CORONA GENERAL PLAN TECHNICAL UPDATE

For City of Corona

Volume IIa

Draft 2019 | Draft Environmental Impact Report

State Clearinghouse No. 2018081039

December 2019 | **Draft Environmental Impact Report**
State Clearinghouse No. 2018081039

CORONA GENERAL PLAN TECHNICAL UPDATE

for City of Corona

Volume IIa – Appendices A through I

Prepared for:

City of Corona
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400 S. Vicentia Avenue
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951.736.2434

Prepared by:

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PLACEWORKS

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Appendix A Notice of Preparation (NOP)

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NOTICE OF PREPARATION AND SCOPING MEETING CITY OF CORONA

Date:	August 14, 2018
Subject:	Notice of Preparation (NOP) and Scoping Meeting for the Corona General Plan Interim Technical Update Environmental Impact Report
To:	State Clearinghouse, State Responsible Agencies, State Trustee Agencies, Other Public Agencies, Interested Organizations
Lead Agency/Sponsor:	City of Corona, Community Development Department
Project Title:	City of Corona General Plan Update

NOTICE IS HEREBY GIVEN that the City of Corona will prepare an environmental impact report (EIR) for the City of Corona General Plan Interim Technical Update. The City is the lead agency for the project. The purpose of this notice is (1) to serve as a Notice of Preparation of an EIR pursuant to the California Environmental Quality Act (CEQA) Guidelines § 15082, (2) to advise and solicit comments and suggestions regarding the scope and content of the EIR to be prepared for the proposed project, and (3) to notice the public scoping meeting.

The City determined that the proposed project would require preparation of a full-scope EIR; thus, an Initial Study was not prepared in conjunction with this Notice of Preparation (NOP). Consistent with § 15168 of the CEQA Guidelines, the City will prepare an EIR to address the environmental impacts associated with the project at a programmatic level. The proposed project is a long-term plan consisting of policies that will guide future development activities and City actions. No specific development projects are proposed as part of this General Plan Update. However, the program EIR can serve to streamline environmental review of future projects.

Notice of Preparation: The City of Corona, as Lead Agency, requests that responsible and trustee agencies respond in a manner consistent with § 15082(b) of the CEQA Guidelines. Pursuant to CEQA § 21080.4, responsible agencies must submit any comments in response to this notice no later than 30 days after receipt. Comments in response to this notice must be submitted in writing at the address below at the close of the 30-day NOP review period, by 5:00 PM on September 14, 2018:

Terri Manuel, AICP, Planning Manager
City of Corona
400 S. Vicentia Avenue
Corona, CA 92882

Scoping Meeting: The City will hold a scoping meeting in conjunction with this NOP in order to present the project and the EIR process and to provide an opportunity for agency representatives and the public to assist the lead agency in determining the scope and content of the environmental analysis for the EIR. The Scoping Meeting will be held on August 30, 2018 at 7:00 p.m. to 8:30 p.m. at the Circle City Center, 365 North Main Street, Corona, 92880 .

Signature:

Name: Terri Manuel, AICP, Planning Manager

FILED/POSTED
County of Riverside
Peter Aldana
Assessor-County Clerk-Recorder
E-201801026
08/15/2018 09:46 AM Fee: $ 0.00
Page 1 of 3
Removed: By: Deputy

Project Location

As shown on Figure 1, Corona is the northwestern-most City in Riverside County. It is bordered by the County of Orange to the west, San Bernardino County to the north, unincorporated communities in the County of Riverside to the east and south, and the incorporated cities of Norco, Anaheim, Lake Elsinore, Chino Hills, Eastvale, Riverside, and Yorba Linda. The city is accessed by State Route 91 (SR-91) and Interstate 15 (I-15).

Project Description

The City of Corona is in the process of preparing a technical update to its existing General Plan. The update is expected to be completed in 2019 and will guide the City's development and conservation for the next 20 years to 2040.

State law requires that a general plan contain eight elements: land use, circulation, housing, open space, noise, safety, environmental justice, and conservation. The contents of these elements are outlined in state law. The City of Corona General Plan Technical Update would bring the General Plan into compliance with recently enacted state laws and reflect current data as well as public and staff participation. The proposed project would organize all elements into five broad categories:

» Community development: how development is maintained and enhanced and how new development occurs. It addresses land uses, community design, housing, economic development, and historic preservation.

» Infrastructure and public services: the provision of infrastructure and services that support residents and businesses. It includes parks and recreation, schools, libraries, circulation, infrastructure and utilities, and other public services.

