDSCAPING. ADDITIONAL RIGHT-OF-WAY MAY BE REQUIRED

SPECIAL BOULEVARD
TWO-LANE DIVIDED ROADWAY OF VARIABLE GEOMETRIC DESIGN

SPECIAL BOULEVARD
VARIABLE WIDTHS AND DESIGN. CONTACT PUBLIC WORKS FOR DETAIL. SEE OBJECTIVE COM-3 AND POLICIES COM-3.1 THROUGH COM-3.5.

PARKWAYS
FOR INFORMATION ON PARKWAYS SEE LAND USE ELEMENT

CETAP CORRIDOR AREA
CORRIDOR OPTIONS SUBJECT TO SPECIAL STUDY

RIVERSIDE CITY BOUNDARY

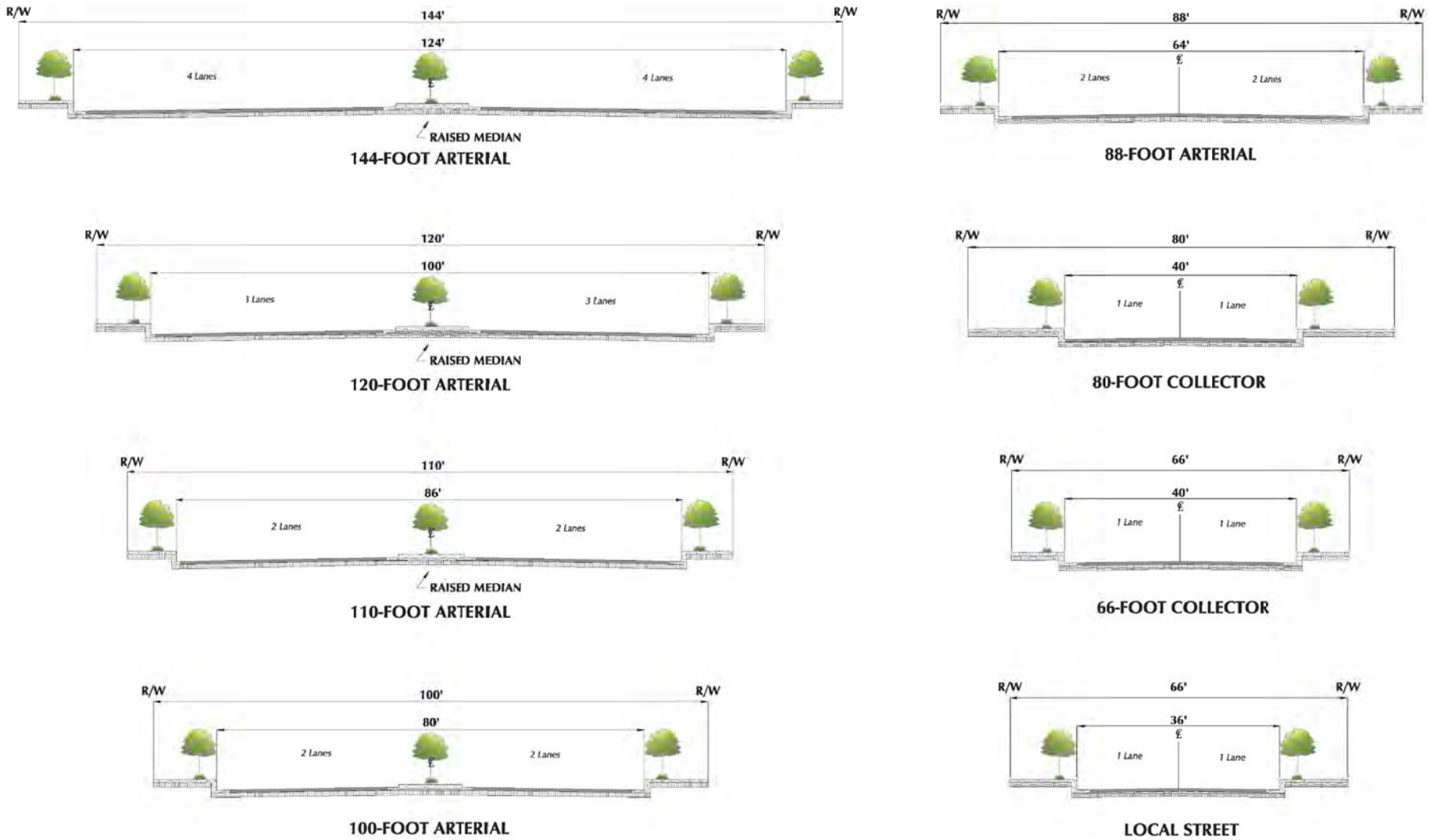
RIVERSIDE PROPOSED SPHERE OF INFLUENCE

KUNZMAN ASSOCIATES, INC.
OVER 40 YEARS OF EXCELLENT SERVICE

Source: City of Riverside

JN 6055a

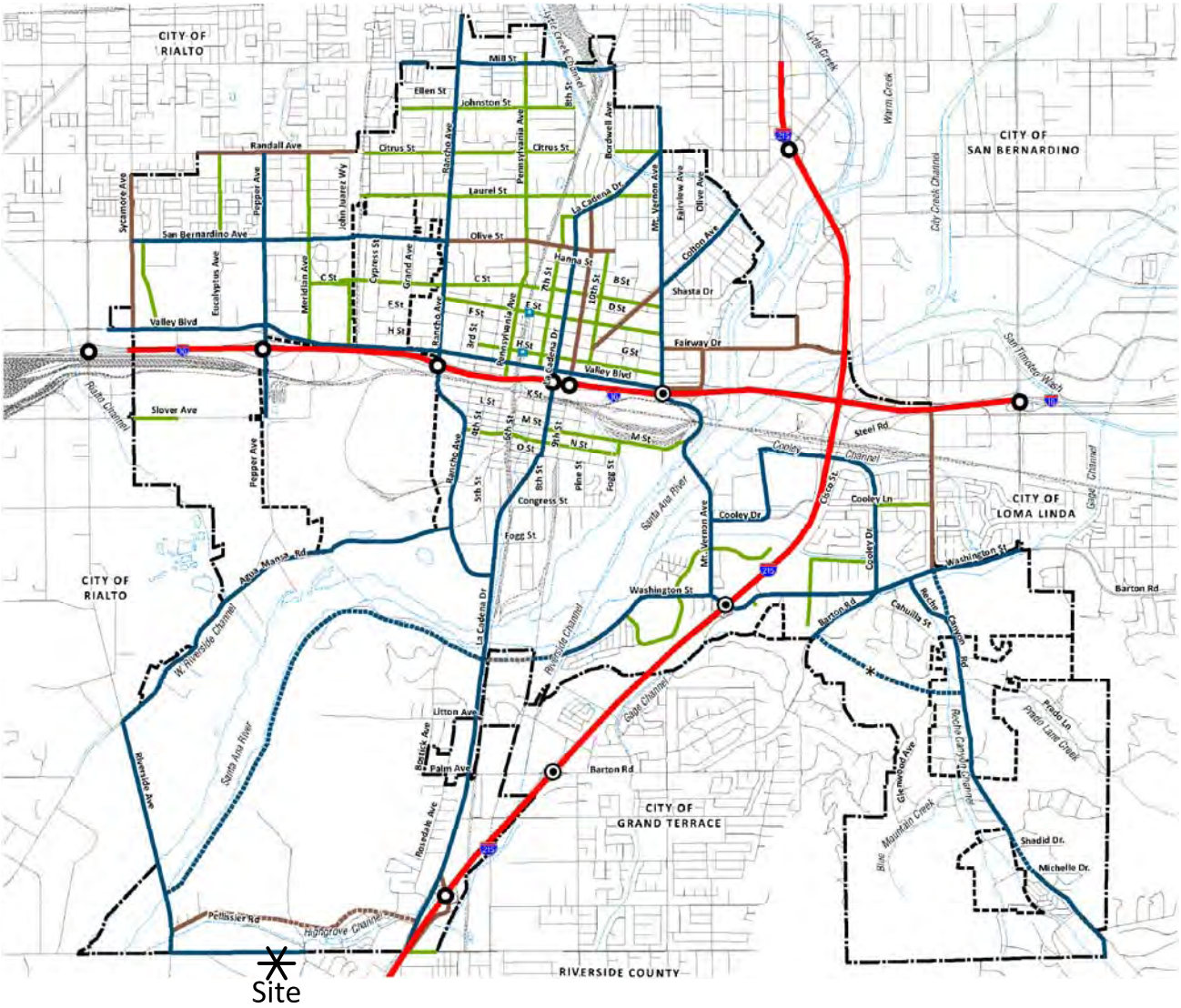
Figure 8
City of Riverside General Plan Roadway Cross-Sections



Source: City of Riverside

JN 6055a

Figure 9
City of Colton General Plan Circulation Element



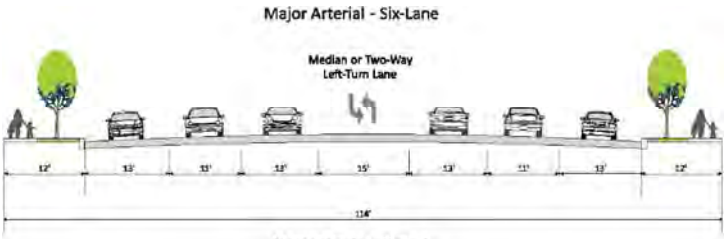
Legend

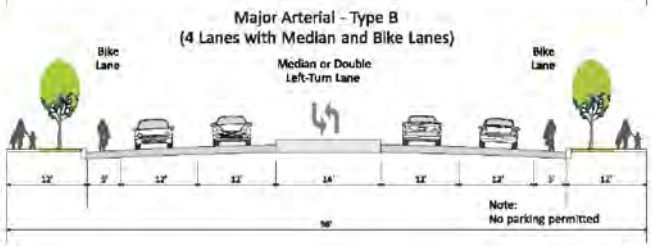
- Freeway
- Major Arterial
- Planned Arterial
- Secondary Arterial
- Planned Secondary
- Collector Street
- Planned Collector
- Planned Roadway Located in Another City

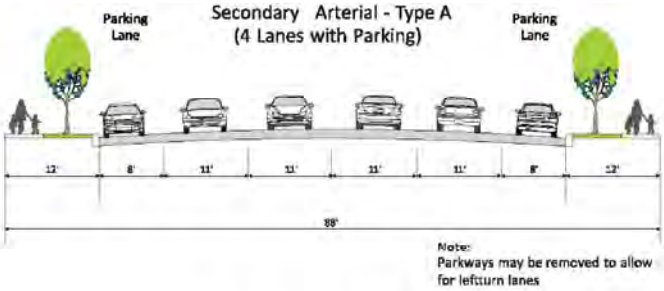
Source: City of Colton

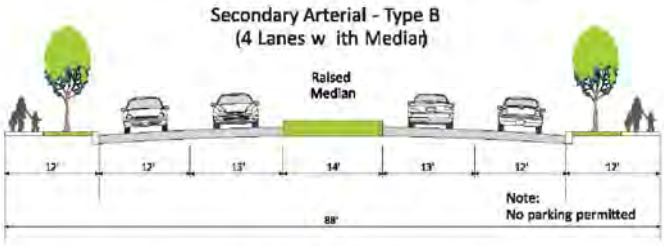
JN 6055a

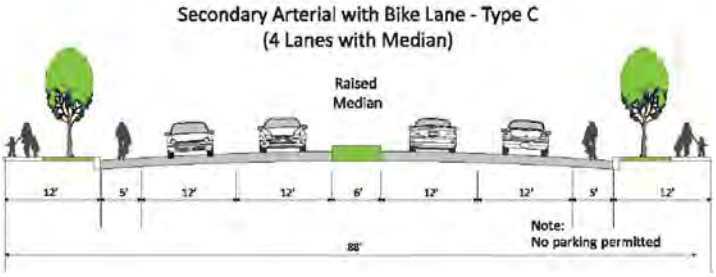
Figure 10
City of Colton General Plan Roadway Cross-Sections

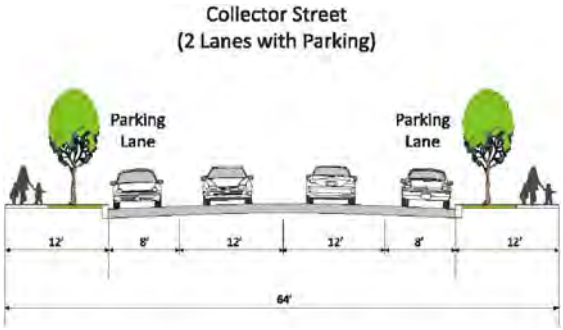


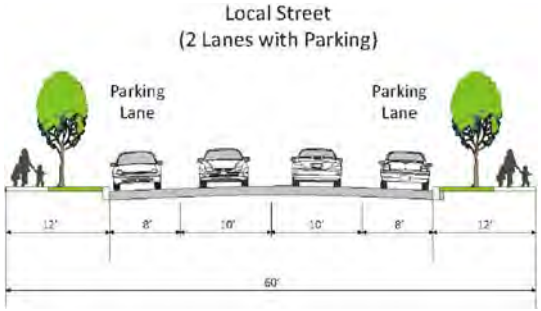


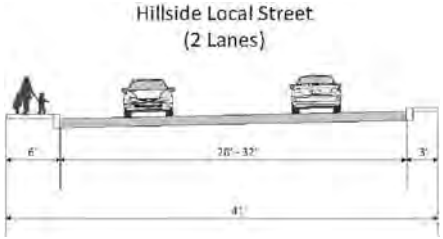












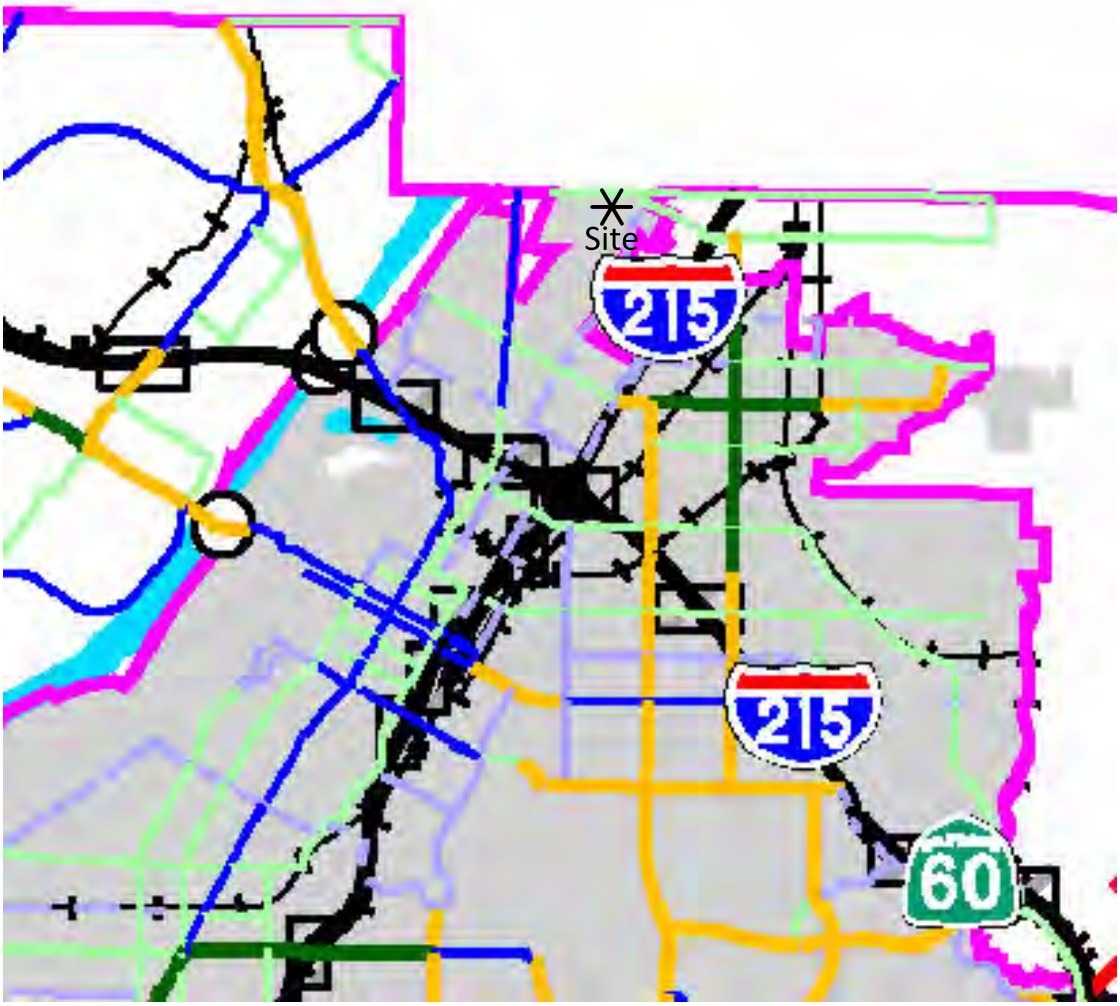
KUNZMAN ASSOCIATES, INC.

Source: City of Colton

JN 6055a

OVER 40 YEARS OF EXCELLENT SERVICE

Figure 11
County of Riverside General Plan Circulation Element



Legend

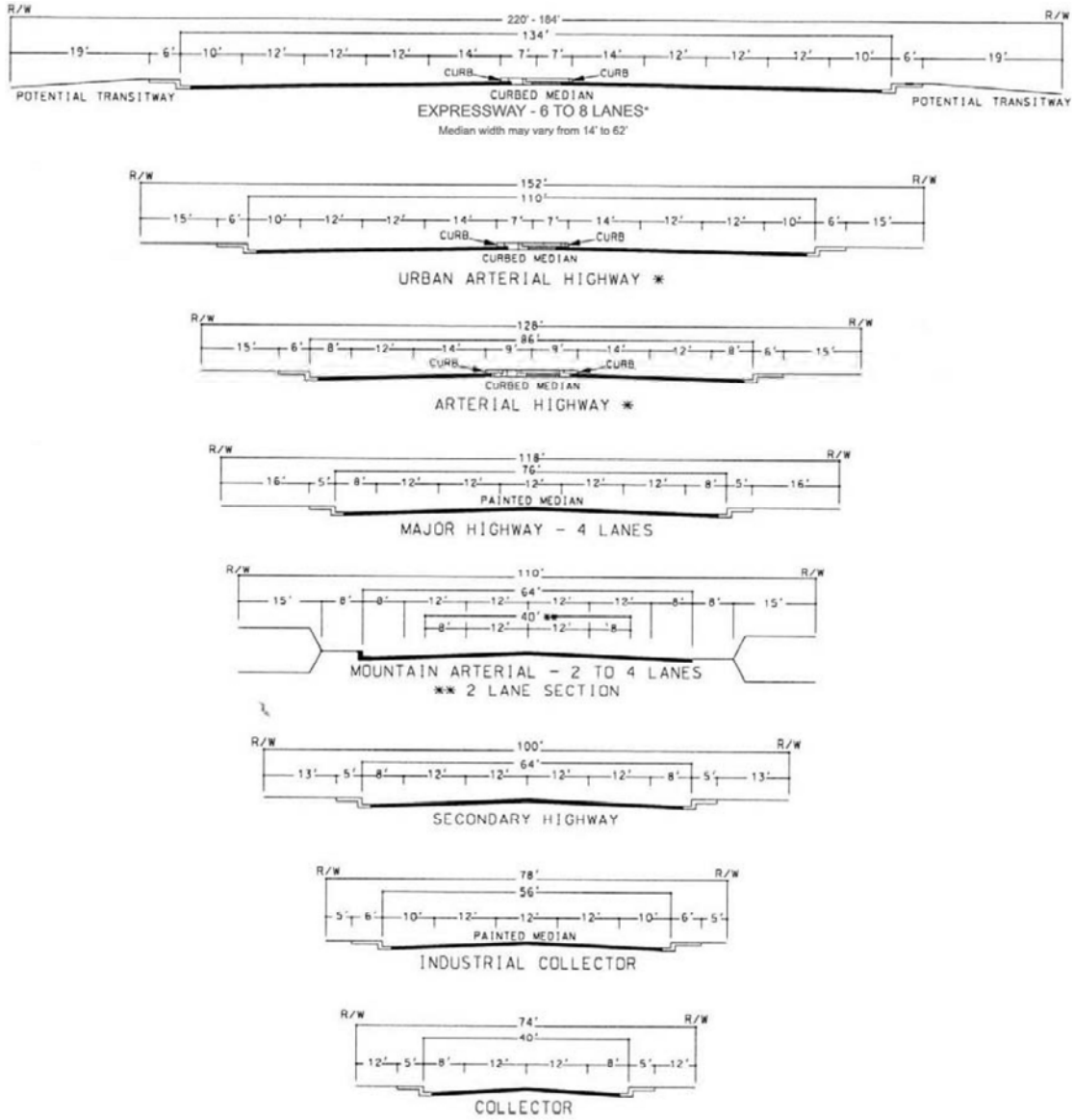
- Freeway
- Expressway (220' ROW)
- Urban Arterial (152' ROW)
- Arterial (128' ROW)
- Major (118' ROW)
- Mountain Arterial (110' ROW)
- Secondary (100' ROW)
- Collector (74' ROW)
- Moreno Valley to San Bernardino Corridor
- Cajalco Romona Corridor
- SR-79 Re-alignment Alternatives
- Existing Interchange
- Proposed Interchange
- Bridge
- Rail
- Water
- City
- Area Plan Boundary

KUNZMAN ASSOCIATES, INC.
OVER 40 YEARS OF EXCELLENT SERVICE

Source: County of Riverside

JN 6055a

Figure 12
County of Riverside General Plan Roadway Cross-Sections

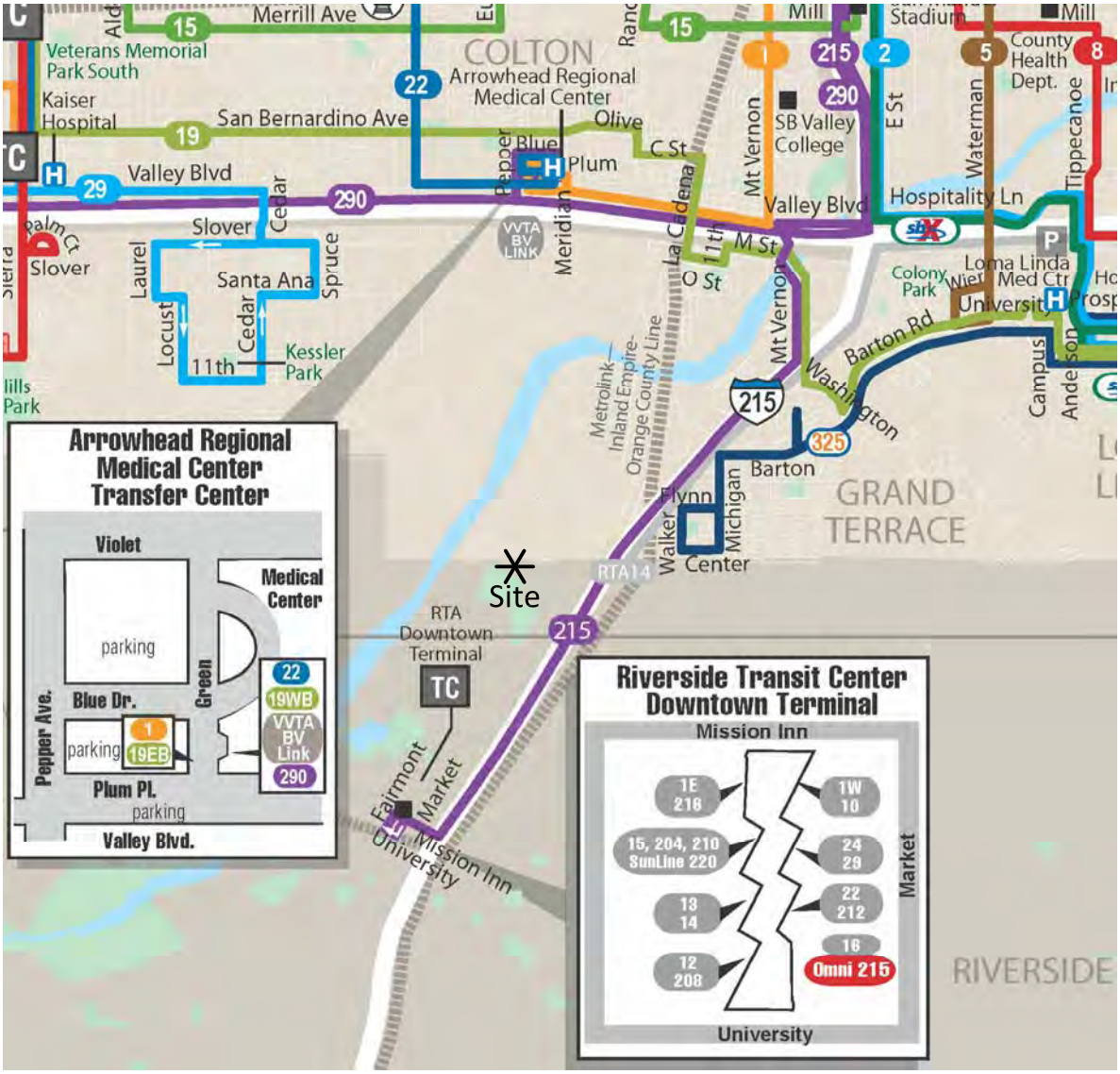


*IMPROVEMENTS MAY BE RECONFIGURED TO ACCOMMODATE EXCLUSIVE TRANSIT LANES OR ALTERNATIVE LANE ARRANGEMENTS. ADDITIONAL RIGHT OF WAY MAY BE REQUIRED AT INTERSECTIONS TO ACCOMMODATE. ULTIMATE IMPROVEMENTS FOR STATE HIGHWAYS SHALL CONFORM TO CALTRANS DESIGN STANDARDS.

Source: County of Riverside

JN 6055a

Figure 13
Existing Transit Routes



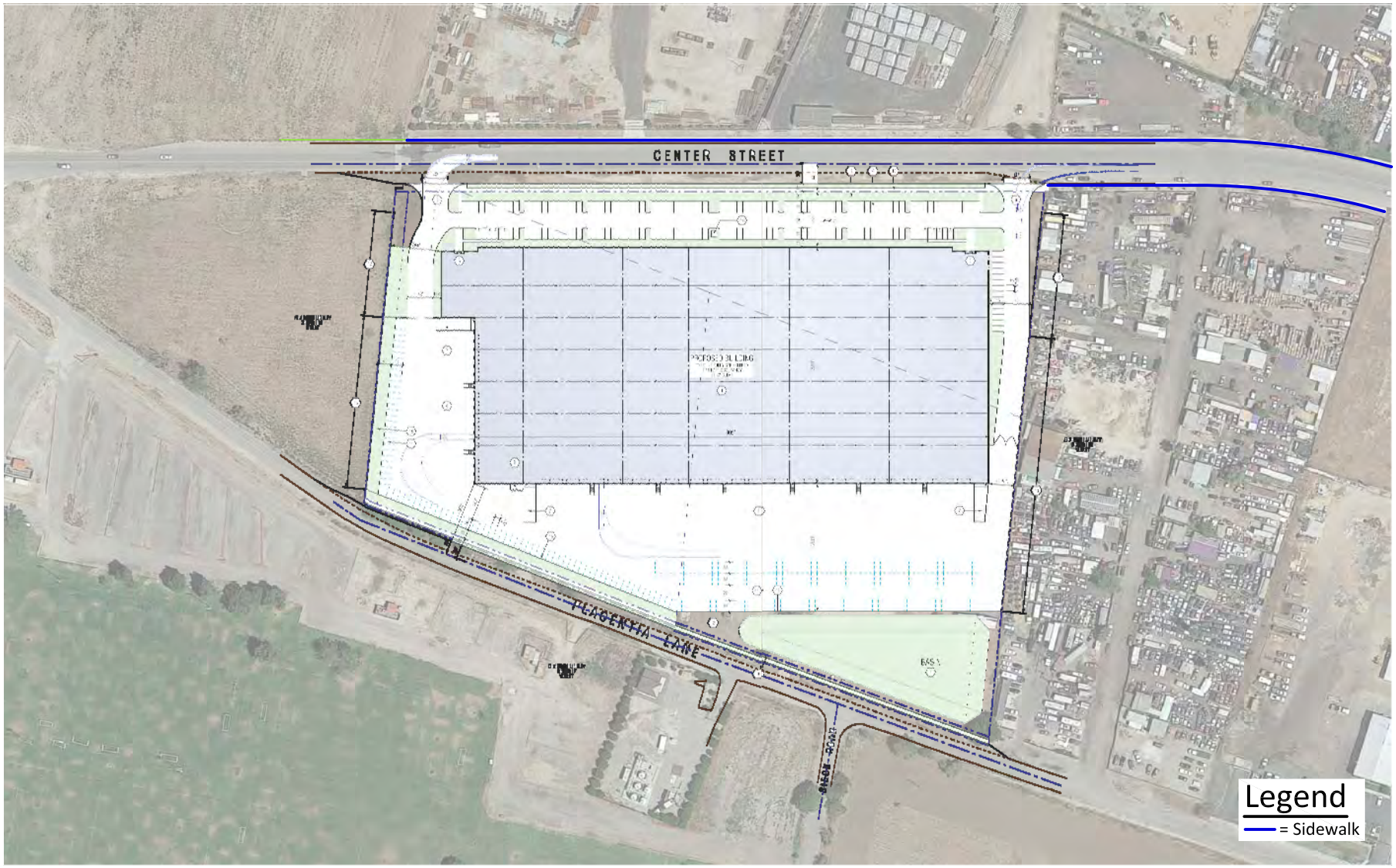
Legend

Route	Route Name
CSUSB	Palm/Kendall - CSUSB / VA Hospital
1	ARMC – San Bernardino Del Rosa
2	Cal St – E St – Loma Linda
3/4	Baseline – Highland – San Bdno
5	South Waterman – Del Rosa – Cal State
7	N San Bdno – Sierra Way – San Bdno
8	San Bdno – Mentone – Crafton Hills College
10	Fontana – Baseline – San Bernardino
11	San Bernardino – Muscoy – Cal State
14	Fontana – Foothill – San Bernardino
15	Fontana – San Bernardino/Highland – Redlands
19	Fontana – Colton – Redlands – Yucaipa
20	Fontana – Metrolink – Via Hemlock – Kaiser
22	North Rialto – Riverside Ave – ARMC
29	Bloomington – Valley Blvd – Kaiser
61	Fontana – Ontario Mills – Pomona
63	Chino – Ontario – Upland
65	Montclair – Chino Hills
66	Fontana – Foothill Blvd – Montclair
67	Montclair – Baseline – Fontana
68	Chino – Montclair – Chaffey College
80	Montclair – Ont Conv Cntr – Chaffey College
81	Ontario – Ontario Mills – Chaffey College
82	Rancho Cucamonga – Fontana – Sierra Lakes
83	Upland – Euclid – Chino
215	San Bernardino – Riverside
306/308/310	OmniGo Yucaipa
325	OmniGo Grand Terrace
365	OmniGo Chino/Chino Hills

Source: Riverside Transit Agency

JN 6055a

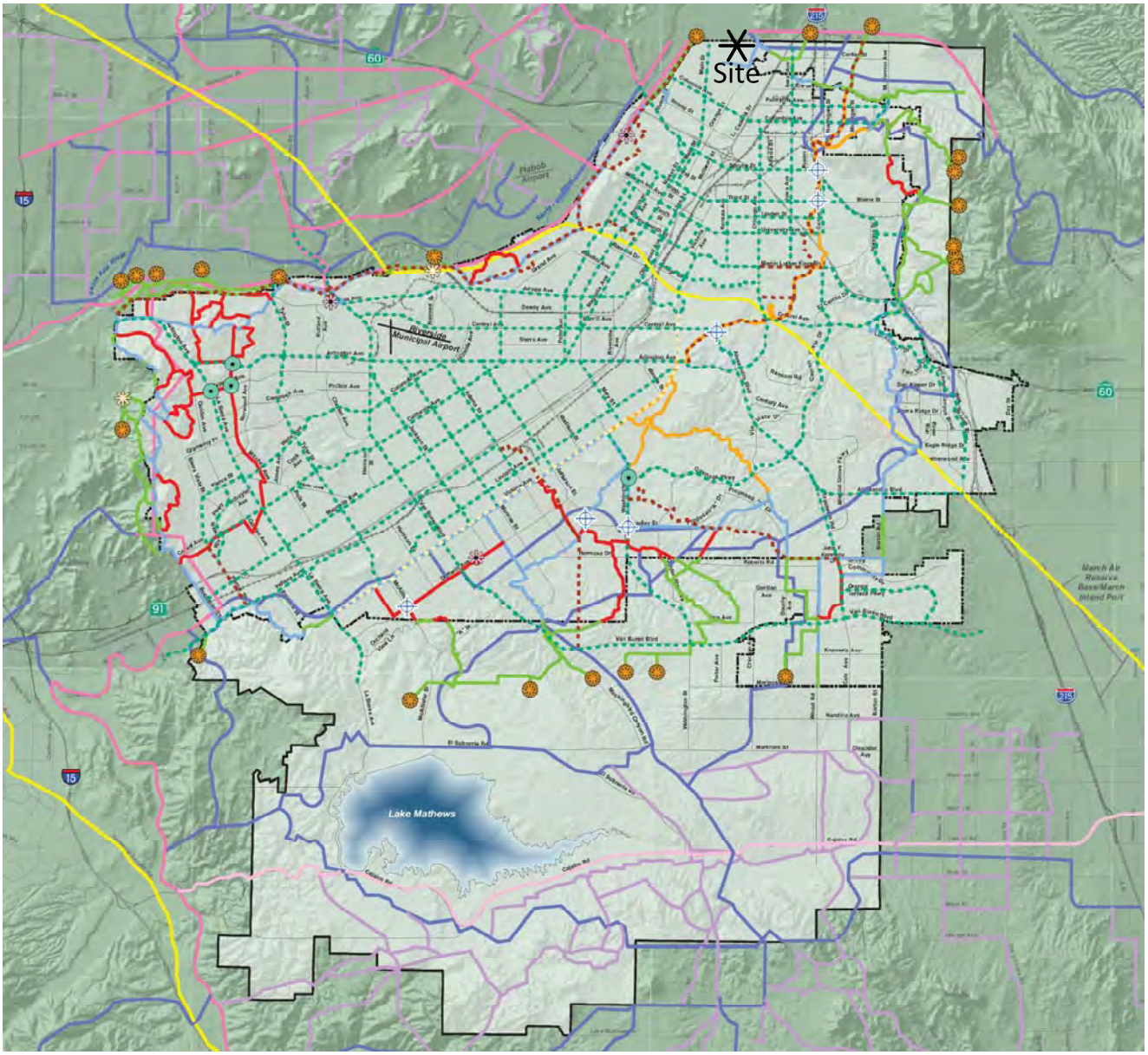
Figure 14
Existing Pedestrian Facilities



KUNZMAN ASSOCIATES, INC.
OVER 40 YEARS OF EXCELLENT SERVICE

JN 6055a

Figure 15
City of Riverside Bike Paths



Legend

CITY TRAIL POINTS
- STAGING AREAS EXISTING FACILITIES
- STAGING AREAS PROPOSED FACILITIES
- CONNECTION TO COUNTY DESIGNATED TRAILS
- TRAIL CROSSING PROPOSED STOP SIGN
- TRAIL CROSSING PROPOSED TRAFFIC SIGNAL

CITY TRAILS
- PRIMARY - EQUESTRIAN, BIKE & PEDESTRIAN TRAIL
- SECONDARY - EQUESTRIAN, BIKE & PEDESTRIAN TRAIL
- SECONDARY - NO EQUESTRIAN
- IN ADJACENT JURISDICTION

CITY BIKEWAYS
- CLASS 1
- CLASS 1&2
- CLASS 2

RIVERSIDE COUNTY TRAILS
- CLASS 1 BIKE PATH
- CLASS 1 BIKE PATH/REGIONAL TRAIL
- COMMUNITY TRAIL
- REGIONAL TRAIL
- HISTORIC TRAIL

- RIVERSIDE CITY BOUNDARY
- RIVERSIDE PROPOSED SPHERE OF INFLUENCE

KUNZMAN ASSOCIATES, INC.

OVER 40 YEARS OF EXCELLENT SERVICE

Source: City of Riverside

JN 6055a

V. PROJECT TRAFFIC

The approximately 16 acre project site is proposed to be developed with 308,000 square feet of manufacturing and will have access to Center Street.

A. Site Traffic

1. Trip Generation

The trips generated by the project are determined by multiplying an appropriate trip generation rate by the quantity of land use. Trip generation rates are predicated on the assumption that energy costs, the availability of roadway capacity, the availability of vehicles to drive, and life styles remain similar to what are known today. A major change in these variables may affect trip generation rates.

Trip generation rates were determined for daily trips, morning peak hour inbound and outbound trips, and evening peak hour inbound and outbound trips for the proposed land use. By multiplying the trip generation rates by the land use quantity, the traffic volumes are determined. Table 2 shows the project trip generation based upon rates obtained from the Institute of Transportation Engineers, Trip Generation Manual, 9th Edition, and the City of Fontana, Truck Trip Generation Study, August 2003.

As shown in Table 2, the proposed development is projected to generate approximately 1,576 daily vehicle trips in Passenger Car Equivalent's, 301 of which will occur during the morning peak hour in Passenger Car Equivalent's and 303 of which will occur during the evening peak hour in Passenger Car Equivalent's.

2. Trip Distribution

Figures 16 to 19 contain the directional distributions of the project trips for the proposed land use. To determine the trip distributions for the proposed project, peak hour traffic counts of the existing directional distribution of traffic for existing areas in the vicinity of the site and other additional information on future development and traffic impacts in the area were reviewed.

3. Trip Assignment

Based on the identified trip generation and distributions, project average daily traffic volumes have been calculated and shown on Figure 20. Morning and evening peak hour intersection turning movement volumes expected from the project are shown on Figures 21 and 22, respectively.

4. Modal Split

The traffic reducing potential of public transit has not been considered in this report. Essentially the traffic projections are conservative in that public transit might be able to reduce the traffic volumes.

Table 2

Project Trip Generation

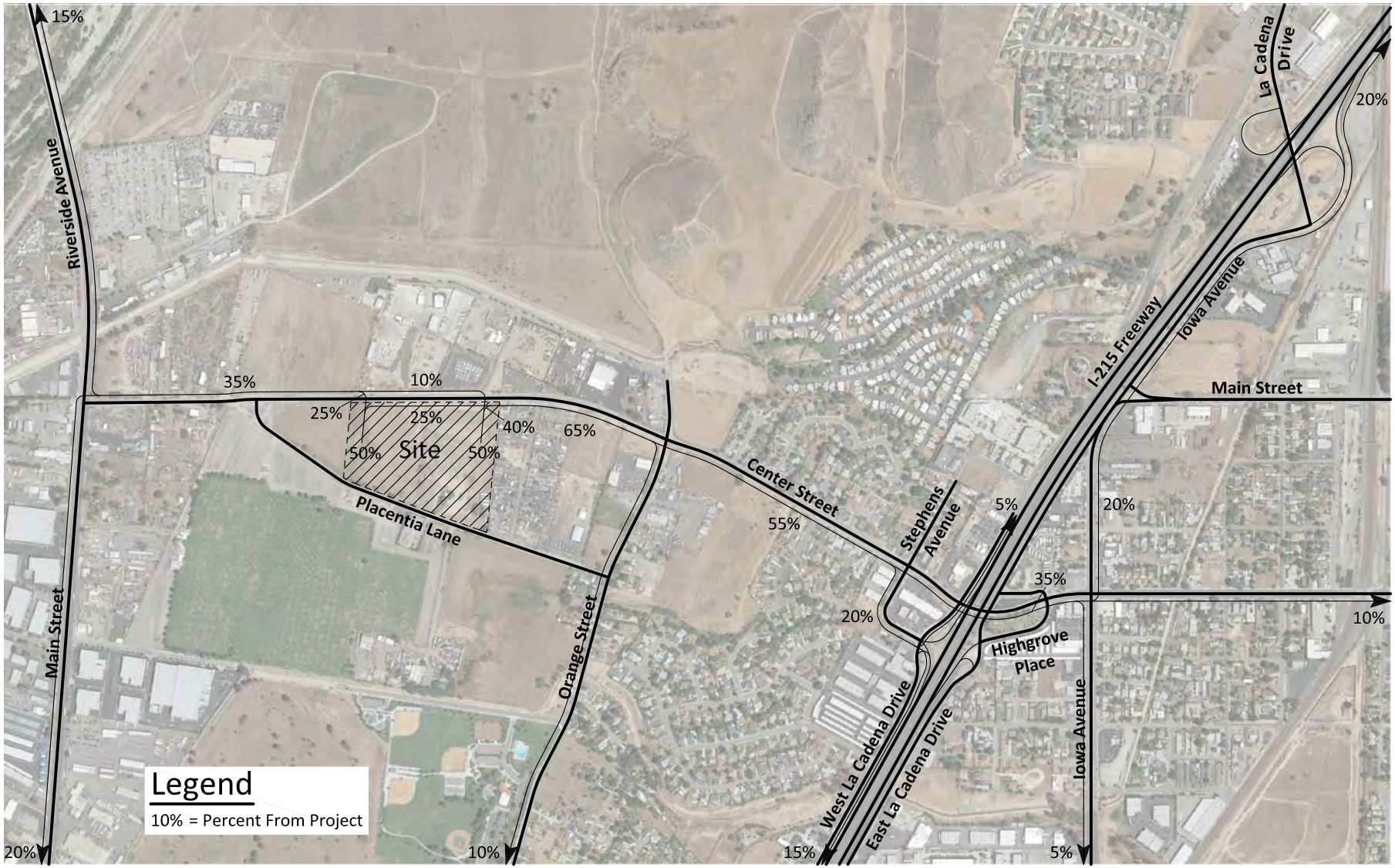
Descriptor		Quantity	Units[2]	Type of Vehicle: Passenger Car	2 Axle Truck	3 Axle Truck	4+ Axle Truck	Total Trucks	Total
Land Use: Manufacturing		308.000	TSF	74.4%	8.4%	4.6%	12.6%	25.6%	100%
Traffic Generation Rates in trips per TSF									
Daily				2.842	0.321	0.176	0.481	0.978	3.82
Morning Peak Hour				0.543	0.061	0.034	0.092	0.187	0.73
Evening Peak Hour				0.543	0.061	0.034	0.092	0.187	0.73
Traffic Generation in Vehicles									
Daily				875	99	54	148	301	1,176
Morning Peak Hour									
	Inbound			131	15	8	22	45	176
	Outbound			37	4	2	6	12	49
	Total			168	19	10	28	57	225
Evening Peak Hour									
	Inbound			60	7	4	10	21	81
	Outbound			108	12	7	18	37	145
	Total			168	19	11	28	58	226
Passenger Car Equivalent's (PCE'S) Factor[3]				1.00	1.50	2.00	3.00		
Traffic Generation in PCE's									
Daily				875	149	108	444	701	1,576
Morning Peak Hour									
	Inbound			131	23	16	66	105	236
	Outbound			37	6	4	18	28	65
	Total			168	29	20	84	133	301
Evening Peak Hour									
	Inbound			60	11	8	30	49	109
	Outbound			108	18	14	54	86	194
	Total			168	29	22	84	135	303

[1] Source: Institute of Transportation Engineers, Trip Generation Manual, 9th Edition, 2012, Land Use Category 140 and City of Fontana, Truck Trip Generation Study, August 2003.

[2] TSF = Thousand Square Feet

[3] Passenger Car Equivalent factors are recommended by San Bernardino Associated Governments.

Figure 16
Project Outbound Trip Distribution - Cars



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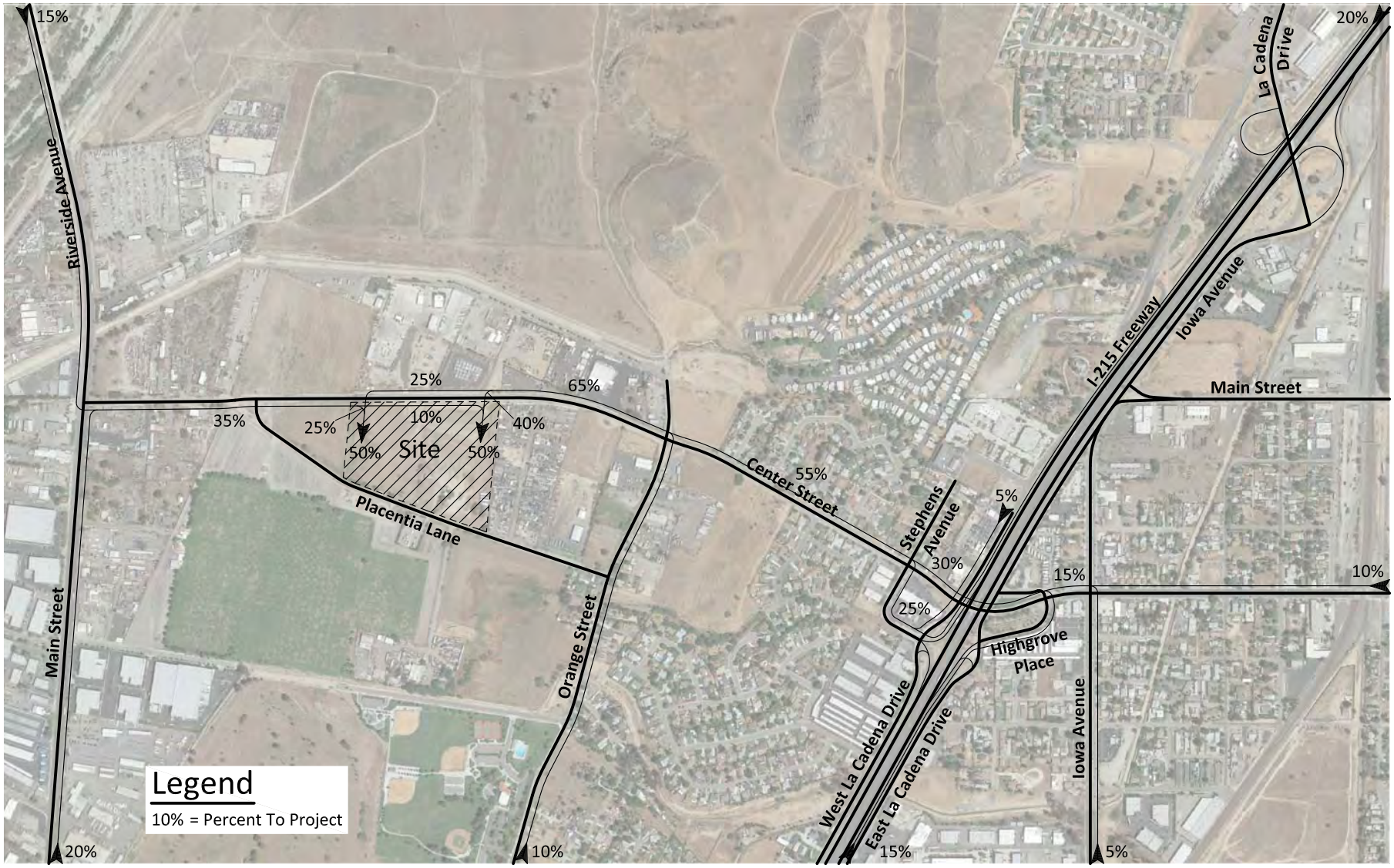
OVER 40 YEARS OF EXCELLENT SERVICE

JN 6055a

Figure 17
Project Inbound Trip Distribution - Cars

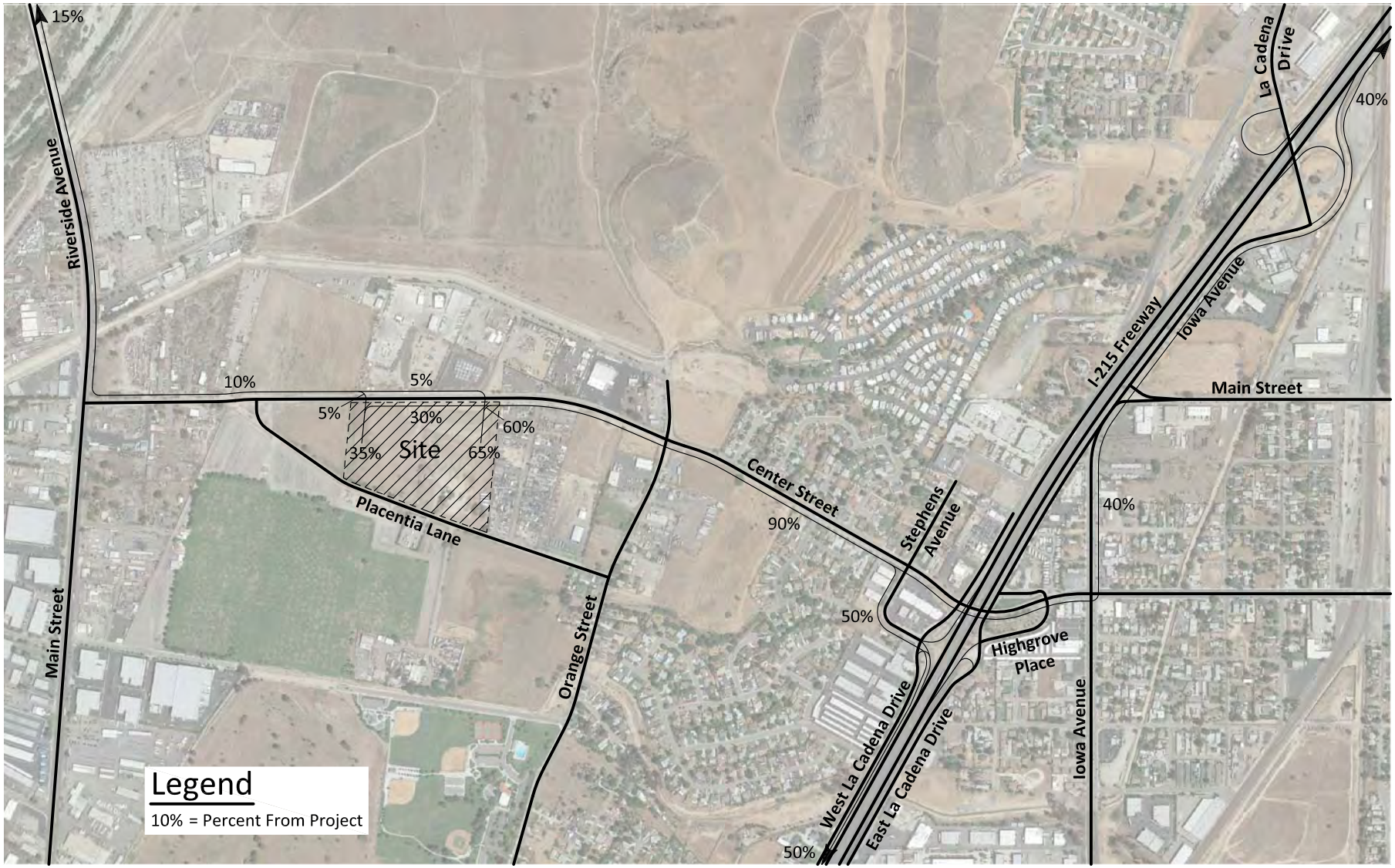


KUNZMAN ASSOCIATES, INC.

OVER 40 YEARS OF EXCELLENT SERVICE

JN 6055a

Figure 18
Project Outbound Trip Distribution - Trucks

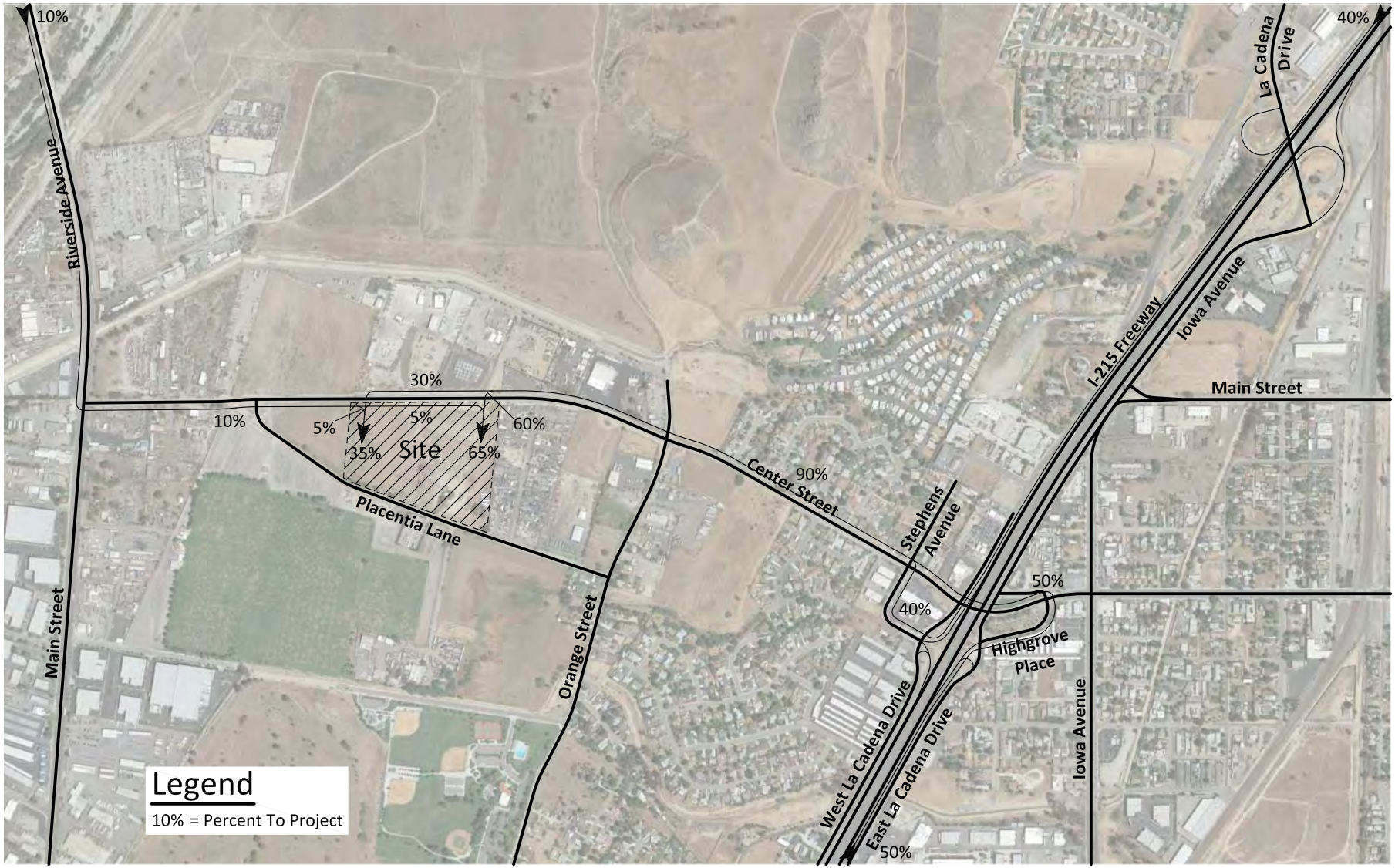


KUNZMAN ASSOCIATES, INC.

OVER 40 YEARS OF EXCELLENT SERVICE

JN 6055a

Figure 19
Project Inbound Trip Distribution - Trucks

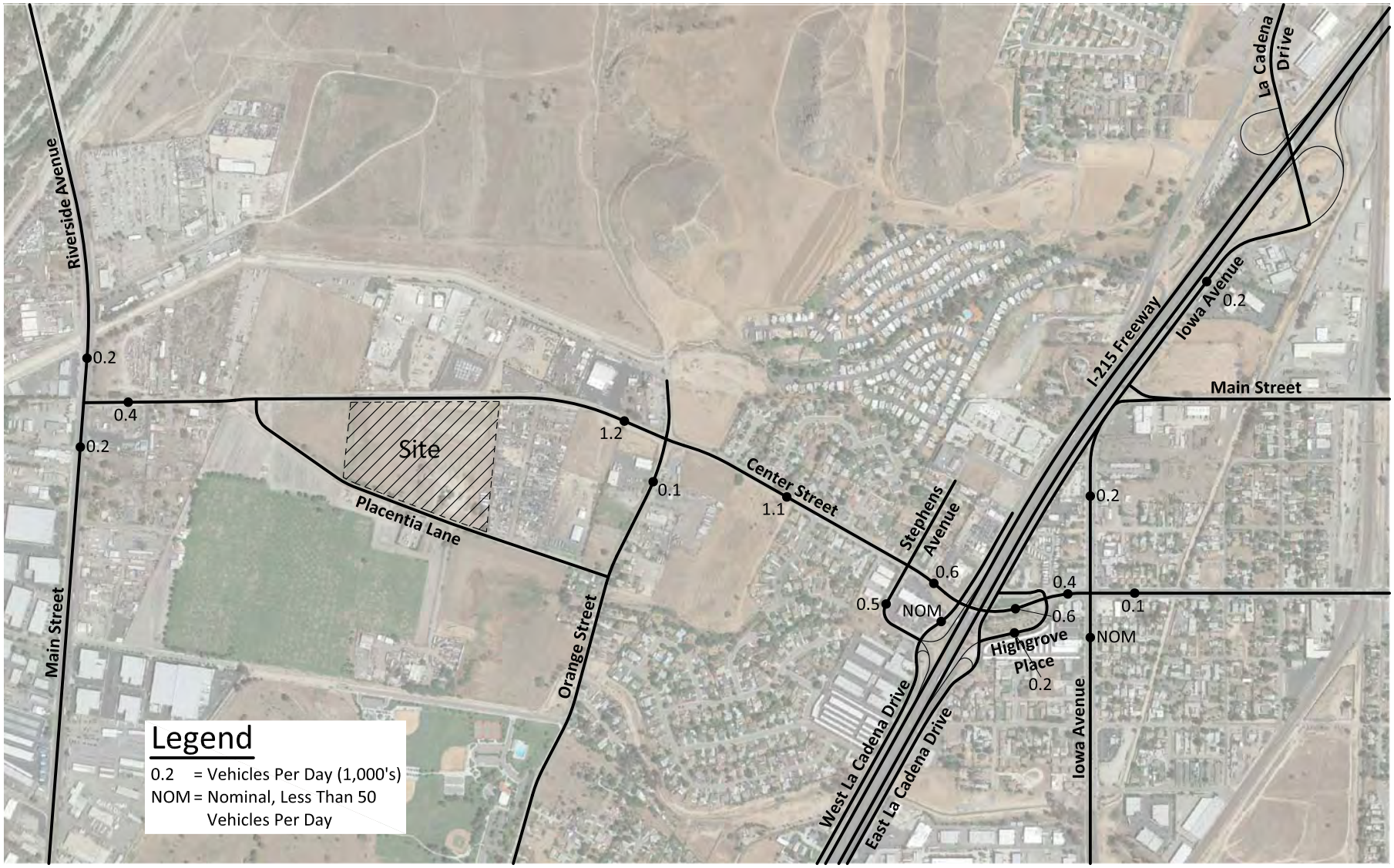


KUNZMAN ASSOCIATES, INC.

OVER 40 YEARS OF EXCELLENT SERVICE

JN 6055a

Figure 20
Project Average Daily Traffic Volumes

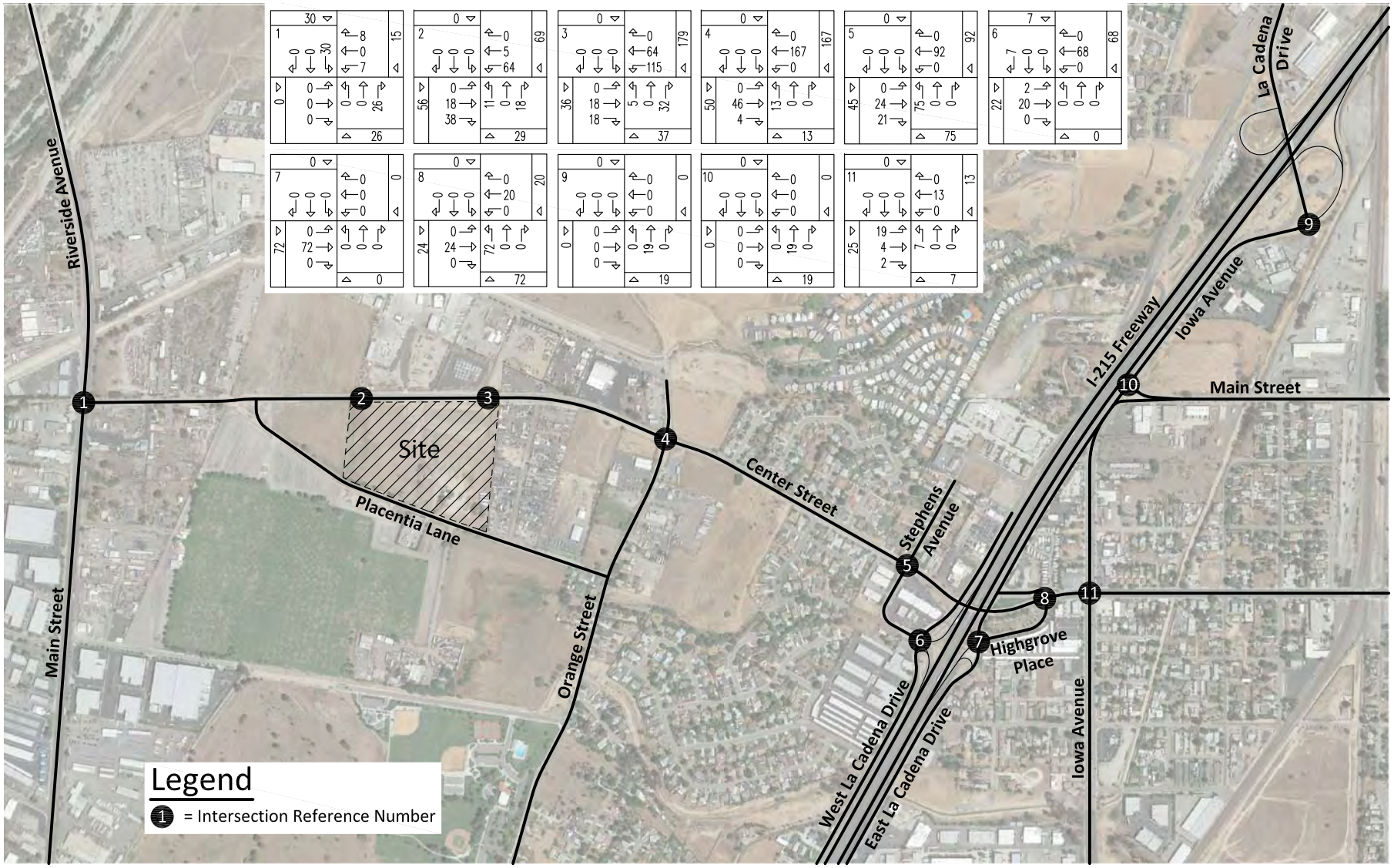


KUNZMAN ASSOCIATES, INC.