» Environmental resources: addresses a wide variety of resources, including the management of open space and conservation of natural resources such as water, soils, plants and wildlife, viewscapes, air, and energy.

» Health and environmental justice: addresses new state requirements related to pollution burdens, equitable environmental and public health, and wellness.

» Public safety and hazards: protects residents from the impacts of natural hazards. This element includes natural hazards (flooding, seismic, wildfire), human-caused hazards (hazardous materials), and noise.

The purpose of the Corona General Plan is to create a policy framework that articulates a vision for the city's long-term physical form and development, while preserving and enhancing the quality of life for Corona's residents. The key components of this project will include broad community goals for the future of Corona and specific policies and implementing actions that will help meet the goals.

The land use designations in the City of Corona and its SOI will remain as designated under the current General Plan. Table 1 provides a statistical summary of the buildout potential associated with the General Plan compared to existing conditions.

Table 1 Buildout Statistical Summary

Scenario	Acres	Units	Households	Population	Non-residential Square Feet	Employment
Existing Conditions						
City	25,551	48,532	46,979	165,366	52,278,846	70,972
SOI	16,515	10,896	10,351	37,264	3,436,459	4,346
Total	42,066	59,428	57,330	202,630	55,715,305	75,318
Proposed General Plan / Current General Plan						
City	25,551	54,026	52,297	184,086	61,794,650	84,395
SOI	16,515	16,913	16,067	57,842	20,397,007	22,079
Total	42,066	70,939	68,364	241,928	82,191,657	106,474

Public Agency Approvals

The proposed project would require adoption by the Corona City Council. The Planning Commission and other decision-making bodies would review the proposed project and make recommendations to City Council. While other agencies may be consulted during the General Plan Update process, their approval is not required for adoption of the General Plan Update. However, subsequent development under the General Plan Update may require approval of state, federal and responsible trustee agencies that may rely on the programmatic EIR for decisions in their areas of expertise.

Environmental Factors Potentially Affected

The proposed project could potentially affect the following environmental factors, and each will be addressed in the EIR:

» Aesthetics
» Air Quality
» Agricultural & Forest Resources
» Biological Resources
» Cultural Resources
» Geology/Soils
» Greenhouse Gas Emissions
» Hazards and Hazardous Materials
» Hydrology/Water Quality
» Land Use and Planning
» Mineral Resources
» Noise
» Population and Housing
» Public Services
» Parks and Recreation
» Transportation and Traffic
» Utilities and Service Systems
» Tribal Cultural Resources

ATTACHMENTS:

» Figure 1: Regional Location
» Figure 2: Aerial Photograph
» Figure 3: Proposed Land Use Plan (City)
» Figure 4: Proposed Land Use Plan (Sphere of Influence)