OVER 40 YEARS OF EXCELLENT SERVICE

JN 6055a

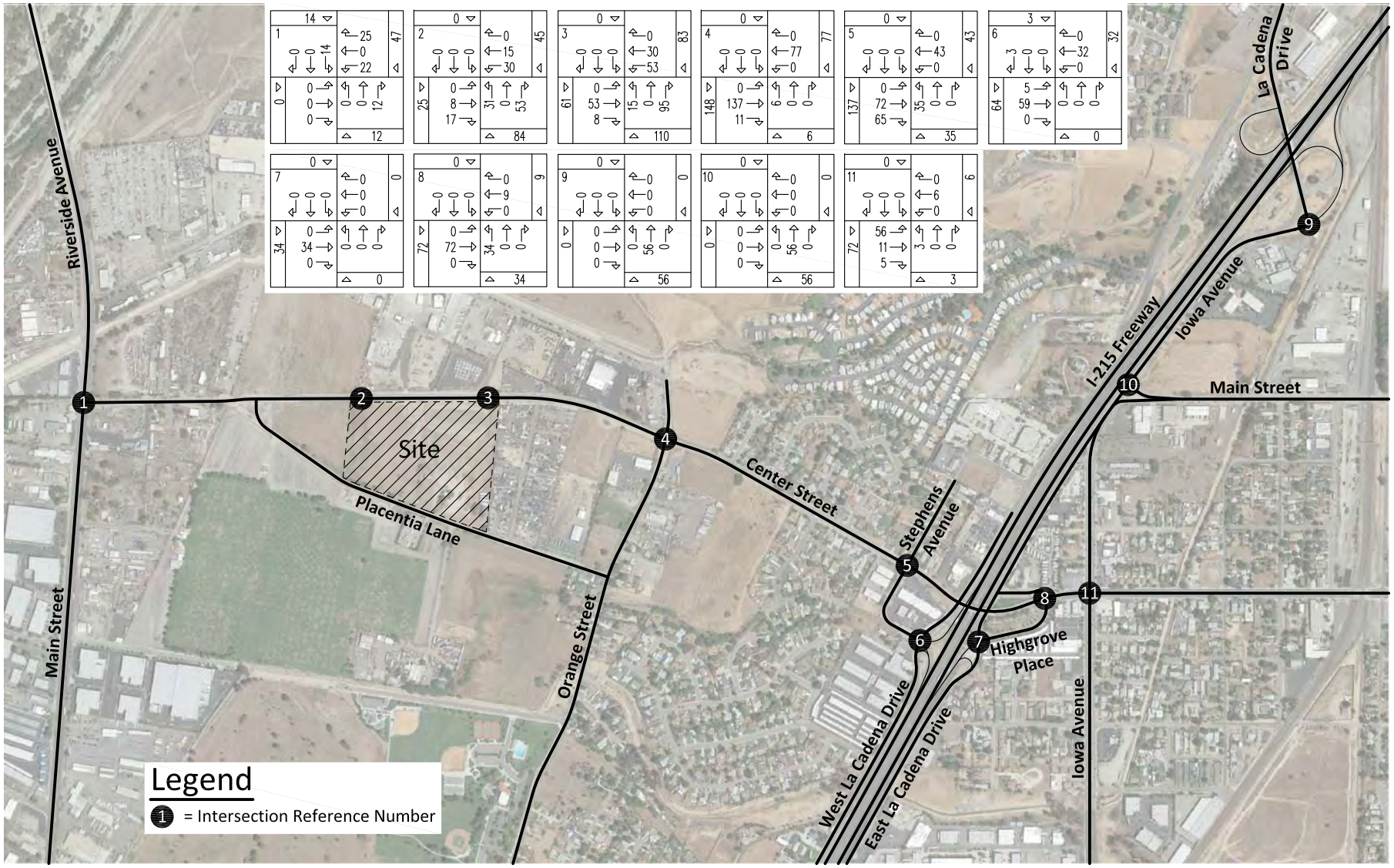
Figure 21
Project Morning Peak Hour Intersection Turning Movement Volumes



KUNZMAN ASSOCIATES, INC. Intersection reference numbers are in upper left corner of turning movement boxes. JN 6055a

OVER 40 YEARS OF EXCELLENT SERVICE

Figure 22
Project Evening Peak Hour Intersection Turning Movement Volumes



KUNZMAN ASSOCIATES, INC. Intersection reference numbers are in upper left corner of turning movement boxes. JN 6055a

OVER 40 YEARS OF EXCELLENT SERVICE

VI. EXISTING PLUS PROJECT TRAFFIC CONDITIONS

Once the project-related trips are assigned to the existing street network and added to existing volumes, the traffic impact can be assessed. Figures 23 to 25 illustrate the Existing Plus Project traffic conditions.

A. Method of Projection

To assess Existing Plus Project traffic conditions, project traffic is combined with existing traffic.

B. Existing Plus Project Average Daily Traffic Volumes

Upon project completion and occupancy, the Existing Plus Project average daily traffic volumes are as illustrated on Figure 23.

C. Existing Plus Project Intersection Delay

The technique used to assess the capacity needs of an intersection is known as the Intersection Delay Method (see Appendix D). To calculate delay, the volume of traffic using the intersection is compared with the capacity of the intersection.

The delay and Level of Service for Existing Plus Project traffic conditions have been calculated and are shown in Table 3. Existing Plus Project morning and evening peak hour intersection turning movement volumes are shown on Figures 24 and 25, respectively.

For Existing Plus Project traffic conditions, the study area intersections are projected to operate at acceptable Levels of Service during the peak hours, except for the following study area intersection that is projected to operate at unacceptable Levels of Service during the peak hours, without improvements:

Iowa Avenue/I-215 Freeway NB Ramps (NS) at:
La Cadena Drive (EW) - #9

For Existing Plus Project traffic conditions, the study area intersections are projected to operate within acceptable Levels of Service during the peak hours, with improvements. Existing Plus Project delay worksheets are provided in Appendix D.

Table 3

Existing Plus Project Intersection Delay and Level of Service

Intersection	Jurisdiction	Traffic Control[3]	Intersection Approach Lanes[1]												Peak Hour Delay-LOS[2]	
			Northbound			Southbound			Eastbound			Westbound				
			L	T	R	L	T	R	L	T	R	L	T	R	Morning	Evening
Main Street/Riverside Avenue (NS) at:																
Center Street (EW) - #1	Colton/Riverside															
- Without Improvements		CSS	0	2	d	1	2	0	0	0	0	0	1	0	15.2-C	19.6-C
- With Improvements		**TS**	0	2	d	1	2	0	0	0	0	0	1	0	11.5-B	10.6-B
Project West Access (NS) at:																
Center Street (EW) - #2	Colton/Riverside	**CSS**	**0.5**	0	**0.5**	0	0	0	0	1	**1**	**1**	1	0	10.4-B	11.2-B
Project East Access (NS) at:																
Center Street (EW) - #3	Colton/Riverside	**CSS**	**0.5**	0	**0.5**	0	0	0	0	1	**1**	**1**	1	0	10.0-A	11.4-B
Orange Street (NS) at:																
Center Street (EW) - #4	Riverside	AWS	0	1	0	0	1	0	0	1	0	0	1	0	10.7-B	13.8-B
Stephens Avenue (NS) at:																
Center Street (EW) - #5	Riverside County	TS	0	1	0	0	1	0	0.5	0.5	1	0.5	0.5	d	14.2-B	12.8-B
West La Cadena Drive (NS) at:																
Stephens Avenue/I-215 Freeway SB Ramps (EW) - #6	Caltrans															
- Without Improvements		AWS	0.5	0.5	1>>	0.5	0.5	d	0	1	0	0	1	0	19.2-C	24.3-C
- With Improvements		**TS**	0.5	0.5	1>>	0.5	0.5	d	0	1	0	0	1	0	15.5-B	17.8-B
East La Cadena Drive (NS) at:																
Highgrove Place/I-215 Freeway NB Ramps (EW) - #7	Caltrans	AWS	0	0.5	0.5	0.5	0.5	0	0.5	0.5	1>>	1	0	1>>	9.5-A	10.2-B
Highgrove Place (NS) at:																
Center Street (EW) - #8	Riverside County															
- Without Improvements		CSS	0.5	0.5	1	0	1	0	0.5	0.5	1>>	0	1	0	16.9-C	13.8-B
- With Improvements		**TS**	0.5	0.5	1	0	1	0	0.5	0.5	1>>	0	1	0	12.8-B	13.1-B
Iowa Avenue/I-215 Freeway NB Ramps (NS) at:																
La Cadena Drive (EW) - #9	Caltrans															
- Without Improvements		TS	1	1	0	0	0.5	0.5	0.5	0	0.5	0	0	0	78.1-E	99.9-F[4]
- With Improvements		TS	1	1	0	0	0.5	0.5	1	0	**1>**	0	0	0	21.4-C	26.3-C
Iowa Avenue (NS) at:																
Main Street (EW) - #10	Colton/Riverside County	TS	0	1	1>>	1	1	0	0	0	0	1	0	1	17.0-B	17.9-B
Center Street (EW) - #11	Riverside County	TS	1	2	d	1	2	d	1	1.5	0.5	1	1	1	18.9-B	18.2-B

[1] When a right turn lane is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicle to travel outside the through lanes. L = Left; T = Through; R = Right; d = De Facto Right Turn Lane; > = Right Turn Overlap; >> = Free Right Turn Lane; **BOLD** = Improvement

[2] Delay and level of service has been calculated using the following analysis software: Highway Capacity Software (2010). Per the Highway Capacity Manual, overall average for intersection delay and level of service are shown for intersections with traffic signal or all way stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[3] CSS = Cross Street Stop; AWS = All Way Stop; TS = Traffic Signal

[4] 99.9-F = Delay High, Intersection Unstable, Level of Service F

Figure 23
Existing Plus Project Average Daily Traffic Volumes

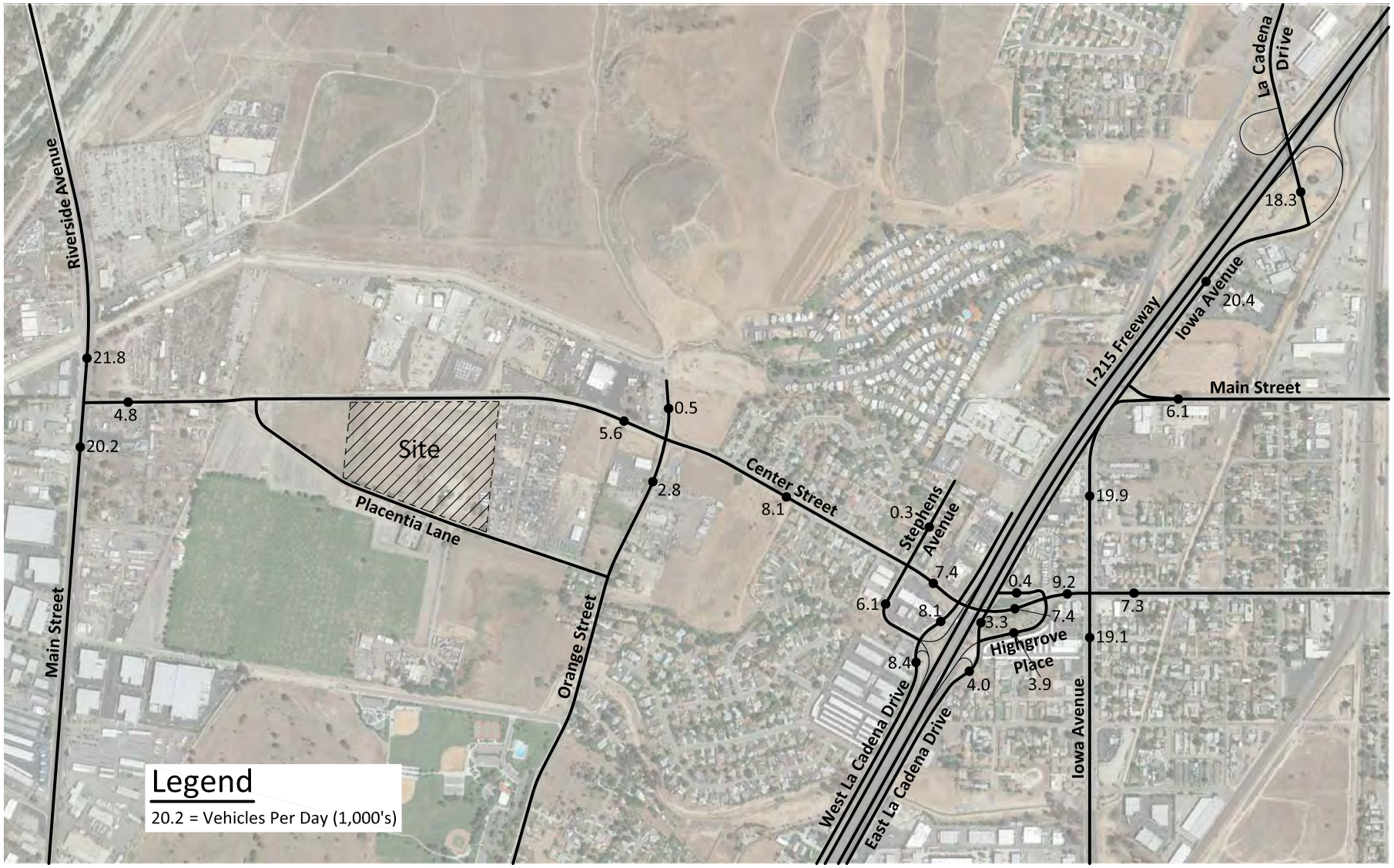


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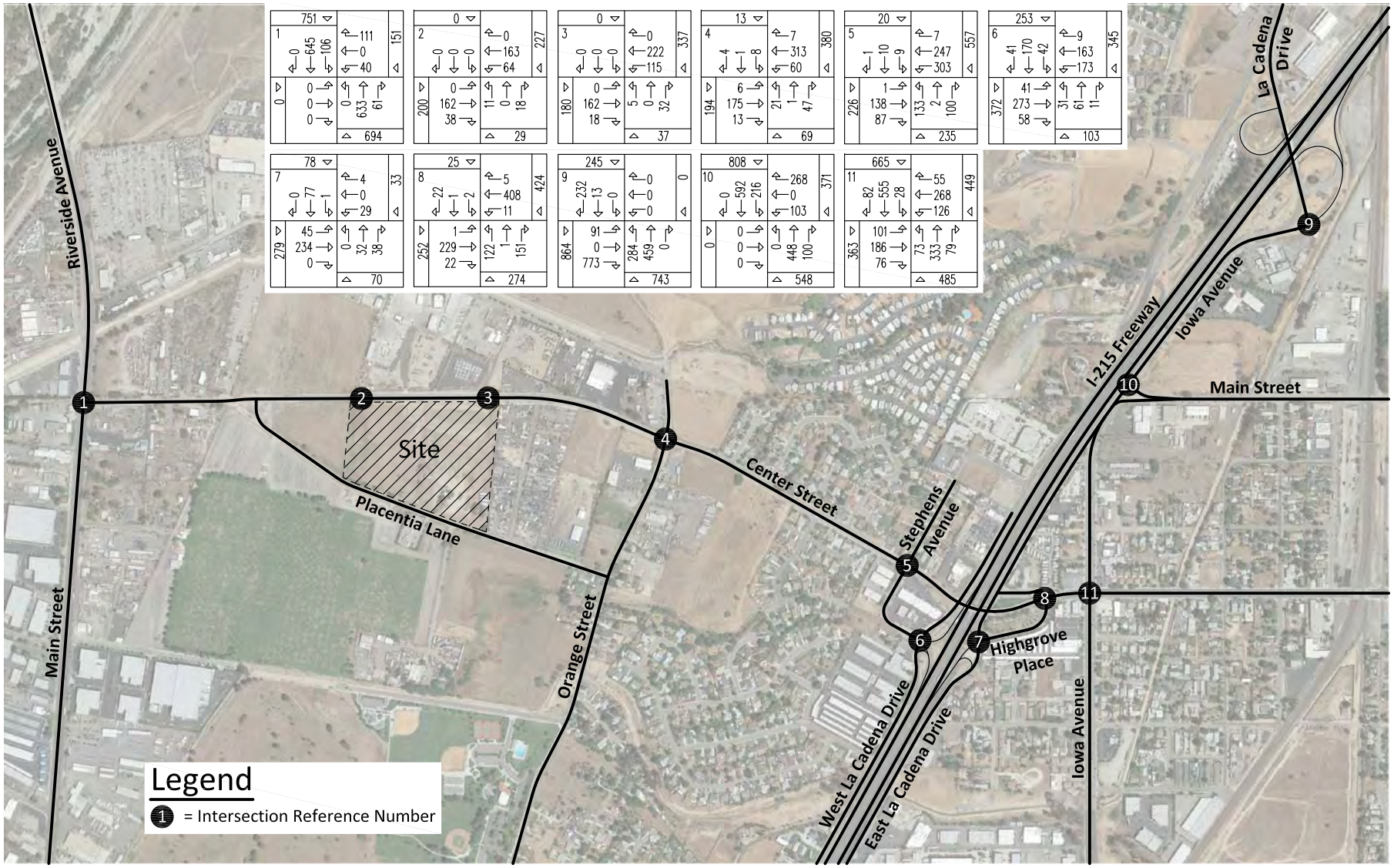
Figure 24
Existing Plus Project
Morning Peak Hour Intersection Turning Movement Volumes



KUNZMAN ASSOCIATES, INC. Intersection reference numbers are in upper left corner of turning movement boxes. JN 6055a

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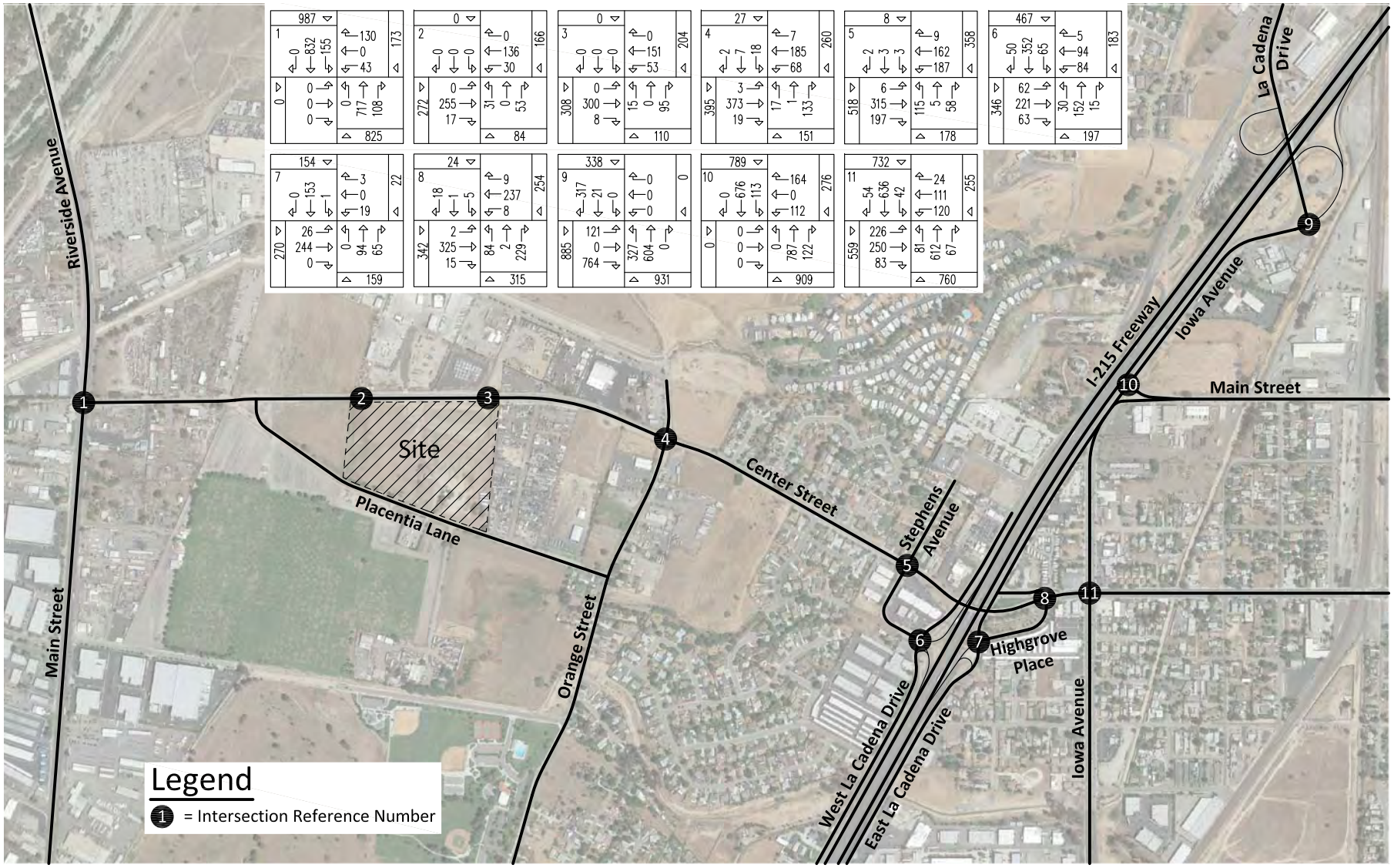
Figure 25
Existing Plus Project
Evening Peak Hour Intersection Turning Movement Volumes



KUNZMAN ASSOCIATES, INC. Intersection reference numbers are in upper left corner of turning movement boxes. JN 6055a

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VII. OPENING YEAR TRAFFIC CONDITIONS

Figures 26 to 44 illustrate the Opening Year traffic conditions.

A. Method of Projection

To assess Opening Year traffic conditions, existing traffic is combined with areawide growth. The Opening Year for analysis purposes in this report is 2017.

To account for areawide growth on roadways, traffic volumes have been calculated based on a "conservative" 2.0 percent annual growth rate of existing traffic volumes over the two (2) year period.

B. Other Development

Table 4 lists the proposed land uses for the other development (see Figure 26) and shows the daily and peak hour vehicle trips generated by each development in the study area. Lists of other potential developments within the study area have been provided by the planning departments of the Cities of Riverside, Colton, Grand Terrace, Jurupa Valley, and the County of Riverside. Potential developments within the study area are included in the analysis if they are not currently built, they are approved, their approval has not expired, and they would contribute trips to the study area intersections. Figures 27 through 35 contain the directional distribution and assignment of the other development trips.

Figure 36 shows the average daily traffic volumes that can be expected for the other development traffic conditions. Other development morning and evening peak hour intersection turning movement volumes are shown on Figures 37 and 38, respectively.

C. Opening Year (2017) Average Daily Traffic Volumes

The Opening Year (2017) Without Project average daily traffic volumes are as illustrated on Figure 39 and Opening Year (2015) With Project average daily traffic volumes are as illustrated on Figure 40.

D. Opening Year (2017) Intersection Delay

The technique used to assess the capacity needs of an intersection is known as the Intersection Delay Method (see Appendix D). To calculate delay, the volume of traffic using the intersection is compared with the capacity of the intersection.

The delay and Level of Service for Opening Year (2017) Without Project traffic conditions have been calculated and are shown in Table 5. Opening Year (2017) Without Project morning and evening peak hour intersection turning movement volumes are shown on Figures 41 and 42, respectively.

For Opening Year (2017) Without Project traffic conditions, the study area intersections are projected to operate at acceptable Levels of Service during the peak hours, except for the following study area intersection that is projected to operate at unacceptable Levels of Service during the peak hours, without improvements:

Iowa Avenue/I-215 Freeway NB Ramps (NS) at:
La Cadena Drive (EW) - #9

For Opening Year (2017) Without Project traffic conditions, the study area intersections are projected to operate within acceptable Levels of Service during the peak hours, with improvements. Opening Year (2017) Without Project delay worksheets are provided in Appendix D.

The delay and Level of Service for Opening Year (2017) With Project traffic conditions have been calculated and are shown in Table 6. Opening Year (2017) With Project morning and evening peak hour intersection turning movement volumes are shown on Figures 43 and 44, respectively.

For Opening Year (2017) With Project traffic conditions, the study area intersections are projected to operate at acceptable Levels of Service during the peak hours, except for the following study area intersection that is projected to operate at unacceptable Levels of Service during the peak hours, without improvements:

Iowa Avenue/I-215 Freeway NB Ramps (NS) at:
La Cadena Drive (EW) - #9

For Opening Year (2017) With Project traffic conditions, the study area intersections are projected to operate within acceptable Levels of Service during the peak hours, with improvements. Opening Year (2017) With Project delay worksheets are provided in Appendix D.

E. Significant Transportation Impact

The City of Riverside allows Level of Service D to be used as a maximum acceptable threshold for the study area intersections.

A significant impact occurs at a study intersection when the addition of project generated trips causes either peak hour Level of Service to degrade from acceptable Level of Service (A thru D) to unacceptable Level of Service (E or F) or peak hour delay to increase as follows:

Level of Service A/B	=	By 10.0 seconds
Level of Service C	=	By 8.0 seconds
Level of Service D	=	By 5.0 seconds
Level of Service E	=	By 2.0 seconds
Level of Service F	=	By 1.0 seconds

As shown in Table 7, the project site does not significantly impact the following study area intersections for Opening Year (2017) With Project traffic conditions.

Table 4

Other Development Trip Generation[1]

Traffic Analysis Zone	Name	Land Use	Quantity	Units[2]	Peak Hour						Daily
					Morning			Evening			
					Inbound	Outbound	Total	Inbound	Outbound	Total	
1	Agua Mansa Commerce Center Addendum[3]	High-Cube Distribution Warehouse - Cars	447.330	TSF	28	11	39	14	28	42	598
		High-Cube Distribution Warehouse - Trucks			18	8	26	10	18	28	388
	Agua Mansa Commerce Center[3]	High-Cube Distribution Warehouse - Cars	899.103	TSF	57	21	78	29	57	86	1,202
		High-Cube Distribution Warehouse - Trucks			36	13	49	18	38	56	776
2	Scannel Properties[3]	High-Cube Distribution Warehouse - Cars	320.000	TSF	20	8	28	10	20	30	428
		High-Cube Distribution Warehouse - Trucks			13	3	16	8	13	21	277
3	Crane[3]	Light Industrial	20.800	TSF	17	2	19	18	2	20	145
	Riverside Avenue Warehouse Project[3]	High-Cube Distribution Warehouse - Cars	300.773	TSF	19	7	26	10	19	29	402
		High-Cube Distribution Warehouse - Trucks			13	3	16	5	13	18	258
	PPD # 1966[3]	Concrete Batch Plant	47.000	TSF	26	26	52	24	26	50	1,122
		Office	0.800	TSF	1	1	2	1	1	2	9
4	El Rivino[3]	High-Cube Distribution Warehouse - Cars	269.000	TSF	17	6	23	9	17	26	360
		High-Cube Distribution Warehouse - Trucks			13	3	16	5	13	18	234
		Light Industrial	80.000	TSF	86	12	98	12	93	105	748
	Oakmont El Rivino[3]	High-Cube Distribution Warehouse - Cars	3,659.000	TSF	233	87	320	116	233	349	4,891
		High-Cube Distribution Warehouse - Trucks			151	58	209	76	151	227	3,164
5	Agua Mansa Logistics Center[4]	High-Cube Distribution Warehouse - Cars	808.500	TSF	51	19	70	26	51	77	1,081
		High-Cube Distribution Warehouse - Trucks			33	13	46	18	33	51	698
6	Tract Map 34908[3]	Single-Family Detached Residential	15	DU	3	8	11	9	6	15	143
7	P13-0956, P13-0959, P13-0960, P13-0964, P13-0965, P13-0966	High-Cube Distribution Warehouse - Cars	1,461.449	TSF	93	35	128	47	93	140	1,954
		High-Cube Distribution Warehouse - Trucks		TSF	58	22	80	30	58	88	1,265
Total					693	248	941	338	685	1,023	13,817

[1] Source: Institute of Transportation Engineers, Trip Generation Manual, 9th Edition, 2012, Land Use Category 152 and City of Fontana, Truck Trip Generation Study, August 2003.

[2] TSF = Thousand Square Feet; DU = Dwelling Unit

[3] Source: Agua Mansa Commerce Center Addendum Traffic Impact Analysis, Kunzman Associates, Inc., May 22, 2014.

[4] Source: Agua Mansa Logistics Center Traffic Impact Analysis, Kunzman Associates, Inc., October 9, 2013.

Table 5

Opening Year (2017) Without Project Intersection Delay and Level of Service

Intersection	Jurisdiction	Traffic Control[3]	Intersection Approach Lanes[1]												Peak Hour Delay-LOS[2]	
			Northbound			Southbound			Eastbound			Westbound				
			L	T	R	L	T	R	L	T	R	L	T	R	Morning	Evening
Main Street/Riverside Avenue (NS) at:																
Center Street (EW) - #1	Colton/Riverside															
- Without Improvements		CSS	0	2	d	1	2	0	0	0	0	0	1	0	15.8-C	16.9-C
- With Improvements		**TS**	0	2	d	1	2	0	0	0	0	0	1	0	11.7-B	10.6-B
Orange Street (NS) at:																
Center Street (EW) - #4	Riverside	AWS	0	1	0	0	1	0	0	1	0	0	1	0	8.9-A	10.5-B
Stephens Avenue (NS) at:																
Center Street (EW) - #5	Riverside County	TS	0	1	0	0	1	0	0.5	0.5	1	0.5	0.5	d	13.8-B	12.2-B
West La Cadena Drive (NS) at:																
Stephens Avenue/I-215 Freeway SB Ramps (EW) - #6	Caltrans															
- Without Improvements		AWS	0.5	0.5	1>>	0.5	0.5	d	0	1	0	0	1	0	15.2-C	23.3-C
- With Improvements		**TS**	0.5	0.5	1>>	0.5	0.5	d	0	1	0	0	1	0	16.8-B	17.7-B
East La Cadena Drive (NS) at:																
Highgrove Place/I-215 Freeway NB Ramps (EW) - #7	Caltrans	AWS	0	0.5	0.5	0.5	0.5	0	0.5	0.5	1>>	1	0	1>>	9.1-A	10.1-B
Highgrove Place (NS) at:																
Center Street (EW) - #8	Riverside County															
- Without Improvements		CSS	0.5	0.5	1	0	1	0	0.5	0.5	1>>	0	1	0	13.6-B	12.6-B
- With Improvements		**TS**	0.5	0.5	1	0	1	0	0.5	0.5	1>>	0	1	0	12.7-B	13.0-B
Iowa Avenue/I-215 Freeway NB Ramps (NS) at:																
La Cadena Drive (EW) - #9	Caltrans															
- Without Improvements		TS	1	1	0	0	0.5	0.5	0.5	0	0.5	0	0	0	99.0-F	99.9-F[4]
- With Improvements		TS	1	1	0	0	0.5	0.5	1	0	**1>**	0	0	0	23.4-C	31.7-C
Iowa Avenue (NS) at:																
Main Street (EW) - #10	Colton/Riverside County	TS	0	1	1>>	1	1	0	0	0	0	1	0	1	17.8-B	17.2-B
Center Street (EW) - #11	Riverside County	TS	1	2	d	1	2	d	1	1.5	0.5	1	1	1	18.9-B	17.8-B

[1] When a right turn lane is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicle to travel outside the through lanes. L = Left; T = Through; R = Right; d = De Facto Right Turn Lane; > = Right Turn Overlap; >> = Free Right Turn Lane; **BOLD** = Improvement

[2] Delay and level of service has been calculated using the following analysis software: Highway Capacity Software (2010). Per the Highway Capacity Manual, overall average for intersection delay and level of service are shown for intersections with traffic signal or all way stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[3] CSS = Cross Street Stop; AWS = All Way Stop; TS = Traffic Signal

[4] 99.9-F = Delay High, Intersection Unstable, Level of Service F

Table 6

Opening Year (2017) With Project Intersection Delay and Level of Service

Intersection	Jurisdiction	Traffic Control[3]	Intersection Approach Lanes[1]												Peak Hour Delay-LOS[2]	
			Northbound			Southbound			Eastbound			Westbound				
			L	T	R	L	T	R	L	T	R	L	T	R	Morning	Evening
Main Street/Riverside Avenue (NS) at:																
Center Street (EW) - #1	Colton/Riverside															
- Without Improvements		CSS	0	2	d	1	2	0	0	0	0	0	1	0	17.5-C	24.5-C
- With Improvements		**TS**	0	2	d	1	2	0	0	0	0	0	1	0	12.1-B	10.9-B
Project West Access (NS) at:																
Center Street (EW) - #2	Colton/Riverside	**CSS**	**0.5**	0	**0.5**	0	0	0	0	1	**1**	**1**	1	0	10.7-B	11.7-B
Project East Access (NS) at:																
Center Street (EW) - #3	Colton/Riverside	**CSS**	**0.5**	0	**0.5**	0	0	0	0	1	**1**	**1**	1	0	10.2-B	11.8-B
Orange Street (NS) at:																
Center Street (EW) - #4	Riverside	AWS	0	1	0	0	1	0	0	1	0	0	1	0	11.5-B	15.7-C
Stephens Avenue (NS) at:																
Center Street (EW) - #5	Riverside County	TS	0	1	0	0	1	0	0.5	0.5	1	0.5	0.5	d	16.2-B	13.2-B
West La Cadena Drive (NS) at:																
Stephens Avenue/I-215 Freeway SB Ramps (EW) - #6	Caltrans															
- Without Improvements		AWS	0.5	0.5	1>>	0.5	0.5	d	0	1	0	0	1	0	18.1-C	30.8-D
- With Improvements		**TS**	0.5	0.5	1>>	0.5	0.5	d	0	1	0	0	1	0	17.3-B	18.7-B
East La Cadena Drive (NS) at:																
Highgrove Place/I-215 Freeway NB Ramps (EW) - #7	Caltrans	AWS	0	0.5	0.5	0.5	0.5	0	0.5	0.5	1>>	1	0	1>>	10.0-A	10.6-B
Highgrove Place (NS) at:																
Center Street (EW) - #8	Riverside County															
- Without Improvements		CSS	0.5	0.5	1	0	1	0	0.5	0.5	1>>	0	1	0	19.9-C	14.6-B
- With Improvements		**TS**	0.5	0.5	1	0	1	0	0.5	0.5	1>>	0	1	0	13.0-B	13.3-B
Iowa Avenue/I-215 Freeway NB Ramps (NS) at:																
La Cadena Drive (EW) - #9	Caltrans															
- Without Improvements		TS	1	1	0	0	0.5	0.5	0.5	0	0.5	0	0	0	99.8-F	99.9-F[4]
- With Improvements		TS	1	1	0	0	0.5	0.5	1	0	**1>**	0	0	0	23.4-C	31.7-C
Iowa Avenue (NS) at:																
Main Street (EW) - #10	Colton/Riverside County	TS	0	1	1>>	1	1	0	0	0	0	1	0	1	18.9-B	21.5-C
Center Street (EW) - #11	Riverside County	TS	1	2	d	1	2	d	1	1.5	0.5	1	1	1	20.0-B	18.7-B

[1] When a right turn lane is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicle to travel outside the through lanes. L = Left; T = Through; R = Right; d = De Facto Right Turn Lane; > = Right Turn Overlap; >> = Free Right Turn Lane; **BOLD** = Improvement

[2] Delay and level of service has been calculated using the following analysis software: Highway Capacity Software (2010). Per the Highway Capacity Manual, overall average for intersection delay and level of service are shown for intersections with traffic signal or all way stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[3] CSS = Cross Street Stop; AWS = All Way Stop; TS = Traffic Signal

[4] 99.9-F = Delay High, Intersection Unstable, Level of Service F

Table 7

Opening Year (2015) With Project Traffic Contribution

Intersection	Jurisdiction	Peak Hour	Opening Year (2017) Without Project		Opening Year (2015) With Project			
			Delay	LOS[1]	Delay	LOS	Project Impact	Significant Impact[2]
Main Street/Riverside Avenue (NS) at:								
Center Street (EW) - #1	Colton/Riverside	Morning	15.8	C	17.5	C	1.7	No
		Evening	16.9	C	24.5	C	7.6	No
Orange Street (NS) at:								
Center Street (EW) - #4	Riverside	Morning	8.9	A	11.5	B	2.6	No
		Evening	10.5	B	15.7	C	5.2	No
Stephens Avenue (NS) at:								
Center Street (EW) - #5	Riverside County	Morning	13.8	B	16.2	B	2.4	No
		Evening	12.2	B	13.2	B	1.0	No
West La Cadena Drive (NS) at:								
Stephens Avenue/I-215 Freeway SB Ramps (EW) - #6	Caltrans	Morning	15.2	C	18.1	C	2.9	No
		Evening	23.3	C	30.8	D	7.5	No
East La Cadena Drive (NS) at:								
Highgrove Place/I-215 Freeway NB Ramps (EW) - #7	Caltrans	Morning	9.1	A	10.0	A	0.9	No
		Evening	10.1	B	10.6	B	0.5	No
Highgrove Place (NS) at:								
Center Street (EW) - #8	Riverside County	Morning	13.6	B	19.9	C	6.3	No
		Evening	12.6	B	14.6	B	2.0	No
Iowa Avenue/I-215 Freeway NB Ramps (NS) at:								
La Cadena Drive (EW) - #9	Caltrans	Morning	99.0	F	99.8	F	0.8	No
		Evening	155.7	F	156.2	F	0.5	No
Iowa Avenue (NS) at:								
Main Street (EW) - #10	Colton/Riverside County	Morning	17.8	B	18.9	B	1.1	No
		Evening	17.2	B	21.5	C	4.3	No
Center Street (EW) - #11	Riverside County	Morning	18.9	B	20.0	B	1.1	No
		Evening	17.8	B	18.7	B	0.9	No

[1] LOS = Level of Service

[2] A significant impact occurs at a study intersection when the addition of project generated trips adds 10.0 seconds of delay at an intersection operating at Level of Service A or B, 8.0 seconds of delay at an intersecti at Level of Service C, 5.0 seconds of delay at an intersection operating at Level of Service D, 2.0 seconds of delay at an intersection operating at Level of Service E, or 1.0 seconds of delay at an intersection operating Service F.

Figure 26
Other Development Traffic Analysis Zone Map

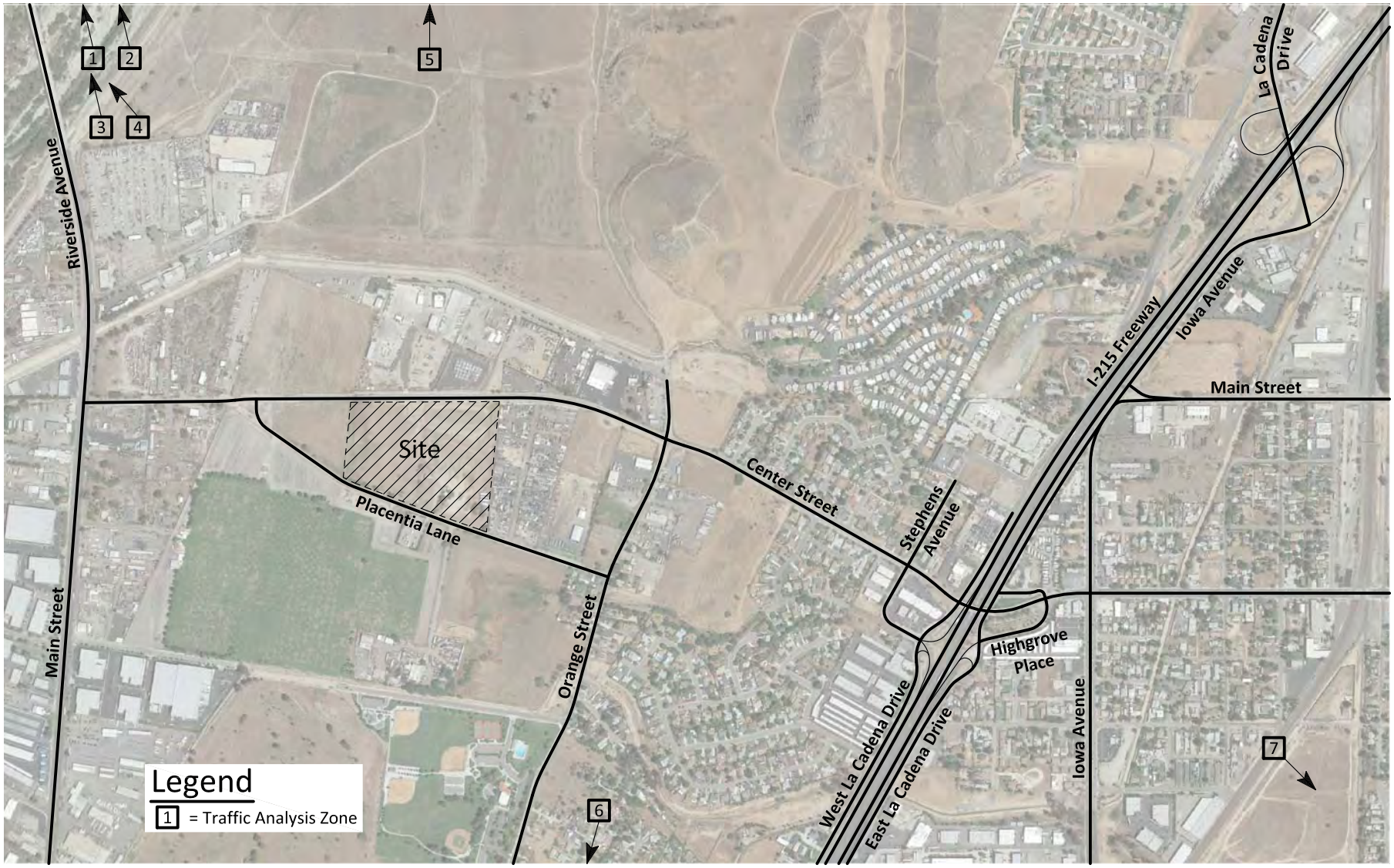

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Figure 27
Other Development Traffic Analysis Zone 1 Trip Distribution - Cars

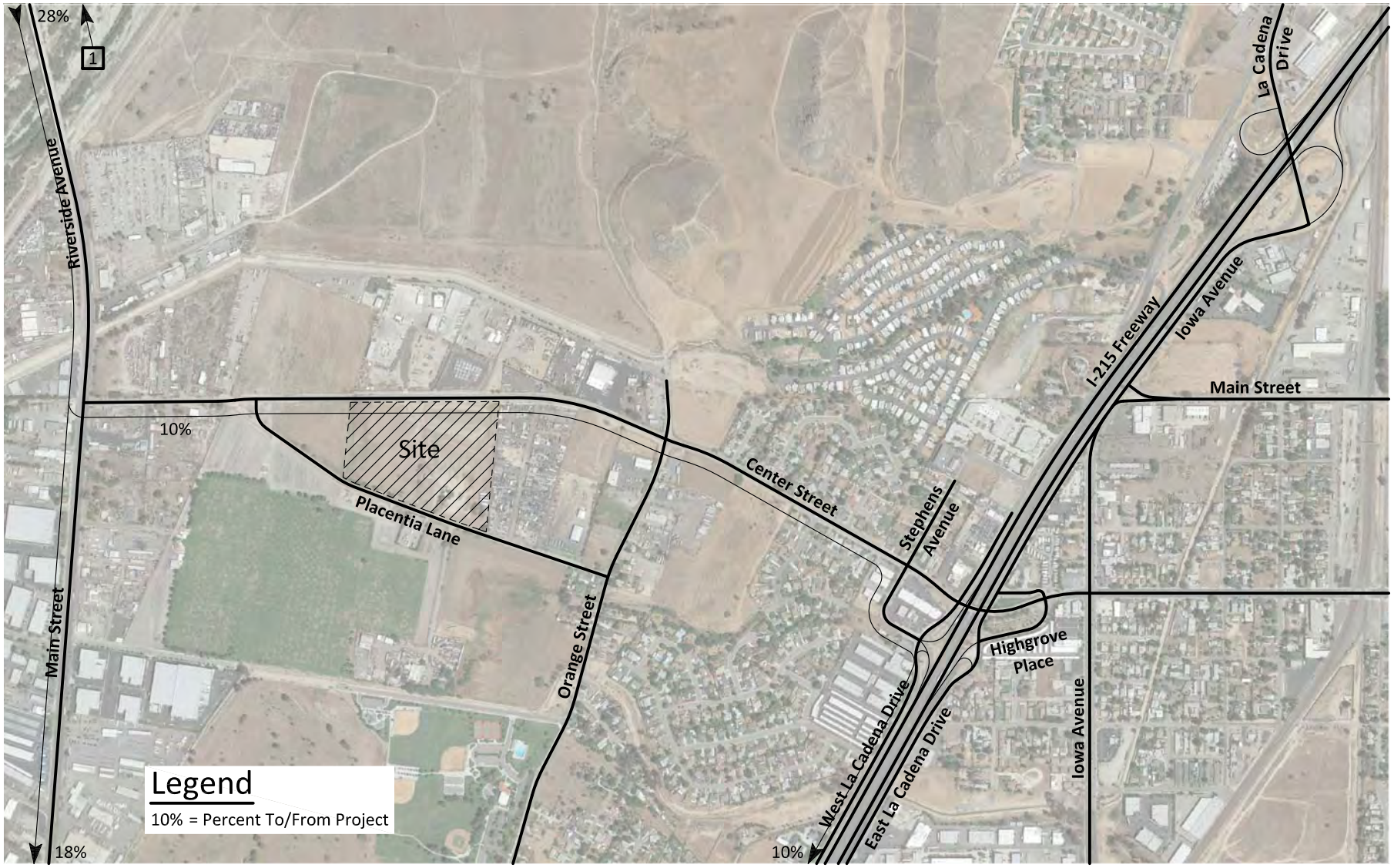

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Figure 28
Other Development Traffic Analysis Zone 1 Trip Distribution - Trucks

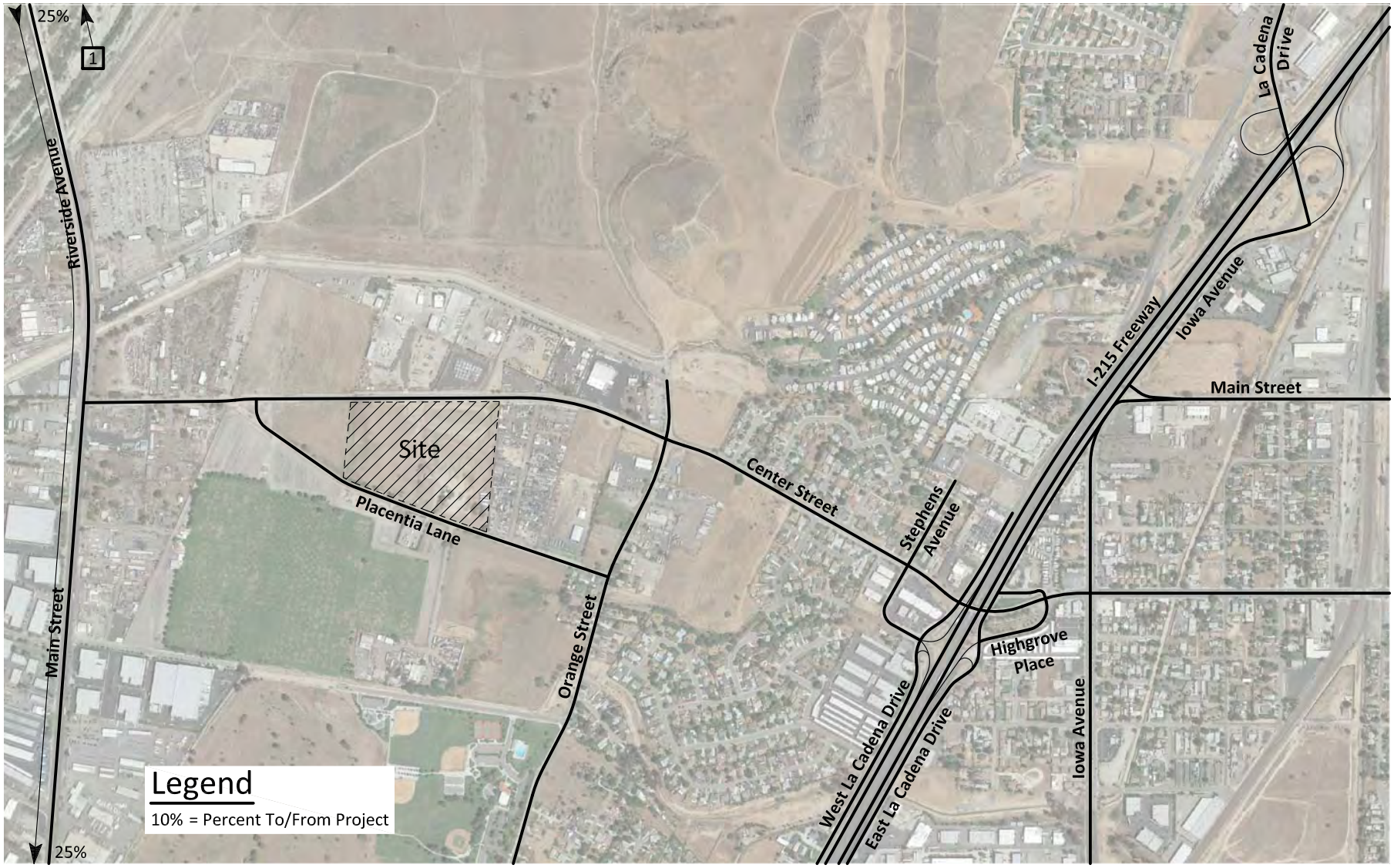

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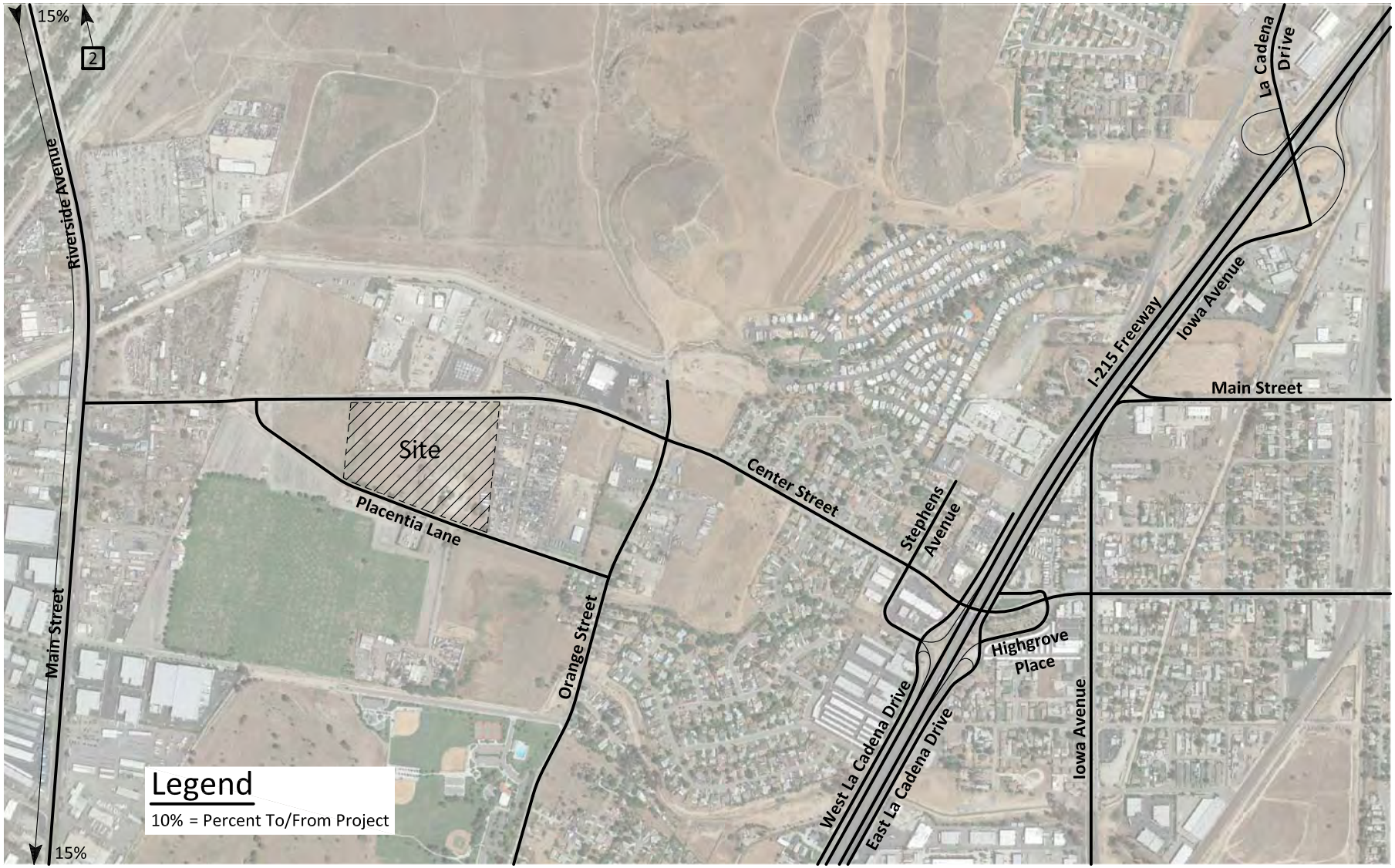
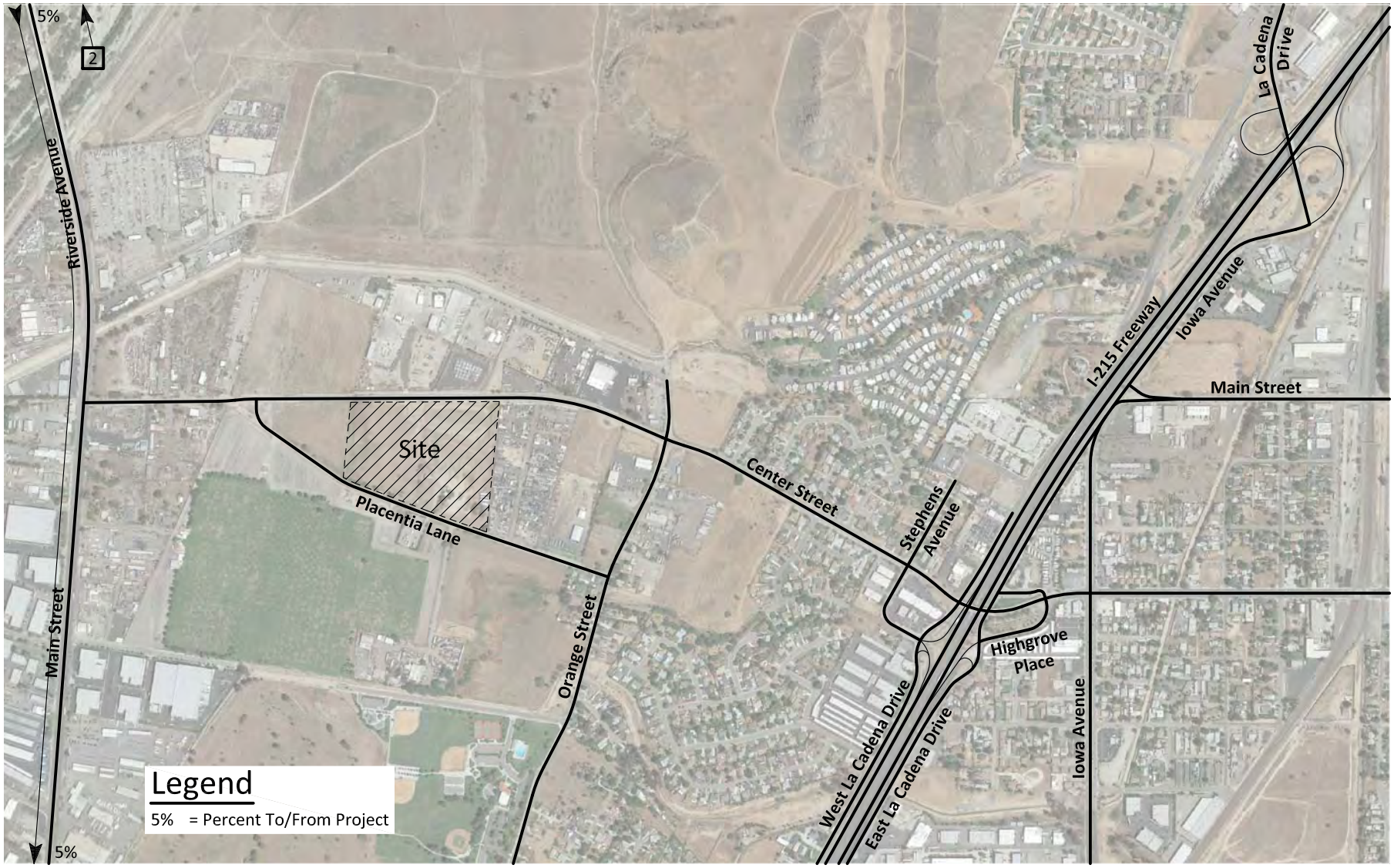
Figure 29
Other Development Traffic Analysis Zone 2 Trip Distribution - Cars



KUNZMAN ASSOCIATES, INC.
OVER 40 YEARS OF EXCELLENT SERVICE

JN 6055a

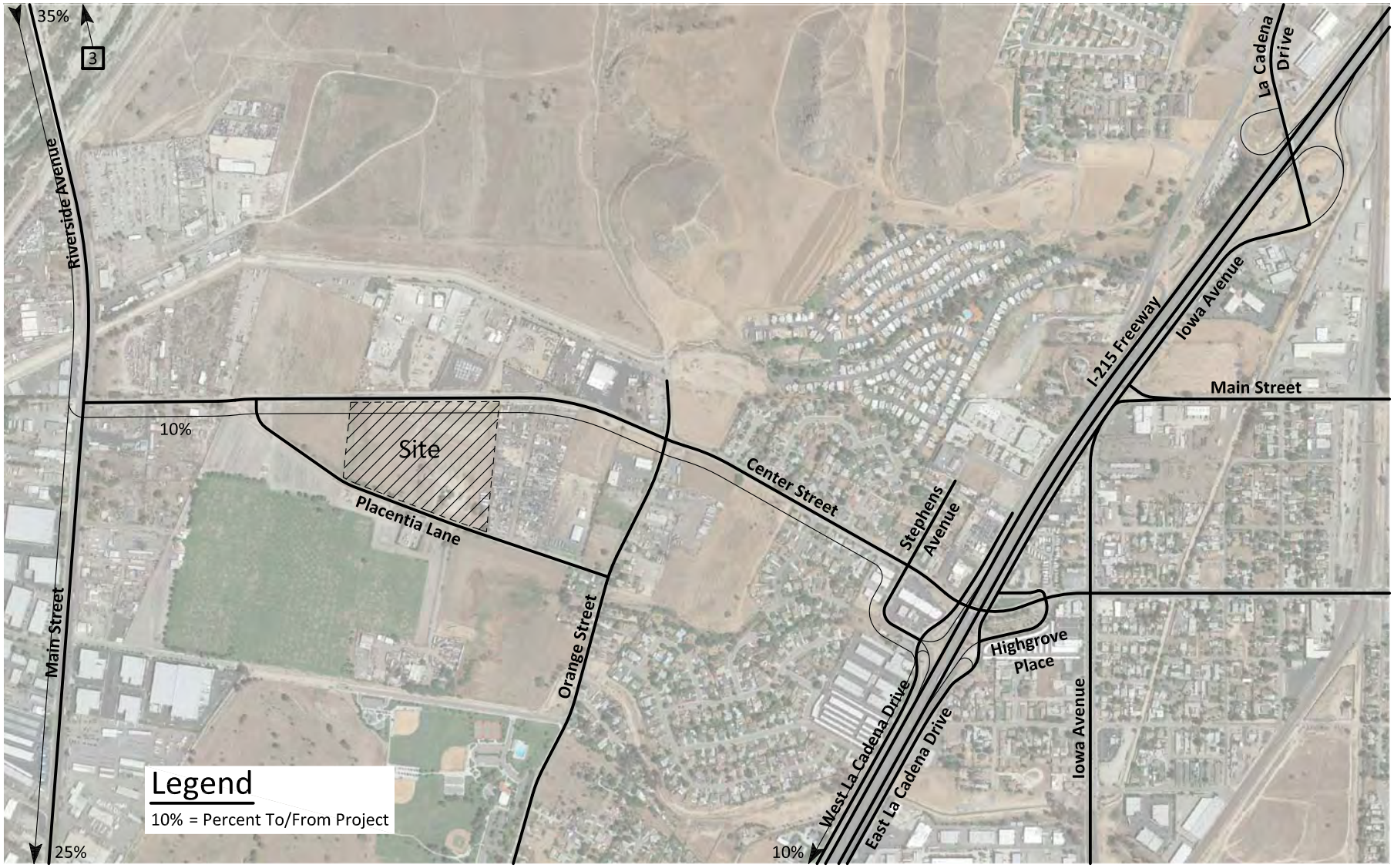
Figure 30
Other Development Traffic Analysis Zone 2 Trip Distribution - Trucks



KUNZMAN ASSOCIATES, INC.
OVER 40 YEARS OF EXCELLENT SERVICE

JN 6055a

Figure 31
Other Development Traffic Analysis Zone 3 Trip Distribution

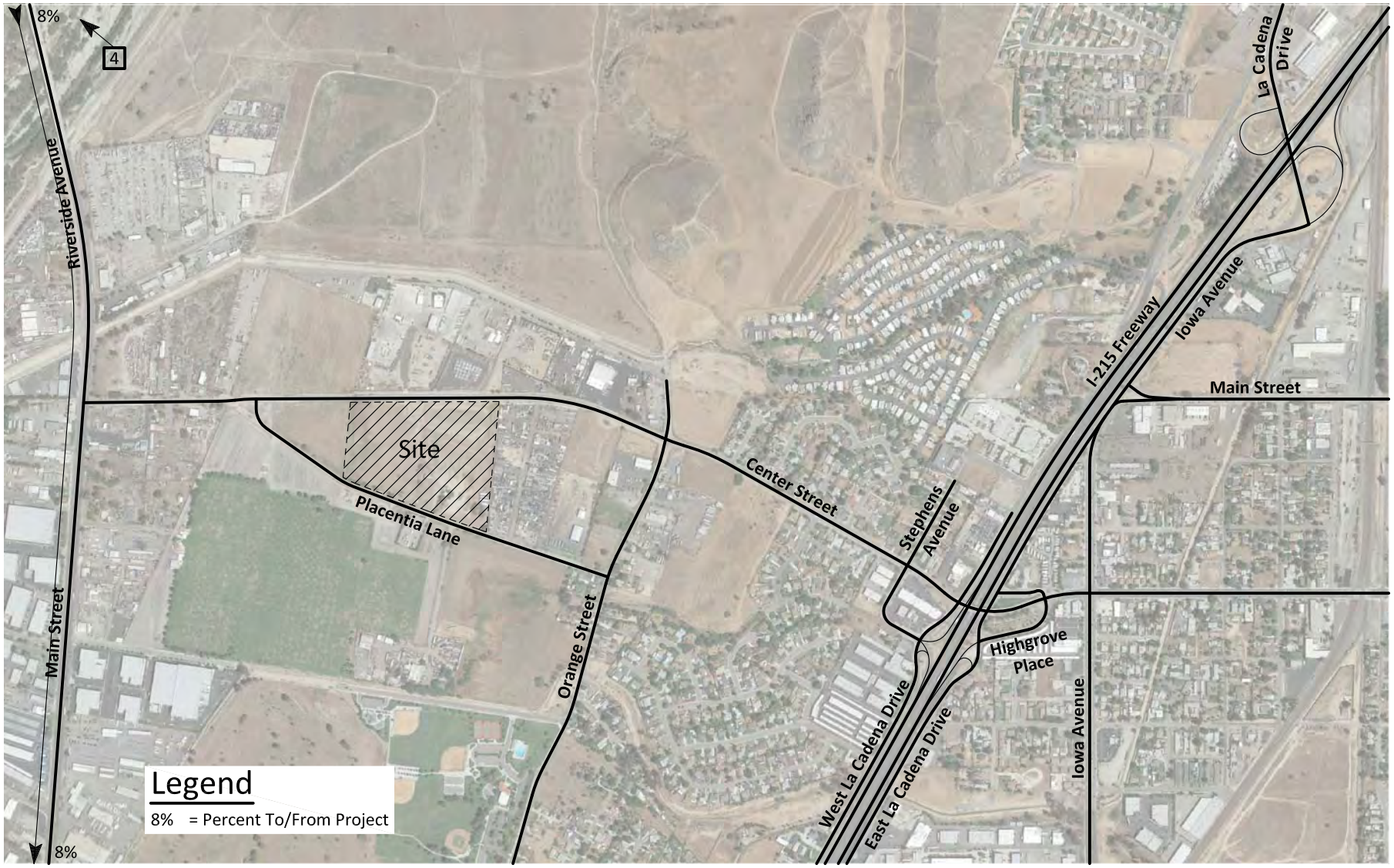


KUNZMAN ASSOCIATES, INC.

OVER 40 YEARS OF EXCELLENT SERVICE

JN 6055a

Figure 32
Other Development Traffic Analysis Zone 4 Trip Distribution - Cars

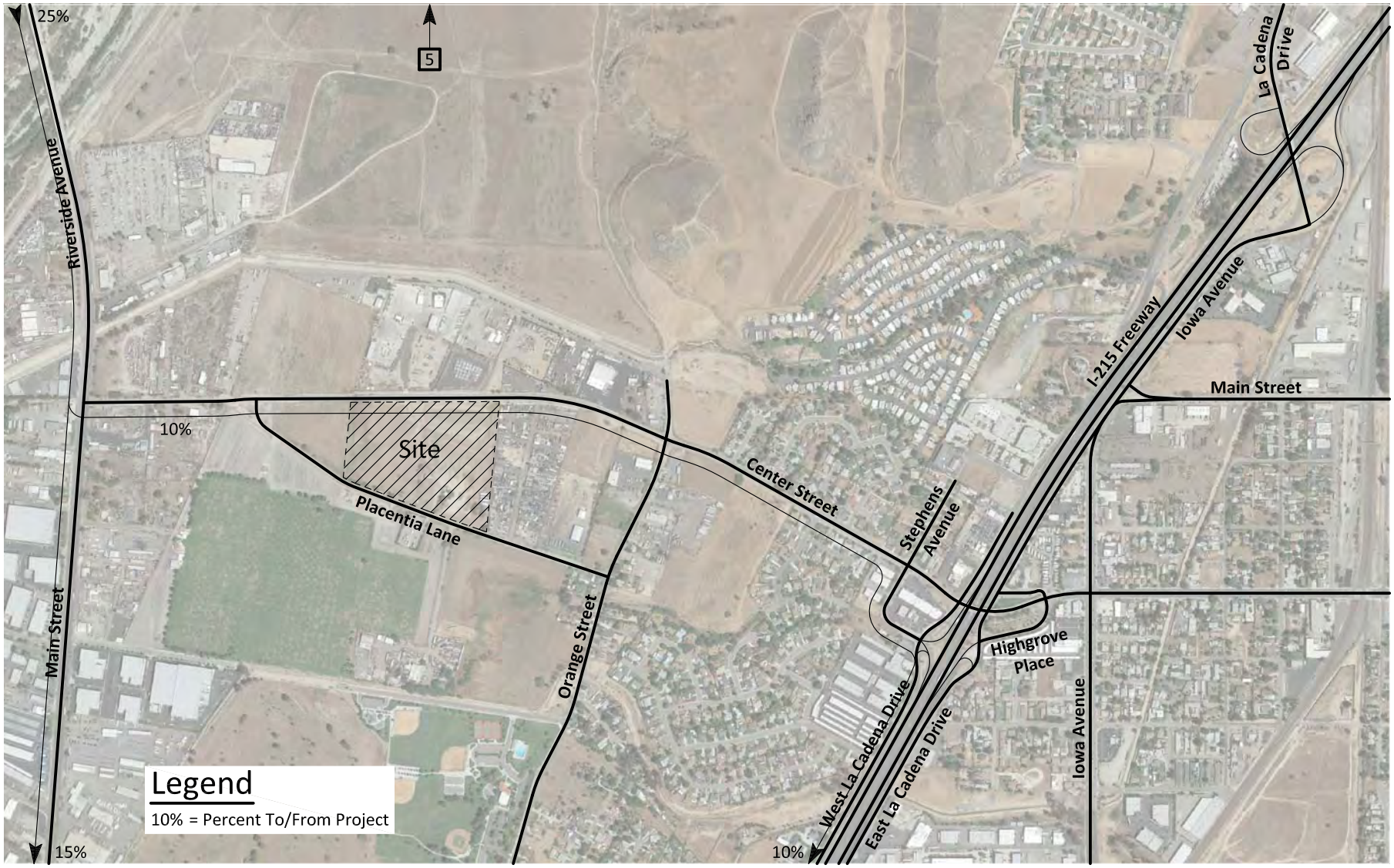


KUNZMAN ASSOCIATES, INC.

OVER 40 YEARS OF EXCELLENT SERVICE

JN 6055a

Figure 33
Other Development Traffic Analysis Zone 5 Trip Distribution - Cars



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OVER 40 YEARS OF EXCELLENT SERVICE

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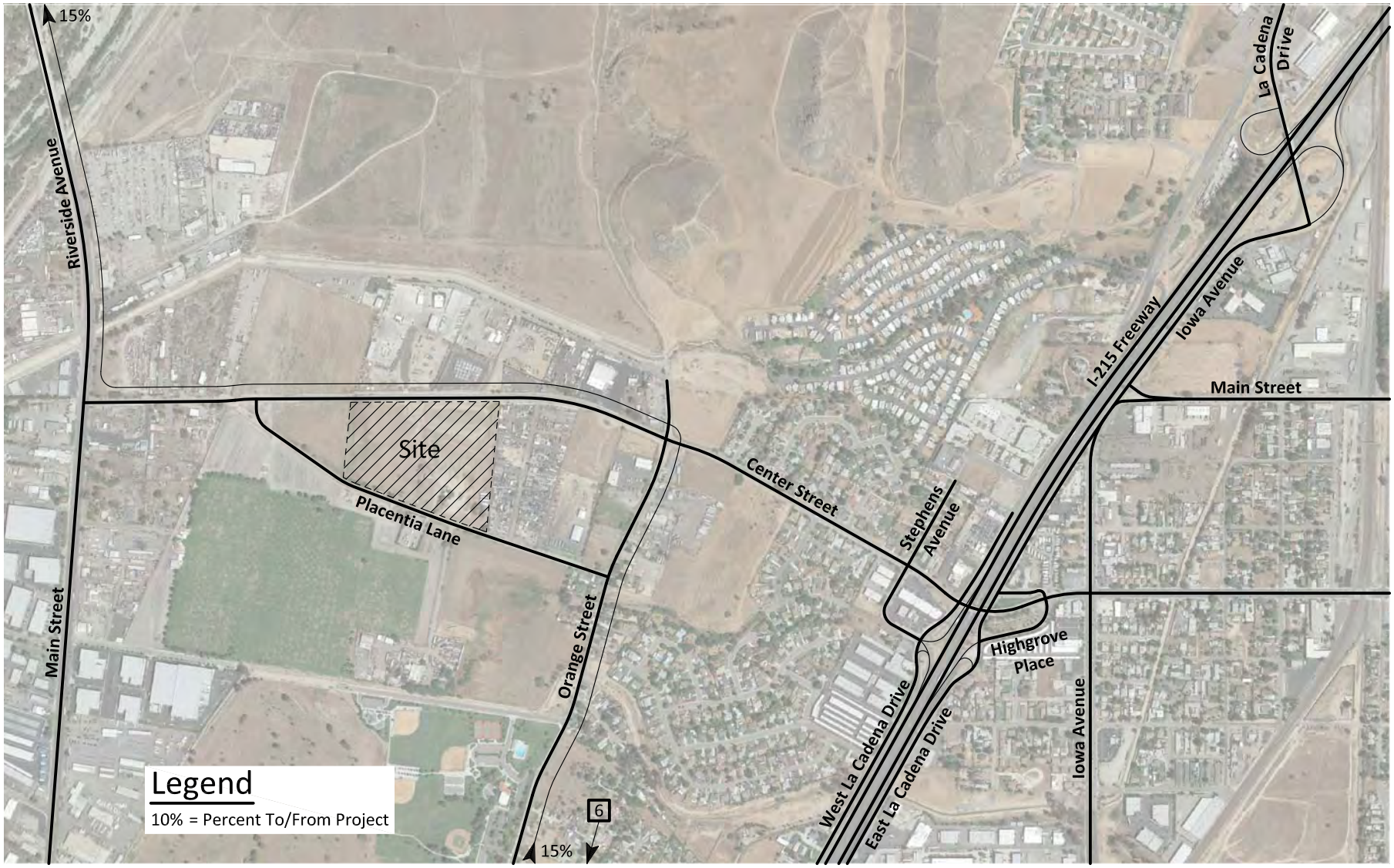
Figure 34
Other Development Traffic Analysis Zone 6 Trip Distribution

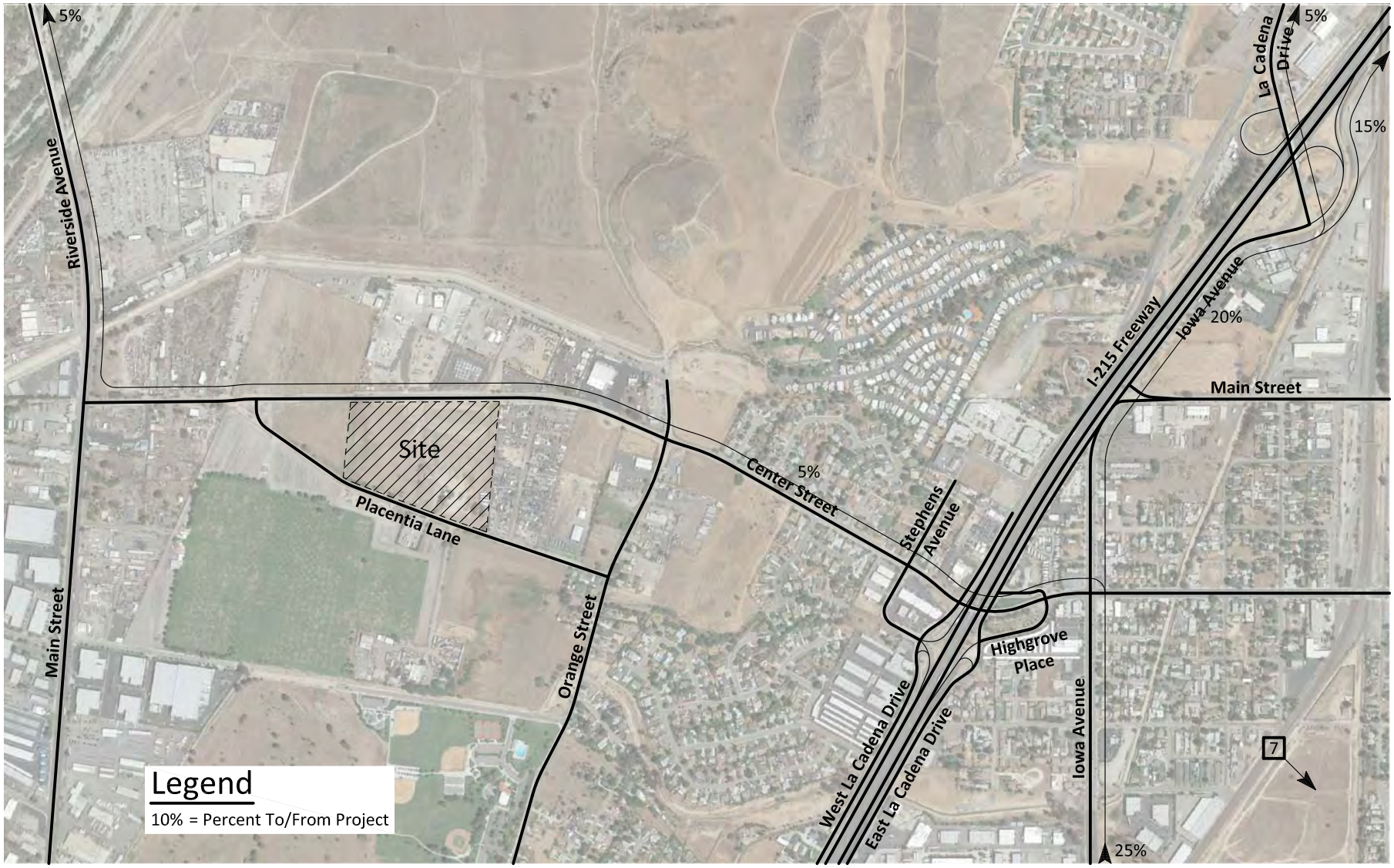


KUNZMAN ASSOCIATES, INC.

OVER 40 YEARS OF EXCELLENT SERVICE

JN 6055a

Figure 35
Other Development Traffic Analysis Zone 7 Trip Distribution - Cars



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OVER 40 YEARS OF EXCELLENT SERVICE

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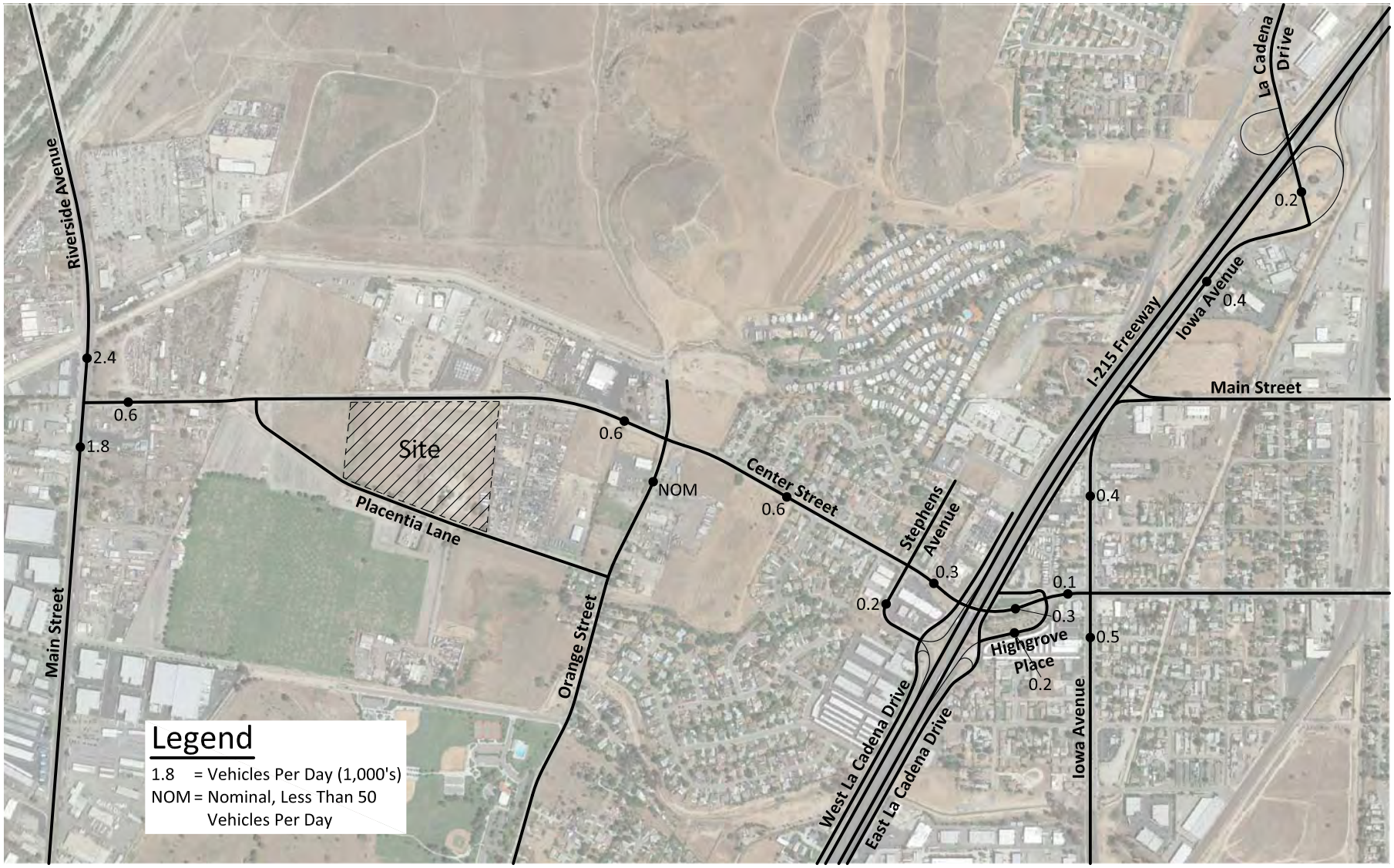
Figure 36
Other Development Average Daily Traffic Volumes

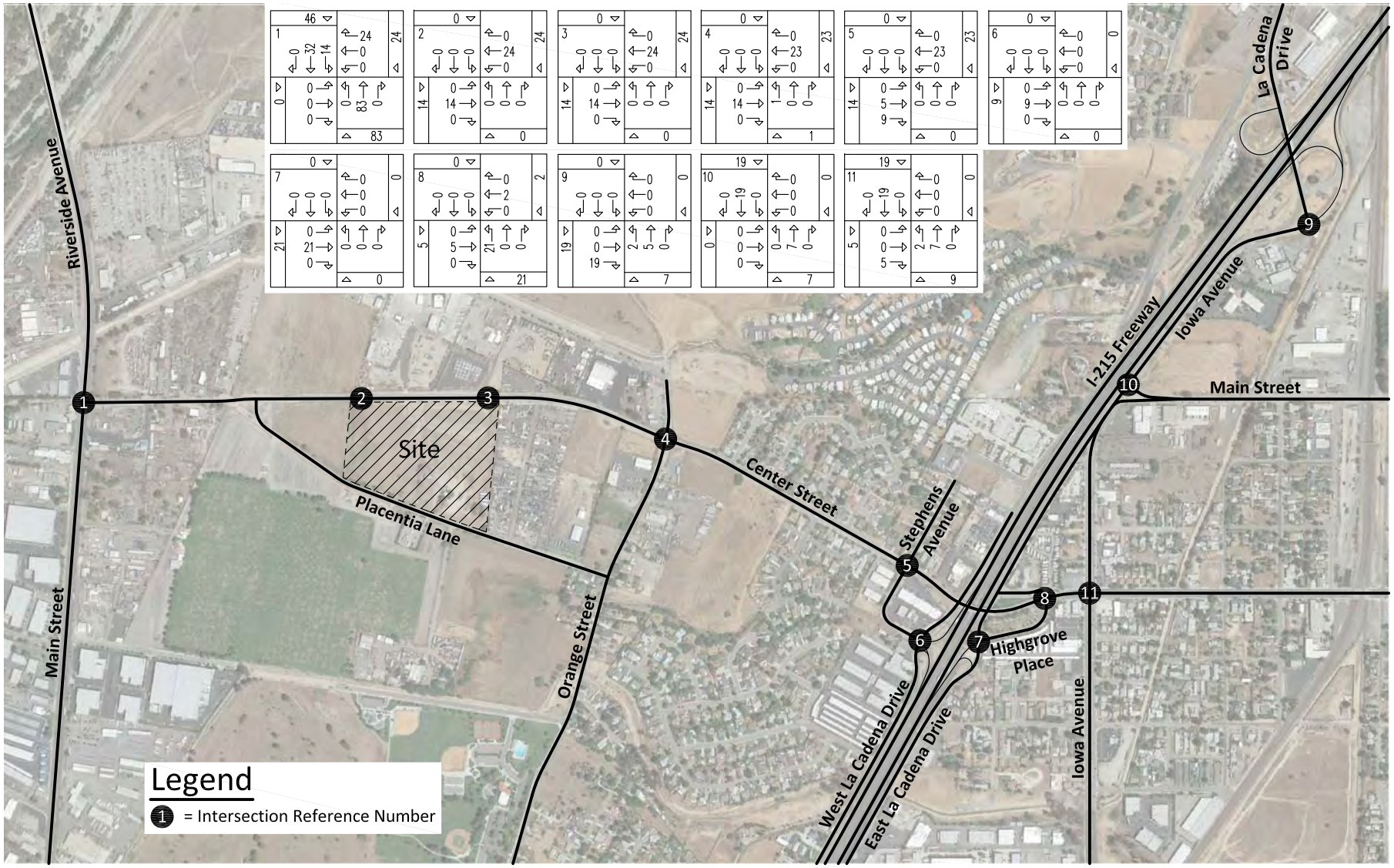


KUNZMAN ASSOCIATES, INC.

OVER 40 YEARS OF EXCELLENT SERVICE

JN 6055a

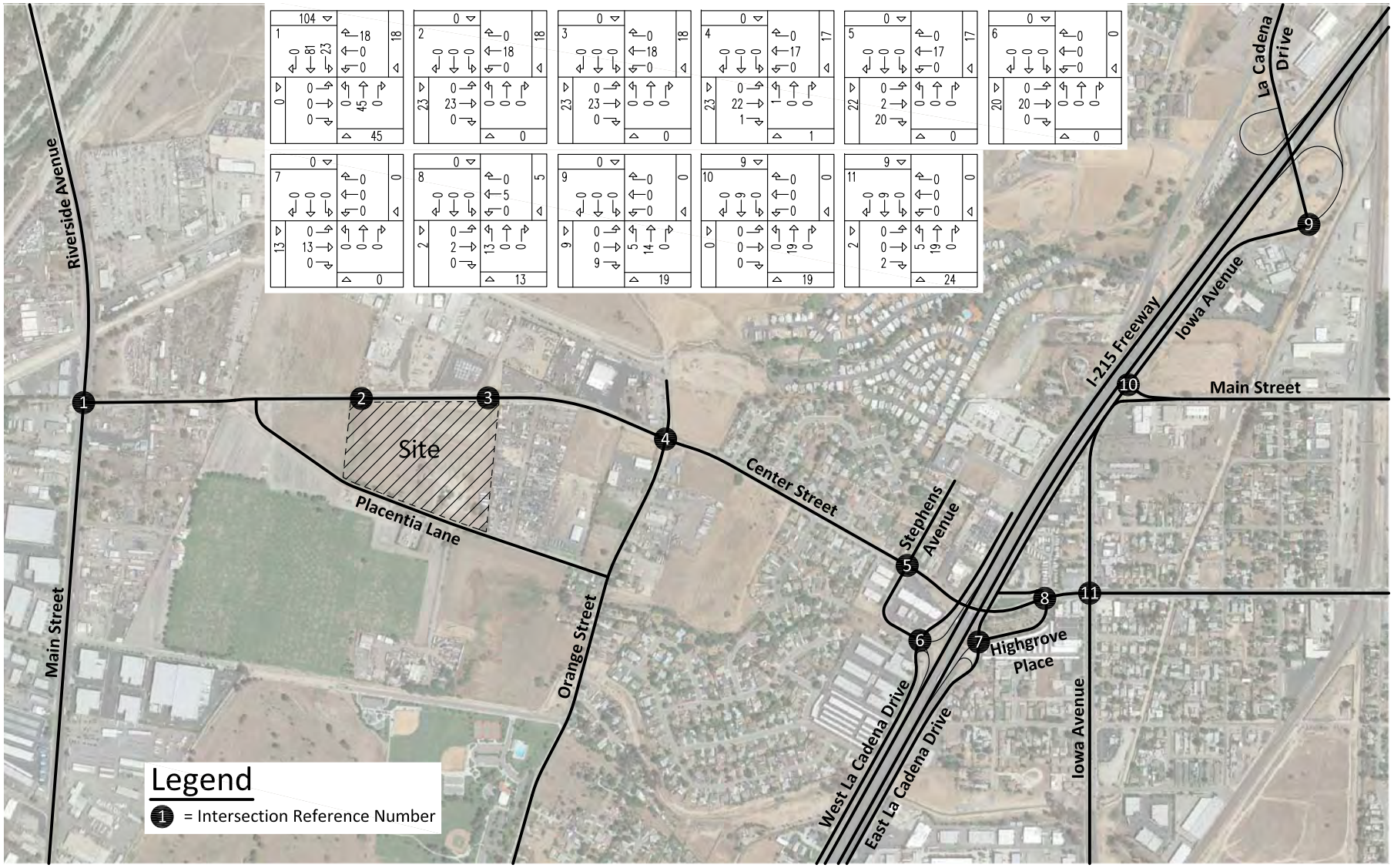
Figure 37
Other Development
Morning Peak Hour Intersection Turning Movement Volumes



KUNZMAN ASSOCIATES, INC. Intersection reference numbers are in upper left corner of turning movement boxes. JN 6055a

OVER 40 YEARS OF EXCELLENT SERVICE

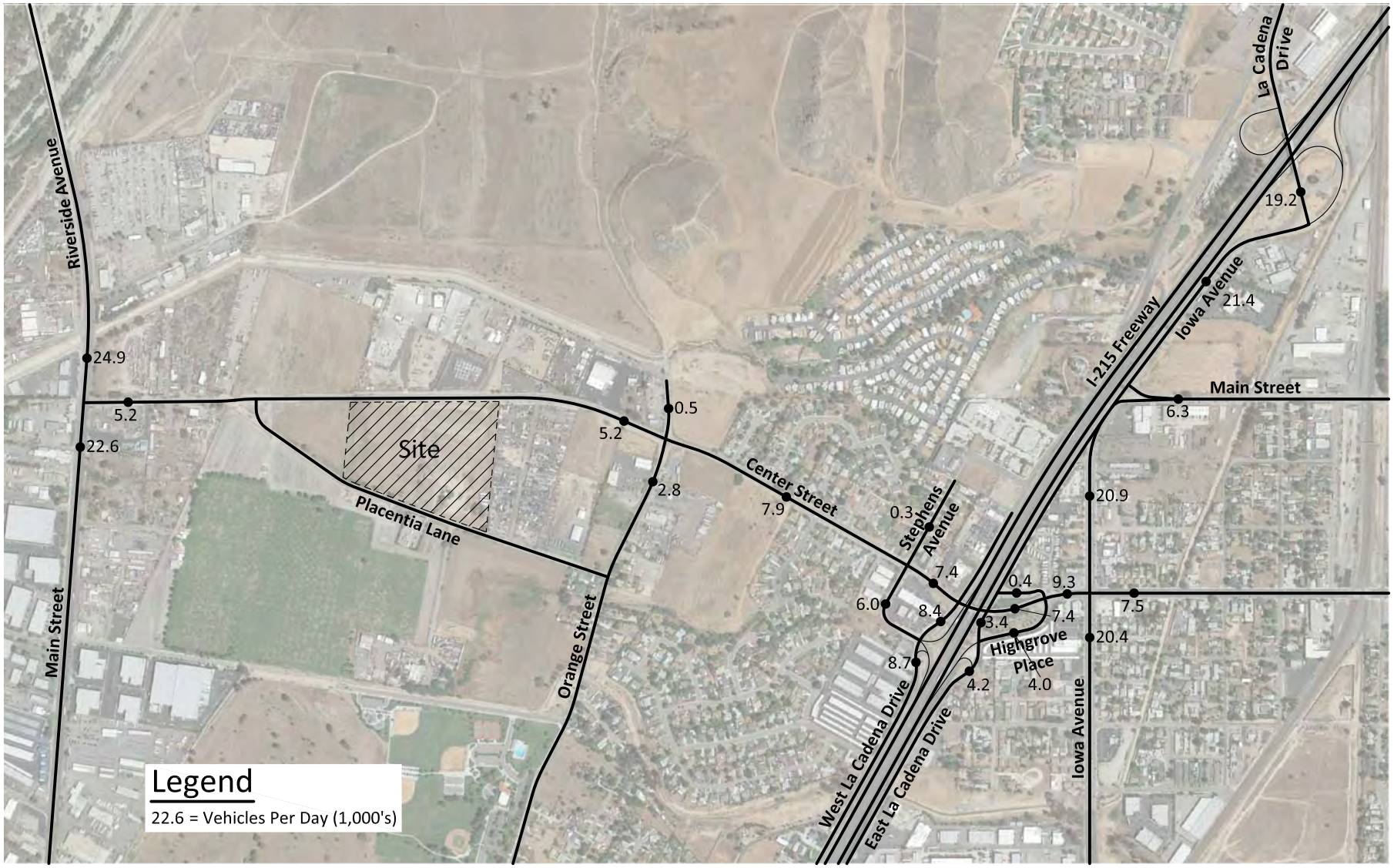
Figure 38
Other Development
Evening Peak Hour Intersection Turning Movement Volumes



KUNZMAN ASSOCIATES, INC. Intersection reference numbers are in upper left corner of turning movement boxes. JN 6055a

OVER 40 YEARS OF EXCELLENT SERVICE

Figure 39
Opening Year (2017) Without Project Average Daily Traffic Volumes

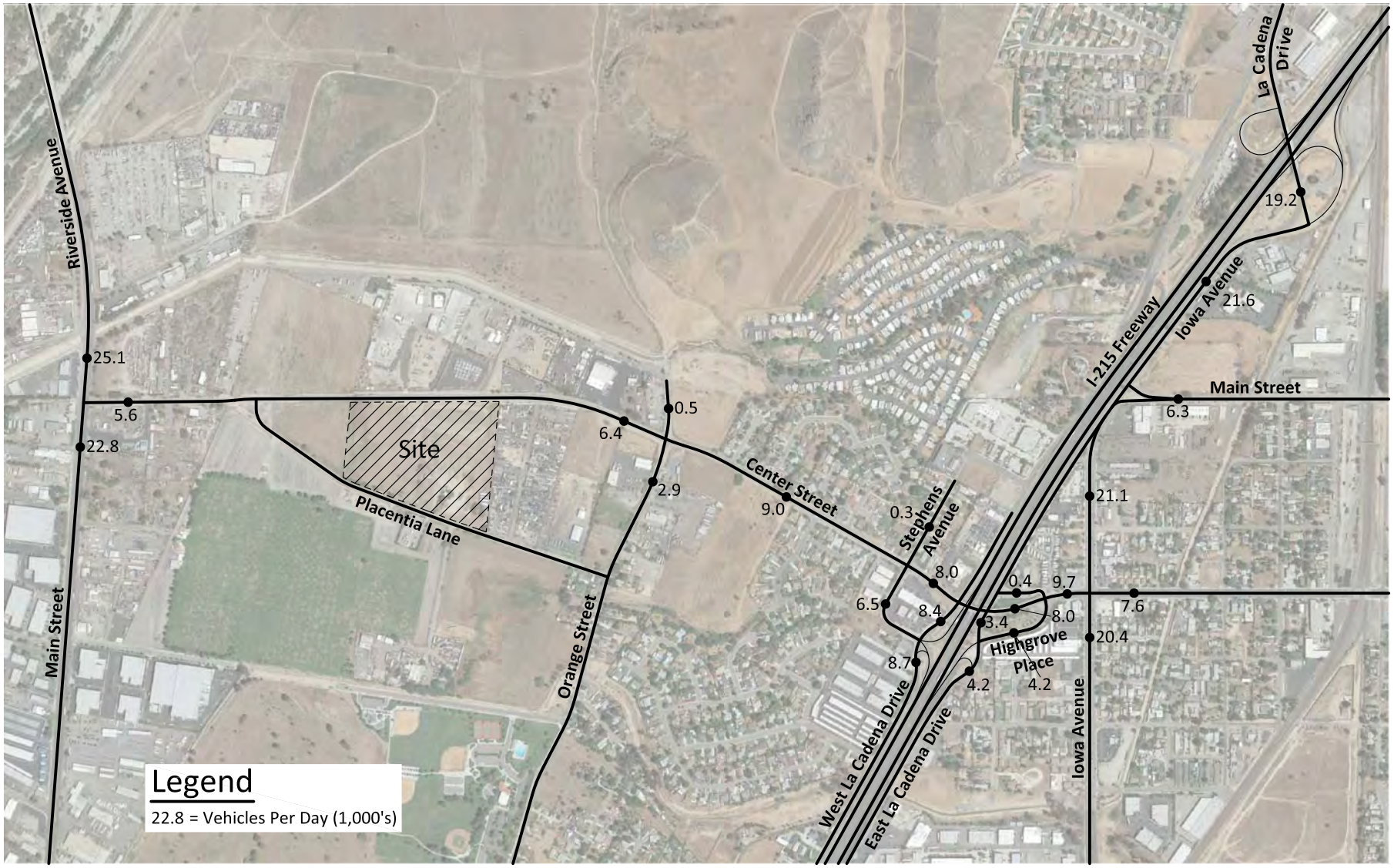


KUNZMAN ASSOCIATES, INC.

OVER 40 YEARS OF EXCELLENT SERVICE

JN 6055a

Figure 40
Opening Year (2017) With Project Average Daily Traffic Volumes

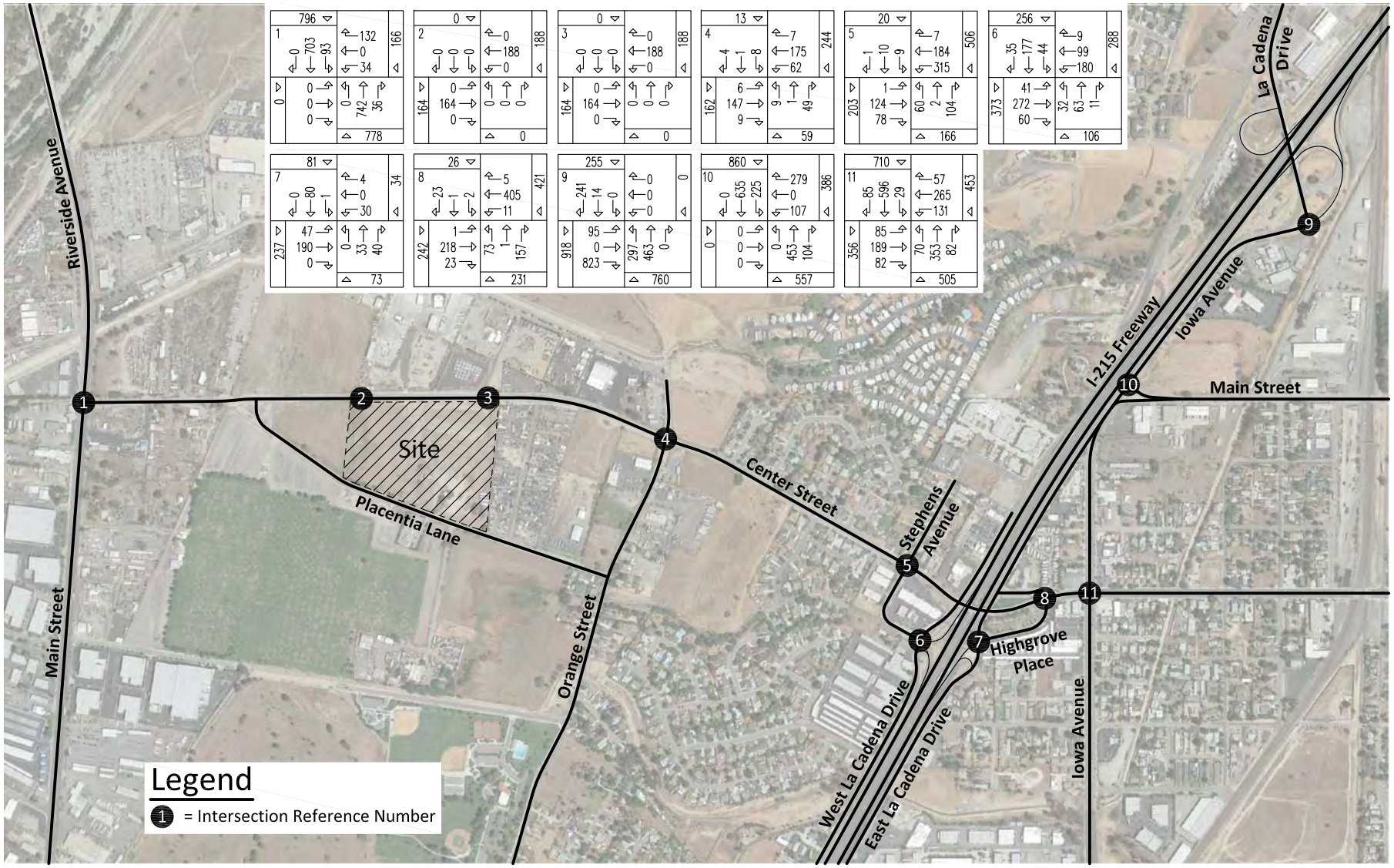


KUNZMAN ASSOCIATES, INC.

OVER 40 YEARS OF EXCELLENT SERVICE

JN 6055a

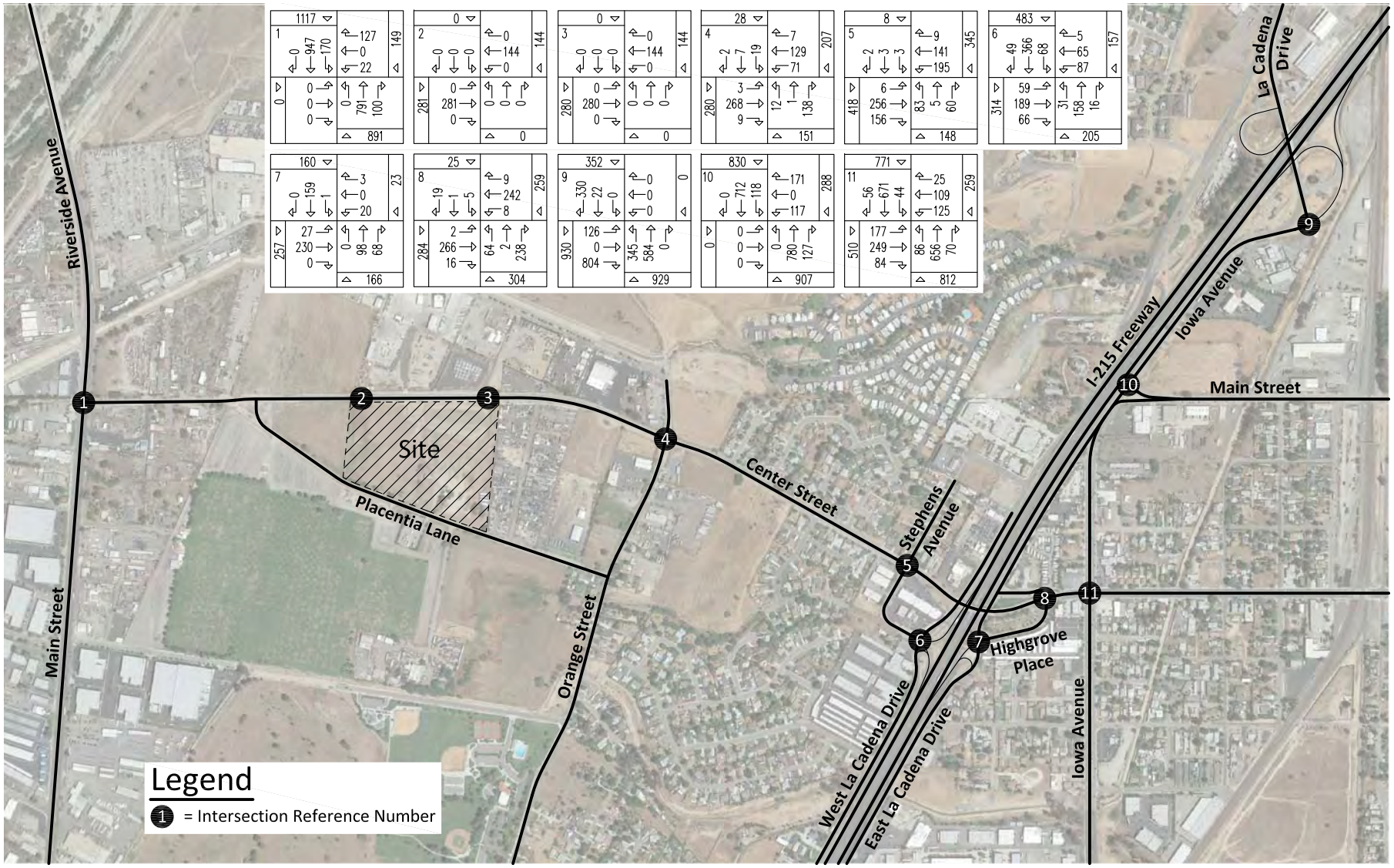
Figure 41
Opening Year (2017) Without Project
Morning Peak Hour Intersection Turning Movement Volumes



KUNZMAN ASSOCIATES, INC. Intersection reference numbers are in upper left corner of turning movement boxes. JN 6055a

OVER 40 YEARS OF EXCELLENT SERVICE

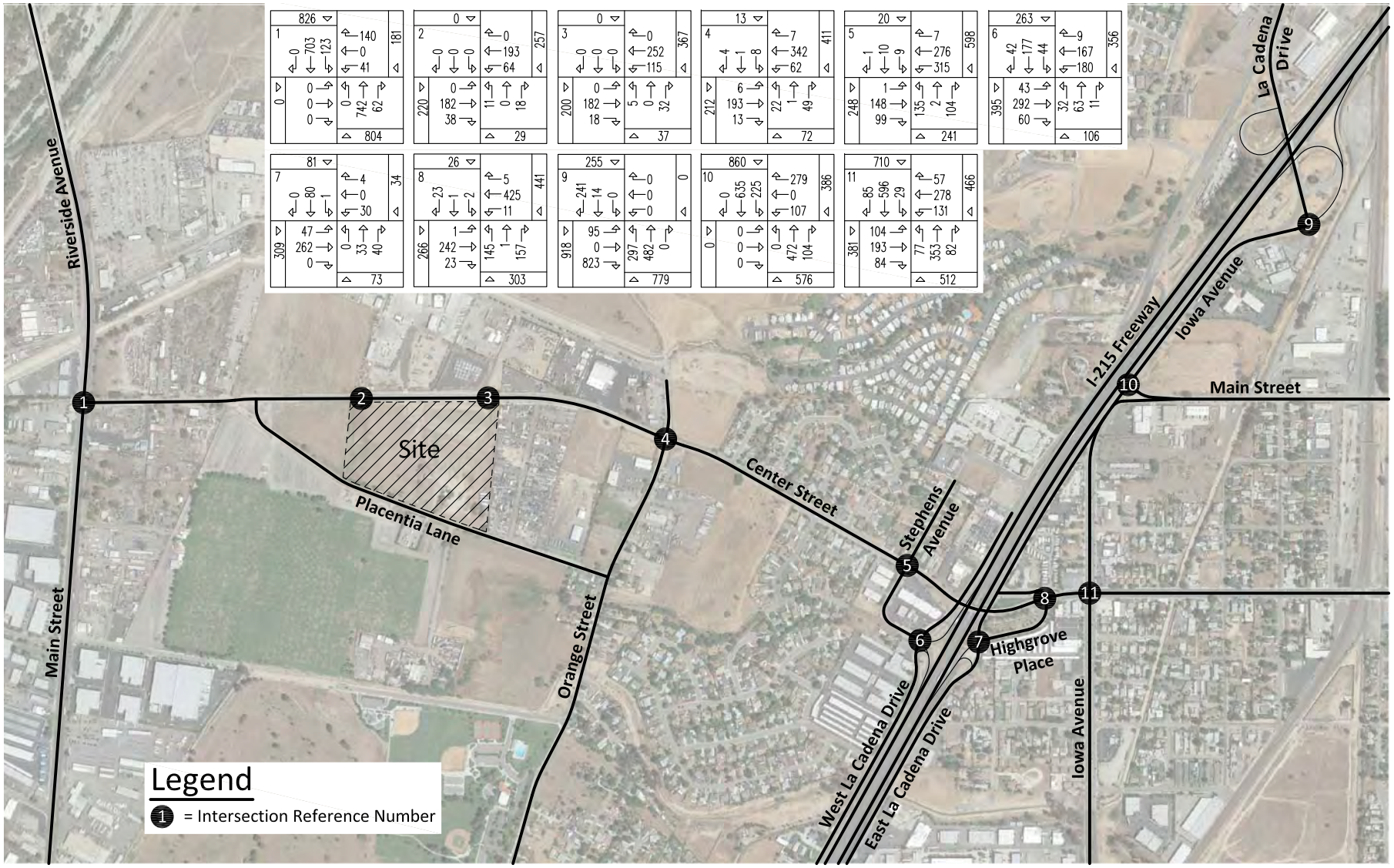
Figure 42
Opening Year (2017) Without Project
Evening Peak Hour Intersection Turning Movement Volumes



KUNZMAN ASSOCIATES, INC. Intersection reference numbers are in upper left corner of turning movement boxes. JN 6055a

OVER 40 YEARS OF EXCELLENT SERVICE

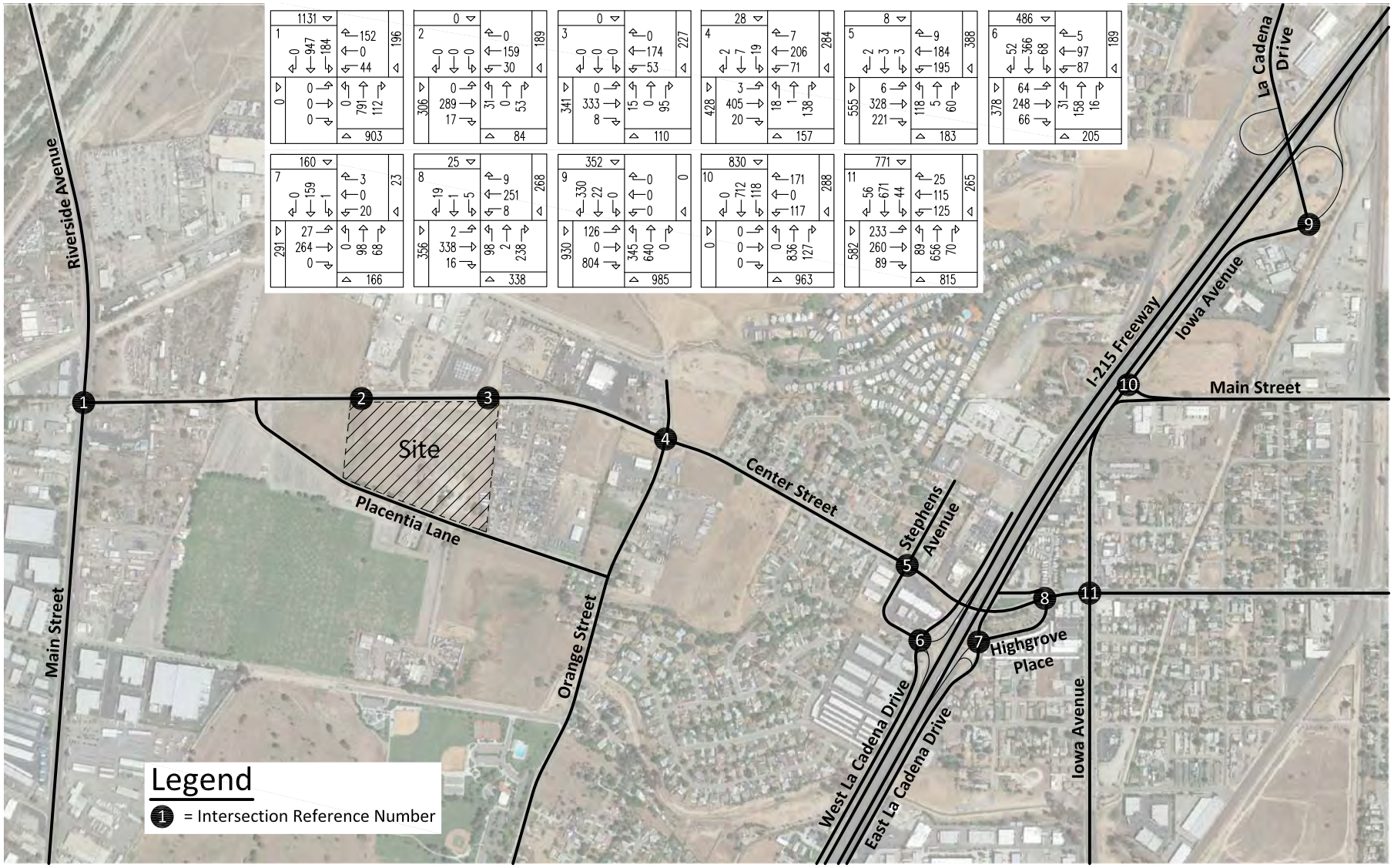
Figure 43
Opening Year (2017) With Project
Morning Peak Hour Intersection Turning Movement Volumes



KUNZMAN ASSOCIATES, INC. Intersection reference numbers are in upper left corner of turning movement boxes. JN 6055a

OVER 40 YEARS OF EXCELLENT SERVICE

Figure 44
Opening Year (2017) With Project
Evening Peak Hour Intersection Turning Movement Volumes



KUNZMAN ASSOCIATES, INC. Intersection reference numbers are in upper left corner of turning movement boxes. JN 6055a

OVER 40 YEARS OF EXCELLENT SERVICE

VIII. RECOMMENDATIONS

A. Site Access

The proposed project will have access to Center Street.

B. Roadway Improvements

1. On- Site

Site-specific circulation and access recommendations are depicted on Figure 45.

Construct Center Street from the west project boundary to the east project boundary at its ultimate half-section width including landscaping and parkway improvements in conjunction with development, as necessary.

Construct Placentia Lane from the west project boundary to the east project boundary at its ultimate half-section width including landscaping and parkway improvements in conjunction with development, as necessary.

Sufficient on-site parking should be provided to meet City of Riverside parking code requirements.

Sight distance at the project accesses shall comply with standard California Department of Transportation and City of Riverside sight distance standards. The final grading, landscaping, and street improvement plans shall demonstrate that sight distance standards are met. Such plans must be reviewed by the City and approved as consistent with this measure prior to issue of grading permits.

On-site traffic signing and striping should be implemented in conjunction with detailed construction plans for the project.

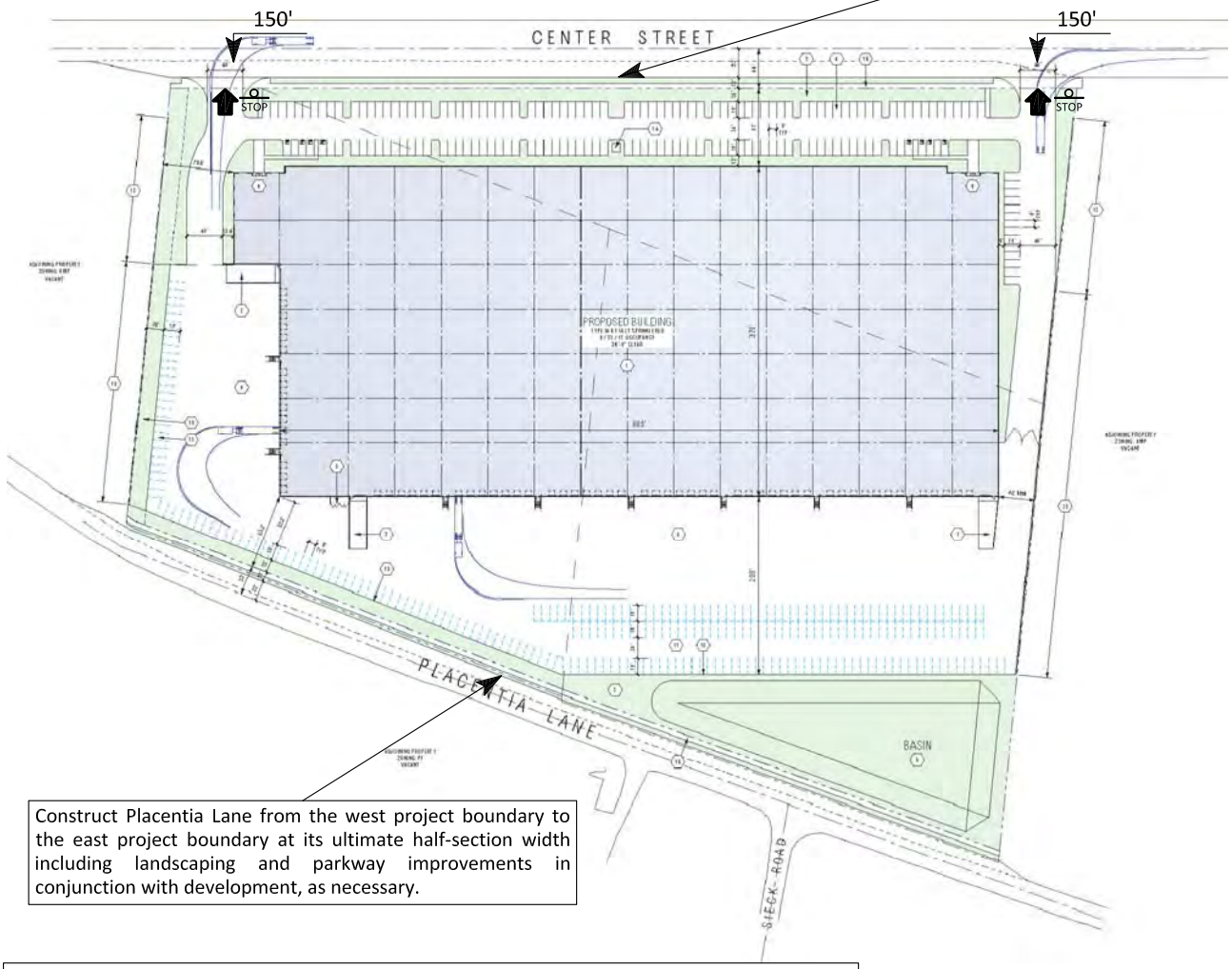
2. Off-Site

As is the case for any roadway design, the City of Riverside should periodically review traffic operations in the vicinity of the project once the project is constructed to assure that the traffic operations are satisfactory.

Participate in the phased construction of off-site traffic signals through payment of traffic signal mitigation fees. The traffic signals within the study area at buildout should specifically include an interconnect of the traffic signals to function in a coordinated system.

Figure 45
Circulation Recommendations

Construct Center Street from the west project boundary to the east project boundary at its ultimate half-section width including landscaping and parkway improvements in conjunction with development, as necessary.



Construct Placentia Lane from the west project boundary to the east project boundary at its ultimate half-section width including landscaping and parkway improvements in conjunction with development, as necessary.

Sufficient on-site parking should be provided to meet City of Riverside parking code requirements.

On-site traffic signing and striping should be implemented in conjunction with detailed construction plans for the project.

Sight distance at project accesses shall comply with standard California Department of Transportation and City of Riverside sight distance standards. The final grading, landscaping, and street improvement plans shall demonstrate that sight distance standards are met. Such plans must be reviewed by the City and approved as consistent with this measure prior to issue of grading permits.

As is the case for any roadway design, the City of Riverside should periodically review traffic operations in the vicinity of the project once the project is constructed to assure that the traffic operations are satisfactory.

Participate in the phased construction of off-site traffic signals though payment of traffic signal mitigation fees. the traffic signals within the study area at buildout should specifically include an interconnect of the traffic signals to function in a coordinated system.

Legend

STOP = Stop Sign
= Full Access Driveway
150' = Left Turn Pocket Length

APPENDICES

Appendix A – Glossary of Transportation Terms

Appendix B – City of Riverside Scoping Agreement

Appendix C – Traffic Count Worksheets

Appendix D – Explanation and Calculation of Intersection Delay

Appendix E – Traffic Signal Warrant Worksheets

APPENDIX A

Glossary of Transportation Terms

GLOSSARY OF TRANSPORTATION TERMS

COMMON ABBREVIATIONS

AC:	Acres
ADT:	Average Daily Traffic
Caltrans:	California Department of Transportation
DU:	Dwelling Unit
ICU:	Intersection Capacity Utilization
LOS:	Level of Service
TSF:	Thousand Square Feet
V/C:	Volume/Capacity
VMT:	Vehicle Miles Traveled

TERMS

AVERAGE DAILY TRAFFIC: The total volume during a year divided by the number of days in a year. Usually only weekdays are included.

BANDWIDTH: The number of seconds of green time available for through traffic in a signal progression.

BOTTLENECK: A constriction along a travelway that limits the amount of traffic that can proceed downstream from its location.

CAPACITY: The maximum number of vehicles that can be reasonably expected to pass over a given section of a lane or a roadway in a given time period.

CHANNELIZATION: The separation or regulation of conflicting traffic movements into definite paths of travel by the use of pavement markings, raised islands, or other suitable means to facilitate the safe and orderly movements of both vehicles and pedestrians.

CLEARANCE INTERVAL: Nearly same as yellow time. If there is an all red interval after the end of a yellow, then that is also added into the clearance interval.

CORDON: An imaginary line around an area across which vehicles, persons, or other items are counted (in and out).

CYCLE LENGTH: The time period in seconds required for one complete signal cycle.

CUL-DE-SAC STREET: A local street open at one end only, and with special provisions for turning around.

DAILY CAPACITY: The daily volume of traffic that will result in a volume during the peak hour equal to the capacity of the roadway.

DELAY: The time consumed while traffic is impeded in its movement by some element over which it has no control, usually expressed in seconds per vehicle.

DEMAND RESPONSIVE SIGNAL: Same as traffic-actuated signal.

DENSITY: The number of vehicles occupying in a unit length of the through traffic lanes of a roadway at any given instant. Usually expressed in vehicles per mile.

DETECTOR: A device that responds to a physical stimulus and transmits a resulting impulse to the signal controller.

DESIGN SPEED: A speed selected for purposes of design. Features of a highway, such as curvature, superelevation, and sight distance (upon which the safe operation of vehicles is dependent) are correlated to design speed.

DIRECTIONAL SPLIT: The percent of traffic in the peak direction at any point in time.

DIVERSION: The rerouting of peak hour traffic to avoid congestion.

FORCED FLOW: Opposite of free flow.

FREE FLOW: Volumes are well below capacity. Vehicles can maneuver freely and travel is unimpeded by other traffic.

GAP: Time or distance between successive vehicles in a traffic stream, rear bumper to front bumper.

HEADWAY: Time or distance spacing between successive vehicles in a traffic stream, front bumper to front bumper.

INTERCONNECTED SIGNAL SYSTEM: A number of intersections that are connected to achieve signal progression.

LEVEL OF SERVICE: A qualitative measure of a number of factors, which include speed and travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience, and operating costs.

LOOP DETECTOR: A vehicle detector consisting of a loop of wire embedded in the roadway, energized by alternating current and producing an output circuit closure when passed over by a vehicle.

MINIMUM ACCEPTABLE GAP: Smallest time headway between successive vehicles in a traffic stream into which another vehicle is willing and able to cross or merge.

MULTI-MODAL: More than one mode; such as automobile, bus transit, rail rapid transit, and bicycle transportation modes.

OFFSET: The time interval in seconds between the beginning of green at one intersection and the beginning of green at an adjacent intersection.

PLATOON: A closely grouped component of traffic that is composed of several vehicles moving, or standing ready to move, with clear spaces ahead and behind.

ORIGIN-DESTINATION SURVEY: A survey to determine the point of origin and the point of destination for a given vehicle trip.

PASSENGER CAR EQUIVALENTS (PCE): One car is one Passenger Car Equivalent. A truck is equal to 2 or 3 Passenger Car Equivalents in that a truck requires longer to start, goes slower, and accelerates slower. Loaded trucks have a higher Passenger Car Equivalent than empty trucks.

PEAK HOUR: The 60 consecutive minutes with the highest number of vehicles.

PRETIMED SIGNAL: A type of traffic signal that directs traffic to stop and go on a predetermined time schedule without regard to traffic conditions. Also, fixed time signal.

PROGRESSION: A term used to describe the progressive movement of traffic through several signalized intersections.

SCREEN-LINE: An imaginary line or physical feature across which all trips are counted, normally to verify the validity of mathematical traffic models.

SIGNAL CYCLE: The time period in seconds required for one complete sequence of signal indications.

SIGNAL PHASE: The part of the signal cycle allocated to one or more traffic movements.

STARTING DELAY: The delay experienced in initiating the movement of queued traffic from a stop to an average running speed through a signalized intersection.

TRAFFIC-ACTUATED SIGNAL: A type of traffic signal that directs traffic to stop and go in accordance with the demands of traffic, as registered by the actuation of detectors.

TRIP: The movement of a person or vehicle from one location (origin) to another (destination). For example, from home to store to home is two trips, not one.

TRIP-END: One end of a trip at either the origin or destination; i.e. each trip has two trip-ends. A trip-end occurs when a person, object, or message is transferred to or from a vehicle.

TRIP GENERATION RATE: The quantity of trips produced and/or attracted by a specific land use stated in terms of units such as per dwelling, per acre, and per 1,000 square feet of floor space.

TRUCK: A vehicle having dual tires on one or more axles, or having more than two axles.

UNBALANCED FLOW: Heavier traffic flow in one direction than the other. On a daily basis, most facilities have balanced flow. During the peak hours, flow is seldom balanced in an urban area.

VEHICLE MILES OF TRAVEL: A measure of the amount of usage of a section of highway, obtained by multiplying the average daily traffic by length of facility in miles.

APPENDIX B

City of Riverside Scoping Agreement

Exhibit B

SCOPING AGREEMENT FOR TRAFFIC IMPACT STUDY

This letter acknowledges the City of Riverside Public Works Traffic Engineering Division requirements for traffic impact analysis of the following project. The analysis must follow the City Traffic Impact Analysis Preparation Guide dated August 2012.