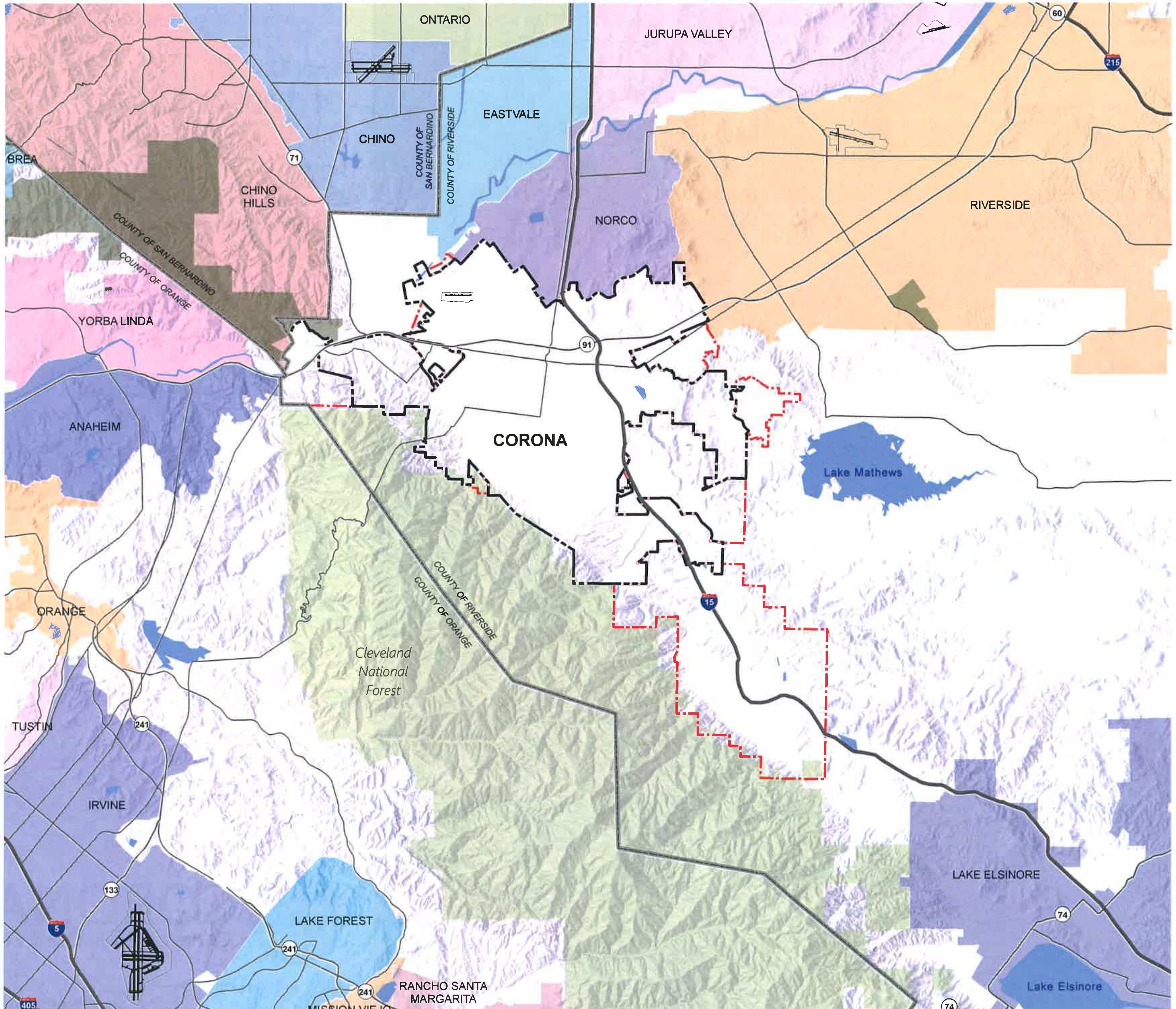

Figure 1
REGIONAL MAP

Legend

City Boundary
Sphere of Influence Areas
National Parks and Forests
State Parks and Forests

Source:
City of Corona 2017
County of Riverside 2017
County of Orange 2017
County of San Bernardino 2017
US Forest Service 2017