Case No. APN 246-070-017 / 246-070-002 / 246-040-027 / 246-040-026
Related Cases -
SP No.
EIR No.
GPA No.
CZ No.
Project Name: 6055 Center Street Warehouse Project
Project Location: 6055 Center Street
Project Description: 308,000 square feet of Manufacturing

	Consultant	Developer
Name:	Kunzman Associates, Inc.	MIG I HOGLE-IRELAND
Address:	1111 W Town & Country Road, Ste. 34	1500 Iowa Avenue, Suite 110
	Orange, CA 92868	Riverside, CA 92507
Telephone:	(714) 973-8383	(9051) 787-9222

A. Trip Generation Source: ITE *Trip Generation Manual,* most recent edition

Existing Land Use	Vacant	Proposed Land Use	Manufacturing
Existing Zoning	BMP	Proposed Zoning	BMP
Total Daily Trips	1,576		

	In	Out	Total
AM Trips	236	65	301
PM Trips	109	194	303

Internal Trip Allowance ☐ Yes ☑ No (% Trip Discount)
Pass-By Trip Allowance ☐ Yes ☑ No (% Trip Discount)
(Attach additional sheet if this is a multi-use site with a breakdown of trips generated)

B. Trip Geographic Distribution: N % S % E % W %
(See attached exhibit for detailed assignment)

C. Background Traffic

Project Completion Year: 2017 Annual Ambient Growth Rate: 2.0 %
Other area projects to be included: To be included when data provided.

Please contact Planning Division or use the most recently provided data

Model/Forecast methodology if required _____

D. Study intersections: (NOTE: Subject to revision after other projects, trip generation and distribution are determined, or comments from other agencies.)

1. Main Street/Riverside Avenue at Center Street
2. Project West Access at Center Street
3. Project East Access at Center Street
4. Orange Street at Center Street
5. Stephens Avenue at Center Street
6. West La Cadena Drive at Stevens Avenue
7. East La Cadena Drive at Stevens Avenue
8. Highgrove Place at Center Street
9. Iowa Avenue at I-215 NB On-Ramp
10. Iowa Avenue at Main Street
11. Iowa Avenue at Center Street

E. Study Roadway Segments (For GP level study):

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

F. Other Jurisdictional Impacts

Is this project within any other Agency's Sphere of Influence or one-mile radius of boundaries? ☑ Yes ☐ No

If so, name of Jurisdiction: Cities of Jurupa Valley, Rialto, Colton, and Grand Terrace

G. Site Plan (please attach a legible 11'X17' copy)

H. Specific issues to be addressed in the Study (in addition to the standard analysis described in the Guideline) (To be filled out by Public Works Traffic Department)

_____

_____

Recommended by:

Bryan Crawford
Consultant's Representative

12/7/15
Date

Scoping Agreement Submitted on

12/7/15
Date

Scoping Agreement Resubmitted on

_____
Date

Approved Scoping Agreement:

_____
City of Riverside
Traffic Engineering Division

_____
Date

cc: Planning Division
Land Development Section

Table 1

Project Trip Generation

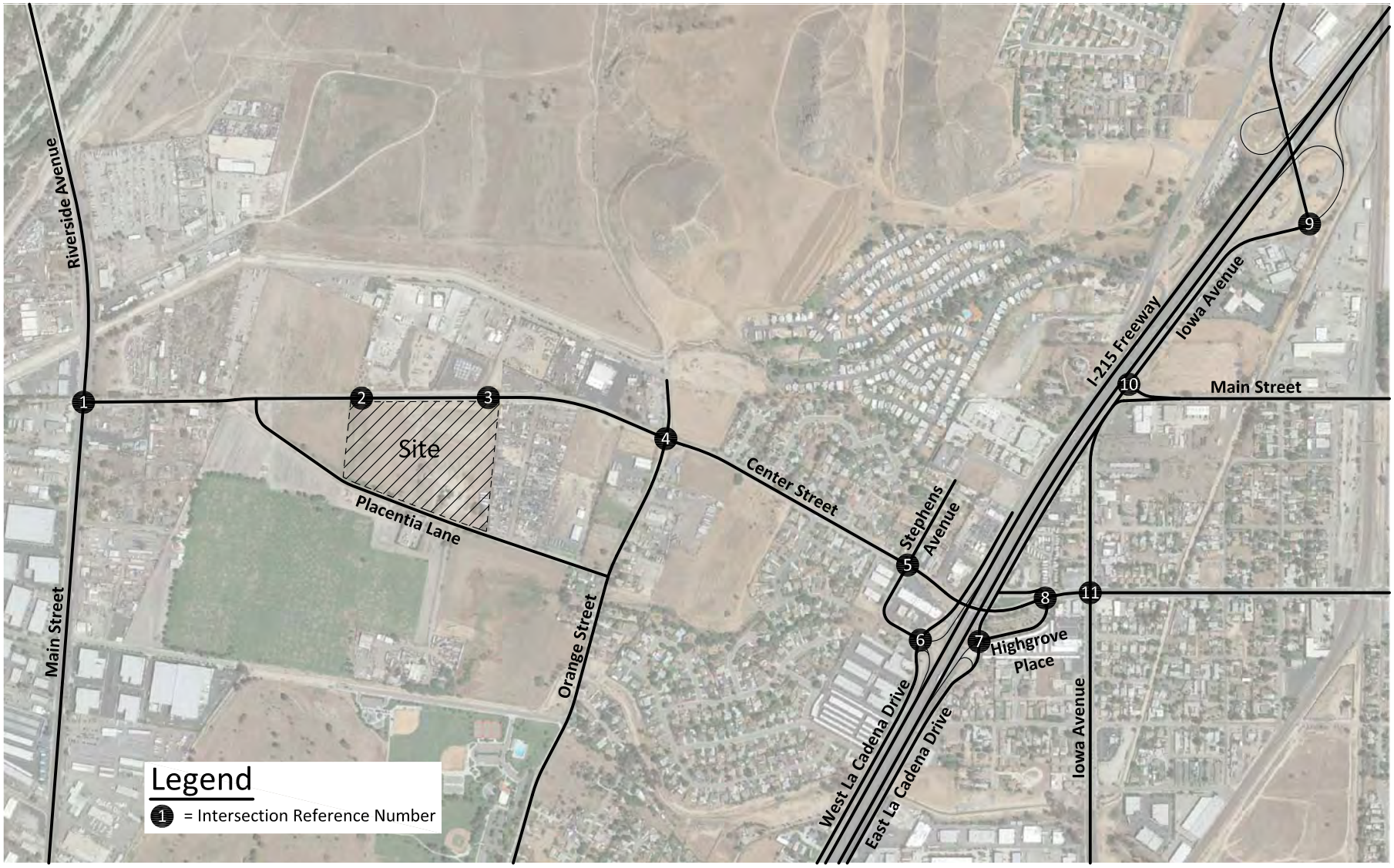
Descriptor		Quantity	Units[2]	Type of Vehicle: Passenger Car	2 Axle Truck	3 Axle Truck	4+ Axle Truck	Total Trucks	Total
Land Use: Manufacturing		308.000	TSF	74.4%	8.4%	4.6%	12.6%	25.6%	100%
Traffic Generation Rates in trips per TSF									
Daily				2.842	0.321	0.176	0.481	0.978	3.82
Morning Peak Hour				0.543	0.061	0.034	0.092	0.187	0.73
Evening Peak Hour				0.543	0.061	0.034	0.092	0.187	0.73
Traffic Generation in Vehicles									
Daily				875	99	54	148	301	1,176
Morning Peak Hour									
	Inbound			131	15	8	22	45	176
	Outbound			37	4	2	6	12	49
	Total			168	19	10	28	57	225
Evening Peak Hour									
	Inbound			60	7	4	10	21	81
	Outbound			108	12	7	18	37	145
	Total			168	19	11	28	58	226
Passenger Car Equivalent's (PCE'S) Factor[3]				1.00	1.50	2.00	3.00		
Traffic Generation in PCE's									
Daily				875	149	108	444	701	1,576
Morning Peak Hour									
	Inbound			131	23	16	66	105	236
	Outbound			37	6	4	18	28	65
	Total			168	29	20	84	133	301
Evening Peak Hour									
	Inbound			60	11	8	30	49	109
	Outbound			108	18	14	54	86	194
	Total			168	29	22	84	135	303

[1] Source: Institute of Transportation Engineers, Trip Generation, 9th Edition, 2012, Land Use Category 140 and Truck Trip Generation Study, City of Fontana,August 2003.

[2] TSF = Thousand Square Feet

[3] Passenger Car Equivalent factors are recommended by San Bernardino Associated Governments.

Figure 1
Project Location Map



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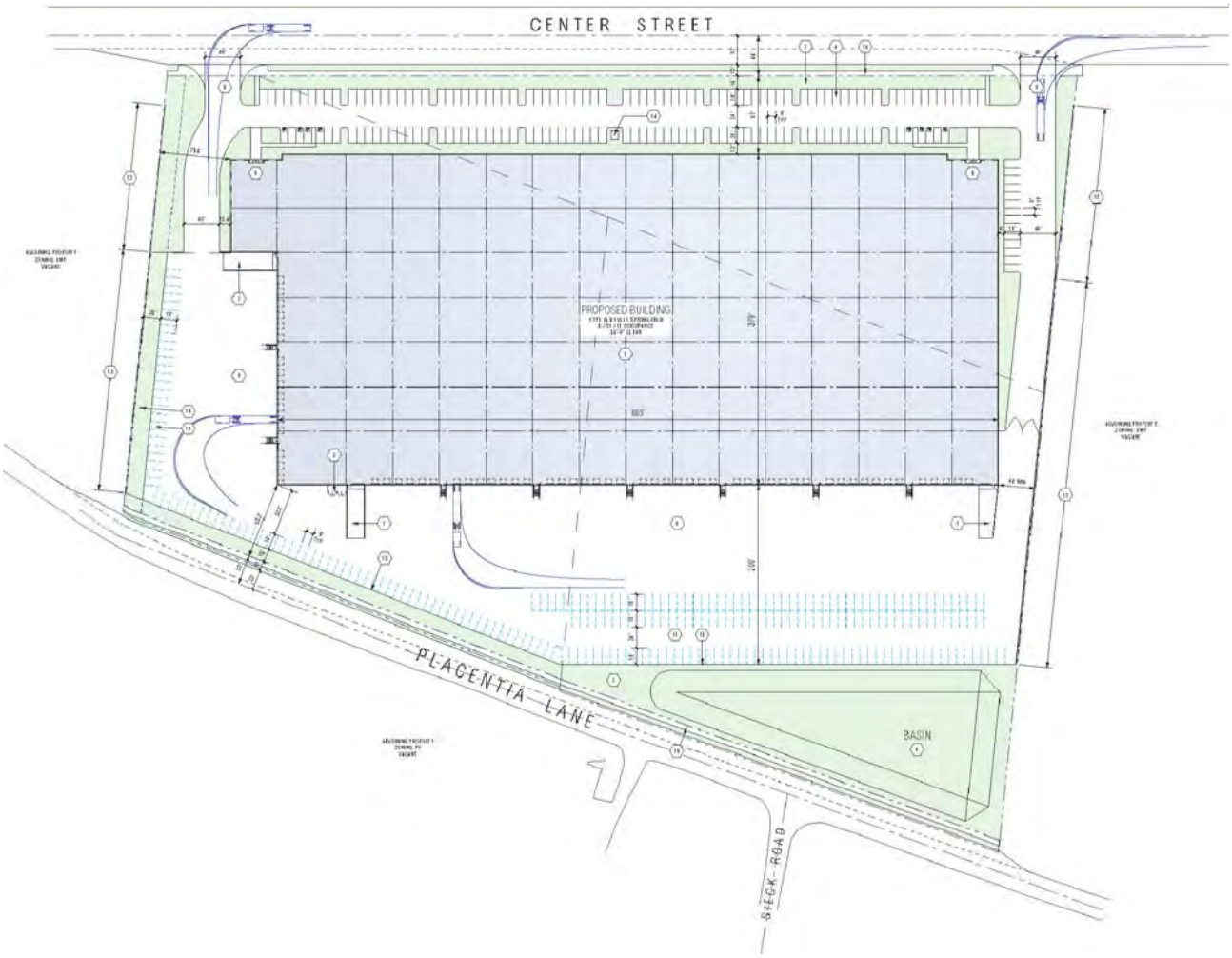
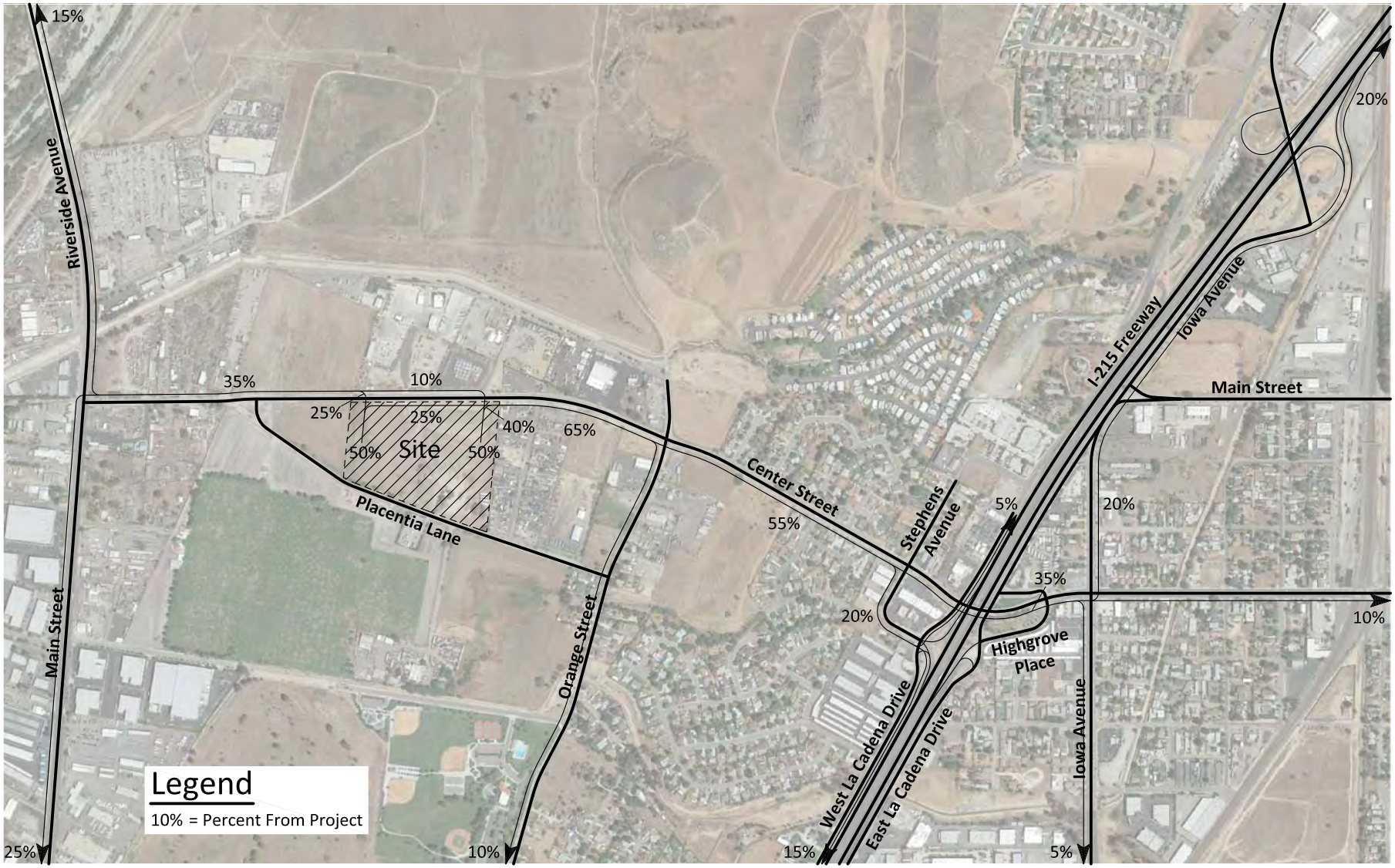
6055a/1

Figure 2
Site Plan



6055a/2

Figure 3
Project Outbound Trip Distribution - Cars



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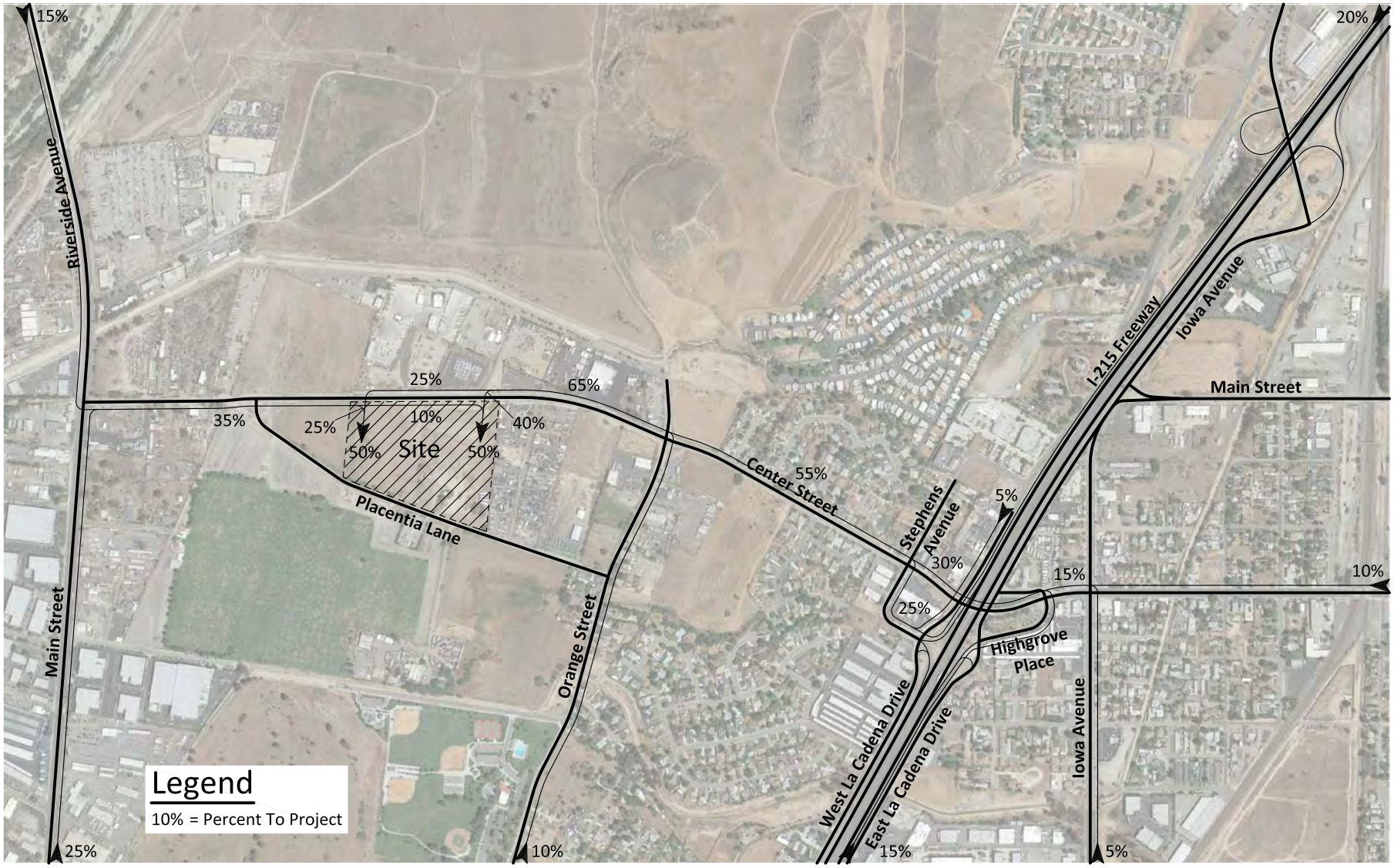
KUNZMAN ASSOCIATES, INC.
OVER 35 YEARS OF EXCELLENT SERVICE

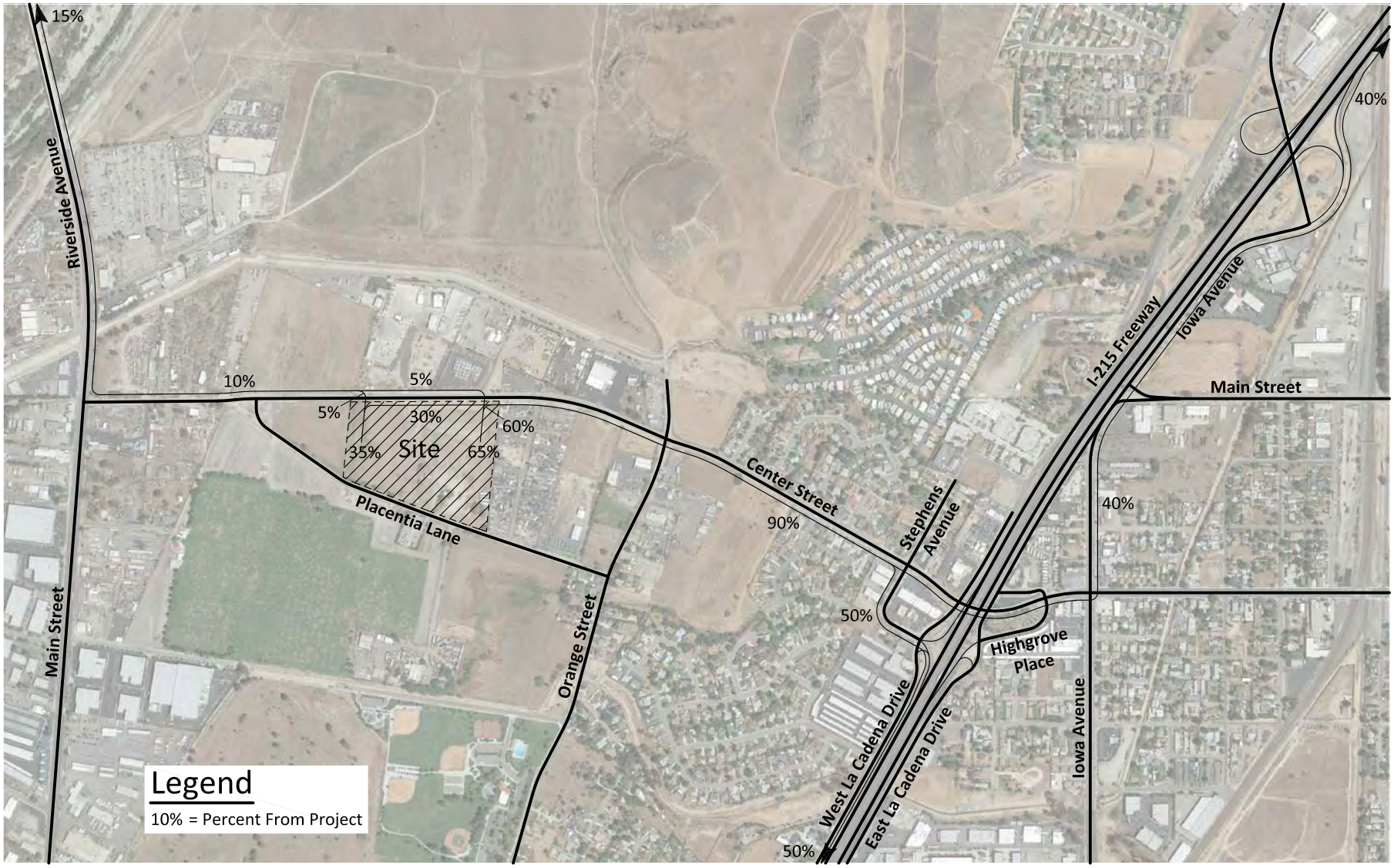
Figure 4
Project Inbound Trip Distribution - Cars



KUNZMAN ASSOCIATES, INC.
OVER 35 YEARS OF EXCELLENT SERVICE

6055a/4

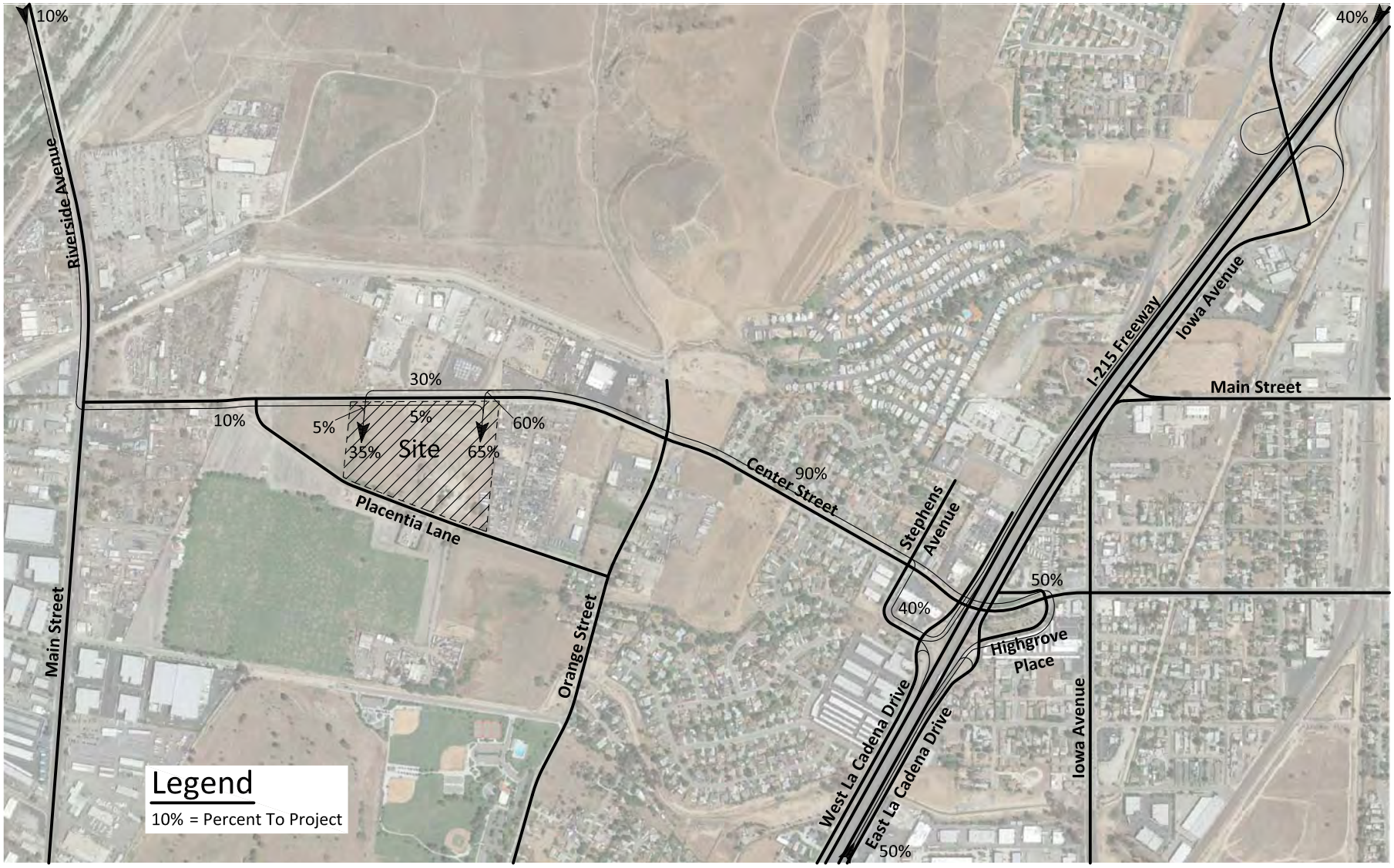
Figure 5
Project Outbound Trip Distribution - Trucks



KUNZMAN ASSOCIATES, INC.
OVER 35 YEARS OF EXCELLENT SERVICE

6055a/5

Figure 6
Project Inbound Trip Distribution - Trucks



6055a/6

KUNZMAN ASSOCIATES, INC.
OVER 35 YEARS OF EXCELLENT SERVICE

APPENDIX C

Traffic Count Worksheets

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 pacific@aimtd.com

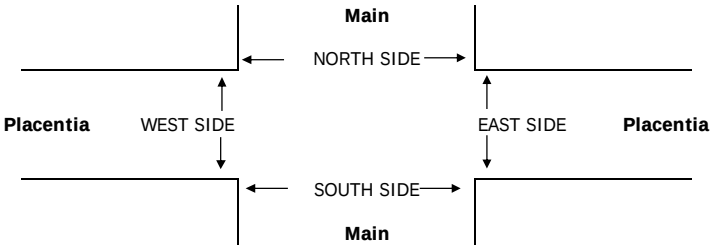
DATE:	LOCATION:	Riverside	PROJECT #:	SC0789
Thu, Dec 10, 15	NORTH & SOUTH:	Main	LOCATION #:	1
	EAST & WEST:	Placentia	CONTROL:	STOP W

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N / ◄ W / E ► / S ▼

☑ Add U-Turns to Left Turns

		NORTHBOUND Main			SOUTHBOUND Main			EASTBOUND Placentia			WESTBOUND Placentia				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	0	2	0	0	2	0	0	1	0	0	1	0		0	0	0	0	
AM	7:00 AM	1	170	6	19	142	1	0	0	0	8	1	22	370	0	0	0	0	0
	7:15 AM	0	164	7	17	159	0	0	0	0	2	0	33	382	0	0	0	0	0
	7:30 AM	0	141	8	21	170	0	0	0	0	9	0	25	374	0	0	0	0	0
	7:45 AM	1	158	14	19	174	0	0	0	0	14	0	23	403	0	0	0	0	0
	8:00 AM	1	127	20	16	131	3	0	0	0	12	0	15	325	0	0	0	0	0
	8:15 AM	0	128	14	20	130	0	0	0	0	14	0	18	324	0	0	0	0	0
	8:30 AM	2	132	14	22	130	1	0	0	0	8	0	33	342	0	0	0	0	0
	8:45 AM	1	119	7	22	132	0	0	0	3	15	0	34	333	0	0	0	0	0
	VOLUMES	6	1,139	90	156	1,168	5	0	0	3	82	1	203	2,853	0	0	0	0	0
	APPROACH %	0%	92%	7%	12%	88%	0%	0%	0%	100%	29%	0%	71%						
	APP/DEPART	1,235	/	1,342	1,329	/	1,253	3	/	246	286	/	12	0					
	BEGIN PEAK HR		7:00 AM																
	VOLUMES	2	633	35	76	645	1	0	0	0	33	1	103	1,529					
	APPROACH %	0%	94%	5%	11%	89%	0%	0%	0%	0%	24%	1%	75%						
	PEAK HR FACTOR		0.946			0.935			0.000			0.926		0.949					
	APP/DEPART	670	/	736	722	/	678	0	/	111	137	/	4	0					
PM	4:00 PM	2	148	21	43	222	0	0	0	0	9	0	18	463	0	0	0	0	0
	4:15 PM	0	141	24	38	195	0	0	0	0	14	0	22	434	0	0	0	0	0
	4:30 PM	0	187	30	41	221	1	0	0	0	3	0	31	514	0	0	0	0	0
	4:45 PM	0	172	22	32	181	0	0	0	0	9	0	23	439	0	1	0	0	1
	5:00 PM	0	185	27	36	238	0	0	0	1	2	0	24	513	0	0	0	0	0
	5:15 PM	0	173	17	32	192	0	0	0	1	7	0	27	449	0	0	0	0	0
	5:30 PM	0	171	18	35	193	0	0	0	0	11	0	24	452	0	0	0	0	0
	5:45 PM	1	123	16	26	132	0	0	0	0	10	0	23	331	0	0	0	0	0
	VOLUMES	3	1,300	175	283	1,574	1	0	0	2	65	0	192	3,595	0	1	0	0	1
	APPROACH %	0%	88%	12%	15%	85%	0%	0%	0%	100%	25%	0%	75%						
	APP/DEPART	1,478	/	1,493	1,858	/	1,641	2	/	457	257	/	4	0					
	BEGIN PEAK HR		4:30 PM																
	VOLUMES	0	717	96	141	832	1	0	0	2	21	0	105	1,915					
	APPROACH %	0%	88%	12%	14%	85%	0%	0%	0%	100%	17%	0%	83%						
	PEAK HR FACTOR		0.937			0.889			0.500			0.926		0.931					
	APP/DEPART	813	/	823	974	/	855	2	/	236	126	/	1	0					



		PEDESTRIAN + BIKE CROSSINGS					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 pacific@aimtd.com

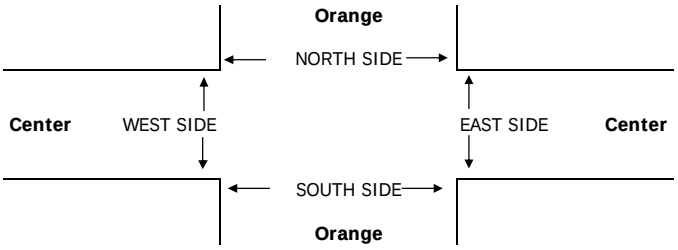
DATE:				
Thu, Dec 10, 15	LOCATION:	Riverside	PROJECT #:	SC0789
	NORTH & SOUTH:	Orange	LOCATION #:	2
	EAST & WEST:	Center	CONTROL:	STOP ALL

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N ◄ W E ► S ▼

☑ Add U-Turns to Left Turns

		NORTHBOUND Orange			SOUTHBOUND Orange			EASTBOUND Center			WESTBOUND Center				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	0	1	0	0	1	0	0	1	0	0	1	0		0	0	0	0	
AM	7:00 AM	1	0	6	1	0	2	0	29	0	7	30	3	79	0	0	0	0	0
	7:15 AM	3	0	15	0	0	0	1	27	0	18	31	0	95	0	0	0	0	0
	7:30 AM	1	1	15	2	0	0	4	22	0	12	37	2	96	0	0	0	0	0
	7:45 AM	7	0	14	1	0	0	1	26	2	20	36	5	112	0	0	0	0	0
	8:00 AM	1	0	10	0	0	0	2	31	3	15	30	1	93	0	0	0	0	0
	8:15 AM	2	1	14	4	0	2	0	29	2	18	27	0	99	0	0	0	0	0
	8:30 AM	1	0	9	2	0	1	3	36	1	15	45	5	118	0	0	0	0	0
	8:45 AM	4	0	14	2	0	1	1	33	3	12	44	1	115	0	0	0	0	0
	VOLUMES	20	2	97	12	0	6	12	233	11	117	280	17	807	0	0	0	0	0
	APPROACH %	17%	2%	82%	67%	0%	33%	5%	91%	4%	28%	68%	4%						
	APP/DEPART	119	/	31	18	/	128	256	/	342	414	/	306	0					
	BEGIN PEAK HR		8:00 AM																
	VOLUMES	8	1	47	8	0	4	6	129	9	60	146	7	425					
	APPROACH %	14%	2%	84%	67%	0%	33%	4%	90%	6%	28%	69%	3%						
	PEAK HR FACTOR		0.778			0.500			0.900			0.819		0.900					
	APP/DEPART	56	/	14	12	/	69	144	/	184	213	/	158	0					
PM	4:00 PM	4	1	37	3	0	0	1	61	3	17	30	0	157	0	0	0	0	0
	4:15 PM	2	0	40	4	2	1	2	55	1	14	27	3	151	0	0	0	0	0
	4:30 PM	3	0	30	9	5	1	0	73	1	24	29	4	179	0	0	0	0	0
	4:45 PM	2	0	26	2	0	0	0	47	3	13	22	0	115	0	0	0	0	0
	5:00 PM	2	0	28	2	0	0	0	56	9	15	31	1	144	0	0	0	0	0
	5:15 PM	2	1	27	2	0	1	1	50	2	23	34	1	144	0	0	0	0	0
	5:30 PM	5	0	24	3	0	0	0	45	3	22	34	0	136	0	0	0	0	0
	5:45 PM	3	1	23	0	0	1	0	40	0	15	30	0	113	0	0	0	0	0
	VOLUMES	23	3	235	25	7	4	4	427	22	143	237	9	1,139	0	0	0	0	0
	APPROACH %	9%	1%	90%	69%	19%	11%	1%	94%	5%	37%	61%	2%						
	APP/DEPART	261	/	16	36	/	172	453	/	687	389	/	264	0					
	BEGIN PEAK HR		4:00 PM																
	VOLUMES	11	1	133	18	7	2	3	236	8	68	108	7	602					
	APPROACH %	8%	1%	92%	67%	26%	7%	1%	96%	3%	37%	59%	4%						
	PEAK HR FACTOR		0.863			0.450			0.834			0.803		0.841					
	APP/DEPART	145	/	11	27	/	83	247	/	387	183	/	121	0					



		PEDESTRIAN + BIKE CROSSINGS					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 pacific@aimtd.com

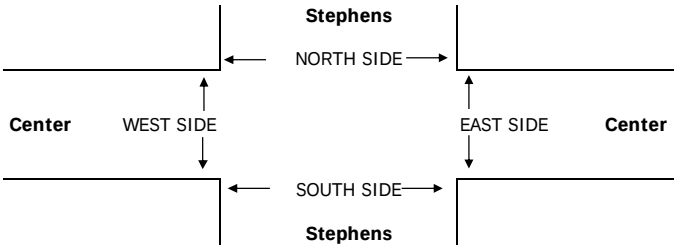
DATE:	LOCATION:	Riverside	PROJECT #:	SC0789
Thu, Dec 10, 15	NORTH & SOUTH:	Stephens	LOCATION #:	3
	EAST & WEST:	Center	CONTROL:	SIGNAL

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N ◄ W E ► S ▼

☑ Add U-Turns to Left Turns

		NORTHBOUND Stephens			SOUTHBOUND Stephens			EASTBOUND Center			WESTBOUND Center				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	0	1	0	0	1	0	0	1	1	0	1	0		0	0	0	0	
AM	7:00 AM	15	1	28	1	2	0	0	21	12	49	33	0	162	0	0	0	0	0
	7:15 AM	12	1	30	5	4	0	0	33	15	78	37	1	216	0	0	0	0	0
	7:30 AM	16	0	17	2	4	1	0	35	21	90	31	3	220	0	0	0	0	0
	7:45 AM	15	0	25	1	0	0	0	25	18	86	54	3	227	0	0	0	0	0
	8:00 AM	14	1	20	1	0	1	0	27	12	37	33	1	147	0	0	0	0	0
	8:15 AM	20	0	21	2	1	0	1	20	23	50	26	1	165	0	0	0	0	0
	8:30 AM	31	0	22	0	0	0	0	19	16	47	33	0	168	0	0	0	0	0
	8:45 AM	24	2	21	0	6	2	0	28	20	55	28	1	187	0	0	0	0	0
	VOLUMES	147	5	184	12	17	4	1	208	137	492	275	10	1,492	0	0	0	0	0
	APPROACH %	44%	1%	55%	36%	52%	12%	0%	60%	40%	63%	35%	1%						
	APP/DEPART	336	/	16	33	/	646	346	/	404	777	/	426	0					
	BEGIN PEAK HR		7:00 AM																
	VOLUMES	58	2	100	9	10	1	0	114	66	303	155	7	825					
	APPROACH %	36%	1%	63%	45%	50%	5%	0%	63%	37%	65%	33%	2%						
	PEAK HR FACTOR		0.909			0.556			0.804			0.813		0.909					
	APP/DEPART	160	/	9	20	/	379	180	/	223	465	/	214	0					
PM	4:00 PM	25	1	10	1	1	2	0	57	35	45	24	0	201	0	0	0	0	0
	4:15 PM	24	1	11	1	0	0	2	62	31	50	25	2	209	0	0	0	0	0
	4:30 PM	20	2	16	0	1	0	1	73	37	42	36	1	229	0	0	0	0	0
	4:45 PM	12	2	14	1	2	1	2	52	32	45	25	2	190	0	0	0	1	1
	5:00 PM	24	0	17	1	0	1	1	56	32	50	33	4	219	0	0	0	0	0
	5:15 PM	23	1	12	2	0	0	0	47	29	32	33	1	180	0	0	0	0	0
	5:30 PM	16	2	13	2	1	0	1	43	26	21	31	2	158	0	0	0	0	0
	5:45 PM	15	1	10	1	0	1	0	46	24	17	28	1	144	0	0	0	0	0
	VOLUMES	159	10	103	9	5	5	7	436	246	302	235	13	1,530	0	0	0	1	1
	APPROACH %	58%	4%	38%	47%	26%	26%	1%	63%	36%	55%	43%	2%						
	APP/DEPART	272	/	30	19	/	552	689	/	549	550	/	399	0					
	BEGIN PEAK HR		4:15 PM																
	VOLUMES	80	5	58	3	3	2	6	243	132	187	119	9	847					
	APPROACH %	56%	3%	41%	38%	38%	25%	2%	64%	35%	59%	38%	3%						
	PEAK HR FACTOR		0.872			0.500			0.858			0.905		0.925					
	APP/DEPART	143	/	20	8	/	321	381	/	305	315	/	201	0					



		PEDESTRIAN + BIKE CROSSINGS					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 pacific@aimtd.com

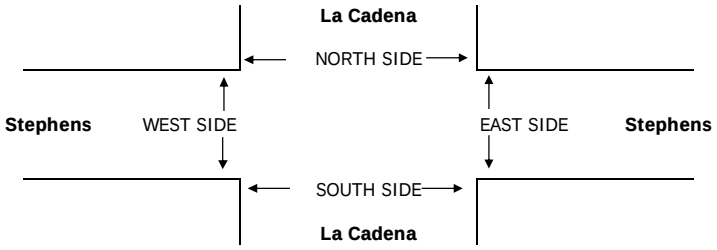
DATE:				
Thu, Dec 10, 15	LOCATION:	Riverside	PROJECT #:	SC0789
	NORTH & SOUTH:	La Cadena	LOCATION #:	4
	EAST & WEST:	Stephens	CONTROL:	STOP ALL

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N ◄ W E ► S ▼

☑ Add U-Turns to Left Turns

		NORTHBOUND La Cadena			SOUTHBOUND La Cadena			EASTBOUND Stephens			WESTBOUND Stephens				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	0	1	0	0	1	0	0	1	0	0	1	1		0	0	0	0	
AM	7:00 AM	9	26	2	9	32	10	12	67	11	19	24	1	222	0	0	0	0	0
	7:15 AM	10	27	1	12	46	8	15	77	14	21	25	2	258	0	0	0	0	0
	7:30 AM	11	10	6	19	52	7	13	83	12	25	20	0	258	0	0	0	0	0
	7:45 AM	7	11	2	7	43	8	5	51	10	42	22	2	210	0	0	0	1	1
	8:00 AM	3	13	2	4	29	11	6	42	22	85	28	5	250	0	0	0	1	1
	8:15 AM	5	12	4	8	44	9	4	43	21	73	29	2	254	0	0	0	0	0
	8:30 AM	7	15	4	6	41	8	18	39	11	42	31	3	225	0	0	0	0	0
	8:45 AM	7	10	4	5	12	5	8	46	10	12	23	1	143	0	0	0	0	0
	VOLUMES	59	124	25	70	299	66	81	448	111	319	202	16	1,820	0	0	0	2	2
	APPROACH %	28%	60%	12%	16%	69%	15%	13%	70%	17%	59%	38%	3%						
	APP/DEPART	208	/	221	435	/	727	640	/	545	537	/	327	0					
	BEGIN PEAK HR		7:15 AM																
	VOLUMES	31	61	11	42	170	34	39	253	58	173	95	9	976					
	APPROACH %	30%	59%	11%	17%	69%	14%	11%	72%	17%	62%	34%	3%						
	PEAK HR FACTOR		0.678			0.788			0.810			0.587		0.946					
	APP/DEPART	103	/	109	246	/	399	350	/	308	277	/	160	0					
PM	4:00 PM	10	30	8	20	53	14	19	38	23	19	15	1	250	0	0	0	0	0
	4:15 PM	10	41	3	15	83	8	7	41	23	17	17	0	265	0	0	0	0	0
	4:30 PM	6	36	2	21	82	8	18	46	14	14	13	0	260	0	0	0	0	0
	4:45 PM	9	31	5	20	78	8	19	43	14	20	14	1	262	0	0	0	1	1
	5:00 PM	8	40	7	16	84	14	17	43	17	24	13	2	285	0	0	0	0	0
	5:15 PM	6	49	0	18	100	15	9	31	15	9	15	2	269	0	0	0	0	0
	5:30 PM	7	32	3	11	90	10	12	45	17	31	20	0	278	0	0	0	0	0
	5:45 PM	6	37	1	9	81	14	8	21	18	29	10	0	234	1	0	0	0	1
	VOLUMES	62	296	29	130	651	91	109	308	141	163	117	6	2,103	1	0	0	1	2
	APPROACH %	16%	76%	7%	15%	75%	10%	20%	55%	25%	57%	41%	2%						
	APP/DEPART	387	/	411	872	/	955	558	/	468	286	/	269	0					
	BEGIN PEAK HR		4:45 PM																
	VOLUMES	30	152	15	65	352	47	57	162	63	84	62	5	1,094					
	APPROACH %	15%	77%	8%	14%	76%	10%	20%	57%	22%	56%	41%	3%						
	PEAK HR FACTOR		0.895			0.872			0.916			0.740		0.960					
	APP/DEPART	197	/	214	464	/	498	282	/	243	151	/	139	0					



		PEDESTRIAN + BIKE CROSSINGS					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 pacific@aimtd.com

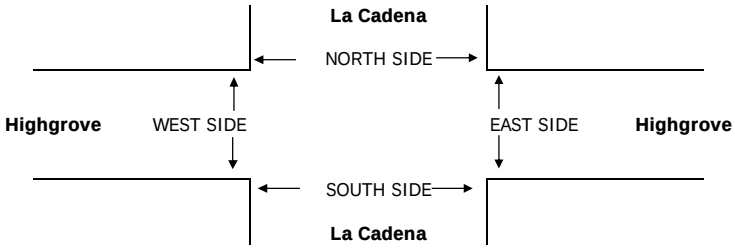
DATE:				
Thu, Dec 10, 15	LOCATION:	Riverside	PROJECT #:	SC0789
	NORTH & SOUTH:	La Cadena	LOCATION #:	5
	EAST & WEST:	Highgrove	CONTROL:	STOP ALL

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N ◄ W E ► S ▼

☑ Add U-Turns to Left Turns

		NORTHBOUND La Cadena			SOUTHBOUND La Cadena			EASTBOUND Highgrove			WESTBOUND Highgrove				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	X	1	0	0	1	X	0	1	0	0	X	1		0	0	0	0	
AM	7:00 AM	0	3	8	0	9	0	19	53	0	4	0	1	97	0	0	0	0	0
	7:15 AM	0	10	9	0	21	0	10	32	0	5	0	2	89	0	0	0	0	0
	7:30 AM	0	9	11	0	22	0	8	33	0	9	0	0	92	0	0	0	0	0
	7:45 AM	0	10	10	0	25	0	8	44	0	11	0	1	109	0	0	0	0	0
	8:00 AM	0	10	9	0	16	0	3	31	0	9	0	1	79	0	0	0	0	0
	8:15 AM	0	8	2	0	19	0	7	26	0	5	0	1	68	0	0	0	0	0
	8:30 AM	0	7	6	0	23	0	6	42	0	8	0	1	93	0	0	0	0	0
	8:45 AM	0	10	7	2	17	0	11	48	0	4	0	0	99	0	0	0	0	0
	VOLUMES	0	67	62	2	152	0	72	309	0	55	0	7	726	0	0	0	0	0
	APPROACH %	0%	52%	48%	1%	99%	0%	19%	81%	0%	89%	0%	11%						
	APP/DEPART	129	/	146	154	/	207	381	/	373	62	/	0	0					
	BEGIN PEAK HR		7:00 AM																
	VOLUMES	0	32	38	0	77	0	45	162	0	29	0	4	387					
	APPROACH %	0%	46%	54%	0%	100%	0%	22%	78%	0%	88%	0%	12%						
	PEAK HR FACTOR		0.875			0.770			0.719			0.688		0.888					
	APP/DEPART	70	/	81	77	/	106	207	/	200	33	/	0	0					
PM	4:00 PM	0	21	13	0	33	0	11	41	0	2	0	4	125	0	0	0	0	0
	4:15 PM	0	17	12	0	27	0	13	41	1	7	0	1	119	0	0	0	0	0
	4:30 PM	0	9	14	0	33	0	5	50	0	6	0	0	117	0	0	0	0	0
	4:45 PM	0	11	18	0	20	0	11	47	0	7	0	0	114	0	0	0	0	0
	5:00 PM	0	24	17	0	28	0	5	57	0	5	0	1	137	0	0	0	0	0
	5:15 PM	0	27	21	0	45	0	7	47	2	6	0	2	157	0	0	0	0	0
	5:30 PM	0	24	15	1	42	0	7	51	0	4	0	0	144	0	0	0	0	0
	5:45 PM	0	19	12	0	38	0	7	55	1	4	0	0	136	0	0	0	0	0
	VOLUMES	0	152	122	1	266	0	66	389	4	41	0	8	1,049	0	0	0	0	0
	APPROACH %	0%	55%	45%	0%	100%	0%	14%	85%	1%	84%	0%	16%						
	APP/DEPART	274	/	226	267	/	311	459	/	512	49	/	0	0					
	BEGIN PEAK HR		5:00 PM																
	VOLUMES	0	94	65	1	153	0	26	210	3	19	0	3	574					
	APPROACH %	0%	59%	41%	1%	99%	0%	11%	88%	1%	86%	0%	14%						
	PEAK HR FACTOR		0.828			0.856			0.948			0.688		0.914					
	APP/DEPART	159	/	123	154	/	175	239	/	276	22	/	0	0					



		PEDESTRIAN + BIKE CROSSINGS					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 pacific@aimtd.com

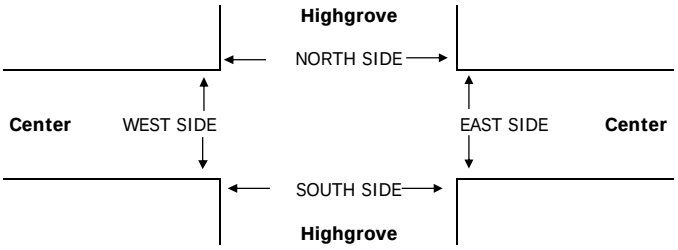
DATE:				
Thu, Dec 10, 15	LOCATION:	Riverside	PROJECT #:	SC0789
	NORTH & SOUTH:	Highgrove	LOCATION #:	6
	EAST & WEST:	Center	CONTROL:	STOP N/S

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N ◄ W E ► S ▼

☑ Add U-Turns to Left Turns

		NORTHBOUND Highgrove			SOUTHBOUND Highgrove			EASTBOUND Center			WESTBOUND Center				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	0	1	1	0	1	0	0	1	1	0	1	0		0	0	0	0	
AM	7:00 AM	10	0	45	2	0	2	1	49	5	0	69	1	184	0	0	0	0	0
	7:15 AM	7	0	37	0	0	6	0	57	6	2	119	1	235	0	0	0	0	0
	7:30 AM	12	0	33	0	1	9	0	51	2	5	117	3	233	0	0	0	0	0
	7:45 AM	21	0	36	0	0	5	0	48	9	4	83	0	206	0	0	0	0	0
	8:00 AM	13	0	29	1	0	5	0	39	7	4	69	0	167	0	0	0	0	0
	8:15 AM	12	0	21	1	0	3	0	41	5	2	58	1	144	0	0	0	0	0
	8:30 AM	21	0	22	0	0	1	0	41	5	4	56	0	150	0	0	0	0	0
	8:45 AM	21	0	34	0	0	2	0	46	4	0	53	0	160	0	0	0	0	0
	VOLUMES	117	0	257	4	1	33	1	372	43	21	624	6	1,479	0	0	0	0	0
	APPROACH %	31%	0%	69%	11%	3%	87%	0%	89%	10%	3%	96%	1%						
	APP/DEPART	374	/	7	38	/	65	416	/	633	651	/	774	0					
	BEGIN PEAK HR		7:00 AM																
	VOLUMES	50	0	151	2	1	22	1	205	22	11	388	5	858					
	APPROACH %	25%	0%	75%	8%	4%	88%	0%	90%	10%	3%	96%	1%						
	PEAK HR FACTOR		0.882			0.625			0.905			0.808		0.913					
	APP/DEPART	201	/	6	25	/	34	228	/	358	404	/	460	0					
PM	4:00 PM	9	0	45	0	1	9	1	67	3	1	52	0	188	0	0	0	0	0
	4:15 PM	8	0	41	0	0	6	0	68	5	3	47	2	180	0	0	0	0	0
	4:30 PM	11	1	47	0	0	5	1	74	3	1	59	1	203	0	0	0	0	0
	4:45 PM	13	0	57	0	0	3	1	65	5	4	53	4	205	0	0	0	0	0
	5:00 PM	17	0	49	3	1	7	1	67	3	1	53	3	205	0	0	0	0	0
	5:15 PM	9	2	67	1	0	1	0	51	5	1	57	2	196	0	0	0	0	0
	5:30 PM	11	0	56	1	0	7	0	70	2	2	65	0	214	0	0	0	0	0
	5:45 PM	12	0	56	1	0	5	0	58	3	2	36	1	174	0	0	0	0	0
	VOLUMES	90	3	418	6	2	43	4	520	29	15	422	13	1,565	0	0	0	0	0
	APPROACH %	18%	1%	82%	12%	4%	84%	1%	94%	5%	3%	94%	3%						
	APP/DEPART	511	/	20	51	/	46	553	/	944	450	/	555	0					
	BEGIN PEAK HR		4:45 PM																
	VOLUMES	50	2	229	5	1	18	2	253	15	8	228	9	820					
	APPROACH %	18%	1%	81%	21%	4%	75%	1%	94%	6%	3%	93%	4%						
	PEAK HR FACTOR		0.901			0.545			0.938			0.914		0.958					
	APP/DEPART	281	/	13	24	/	24	270	/	487	245	/	296	0					



		PEDESTRIAN + BIKE CROSSINGS					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 pacific@aimtd.com

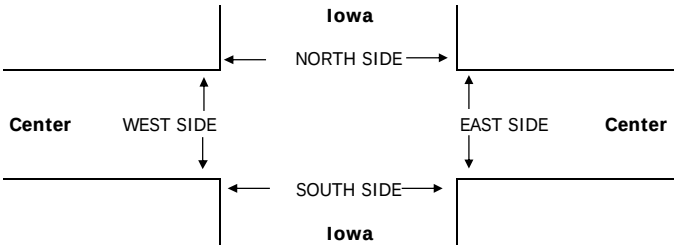
DATE:				
Thu, Dec 10, 15	LOCATION:	Riverside	PROJECT #:	SC0789
	NORTH & SOUTH:	Iowa	LOCATION #:	7
	EAST & WEST:	Center	CONTROL:	SIGNAL

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N ◄ W E ► S ▼

☑ Add U-Turns to Left Turns

		NORTHBOUND Iowa			SOUTHBOUND Iowa			EASTBOUND Center			WESTBOUND Center				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	1	2	0	1	2	0	1	2	0	1	1	1		0	0	0	0	
AM	7:00 AM	9	75	13	6	69	17	24	51	21	21	42	18	366	0	0	2	13	15
	7:15 AM	16	83	27	11	113	28	22	55	17	25	79	15	491	0	0	1	3	4
	7:30 AM	12	89	22	8	135	28	11	56	17	47	86	24	535	0	0	1	5	6
	7:45 AM	22	63	11	5	173	21	29	42	22	39	59	9	495	0	0	5	5	10
	8:00 AM	16	98	19	4	134	5	20	29	18	15	31	7	396	0	0	3	8	11
	8:15 AM	15	103	9	5	114	6	20	20	21	18	40	7	378	0	0	1	8	9
	8:30 AM	13	70	8	4	110	15	19	17	27	19	33	4	339	0	1	1	8	10
	8:45 AM	10	75	11	0	109	15	24	27	28	15	24	12	350	0	0	3	4	7
	VOLUMES	113	656	120	43	957	135	169	297	171	199	394	96	3,350	0	1	17	54	72
	APPROACH %	13%	74%	13%	4%	84%	12%	27%	47%	27%	29%	57%	14%						
	APP/DEPART	889	/	905	1,135	/	1,273	637	/	513	689	/	659	0					
	BEGIN PEAK HR		7:15 AM																
	VOLUMES	66	333	79	28	555	82	82	182	74	126	255	55	1,917					
	APPROACH %	14%	70%	17%	4%	83%	12%	24%	54%	22%	29%	58%	13%						
	PEAK HR FACTOR		0.898			0.835			0.899			0.694		0.896					
	APP/DEPART	478	/	460	665	/	734	338	/	310	436	/	413	0					
PM	4:00 PM	9	140	12	5	133	12	44	58	10	28	32	6	489	0	0	0	7	7
	4:15 PM	16	138	9	6	144	16	41	50	18	35	20	9	502	0	0	0	13	13
	4:30 PM	21	154	12	14	148	12	44	57	21	33	24	6	546	0	0	2	7	9
	4:45 PM	20	145	13	14	182	12	44	57	22	31	24	10	574	0	0	4	5	9
	5:00 PM	23	178	15	7	149	21	49	49	20	22	13	5	551	0	0	0	7	7
	5:15 PM	18	148	23	6	153	11	42	59	19	38	30	5	552	0	0	1	7	8
	5:30 PM	17	141	16	15	152	10	35	74	17	29	38	4	548	0	0	0	0	0
	5:45 PM	16	133	13	16	148	9	31	67	16	26	13	6	494	0	0	0	0	0
	VOLUMES	140	1,177	113	83	1,209	103	330	471	143	242	194	51	4,256	0	0	7	46	53
	APPROACH %	10%	82%	8%	6%	87%	7%	35%	50%	15%	50%	40%	10%						
	APP/DEPART	1,430	/	1,551	1,395	/	1,548	944	/	713	487	/	444	0					
	BEGIN PEAK HR		4:45 PM																
	VOLUMES	78	612	67	42	636	54	170	239	78	120	105	24	2,225					
	APPROACH %	10%	81%	9%	6%	87%	7%	35%	49%	16%	48%	42%	10%						
	PEAK HR FACTOR		0.876			0.880			0.966			0.853		0.969					
	APP/DEPART	757	/	801	732	/	815	487	/	367	249	/	242	0					



		PEDESTRIAN + BIKE CROSSINGS					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:15 PM	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0
	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 pacific@aimtd.com

DATE:	LOCATION:	Riverside	PROJECT #:	SC0789
Thu, Dec 10, 15	NORTH & SOUTH:	Iowa	LOCATION #:	8
	EAST & WEST:	Main	CONTROL:	SIGNAL

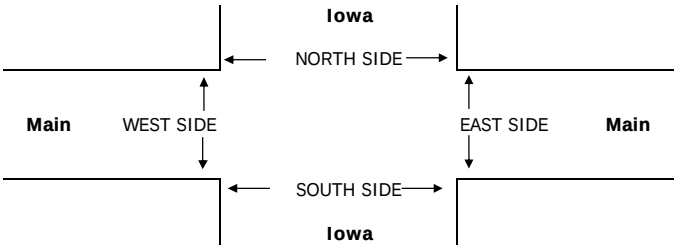
NOTES:

AM PM MD OTHER OTHER

N ◄ W E ► S

☑ Add U-Turns to Left Turns

		NORTHBOUND Iowa			SOUTHBOUND Iowa			EASTBOUND Main			WESTBOUND Main				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	X	1	1	1	1	X	X	X	X	1	X	1		0	0	0	0	
AM	7:00 AM	0	103	35	78	94	0	0	0	0	14	0	70	394	0	0	0	0	0
	7:15 AM	0	116	37	89	145	0	0	0	0	33	0	100	520	0	0	0	0	0
	7:30 AM	0	101	13	29	164	0	0	0	0	31	0	72	410	0	0	0	0	0
	7:45 AM	0	109	15	20	189	0	0	0	0	25	0	26	384	0	0	0	0	0
	8:00 AM	0	114	12	18	137	0	0	0	0	5	0	20	306	0	0	0	0	0
	8:15 AM	0	119	15	16	103	0	0	0	0	9	0	11	273	0	0	0	0	0
	8:30 AM	0	96	16	16	147	0	0	0	0	9	0	14	298	0	0	0	0	0
	8:45 AM	0	107	12	11	127	0	0	0	0	8	0	14	279	0	0	0	0	0
	VOLUMES	0	865	155	277	1,106	0	0	0	0	134	0	327	2,864	0	0	0	0	0
	APPROACH %	0%	85%	15%	20%	80%	0%	0%	0%	0%	29%	0%	71%						
	APP/DEPART	1,020	/	1,192	1,383	/	1,240	0	/	432	461	/	0	0					
	BEGIN PEAK HR		7:00 AM																
	VOLUMES	0	429	100	216	592	0	0	0	0	103	0	268	1,708					
	APPROACH %	0%	81%	19%	27%	73%	0%	0%	0%	0%	28%	0%	72%						
	PEAK HR FACTOR		0.864			0.863			0.000			0.697		0.821					
	APP/DEPART	529	/	697	808	/	695	0	/	316	371	/	0	0					
PM	4:00 PM	0	181	29	13	144	0	0	0	0	23	0	31	421	0	0	0	0	0
	4:15 PM	0	177	24	24	183	0	0	0	0	17	0	20	445	0	0	0	0	0
	4:30 PM	0	191	19	18	169	0	0	0	0	21	0	42	460	0	0	0	0	0
	4:45 PM	0	174	25	33	165	0	0	0	0	26	0	43	466	0	0	0	0	0
	5:00 PM	0	208	35	27	144	0	0	0	0	25	0	46	485	0	0	0	0	0
	5:15 PM	0	183	33	26	185	0	0	0	0	33	0	44	504	0	0	0	0	0
	5:30 PM	0	166	29	27	182	0	0	0	0	28	0	31	463	0	0	0	0	0
	5:45 PM	0	187	25	19	193	0	0	0	0	17	0	11	452	0	0	0	0	0
	VOLUMES	0	1,467	219	187	1,365	0	0	0	0	190	0	268	3,696	0	0	0	0	0
	APPROACH %	0%	87%	13%	12%	88%	0%	0%	0%	0%	41%	0%	59%						
	APP/DEPART	1,686	/	1,735	1,552	/	1,555	0	/	406	458	/	0	0					
	BEGIN PEAK HR		4:45 PM																
	VOLUMES	0	731	122	113	676	0	0	0	0	112	0	164	1,918					
	APPROACH %	0%	86%	14%	14%	86%	0%	0%	0%	0%	41%	0%	59%						
	PEAK HR FACTOR		0.878			0.935			0.000			0.896		0.951					
	APP/DEPART	853	/	895	789	/	788	0	/	235	276	/	0	0					



		PEDESTRIAN + BIKE CROSSINGS					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 pacific@aimtd.com

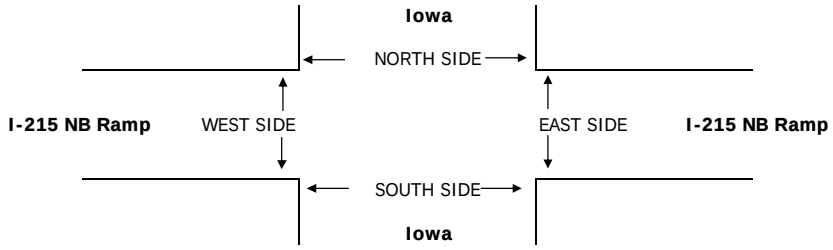
DATE:	LOCATION:	Riverside	PROJECT #:	SC0789
Thu, Dec 10, 15	NORTH & SOUTH:	Iowa	LOCATION #:	9
	EAST & WEST:	I-215 NB Ramp	CONTROL:	SIGNAL

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N ◄ W E ► S ▼

☑ Add U-Turns to Left Turns

		NORTHBOUND Iowa			SOUTHBOUND Iowa			EASTBOUND I-215 NB Ramp			WESTBOUND I-215 NB Ramp				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	X	X	X	0	X	0	0	2	X	X	0.5	0.5		0	0	0	0	
AM	7:00 AM	0	0	0	21	0	223	75	118	0	0	5	70	512	0	0	0	0	0
	7:15 AM	0	0	0	20	0	164	74	106	0	0	2	60	426	0	0	0	0	0
	7:30 AM	0	0	0	24	0	189	86	141	0	0	3	50	493	0	0	0	0	0
	7:45 AM	0	0	0	26	0	197	49	75	0	0	3	52	402	0	1	0	0	1
	8:00 AM	0	0	0	15	0	145	49	101	0	0	9	40	359	0	0	0	0	0
	8:15 AM	0	0	0	17	0	110	43	98	0	0	3	43	314	0	0	0	0	0
	8:30 AM	0	0	0	23	0	148	23	66	0	0	5	38	303	0	0	0	0	0
	8:45 AM	0	0	0	18	0	122	39	89	0	0	3	46	317	0	0	0	0	0
	VOLUMES	0	0	0	164	0	1,298	438	794	0	0	33	399	3,126	0	1	0	0	1
	APPROACH %	0%	0%	0%	11%	0%	89%	36%	64%	0%	0%	8%	92%						
	APP/DEPART	0	/	838	1,462	/	0	1,232	/	957	432	/	1,331	0					
	BEGIN PEAK HR		7:00 AM																
	VOLUMES	0	0	0	91	0	773	284	440	0	0	13	232	1,833					
	APPROACH %	0%	0%	0%	11%	0%	89%	39%	61%	0%	0%	5%	95%						
	PEAK HR FACTOR		0.000			0.885			0.797			0.817		0.895					
	APP/DEPART	0	/	517	864	/	0	724	/	530	245	/	786	0					
PM	4:00 PM	0	0	0	27	0	154	61	126	0	0	6	60	434	0	0	0	0	0
	4:15 PM	0	0	0	25	0	194	61	137	0	0	4	69	490	0	0	0	0	0
	4:30 PM	0	0	0	25	0	175	76	151	0	0	6	64	497	0	0	0	0	0
	4:45 PM	0	0	0	19	0	168	73	138	0	0	5	78	481	0	0	0	0	0
	5:00 PM	0	0	0	35	0	171	83	148	0	0	6	74	517	0	0	0	0	0
	5:15 PM	0	0	0	32	0	207	110	153	0	0	5	87	594	0	0	0	0	0
	5:30 PM	0	0	0	29	0	197	66	123	0	0	5	85	505	0	0	0	0	0
	5:45 PM	0	0	0	25	0	189	68	124	0	0	5	71	482	0	0	0	0	0
	VOLUMES	0	0	0	217	0	1,455	598	1,100	0	0	42	588	4,000	0	0	0	0	0
	APPROACH %	0%	0%	0%	13%	0%	87%	35%	65%	0%	0%	7%	93%						
	APP/DEPART	0	/	1,186	1,672	/	0	1,698	/	1,317	630	/	1,497	0					
	BEGIN PEAK HR		5:00 PM																
	VOLUMES	0	0	0	121	0	764	327	548	0	0	21	317	2,098					
	APPROACH %	0%	0%	0%	14%	0%	86%	37%	63%	0%	0%	6%	94%						
	PEAK HR FACTOR		0.000			0.926			0.832			0.918		0.883					
	APP/DEPART	0	/	644	885	/	0	875	/	669	338	/	785	0					



		PEDESTRIAN + BIKE CROSSINGS					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

APPENDIX D

Explanation and Calculation of Intersection Delay

EXPLANATION AND CALCULATION OF INTERSECTION LEVEL OF SERVICE USING DELAY METHODOLOGY

The levels of service at the unsignalized and signalized intersections are calculated using the delay methodology in the 2010 Highway Capacity Manual. This methodology views an intersection as consisting of several lane groups. A lane group is a set of lanes serving a movement. If there are two northbound left turn lanes, then the lane group serving the northbound left turn movement has two lanes. Similarly, there may be three lanes in the lane group serving the northbound through movement, one lane in the lane group serving the northbound right turn movement, and so forth. It is also possible for one lane to serve two lane groups. A shared lane might result in there being 1.5 lanes in the northbound left turn lane group and 2.5 lanes in the northbound through lane group.

For each lane group, there is a capacity. That capacity is calculated by multiplying the number of lanes in the lane group times a theoretical maximum lane capacity per lane times 12 adjustment factors.

Each of the 12 adjustment factors has a value of approximately 1.00. A value less than 1.00 is generally assigned when a less than desirable condition occurs.

The 12 adjustment factors are as follows:

1. Peak hour factor (to account for peaking within the peak hour)
2. Lane utilization factor (to account for not all lanes loading equally)
3. Lane width
4. Percent of heavy trucks
5. Approach grade
6. Parking
7. Bus stops at intersections
8. Area type (CBD or other)
9. Right turns
10. Left turns

11. Pedestrian activity

12. Signal progression

The maximum theoretical lane capacity and the 12 adjustment factors for it are all unknowns for which approximate estimates have been recommended in the 2010 Highway Capacity Manual. For the most part, the recommended values are not based on statistical analysis but rather on educated estimates. However, it is possible to use the delay method and get reasonable results as will be discussed below.

Once the lane group volume is known and the lane group capacity is known, a volume to capacity ratio can be calculated for the lane group.

With a volume to capacity ratio calculated, average delay per vehicle in a lane group can be estimated. The average delay per vehicle in a lane group is calculated using a complex formula provided by the 2010 Highway Capacity Manual, which can be simplified and described as follows:

Delay per vehicle in a lane group is a function of the following:

1. Cycle length

2. Amount of red time faced by a lane group

3. Amount of yellow time for that lane group

4. The volume to capacity ratio of the lane group

The average delay per vehicle for each lane group is calculated, and eventually an overall average delay for all vehicles entering the intersection is calculated. This average delay per vehicle is then used to judge Level of Service. The Level of Services are defined in the table that follows this discussion.

Experience has shown that when a maximum lane capacity of 1,900 vehicles per hour is used (as recommended in the 2010 Highway Capacity Manual), little or no yellow time penalty is used, and none of the 12 penalty factors are applied, calculated delay is realistic. The delay calculation for instance assumes that yellow time is totally unused. Yet experience shows that most of the yellow time is used.

An idiosyncrasy of the delay methodology is that it is possible to add traffic to an intersection and reduce the average total delay per vehicle. If the average total delay is 30 seconds per vehicle for all vehicles traveling through an intersection, and traffic is

added to a movement that has an average total delay of 15 seconds per vehicle, then the overall average total delay is reduced.

The delay calculation for a lane group is based on a concept that the delay is a function of the amount of unused capacity available. As the volume approaches capacity and there is no more unused capacity available, then the delay rapidly increases. Delay is not proportional to volume, but rather increases rapidly as the unused capacity approaches zero.

Because delay is not linearly related to volumes, the delay does not reflect how close an intersection is to overloading. If an intersection is operating at Level of Service C and has an average total delay of 2 seconds per vehicle, you know very little as to what percent the traffic can increase before Level of Service E is reached.

LEVEL OF SERVICE DESCRIPTION[1]

Level of Service	Description	Average Total Delay Per Vehicle (Seconds)	
		Signalized	Unsignalized
A	Level of Service A occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.	0 to 10.00	0 to 10.00
B	Level of Service B generally occurs with good progression and/or short cycle lengths. More vehicles stop than for Level of Service A, causing higher levels of average total delay.	10.01 to 20.00	10.01 to 15.00
C	Level of Service C generally results when there is fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.	20.01 to 35.00	15.01 to 25.00
D	Level of Service D generally results in noticeable congestion. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume to capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	35.01 to 55.00	25.01 to 35.00
E	Level of Service E is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high volume to capacity ratios. Individual cycle failures are frequent occurrences.	55.01 to 80.00	35.01 to 50.00
F	Level of Service F is considered to be unacceptable to most drivers. This condition often occurs with oversaturation, i.e., when arrival flow rates exceed the capacity of the intersection. It may also occur at high volume to capacity ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.	80.01 and up	50.01 and up

[1] Source: Highway Capacity Manual Special Report 209, Transportation Research Board, National Research Council, Washington, D.C., 2000.

Existing

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*BC*	Intersection	*Main Street/Center Street*
Agency/Co.	*Kunzman Associates, Inc.*	Jurisdiction	*City of Riverside*
Date Performed	*1/18/2016*	Analysis Year	*Existing*
Analysis Time Period	*Morning Peak Hour*		

Project Description *Center Street Warehouse*

East/West Street: *Center Street* | North/South Street: *Main Street/Riverside Avenue*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*633*	*35*	*76*	*645*	
Peak-Hour Factor, PHF	*1.00*	*0.95*	*0.95*	*0.95*	*0.95*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*666*	*36*	*80*	*678*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Two Way Left Turn Lane*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*1*	*1*	*2*	*0*
Configuration		*T*	*R*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*33*	*0*	*103*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.95*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*34*	*0*	*108*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*1*	*0*
Configuration					*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*		*LTR*				
v (veh/h)		*80*		*142*				
C (m) (veh/h)		*905*		*542*				
v/c		*0.09*		*0.26*				
95% queue length		*0.29*		*1.04*				
Control Delay (s/veh)		*9.4*		*14.0*				
LOS		*A*		*B*				
Approach Delay (s/veh)	--	--	*14.0*					
Approach LOS	--	--	*B*					

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*BC*	Intersection	*Main Street/Center Street*
Agency/Co.	*Kunzman Associates, Inc.*	Jurisdiction	*City of Riverside*
Date Performed	*1/18/2016*	Analysis Year	*Existing*
Analysis Time Period	*Evening Peak Hour*		

Project Description *Center Street Warehouse*

East/West Street: *Center Street* | North/South Street: *Main Street/Riverside Avenue*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*717*	*96*	*141*	*832*	
Peak-Hour Factor, PHF	*1.00*	*0.93*	*0.93*	*0.93*	*0.93*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*770*	*103*	*151*	*894*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Two Way Left Turn Lane*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*1*	*1*	*2*	*0*
Configuration		*T*	*R*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*21*	*0*	*105*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.93*	*1.00*	*0.93*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*22*	*0*	*112*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*1*	*0*
Configuration					*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*		*LTR*				
v (veh/h)		*151*		*134*				
C (m) (veh/h)		*781*		*496*				
v/c		*0.19*		*0.27*				
95% queue length		*0.71*		*1.08*				
Control Delay (s/veh)		*10.7*		*14.9*				
LOS		*B*		*B*				
Approach Delay (s/veh)	--	--	*14.9*					
Approach LOS	--	--	*B*					

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*BC*
Agency/Co.	*Kunzman Associates, Inc.*
Date Performed	*1/18/2016*
Analysis Time Period	*Morning Peak Hour*

Site Information

Intersection	*Orange Street/Center Street*
Jurisdiction	*City of Riverside*
Analysis Year	*Existing*

Project ID *Center Street Warehouse*

East/West Street: *Center Street* North/South Street: *Orange Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	6	129	9	60	146	7
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	8	1	47	8	1	4
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.90		0.90		0.90		0.90	
Flow Rate (veh/h)	159		235		61		13	
% Heavy Vehicles	0		0		0		0	
No. Lanes	1		1		1		1	
Geometry Group	1		1		1		1	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.0		0.3		0.1		0.6	
Prop. Right-Turns	0.1		0.0		0.9		0.3	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	-0.0		0.0		-0.5		-0.1	

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20		3.20		3.20	
x, initial	0.14		0.21		0.05		0.01	
hd, final value (s)	4.29		4.28		4.30		4.79	
x, final value	0.19		0.28		0.07		0.02	
Move-up time, m (s)	2.0		2.0		2.0		2.0	
Service Time, t_s (s)	2.3		2.3		2.3		2.8	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	409		485		311		263	
Delay (s/veh)	8.28		8.92		7.64		7.87	
LOS	A		A		A		A	
Approach: Delay (s/veh)	8.28		8.92		7.64		7.87	
LOS	A		A		A		A	
Intersection Delay (s/veh)	8.51							
Intersection LOS	A							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*BC*
Agency/Co.	*Kunzman Associates, Inc.*
Date Performed	*1/18/2016*
Analysis Time Period	*Evening Peak Hour*

Site Information

Intersection	*Orange Street/Center Street*
Jurisdiction	*City of Riverside*
Analysis Year	*Existing*

Project ID *Center Street Warehouse*

East/West Street: *Center Street* North/South Street: *Orange Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	3	236	8	68	108	7
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	11	1	133	18	7	2
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.84		0.84		0.84		0.84	
Flow Rate (veh/h)	292		216		172		31	
% Heavy Vehicles	0		0		0		0	
No. Lanes	1		1		1		1	
Geometry Group	1		1		1		1	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.0		0.4		0.1		0.7	
Prop. Right-Turns	0.0		0.0		0.9		0.1	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	-0.0		0.1		-0.5		0.1	

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20		3.20		3.20	
x, initial	0.26		0.19		0.15		0.03	
hd, final value (s)	4.67		4.83		4.64		5.49	
x, final value	0.38		0.29		0.22		0.05	
Move-up time, m (s)	2.0		2.0		2.0		2.0	
Service Time, t_s (s)	2.7		2.8		2.6		3.5	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	542		466		422		281	
Delay (s/veh)	10.50		9.79		8.96		8.77	
LOS	B		A		A		A	
Approach: Delay (s/veh)	10.50		9.79		8.96		8.77	
LOS	B		A		A		A	
Intersection Delay (s/veh)	9.83							
Intersection LOS	A							

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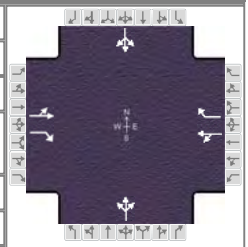
HCS 2010 Signalized Intersection Results Summary

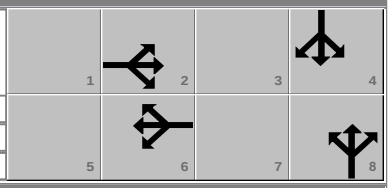
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Morning Peak Hour	PHF	0.91
Intersection	Stephens Avenue/Center S	Analysis Year	Existing	Analysis Period	1> 7:00
File Name	AME5.xus				
Project Description	Center Street Warehouse				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	1	114	66	303	155	7	58	2	100	9	10	1

Signal Information			
Cycle, s	51.2	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	20.2	4.3	14.7	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		7.0		7.0		12.0		12.0
Phase Duration, s		24.2		24.2		18.7		8.3
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (*MAH*), s		3.2		3.2		3.3		3.1
Queue Clearance Time (g_s), s		4.2		18.6		6.3		2.6
Green Extension Time (g_e), s		1.5		1.5		0.3		0.0
Phase Call Probability		1.00		1.00		0.92		0.27
Max Out Probability		0.00		0.00		0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h		126	73		503	8		176			22	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1899	1610		1444	1610		1680			1842	
Queue Service Time (g_s), s		0.0	1.5		14.5	0.1		4.3			0.6	
Cycle Queue Clearance Time (g_c), s		2.2	1.5		16.6	0.1		4.3			0.6	
Green Ratio (*g/C*)		0.39	0.39		0.39	0.39		0.29			0.08	
Capacity (*c*), veh/h		820	636		686	636		482			156	
Volume-to-Capacity Ratio (*X*)		0.154	0.114		0.733	0.012		0.365			0.141	
Available Capacity (c_a), veh/h		2653	2196		2085	2196		982			1077	
Back of Queue (*Q*), veh/ln (50th percentile)		0.8	0.4		4.4	0.0		1.4			0.2	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00	0.00		0.00	0.00		0.00			0.00	
Uniform Delay (d_1), s/veh		10.1	9.8		14.4	9.4		14.6			21.8	
Incremental Delay (d_2), s/veh		0.0	0.0		0.6	0.0		0.2			0.2	
Initial Queue Delay (d_3), s/veh		0.0	0.0		0.0	0.0		0.0			0.0	
Control Delay (*d*), s/veh		10.1	9.9		15.0	9.4		14.7			21.9	
Level of Service (LOS)		B	A		B	A		B			C	
Approach Delay, s/veh / LOS	10.0	B		14.9	B		14.7	B		21.9	C	
Intersection Delay, s/veh / LOS	14.0						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.1	B	2.1	B	2.3	B	2.3	B
Bicycle LOS Score / LOS	0.8	A	1.3	A	0.8	A	0.5	A

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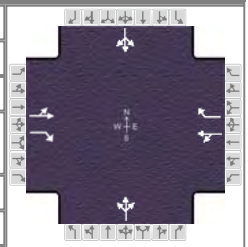
HCS 2010 Signalized Intersection Results Summary

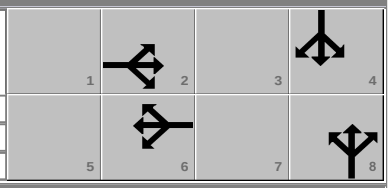
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Evening Peak Hour	PHF	0.93
Intersection	Stephens Avenue/Center S	Analysis Year	Existing	Analysis Period	1> 7:00
File Name	PME5.xus				
Project Description	Center Street Warehouse				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	6	243	132	187	119	9	80	5	58	3	3	2

Signal Information			
Cycle, s	51.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	20.0	2.2	16.9	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		7.0		7.0		12.0		12.0
Phase Duration, s		24.0		24.0		20.9		6.2
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (*MAH*), s		3.3		3.3		3.2		3.1
Queue Clearance Time (g_s), s		7.1		11.5		5.3		2.2
Green Extension Time (g_e), s		1.6		1.6		0.3		0.0
Phase Call Probability		1.00		1.00		0.89		0.11
Max Out Probability		0.00		0.00		0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h		268	142		329	10		154			9	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1895	1610		1376	1610		1726			1786	
Queue Service Time (g_s), s		0.0	3.0		4.4	0.2		3.3			0.2	
Cycle Queue Clearance Time (g_c), s		5.1	3.0		9.5	0.2		3.3			0.2	
Green Ratio (*g/C*)		0.39	0.39		0.39	0.39		0.33			0.04	
Capacity (*c*), veh/h		814	631		653	631		570			77	
Volume-to-Capacity Ratio (*X*)		0.329	0.225		0.504	0.015		0.270			0.112	
Available Capacity (c_a), veh/h		2654	2207		1971	2207		1014			1049	
Back of Queue (*Q*), veh/ln (50th percentile)		1.7	0.9		2.4	0.1		1.1			0.1	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00	0.00		0.00	0.00		0.00			0.00	
Uniform Delay (d_1), s/veh		11.0	10.4		12.2	9.5		12.6			23.5	
Incremental Delay (d_2), s/veh		0.1	0.1		0.2	0.0		0.1			0.2	
Initial Queue Delay (d_3), s/veh		0.0	0.0		0.0	0.0		0.0			0.0	
Control Delay (*d*), s/veh		11.1	10.4		12.4	9.5		12.7			23.7	
Level of Service (LOS)		B	B		B	A		B			C	
Approach Delay, s/veh / LOS	10.9	B		12.3	B		12.7	B		23.7	C	
Intersection Delay, s/veh / LOS	11.8						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.1	B	2.1	B	2.3	B	2.3	B
Bicycle LOS Score / LOS	1.2	A	1.0	A	0.7	A	0.5	A

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	BC
Agency/Co.	Kunzman Associates, Inc.
Date Performed	1/18/2016
Analysis Time Period	Morning Peak Hour

Site Information

Intersection	La Cadena/Stephens-I-215 SB
Jurisdiction	City of Riverside
Analysis Year	Existing

Project ID *Center Street Warehouse*

East/West Street: *Stephens Avenue/I-215 FWY SB* North/South Street: *La Cadena Drive*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	39	253	58	173	95	9
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	31	61	11	42	170	34
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LT	R	LT	R
PHF	0.95		0.95		0.95	0.95	0.95	0.95
Flow Rate (veh/h)	368		291		96	11	222	35
% Heavy Vehicles	0		0		0	0	0	0
No. Lanes	1		1		2		2	
Geometry Group	2		2		5		5	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.1		0.6		0.3	0.0	0.2	0.0
Prop. Right-Turns	0.2		0.0		0.0	1.0	0.0	1.0
Prop. Heavy Vehicle	0.0		0.0		0.0	0.0	0.0	0.0
hLT-adj	0.2	0.2	0.2	0.2	0.5	0.5	0.5	0.5
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.7	-0.7	-0.7	-0.7
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	-0.1		0.1		0.2	-0.7	0.1	-0.7

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20		3.20	3.20	3.20	3.20
x, initial	0.33		0.26		0.09	0.01	0.20	0.03
hd, final value (s)	5.52		5.82		7.15	6.25	6.74	5.92
x, final value	0.56		0.47		0.19	0.02	0.42	0.06
Move-up time, m (s)	2.0		2.0		2.3		2.3	
Service Time, t_s (s)	3.5		3.8		4.8	4.0	4.4	3.6

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	618		541		346	261	472	285
Delay (s/veh)	15.45		13.89		11.52	9.08	14.15	8.98
LOS	C		B		B	A	B	A
Approach: Delay (s/veh)	15.45		13.89		11.27		13.45	
LOS	C		B		B		B	
Intersection Delay (s/veh)	14.06							
Intersection LOS	B							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	BC
Agency/Co.	Kunzman Associates, Inc.
Date Performed	1/18/2016
Analysis Time Period	Evening Peak Hour

Site Information

Intersection	La Cadena/Stephens-I-215 SB
Jurisdiction	City of Riverside
Analysis Year	Existing

Project ID *Center Street Warehouse*

East/West Street: *Stephens Avenue/I-215 FWY SB* North/South Street: *La Cadena Drive*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	57	162	63	84	62	5
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	30	152	15	65	352	47
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LT	R	LT	R
PHF	0.96		0.96		0.96	0.96	0.96	0.96
Flow Rate (veh/h)	292		156		189	15	433	48
% Heavy Vehicles	0		0		0	0	0	0
No. Lanes	1		1		2		2	
Geometry Group	2		2		5		5	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.2		0.6		0.2	0.0	0.2	0.0
Prop. Right-Turns	0.2		0.0		0.0	1.0	0.0	1.0
Prop. Heavy Vehicle	0.0		0.0		0.0	0.0	0.0	0.0
hLT-adj	0.2	0.2	0.2	0.2	0.5	0.5	0.5	0.5
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.7	-0.7	-0.7	-0.7
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	-0.1		0.1		0.1	-0.7	0.1	-0.7

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20		3.20	3.20	3.20	3.20
x, initial	0.26		0.14		0.17	0.01	0.38	0.04
hd, final value (s)	6.26		6.80		7.01	6.21	6.50	5.71
x, final value	0.51		0.29		0.37	0.03	0.78	0.08
Move-up time, m (s)	2.0		2.0		2.3		2.3	
Service Time, t_s (s)	4.3		4.8		4.7	3.9	4.2	3.4

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	532		406		439	265	542	298
Delay (s/veh)	15.56		12.62		13.73	9.07	28.70	8.88
LOS	C		B		B	A	D	A
Approach: Delay (s/veh)	15.56		12.62		13.39		26.72	
LOS	C		B		B		D	
Intersection Delay (s/veh)	19.50							
Intersection LOS	C							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*BC*
Agency/Co.	*Kunzman Associates, Inc.*
Date Performed	*1/18/2016*
Analysis Time Period	*Morning Peak Hour*

Site Information

Intersection	*La Cadena/Highgrove-I-215 NB*
Jurisdiction	*City of Riverside*
Analysis Year	*Existing*

Project ID *Center Street Warehouse*

East/West Street: *Highgrove Place/I-215 FWY NB* North/South Street: *La Cadena Drive*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	45	162	0	29	0	4
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	0	32	38	1	77	0
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT		L	R	TR		LT	
PHF	0.89		0.89	0.89	0.89		0.89	
Flow Rate (veh/h)	232		32	4	77		87	
% Heavy Vehicles	0		0	0	0		0	
No. Lanes	1		2		1		1	
Geometry Group	4a		5		2		2	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.2		1.0	0.0	0.0		0.0	
Prop. Right-Turns	0.0		0.0	1.0	0.5		0.0	
Prop. Heavy Vehicle	0.0		0.0	0.0	0.0		0.0	
hLT-adj	0.2	0.2	0.5	0.5	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.7	-0.7	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	0.0		0.5	-0.7	-0.3		0.0	

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20	3.20	3.20		3.20	
x, initial	0.21		0.03	0.00	0.07		0.08	
hd, final value (s)	4.49		5.59	4.38	4.32		4.63	
x, final value	0.29		0.05	0.00	0.09		0.11	
Move-up time, m (s)	2.0		2.3		2.0		2.0	
Service Time, t_s (s)	2.5		3.3	2.1	2.3		2.6	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	482		282	254	327		337	
Delay (s/veh)	9.30		8.58	7.11	7.76		8.21	
LOS	A		A	A	A		A	
Approach: Delay (s/veh)	9.30		8.42		7.76		8.21	
LOS	A		A		A		A	
Intersection Delay (s/veh)	8.73							
Intersection LOS	A							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*BC*
Agency/Co.	*Kunzman Associates, Inc.*
Date Performed	*1/18/2016*
Analysis Time Period	*Evening Peak Hour*

Site Information

Intersection	*La Cadena/Highgrove-I-215 NB*
Jurisdiction	*City of Riverside*
Analysis Year	*Existing*

Project ID *Center Street Warehouse*

East/West Street: *Highgrove Place/I-215 FWY NB* North/South Street: *La Cadena Drive*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	26	210	0	19	0	3
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	0	94	65	1	153	0
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT		L	R	TR		LT	
PHF	0.91		0.91	0.91	0.91		0.91	
Flow Rate (veh/h)	258		20	3	174		169	
% Heavy Vehicles	0		0	0	0		0	
No. Lanes	1		2		1		1	
Geometry Group	4a		5		2		2	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.1		1.0	0.0	0.0		0.0	
Prop. Right-Turns	0.0		0.0	1.0	0.4		0.0	
Prop. Heavy Vehicle	0.0		0.0	0.0	0.0		0.0	
hLT-adj	0.2	0.2	0.5	0.5	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.7	-0.7	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	0.0		0.5	-0.7	-0.2		0.0	

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20	3.20	3.20		3.20	
x, initial	0.23		0.02	0.00	0.15		0.15	
hd, final value (s)	4.91		6.16	4.95	4.61		4.85	
x, final value	0.35		0.03	0.00	0.22		0.23	
Move-up time, m (s)	2.0		2.3		2.0		2.0	
Service Time, t_s (s)	2.9		3.9	2.6	2.6		2.9	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	508		270	253	424		419	
Delay (s/veh)	10.56		9.08	7.67	8.93		9.28	
LOS	B		A	A	A		A	
Approach: Delay (s/veh)	10.56		8.89		8.93		9.28	
LOS	B		A		A		A	
Intersection Delay (s/veh)	9.70							
Intersection LOS	A							

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*BC*
Agency/Co.	*Kunzman Associates, Inc.*
Date Performed	*1/18/2016*
Analysis Time Period	*Morning Peak Hour*

Site Information

Intersection	*Highgrove Place/Center Street*
Jurisdiction	*City of Riverside*
Analysis Year	*Existing*

Project Description *Center Street Warehouse*

East/West Street: *Center Street* | North/South Street: *Highgrove Place*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*1*	*205*	*0*	*11*	*388*	*5*
Peak-Hour Factor, PHF	*0.91*	*0.91*	*0.91*	*0.91*	*0.91*	*0.91*
Hourly Flow Rate, HFR (veh/h)	*1*	*225*	*0*	*12*	*426*	*5*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*1*	*0*	*1*	*0*
Configuration	*LT*		*R*	*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*50*	*1*	*151*	*2*	*1*	*22*
Peak-Hour Factor, PHF	*0.91*	*0.91*	*0.91*	*0.91*	*0.91*	*0.91*
Hourly Flow Rate, HFR (veh/h)	*54*	*1*	*165*	*2*	*1*	*24*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*1*	*0*	*1*	*0*
Configuration	*LT*		*R*		*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*	*LTR*	*LT*		*R*		*LTR*	
v (veh/h)	*1*	*12*	*55*		*165*		*27*	
C (m) (veh/h)	*1139*	*1356*	*343*		*819*		*556*	
v/c	*0.00*	*0.01*	*0.16*		*0.20*		*0.05*	
95% queue length	*0.00*	*0.03*	*0.56*		*0.75*		*0.15*	
Control Delay (s/veh)	*8.2*	*7.7*	*17.5*		*10.5*		*11.8*	
LOS	*A*	*A*	*C*		*B*		*B*	
Approach Delay (s/veh)	--	--	*12.2*			*11.8*		
Approach LOS	--	--	*B*			*B*		

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*BC*
Agency/Co.	*Kunzman Associates, Inc.*
Date Performed	*1/18/2016*
Analysis Time Period	*Evening Peak Hour*

Site Information

Intersection	*Highgrove Place/Center Street*
Jurisdiction	*City of Riverside*
Analysis Year	*Existing*

Project Description *Center Street Warehouse*

East/West Street: *Center Street* | North/South Street: *Highgrove Place*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*2*	*253*	*0*	*8*	*228*	*9*
Peak-Hour Factor, PHF	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*
Hourly Flow Rate, HFR (veh/h)	*2*	*263*	*0*	*8*	*237*	*9*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*1*	*0*	*1*	*0*
Configuration	*LT*		*R*	*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*50*	*2*	*229*	*5*	*1*	*18*
Peak-Hour Factor, PHF	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*
Hourly Flow Rate, HFR (veh/h)	*52*	*2*	*238*	*5*	*1*	*18*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*1*	*0*	*1*	*0*
Configuration	*LT*		*R*		*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*	*LTR*	*LT*		*R*		*LTR*	
v (veh/h)	*2*	*8*	*54*		*238*		*24*	
C (m) (veh/h)	*1332*	*1313*	*446*		*781*		*553*	
v/c	*0.00*	*0.01*	*0.12*		*0.30*		*0.04*	
95% queue length	*0.00*	*0.02*	*0.41*		*1.29*		*0.14*	
Control Delay (s/veh)	*7.7*	*7.8*	*14.2*		*11.6*		*11.8*	
LOS	*A*	*A*	*B*		*B*		*B*	
Approach Delay (s/veh)	--	--	*12.1*			*11.8*		
Approach LOS	--	--	*B*			*B*		

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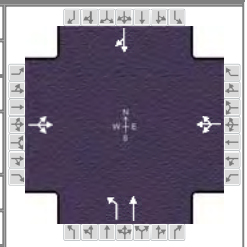
HCS 2010 Signalized Intersection Results Summary

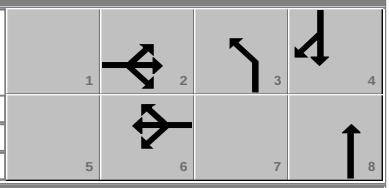
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Morning Peak Hour	PHF	0.90
Intersection	Iowa Avenue-I-215 NB Ran	Analysis Year	Existing	Analysis Period	1> 7:00
File Name	AME9.xus				
Project Description	Center Street Warehouse				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	91	0	773	0	0	0	284	440			13	232

Signal Information			
Cycle, s	73.9	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	37.0	14.9	10.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8		4
Case Number		8.0		8.0	2.0	4.0		8.3
Phase Duration, s		41.0		41.0	18.9	32.9		14.0
Change Period, ($Y+R_c$), s		4.0		4.0	4.0	4.0		4.0
Max Allow Headway (*MAH*), s		3.3		0.0	3.1	3.1		3.1
Queue Clearance Time (g_s), s		39.0			14.5	17.6		12.0
Green Extension Time (g_e), s		0.0		0.0	0.5	1.5		0.0
Phase Call Probability		1.00			1.00	1.00		1.00
Max Out Probability		1.00			0.00	0.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8			4	14
Adjusted Flow Rate (*v*), veh/h		960			0		316	489			272	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1600			0		1810	1900			1623	
Queue Service Time (g_s), s		29.5			0.0		12.5	15.6			10.0	
Cycle Queue Clearance Time (g_c), s		37.0			0.0		12.5	15.6			10.0	
Green Ratio (*g/C*)		0.50					0.20	0.39			0.14	
Capacity (*c*), veh/h		855					365	743			220	
Volume-to-Capacity Ratio (*X*)		1.123			0.000		0.865	0.658			1.239	
Available Capacity (c_a), veh/h		855					612	1028			220	
Back of Queue (*Q*), veh/ln (50th percentile)		29.9			0.0		5.4	6.3			12.3	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00		0.00	0.00			0.00	
Uniform Delay (d_1), s/veh		19.5					28.5	18.4			32.0	
Incremental Delay (d_2), s/veh		70.5			0.0		3.3	0.4			140.3	
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0			0.0	
Control Delay (*d*), s/veh		90.1					31.8	18.8			172.2	
Level of Service (LOS)		F					C	B			F	
Approach Delay, s/veh / LOS	90.1	F		0.0			23.9	C		172.2	F	
Intersection Delay, s/veh / LOS	74.9						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	2.1	B	2.1	B	2.1	B
Bicycle LOS Score / LOS	2.1	B	0.5	A	1.8	A	0.9	A

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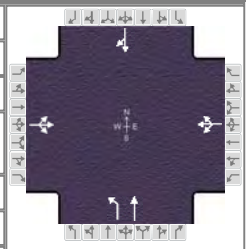
HCS 2010 Signalized Intersection Results Summary

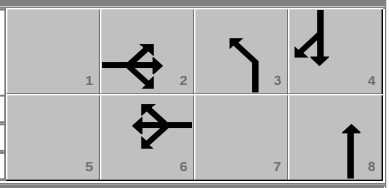
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Evening Peak Hour	PHF	0.88
Intersection	Iowa Avenue-I-215 NB Ran	Analysis Year	Existing	Analysis Period	1> 7:00
File Name	PME9.xus				
Project Description	Center Street Warehouse				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	121	0	764	0	0	0	327	548			21	317

Signal Information			
Cycle, s	68.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	30.0	16.0	10.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8		4
Case Number		8.0		8.0	2.0	4.0		8.3
Phase Duration, s		34.0		34.0	20.0	34.0		14.0
Change Period, ($Y+R_c$), s		4.0		4.0	4.0	4.0		4.0
Max Allow Headway (*MAH*), s		3.3		0.0	3.1	3.1		3.1
Queue Clearance Time (g_s), s		32.0			15.4	20.5		12.0
Green Extension Time (g_e), s		0.0		0.0	0.6	2.2		0.0
Phase Call Probability		1.00			1.00	1.00		1.00
Max Out Probability		1.00			0.01	0.01		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8			4	14
Adjusted Flow Rate (*v*), veh/h		1006			0		372	623			384	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1593			0		1810	1900			1626	
Queue Service Time (g_s), s		25.7			0.0		13.4	18.5			10.0	
Cycle Queue Clearance Time (g_c), s		30.0			0.0		13.4	18.5			10.0	
Green Ratio (*g/C*)		0.44					0.24	0.44			0.15	
Capacity (*c*), veh/h		763					425	838			239	
Volume-to-Capacity Ratio (*X*)		1.318			0.000		0.874	0.743			1.606	
Available Capacity (c_a), veh/h		763					666	1118			239	
Back of Queue (*Q*), veh/ln (50th percentile)		43.1			0.0		5.9	7.1			23.0	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00		0.00	0.00			0.00	
Uniform Delay (d_1), s/veh		20.1					25.0	15.8			29.0	
Incremental Delay (d_2), s/veh		152.1			0.0		5.0	1.1			291.4	
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0			0.0	
Control Delay (*d*), s/veh		172.2					30.1	16.9			320.4	
Level of Service (LOS)		F					C	B			F	
Approach Delay, s/veh / LOS	172.2	F		0.0			21.8	C		320.4	F	
Intersection Delay, s/veh / LOS	133.4						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	2.1	B	2.1	B
Bicycle LOS Score / LOS	2.1	B	0.5	A	2.1	B	1.1	A

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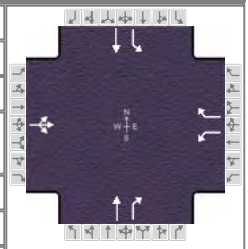
HCS 2010 Signalized Intersection Results Summary

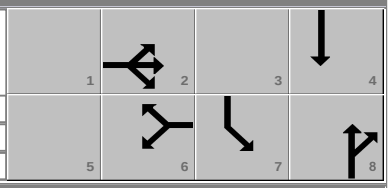
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Morning Peak Hour	PHF	0.82
Intersection	Iowa Avenue/Main Street	Analysis Year	Existing	Analysis Period	1> 7:00
File Name	AME10.xus				
Project Description	Center Street Warehouse				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	0	0	0	103		268		429	0	216	592	

Signal Information			
Cycle, s	50.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	12.5	9.7	15.7	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8	7	4
Case Number		8.0		5.0		7.3	2.0	4.0
Phase Duration, s		16.5		16.5		19.7	13.7	33.4
Change Period, ($Y+R_c$), s		4.0		4.0		4.0	4.0	4.0
Max Allow Headway (*MAH*), s		0.0		3.3		3.0	3.1	3.0
Queue Clearance Time (g_s), s				11.5		15.0	8.9	14.6
Green Extension Time (g_e), s		0.0		1.0		0.6	0.3	1.6
Phase Call Probability				1.00		1.00	0.97	1.00
Max Out Probability				0.00		0.59	0.07	0.53

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1		16		8	18	7	4	
Adjusted Flow Rate (*v*), veh/h		0		126		327		523	0	263	722	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		0		1810		1610		1900	1610	1810	1900	
Queue Service Time (g_s), s		0.0		2.8		9.5		13.0	0.0	6.9	12.6	
Cycle Queue Clearance Time (g_c), s		0.0		2.8		9.5		13.0	0.0	6.9	12.6	
Green Ratio (*g/C*)				0.25		0.25		0.31	0.31	0.20	0.59	
Capacity (*c*), veh/h				598		404		597	506	353	1119	
Volume-to-Capacity Ratio (*X*)		0.000		0.210		0.809		0.876	0.000	0.747	0.645	
Available Capacity (c_a), veh/h				1591		1288		760	644	543	1119	
Back of Queue (*Q*), veh/ln (50th percentile)		0.0		1.0		3.1		6.0	0.0	2.6	3.3	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00		0.00		0.00		0.00	0.00	0.00	0.00	
Uniform Delay (d_1), s/veh				15.1		17.6		16.2	0.0	19.0	6.8	
Incremental Delay (d_2), s/veh		0.0		0.1		1.5		8.0	0.0	1.2	1.0	
Initial Queue Delay (d_3), s/veh		0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh				15.1		19.1		24.2	0.0	20.2	7.8	
Level of Service (LOS)				B		B		C		C	A	
Approach Delay, s/veh / LOS	0.0			18.0		B	24.2		C	11.1		B
Intersection Delay, s/veh / LOS	16.2						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.3	B	1.3	A
Bicycle LOS Score / LOS	0.5	A		F	1.4	A	2.1	B

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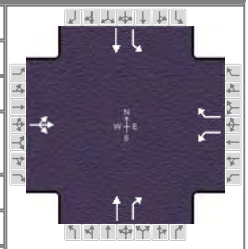
HCS 2010 Signalized Intersection Results Summary

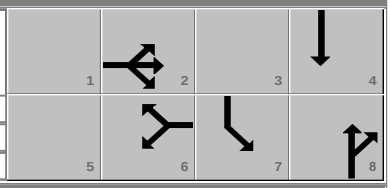
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Evening Peak Hour	PHF	0.95
Intersection	Iowa Avenue/Main Street	Analysis Year	Existing	Analysis Period	1> 7:00
File Name	PME10.xus				
Project Description	Center Street Warehouse				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	0	0	0	112		164		731	0	113	676	

Signal Information			
Cycle, s	51.2	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	7.8	9.0	22.4	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8	7	4
Case Number		8.0		5.0		7.3	2.0	4.0
Phase Duration, s		11.8		11.8		26.4	13.0	39.4
Change Period, ($Y+R_c$), s		4.0		4.0		4.0	4.0	4.0
Max Allow Headway (*MAH*), s		0.0		3.2		3.0	3.1	3.0
Queue Clearance Time (g_s), s				7.2		21.6	5.0	11.5
Green Extension Time (g_e), s		0.0		0.6		0.8	0.1	2.6
Phase Call Probability				1.00		1.00	0.82	1.00
Max Out Probability				0.00		0.93	0.00	0.31

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1		16		8	18	7	4	
Adjusted Flow Rate (*v*), veh/h		0		118		173		769	0	119	712	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		0		1810		1610		1900	1610	1810	1900	
Queue Service Time (g_s), s		0.0		3.0		5.2		19.6	0.0	3.0	9.5	
Cycle Queue Clearance Time (g_c), s		0.0		3.0		5.2		19.6	0.0	3.0	9.5	
Green Ratio (*g/C*)				0.15		0.15		0.44	0.44	0.18	0.69	
Capacity (*c*), veh/h				416		246		832	705	318	1314	
Volume-to-Capacity Ratio (*X*)		0.000		0.283		0.703		0.925	0.000	0.374	0.542	
Available Capacity (c_a), veh/h				1553		1257		927	786	530	1314	
Back of Queue (*Q*), veh/ln (50th percentile)		0.0		1.1		1.8		9.4	0.0	1.1	1.6	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00		0.00		0.00		0.00	0.00	0.00	0.00	
Uniform Delay (d_1), s/veh				19.7		20.6		13.6	0.0	18.6	3.9	
Incremental Delay (d_2), s/veh		0.0		0.1		1.4		13.2	0.0	0.3	0.3	
Initial Queue Delay (d_3), s/veh		0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh				19.8		22.0		26.8	0.0	18.9	4.2	
Level of Service (LOS)				B		C		C		B	A	
Approach Delay, s/veh / LOS	0.0			21.1		C	26.8		C	6.3		A
Intersection Delay, s/veh / LOS	16.9						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.2	B	1.3	A
Bicycle LOS Score / LOS	0.5	A		F	1.8	A	1.9	A

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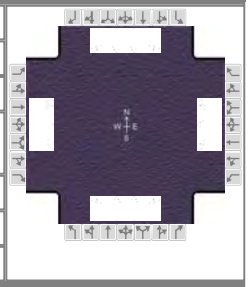
HCS 2010 Signalized Intersection Results Summary

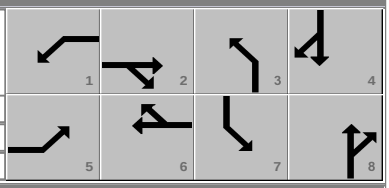
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Morning Peak Hour	PHF	0.90
Intersection	Iowa Avenue/Center Street	Analysis Year	Existing	Analysis Period	1> 7:00
File Name	AME11.xus				
Project Description	Center Street Warehouse				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	82	182	74	126	255	55	66	333	79	28	555	82

Signal Information			
Cycle, s	51.9	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.6	1.2	9.2	3.3	2.6	12.9
Yellow	4.0	0.0	4.0	4.0	0.0	4.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	4.0	2.0	3.0	2.0	3.0	2.0	3.0
Phase Duration, s	10.6	13.2	11.8	14.5	9.9	19.5	7.3	16.9
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (*MAH*), s	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	4.4	5.7	5.7	9.3	3.9	6.1	2.9	10.0
Green Extension Time (g_e), s	0.1	1.1	0.2	1.2	0.1	2.6	0.0	2.8
Phase Call Probability	0.73	1.00	0.87	1.00	0.65	1.00	0.36	1.00
Max Out Probability	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	91	146	139	140	283	61	73	370	88	31	617	91
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1900	1717	1810	1900	1610	1810	1809	1610	1810	1809	1610
Queue Service Time (g_s), s	2.4	3.6	3.7	3.7	7.3	1.6	1.9	4.1	2.1	0.9	8.0	2.3
Cycle Queue Clearance Time (g_c), s	2.4	3.6	3.7	3.7	7.3	1.6	1.9	4.1	2.1	0.9	8.0	2.3
Green Ratio (*g/C*)	0.13	0.18	0.18	0.15	0.20	0.20	0.11	0.30	0.30	0.06	0.25	0.25
Capacity (*c*), veh/h	230	339	307	273	384	325	206	1083	482	114	900	401
Volume-to-Capacity Ratio (*X*)	0.395	0.430	0.452	0.513	0.738	0.188	0.356	0.342	0.182	0.272	0.685	0.227
Available Capacity (c_a), veh/h	696	731	661	696	1462	1239	696	1392	620	696	2785	1239
Back of Queue (*Q*), veh/ln (50th percentile)	0.9	1.4	1.3	1.4	2.9	0.5	0.8	1.5	0.7	0.3	2.9	0.8
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	20.8	19.0	19.1	20.3	19.4	17.2	21.3	14.2	13.5	23.2	17.7	15.5
Incremental Delay (d_2), s/veh	0.4	0.3	0.4	0.6	1.1	0.1	0.4	0.1	0.1	0.5	0.3	0.1
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	21.2	19.3	19.5	20.9	20.5	17.3	21.7	14.3	13.6	23.7	18.0	15.6
Level of Service (LOS)	C	B	B	C	C	B	C	B	B	C	B	B
Approach Delay, s/veh / LOS	19.8	B		20.2	C		15.2	B		18.0	B	
Intersection Delay, s/veh / LOS	18.1						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	2.9	C	2.8	C	2.4	B
Bicycle LOS Score / LOS	0.8	A	1.3	A	0.9	A	1.1	A

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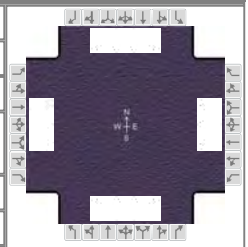
HCS 2010 Signalized Intersection Results Summary

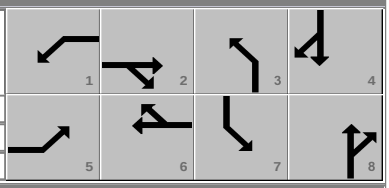
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Evening Peak Hour	PHF	0.97
Intersection	Iowa Avenue/Center Street	Analysis Year	Existing	Analysis Period	1> 7:00
File Name	PME11.xus				
Project Description	Center Street Warehouse				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	170	239	78	120	105	24	78	612	67	42	636	54

Signal Information			
Cycle, s	50.5	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.6	0.7	8.0	3.7	1.8	13.8
Yellow	4.0	0.0	4.0	4.0	0.0	4.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	4.0	2.0	3.0	2.0	3.0	2.0	3.0
Phase Duration, s	11.3	12.7	10.6	12.0	9.4	19.5	7.7	17.8
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (*MAH*), s	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	6.6	6.2	5.2	4.6	4.1	9.4	3.1	10.1
Green Extension Time (g_e), s	0.2	0.7	0.2	0.8	0.1	2.9	0.0	3.6
Phase Call Probability	0.91	1.00	0.82	1.00	0.68	1.00	0.46	1.00
Max Out Probability	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	175	167	159	124	108	25	80	631	69	43	656	56
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1900	1742	1810	1900	1610	1810	1809	1610	1810	1809	1610
Queue Service Time (g_s), s	4.6	4.0	4.2	3.2	2.6	0.7	2.1	7.4	1.6	1.1	8.1	1.3
Cycle Queue Clearance Time (g_c), s	4.6	4.0	4.2	3.2	2.6	0.7	2.1	7.4	1.6	1.1	8.1	1.3
Green Ratio (*g/C*)	0.14	0.17	0.17	0.13	0.16	0.16	0.11	0.31	0.31	0.07	0.27	0.27
Capacity (*c*), veh/h	262	328	301	236	301	255	194	1113	495	131	986	439
Volume-to-Capacity Ratio (*X*)	0.668	0.511	0.530	0.523	0.360	0.097	0.414	0.567	0.139	0.331	0.665	0.127
Available Capacity (c_a), veh/h	716	752	689	716	1504	1274	716	1432	637	716	2863	1274
Back of Queue (*Q*), veh/ln (50th percentile)	1.8	1.6	1.5	1.3	1.0	0.2	0.8	2.5	0.5	0.5	2.9	0.4
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	20.5	19.0	19.0	20.5	19.0	18.2	21.1	14.7	12.7	22.3	16.3	13.8
Incremental Delay (d_2), s/veh	1.1	0.5	0.5	0.7	0.3	0.1	0.5	0.2	0.0	0.5	0.3	0.0
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	21.6	19.4	19.6	21.2	19.3	18.2	21.6	14.8	12.7	22.8	16.6	13.9
Level of Service (LOS)	C	B	B	C	B	B	C	B	B	C	B	B
Approach Delay, s/veh / LOS	20.2	C		20.1	C		15.3	B		16.8	B	
Intersection Delay, s/veh / LOS	17.4						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	2.9	C	2.8	C	2.4	B
Bicycle LOS Score / LOS	0.9	A	0.9	A	1.1	A	1.1	A

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Existing Plus Project

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*BC*	Intersection	*Main Street/Center Street*
Agency/Co.	*Kunzman Associates, Inc.*	Jurisdiction	*City of Riverside*
Date Performed	*1/18/2016*	Analysis Year	*Existing Plus Project*
Analysis Time Period	*Morning Peak Hour*		

Project Description *Center Street Warehouse*

East/West Street: *Center Street* | North/South Street: *Main Street/Riverside Avenue*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*633*	*61*	*106*	*645*	
Peak-Hour Factor, PHF	*1.00*	*0.95*	*0.95*	*0.95*	*0.95*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*666*	*64*	*111*	*678*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Two Way Left Turn Lane*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*1*	*1*	*2*	*0*
Configuration		*T*	*R*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*40*	*0*	*111*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.95*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*42*	*0*	*116*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*1*	*0*
Configuration					*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*		*LTR*				
v (veh/h)		*111*		*158*				
C (m) (veh/h)		*883*		*510*				
v/c		*0.13*		*0.31*				
95% queue length		*0.43*		*1.31*				
Control Delay (s/veh)		*9.7*		*15.2*				
LOS		*A*		*C*				
Approach Delay (s/veh)	--	--	*15.2*					
Approach LOS	--	--	*C*					

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*BC*	Intersection	*Main Street/Center Street*
Agency/Co.	*Kunzman Associates, Inc.*	Jurisdiction	*City of Riverside*
Date Performed	*1/18/2016*	Analysis Year	*Existing Plus Project*
Analysis Time Period	*Evening Peak Hour*		

Project Description *Center Street Warehouse*

East/West Street: *Center Street* | North/South Street: *Main Street/Riverside Avenue*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*717*	*108*	*155*	*832*	
Peak-Hour Factor, PHF	*1.00*	*0.93*	*0.93*	*0.93*	*0.93*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*770*	*116*	*166*	*894*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Two Way Left Turn Lane*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*1*	*1*	*2*	*0*
Configuration		*T*	*R*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*43*	*0*	*130*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.93*	*1.00*	*0.93*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*46*	*0*	*139*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*1*	*0*
Configuration					*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*		*LTR*				
v (veh/h)		*166*		*185*				
C (m) (veh/h)		*773*		*429*				
v/c		*0.21*		*0.43*				
95% queue length		*0.81*		*2.13*				
Control Delay (s/veh)		*10.9*		*19.6*				
LOS		*B*		*C*				
Approach Delay (s/veh)	--	--	*19.6*					
Approach LOS	--	--	*C*					

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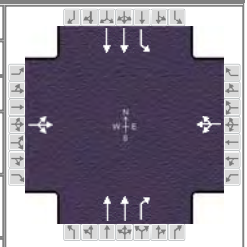
HCS 2010 Signalized Intersection Results Summary

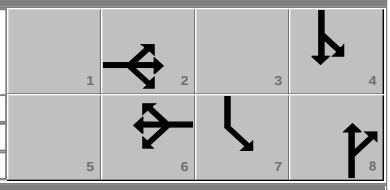
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Morning Peak Hour	PHF	0.95
Intersection	Main Street/Riverside Aven	Analysis Year	Existing Plus Project	Analysis Period	1> 7:00
File Name	AMEP1I.xus				
Project Description	Center Street Warehouse - With Improvements				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	0	0	0	40	0	111		633	61	106	645	

Signal Information			
Cycle, s	51.1	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	14.0	11.1	14.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8	7	4
Case Number		8.0		8.0		7.3	1.0	4.0
Phase Duration, s		18.0		18.0		18.0	15.1	33.1
Change Period, ($Y+R_c$), s		4.0		4.0		4.0	4.0	4.0
Max Allow Headway (*MAH*), s		0.0		3.3		3.0	3.1	3.0
Queue Clearance Time (g_s), s				5.9		10.4	3.6	7.1
Green Extension Time (g_e), s		0.0		0.3		3.4	0.2	3.6
Phase Call Probability				1.00		1.00	0.80	1.00
Max Out Probability				0.00		0.01	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16		8	18	7	4	
Adjusted Flow Rate (*v*), veh/h		0			159			666	64	112	679	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		0			1602			1809	1610	1810	1809	
Queue Service Time (g_s), s		0.0			0.0			8.4	1.5	1.6	5.1	
Cycle Queue Clearance Time (g_c), s		0.0			3.9			8.4	1.5	1.6	5.1	
Green Ratio (*g/C*)					0.27			0.27	0.27	0.53	0.57	
Capacity (*c*), veh/h					528			991	441	621	2061	
Volume-to-Capacity Ratio (*X*)		0.000			0.301			0.673	0.146	0.180	0.329	
Available Capacity (c_a), veh/h					1016			2122	944	1288	2122	
Back of Queue (*Q*), veh/ln (50th percentile)		0.0			1.3			3.0	0.5	0.4	1.3	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00			0.00	0.00	0.00	0.00	
Uniform Delay (d_1), s/veh					14.9			16.5	14.0	7.2	5.8	
Incremental Delay (d_2), s/veh		0.0			0.1			0.3	0.1	0.1	0.0	
Initial Queue Delay (d_3), s/veh		0.0			0.0			0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh					15.0			16.8	14.1	7.3	5.9	
Level of Service (LOS)					B			B	B	A	A	
Approach Delay, s/veh / LOS	0.0			15.0		B	16.6		B	6.1		A
Intersection Delay, s/veh / LOS	11.5						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.8	C	2.1	B	2.1	B
Bicycle LOS Score / LOS	0.5	A	0.7	A	1.1	A	1.1	A

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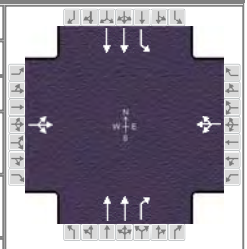
HCS 2010 Signalized Intersection Results Summary

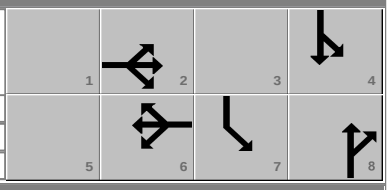
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Evening Peak Hour	PHF	0.93
Intersection	Main Street/Riverside Aven	Analysis Year	Existing Plus Project	Analysis Period	1> 7:00
File Name	PMEP1I.xus				
Project Description	Center Street Warehouse - With Improvements				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	0	0	0	43	0	130		717	108	155	832	

Signal Information			
Cycle, s	50.5	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	12.0	10.8	15.6	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8	7	4
Case Number		8.0		8.0		7.3	1.0	4.0
Phase Duration, s		16.0		16.0		19.6	14.8	34.5
Change Period, ($Y+R_c$), s		4.0		4.0		4.0	4.0	4.0
Max Allow Headway (*MAH*), s		0.0		3.3		3.0	3.1	3.0
Queue Clearance Time (g_s), s				6.9		11.4	4.2	8.6
Green Extension Time (g_e), s		0.0		0.4		3.7	0.3	4.8
Phase Call Probability				1.00		1.00	0.90	1.00
Max Out Probability				0.00		0.05	0.00	0.03

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16		8	18	7	4	
Adjusted Flow Rate (*v*), veh/h		0			186			771	116	167	895	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		0			1603			1809	1610	1810	1809	
Queue Service Time (g_s), s		0.0			0.6			9.4	2.7	2.2	6.6	
Cycle Queue Clearance Time (g_c), s		0.0			4.9			9.4	2.7	2.2	6.6	
Green Ratio (*g/C*)					0.24			0.31	0.31	0.56	0.60	
Capacity (*c*), veh/h					470			1120	498	618	2184	
Volume-to-Capacity Ratio (*X*)		0.000			0.396			0.689	0.233	0.270	0.410	
Available Capacity (c_a), veh/h					1028			2151	957	1305	2184	
Back of Queue (*Q*), veh/ln (50th percentile)		0.0			1.6			3.3	0.8	0.6	1.5	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00			0.00	0.00	0.00	0.00	
Uniform Delay (d_1), s/veh					16.5			15.3	13.0	7.0	5.3	
Incremental Delay (d_2), s/veh		0.0			0.2			0.3	0.1	0.1	0.0	
Initial Queue Delay (d_3), s/veh		0.0			0.0			0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh					16.7			15.6	13.1	7.1	5.3	
Level of Service (LOS)					B			B	B	A	A	
Approach Delay, s/veh / LOS	0.0			16.7		B	15.2		B	5.6		A
Intersection Delay, s/veh / LOS	10.6						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.8	C	2.1	B	2.0	B
Bicycle LOS Score / LOS	0.5	A	0.8	A	1.2	A	1.4	A

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*BC*
Agency/Co.	*Kunzman Associates, Inc.*
Date Performed	*1/18/2016*
Analysis Time Period	*Morning Peak Hour*

Site Information

Intersection	*Project West Acc/Center Street*
Jurisdiction	*City of Riverside*
Analysis Year	*Existing Plus Project*

Project Description *Center Street Warehouse*

East/West Street: *Center Street* | North/South Street: *Project West Access*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*162*	*38*	*64*	*163*	
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*170*	*40*	*67*	*171*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*1*	*1*	*1*	*0*
Configuration		*T*	*R*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*11*	*0*	*18*			
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*11*	*0*	*18*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*0*	*0*
Configuration		*LTR*				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*		*LTR*				
v (veh/h)		*67*		*29*				
C (m) (veh/h)		*1373*		*700*				
v/c		*0.05*		*0.04*				
95% queue length		*0.15*		*0.13*				
Control Delay (s/veh)		*7.8*		*10.4*				
LOS		*A*		*B*				
Approach Delay (s/veh)	--	--	*10.4*					
Approach LOS	--	--	*B*					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*BC*
Agency/Co.	*Kunzman Associates, Inc.*
Date Performed	*1/18/2016*
Analysis Time Period	*Evening Peak Hour*

Site Information

Intersection	*Project West Acc/Center Street*
Jurisdiction	*City of Riverside*
Analysis Year	*Existing Plus Project*

Project Description *Center Street Warehouse*

East/West Street: *Center Street* | North/South Street: *Project West Access*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*255*	*17*	*30*	*136*	
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*268*	*17*	*31*	*143*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*1*	*1*	*1*	*0*
Configuration		*T*	*R*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*31*	*0*	*53*			
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*32*	*0*	*55*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*0*	*0*
Configuration		*LTR*				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*		*LTR*				
v (veh/h)		*31*		*87*				
C (m) (veh/h)		*1289*		*669*				
v/c		*0.02*		*0.13*				
95% queue length		*0.07*		*0.45*				
Control Delay (s/veh)		*7.9*		*11.2*				
LOS		*A*		*B*				
Approach Delay (s/veh)	--	--	*11.2*					
Approach LOS	--	--	*B*					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*BC*
Agency/Co.	*Kunzman Associates, Inc.*
Date Performed	*1/18/2016*
Analysis Time Period	*Morning Peak Hour*

Site Information

Intersection	*Project East Acc/Center Street*
Jurisdiction	*City of Riverside*
Analysis Year	*Existing Plus Project*

Project Description *Center Street Warehouse*

East/West Street: *Center Street* | North/South Street: *Project EastAccess*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*162*	*18*	*115*	*222*	
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*170*	*18*	*121*	*233*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*1*	*1*	*1*	*0*
Configuration		*T*	*R*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*5*	*0*	*32*			
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*5*	*0*	*33*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*0*	*0*
Configuration		*LTR*				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*		*LTR*				
v (veh/h)		*121*		*38*				
C (m) (veh/h)		*1398*		*760*				
v/c		*0.09*		*0.05*				
95% queue length		*0.28*		*0.16*				
Control Delay (s/veh)		*7.8*		*10.0*				
LOS		*A*		*A*				
Approach Delay (s/veh)	--	--	*10.0*					
Approach LOS	--	--	*A*					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*BC*
Agency/Co.	*Kunzman Associates, Inc.*
Date Performed	*1/18/2016*
Analysis Time Period	*Evening Peak Hour*

Site Information

Intersection	*Project East Acc/Center Street*
Jurisdiction	*City of Riverside*
Analysis Year	*Existing Plus Project*

Project Description *Center Street Warehouse*

East/West Street: *Center Street* | North/South Street: *Project EastAccess*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*300*	*8*	*53*	*151*	
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*315*	*8*	*55*	*158*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*1*	*1*	*1*	*0*
Configuration		*T*	*R*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*15*	*0*	*95*			
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*15*	*0*	*100*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*0*	*0*
Configuration		*LTR*				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*		*LTR*				
v (veh/h)		*55*		*115*				
C (m) (veh/h)		*1248*		*677*				
v/c		*0.04*		*0.17*				
95% queue length		*0.14*		*0.61*				
Control Delay (s/veh)		*8.0*		*11.4*				
LOS		*A*		*B*				
Approach Delay (s/veh)	--	--	*11.4*					
Approach LOS	--	--	*B*					

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*BC*
Agency/Co.	*Kunzman Associates, Inc.*
Date Performed	*1/18/2016*
Analysis Time Period	*Morning Peak Hour*

Site Information

Intersection	*Orange Street/Center Street*
Jurisdiction	*City of Riverside*
Analysis Year	*Existing Plus Project*

Project ID *Center Street Warehouse*

East/West Street: *Center Street* North/South Street: *Orange Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	6	175	13	60	313	7
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	21	1	47	8	1	4
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.90		0.90		0.90		0.90	
Flow Rate (veh/h)	214		420		76		13	
% Heavy Vehicles	0		0		0		0	
No. Lanes	1		1		1		1	
Geometry Group	1		1		1		1	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.0		0.2		0.3		0.6	
Prop. Right-Turns	0.1		0.0		0.7		0.3	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	-0.0		0.0		-0.4		-0.1	

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20		3.20		3.20	
x, initial	0.19		0.37		0.07		0.01	
hd, final value (s)	4.56		4.40		5.00		5.40	
x, final value	0.27		0.51		0.11		0.02	
Move-up time, m (s)	2.0		2.0		2.0		2.0	
Service Time, t_s (s)	2.6		2.4		3.0		3.4	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	464		670		326		263	
Delay (s/veh)	9.25		11.95		8.59		8.51	
LOS	A		B		A		A	
Approach: Delay (s/veh)	9.25		11.95		8.59		8.51	
LOS	A		B		A		A	
Intersection Delay (s/veh)	10.74							
Intersection LOS	B							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*BC*
Agency/Co.	*Kunzman Associates, Inc.*
Date Performed	*1/18/2016*
Analysis Time Period	*Evening Peak Hour*