CORONA
General Plan Draft EIR

0 0.5 1 1.5 2 2.5 3 Miles

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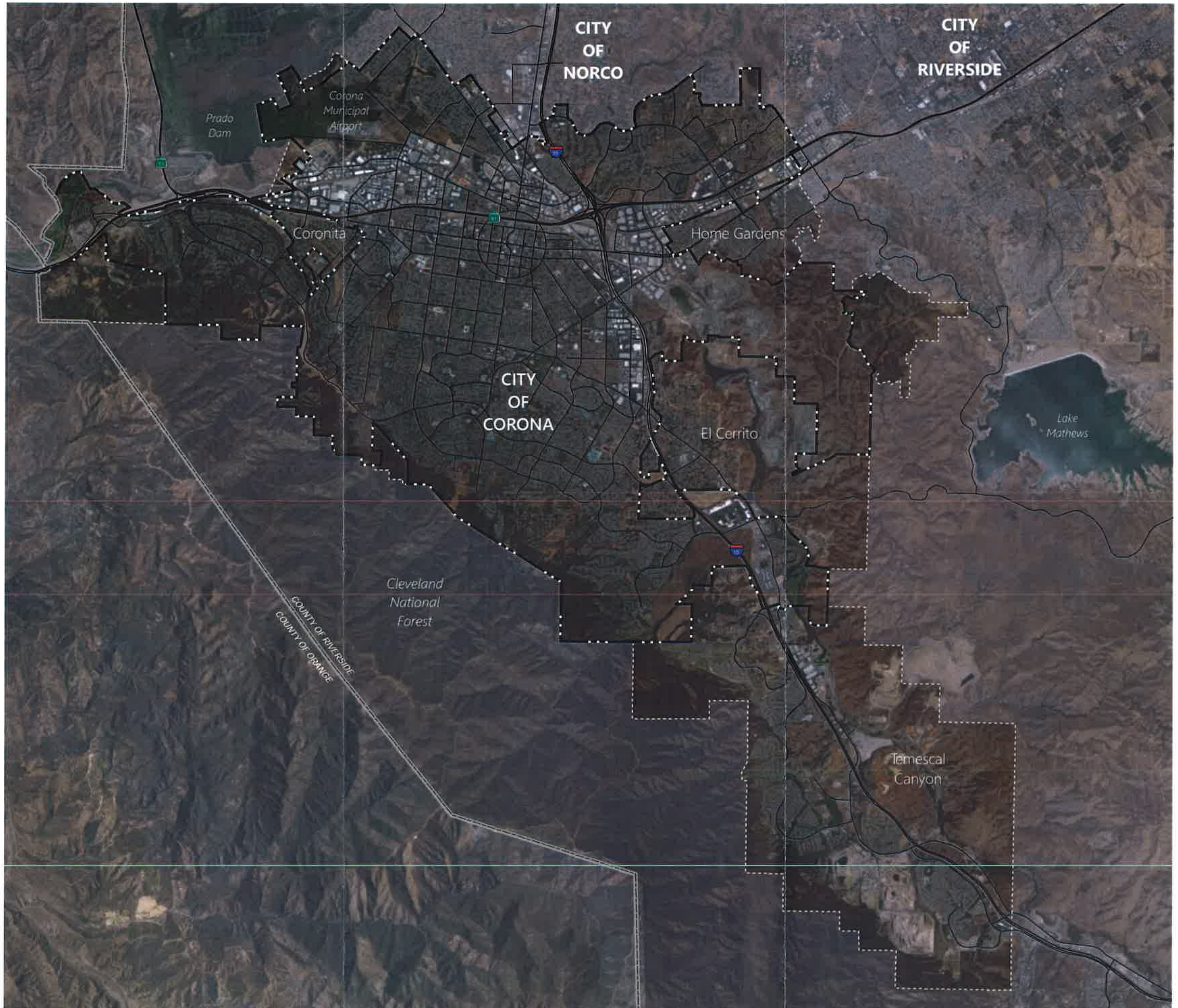

Figure 2

CITYWIDE AERIAL

Legend

City Boundary