Site Information

Intersection	*Orange Street/Center Street*
Jurisdiction	*City of Riverside*
Analysis Year	*Existing Plus Project*

Project ID *Center Street Warehouse*

East/West Street: *Center Street* North/South Street: *Orange Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	3	373	19	68	185	7
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	17	1	133	18	7	2
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.84		0.84		0.84		0.84	
Flow Rate (veh/h)	469		308		179		31	
% Heavy Vehicles	0		0		0		0	
No. Lanes	1		1		1		1	
Geometry Group	1		1		1		1	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.0		0.3		0.1		0.7	
Prop. Right-Turns	0.0		0.0		0.9		0.1	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	-0.0		0.0		-0.5		0.1	

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20		3.20		3.20	
x, initial	0.42		0.27		0.16		0.03	
hd, final value (s)	4.92		5.18		5.39		6.34	
x, final value	0.64		0.44		0.27		0.05	
Move-up time, m (s)	2.0		2.0		2.0		2.0	
Service Time, t_s (s)	2.9		3.2		3.4		4.3	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	714		558		429		281	
Delay (s/veh)	16.30		12.25		10.34		9.71	
LOS	C		B		B		A	
Approach: Delay (s/veh)	16.30		12.25		10.34		9.71	
LOS	C		B		B		A	
Intersection Delay (s/veh)	13.75							
Intersection LOS	B							

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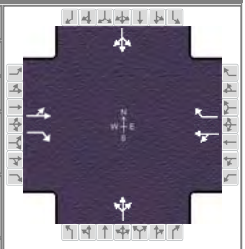
HCS 2010 Signalized Intersection Results Summary

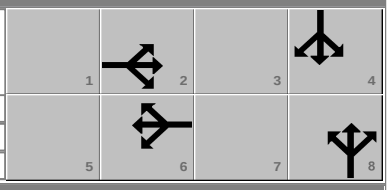
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Morning Peak Hour	PHF	0.91
Intersection	Stephens Avenue/Center S	Analysis Year	Existing Plus Project	Analysis Period	1> 7:00
File Name	AMEP5.xus				
Project Description	Center Street Warehouse				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	1	138	87	303	247	7	133	2	100	9	10	1

Signal Information			
Cycle, s	54.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	24.4	3.9	13.7	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		7.0		7.0		12.0		12.0
Phase Duration, s		28.4		28.4		17.7		7.9
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (*MAH*), s		3.2		3.2		3.2		3.1
Queue Clearance Time (g_s), s		4.6		22.5		9.1		2.6
Green Extension Time (g_e), s		1.9		1.9		0.5		0.0
Phase Call Probability		1.00		1.00		0.98		0.28
Max Out Probability		0.00		0.01		0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h		153	96		604	8		258			22	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1899	1610		1481	1610		1720			1842	
Queue Service Time (g_s), s		0.0	1.9		18.0	0.1		7.1			0.6	
Cycle Queue Clearance Time (g_c), s		2.6	1.9		20.5	0.1		7.1			0.6	
Green Ratio (*g/C*)		0.45	0.45		0.45	0.45		0.25			0.07	
Capacity (*c*), veh/h		924	726		771	726		436			135	
Volume-to-Capacity Ratio (*X*)		0.165	0.132		0.784	0.011		0.592			0.163	
Available Capacity (c_a), veh/h		1470	1191		1199	1191		954			1022	
Back of Queue (*Q*), veh/ln (50th percentile)		0.9	0.5		5.4	0.0		2.5			0.2	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00	0.00		0.00	0.00		0.00			0.00	
Uniform Delay (d_1), s/veh		8.9	8.7		13.8	8.2		17.7			23.5	
Incremental Delay (d_2), s/veh		0.0	0.0		0.7	0.0		0.5			0.2	
Initial Queue Delay (d_3), s/veh		0.0	0.0		0.0	0.0		0.0			0.0	
Control Delay (*d*), s/veh		8.9	8.7		14.5	8.2		18.2			23.7	
Level of Service (LOS)		A	A		B	A		B			C	
Approach Delay, s/veh / LOS	8.8	A		14.4	B		18.2	B		23.7	C	
Intersection Delay, s/veh / LOS	14.2						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.1	B	2.1	B	2.3	B	2.3	B
Bicycle LOS Score / LOS	0.9	A	1.5	A	0.9	A	0.5	A

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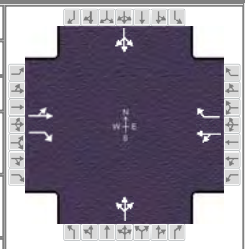
HCS 2010 Signalized Intersection Results Summary

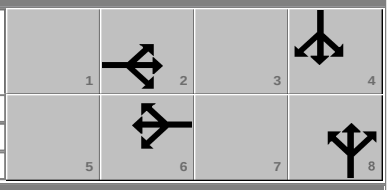
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Evening Peak Hour	PHF	0.93
Intersection	Stephens Avenue/Center S	Analysis Year	Existing Plus Project	Analysis Period	1> 7:00
File Name	PMEP5.xus				
Project Description	Center Street Warehouse				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	6	315	197	187	162	9	115	5	58	3	3	2

Signal Information			
Cycle, s	50.9	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	19.0	2.2	17.7	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		7.0		7.0		12.0		12.0
Phase Duration, s		23.0		23.0		21.7		6.2
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (*MAH*), s		3.3		3.3		3.2		3.1
Queue Clearance Time (g_s), s		9.1		14.0		6.1		2.2
Green Extension Time (g_e), s		2.2		2.2		0.3		0.0
Phase Call Probability		1.00		1.00		0.93		0.11
Max Out Probability		0.00		0.00		0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h		345	212		375	10		191			9	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1895	1610		1360	1610		1742			1786	
Queue Service Time (g_s), s		0.0	4.8		4.9	0.2		4.1			0.2	
Cycle Queue Clearance Time (g_c), s		7.1	4.8		12.0	0.2		4.1			0.2	
Green Ratio (*g/C*)		0.37	0.37		0.37	0.37		0.35			0.04	
Capacity (*c*), veh/h		779	601		616	601		607			77	
Volume-to-Capacity Ratio (*X*)		0.443	0.353		0.609	0.016		0.315			0.112	
Available Capacity (c_a), veh/h		1555	1265		1165	1265		1026			1052	
Back of Queue (*Q*), veh/ln (50th percentile)		2.5	1.4		3.0	0.1		1.3			0.1	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00	0.00		0.00	0.00		0.00			0.00	
Uniform Delay (d_1), s/veh		12.2	11.5		13.6	10.1		12.1			23.4	
Incremental Delay (d_2), s/veh		0.1	0.1		0.4	0.0		0.1			0.2	
Initial Queue Delay (d_3), s/veh		0.0	0.0		0.0	0.0		0.0			0.0	
Control Delay (*d*), s/veh		12.4	11.7		14.0	10.1		12.3			23.7	
Level of Service (LOS)		B	B		B	B		B			C	
Approach Delay, s/veh / LOS	12.1	B		13.9	B		12.3	B		23.7	C	
Intersection Delay, s/veh / LOS	12.8						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.1	B	2.1	B	2.3	B	2.3	B
Bicycle LOS Score / LOS	1.4	A	1.1	A	0.8	A	0.5	A

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	BC
Agency/Co.	Kunzman Associates, Inc.
Date Performed	1/18/2016
Analysis Time Period	Morning Peak Hour

Site Information

Intersection	La Cadena/Stephens-I-215 SB
Jurisdiction	City of Riverside
Analysis Year	Existing Plus Project

Project ID *Center Street Warehouse*

East/West Street: *Stephens Avenue/I-215 FWY SB* North/South Street: *La Cadena Drive*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	41	273	58	173	95	163
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	31	61	11	42	170	41
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LT	R	LT	R
PHF	0.95		0.95		0.95	0.95	0.95	0.95
Flow Rate (veh/h)	391		453		96	11	222	43
% Heavy Vehicles	0		0		0	0	0	0
No. Lanes	1		1		2		2	
Geometry Group	2		2		5		5	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.1		0.4		0.3	0.0	0.2	0.0
Prop. Right-Turns	0.2		0.4		0.0	1.0	0.0	1.0
Prop. Heavy Vehicle	0.0		0.0		0.0	0.0	0.0	0.0
hLT-adj	0.2	0.2	0.2	0.2	0.5	0.5	0.5	0.5
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.7	-0.7	-0.7	-0.7
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	-0.1		-0.1		0.2	-0.7	0.1	-0.7

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20		3.20	3.20	3.20	3.20
x, initial	0.35		0.40		0.09	0.01	0.20	0.04
hd, final value (s)	5.99		5.82		7.90	7.00	7.38	6.55
x, final value	0.65		0.73		0.21	0.02	0.45	0.08
Move-up time, m (s)	2.0		2.0		2.3		2.3	
Service Time, t_s (s)	4.0		3.8		5.6	4.7	5.1	4.3

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	576		600		346	261	449	293
Delay (s/veh)	19.46		23.02		12.70	9.85	16.08	9.81
LOS	C		C		B	A	C	A
Approach: Delay (s/veh)	19.46		23.02		12.40		15.06	
LOS	C		C		B		C	
Intersection Delay (s/veh)	19.21							
Intersection LOS	C							

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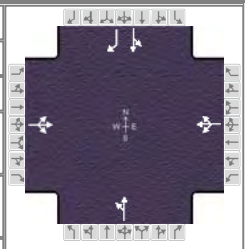
HCS 2010 Signalized Intersection Results Summary

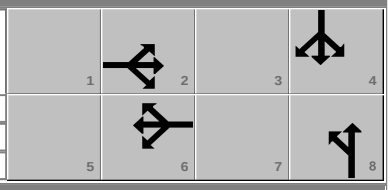
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Morning Peak Hour	PHF	0.95
Intersection	La Cadena/Stephens-I-215	Analysis Year	Existing Plus Project	Analysis Period	1> 7:00
File Name	AMEP6I.xus				
Project Description	Center Street Warehouse - With Improvements				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	41	273	58	173	95	163	31	61		42	170	41

Signal Information			
Cycle, s	51.6	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	18.8	11.7	9.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		8.0		8.0		12.0		11.0
Phase Duration, s		22.8		22.8		13.0		15.7
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (*MAH*), s		3.4		3.4		3.1		3.1
Queue Clearance Time (g_s), s		10.9		17.0		4.3		7.4
Green Extension Time (g_e), s		2.0		1.9		0.1		0.5
Phase Call Probability		1.00		1.00		0.75		0.98
Max Out Probability		0.00		0.04		0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	14
Adjusted Flow Rate (*v*), veh/h		392			454			97			223	43
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1791			1430			1869			1881	1610
Queue Service Time (g_s), s		0.0			6.2			2.3			5.4	1.1
Cycle Queue Clearance Time (g_c), s		8.9			15.0			2.3			5.4	1.1
Green Ratio (*g/C*)		0.37			0.37			0.17			0.23	0.23
Capacity (*c*), veh/h		731			620			327			428	366
Volume-to-Capacity Ratio (*X*)		0.535			0.732			0.296			0.521	0.118
Available Capacity (c_a), veh/h		1103			914			1086			1093	936
Back of Queue (*Q*), veh/ln (50th percentile)		3.0			4.0			0.9			2.1	0.4
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00			0.00			0.00	0.00
Uniform Delay (d_1), s/veh		13.2			14.9			18.5			17.5	15.8
Incremental Delay (d_2), s/veh		0.2			0.6			0.2			0.4	0.1
Initial Queue Delay (d_3), s/veh		0.0			0.0			0.0			0.0	0.0
Control Delay (*d*), s/veh		13.4			15.5			18.7			17.8	15.9
Level of Service (LOS)		B			B			B			B	B
Approach Delay, s/veh / LOS	13.4	B		15.5	B		18.7	B		17.5	B	
Intersection Delay, s/veh / LOS	15.5						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.1	B	2.3	B	2.1	B	2.1	B
Bicycle LOS Score / LOS	1.1	A	1.2	A	0.6	A	0.9	A

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	BC
Agency/Co.	Kunzman Associates, Inc.
Date Performed	1/18/2016
Analysis Time Period	Evening Peak Hour

Site Information

Intersection	La Cadena/Stephens-I-215 SB
Jurisdiction	City of Riverside
Analysis Year	Existing Plus Project

Project ID *Center Street Warehouse*

East/West Street: *Stephens Avenue/I-215 FWY SB* North/South Street: *La Cadena Drive*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	62	221	63	84	94	5
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	30	152	15	65	352	50
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LT	R	LT	R
PHF	0.96		0.96		0.96	0.96	0.96	0.96
Flow Rate (veh/h)	359		189		189	15	433	52
% Heavy Vehicles	0		0		0	0	0	0
No. Lanes	1		1		2		2	
Geometry Group	2		2		5		5	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.2		0.5		0.2	0.0	0.2	0.0
Prop. Right-Turns	0.2		0.0		0.0	1.0	0.0	1.0
Prop. Heavy Vehicle	0.0		0.0		0.0	0.0	0.0	0.0
hLT-adj	0.2	0.2	0.2	0.2	0.5	0.5	0.5	0.5
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.7	-0.7	-0.7	-0.7
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	-0.1		0.1		0.1	-0.7	0.1	-0.7

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20		3.20	3.20	3.20	3.20
x, initial	0.32		0.17		0.17	0.01	0.38	0.05
hd, final value (s)	6.60		7.23		7.64	6.83	7.02	6.22
x, final value	0.66		0.38		0.40	0.03	0.84	0.09
Move-up time, m (s)	2.0		2.0		2.3		2.3	
Service Time, t_s (s)	4.6		5.2		5.3	4.5	4.7	3.9

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	516		439		425	265	504	302
Delay (s/veh)	21.39		14.58		15.37	9.73	37.11	9.54
LOS	C		B		C	A	E	A
Approach: Delay (s/veh)	21.39		14.58		14.95		34.15	
LOS	C		B		B		D	
Intersection Delay (s/veh)	24.29							
Intersection LOS	C							

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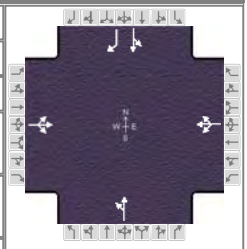
HCS 2010 Signalized Intersection Results Summary

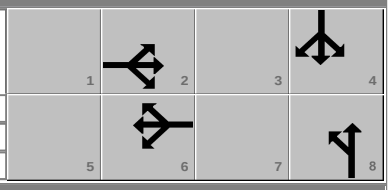
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Morning Peak Hour	PHF	0.96
Intersection	La Cadena/Stephens-I-215	Analysis Year	Existing Plus Project	Analysis Period	1> 7:00
File Name	PMEP6I.xus				
Project Description	Center Street Warehouse - With Improvements				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	62	221	63	84	94	5	30	152		65	352	50

Signal Information			
Cycle, s	51.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	12.9	14.0	12.1	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		8.0		8.0		12.0		11.0
Phase Duration, s		16.9		16.9		16.1		18.0
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (*MAH*), s		3.2		3.2		3.0		3.1
Queue Clearance Time (g_s), s		11.8		7.2		6.4		13.1
Green Extension Time (g_e), s		1.1		1.1		0.3		0.9
Phase Call Probability		1.00		1.00		0.93		1.00
Max Out Probability		0.00		0.00		0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	14
Adjusted Flow Rate (*v*), veh/h		360			191			190			434	52
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1751			1467			1884			1885	1610
Queue Service Time (g_s), s		4.6			0.0			4.4			11.1	1.2
Cycle Queue Clearance Time (g_c), s		9.8			5.2			4.4			11.1	1.2
Green Ratio (*g/C*)		0.25			0.25			0.24			0.27	0.27
Capacity (*c*), veh/h		526			474			448			517	442
Volume-to-Capacity Ratio (*X*)		0.685			0.402			0.423			0.840	0.118
Available Capacity (c_a), veh/h		1097			949			1107			1107	946
Back of Queue (*Q*), veh/ln (50th percentile)		3.5			1.6			1.7			4.3	0.4
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00			0.00			0.00	0.00
Uniform Delay (d_1), s/veh		17.8			16.0			16.5			17.5	13.9
Incremental Delay (d_2), s/veh		0.6			0.2			0.2			1.4	0.0
Initial Queue Delay (d_3), s/veh		0.0			0.0			0.0			0.0	0.0
Control Delay (*d*), s/veh		18.4			16.2			16.7			18.9	13.9
Level of Service (LOS)		B			B			B			B	B
Approach Delay, s/veh / LOS	18.4	B		16.2	B		16.7	B		18.4	B	
Intersection Delay, s/veh / LOS	17.8						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.1	B	2.3	B	2.1	B	2.1	B
Bicycle LOS Score / LOS	1.1	A	0.8	A	0.8	A	1.3	A

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*BC*
Agency/Co.	*Kunzman Associates, Inc.*
Date Performed	*1/18/2016*
Analysis Time Period	*Morning Peak Hour*

Site Information

Intersection	*La Cadena/Highgrove-I-215 NB*
Jurisdiction	*City of Riverside*
Analysis Year	*Existing Plus Project*

Project ID *Center Street Warehouse*

East/West Street: *Highgrove Place/I-215 FWY NB* North/South Street: *La Cadena Drive*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	45	234	0	29	0	4
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	0	32	38	1	77	0
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT		L	R	TR		LT	
PHF	0.89		0.89	0.89	0.89		0.89	
Flow Rate (veh/h)	312		32	4	77		87	
% Heavy Vehicles	0		0	0	0		0	
No. Lanes	1		2		1		1	
Geometry Group	4a		5		2		2	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.2		1.0	0.0	0.0		0.0	
Prop. Right-Turns	0.0		0.0	1.0	0.5		0.0	
Prop. Heavy Vehicle	0.0		0.0	0.0	0.0		0.0	
hLT-adj	0.2	0.2	0.5	0.5	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.7	-0.7	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	0.0		0.5	-0.7	-0.3		0.0	

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20	3.20	3.20		3.20	
x, initial	0.28		0.03	0.00	0.07		0.08	
hd, final value (s)	4.49		5.68	4.47	4.52		4.83	
x, final value	0.39		0.05	0.00	0.10		0.12	
Move-up time, m (s)	2.0		2.3		2.0		2.0	
Service Time, t_s (s)	2.5		3.4	2.2	2.5		2.8	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	562		282	254	327		337	
Delay (s/veh)	10.33		8.68	7.19	8.00		8.46	
LOS	B		A	A	A		A	
Approach: Delay (s/veh)	10.33		8.52		8.00		8.46	
LOS	B		A		A		A	
Intersection Delay (s/veh)	9.53							
Intersection LOS	A							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*BC*
Agency/Co.	*Kunzman Associates, Inc.*
Date Performed	*1/18/2016*
Analysis Time Period	*Evening Peak Hour*

Site Information

Intersection	*La Cadena/Highgrove-I-215 NB*
Jurisdiction	*City of Riverside*
Analysis Year	*Existing Plus Project*

Project ID *Center Street Warehouse*

East/West Street: *Highgrove Place/I-215 FWY NB* North/South Street: *La Cadena Drive*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	26	244	0	19	0	3
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	0	94	65	1	153	0
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT		L	R	TR		LT	
PHF	0.91		0.91	0.91	0.91		0.91	
Flow Rate (veh/h)	296		20	3	174		169	
% Heavy Vehicles	0		0	0	0		0	
No. Lanes	1		2		1		1	
Geometry Group	4a		5		2		2	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.1		1.0	0.0	0.0		0.0	
Prop. Right-Turns	0.0		0.0	1.0	0.4		0.0	
Prop. Heavy Vehicle	0.0		0.0	0.0	0.0		0.0	
hLT-adj	0.2	0.2	0.5	0.5	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.7	-0.7	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	0.0		0.5	-0.7	-0.2		0.0	

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20	3.20	3.20		3.20	
x, initial	0.26		0.02	0.00	0.15		0.15	
hd, final value (s)	4.93		6.23	5.01	4.72		4.96	
x, final value	0.41		0.03	0.00	0.23		0.23	
Move-up time, m (s)	2.0		2.3		2.0		2.0	
Service Time, t_s (s)	2.9		3.9	2.7	2.7		3.0	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	546		270	253	424		419	
Delay (s/veh)	11.25		9.15	7.74	9.11		9.47	
LOS	B		A	A	A		A	
Approach: Delay (s/veh)	11.25		8.97		9.11		9.47	
LOS	B		A		A		A	
Intersection Delay (s/veh)	10.15							
Intersection LOS	B							

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*BC*
Agency/Co.	*Kunzman Associates, Inc.*
Date Performed	*1/18/2016*
Analysis Time Period	*Morning Peak Hour*

Site Information

Intersection	*Highgrove Place/Center Street*
Jurisdiction	*City of Riverside*
Analysis Year	*Existing Plus Project*

Project Description *Center Street Warehouse*

East/West Street: *Center Street* | North/South Street: *Highgrove Place*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*1*	*229*	*0*	*11*	*408*	*5*
Peak-Hour Factor, PHF	*0.91*	*0.91*	*0.91*	*0.91*	*0.91*	*0.91*
Hourly Flow Rate, HFR (veh/h)	*1*	*251*	*0*	*12*	*448*	*5*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*1*	*0*	*1*	*0*
Configuration	*LT*		*R*	*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*122*	*1*	*151*	*2*	*1*	*22*
Peak-Hour Factor, PHF	*0.91*	*0.91*	*0.91*	*0.91*	*0.91*	*0.91*
Hourly Flow Rate, HFR (veh/h)	*134*	*1*	*165*	*2*	*1*	*24*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*1*	*0*	*1*	*0*
Configuration	*LT*		*R*		*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*	*LTR*	*LT*		*R*		*LTR*	
v (veh/h)	*1*	*12*	*135*		*165*		*27*	
C (m) (veh/h)	*1118*	*1326*	*318*		*793*		*534*	
v/c	*0.00*	*0.01*	*0.42*		*0.21*		*0.05*	
95% queue length	*0.00*	*0.03*	*2.03*		*0.78*		*0.16*	
Control Delay (s/veh)	*8.2*	*7.7*	*24.4*		*10.7*		*12.1*	
LOS	*A*	*A*	*C*		*B*		*B*	
Approach Delay (s/veh)	--	--	*16.9*			*12.1*		
Approach LOS	--	--	*C*			*B*		

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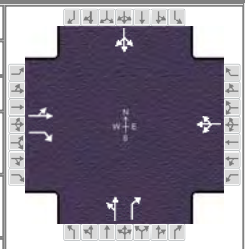
HCS 2010 Signalized Intersection Results Summary

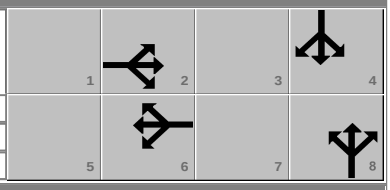
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Morning Peak Hour	PHF	0.91
Intersection	Highgrove Place/Center St	Analysis Year	Existing Plus Project	Analysis Period	1> 7:00
File Name	AMEP8I.xus				
Project Description	Center Street Warehouse - With Improvements				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	1	229	0	11	408	5	122	1	151	2	1	22

Signal Information			
Cycle, s	51.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	20.0	3.2	15.8	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		7.0		8.0		11.0		12.0
Phase Duration, s		24.0		24.0		19.8		7.2
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (*MAH*), s		3.0		3.0		3.3		3.3
Queue Clearance Time (g_s), s		6.8		12.1		6.0		2.8
Green Extension Time (g_e), s		1.3		1.3		0.5		0.0
Phase Call Probability		1.00		1.00		0.99		0.32
Max Out Probability		0.00		0.00		0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h		253	0		466			135	166		27	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1899	1610		1885			1810	1610		1635	
Queue Service Time (g_s), s		0.0	0.0		0.0			2.8	4.0		0.8	
Cycle Queue Clearance Time (g_c), s		4.8	0.0		10.1			2.8	4.0		0.8	
Green Ratio (*g/C*)		0.39	0.39		0.39			0.31	0.31		0.06	
Capacity (*c*), veh/h		816	631		812			560	498		103	
Volume-to-Capacity Ratio (*X*)		0.310	0.000		0.574			0.241	0.333		0.266	
Available Capacity (c_a), veh/h		1186	947		1177			781	695		481	
Back of Queue (*Q*), veh/ln (50th percentile)		1.6	0.0		3.5			1.0	1.3		0.3	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00	0.00		0.00			0.00	0.00		0.00	
Uniform Delay (d_1), s/veh		10.9	0.0		12.5			13.1	13.6		22.8	
Incremental Delay (d_2), s/veh		0.1	0.0		0.2			0.1	0.1		0.5	
Initial Queue Delay (d_3), s/veh		0.0	0.0		0.0			0.0	0.0		0.0	
Control Delay (*d*), s/veh		10.9	0.0		12.7			13.2	13.7		23.3	
Level of Service (LOS)		B			B			B	B		C	
Approach Delay, s/veh / LOS	10.9	B		12.7	B		13.5	B		23.3	C	
Intersection Delay, s/veh / LOS	12.8						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	2.1	B	2.1	B	2.3	B
Bicycle LOS Score / LOS	0.9	A	1.3	A	1.0	A	0.5	A

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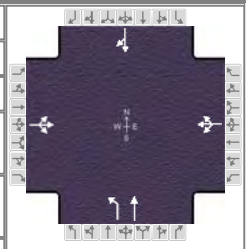
HCS 2010 Signalized Intersection Results Summary

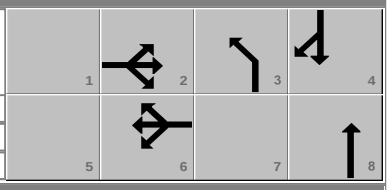
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Evening Peak Hour	PHF	0.88
Intersection	Iowa Avenue-I-215 NB Ran	Analysis Year	Existing Plus Project	Analysis Period	1> 7:00
File Name	PMEP9.xus				
Project Description	Center Street Warehouse				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	121	0	764	0	0	0	327	604			21	317

Signal Information			
Cycle, s	68.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	30.0	16.0	10.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8		4
Case Number		8.0		8.0	2.0	4.0		8.3
Phase Duration, s		34.0		34.0	20.0	34.0		14.0
Change Period, ($Y+R_c$), s		4.0		4.0	4.0	4.0		4.0
Max Allow Headway (*MAH*), s		3.3		0.0	3.1	3.1		3.1
Queue Clearance Time (g_s), s		32.0			15.4	23.5		12.0
Green Extension Time (g_e), s		0.0		0.0	0.6	2.3		0.0
Phase Call Probability		1.00			1.00	1.00		1.00
Max Out Probability		1.00			0.01	0.02		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8			4	14
Adjusted Flow Rate (*v*), veh/h		1006			0		372	686			384	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1593			0		1810	1900			1626	
Queue Service Time (g_s), s		25.7			0.0		13.4	21.5			10.0	
Cycle Queue Clearance Time (g_c), s		30.0			0.0		13.4	21.5			10.0	
Green Ratio (*g/C*)		0.44					0.24	0.44			0.15	
Capacity (*c*), veh/h		763					425	838			239	
Volume-to-Capacity Ratio (*X*)		1.318			0.000		0.874	0.819			1.606	
Available Capacity (c_a), veh/h		763					666	1118			239	
Back of Queue (*Q*), veh/ln (50th percentile)		43.1			0.0		5.9	8.6			23.0	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00		0.00	0.00			0.00	
Uniform Delay (d_1), s/veh		20.1					25.0	16.6			29.0	
Incremental Delay (d_2), s/veh		152.1			0.0		5.0	2.7			291.4	
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0			0.0	
Control Delay (*d*), s/veh		172.2					30.1	19.4			320.4	
Level of Service (LOS)		F					C	B			F	
Approach Delay, s/veh / LOS	172.2	F		0.0			23.1	C		320.4	F	
Intersection Delay, s/veh / LOS	131.0						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	2.1	B	2.1	B
Bicycle LOS Score / LOS	2.1	B	0.5	A	2.2	B	1.1	A

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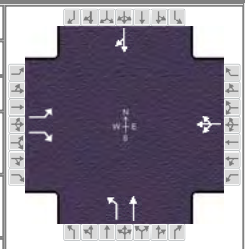
HCS 2010 Signalized Intersection Results Summary

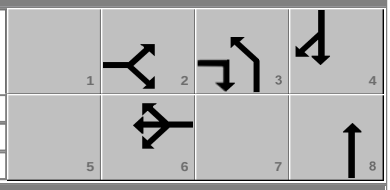
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Evening Peak Hour	PHF	0.88
Intersection	Iowa Avenue-I-215 NB Ran	Analysis Year	Existing Plus Project	Analysis Period	1> 7:00
File Name	PMEP9I.xus				
Project Description	Center Street Warehouse - With Improvements				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	121		764	0	0	0	327	604			21	317

Signal Information			
Cycle, s	79.4	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	15.0	21.0	31.4	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		5.0		8.0		10.0		12.0
Phase Duration, s		19.0		19.0		35.4		25.0
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (*MAH*), s		3.3		0.0		3.1		3.3
Queue Clearance Time (g_s), s		17.0				29.1		20.1
Green Extension Time (g_e), s		0.0		0.0		2.2		0.8
Phase Call Probability		1.00				1.00		1.00
Max Out Probability		1.00				0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5		12	1	6	16	3	8			4	14
Adjusted Flow Rate (*v*), veh/h	138		868		0		372	686			384	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810		1610		0		1810	1900			1626	
Queue Service Time (g_s), s	5.3		15.0		0.0		12.4	27.1			18.1	
Cycle Queue Clearance Time (g_c), s	5.3		15.0		0.0		12.4	27.1			18.1	
Green Ratio (*g/C*)	0.19		0.59				0.40	0.40			0.26	
Capacity (*c*), veh/h	432		941				716	752			430	
Volume-to-Capacity Ratio (*X*)	0.318		0.922		0.000		0.519	0.912			0.894	
Available Capacity (c_a), veh/h	432		941				1594	1674			818	
Back of Queue (*Q*), veh/ln (50th percentile)	2.2		15.0		0.0		4.8	11.4			6.9	
Queue Storage Ratio (*RQ*) (50th percentile)	0.00		0.00		0.00		0.00	0.00			0.00	
Uniform Delay (d_1), s/veh	28.3		14.9				18.2	22.7			28.2	
Incremental Delay (d_2), s/veh	0.2		13.9		0.0		0.2	1.9			2.7	
Initial Queue Delay (d_3), s/veh	0.0		0.0		0.0		0.0	0.0			0.0	
Control Delay (*d*), s/veh	28.4		28.8				18.5	24.6			30.8	
Level of Service (LOS)	C		C				B	C			C	
Approach Delay, s/veh / LOS	28.7		C	0.0			22.4		C	30.8		C
Intersection Delay, s/veh / LOS	26.3						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	1.4	A	2.3	B
Bicycle LOS Score / LOS		F	0.5	A	2.2	B	1.1	A

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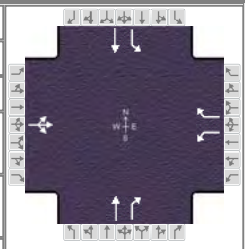
HCS 2010 Signalized Intersection Results Summary

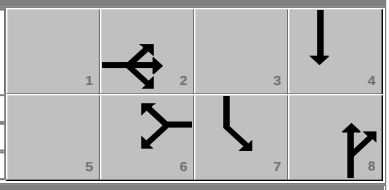
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Morning Peak Hour	PHF	0.82
Intersection	Iowa Avenue/Main Street	Analysis Year	Existing Plus Project	Analysis Period	1> 7:00
File Name	AMEP10.xus				
Project Description	Center Street Warehouse				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	0	0	0	103		268		448	0	216	592	

Signal Information			
Cycle, s	51.1	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	12.8	9.8	16.5	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8	7	4
Case Number		8.0		5.0		7.3	2.0	4.0
Phase Duration, s		16.8		16.8		20.5	13.8	34.3
Change Period, ($Y+R_c$), s		4.0		4.0		4.0	4.0	4.0
Max Allow Headway (*MAH*), s		0.0		3.3		3.0	3.1	3.0
Queue Clearance Time (g_s), s				11.8		15.9	9.0	14.7
Green Extension Time (g_e), s		0.0		1.0		0.6	0.3	1.6
Phase Call Probability				1.00		1.00	0.98	1.00
Max Out Probability				0.00		0.76	0.08	0.56

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1		16		8	18	7	4	
Adjusted Flow Rate (*v*), veh/h		0		126		327		546	0	263	722	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		0		1810		1610		1900	1610	1810	1900	
Queue Service Time (g_s), s		0.0		2.9		9.8		13.9	0.0	7.0	12.7	
Cycle Queue Clearance Time (g_c), s		0.0		2.9		9.8		13.9	0.0	7.0	12.7	
Green Ratio (*g/C*)				0.25		0.25		0.32	0.32	0.19	0.59	
Capacity (*c*), veh/h				593		402		616	522	346	1128	
Volume-to-Capacity Ratio (*X*)		0.000		0.212		0.812		0.887	0.000	0.762	0.640	
Available Capacity (c_a), veh/h				1557		1260		743	630	531	1128	
Back of Queue (*Q*), veh/ln (50th percentile)		0.0		1.0		3.3		6.7	0.0	2.7	3.4	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00		0.00		0.00		0.00	0.00	0.00	0.00	
Uniform Delay (d_1), s/veh				15.5		18.0		16.4	0.0	19.6	6.8	
Incremental Delay (d_2), s/veh		0.0		0.1		1.5		9.8	0.0	1.3	1.0	
Initial Queue Delay (d_3), s/veh		0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh				15.5		19.6		26.2	0.0	20.9	7.8	
Level of Service (LOS)				B		B		C		C	A	
Approach Delay, s/veh / LOS	0.0			18.4		B	26.2		C	11.3		B
Intersection Delay, s/veh / LOS	17.0						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.3	B	1.3	A
Bicycle LOS Score / LOS	0.5	A		F	1.4	A	2.1	B

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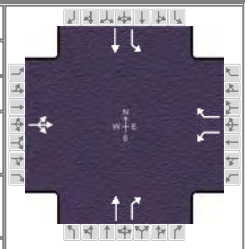
HCS 2010 Signalized Intersection Results Summary

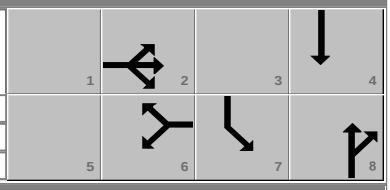
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Evening Peak Hour	PHF	0.95
Intersection	Iowa Avenue/Main Street	Analysis Year	Existing Plus Project	Analysis Period	1> 7:00
File Name	PMEP10.xus				
Project Description	Center Street Warehouse				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	0	0	0	112		164		787	0	113	676	

Signal Information			
Cycle, s	50.6	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	7.7	7.3	23.5	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8	7	4
Case Number		8.0		5.0		7.3	2.0	4.0
Phase Duration, s		11.7		11.7		27.5	11.3	38.8
Change Period, ($Y+R_c$), s		4.0		4.0		4.0	4.0	4.0
Max Allow Headway (*MAH*), s		0.0		3.2		3.0	3.1	3.0
Queue Clearance Time (g_s), s				7.1		22.9	5.0	11.4
Green Extension Time (g_e), s		0.0		0.6		0.6	0.1	2.7
Phase Call Probability				1.00		1.00	0.81	1.00
Max Out Probability				0.00		1.00	0.00	0.33

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1		16		8	18	7	4	
Adjusted Flow Rate (*v*), veh/h		0		118		173		828	0	119	712	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		0		1810		1610		1900	1610	1810	1900	
Queue Service Time (g_s), s		0.0		3.0		5.1		20.9	0.0	3.0	9.4	
Cycle Queue Clearance Time (g_c), s		0.0		3.0		5.1		20.9	0.0	3.0	9.4	
Green Ratio (*g/C*)				0.15		0.15		0.46	0.46	0.14	0.69	
Capacity (*c*), veh/h				419		246		884	749	262	1309	
Volume-to-Capacity Ratio (*X*)		0.000		0.281		0.701		0.937	0.000	0.454	0.544	
Available Capacity (c_a), veh/h				1573		1273		939	796	536	1309	
Back of Queue (*Q*), veh/ln (50th percentile)		0.0		1.1		1.8		10.3	0.0	1.2	1.5	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00		0.00		0.00		0.00	0.00	0.00	0.00	
Uniform Delay (d_1), s/veh				19.4		20.3		12.8	0.0	19.8	3.9	
Incremental Delay (d_2), s/veh		0.0		0.1		1.4		15.4	0.0	0.5	0.3	
Initial Queue Delay (d_3), s/veh		0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh				19.5		21.7		28.3	0.0	20.3	4.2	
Level of Service (LOS)				B		C		C		C	A	
Approach Delay, s/veh / LOS	0.0			20.8		C	28.3		C	6.5		A
Intersection Delay, s/veh / LOS	17.9						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.2	B	1.3	A
Bicycle LOS Score / LOS	0.5	A		F	1.9	A	1.9	A

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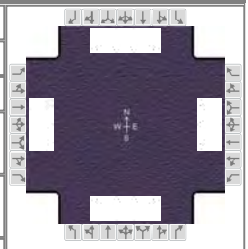
HCS 2010 Signalized Intersection Results Summary

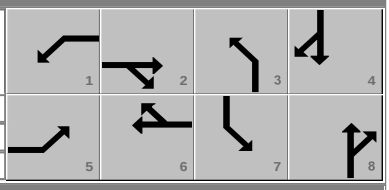
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Morning Peak Hour	PHF	0.90
Intersection	Iowa Avenue/Center Street	Analysis Year	Existing Plus Project	Analysis Period	1> 7:00
File Name	AMEP11.xus				
Project Description	Center Street Warehouse				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	101	186	76	126	268	55	73	333	79	28	555	82

Signal Information			
Cycle, s	51.5	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	7.2	0.6	9.8	3.2	2.9	11.7
Yellow	4.0	0.0	4.0	4.0	0.0	4.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	4.0	2.0	3.0	2.0	3.0	2.0	3.0
Phase Duration, s	11.2	13.8	11.8	14.4	10.2	18.7	7.2	15.7
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (*MAH*), s	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	4.9	5.8	5.7	9.6	4.1	6.2	2.8	10.2
Green Extension Time (g_e), s	0.1	1.0	0.1	0.7	0.1	2.2	0.0	1.6
Phase Call Probability	0.80	1.00	0.87	1.00	0.69	1.00	0.36	1.00
Max Out Probability	0.00	0.04	0.00	0.32	0.00	0.15	0.00	0.56

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	112	149	142	140	298	61	81	370	88	31	617	91
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1900	1716	1810	1900	1610	1810	1809	1610	1810	1809	1610
Queue Service Time (g_s), s	2.9	3.6	3.8	3.7	7.6	1.6	2.1	4.2	2.1	0.8	8.2	2.4
Cycle Queue Clearance Time (g_c), s	2.9	3.6	3.8	3.7	7.6	1.6	2.1	4.2	2.1	0.8	8.2	2.4
Green Ratio (*g/C*)	0.14	0.19	0.19	0.15	0.20	0.20	0.12	0.29	0.29	0.06	0.23	0.23
Capacity (*c*), veh/h	253	362	327	274	384	325	217	1031	459	114	824	367
Volume-to-Capacity Ratio (*X*)	0.444	0.413	0.433	0.512	0.776	0.188	0.373	0.359	0.191	0.273	0.748	0.248
Available Capacity (c_a), veh/h	526	553	499	526	553	468	526	1052	468	526	1052	468
Back of Queue (*Q*), veh/ln (50th percentile)	1.1	1.4	1.3	1.4	3.2	0.5	0.8	1.5	0.7	0.3	3.1	0.8
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	20.3	18.3	18.4	20.1	19.5	17.1	20.9	14.7	13.9	23.0	18.5	16.3
Incremental Delay (d_2), s/veh	0.5	0.3	0.3	0.6	2.4	0.1	0.4	0.1	0.1	0.5	1.5	0.1
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	20.8	18.6	18.8	20.7	21.9	17.2	21.3	14.8	14.0	23.5	20.1	16.4
Level of Service (LOS)	C	B	B	C	C	B	C	B	B	C	C	B
Approach Delay, s/veh / LOS	19.3	B		21.0	C		15.6	B		19.8	B	
Intersection Delay, s/veh / LOS	18.9						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	2.9	C	2.8	C	2.4	B
Bicycle LOS Score / LOS	0.8	A	1.3	A	0.9	A	1.1	A

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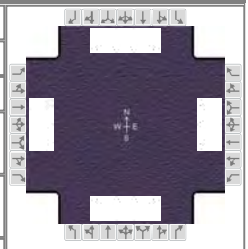
HCS 2010 Signalized Intersection Results Summary

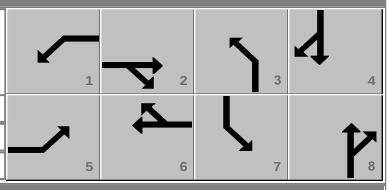
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Evening Peak Hour	PHF	0.97
Intersection	Iowa Avenue/Center Street	Analysis Year	Existing Plus Project	Analysis Period	1> 7:00
File Name	PMEP11.xus				
Project Description	Center Street Warehouse				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	226	250	83	120	111	24	81	612	67	42	636	54

Signal Information			
Cycle, s	52.3	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.7	1.8	8.0	3.8	1.9	14.1
Yellow	4.0	0.0	4.0	4.0	0.0	4.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	4.0	2.0	3.0	2.0	3.0	2.0	3.0
Phase Duration, s	12.5	13.8	10.7	12.0	9.6	20.0	7.8	18.1
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (*MAH*), s	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	8.5	6.5	5.4	4.8	4.3	9.7	3.2	10.5
Green Extension Time (g_e), s	0.3	0.8	0.2	0.9	0.1	2.9	0.0	3.6
Phase Call Probability	0.97	1.00	0.83	1.00	0.70	1.00	0.47	1.00
Max Out Probability	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	233	176	167	124	114	25	84	631	69	43	656	56
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1900	1740	1810	1900	1610	1810	1809	1610	1810	1809	1610
Queue Service Time (g_s), s	6.5	4.3	4.5	3.4	2.8	0.7	2.3	7.7	1.6	1.2	8.5	1.4
Cycle Queue Clearance Time (g_c), s	6.5	4.3	4.5	3.4	2.8	0.7	2.3	7.7	1.6	1.2	8.5	1.4
Green Ratio (*g/C*)	0.16	0.19	0.19	0.13	0.15	0.15	0.11	0.31	0.31	0.07	0.27	0.27
Capacity (*c*), veh/h	296	358	328	232	290	246	195	1107	493	130	977	435
Volume-to-Capacity Ratio (*X*)	0.787	0.492	0.510	0.534	0.394	0.101	0.427	0.570	0.140	0.333	0.671	0.128
Available Capacity (c_a), veh/h	691	726	665	691	1452	1230	1382	1382	615	691	2764	1230
Back of Queue (*Q*), veh/ln (50th percentile)	2.6	1.7	1.6	1.3	1.1	0.2	0.9	2.7	0.5	0.5	3.0	0.4
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	21.0	19.0	19.1	21.4	20.0	19.1	21.8	15.3	13.2	23.1	17.0	14.4
Incremental Delay (d_2), s/veh	1.8	0.4	0.5	0.7	0.3	0.1	0.6	0.2	0.0	0.6	0.3	0.0
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	22.8	19.4	19.5	22.1	20.3	19.1	22.4	15.4	13.2	23.7	17.3	14.5
Level of Service (LOS)	C	B	B	C	C	B	C	B	B	C	B	B
Approach Delay, s/veh / LOS	20.8	C		21.0	C		16.0	B		17.5	B	
Intersection Delay, s/veh / LOS	18.2						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	2.9	C	2.8	C	2.4	B
Bicycle LOS Score / LOS	1.0	A	0.9	A	1.1	A	1.1	A

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Opening Year (2017) Without Project

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*BC*	Intersection	*Main Street/Center Street*
Agency/Co.	*Kunzman Associates, Inc.*	Jurisdiction	*City of Riverside*
Date Performed	*1/18/2016*	Analysis Year	*OY (2017) Without Project*
Analysis Time Period	*Morning Peak Hour*		

Project Description *Center Street Warehouse*

East/West Street: *Center Street* | North/South Street: *Main Street/Riverside Avenue*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*742*	*36*	*93*	*703*	
Peak-Hour Factor, PHF	*1.00*	*0.95*	*0.95*	*0.95*	*0.95*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*781*	*37*	*97*	*740*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Two Way Left Turn Lane*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*1*	*1*	*2*	*0*
Configuration		*T*	*R*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*34*	*0*	*131*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.95*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*35*	*0*	*137*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*1*	*0*
Configuration					*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*		*LTR*				
v (veh/h)		*97*		*172*				
C (m) (veh/h)		*819*		*505*				
v/c		*0.12*		*0.34*				
95% queue length		*0.40*		*1.50*				
Control Delay (s/veh)		*10.0*		*15.8*				
LOS		*A*		*C*				
Approach Delay (s/veh)	--	--	*15.8*					
Approach LOS	--	--	*C*					

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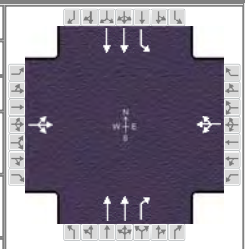
HCS 2010 Signalized Intersection Results Summary

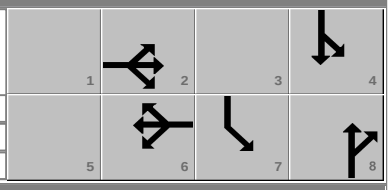
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Morning Peak Hour	PHF	0.95
Intersection	Main Street/Riverside Aven	Analysis Year	OY (2017) Without Project	Analysis Period	1> 7:00
File Name	AMOYWO1I.xus				
Project Description	Center Street Warehouse - With Improvements				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	0	0	0	34	0	131		742	36	93	703	

Signal Information			
Cycle, s	52.3	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	14.0	10.6	15.7	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8	7	4
Case Number		8.0		8.0		7.3	1.0	4.0
Phase Duration, s		18.0		18.0		19.7	14.6	34.3
Change Period, ($Y+R_c$), s		4.0		4.0		4.0	4.0	4.0
Max Allow Headway (*MAH*), s		0.0		3.3		3.0	3.1	3.0
Queue Clearance Time (g_s), s				6.5		12.1	3.4	7.7
Green Extension Time (g_e), s		0.0		0.3		3.1	0.2	4.1
Phase Call Probability				1.00		1.00	0.76	1.00
Max Out Probability				0.00		0.03	0.00	0.01

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16		8	18	7	4	
Adjusted Flow Rate (*v*), veh/h		0			174			781	38	98	740	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		0			1610			1809	1610	1810	1809	
Queue Service Time (g_s), s		0.0			0.0			10.1	0.9	1.4	5.7	
Cycle Queue Clearance Time (g_c), s		0.0			4.5			10.1	0.9	1.4	5.7	
Green Ratio (*g/C*)					0.27			0.30	0.30	0.54	0.58	
Capacity (*c*), veh/h					514			1085	483	581	2097	
Volume-to-Capacity Ratio (*X*)		0.000			0.338			0.720	0.078	0.169	0.353	
Available Capacity (c_a), veh/h					994			2073	923	1250	2097	
Back of Queue (*Q*), veh/ln (50th percentile)		0.0			1.5			3.6	0.3	0.4	1.4	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00			0.00	0.00	0.00	0.00	
Uniform Delay (d_1), s/veh					15.7			16.4	13.1	7.4	5.8	
Incremental Delay (d_2), s/veh		0.0			0.1			0.3	0.0	0.1	0.0	
Initial Queue Delay (d_3), s/veh		0.0			0.0			0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh					15.8			16.7	13.2	7.5	5.9	
Level of Service (LOS)					B			B	B	A	A	
Approach Delay, s/veh / LOS	0.0			15.8		B	16.5		B	6.0		A
Intersection Delay, s/veh / LOS	11.7						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.8	C	2.1	B	2.0	B
Bicycle LOS Score / LOS	0.5	A	0.8	A	1.2	A	1.2	A

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*BC*	Intersection	*Main Street/Center Street*
Agency/Co.	*Kunzman Associates, Inc.*	Jurisdiction	*City of Riverside*
Date Performed	*1/18/2016*	Analysis Year	*OY (2017) Without Project*
Analysis Time Period	*Evening Peak Hour*		

Project Description *Center Street Warehouse*

East/West Street: *Center Street* | North/South Street: *Main Street/Riverside Avenue*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*791*	*100*	*170*	*947*	
Peak-Hour Factor, PHF	*1.00*	*0.93*	*0.93*	*0.93*	*0.93*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*850*	*107*	*182*	*1018*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Two Way Left Turn Lane*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*1*	*1*	*2*	*0*
Configuration		*T*	*R*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*22*	*0*	*127*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.93*	*1.00*	*0.93*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*23*	*0*	*136*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*1*	*0*
Configuration					*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*		*LTR*				
v (veh/h)		*182*		*159*				
C (m) (veh/h)		*727*		*460*				
v/c		*0.25*		*0.35*				
95% queue length		*0.99*		*1.52*				
Control Delay (s/veh)		*11.6*		*16.9*				
LOS		*B*		*C*				
Approach Delay (s/veh)	--	--	*16.9*					
Approach LOS	--	--	*C*					

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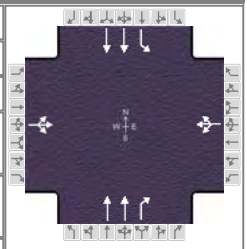
HCS 2010 Signalized Intersection Results Summary

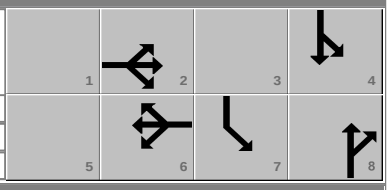
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Evening Peak Hour	PHF	0.93
Intersection	Main Street/Riverside Aven	Analysis Year	OY (2017) Without Project	Analysis Period	1> 7:00
File Name	PMOYWO1I.xus				
Project Description	Center Street Warehouse - With Improvements				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	0	0	0	22	0	127		791	100	170	947	

Signal Information			
Cycle, s	51.5	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	12.0	11.1	16.4	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8	7	4
Case Number		8.0		8.0		7.3	1.0	4.0
Phase Duration, s		16.0		16.0		20.4	15.1	35.5
Change Period, ($Y+R_c$), s		4.0		4.0		4.0	4.0	4.0
Max Allow Headway (*MAH*), s		0.0		3.3		3.0	3.1	3.0
Queue Clearance Time (g_s), s				6.3		12.8	4.5	9.8
Green Extension Time (g_e), s		0.0		0.3		3.1	0.3	5.5
Phase Call Probability				1.00		1.00	0.93	1.00
Max Out Probability				0.00		0.10	0.00	0.06

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16		8	18	7	4	
Adjusted Flow Rate (*v*), veh/h		0			160			851	108	183	1018	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		0			1614			1809	1610	1810	1809	
Queue Service Time (g_s), s		0.0			0.0			10.8	2.5	2.5	7.8	
Cycle Queue Clearance Time (g_c), s		0.0			4.3			10.8	2.5	2.5	7.8	
Green Ratio (*g/C*)					0.23			0.32	0.32	0.57	0.61	
Capacity (*c*), veh/h					456			1151	512	602	2213	
Volume-to-Capacity Ratio (*X*)		0.000			0.351			0.739	0.210	0.304	0.460	
Available Capacity (c_a), veh/h					1009			2106	938	1265	2213	
Back of Queue (*Q*), veh/ln (50th percentile)		0.0			1.4			3.8	0.8	0.6	1.8	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00			0.00	0.00	0.00	0.00	
Uniform Delay (d_1), s/veh					16.8			15.7	12.8	7.4	5.4	
Incremental Delay (d_2), s/veh		0.0			0.2			0.4	0.1	0.1	0.1	
Initial Queue Delay (d_3), s/veh		0.0			0.0			0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh					17.0			16.0	12.9	7.5	5.5	
Level of Service (LOS)					B			B	B	A	A	
Approach Delay, s/veh / LOS	0.0			17.0		B	15.7		B	5.8		A
Intersection Delay, s/veh / LOS	10.6						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.8	C	2.1	B	2.0	B
Bicycle LOS Score / LOS	0.5	A	0.8	A	1.3	A	1.5	A

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	BC
Agency/Co.	Kunzman Associates, Inc.
Date Performed	1/18/2016
Analysis Time Period	Morning Peak Hour

Site Information

Intersection	Orange Street/Center Street
Jurisdiction	City of Riverside
Analysis Year	OY (2017) Without Project

Project ID *Center Street Warehouse*

East/West Street: *Center Street* North/South Street: *Orange Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	6	148	9	62	175	7
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	9	1	49	8	1	4
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.90		0.90		0.90		0.90	
Flow Rate (veh/h)	180		269		65		13	
% Heavy Vehicles	0		0		0		0	
No. Lanes	1		1		1		1	
Geometry Group	1		1		1		1	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.0		0.3		0.2		0.6	
Prop. Right-Turns	0.1		0.0		0.8		0.3	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	-0.0		0.0		-0.5		-0.1	

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20		3.20		3.20	
x, initial	0.16		0.24		0.06		0.01	
hd, final value (s)	4.34		4.31		4.45		4.93	
x, final value	0.22		0.32		0.08		0.02	
Move-up time, m (s)	2.0		2.0		2.0		2.0	
Service Time, t_s (s)	2.3		2.3		2.4		2.9	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	430		519		315		263	
Delay (s/veh)	8.54		9.35		7.83		8.02	
LOS	A		A		A		A	
Approach: Delay (s/veh)	8.54		9.35		7.83		8.02	
LOS	A		A		A		A	
Intersection Delay (s/veh)	8.85							
Intersection LOS	A							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*BC*
Agency/Co.	*Kunzman Associates, Inc.*
Date Performed	*1/18/2016*
Analysis Time Period	*Evening Peak Hour*

Site Information

Intersection	*Orange Street/Center Street*
Jurisdiction	*City of Riverside*
Analysis Year	*OY (2017) Without Project*

Project ID *Center Street Warehouse*

East/West Street: *Center Street* North/South Street: *Orange Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	3	268	9	71	129	7
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	12	1	138	19	7	2
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.84		0.84		0.84		0.84	
Flow Rate (veh/h)	332		245		179		32	
% Heavy Vehicles	0		0		0		0	
No. Lanes	1		1		1		1	
Geometry Group	1		1		1		1	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.0		0.3		0.1		0.7	
Prop. Right-Turns	0.0		0.0		0.9		0.1	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	-0.0		0.0		-0.5		0.1	

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20		3.20		3.20	
x, initial	0.30		0.22		0.16		0.03	
hd, final value (s)	4.76		4.93		4.83		5.72	
x, final value	0.44		0.34		0.24		0.05	
Move-up time, m (s)	2.0		2.0		2.0		2.0	
Service Time, t_s (s)	2.8		2.9		2.8		3.7	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	582		495		429		282	
Delay (s/veh)	11.44		10.40		9.35		9.03	
LOS	B		B		A		A	
Approach: Delay (s/veh)	11.44		10.40		9.35		9.03	
LOS	B		B		A		A	
Intersection Delay (s/veh)	10.54							
Intersection LOS	B							

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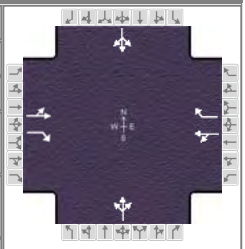
HCS 2010 Signalized Intersection Results Summary

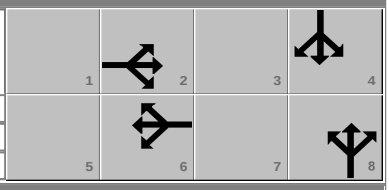
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Morning Peak Hour	PHF	0.91
Intersection	Stephens Avenue/Center S	Analysis Year	OY (2017) Without Project	Analysis Period	1> 7:00
File Name	AMOYWO5.xus				
Project Description	Center Street Warehouse				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	1	124	78	315	184	7	60	2	104	9	10	1

Signal Information			
Cycle, s	52.1	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	22.0	4.1	13.9	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		7.0		7.0		12.0		12.0
Phase Duration, s		26.0		26.0		17.9		8.1
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (*MAH*), s		3.2		3.2		3.3		3.1
Queue Clearance Time (g_s), s		4.3		20.3		6.6		2.6
Green Extension Time (g_e), s		1.7		1.7		0.3		0.0
Phase Call Probability		1.00		1.00		0.93		0.27
Max Out Probability		0.00		0.00		0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h		137	86		548	8		182			22	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1899	1610		1449	1610		1680			1842	
Queue Service Time (g_s), s		0.0	1.7		16.1	0.1		4.6			0.6	
Cycle Queue Clearance Time (g_c), s		2.3	1.7		18.3	0.1		4.6			0.6	
Green Ratio (*g/C*)		0.42	0.42		0.42	0.42		0.27			0.08	
Capacity (*c*), veh/h		873	681		726	681		450			145	
Volume-to-Capacity Ratio (*X*)		0.157	0.126		0.755	0.011		0.406			0.151	
Available Capacity (c_a), veh/h		1524	1236		1225	1236		967			1060	
Back of Queue (*Q*), veh/ln (50th percentile)		0.8	0.5		4.8	0.0		1.6			0.2	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00	0.00		0.00	0.00		0.00			0.00	
Uniform Delay (d_1), s/veh		9.3	9.2		14.0	8.7		15.7			22.4	
Incremental Delay (d_2), s/veh		0.0	0.0		0.6	0.0		0.2			0.2	
Initial Queue Delay (d_3), s/veh		0.0	0.0		0.0	0.0		0.0			0.0	
Control Delay (*d*), s/veh		9.4	9.2		14.6	8.7		15.9			22.6	
Level of Service (LOS)		A	A		B	A		B			C	
Approach Delay, s/veh / LOS	9.3	A		14.5	B		15.9	B		22.6	C	
Intersection Delay, s/veh / LOS	13.8						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.1	B	2.1	B	2.3	B	2.3	B
Bicycle LOS Score / LOS	0.9	A	1.4	A	0.8	A	0.5	A

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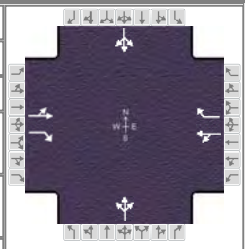
HCS 2010 Signalized Intersection Results Summary

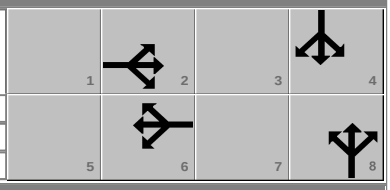
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Evening Peak Hour	PHF	0.93
Intersection	Stephens Avenue/Center S	Analysis Year	OY (2017) Without Project	Analysis Period	1> 7:00
File Name	PMOYWO5.xus				
Project Description	Center Street Warehouse				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	6	255	157	195	141	9	83	5	60	3	3	2

Signal Information			
Cycle, s	50.1	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	19.0	2.1	16.9	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		7.0		7.0		12.0		12.0
Phase Duration, s		23.0		23.0		20.9		6.1
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (*MAH*), s		3.3		3.3		3.2		3.1
Queue Clearance Time (g_s), s		7.4		12.8		5.4		2.2
Green Extension Time (g_e), s		1.8		1.8		0.3		0.0
Phase Call Probability		1.00		1.00		0.89		0.11
Max Out Probability		0.00		0.00		0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h		281	169		361	10		159			9	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1894	1610		1379	1610		1726			1786	
Queue Service Time (g_s), s		0.0	3.6		5.4	0.2		3.4			0.2	
Cycle Queue Clearance Time (g_c), s		5.4	3.6		10.8	0.2		3.4			0.2	
Green Ratio (*g/C*)		0.38	0.38		0.38	0.38		0.34			0.04	
Capacity (*c*), veh/h		792	611		637	611		583			77	
Volume-to-Capacity Ratio (*X*)		0.354	0.276		0.567	0.016		0.273			0.112	
Available Capacity (c_a), veh/h		1580	1286		1205	1286		1034			1070	
Back of Queue (*Q*), veh/ln (50th percentile)		1.8	1.1		2.7	0.1		1.1			0.1	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00	0.00		0.00	0.00		0.00			0.00	
Uniform Delay (d_1), s/veh		11.3	10.8		12.9	9.7		12.1			23.1	
Incremental Delay (d_2), s/veh		0.1	0.1		0.3	0.0		0.1			0.2	
Initial Queue Delay (d_3), s/veh		0.0	0.0		0.0	0.0		0.0			0.0	
Control Delay (*d*), s/veh		11.4	10.9		13.2	9.7		12.2			23.3	
Level of Service (LOS)		B	B		B	A		B			C	
Approach Delay, s/veh / LOS	11.2	B		13.1	B		12.2	B		23.3	C	
Intersection Delay, s/veh / LOS	12.2						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.1	B	2.1	B	2.3	B	2.3	B
Bicycle LOS Score / LOS	1.2	A	1.1	A	0.8	A	0.5	A

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	BC
Agency/Co.	Kunzman Associates, Inc.
Date Performed	1/18/2016
Analysis Time Period	Morning Peak Hour

Site Information

Intersection	La Cadena/Stephens-I-215 SB
Jurisdiction	City of Riverside
Analysis Year	OY (2017) Without Project

Project ID *Center Street Warehouse*

East/West Street: *Stephens Avenue/I-215 FWY SB* North/South Street: *La Cadena Drive*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	41	272	60	180	99	9
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	32	63	11	44	177	35
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LT	R	LT	R
PHF	0.95		0.95		0.95	0.95	0.95	0.95
Flow Rate (veh/h)	392		302		99	11	232	36
% Heavy Vehicles	0		0		0	0	0	0
No. Lanes	1		1		2		2	
Geometry Group	2		2		5		5	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.1		0.6		0.3	0.0	0.2	0.0
Prop. Right-Turns	0.2		0.0		0.0	1.0	0.0	1.0
Prop. Heavy Vehicle	0.0		0.0		0.0	0.0	0.0	0.0
hLT-adj	0.2	0.2	0.2	0.2	0.5	0.5	0.5	0.5
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.7	-0.7	-0.7	-0.7
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	-0.1		0.1		0.2	-0.7	0.1	-0.7

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20		3.20	3.20	3.20	3.20
x, initial	0.35		0.27		0.09	0.01	0.21	0.03
hd, final value (s)	5.64		5.97		7.35	6.45	6.90	6.08
x, final value	0.61		0.50		0.20	0.02	0.44	0.06
Move-up time, m (s)	2.0		2.0		2.3		2.3	
Service Time, t_s (s)	3.6		4.0		5.0	4.2	4.6	3.8

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	612		552		349	261	482	286
Delay (s/veh)	17.22		14.80		11.90	9.28	15.01	9.17
LOS	C		B		B	A	C	A
Approach: Delay (s/veh)	17.22		14.80		11.64		14.22	
LOS	C		B		B		B	
Intersection Delay (s/veh)	15.22							
Intersection LOS	C							

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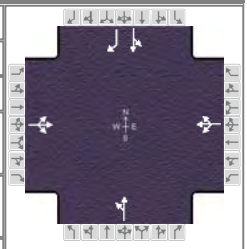
HCS 2010 Signalized Intersection Results Summary

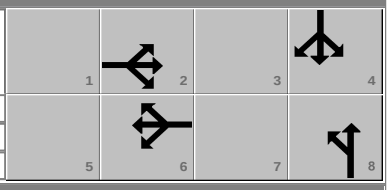
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Morning Peak Hour	PHF	0.95
Intersection	La Cadena/Stephens-I-215	Analysis Year	OY (2017) Without Project	Analysis Period	1> 7:00
File Name	AMOYWO6I.xus				
Project Description	Center Street Warehouse - With Improvements				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	41	272	60	180	99	9	32	63		44	177	35

Signal Information			
Cycle, s	52.6	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	16.1	13.7	10.8	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		8.0		8.0		12.0		11.0
Phase Duration, s		20.1		20.1		14.8		17.7
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (*MAH*), s		3.3		3.3		3.1		3.1
Queue Clearance Time (g_s), s		11.9		14.6		4.4		7.5
Green Extension Time (g_e), s		1.5		1.5		0.1		0.5
Phase Call Probability		1.00		1.00		0.77		0.98
Max Out Probability		0.00		0.01		0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	14
Adjusted Flow Rate (*v*), veh/h		393			303			100			233	37
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1813			1196			1869			1881	1610
Queue Service Time (g_s), s		0.0			2.7			2.4			5.5	0.9
Cycle Queue Clearance Time (g_c), s		9.9			12.6			2.4			5.5	0.9
Green Ratio (*g/C*)		0.31			0.31			0.20			0.26	0.26
Capacity (*c*), veh/h		631			477			382			491	420
Volume-to-Capacity Ratio (*X*)		0.622			0.635			0.262			0.474	0.088
Available Capacity (c_a), veh/h		1096			809			1066			1073	918
Back of Queue (*Q*), veh/ln (50th percentile)		3.6			2.9			0.9			2.1	0.3
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00			0.00			0.00	0.00
Uniform Delay (d_1), s/veh		16.1			16.9			17.6			16.4	14.7
Incremental Delay (d_2), s/veh		0.4			0.5			0.1			0.3	0.0
Initial Queue Delay (d_3), s/veh		0.0			0.0			0.0			0.0	0.0
Control Delay (*d*), s/veh		16.5			17.4			17.7			16.7	14.7
Level of Service (LOS)		B			B			B			B	B
Approach Delay, s/veh / LOS	16.5	B		17.4	B		17.7	B		16.4	B	
Intersection Delay, s/veh / LOS	16.8						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.1	B	2.3	B	2.1	B	2.1	B
Bicycle LOS Score / LOS	1.1	A	1.0	A	0.7	A	0.9	A

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	BC
Agency/Co.	Kunzman Associates, Inc.
Date Performed	1/18/2016
Analysis Time Period	Evening Peak Hour

Site Information

Intersection	La Cadena/Stephens-I-215 SB
Jurisdiction	City of Riverside
Analysis Year	OY (2017) Without Project

Project ID *Center Street Warehouse*

East/West Street: *Stephens Avenue/I-215 FWY SB* North/South Street: *La Cadena Drive*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	59	189	66	87	65	5
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	31	158	16	68	366	49
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LT	R	LT	R
PHF	0.96		0.96		0.96	0.96	0.96	0.96
Flow Rate (veh/h)	325		162		196	16	451	51
% Heavy Vehicles	0		0		0	0	0	0
No. Lanes	1		1		2		2	
Geometry Group	2		2		5		5	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.2		0.6		0.2	0.0	0.2	0.0
Prop. Right-Turns	0.2		0.0		0.0	1.0	0.0	1.0
Prop. Heavy Vehicle	0.0		0.0		0.0	0.0	0.0	0.0
hLT-adj	0.2	0.2	0.2	0.2	0.5	0.5	0.5	0.5
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.7	-0.7	-0.7	-0.7
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	-0.1		0.1		0.1	-0.7	0.1	-0.7

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20		3.20	3.20	3.20	3.20
x, initial	0.29		0.14		0.17	0.01	0.40	0.05
hd, final value (s)	6.48		7.12		7.33	6.53	6.76	5.96
x, final value	0.59		0.32		0.40	0.03	0.85	0.08
Move-up time, m (s)	2.0		2.0		2.3		2.3	
Service Time, t_s (s)	4.5		5.1		5.0	4.2	4.5	3.7

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	519		412		446	266	525	301
Delay (s/veh)	18.21		13.44		14.82	9.42	36.25	9.21
LOS	C		B		B	A	E	A
Approach: Delay (s/veh)	18.21		13.44		14.41		33.51	
LOS	C		B		B		D	
Intersection Delay (s/veh)	23.29							
Intersection LOS	C							

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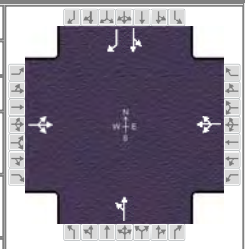
HCS 2010 Signalized Intersection Results Summary

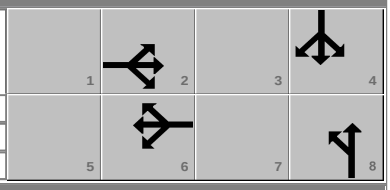
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Morning Peak Hour	PHF	0.96
Intersection	La Cadena/Stephens-I-215	Analysis Year	OY (2017) Without Project	Analysis Period	1> 7:00
File Name	PMOYWO6I.xus				
Project Description	Center Street Warehouse - With Improvements				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	59	189	66	87	65	5	31	158		68	366	49

Signal Information			
Cycle, s	50.5	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	12.0	14.3	12.2	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		8.0		8.0		12.0		11.0
Phase Duration, s		16.0		16.0		16.2		18.3
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (*MAH*), s		3.2		3.2		3.0		3.1
Queue Clearance Time (g_s), s		10.8		6.7		6.5		13.4
Green Extension Time (g_e), s		1.0		1.0		0.3		0.9
Phase Call Probability		1.00		1.00		0.94		1.00
Max Out Probability		0.00		0.00		0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	14
Adjusted Flow Rate (*v*), veh/h		327			164			197			452	51
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1747			1405			1885			1885	1610
Queue Service Time (g_s), s		4.1			0.0			4.5			11.4	1.2
Cycle Queue Clearance Time (g_c), s		8.8			4.7			4.5			11.4	1.2
Green Ratio (*g/C*)		0.24			0.24			0.24			0.28	0.28
Capacity (*c*), veh/h		500			444			455			535	457
Volume-to-Capacity Ratio (*X*)		0.655			0.368			0.433			0.845	0.112
Available Capacity (c_a), veh/h		1106			934			1119			1119	956
Back of Queue (*Q*), veh/ln (50th percentile)		3.1			1.4			1.7			4.3	0.4
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00			0.00			0.00	0.00
Uniform Delay (d_1), s/veh		18.0			16.3			16.2			17.1	13.4
Incremental Delay (d_2), s/veh		0.5			0.2			0.2			1.4	0.0
Initial Queue Delay (d_3), s/veh		0.0			0.0			0.0			0.0	0.0
Control Delay (*d*), s/veh		18.5			16.5			16.5			18.5	13.4
Level of Service (LOS)		B			B			B			B	B
Approach Delay, s/veh / LOS	18.5	B		16.5	B		16.5	B		18.0	B	
Intersection Delay, s/veh / LOS	17.7						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.1	B	2.3	B	2.1	B	2.1	B
Bicycle LOS Score / LOS	1.0	A	0.8	A	0.8	A	1.3	A

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	BC
Agency/Co.	Kunzman Associates, Inc.
Date Performed	1/18/2016
Analysis Time Period	Morning Peak Hour

Site Information

Intersection	La Cadena/Highgrove-I-215 NB
Jurisdiction	City of Riverside
Analysis Year	OY (2017) Without Project

Project ID *Center Street Warehouse*

East/West Street: *Highgrove Place/I-215 FWY NB* North/South Street: *La Cadena Drive*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	47	190	0	30	0	4
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	0	33	40	1	80	0
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT		L	R	TR		LT	
PHF	0.89		0.89	0.89	0.89		0.89	
Flow Rate (veh/h)	265		33	4	81		90	
% Heavy Vehicles	0		0	0	0		0	
No. Lanes	1		2		1		1	
Geometry Group	4a		5		2		2	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.2		1.0	0.0	0.0		0.0	
Prop. Right-Turns	0.0		0.0	1.0	0.5		0.0	
Prop. Heavy Vehicle	0.0		0.0	0.0	0.0		0.0	
hLT-adj	0.2	0.2	0.5	0.5	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.7	-0.7	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	0.0		0.5	-0.7	-0.3		0.0	

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20	3.20	3.20		3.20	
x, initial	0.24		0.03	0.00	0.07		0.08	
hd, final value (s)	4.51		5.65	4.44	4.41		4.72	
x, final value	0.33		0.05	0.00	0.10		0.12	
Move-up time, m (s)	2.0		2.3		2.0		2.0	
Service Time, t_s (s)	2.5		3.3	2.1	2.4		2.7	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	515		283	254	331		340	
Delay (s/veh)	9.73		8.66	7.16	7.90		8.35	
LOS	A		A	A	A		A	
Approach: Delay (s/veh)	9.73		8.50		7.90		8.35	
LOS	A		A		A		A	
Intersection Delay (s/veh)	9.06							
Intersection LOS	A							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*BC*
Agency/Co.	*Kunzman Associates, Inc.*
Date Performed	*1/18/2016*
Analysis Time Period	*Evening Peak Hour*

Site Information

Intersection	*La Cadena/Highgrove-I-215 NB*
Jurisdiction	*City of Riverside*
Analysis Year	*OY (2017) Without Project*

Project ID *Center Street Warehouse*

East/West Street: *Highgrove Place/I-215 FWY NB* North/South Street: *La Cadena Drive*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	27	231	0	20	0	3
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	0	98	68	1	159	0
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT		L	R	TR		LT	
PHF	0.91		0.91	0.91	0.91		0.91	
Flow Rate (veh/h)	282		21	3	181		175	
% Heavy Vehicles	0		0	0	0		0	
No. Lanes	1		2		1		1	
Geometry Group	4a		5		2		2	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.1		1.0	0.0	0.0		0.0	
Prop. Right-Turns	0.0		0.0	1.0	0.4		0.0	
Prop. Heavy Vehicle	0.0		0.0	0.0	0.0		0.0	
hLT-adj	0.2	0.2	0.5	0.5	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.7	-0.7	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	0.0		0.5	-0.7	-0.2		0.0	

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20	3.20	3.20		3.20	
x, initial	0.25		0.02	0.00	0.16		0.16	
hd, final value (s)	4.96		6.25	5.03	4.70		4.94	
x, final value	0.39		0.04	0.00	0.24		0.24	
Move-up time, m (s)	2.0		2.3		2.0		2.0	
Service Time, t_s (s)	3.0		3.9	2.7	2.7		2.9	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	532		271	253	431		425	
Delay (s/veh)	11.08		9.18	7.75	9.15		9.50	
LOS	B		A	A	A		A	
Approach: Delay (s/veh)	11.08		9.00		9.15		9.50	
LOS	B		A		A		A	
Intersection Delay (s/veh)	10.06							
Intersection LOS	B							

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*BC*
Agency/Co.	*Kunzman Associates, Inc.*
Date Performed	*1/18/2016*
Analysis Time Period	*Morning Peak Hour*

Site Information

Intersection	*Highgrove Place/Center Street*
Jurisdiction	*City of Riverside*
Analysis Year	*OY (2017) Without Project*

Project Description *Center Street Warehouse*

East/West Street: *Center Street* | North/South Street: *Highgrove Place*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*1*	*218*	*23*	*11*	*406*	*5*
Peak-Hour Factor, PHF	*0.91*	*0.91*	*0.91*	*0.91*	*0.91*	*0.91*
Hourly Flow Rate, HFR (veh/h)	*1*	*239*	*25*	*12*	*446*	*5*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*1*	*0*	*1*	*0*
Configuration	*LT*		*R*	*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*73*	*1*	*157*	*2*	*1*	*23*
Peak-Hour Factor, PHF	*0.91*	*0.91*	*0.91*	*0.91*	*0.91*	*0.91*
Hourly Flow Rate, HFR (veh/h)	*80*	*1*	*172*	*2*	*1*	*25*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*1*	*0*	*1*	*0*
Configuration	*LT*		*R*		*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*	*LTR*	*LT*		*R*		*LTR*	
v (veh/h)	*1*	*12*	*81*		*172*		*28*	
C (m) (veh/h)	*1120*	*1312*	*324*		*805*		*537*	
v/c	*0.00*	*0.01*	*0.25*		*0.21*		*0.05*	
95% queue length	*0.00*	*0.03*	*0.97*		*0.81*		*0.16*	
Control Delay (s/veh)	*8.2*	*7.8*	*19.8*		*10.7*		*12.1*	
LOS	*A*	*A*	*C*		*B*		*B*	
Approach Delay (s/veh)	--	--	*13.6*			*12.1*		
Approach LOS	--	--	*B*			*B*		

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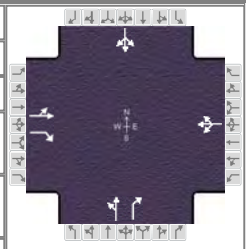
HCS 2010 Signalized Intersection Results Summary

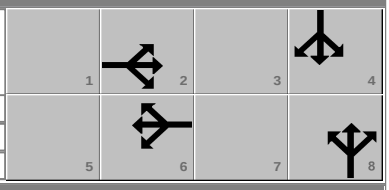
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Morning Peak Hour	PHF	0.91
Intersection	Highgrove Place/Center St	Analysis Year	OY (2017) Without Project	Analysis Period	1> 7:00
File Name	AMOYWO8I.xus				
Project Description	Center Street Warehouse - With Improvements				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	1	218	23	11	406	5	73	1	157	2	1	23

Signal Information			
Cycle, s	50.9	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	20.0	3.3	15.6	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		7.0		8.0		11.0		12.0
Phase Duration, s		24.0		24.0		19.6		7.3
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (*MAH*), s		3.1		3.1		3.3		3.3
Queue Clearance Time (g_s), s		6.5		12.0		6.2		2.8
Green Extension Time (g_e), s		1.4		1.3		0.5		0.0
Phase Call Probability		1.00		1.00		0.97		0.33
Max Out Probability		0.00		0.00		0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h		241	25		464			81	173		29	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1899	1610		1885			1811	1610		1634	
Queue Service Time (g_s), s		0.0	0.5		0.0			1.7	4.2		0.8	
Cycle Queue Clearance Time (g_c), s		4.5	0.5		10.0			1.7	4.2		0.8	
Green Ratio (*g/C*)		0.39	0.39		0.39			0.31	0.31		0.07	
Capacity (*c*), veh/h		817	633		814			554	492		107	
Volume-to-Capacity Ratio (*X*)		0.294	0.040		0.570			0.147	0.350		0.268	
Available Capacity (c_a), veh/h		1189	949		1180			783	696		482	
Back of Queue (*Q*), veh/ln (50th percentile)		1.5	0.1		3.4			0.6	1.3		0.3	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00	0.00		0.00			0.00	0.00		0.00	
Uniform Delay (d_1), s/veh		10.7	9.5		12.4			12.8	13.7		22.6	
Incremental Delay (d_2), s/veh		0.1	0.0		0.2			0.0	0.2		0.5	
Initial Queue Delay (d_3), s/veh		0.0	0.0		0.0			0.0	0.0		0.0	
Control Delay (*d*), s/veh		10.8	9.5		12.6			12.9	13.9		23.1	
Level of Service (LOS)		B	A		B			B	B		C	
Approach Delay, s/veh / LOS	10.7	B		12.6	B		13.6	B		23.1	C	
Intersection Delay, s/veh / LOS	12.7						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	2.1	B	2.1	B	2.3	B
Bicycle LOS Score / LOS	0.9	A	1.3	A	0.9	A	0.5	A

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*BC*
Agency/Co.	*Kunzman Associates, Inc.*
Date Performed	*1/18/2016*
Analysis Time Period	*Evening Peak Hour*

Site Information

Intersection	*Highgrove Place/Center Street*
Jurisdiction	*City of Riverside*
Analysis Year	*OY (2017) Without Project*

Project Description *Center Street Warehouse*

East/West Street: *Center Street* | North/South Street: *Highgrove Place*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*2*	*265*	*16*	*8*	*242*	*9*
Peak-Hour Factor, PHF	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*
Hourly Flow Rate, HFR (veh/h)	*2*	*276*	*16*	*8*	*252*	*9*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*1*	*0*	*1*	*0*
Configuration	*LT*		*R*	*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*65*	*2*	*238*	*5*	*1*	*19*
Peak-Hour Factor, PHF	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*
Hourly Flow Rate, HFR (veh/h)	*67*	*2*	*247*	*5*	*1*	*19*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*1*	*0*	*1*	*0*
Configuration	*LT*		*R*		*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*	*LTR*	*LT*		*R*		*LTR*	
v (veh/h)	*2*	*8*	*69*		*247*		*25*	
C (m) (veh/h)	*1315*	*1281*	*427*		*768*		*534*	
v/c	*0.00*	*0.01*	*0.16*		*0.32*		*0.05*	
95% queue length	*0.00*	*0.02*	*0.57*		*1.39*		*0.15*	
Control Delay (s/veh)	*7.7*	*7.8*	*15.0*		*11.9*		*12.1*	
LOS	*A*	*A*	*C*		*B*		*B*	
Approach Delay (s/veh)	--	--	*12.6*			*12.1*		
Approach LOS	--	--	*B*			*B*		

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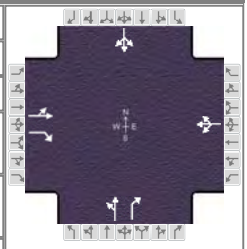
HCS 2010 Signalized Intersection Results Summary

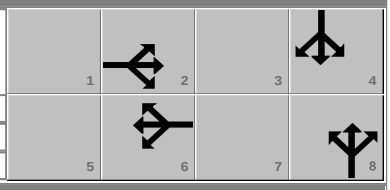
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Evening Peak Hour	PHF	0.91
Intersection	Highgrove Place/Center St	Analysis Year	OY (2017) Without Project	Analysis Period	1> 7:00
File Name	PMOYWO8I.xus				
Project Description	Center Street Warehouse - With Improvements				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	2	265	16	8	242	9	65	2	238	5	1	19

Signal Information			
Cycle, s	51.1	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	18.0	3.2	17.8	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		7.0		8.0		11.0		12.0
Phase Duration, s		22.0		22.0		21.8		7.2
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (*MAH*), s		3.1		3.1		3.3		3.3
Queue Clearance Time (g_s), s		8.0		7.9		8.4		2.8
Green Extension Time (g_e), s		1.1		1.1		0.6		0.0
Phase Call Probability		1.00		1.00		0.99		0.32
Max Out Probability		0.00		0.00		0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h		293	18		285			74	262		27	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1898	1610		1875			1812	1610		1657	
Queue Service Time (g_s), s		0.0	0.4		0.0			1.4	6.4		0.8	
Cycle Queue Clearance Time (g_c), s		6.0	0.4		5.9			1.4	6.4		0.8	
Green Ratio (*g/C*)		0.35	0.35		0.35			0.35	0.35		0.06	
Capacity (*c*), veh/h		740	567		734			633	563		105	
Volume-to-Capacity Ratio (*X*)		0.397	0.031		0.388			0.116	0.465		0.262	
Available Capacity (c_a), veh/h		1184	946		1168			781	694		487	
Back of Queue (*Q*), veh/ln (50th percentile)		2.1	0.1		2.1			0.5	1.9		0.3	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00	0.00		0.00			0.00	0.00		0.00	
Uniform Delay (d_1), s/veh		12.7	10.8		12.6			11.3	12.9		22.8	
Incremental Delay (d_2), s/veh		0.1	0.0		0.1			0.0	0.2		0.5	
Initial Queue Delay (d_3), s/veh		0.0	0.0		0.0			0.0	0.0		0.0	
Control Delay (*d*), s/veh		12.8	10.8		12.7			11.3	13.1		23.3	
Level of Service (LOS)		B	B		B			B	B		C	
Approach Delay, s/veh / LOS	12.7	B		12.7	B		12.7	B		23.3	C	
Intersection Delay, s/veh / LOS	13.0						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	2.1	B	2.3	B
Bicycle LOS Score / LOS	1.0	A	1.0	A	1.0	A	0.5	A

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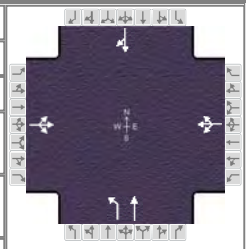
HCS 2010 Signalized Intersection Results Summary

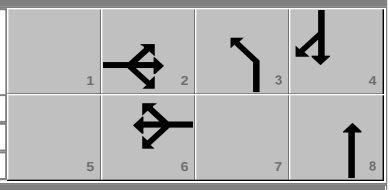
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Morning Peak Hour	PHF	0.90
Intersection	Iowa Avenue-I-215 NB Ran	Analysis Year	OY (2017) Without Project	Analysis Period	1> 7:00
File Name	AMOYWO9.xus				
Project Description	Center Street Warehouse				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	95	0	823	0	0	0	297	463			14	241

Signal Information			
Cycle, s	68.5	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	32.0	14.5	10.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8		4
Case Number		8.0		8.0	2.0	4.0		8.3
Phase Duration, s		36.0		36.0	18.5	32.5		14.0
Change Period, ($Y+R_c$), s		4.0		4.0	4.0	4.0		4.0
Max Allow Headway (*MAH*), s		3.3		0.0	3.1	3.1		3.1
Queue Clearance Time (g_s), s		34.0			14.0	16.9		12.0
Green Extension Time (g_e), s		0.0		0.0	0.5	1.6		0.0
Phase Call Probability		1.00			1.00	1.00		1.00
Max Out Probability		1.00			0.00	0.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8			4	14
Adjusted Flow Rate (*v*), veh/h		1020			0		330	514			283	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1600			0		1810	1900			1624	
Queue Service Time (g_s), s		25.6			0.0		12.0	14.9			10.0	
Cycle Queue Clearance Time (g_c), s		32.0			0.0		12.0	14.9			10.0	
Green Ratio (*g/C*)		0.47					0.21	0.42			0.15	
Capacity (*c*), veh/h		805					383	791			237	
Volume-to-Capacity Ratio (*X*)		1.267			0.000		0.861	0.651			1.196	
Available Capacity (c_a), veh/h		805					660	1109			237	
Back of Queue (*Q*), veh/ln (50th percentile)		40.5			0.0		5.0	5.7			11.7	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00		0.00	0.00			0.00	
Uniform Delay (d_1), s/veh		19.3					26.0	16.0			29.3	
Incremental Delay (d_2), s/veh		129.9			0.0		2.2	0.3			121.6	
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0			0.0	
Control Delay (*d*), s/veh		149.3					28.3	16.3			150.9	
Level of Service (LOS)		F					C	B			F	
Approach Delay, s/veh / LOS	149.3	F		0.0			21.0	C		150.9	F	
Intersection Delay, s/veh / LOS	99.0						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	2.1	B	2.1	B	2.1	B
Bicycle LOS Score / LOS	2.2	B	0.5	A	1.9	A	1.0	A

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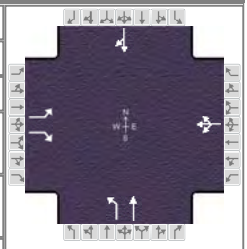
HCS 2010 Signalized Intersection Results Summary

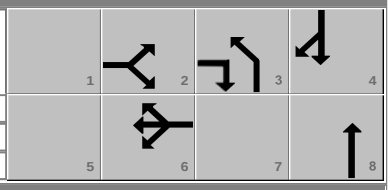
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Morning Peak Hour	PHF	0.90
Intersection	Iowa Avenue-I-215 NB Ran	Analysis Year	OY (2017) Without Project	Analysis Period	1> 7:00
File Name	AMOYWO9I.xus				
Project Description	Center Street Warehouse				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	95		823	0	0	0	297	463			14	241

Signal Information			
Cycle, s	87.5	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	40.0	18.1	17.4	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8		4
Case Number		5.0		8.0	2.0	4.0		8.3
Phase Duration, s		44.0		44.0	22.1	43.5		21.4
Change Period, ($Y+R_c$), s		4.0		4.0	4.0	4.0		4.0
Max Allow Headway (*MAH*), s		3.3		0.0	3.1	3.1		3.1
Queue Clearance Time (g_s), s		40.6			17.5	19.8		16.8
Green Extension Time (g_e), s		0.0		0.0	0.6	1.5		0.6
Phase Call Probability		1.00			1.00	1.00		1.00
Max Out Probability		1.00			0.00	0.01		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5		12	1	6	16	3	8			4	14
Adjusted Flow Rate (*v*), veh/h	106		914		0		330	514			283	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810		1610		0		1810	1900			1624	
Queue Service Time (g_s), s	2.9		38.6		0.0		15.5	17.8			14.8	
Cycle Queue Clearance Time (g_c), s	2.9		38.6		0.0		15.5	17.8			14.8	
Green Ratio (*g/C*)	0.46		0.66				0.21	0.45			0.20	
Capacity (*c*), veh/h	910		1069				374	858			323	
Volume-to-Capacity Ratio (*X*)	0.116		0.855		0.000		0.882	0.600			0.878	
Available Capacity (c_a), veh/h	910		1069				827	858			742	
Back of Queue (*Q*), veh/ln (50th percentile)	1.1		12.7		0.0		6.8	7.4			5.9	
Queue Storage Ratio (*RQ*) (50th percentile)	0.00		0.00		0.00		0.00	0.00			0.00	
Uniform Delay (d_1), s/veh	13.7		11.4				33.7	18.1			34.0	
Incremental Delay (d_2), s/veh	0.0		6.6		0.0		2.7	0.8			3.0	
Initial Queue Delay (d_3), s/veh	0.0		0.0		0.0		0.0	0.0			0.0	
Control Delay (*d*), s/veh	13.7		18.0				36.4	18.9			37.1	
Level of Service (LOS)	B		B				D	B			D	
Approach Delay, s/veh / LOS	17.6	B		0.0			25.7	C		37.1	D	
Intersection Delay, s/veh / LOS	23.4						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	1.4	A	2.3	B
Bicycle LOS Score / LOS		F	0.5	A	1.9	A	1.0	A

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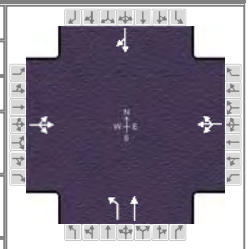
HCS 2010 Signalized Intersection Results Summary

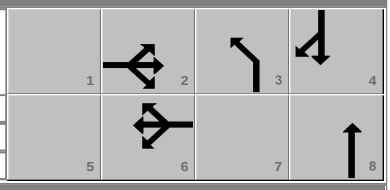
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Evening Peak Hour	PHF	0.88
Intersection	Iowa Avenue-I-215 NB Ran	Analysis Year	OY (2017) Without Project	Analysis Period	1> 7:00
File Name	PMOYWO9.xus				
Project Description	Center Street Warehouse				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	126	0	804	0	0	0	345	584			22	330

Signal Information			
Cycle, s	68.9	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	30.0	16.9	10.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8		4
Case Number		8.0		8.0	2.0	4.0		8.3
Phase Duration, s		34.0		34.0	20.9	34.9		14.0
Change Period, ($Y+R_c$), s		4.0		4.0	4.0	4.0		4.0
Max Allow Headway (*MAH*), s		3.3		0.0	3.1	3.1		3.1
Queue Clearance Time (g_s), s		32.0			16.4	22.4		12.0
Green Extension Time (g_e), s		0.0		0.0	0.6	2.3		0.0
Phase Call Probability		1.00			1.00	1.00		1.00
Max Out Probability		1.00			0.02	0.01		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8			4	14
Adjusted Flow Rate (*v*), veh/h		1057			0		392	664			400	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1593			0		1810	1900			1626	
Queue Service Time (g_s), s		26.1			0.0		14.4	20.4			10.0	
Cycle Queue Clearance Time (g_c), s		30.0			0.0		14.4	20.4			10.0	
Green Ratio (*g/C*)		0.44					0.25	0.45			0.15	
Capacity (*c*), veh/h		752					445	853			236	
Volume-to-Capacity Ratio (*X*)		1.405			0.000		0.882	0.778			1.696	
Available Capacity (c_a), veh/h		752					656	1102			236	
Back of Queue (*Q*), veh/ln (50th percentile)		50.7			0.0		6.5	8.0			25.3	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00		0.00	0.00			0.00	
Uniform Delay (d_1), s/veh		20.6					25.0	16.1			29.5	
Incremental Delay (d_2), s/veh		190.1			0.0		6.9	1.9			330.8	
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0			0.0	
Control Delay (*d*), s/veh		210.7					32.0	18.0			360.3	
Level of Service (LOS)		F					C	B			F	
Approach Delay, s/veh / LOS	210.7	F		0.0			23.2	C		360.3	F	
Intersection Delay, s/veh / LOS	155.7						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	2.1	B	2.1	B
Bicycle LOS Score / LOS	2.2	B	0.5	A	2.2	B	1.1	A

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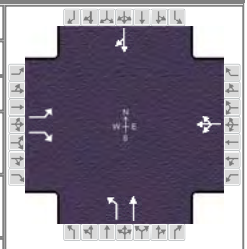
HCS 2010 Signalized Intersection Results Summary

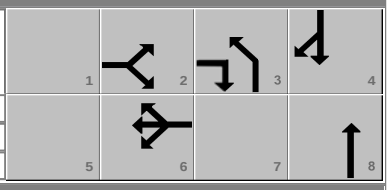
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Evening Peak Hour	PHF	0.88
Intersection	Iowa Avenue-I-215 NB Ran	Analysis Year	OY (2017) Without Project	Analysis Period	1> 7:00
File Name	PMOYWO9I.xus				
Project Description	Center Street Warehouse - With Improvements				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	126		804	0	0	0	345	584			22	330

Signal Information			
Cycle, s	79.1	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	15.0	21.7	30.4	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		5.0		8.0		10.0		12.0
Phase Duration, s		19.0		19.0		34.4		25.7
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (*MAH*), s		3.3		0.0		3.1		3.3
Queue Clearance Time (g_s), s		17.0				28.1		20.8
Green Extension Time (g_e), s		0.0		0.0		2.2		0.9
Phase Call Probability		1.00				1.00		1.00
Max Out Probability		1.00				0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5		12	1	6	16	3	8			4	14
Adjusted Flow Rate (*v*), veh/h	143		914		0		392	664			400	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810		1610		0		1810	1900			1626	
Queue Service Time (g_s), s	5.5		15.0		0.0		13.5	26.1			18.8	
Cycle Queue Clearance Time (g_c), s	5.5		15.0		0.0		13.5	26.1			18.8	
Green Ratio (*g/C*)	0.19		0.57				0.38	0.38			0.27	
Capacity (*c*), veh/h	434		925				696	731			446	
Volume-to-Capacity Ratio (*X*)	0.330		0.988		0.000		0.563	0.908			0.897	
Available Capacity (c_a), veh/h	434		925				1600	1680			821	
Back of Queue (*Q*), veh/ln (50th percentile)	2.3		20.0		0.0		5.3	11.0			7.2	
Queue Storage Ratio (*RQ*) (50th percentile)	0.00		0.00		0.00		0.00	0.00			0.00	
Uniform Delay (d_1), s/veh	28.2		16.6				19.1	23.0			27.7	
Incremental Delay (d_2), s/veh	0.2		26.6		0.0		0.3	1.9			2.7	
Initial Queue Delay (d_3), s/veh	0.0		0.0		0.0		0.0	0.0			0.0	
Control Delay (*d*), s/veh	28.4		43.2				19.4	24.9			30.3	
Level of Service (LOS)	C		D				B	C			C	
Approach Delay, s/veh / LOS	41.2		D	0.0			22.9		C	30.3		C
Intersection Delay, s/veh / LOS	31.7						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	1.4	A	2.3	B
Bicycle LOS Score / LOS		F	0.5	A	2.2	B	1.1	A

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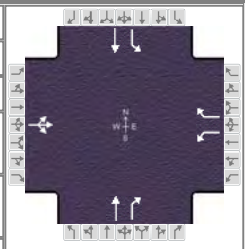
HCS 2010 Signalized Intersection Results Summary

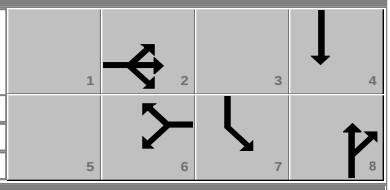
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Morning Peak Hour	PHF	0.82
Intersection	Iowa Avenue/Main Street	Analysis Year	OY (2017) Without Project	Analysis Period	1> 7:00
File Name	AMOYWO10.xus				
Project Description	Center Street Warehouse				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	0	0	0	107		279		453	104	225	635	

Signal Information			
Cycle, s	52.6	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	13.5	9.8	17.2	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8	7	4
Case Number		8.0		5.0		7.3	2.0	4.0
Phase Duration, s		17.5		17.5		21.2	13.8	35.0
Change Period, ($Y+R_c$), s		4.0		4.0		4.0	4.0	4.0
Max Allow Headway (*MAH*), s		0.0		3.3		3.1	3.1	3.1
Queue Clearance Time (g_s), s				12.5		16.5	9.7	16.8
Green Extension Time (g_e), s		0.0		1.0		0.6	0.3	1.3
Phase Call Probability				1.00		1.00	0.98	1.00
Max Out Probability				0.00		0.91	0.15	0.98

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1		16		8	18	7	4	
Adjusted Flow Rate (*v*), veh/h		0		130		340		552	127	274	774	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		0		1810		1610		1900	1610	1810	1900	
Queue Service Time (g_s), s		0.0		3.0		10.5		14.5	3.0	7.7	14.8	
Cycle Queue Clearance Time (g_c), s		0.0		3.0		10.5		14.5	3.0	7.7	14.8	
Green Ratio (*g/C*)				0.26		0.26		0.33	0.33	0.19	0.59	
Capacity (*c*), veh/h				603		415		622	527	338	1122	
Volume-to-Capacity Ratio (*X*)		0.000		0.216		0.820		0.888	0.240	0.811	0.690	
Available Capacity (c_a), veh/h				1511		1223		722	612	515	1122	
Back of Queue (*Q*), veh/ln (50th percentile)		0.0		1.1		3.5		7.1	0.9	3.1	4.2	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00		0.00		0.00		0.00	0.00	0.00	0.00	
Uniform Delay (d_1), s/veh				15.6		18.4		16.8	12.9	20.5	7.5	
Incremental Delay (d_2), s/veh		0.0		0.1		1.6		10.7	0.1	3.1	1.5	
Initial Queue Delay (d_3), s/veh		0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh				15.7		20.0		27.5	13.0	23.6	9.0	
Level of Service (LOS)				B		B		C	B	C	A	
Approach Delay, s/veh / LOS	0.0			18.8		B	24.8		C	12.8		B
Intersection Delay, s/veh / LOS	17.8						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.3	B	1.3	A
Bicycle LOS Score / LOS	0.5	A		F	1.6	A	2.2	B

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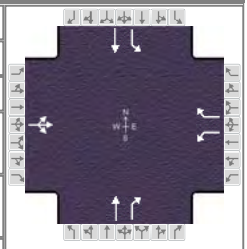
HCS 2010 Signalized Intersection Results Summary

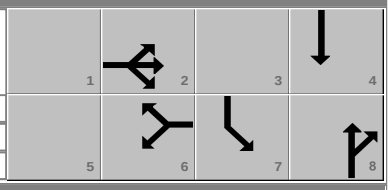
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Evening Peak Hour	PHF	0.95
Intersection	Iowa Avenue/Main Street	Analysis Year	OY (2017) Without Project	Analysis Period	1> 7:00
File Name	PMOYWO10.xus				
Project Description	Center Street Warehouse				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	0	0	0	117		171		780	127	118	712	

Signal Information			
Cycle, s	51.1	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	8.0	7.5	23.6	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8	7	4
Case Number		8.0		5.0		7.3	2.0	4.0
Phase Duration, s		12.0		12.0		27.6	11.5	39.0
Change Period, ($Y+R_c$), s		4.0		4.0		4.0	4.0	4.0
Max Allow Headway (*MAH*), s		0.0		3.2		3.0	3.1	3.0
Queue Clearance Time (g_s), s				7.4		22.9	5.2	12.5
Green Extension Time (g_e), s		0.0		0.6		0.6	0.1	2.8
Phase Call Probability				1.00		1.00	0.83	1.00
Max Out Probability				0.00		1.00	0.00	0.47

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1		16		8	18	7	4	
Adjusted Flow Rate (*v*), veh/h		0		123		180		821	134	124	749	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		0		1810		1610		1900	1610	1810	1900	
Queue Service Time (g_s), s		0.0		3.1		5.4		20.9	2.5	3.2	10.5	
Cycle Queue Clearance Time (g_c), s		0.0		3.1		5.4		20.9	2.5	3.2	10.5	
Green Ratio (*g/C*)				0.16		0.16		0.46	0.46	0.15	0.69	
Capacity (*c*), veh/h				426		253		877	744	264	1304	
Volume-to-Capacity Ratio (*X*)		0.000		0.289		0.711		0.936	0.180	0.470	0.575	
Available Capacity (c_a), veh/h				1557		1260		929	788	531	1304	
Back of Queue (*Q*), veh/ln (50th percentile)		0.0		1.2		1.9		10.3	0.7	1.2	1.8	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00		0.00		0.00		0.00	0.00	0.00	0.00	
Uniform Delay (d_1), s/veh				19.5		20.4		13.0	8.1	20.0	4.2	
Incremental Delay (d_2), s/veh		0.0		0.1		1.4		15.3	0.0	0.5	0.4	
Initial Queue Delay (d_3), s/veh		0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh				19.6		21.8		28.4	8.1	20.5	4.6	
Level of Service (LOS)				B		C		C	A	C	A	
Approach Delay, s/veh / LOS	0.0			20.9		C	25.5		C	6.8		A
Intersection Delay, s/veh / LOS	17.2						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.2	B	1.3	A
Bicycle LOS Score / LOS	0.5	A		F	2.1	B	1.9	A

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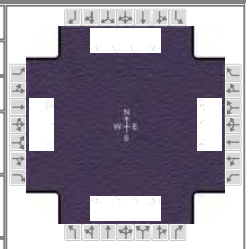
HCS 2010 Signalized Intersection Results Summary

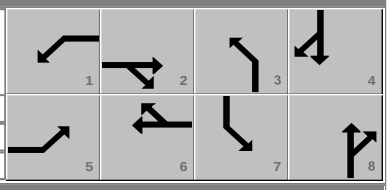
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Morning Peak Hour	PHF	0.90
Intersection	Iowa Avenue/Center Street	Analysis Year	OY (2017) Without Project	Analysis Period	1> 7:00
File Name	AMOYWO11.xus				
Project Description	Center Street Warehouse				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	85	189	82	131	265	57	71	353	82	29	596	85

Signal Information			
Cycle, s	51.3	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.7	1.2	9.1	3.3	2.8	12.3
Yellow	4.0	0.0	4.0	4.0	0.0	4.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	4.0	2.0	3.0	2.0	3.0	2.0	3.0
Phase Duration, s	10.7	13.1	11.9	14.3	10.1	19.0	7.3	16.3
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (*MAH*), s	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	4.5	6.0	5.8	9.5	4.1	6.4	2.9	10.8
Green Extension Time (g_e), s	0.1	1.0	0.2	0.8	0.1	2.3	0.0	1.5
Phase Call Probability	0.74	1.00	0.87	1.00	0.68	1.00	0.37	1.00
Max Out Probability	0.00	0.05	0.00	0.30	0.00	0.18	0.00	0.70

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	94	155	146	146	294	63	79	392	91	32	662	94
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1900	1708	1810	1900	1610	1810	1809	1610	1810	1809	1610
Queue Service Time (g_s), s	2.5	3.7	4.0	3.8	7.5	1.7	2.1	4.4	2.2	0.9	8.8	2.4
Cycle Queue Clearance Time (g_c), s	2.5	3.7	4.0	3.8	7.5	1.7	2.1	4.4	2.2	0.9	8.8	2.4
Green Ratio (*g/C*)	0.13	0.18	0.18	0.15	0.20	0.20	0.12	0.29	0.29	0.06	0.24	0.24
Capacity (*c*), veh/h	235	337	303	278	382	323	215	1059	472	117	865	385
Volume-to-Capacity Ratio (*X*)	0.402	0.460	0.483	0.524	0.772	0.196	0.368	0.370	0.193	0.275	0.766	0.245
Available Capacity (c_a), veh/h	529	555	499	529	555	470	529	1059	472	529	1057	470
Back of Queue (*Q*), veh/ln (50th percentile)	1.0	1.5	1.4	1.5	3.1	0.6	0.8	1.5	0.7	0.4	3.4	0.8
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	20.5	18.9	19.0	20.0	19.4	17.1	20.9	14.4	13.6	22.9	18.2	15.8
Incremental Delay (d_2), s/veh	0.4	0.4	0.4	0.6	2.1	0.1	0.4	0.1	0.1	0.5	2.1	0.1
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	20.9	19.3	19.4	20.6	21.5	17.2	21.2	14.5	13.7	23.3	20.3	15.9
Level of Service (LOS)	C	B	B	C	C	B	C	B	B	C	C	B
Approach Delay, s/veh / LOS	19.7	B		20.7	C		15.3	B		19.9	B	
Intersection Delay, s/veh / LOS	18.9						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	2.9	C	2.8	C	2.4	B
Bicycle LOS Score / LOS	0.8	A	1.3	A	1.0	A	1.1	A

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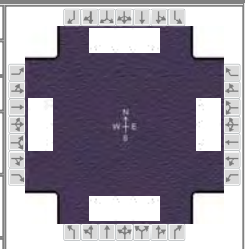
HCS 2010 Signalized Intersection Results Summary

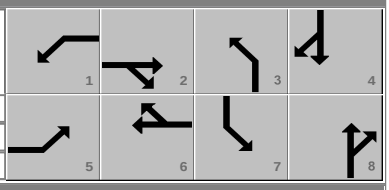
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Evening Peak Hour	PHF	0.97
Intersection	Iowa Avenue/Center Street	Analysis Year	OY (2017) Without Project	Analysis Period	1> 7:00
File Name	PMOYWO11.xus				
Project Description	Center Street Warehouse				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	177	249	83	125	109	25	86	656	70	44	671	56

Signal Information			
Cycle, s	51.9	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.8	0.7	8.0	3.9	1.9	14.7
Yellow	4.0	0.0	4.0	4.0	0.0	4.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	4.0	2.0	3.0	2.0	3.0	2.0	3.0
Phase Duration, s	11.4	12.7	10.8	12.0	9.8	20.7	7.9	18.7
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (*MAH*), s	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	7.0	6.6	5.5	4.8	4.4	10.1	3.2	10.8
Green Extension Time (g_e), s	0.3	0.8	0.2	0.9	0.1	3.0	0.0	3.9
Phase Call Probability	0.93	1.00	0.84	1.00	0.72	1.00	0.48	1.00
Max Out Probability	0.00	0.00	0.00	0.00	0.00	0.18	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	182	176	167	129	112	26	89	676	72	45	692	58
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1900	1739	1810	1900	1610	1810	1809	1610	1810	1809	1610
Queue Service Time (g_s), s	5.0	4.4	4.6	3.5	2.8	0.7	2.4	8.1	1.7	1.2	8.8	1.4
Cycle Queue Clearance Time (g_c), s	5.0	4.4	4.6	3.5	2.8	0.7	2.4	8.1	1.7	1.2	8.8	1.4
Green Ratio (*g/C*)	0.14	0.17	0.17	0.13	0.15	0.15	0.11	0.32	0.32	0.07	0.28	0.28
Capacity (*c*), veh/h	259	317	290	236	292	248	202	1161	517	135	1026	457
Volume-to-Capacity Ratio (*X*)	0.705	0.554	0.575	0.547	0.384	0.104	0.439	0.583	0.140	0.337	0.674	0.126
Available Capacity (c_a), veh/h	696	731	669	696	1462	1239	1392	1392	619	696	2783	1239
Back of Queue (*Q*), veh/ln (50th percentile)	2.0	1.8	1.7	1.4	1.1	0.2	0.9	2.8	0.5	0.5	3.1	0.4
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	21.2	19.9	20.0	21.2	19.8	18.9	21.6	14.7	12.6	22.8	16.5	13.8
Incremental Delay (d_2), s/veh	1.3	0.6	0.7	0.7	0.3	0.1	0.6	0.2	0.0	0.5	0.3	0.0
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	22.5	20.5	20.6	21.9	20.1	19.0	22.1	14.9	12.6	23.4	16.8	13.9
Level of Service (LOS)	C	C	C	C	C	B	C	B	B	C	B	B
Approach Delay, s/veh / LOS	21.2	C		20.9	C		15.5	B		16.9	B	
Intersection Delay, s/veh / LOS	17.8						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	2.9	C	2.8	C	2.4	B
Bicycle LOS Score / LOS	0.9	A	0.9	A	1.2	A	1.1	A

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Opening Year (2017) With Project

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*BC*	Intersection	*Main Street/Center Street*
Agency/Co.	*Kunzman Associates, Inc.*	Jurisdiction	*City of Riverside*
Date Performed	*1/18/2016*	Analysis Year	*OY (2017) With Project*
Analysis Time Period	*Morning Peak Hour*		

Project Description *Center Street Warehouse*

East/West Street: *Center Street* | North/South Street: *Main Street/Riverside Avenue*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*742*	*62*	*123*	*703*	
Peak-Hour Factor, PHF	*1.00*	*0.95*	*0.95*	*0.95*	*0.95*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*781*	*65*	*129*	*740*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Two Way Left Turn Lane*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*1*	*1*	*2*	*0*
Configuration		*T*	*R*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*41*	*0*	*140*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.95*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*43*	*0*	*147*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*1*	*0*
Configuration					*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*		*LTR*				
v (veh/h)		*129*		*190*				
C (m) (veh/h)		*800*		*475*				
v/c		*0.16*		*0.40*				
95% queue length		*0.57*		*1.90*				
Control Delay (s/veh)		*10.4*		*17.5*				
LOS		*B*		*C*				
Approach Delay (s/veh)	--	--	*17.5*					
Approach LOS	--	--	*C*					

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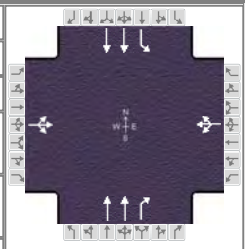
HCS 2010 Signalized Intersection Results Summary

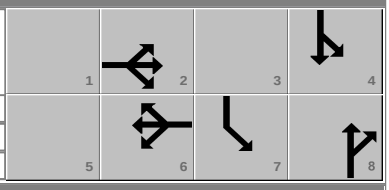
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Morning Peak Hour	PHF	0.95
Intersection	Main Street/Riverside Aven	Analysis Year	OY (2017) With Project	Analysis Period	1> 7:00
File Name	AMOYW1I.xus				
Project Description	Center Street Warehouse - With Improvements				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	0	0	0	41	0	140		742	62	123	703	

Signal Information			
Cycle, s	53.3	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	14.0	11.9	15.3	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8	7	4
Case Number		8.0		8.0		7.3	1.0	4.0
Phase Duration, s		18.0		18.0		19.3	15.9	35.3
Change Period, ($Y+R_c$), s		4.0		4.0		4.0	4.0	4.0
Max Allow Headway (*MAH*), s		0.0		3.3		3.0	3.1	3.0
Queue Clearance Time (g_s), s				7.1		12.4	3.8	7.7
Green Extension Time (g_e), s		0.0		0.4		2.4	0.2	4.1
Phase Call Probability				1.00		1.00	0.85	1.00
Max Out Probability				0.00		0.03	0.00	0.01

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16		8	18	7	4	
Adjusted Flow Rate (*v*), veh/h		0			191			781	65	129	740	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		0			1606			1809	1610	1810	1809	
Queue Service Time (g_s), s		0.0			0.0			10.4	1.6	1.8	5.7	
Cycle Queue Clearance Time (g_c), s		0.0			5.1			10.4	1.6	1.8	5.7	
Green Ratio (*g/C*)					0.26			0.29	0.29	0.55	0.59	
Capacity (*c*), veh/h					505			1040	463	605	2123	
Volume-to-Capacity Ratio (*X*)		0.000			0.377			0.751	0.141	0.214	0.349	
Available Capacity (c_a), veh/h					976			2037	907	1218	2123	
Back of Queue (*Q*), veh/ln (50th percentile)		0.0			1.7			3.8	0.5	0.5	1.4	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00			0.00	0.00	0.00	0.00	
Uniform Delay (d_1), s/veh					16.3			17.2	14.1	7.6	5.7	
Incremental Delay (d_2), s/veh		0.0			0.2			0.4	0.1	0.1	0.0	
Initial Queue Delay (d_3), s/veh		0.0			0.0			0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh					16.5			17.7	14.1	7.7	5.7	
Level of Service (LOS)					B			B	B	A	A	
Approach Delay, s/veh / LOS	0.0			16.5		B	17.4		B	6.0		A
Intersection Delay, s/veh / LOS	12.1						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.8	C	2.1	B	2.0	B
Bicycle LOS Score / LOS	0.5	A	0.8	A	1.2	A	1.2	A

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*BC*	Intersection	*Main Street/Center Street*
Agency/Co.	*Kunzman Associates, Inc.*	Jurisdiction	*City of Riverside*
Date Performed	*1/18/2016*	Analysis Year	*OY (2017) With Project*
Analysis Time Period	*Evening Peak Hour*		

Project Description *Center Street Warehouse*

East/West Street: *Center Street* | North/South Street: *Main Street/Riverside Avenue*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*791*	*112*	*184*	*947*	
Peak-Hour Factor, PHF	*1.00*	*0.93*	*0.93*	*0.93*	*0.93*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*850*	*120*	*197*	*1018*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Two Way Left Turn Lane*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*1*	*1*	*2*	*0*
Configuration		*T*	*R*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*44*	*0*	*152*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.93*	*1.00*	*0.93*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*47*	*0*	*163*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*1*	*0*
Configuration					*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*		*LTR*				
v (veh/h)		*197*		*210*				
C (m) (veh/h)		*719*		*390*				
v/c		*0.27*		*0.54*				
95% queue length		*1.11*		*3.08*				
Control Delay (s/veh)		*11.9*		*24.5*				
LOS		*B*		*C*				
Approach Delay (s/veh)	--	--	*24.5*					
Approach LOS	--	--	*C*					

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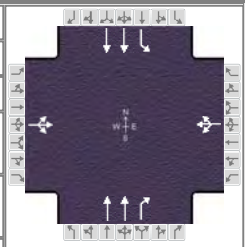
HCS 2010 Signalized Intersection Results Summary

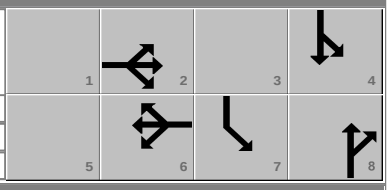
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Evening Peak Hour	PHF	0.93
Intersection	Main Street/Riverside Aven	Analysis Year	OY (2017) With Project	Analysis Period	1> 7:00
File Name	PMOYW1I.xus				
Project Description	Center Street Warehouse - With Improvements				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	0	0	0	44	0	152		791	112	184	947	

Signal Information			
Cycle, s	51.7	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	12.0	11.3	16.4	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8	7	4
Case Number		8.0		8.0		7.3	1.0	4.0
Phase Duration, s		16.0		16.0		20.4	15.3	35.7
Change Period, ($Y+R_c$), s		4.0		4.0		4.0	4.0	4.0
Max Allow Headway (*MAH*), s		0.0		3.3		3.0	3.1	3.0
Queue Clearance Time (g_s), s				7.9		12.9	4.7	9.8
Green Extension Time (g_e), s		0.0		0.4		3.0	0.3	5.5
Phase Call Probability				1.00		1.00	0.94	1.00
Max Out Probability				0.00		0.10	0.00	0.06

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16		8	18	7	4	
Adjusted Flow Rate (*v*), veh/h		0			211			851	120	198	1018	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		0			1602			1809	1610	1810	1809	
Queue Service Time (g_s), s		0.0			1.7			10.9	2.9	2.7	7.8	
Cycle Queue Clearance Time (g_c), s		0.0			5.9			10.9	2.9	2.7	7.8	
Green Ratio (*g/C*)					0.23			0.32	0.32	0.57	0.61	
Capacity (*c*), veh/h					458			1145	510	605	2217	
Volume-to-Capacity Ratio (*X*)		0.000			0.461			0.743	0.236	0.327	0.459	
Available Capacity (c_a), veh/h					1004			2101	935	1260	2217	
Back of Queue (*Q*), veh/ln (50th percentile)		0.0			1.9			3.8	0.9	0.7	1.8	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00			0.00	0.00	0.00	0.00	
Uniform Delay (d_1), s/veh					17.4			15.8	13.0	7.5	5.4	
Incremental Delay (d_2), s/veh		0.0			0.3			0.4	0.1	0.1	0.1	
Initial Queue Delay (d_3), s/veh		0.0			0.0			0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh					17.7			16.1	13.1	7.7	5.4	
Level of Service (LOS)					B			B	B	A	A	
Approach Delay, s/veh / LOS	0.0			17.7		B	15.8		B	5.8		A
Intersection Delay, s/veh / LOS	10.9						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.8	C	2.1	B	2.0	B
Bicycle LOS Score / LOS	0.5	A	0.8	A	1.3	A	1.5	A

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*BC*
Agency/Co.	*Kunzman Associates, Inc.*
Date Performed	*1/18/2016*
Analysis Time Period	*Morning Peak Hour*

Site Information

Intersection	*Project West Acc/Center Street*
Jurisdiction	*City of Riverside*
Analysis Year	*OY (2017) With Project*

Project Description *Center Street Warehouse*

East/West Street: *Center Street* | North/South Street: *Project West Access*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*182*	*38*	*64*	*193*	
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*191*	*40*	*67*	*203*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*1*	*1*	*1*	*0*
Configuration		*T*	*R*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*11*	*0*	*18*			
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*11*	*0*	*18*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*0*	*0*
Configuration		*LTR*				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*		*LTR*				
v (veh/h)		*67*		*29*				
C (m) (veh/h)		*1349*		*666*				
v/c		*0.05*		*0.04*				
95% queue length		*0.16*		*0.14*				
Control Delay (s/veh)		*7.8*		*10.7*				
LOS		*A*		*B*				
Approach Delay (s/veh)	--	--	*10.7*					
Approach LOS	--	--	*B*					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*BC*
Agency/Co.	*Kunzman Associates, Inc.*
Date Performed	*1/18/2016*
Analysis Time Period	*Evening Peak Hour*

Site Information

Intersection	*Project West Acc/Center Street*
Jurisdiction	*City of Riverside*
Analysis Year	*OY (2017) With Project*

Project Description *Center Street Warehouse*

East/West Street: *Center Street* | North/South Street: *Project West Access*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*289*	*17*	*30*	*159*	
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*304*	*17*	*31*	*167*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*1*	*1*	*1*	*0*
Configuration		*T*	*R*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*31*	*0*	*53*			
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*32*	*0*	*55*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*0*	*0*
Configuration		*LTR*				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*		*LTR*				
v (veh/h)		*31*		*87*				
C (m) (veh/h)		*1250*		*628*				
v/c		*0.02*		*0.14*				
95% queue length		*0.08*		*0.48*				
Control Delay (s/veh)		*8.0*		*11.7*				
LOS		*A*		*B*				
Approach Delay (s/veh)	--	--	*11.7*					
Approach LOS	--	--	*B*					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*BC*
Agency/Co.	*Kunzman Associates, Inc.*
Date Performed	*1/18/2016*
Analysis Time Period	*Morning Peak Hour*

Site Information

Intersection	*Project East Acc/Center Street*
Jurisdiction	*City of Riverside*
Analysis Year	*OY (2017) With Project*

Project Description *Center Street Warehouse*

East/West Street: *Center Street* | North/South Street: *Project EastAccess*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*182*	*18*	*115*	*252*	
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*191*	*18*	*121*	*265*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*1*	*1*	*1*	*0*
Configuration		*T*	*R*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*5*	*0*	*32*			
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*5*	*0*	*33*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*0*	*0*
Configuration		*LTR*				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*		*LTR*				
v (veh/h)		*121*		*38*				
C (m) (veh/h)		*1374*		*732*				
v/c		*0.09*		*0.05*				
95% queue length		*0.29*		*0.16*				
Control Delay (s/veh)		*7.9*		*10.2*				
LOS		*A*		*B*				
Approach Delay (s/veh)	--	--	*10.2*					
Approach LOS	--	--	*B*					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*BC*
Agency/Co.	*Kunzman Associates, Inc.*
Date Performed	*1/18/2016*
Analysis Time Period	*Evening Peak Hour*

Site Information

Intersection	*Project East Acc/Center Street*
Jurisdiction	*City of Riverside*
Analysis Year	*OY (2017) With Project*

Project Description *Center Street Warehouse*

East/West Street: *Center Street* | North/South Street: *Project EastAccess*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*333*	*8*	*53*	*174*	
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*350*	*8*	*55*	*183*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*1*	*1*	*1*	*0*
Configuration		*T*	*R*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*15*	*0*	*95*			
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*15*	*0*	*100*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*0*	*0*
Configuration		*LTR*				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*		*LTR*				
v (veh/h)		*55*		*115*				
C (m) (veh/h)		*1212*		*643*				
v/c		*0.05*		*0.18*				
95% queue length		*0.14*		*0.65*				
Control Delay (s/veh)		*8.1*		*11.8*				
LOS		*A*		*B*				
Approach Delay (s/veh)	--	--	*11.8*					
Approach LOS	--	--	*B*					

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*BC*
Agency/Co.	*Kunzman Associates, Inc.*
Date Performed	*1/18/2016*
Analysis Time Period	*Morning Peak Hour*

Site Information

Intersection	*Orange Street/Center Street*
Jurisdiction	*City of Riverside*
Analysis Year	*OY (2017) With Project*

Project ID *Center Street Warehouse*

East/West Street: *Center Street* North/South Street: *Orange Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	6	193	13	62	342	7
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	22	1	49	8	1	4
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.90		0.90		0.90		0.90	
Flow Rate (veh/h)	234		455		79		13	
% Heavy Vehicles	0		0		0		0	
No. Lanes	1		1		1		1	
Geometry Group	1		1		1		1	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.0		0.1		0.3		0.6	
Prop. Right-Turns	0.1		0.0		0.7		0.3	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	-0.0		0.0		-0.3		-0.1	

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20		3.20		3.20	
x, initial	0.21		0.40		0.07		0.01	
hd, final value (s)	4.62		4.44		5.13		5.55	
x, final value	0.30		0.56		0.11		0.02	
Move-up time, m (s)	2.0		2.0		2.0		2.0	
Service Time, t_s (s)	2.6		2.4		3.1		3.6	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	484		705		329		263	
Delay (s/veh)	9.59		12.97		8.78		8.66	
LOS	A		B		A		A	
Approach: Delay (s/veh)	9.59		12.97		8.78		8.66	
LOS	A		B		A		A	
Intersection Delay (s/veh)	11.47							
Intersection LOS	B							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*BC*
Agency/Co.	*Kunzman Associates, Inc.*
Date Performed	*1/18/2016*
Analysis Time Period	*Evening Peak Hour*

Site Information

Intersection	*Orange Street/Center Street*
Jurisdiction	*City of Riverside*
Analysis Year	*OY (2017) With Project*

Project ID *Center Street Warehouse*

East/West Street: *Center Street* North/South Street: *Orange Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	3	405	20	71	206	7
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	18	1	138	19	7	2
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.84		0.84		0.84		0.84	
Flow Rate (veh/h)	508		337		186		32	
% Heavy Vehicles	0		0		0		0	
No. Lanes	1		1		1		1	
Geometry Group	1		1		1		1	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.0		0.2		0.1		0.7	
Prop. Right-Turns	0.0		0.0		0.9		0.1	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	-0.0		0.0		-0.5		0.1	

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20		3.20		3.20	
x, initial	0.45		0.30		0.17		0.03	
hd, final value (s)	5.03		5.31		5.59		6.60	
x, final value	0.71		0.50		0.29		0.06	
Move-up time, m (s)	2.0		2.0		2.0		2.0	
Service Time, t_s (s)	3.0		3.3		3.6		4.6	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	701		587		436		282	
Delay (s/veh)	19.36		13.43		10.84		10.01	
LOS	C		B		B		B	
Approach: Delay (s/veh)	19.36		13.43		10.84		10.01	
LOS	C		B		B		B	
Intersection Delay (s/veh)	15.71							
Intersection LOS	C							

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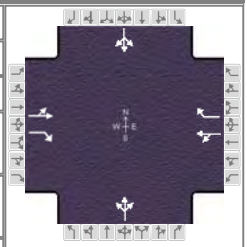
HCS 2010 Signalized Intersection Results Summary

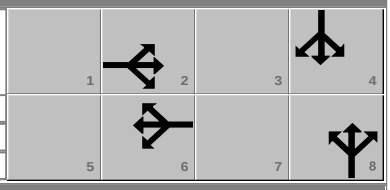
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Morning Peak Hour	PHF	0.91
Intersection	Stephens Avenue/Center S	Analysis Year	OY (2017) With Project	Analysis Period	1> 7:00
File Name	AMOYW5.xus				
Project Description	Center Street Warehouse				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	1	148	99	315	276	7	135	2	104	9	10	1

Signal Information			
Cycle, s	59.9	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	28.5	4.6	14.8	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		7.0		7.0		12.0		12.0
Phase Duration, s		32.5		32.5		18.8		8.6
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (*MAH*), s		3.2		3.2		3.2		3.1
Queue Clearance Time (g_s), s		5.0		26.5		10.2		2.7
Green Extension Time (g_e), s		2.2		1.9		0.5		0.0
Phase Call Probability		1.00		1.00		0.99		0.31
Max Out Probability		0.00		0.03		0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h		164	109		649	8		265			22	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1899	1610		1482	1610		1718			1842	
Queue Service Time (g_s), s		0.0	2.3		21.7	0.2		8.2			0.7	
Cycle Queue Clearance Time (g_c), s		3.0	2.3		24.5	0.2		8.2			0.7	
Green Ratio (*g/C*)		0.48	0.48		0.48	0.48		0.25			0.08	
Capacity (*c*), veh/h		964	766		797	766		425			142	
Volume-to-Capacity Ratio (*X*)		0.170	0.142		0.815	0.010		0.624			0.155	
Available Capacity (c_a), veh/h		1325	1074		1080	1074		859			921	
Back of Queue (*Q*), veh/ln (50th percentile)		1.0	0.7		7.1	0.0		3.0			0.3	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00	0.00		0.00	0.00		0.00			0.00	
Uniform Delay (d_1), s/veh		9.0	8.8		14.7	8.3		20.1			25.9	
Incremental Delay (d_2), s/veh		0.0	0.0		2.6	0.0		0.6			0.2	
Initial Queue Delay (d_3), s/veh		0.0	0.0		0.0	0.0		0.0			0.0	
Control Delay (*d*), s/veh		9.0	8.9		17.2	8.3		20.7			26.0	
Level of Service (LOS)		A	A		B	A		C			C	
Approach Delay, s/veh / LOS	9.0	A		17.1	B		20.7	C		26.0	C	
Intersection Delay, s/veh / LOS	16.2						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.1	B	2.1	B	2.3	B	2.3	B
Bicycle LOS Score / LOS	0.9	A	1.6	A	0.9	A	0.5	A