Sphere of Influence Areas

Source:
City of Corona 2017

CORONA
General Plan Draft EIR

0 0.5 1 1.5 2 Miles

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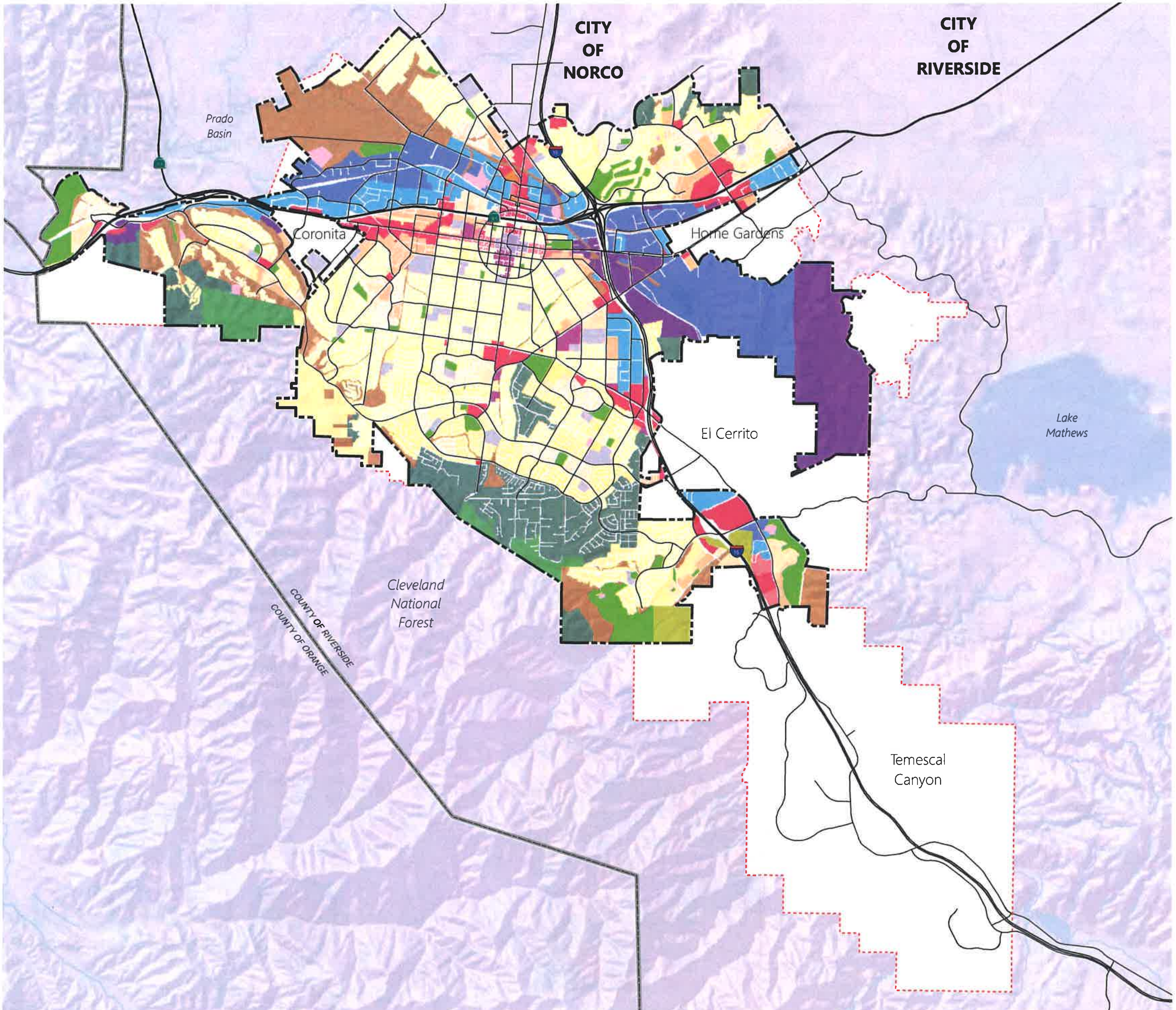
Figure 3