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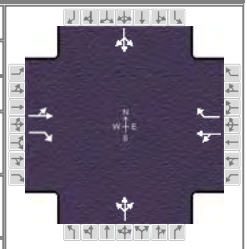
HCS 2010 Signalized Intersection Results Summary

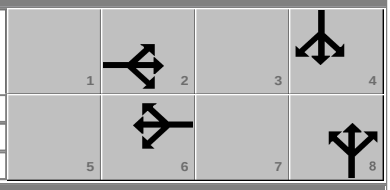
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Evening Peak Hour	PHF	0.93
Intersection	Stephens Avenue/Center S	Analysis Year	OY (2017) With Project	Analysis Period	1> 7:00
File Name	PMOYW5.xus				
Project Description	Center Street Warehouse				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	6	328	221	195	184	9	118	5	60	3	3	2

Signal Information			
Cycle, s	51.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	19.0	2.2	17.8	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		7.0		7.0		12.0		12.0
Phase Duration, s		23.0		23.0		21.8		6.2
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (*MAH*), s		3.3		3.3		3.2		3.1
Queue Clearance Time (g_s), s		9.5		15.7		6.2		2.2
Green Extension Time (g_e), s		2.4		2.4		0.4		0.0
Phase Call Probability		1.00		1.00		0.94		0.11
Max Out Probability		0.00		0.00		0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h		359	238		408	10		197			9	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1895	1610		1355	1610		1741			1786	
Queue Service Time (g_s), s		0.0	5.5		6.2	0.2		4.2			0.2	
Cycle Queue Clearance Time (g_c), s		7.5	5.5		13.7	0.2		4.2			0.2	
Green Ratio (*g/C*)		0.37	0.37		0.37	0.37		0.35			0.04	
Capacity (*c*), veh/h		778	600		612	600		609			77	
Volume-to-Capacity Ratio (*X*)		0.462	0.396		0.666	0.016		0.323			0.112	
Available Capacity (c_a), veh/h		1551	1262		1162	1262		1023			1050	
Back of Queue (*Q*), veh/ln (50th percentile)		2.6	1.6		3.4	0.1		1.4			0.1	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00	0.00		0.00	0.00		0.00			0.00	
Uniform Delay (d_1), s/veh		12.4	11.8		14.2	10.1		12.2			23.5	
Incremental Delay (d_2), s/veh		0.2	0.2		0.5	0.0		0.1			0.2	
Initial Queue Delay (d_3), s/veh		0.0	0.0		0.0	0.0		0.0			0.0	
Control Delay (*d*), s/veh		12.6	11.9		14.7	10.1		12.3			23.7	
Level of Service (LOS)		B	B		B	B		B			C	
Approach Delay, s/veh / LOS	12.3	B		14.6	B		12.3	B		23.7	C	
Intersection Delay, s/veh / LOS	13.2						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.1	B	2.1	B	2.3	B	2.3	B
Bicycle LOS Score / LOS	1.5	A	1.2	A	0.8	A	0.5	A

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	BC
Agency/Co.	Kunzman Associates, Inc.
Date Performed	1/18/2016
Analysis Time Period	Morning Peak Hour

Site Information

Intersection	La Cadena/Stephens-I-215 SB
Jurisdiction	City of Riverside
Analysis Year	OY (2017) With Project

Project ID *Center Street Warehouse*

East/West Street: *Stephens Avenue/I-215 FWY SB* North/South Street: *La Cadena Drive*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	43	292	60	180	167	9
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	32	63	11	44	177	42
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LT	R	LT	R
PHF	0.95		0.95		0.95	0.95	0.95	0.95
Flow Rate (veh/h)	415		373		99	11	232	44
% Heavy Vehicles	0		0		0	0	0	0
No. Lanes	1		1		2		2	
Geometry Group	2		2		5		5	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.1		0.5		0.3	0.0	0.2	0.0
Prop. Right-Turns	0.2		0.0		0.0	1.0	0.0	1.0
Prop. Heavy Vehicle	0.0		0.0		0.0	0.0	0.0	0.0
hLT-adj	0.2	0.2	0.2	0.2	0.5	0.5	0.5	0.5
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.7	-0.7	-0.7	-0.7
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	-0.1		0.1		0.2	-0.7	0.1	-0.7

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20		3.20	3.20	3.20	3.20
x, initial	0.37		0.33		0.09	0.01	0.21	0.04
hd, final value (s)	5.91		6.12		7.79	6.89	7.27	6.44
x, final value	0.68		0.63		0.21	0.02	0.47	0.08
Move-up time, m (s)	2.0		2.0		2.3		2.3	
Service Time, t_s (s)	3.9		4.1		5.5	4.6	5.0	4.1

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	588		564		349	261	459	294
Delay (s/veh)	20.57		19.14		12.60	9.74	16.20	9.69
LOS	C		C		B	A	C	A
Approach: Delay (s/veh)	20.57		19.14		12.32		15.16	
LOS	C		C		B		C	
Intersection Delay (s/veh)	18.07							
Intersection LOS	C							

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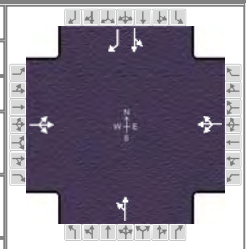
HCS 2010 Signalized Intersection Results Summary

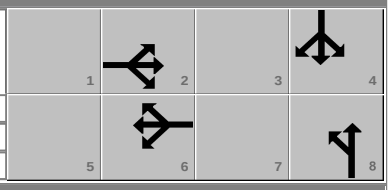
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Morning Peak Hour	PHF	0.95
Intersection	La Cadena/Stephens-I-215	Analysis Year	OY (2017) With Project	Analysis Period	1> 7:00
File Name	AMOYW6I.xus				
Project Description	Center Street Warehouse - With Improvements				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	43	292	60	180	167	9	32	63		44	177	42

Signal Information			
Cycle, s	56.1	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	19.3	13.8	11.1	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		8.0		8.0		12.0		11.0
Phase Duration, s		23.3		23.3		15.1		17.8
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (*MAH*), s		3.3		3.3		3.1		3.1
Queue Clearance Time (g_s), s		12.8		17.6		4.5		8.0
Green Extension Time (g_e), s		1.8		1.6		0.1		0.5
Phase Call Probability		1.00		1.00		0.79		0.99
Max Out Probability		0.01		0.03		0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	14
Adjusted Flow Rate (*v*), veh/h		416			375			100			233	44
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1805			1271			1869			1881	1610
Queue Service Time (g_s), s		0.0			4.8			2.5			6.0	1.2
Cycle Queue Clearance Time (g_c), s		10.8			15.6			2.5			6.0	1.2
Green Ratio (*g/C*)		0.34			0.34			0.20			0.25	0.25
Capacity (*c*), veh/h		690			533			368			463	396
Volume-to-Capacity Ratio (*X*)		0.602			0.704			0.271			0.502	0.112
Available Capacity (c_a), veh/h		1025			786			999			1006	861
Back of Queue (*Q*), veh/ln (50th percentile)		3.9			3.9			1.0			2.3	0.4
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00			0.00			0.00	0.00
Uniform Delay (d_1), s/veh		15.6			17.1			19.1			18.2	16.4
Incremental Delay (d_2), s/veh		0.3			0.6			0.1			0.3	0.0
Initial Queue Delay (d_3), s/veh		0.0			0.0			0.0			0.0	0.0
Control Delay (*d*), s/veh		16.0			17.8			19.3			18.5	16.4
Level of Service (LOS)		B			B			B			B	B
Approach Delay, s/veh / LOS	16.0	B		17.8	B		19.3	B		18.2	B	
Intersection Delay, s/veh / LOS	17.3						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.1	B	2.3	B	2.1	B	2.1	B
Bicycle LOS Score / LOS	1.2	A	1.1	A	0.7	A	0.9	A

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	BC
Agency/Co.	Kunzman Associates, Inc.
Date Performed	1/18/2016
Analysis Time Period	Evening Peak Hour

Site Information

Intersection	La Cadena/Stephens-I-215 SB
Jurisdiction	City of Riverside
Analysis Year	OY (2017) With Project

Project ID *Center Street Warehouse*

East/West Street: *Stephens Avenue/I-215 FWY SB* North/South Street: *La Cadena Drive*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	64	248	66	87	97	5
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	31	158	16	68	366	52
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LT	R	LT	R
PHF	0.96		0.96		0.96	0.96	0.96	0.96
Flow Rate (veh/h)	392		196		196	16	451	54
% Heavy Vehicles	0		0		0	0	0	0
No. Lanes	1		1		2		2	
Geometry Group	2		2		5		5	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.2		0.5		0.2	0.0	0.2	0.0
Prop. Right-Turns	0.2		0.0		0.0	1.0	0.0	1.0
Prop. Heavy Vehicle	0.0		0.0		0.0	0.0	0.0	0.0
hLT-adj	0.2	0.2	0.2	0.2	0.5	0.5	0.5	0.5
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.7	-0.7	-0.7	-0.7
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	-0.1		0.1		0.1	-0.7	0.1	-0.7

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20		3.20	3.20	3.20	3.20
x, initial	0.35		0.17		0.17	0.01	0.40	0.05
hd, final value (s)	6.86		7.62		8.03	7.22	7.32	6.52
x, final value	0.75		0.41		0.44	0.03	0.92	0.10
Move-up time, m (s)	2.0		2.0		2.3		2.3	
Service Time, t_s (s)	4.9		5.6		5.7	4.9	5.0	4.2

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	503		431		412	266	487	304
Delay (s/veh)	27.41		15.91		16.84	10.16	49.51	9.93
LOS	D		C		C	B	E	A
Approach: Delay (s/veh)	27.41		15.91		16.33		45.28	
LOS	D		C		C		E	
Intersection Delay (s/veh)	30.80							
Intersection LOS	D							

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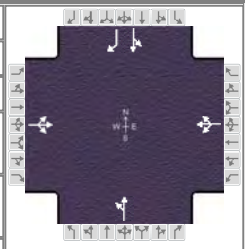
HCS 2010 Signalized Intersection Results Summary

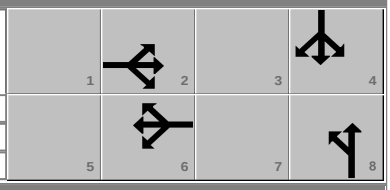
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Evening Peak Hour	PHF	0.96
Intersection	La Cadena/Stephens-I-215	Analysis Year	OY (2017) With Project	Analysis Period	1> 7:00
File Name	PMOYW6I.xus				
Project Description	Center Street Warehouse - With Improvements				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	64	248	66	87	97	5	31	158		68	366	52

Signal Information			
Cycle, s	54.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	14.5	15.2	12.3	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		8.0		8.0		12.0		11.0
Phase Duration, s		18.5		18.5		16.3		19.2
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (*MAH*), s		3.2		3.2		3.0		3.1
Queue Clearance Time (g_s), s		13.3		8.1		6.9		14.3
Green Extension Time (g_e), s		1.2		1.2		0.3		0.9
Phase Call Probability		1.00		1.00		0.95		1.00
Max Out Probability		0.00		0.00		0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	14
Adjusted Flow Rate (*v*), veh/h		394			197			197			452	54
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1758			1371			1885			1885	1610
Queue Service Time (g_s), s		5.3			0.0			4.9			12.3	1.4
Cycle Queue Clearance Time (g_c), s		11.3			6.1			4.9			12.3	1.4
Green Ratio (*g/C*)		0.27			0.27			0.23			0.28	0.28
Capacity (*c*), veh/h		550			466			430			530	453
Volume-to-Capacity Ratio (*X*)		0.715			0.423			0.458			0.853	0.120
Available Capacity (c_a), veh/h		1040			864			1045			1045	893
Back of Queue (*Q*), veh/ln (50th percentile)		4.1			1.8			1.9			4.8	0.4
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00			0.00			0.00	0.00
Uniform Delay (d_1), s/veh		18.5			16.4			18.0			18.4	14.5
Incremental Delay (d_2), s/veh		0.7			0.2			0.3			1.5	0.0
Initial Queue Delay (d_3), s/veh		0.0			0.0			0.0			0.0	0.0
Control Delay (*d*), s/veh		19.2			16.6			18.3			19.9	14.5
Level of Service (LOS)		B			B			B			B	B
Approach Delay, s/veh / LOS	19.2	B		16.6	B		18.3	B		19.3	B	
Intersection Delay, s/veh / LOS	18.7						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.1	B	2.3	B	2.1	B	2.1	B
Bicycle LOS Score / LOS	1.1	A	0.8	A	0.8	A	1.3	A

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	BC
Agency/Co.	Kunzman Associates, Inc.
Date Performed	1/18/2016
Analysis Time Period	Morning Peak Hour

Site Information

Intersection	La Cadena/Highgrove-I-215 NB
Jurisdiction	City of Riverside
Analysis Year	OY (2017) With Project

Project ID *Center Street Warehouse*

East/West Street: *Highgrove Place/I-215 FWY NB* North/South Street: *La Cadena Drive*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	47	262	0	30	0	4
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	0	33	40	1	80	0
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT		L	R	TR		LT	
PHF	0.89		0.89	0.89	0.89		0.89	
Flow Rate (veh/h)	346		33	4	81		90	
% Heavy Vehicles	0		0	0	0		0	
No. Lanes	1		2		1		1	
Geometry Group	4a		5		2		2	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.2		1.0	0.0	0.0		0.0	
Prop. Right-Turns	0.0		0.0	1.0	0.5		0.0	
Prop. Heavy Vehicle	0.0		0.0	0.0	0.0		0.0	
hLT-adj	0.2	0.2	0.5	0.5	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.7	-0.7	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	0.0		0.5	-0.7	-0.3		0.0	

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20	3.20	3.20		3.20	
x, initial	0.31		0.03	0.00	0.07		0.08	
hd, final value (s)	4.52		5.74	4.53	4.61		4.92	
x, final value	0.43		0.05	0.01	0.10		0.12	
Move-up time, m (s)	2.0		2.3		2.0		2.0	
Service Time, t_s (s)	2.5		3.4	2.2	2.6		2.9	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	596		283	254	331		340	
Delay (s/veh)	10.94		8.76	7.26	8.15		8.61	
LOS	B		A	A	A		A	
Approach: Delay (s/veh)	10.94		8.60		8.15		8.61	
LOS	B		A		A		A	
Intersection Delay (s/veh)	10.00-							
Intersection LOS	A							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	BC
Agency/Co.	Kunzman Associates, Inc.
Date Performed	1/18/2016
Analysis Time Period	Evening Peak Hour

Site Information

Intersection	La Cadena/Highgrove-I-215 NB
Jurisdiction	City of Riverside
Analysis Year	OY (2017) With Project

Project ID *Center Street Warehouse*

East/West Street: *Highgrove Place/I-215 FWY NB* North/South Street: *La Cadena Drive*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	27	264	0	20	0	3
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	0	98	68	1	159	0
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT		L	R	TR		LT	
PHF	0.91		0.91	0.91	0.91		0.91	
Flow Rate (veh/h)	319		21	3	181		175	
% Heavy Vehicles	0		0	0	0		0	
No. Lanes	1		2		1		1	
Geometry Group	4a		5		2		2	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.1		1.0	0.0	0.0		0.0	
Prop. Right-Turns	0.0		0.0	1.0	0.4		0.0	
Prop. Heavy Vehicle	0.0		0.0	0.0	0.0		0.0	
hLT-adj	0.2	0.2	0.5	0.5	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.7	-0.7	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	0.0		0.5	-0.7	-0.2		0.0	

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20	3.20	3.20		3.20	
x, initial	0.28		0.02	0.00	0.16		0.16	
hd, final value (s)	4.98		6.32	5.10	4.81		5.05	
x, final value	0.44		0.04	0.00	0.24		0.25	
Move-up time, m (s)	2.0		2.3		2.0		2.0	
Service Time, t_s (s)	3.0		4.0	2.8	2.8		3.1	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	569		271	253	431		425	
Delay (s/veh)	11.85		9.26	7.82	9.34		9.69	
LOS	B		A	A	A		A	
Approach: Delay (s/veh)	11.85		9.08		9.34		9.69	
LOS	B		A		A		A	
Intersection Delay (s/veh)	10.57							
Intersection LOS	B							

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*BC*
Agency/Co.	*Kunzman Associates, Inc.*
Date Performed	*1/18/2016*
Analysis Time Period	*Morning Peak Hour*

Site Information

Intersection	*Highgrove Place/Center Street*
Jurisdiction	*City of Riverside*
Analysis Year	*OY (2017) With Project*

Project Description *Center Street Warehouse*

East/West Street: *Center Street* | North/South Street: *Highgrove Place*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*1*	*242*	*23*	*11*	*425*	*5*
Peak-Hour Factor, PHF	*0.91*	*0.91*	*0.91*	*0.91*	*0.91*	*0.91*
Hourly Flow Rate, HFR (veh/h)	*1*	*265*	*25*	*12*	*467*	*5*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*1*	*0*	*1*	*0*
Configuration	*LT*		*R*	*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*145*	*1*	*157*	*2*	*1*	*23*
Peak-Hour Factor, PHF	*0.91*	*0.91*	*0.91*	*0.91*	*0.91*	*0.91*
Hourly Flow Rate, HFR (veh/h)	*159*	*1*	*172*	*2*	*1*	*25*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*1*	*0*	*1*	*0*
Configuration	*LT*		*R*		*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*	*LTR*	*LT*		*R*		*LTR*	
v (veh/h)	*1*	*12*	*160*		*172*		*28*	
C (m) (veh/h)	*1100*	*1283*	*302*		*779*		*516*	
v/c	*0.00*	*0.01*	*0.53*		*0.22*		*0.05*	
95% queue length	*0.00*	*0.03*	*2.90*		*0.84*		*0.17*	
Control Delay (s/veh)	*8.3*	*7.8*	*29.6*		*10.9*		*12.4*	
LOS	*A*	*A*	*D*		*B*		*B*	
Approach Delay (s/veh)	--	--	*19.9*			*12.4*		
Approach LOS	--	--	*C*			*B*		

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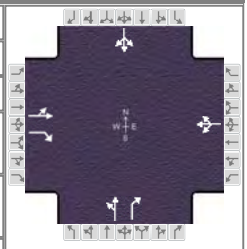
HCS 2010 Signalized Intersection Results Summary

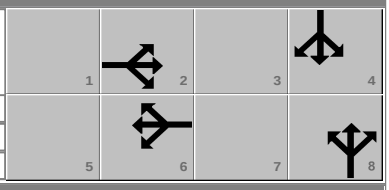
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Morning Peak Hour	PHF	0.91
Intersection	Highgrove Place/Center St	Analysis Year	OY (2017) With Project	Analysis Period	1> 7:00
File Name	AMOYW8I.xus				
Project Description	Center Street Warehouse - With Improvements				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	1	242	23	11	425	5	145	1	157	2	1	23

Signal Information			
Cycle, s	51.2	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	20.0	3.3	15.9	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		7.0		8.0		11.0		12.0
Phase Duration, s		24.0		24.0		19.9		7.3
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (*MAH*), s		3.1		3.1		3.2		3.3
Queue Clearance Time (g_s), s		7.1		12.7		6.2		2.9
Green Extension Time (g_e), s		1.5		1.4		0.6		0.0
Phase Call Probability		1.00		1.00		0.99		0.33
Max Out Probability		0.00		0.00		0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h		267	25		485			160	173		29	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1899	1610		1885			1810	1610		1634	
Queue Service Time (g_s), s		0.0	0.5		0.0			3.4	4.2		0.9	
Cycle Queue Clearance Time (g_c), s		5.1	0.5		10.7			3.4	4.2		0.9	
Green Ratio (*g/C*)		0.39	0.39		0.39			0.31	0.31		0.07	
Capacity (*c*), veh/h		812	629		808			561	499		107	
Volume-to-Capacity Ratio (*X*)		0.329	0.040		0.599			0.286	0.346		0.268	
Available Capacity (c_a), veh/h		1182	943		1173			778	692		479	
Back of Queue (*Q*), veh/ln (50th percentile)		1.7	0.1		3.7			1.2	1.3		0.3	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00	0.00		0.00			0.00	0.00		0.00	
Uniform Delay (d_1), s/veh		11.1	9.7		12.8			13.4	13.7		22.8	
Incremental Delay (d_2), s/veh		0.1	0.0		0.3			0.1	0.2		0.5	
Initial Queue Delay (d_3), s/veh		0.0	0.0		0.0			0.0	0.0		0.0	
Control Delay (*d*), s/veh		11.1	9.7		13.0			13.5	13.8		23.3	
Level of Service (LOS)		B	A		B			B	B		C	
Approach Delay, s/veh / LOS	11.0	B		13.0	B		13.7	B		23.3	C	
Intersection Delay, s/veh / LOS	13.0						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	2.1	B	2.1	B	2.3	B
Bicycle LOS Score / LOS	1.0	A	1.3	A	1.0	A	0.5	A

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*BC*
Agency/Co.	*Kunzman Associates, Inc.*
Date Performed	*1/18/2016*
Analysis Time Period	*Evening Peak Hour*

Site Information

Intersection	*Highgrove Place/Center Street*
Jurisdiction	*City of Riverside*
Analysis Year	*OY (2017) With Project*

Project Description *Center Street Warehouse*

East/West Street: *Center Street* | North/South Street: *Highgrove Place*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*2*	*338*	*16*	*8*	*251*	*9*
Peak-Hour Factor, PHF	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*
Hourly Flow Rate, HFR (veh/h)	*2*	*352*	*16*	*8*	*261*	*9*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*1*	*0*	*1*	*0*
Configuration	*LT*		*R*	*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*98*	*2*	*238*	*5*	*1*	*19*
Peak-Hour Factor, PHF	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*
Hourly Flow Rate, HFR (veh/h)	*102*	*2*	*247*	*5*	*1*	*19*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*1*	*0*	*1*	*0*
Configuration	*LT*		*R*		*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*	*LTR*	*LT*		*R*		*LTR*	
v (veh/h)	*2*	*8*	*104*		*247*		*25*	
C (m) (veh/h)	*1305*	*1202*	*373*		*696*		*485*	
v/c	*0.00*	*0.01*	*0.28*		*0.35*		*0.05*	
95% queue length	*0.00*	*0.02*	*1.12*		*1.60*		*0.16*	
Control Delay (s/veh)	*7.8*	*8.0*	*18.3*		*13.0*		*12.8*	
LOS	*A*	*A*	*C*		*B*		*B*	
Approach Delay (s/veh)	--	--	*14.6*			*12.8*		
Approach LOS	--	--	*B*			*B*		

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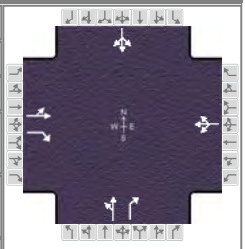
HCS 2010 Signalized Intersection Results Summary

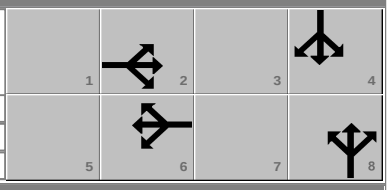
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Evening Peak Hour	PHF	0.91
Intersection	Highgrove Place/Center St	Analysis Year	OY (2017) With Project	Analysis Period	1> 7:00
File Name	PMOYW8I.xus				
Project Description	Center Street Warehouse - With Improvements				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	2	338	16	8	251	9	98	2	238	5	1	19

Signal Information			
Cycle, s	51.1	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	18.0	3.2	17.9	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		7.0		8.0		11.0		12.0
Phase Duration, s		22.0		22.0		21.9		7.2
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (*MAH*), s		3.1		3.1		3.3		3.3
Queue Clearance Time (g_s), s		10.1		8.1		8.4		2.8
Green Extension Time (g_e), s		1.2		1.3		0.7		0.0
Phase Call Probability		1.00		1.00		0.99		0.32
Max Out Probability		0.00		0.00		0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h		374	18		295			110	262		27	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1899	1610		1874			1811	1610		1657	
Queue Service Time (g_s), s		0.0	0.4		0.0			2.1	6.4		0.8	
Cycle Queue Clearance Time (g_c), s		8.1	0.4		6.1			2.1	6.4		0.8	
Green Ratio (*g/C*)		0.35	0.35		0.35			0.35	0.35		0.06	
Capacity (*c*), veh/h		739	567		732			634	564		105	
Volume-to-Capacity Ratio (*X*)		0.506	0.031		0.402			0.173	0.464		0.262	
Available Capacity (c_a), veh/h		1183	945		1164			779	693		486	
Back of Queue (*Q*), veh/ln (50th percentile)		2.9	0.1		2.2			0.7	1.9		0.3	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00	0.00		0.00			0.00	0.00		0.00	
Uniform Delay (d_1), s/veh		13.4	10.9		12.7			11.5	12.9		22.8	
Incremental Delay (d_2), s/veh		0.2	0.0		0.1			0.0	0.2		0.5	
Initial Queue Delay (d_3), s/veh		0.0	0.0		0.0			0.0	0.0		0.0	
Control Delay (*d*), s/veh		13.6	10.9		12.9			11.5	13.1		23.3	
Level of Service (LOS)		B	B		B			B	B		C	
Approach Delay, s/veh / LOS	13.4	B		12.9	B		12.6	B		23.3	C	
Intersection Delay, s/veh / LOS	13.3						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	2.1	B	2.3	B
Bicycle LOS Score / LOS	1.1	A	1.0	A	1.1	A	0.5	A

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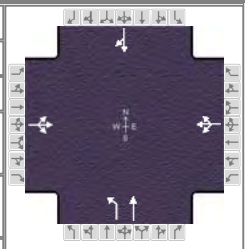
HCS 2010 Signalized Intersection Results Summary

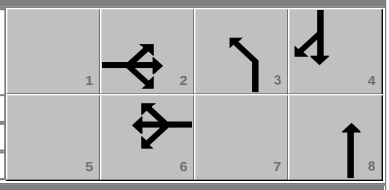
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Morning Peak Hour	PHF	0.90
Intersection	Iowa Avenue-I-215 NB Ran	Analysis Year	OY (2017) With Project	Analysis Period	1> 7:00
File Name	AMOYW9.xus				
Project Description	Center Street Warehouse				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	95	0	823	0	0	0	297	482			14	241

Signal Information			
Cycle, s	67.3	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	31.0	14.3	10.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8		4
Case Number		8.0		8.0	2.0	4.0		8.3
Phase Duration, s		35.0		35.0	18.3	32.3		14.0
Change Period, ($Y+R_c$), s		4.0		4.0	4.0	4.0		4.0
Max Allow Headway (*MAH*), s		3.3		0.0	3.1	3.1		3.1
Queue Clearance Time (g_s), s		33.0			13.8	17.3		12.0
Green Extension Time (g_e), s		0.0		0.0	0.5	1.7		0.0
Phase Call Probability		1.00			1.00	1.00		1.00
Max Out Probability		1.00			0.00	0.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8			4	14
Adjusted Flow Rate (*v*), veh/h		1020			0		330	536			283	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1600			0		1810	1900			1624	
Queue Service Time (g_s), s		24.7			0.0		11.8	15.3			10.0	
Cycle Queue Clearance Time (g_c), s		31.0			0.0		11.8	15.3			10.0	
Green Ratio (*g/C*)		0.46					0.21	0.42			0.15	
Capacity (*c*), veh/h		796					384	799			241	
Volume-to-Capacity Ratio (*X*)		1.281			0.000		0.858	0.670			1.174	
Available Capacity (c_a), veh/h		796					672	1129			241	
Back of Queue (*Q*), veh/ln (50th percentile)		41.1			0.0		4.9	5.8			11.2	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00		0.00	0.00			0.00	
Uniform Delay (d_1), s/veh		19.2					25.5	15.7			28.6	
Incremental Delay (d_2), s/veh		136.2			0.0		2.2	0.4			113.2	
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0			0.0	
Control Delay (*d*), s/veh		155.4					27.7	16.1			141.9	
Level of Service (LOS)		F					C	B			F	
Approach Delay, s/veh / LOS	155.4	F		0.0			20.5	C		141.9	F	
Intersection Delay, s/veh / LOS	99.8						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	2.1	B	2.1	B	2.1	B
Bicycle LOS Score / LOS	2.2	B	0.5	A	1.9	A	1.0	A

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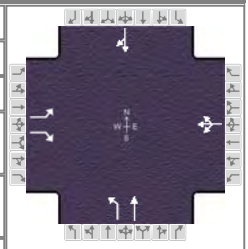
HCS 2010 Signalized Intersection Results Summary

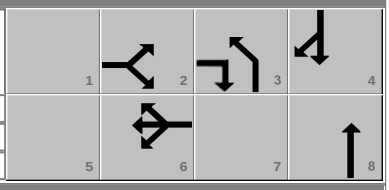
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Morning Peak Hour	PHF	0.90
Intersection	Iowa Avenue-I-215 NB Ran	Analysis Year	OY (2017) With Project	Analysis Period	1> 7:00
File Name	AMOYW9I.xus				
Project Description	Center Street Warehouse				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	95		823	0	0	0	297	482			14	241

Signal Information			
Cycle, s	87.5	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	40.0	18.1	17.4	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8		4
Case Number		5.0		8.0	2.0	4.0		8.3
Phase Duration, s		44.0		44.0	22.1	43.5		21.4
Change Period, ($Y+R_c$), s		4.0		4.0	4.0	4.0		4.0
Max Allow Headway (*MAH*), s		3.3		0.0	3.1	3.1		3.1
Queue Clearance Time (g_s), s		40.6			17.5	20.8		16.8
Green Extension Time (g_e), s		0.0		0.0	0.6	1.6		0.6
Phase Call Probability		1.00			1.00	1.00		1.00
Max Out Probability		1.00			0.00	0.01		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5		12	1	6	16	3	8			4	14
Adjusted Flow Rate (*v*), veh/h	106		914		0		330	536			283	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810		1610		0		1810	1900			1624	
Queue Service Time (g_s), s	2.9		38.6		0.0		15.5	18.8			14.8	
Cycle Queue Clearance Time (g_c), s	2.9		38.6		0.0		15.5	18.8			14.8	
Green Ratio (*g/C*)	0.46		0.66				0.21	0.45			0.20	
Capacity (*c*), veh/h	910		1069				374	858			323	
Volume-to-Capacity Ratio (*X*)	0.116		0.855		0.000		0.882	0.625			0.878	
Available Capacity (c_a), veh/h	910		1069				827	858			742	
Back of Queue (*Q*), veh/ln (50th percentile)	1.1		12.7		0.0		6.8	7.9			5.9	
Queue Storage Ratio (*RQ*) (50th percentile)	0.00		0.00		0.00		0.00	0.00			0.00	
Uniform Delay (d_1), s/veh	13.7		11.4				33.7	18.3			34.0	
Incremental Delay (d_2), s/veh	0.0		6.6		0.0		2.7	1.1			3.0	
Initial Queue Delay (d_3), s/veh	0.0		0.0		0.0		0.0	0.0			0.0	
Control Delay (*d*), s/veh	13.7		18.0				36.4	19.4			37.1	
Level of Service (LOS)	B		B				D	B			D	
Approach Delay, s/veh / LOS	17.6		B	0.0			25.9		C	37.1		D
Intersection Delay, s/veh / LOS	23.4						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	1.4	A	2.3	B
Bicycle LOS Score / LOS		F	0.5	A	1.9	A	1.0	A

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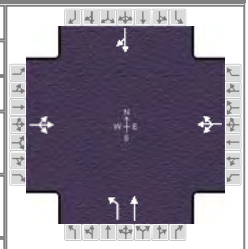
HCS 2010 Signalized Intersection Results Summary

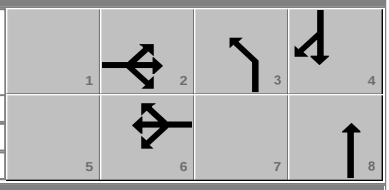
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Evening Peak Hour	PHF	0.88
Intersection	Iowa Avenue-I-215 NB Ran	Analysis Year	OY (2017) With Project	Analysis Period	1> 7:00
File Name	PMOYW9.xus				
Project Description	Center Street Warehouse				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	126	0	804	0	0	0	345	640			22	330

Signal Information			
Cycle, s	64.1	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	26.2	15.9	10.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8		4
Case Number		8.0		8.0	2.0	4.0		8.3
Phase Duration, s		30.2		30.2	19.9	33.9		14.0
Change Period, ($Y+R_c$), s		4.0		4.0	4.0	4.0		4.0
Max Allow Headway (*MAH*), s		3.3		0.0	3.1	3.1		3.1
Queue Clearance Time (g_s), s		28.2			15.3	23.2		12.0
Green Extension Time (g_e), s		0.0		0.0	0.6	2.4		0.0
Phase Call Probability		1.00			1.00	1.00		1.00
Max Out Probability		1.00			0.01	0.02		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8			4	14
Adjusted Flow Rate (*v*), veh/h		1057			0		392	727			400	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1593			0		1810	1900			1626	
Queue Service Time (g_s), s		22.6			0.0		13.3	21.2			10.0	
Cycle Queue Clearance Time (g_c), s		26.2			0.0		13.3	21.2			10.0	
Green Ratio (*g/C*)		0.41					0.25	0.47			0.16	
Capacity (*c*), veh/h		715					449	886			254	
Volume-to-Capacity Ratio (*X*)		1.479			0.000		0.873	0.820			1.577	
Available Capacity (c_a), veh/h		715					706	1185			254	
Back of Queue (*Q*), veh/ln (50th percentile)		53.9			0.0		5.7	8.2			23.2	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00		0.00	0.00			0.00	
Uniform Delay (d_1), s/veh		20.1					23.1	14.8			27.1	
Incremental Delay (d_2), s/veh		222.9			0.0		4.7	2.6			277.9	
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0			0.0	
Control Delay (*d*), s/veh		243.0					27.8	17.4			305.0	
Level of Service (LOS)		F					C	B			F	
Approach Delay, s/veh / LOS	243.0	F		0.0			21.0	C		305.0	F	
Intersection Delay, s/veh / LOS	156.2						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	2.1	B	2.1	B
Bicycle LOS Score / LOS	2.2	B	0.5	A	2.3	B	1.1	A

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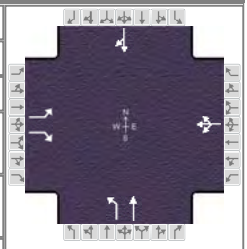
HCS 2010 Signalized Intersection Results Summary

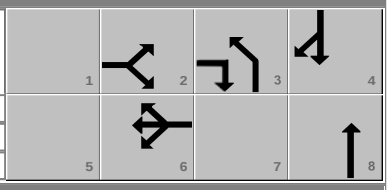
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Evening Peak Hour	PHF	0.88
Intersection	Iowa Avenue-I-215 NB Ran	Analysis Year	OY (2017) With Project	Analysis Period	1> 7:00
File Name	PMOYW9I.xus				
Project Description	Center Street Warehouse - With Improvements				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	126		804	0	0	0	345	640			22	330

Signal Information			
Cycle, s	94.6	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	18.2	25.5	39.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		5.0		8.0		10.0		12.0
Phase Duration, s		22.2		22.2		43.0		29.5
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (*MAH*), s		3.3		0.0		3.1		3.3
Queue Clearance Time (g_s), s		20.2				36.5		24.6
Green Extension Time (g_e), s		0.0		0.0		2.4		0.8
Phase Call Probability		1.00				1.00		1.00
Max Out Probability		1.00				0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5		12	1	6	16	3	8			4	14
Adjusted Flow Rate (*v*), veh/h	143		914		0		392	727			400	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810		1610		0		1810	1900			1626	
Queue Service Time (g_s), s	6.6		18.2		0.0		15.4	34.5			22.6	
Cycle Queue Clearance Time (g_c), s	6.6		18.2		0.0		15.4	34.5			22.6	
Green Ratio (*g/C*)	0.19		0.60				0.41	0.41			0.27	
Capacity (*c*), veh/h	424		973				746	783			438	
Volume-to-Capacity Ratio (*X*)	0.338		0.939		0.000		0.526	0.929			0.914	
Available Capacity (c_a), veh/h	424		973				1337	1404			687	
Back of Queue (*Q*), veh/ln (50th percentile)	2.8		19.7		0.0		6.2	15.2			9.6	
Queue Storage Ratio (*RQ*) (50th percentile)	0.00		0.00		0.00		0.00	0.00			0.00	
Uniform Delay (d_1), s/veh	33.6		17.2				20.9	26.5			33.6	
Incremental Delay (d_2), s/veh	0.2		16.0		0.0		0.2	3.1			8.4	
Initial Queue Delay (d_3), s/veh	0.0		0.0		0.0		0.0	0.0			0.0	
Control Delay (*d*), s/veh	33.7		33.2				21.1	29.6			41.9	
Level of Service (LOS)	C		C				C	C			D	
Approach Delay, s/veh / LOS	33.2		C	0.0			26.7		C	41.9		D
Intersection Delay, s/veh / LOS	31.7						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	1.4	A	2.3	B
Bicycle LOS Score / LOS		F	0.5	A	2.3	B	1.1	A

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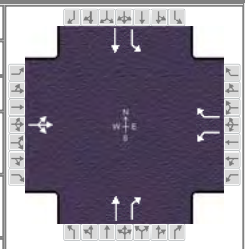
HCS 2010 Signalized Intersection Results Summary

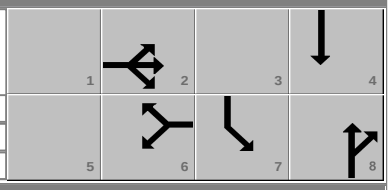
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Morning Peak Hour	PHF	0.82
Intersection	Iowa Avenue/Main Street	Analysis Year	OY (2017) With Project	Analysis Period	1> 7:00
File Name	AMOYW10.xus				
Project Description	Center Street Warehouse				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	0	0	0	107		279		472	104	225	635	

Signal Information			
Cycle, s	53.9	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	13.8	10.0	18.1	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8	7	4
Case Number		8.0		5.0		7.3	2.0	4.0
Phase Duration, s		17.8		17.8		22.1	14.0	36.1
Change Period, ($Y+R_c$), s		4.0		4.0		4.0	4.0	4.0
Max Allow Headway (*MAH*), s		0.0		3.3		3.1	3.1	3.1
Queue Clearance Time (g_s), s				12.8		17.6	9.9	17.0
Green Extension Time (g_e), s		0.0		1.0		0.5	0.3	1.3
Phase Call Probability				1.00		1.00	0.98	1.00
Max Out Probability				0.00		1.00	0.18	1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1		16		8	18	7	4	
Adjusted Flow Rate (*v*), veh/h		0		130		340		576	127	274	774	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		0		1810		1610		1900	1610	1810	1900	
Queue Service Time (g_s), s		0.0		3.1		10.8		15.6	3.1	7.9	15.0	
Cycle Queue Clearance Time (g_c), s		0.0		3.1		10.8		15.6	3.1	7.9	15.0	
Green Ratio (*g/C*)				0.26		0.26		0.34	0.34	0.19	0.60	
Capacity (*c*), veh/h				597		413		639	542	335	1132	
Volume-to-Capacity Ratio (*X*)		0.000		0.219		0.824		0.901	0.234	0.818	0.684	
Available Capacity (c_a), veh/h				1472		1192		703	596	502	1132	
Back of Queue (*Q*), veh/ln (50th percentile)		0.0		1.1		3.7		8.0	1.0	3.3	4.3	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00		0.00		0.00		0.00	0.00	0.00	0.00	
Uniform Delay (d_1), s/veh				16.1		19.0		17.1	12.9	21.1	7.5	
Incremental Delay (d_2), s/veh		0.0		0.1		1.6		13.2	0.1	3.8	1.4	
Initial Queue Delay (d_3), s/veh		0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh				16.2		20.6		30.2	13.0	25.0	8.9	
Level of Service (LOS)				B		C		C	B	C	A	
Approach Delay, s/veh / LOS	0.0			19.3		B	27.1		C	13.1		B
Intersection Delay, s/veh / LOS	18.9						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.3	B	1.3	A
Bicycle LOS Score / LOS	0.5	A		F	1.6	A	2.2	B

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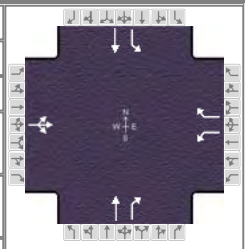
HCS 2010 Signalized Intersection Results Summary

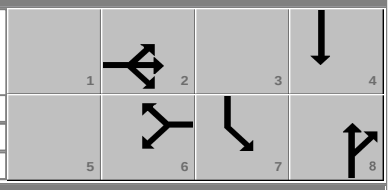
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Evening Peak Hour	PHF	0.95
Intersection	Iowa Avenue/Main Street	Analysis Year	OY (2017) With Project	Analysis Period	1> 7:00
File Name	PMOYW10.xus				
Project Description	Center Street Warehouse				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	0	0	0	117		171		836	127	118	712	

Signal Information			
Cycle, s	52.8	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	8.2	7.5	25.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8	7	4
Case Number		8.0		5.0		7.3	2.0	4.0
Phase Duration, s		12.2		12.2		29.0	11.5	40.5
Change Period, ($Y+R_c$), s		4.0		4.0		4.0	4.0	4.0
Max Allow Headway (*MAH*), s		0.0		3.2		3.0	3.1	3.0
Queue Clearance Time (g_s), s				7.6		25.9	5.3	12.6
Green Extension Time (g_e), s		0.0		0.6		0.0	0.1	2.9
Phase Call Probability				1.00		1.00	0.84	1.00
Max Out Probability				0.00		1.00	0.00	0.50

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1		16		8	18	7	4	
Adjusted Flow Rate (*v*), veh/h		0		123		180		880	134	124	749	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		0		1810		1610		1900	1610	1810	1900	
Queue Service Time (g_s), s		0.0		3.3		5.6		23.9	2.5	3.3	10.6	
Cycle Queue Clearance Time (g_c), s		0.0		3.3		5.6		23.9	2.5	3.3	10.6	
Green Ratio (*g/C*)				0.16		0.16		0.47	0.47	0.14	0.69	
Capacity (*c*), veh/h				418		251		900	763	259	1316	
Volume-to-Capacity Ratio (*X*)		0.000		0.295		0.718		0.977	0.175	0.480	0.569	
Available Capacity (c_a), veh/h				1508		1221		900	763	515	1316	
Back of Queue (*Q*), veh/ln (50th percentile)		0.0		1.2		2.0		13.7	0.7	1.3	1.9	
Queue Storage Ratio (*RQ*) (50th percentile)		0.00		0.00		0.00		0.00	0.00	0.00	0.00	
Uniform Delay (d_1), s/veh				20.2		21.2		13.6	8.0	20.8	4.1	
Incremental Delay (d_2), s/veh		0.0		0.1		1.5		24.4	0.0	0.5	0.4	
Initial Queue Delay (d_3), s/veh		0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh				20.3		22.6		38.0	8.0	21.3	4.5	
Level of Service (LOS)				C		C		D	A	C	A	
Approach Delay, s/veh / LOS	0.0			21.7		C	34.0		C	6.9		A
Intersection Delay, s/veh / LOS	21.5						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.2	B	1.3	A
Bicycle LOS Score / LOS	0.5	A		F	2.2	B	1.9	A

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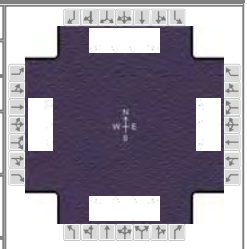
HCS 2010 Signalized Intersection Results Summary

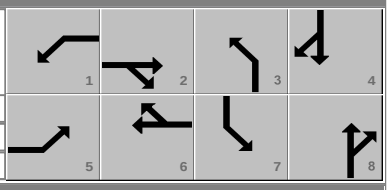
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Morning Peak Hour	PHF	0.90
Intersection	Iowa Avenue/Center Street	Analysis Year	OY (2017) With Project	Analysis Period	1> 7:00
File Name	AMOYW11.xus				
Project Description	Center Street Warehouse				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	104	193	84	131	278	57	77	353	82	29	596	85

Signal Information			
Cycle, s	53.1	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	7.4	0.6	10.3	3.4	3.0	12.3
Yellow	4.0	0.0	4.0	4.0	0.0	4.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	4.0	2.0	3.0	2.0	3.0	2.0	3.0
Phase Duration, s	11.4	14.3	12.0	14.9	10.5	19.4	7.4	16.3
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (*MAH*), s	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	5.1	6.1	5.9	10.2	4.3	6.6	2.9	11.1
Green Extension Time (g_e), s	0.1	1.0	0.2	0.7	0.1	2.3	0.0	1.2
Phase Call Probability	0.82	1.00	0.88	1.00	0.72	1.00	0.38	1.00
Max Out Probability	0.00	0.06	0.00	0.43	0.00	0.19	0.00	0.78

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	116	158	149	146	309	63	86	392	91	32	662	94
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1900	1708	1810	1900	1610	1810	1809	1610	1810	1809	1610
Queue Service Time (g_s), s	3.1	3.9	4.1	3.9	8.2	1.7	2.3	4.6	2.3	0.9	9.1	2.5
Cycle Queue Clearance Time (g_c), s	3.1	3.9	4.1	3.9	8.2	1.7	2.3	4.6	2.3	0.9	9.1	2.5
Green Ratio (*g/C*)	0.14	0.19	0.19	0.15	0.21	0.21	0.12	0.29	0.29	0.06	0.23	0.23
Capacity (*c*), veh/h	251	371	333	271	391	332	220	1048	466	116	840	374
Volume-to-Capacity Ratio (*X*)	0.460	0.427	0.449	0.537	0.789	0.191	0.389	0.374	0.195	0.277	0.788	0.253
Available Capacity (c_a), veh/h	511	537	482	511	537	455	511	1048	466	511	1022	455
Back of Queue (*Q*), veh/ln (50th percentile)	1.2	1.5	1.5	1.5	3.6	0.6	0.9	1.6	0.7	0.4	3.6	0.8
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	21.0	18.8	18.9	20.9	20.0	17.4	21.5	15.0	14.2	23.7	19.2	16.6
Incremental Delay (d_2), s/veh	0.5	0.3	0.4	0.6	3.6	0.1	0.4	0.1	0.1	0.5	2.7	0.1
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	21.5	19.1	19.2	21.5	23.6	17.5	21.9	15.1	14.3	24.1	21.9	16.8
Level of Service (LOS)	C	B	B	C	C	B	C	B	B	C	C	B
Approach Delay, s/veh / LOS	19.8	B		22.3	C		16.0	B		21.4	C	
Intersection Delay, s/veh / LOS	20.0						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	2.9	C	2.8	C	2.4	B
Bicycle LOS Score / LOS	0.8	A	1.3	A	1.0	A	1.1	A

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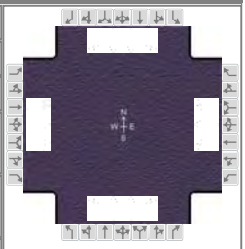
HCS 2010 Signalized Intersection Results Summary

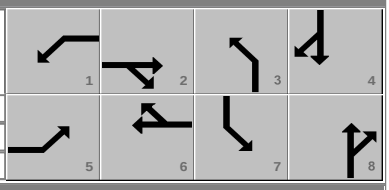
General Information				Intersection Information	
Agency	Kunzman Associates, Inc.			Duration, h	0.25
Analyst	BC	Analysis Date	1/18/2016	Area Type	Other
Jurisdiction	Riverside	Time Period	Evening Peak Hour	PHF	0.97
Intersection	Iowa Avenue/Center Street	Analysis Year	OY (2017) With Project	Analysis Period	1> 7:00
File Name	PMOYW11.xus				
Project Description	Center Street Warehouse				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	233	260	89	125	115	25	89	656	70	44	671	56

Signal Information			
Cycle, s	54.2	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.9	2.2	8.0	4.0	2.0	15.2
Yellow	4.0	0.0	4.0	4.0	0.0	4.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	4.0	2.0	3.0	2.0	3.0	2.0	3.0
Phase Duration, s	13.0	14.2	10.9	12.0	10.0	21.2	8.0	19.2
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (*MAH*), s	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	8.9	6.9	5.6	5.1	4.6	10.5	3.3	11.2
Green Extension Time (g_e), s	0.3	0.8	0.2	0.9	0.2	3.0	0.0	3.9
Phase Call Probability	0.97	1.00	0.86	1.00	0.75	1.00	0.50	1.00
Max Out Probability	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	240	185	175	129	119	26	92	676	72	45	692	58
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1900	1736	1810	1900	1610	1810	1809	1610	1810	1809	1610
Queue Service Time (g_s), s	6.9	4.8	4.9	3.6	3.1	0.8	2.6	8.5	1.7	1.3	9.2	1.5
Cycle Queue Clearance Time (g_c), s	6.9	4.8	4.9	3.6	3.1	0.8	2.6	8.5	1.7	1.3	9.2	1.5
Green Ratio (*g/C*)	0.17	0.19	0.19	0.13	0.15	0.15	0.11	0.32	0.32	0.07	0.28	0.28
Capacity (*c*), veh/h	302	357	326	229	280	237	201	1148	511	133	1013	451
Volume-to-Capacity Ratio (*X*)	0.795	0.518	0.537	0.562	0.423	0.109	0.457	0.589	0.141	0.341	0.683	0.128
Available Capacity (c_a), veh/h	666	700	639	666	1399	1186	1333	1332	593	666	2664	1186
Back of Queue (*Q*), veh/ln (50th percentile)	2.8	1.9	1.8	1.4	1.3	0.3	1.0	3.0	0.5	0.5	3.3	0.5
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	21.7	19.8	19.9	22.3	21.1	20.1	22.6	15.6	13.2	23.9	17.4	14.6
Incremental Delay (d_2), s/veh	1.8	0.4	0.5	0.8	0.4	0.1	0.6	0.2	0.0	0.6	0.3	0.0
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	23.5	20.3	20.4	23.1	21.4	20.1	23.2	15.8	13.3	24.5	17.7	14.6
Level of Service (LOS)	C	C	C	C	C	C	C	B	B	C	B	B
Approach Delay, s/veh / LOS	21.6	C		22.1	C		16.4	B		17.9	B	
Intersection Delay, s/veh / LOS	18.7						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	2.9	C	2.8	C	2.4	B
Bicycle LOS Score / LOS	1.0	A	0.9	A	1.2	A	1.1	A

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APPENDIX E

Traffic Signal Warrant Worksheets

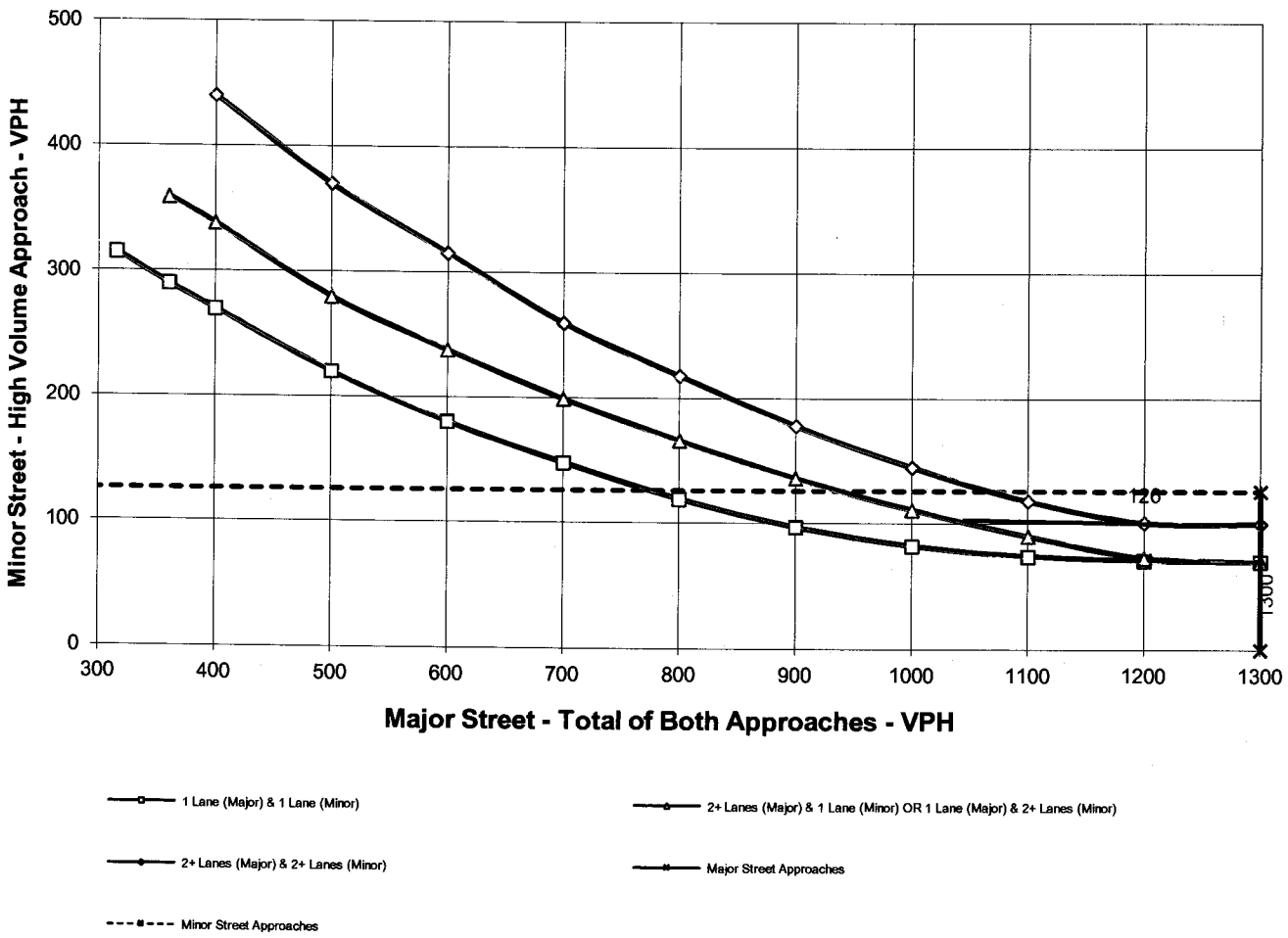
PEAK HOUR VOLUME WARRANT
(Rural Areas)

Existing

Major Street Name = **Main Street/Riverside Avenue** Total of Both Approaches (VPH) = **1786**
Number of Approach Lanes Major Street = **2**

Minor Street Name = **Center Street** High Volume Approach (VPH) = **126**
Number of Approach Lanes Minor Street = **1**

WARRANTED FOR A SIGNAL



** NOTE:
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

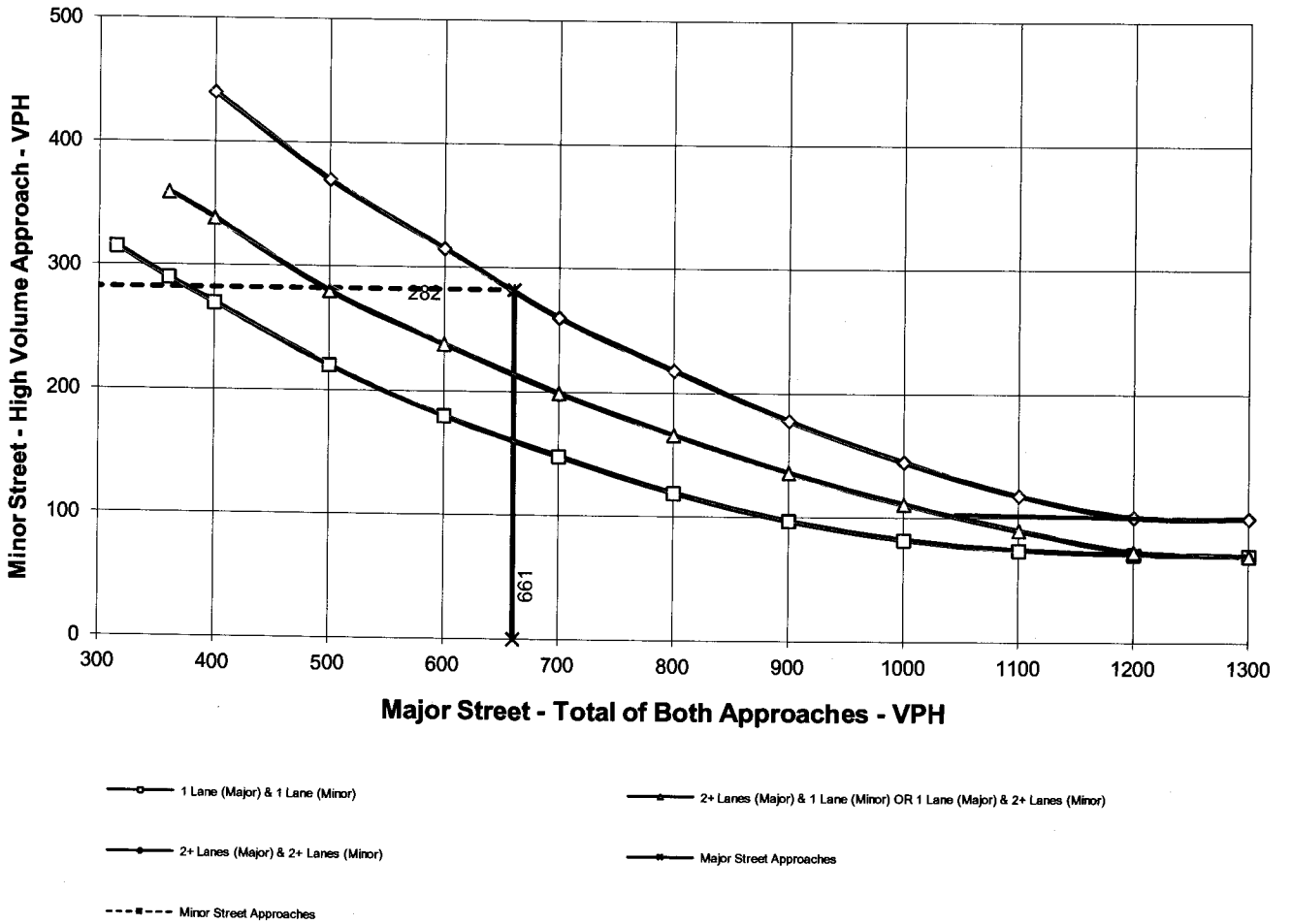
PEAK HOUR VOLUME WARRANT
(Rural Areas)

Existing

Major Street Name = **West La Cadena Drive** Total of Both Approaches (VPH) = **661**
Number of Approach Lanes Major Street = **1**

Minor Street Name = **Stephens Avenue/I-215 Freeway SB Ramps** High Volume Approach (VPH) = **282**
Number of Approach Lanes Minor Street = **1**

WARRANTED FOR A SIGNAL



** NOTE:
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

PEAK HOUR VOLUME WARRANT
(Rural Areas)

Existing

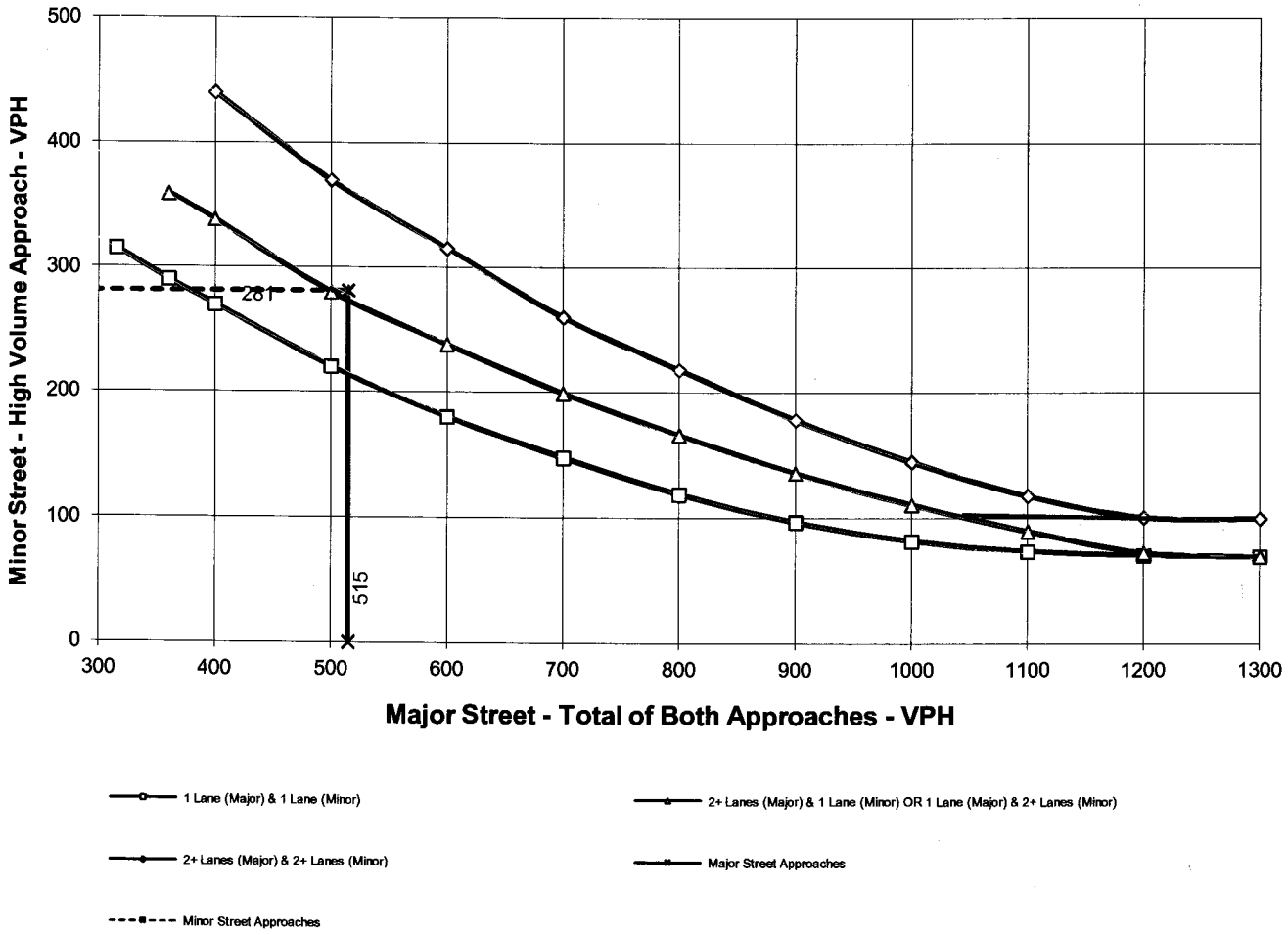
Major Street Name = **Center Street**

Total of Both Approaches (VPH) = **515**
Number of Approach Lanes Major Street = **1**

Minor Street Name = **Highgrove Place**

High Volume Approach (VPH) = **281**
Number of Approach Lanes Minor Street = **1**

WARRANTED FOR A SIGNAL



** NOTE:
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

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