PROPOSED LAND USE PLAN

CITY OF CORONA



Legend

- City Boundary
- Sphere of Influence Areas
- Agriculture (AG)
- Estate Residential (ER)
- Rural Residential (RR 2)
- Low Density Residential (LDR)
- Low Medium Density Residential (LMDR)
- Medium Density Residential (MDR)
- High Density Residential (HDR)
- Urban Density Residential (UDR)
- General Commercial (GC)
- Office Professional (OP)
- Mixed Use Downtown (MUD)
- Mixed Use: Commercial/Residential (MU 1)
- Mixed Use: Industrial/Commercial (MU 2)
- Light Industrial (LI)
- General Industrial (GI)
- Parks, Open Space Recreational (P, OS/R)
- Open Space General (OS, OS/G)
- School (S)
- Fire Station (FS)
- Utility (U)

Source:
City of Corona 2017

CORONA
General Plan Draft EIR

0 0.5 1 1.5 2 Miles

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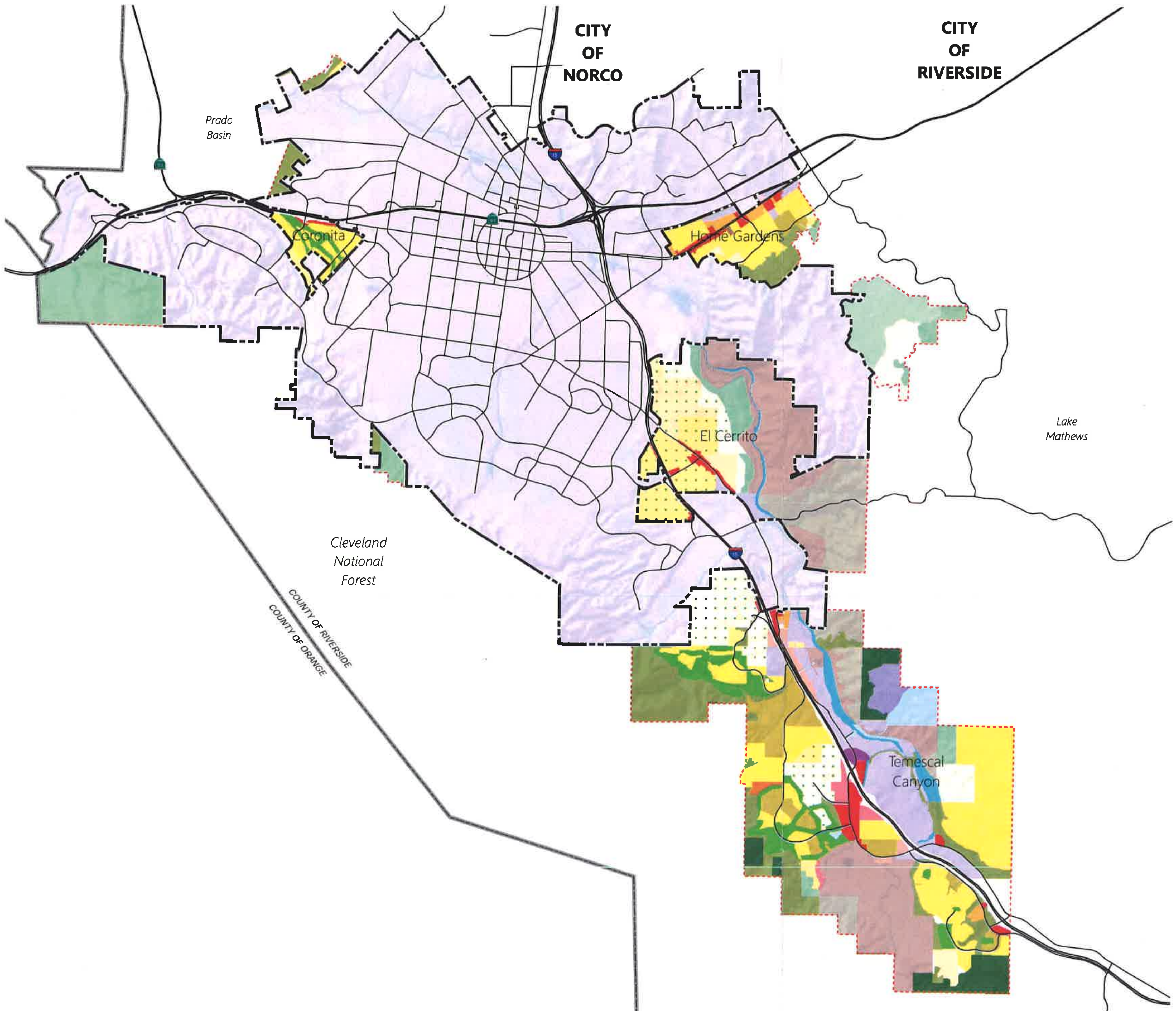
Date Saved: 7/23/2018

Figure 4

PROPOSED LAND USE PLAN

SPHERE OF INFLUENCE AREAS



Legend

- City Boundary
- Sphere of Influence Areas
- Rural Community - Estate Density Residential
- Rural Community - Very Low Density Residential
- Rural Community - Low Density Residential
- Estate Density Residential
- Very Low Density Residential
- Low Density Residential
- Medium Density Residential
- Medium High Density Residential
- High Density Residential
- Very High Density Residential
- Highest Density Residential
- Commercial Retail
- Commercial Tourist
- Commercial Office
- Community Center
- Light Industrial
- Heavy Industrial
- Business Park
- Public Facilities
- Rural Residential
- Rural Mountainous
- Agriculture
- Conservation
- Conservation Habitat
- Open Space Recreation
- Open Space Rural
- Water
- Mineral Resources
- City

Source:
Riverside County 2017

CORONA
General Plan Draft EIR

0 0.5 1 1.5 2 Miles

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Date Saved: 7/23/2018

Appendix B NOP Comments

Appendices

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AIRPORT LAND USE COMMISSION
RIVERSIDE COUNTY

August 21, 2018

Ms. Terri Manuel, Planning Manager
City of Corona Planning Department
400 S. Vicentia Avenue
Corona CA 92882

County Administrative Center
4080 Lemon St.,14th Floor.
Riverside, CA 92501
(951) 955-5132

www.rcaluc.org

RE: AIRPORT LAND USE COMMISSION (ALUC) DEVELOPMENT REVIEW REQUIRED

Jurisdiction Project Case: General Plan Update

Dear Ms. Manuel:

Thank you for providing the Riverside County Airport Land Use Commission (ALUC) with a copy of the transmittal for the City of Corona case; a proposal to prepare a technical update to its existing General Plan, bringing it into compliance with state law.

ALUC staff has determined that the project will occur in all of the Compatibility Zones of Corona Municipal Airport Influence Area.

California Public Utilities Code section 21676 requires the local agency to refer any amendment of a general plan or specific plan, or the adoption or approval of a zoning ordinance or building regulation within an Airport Land Use Compatibility Plan (ALUCP) to the ALUC. Additionally, California Public Utilities Code Section 21676.5 allows the ALUC to review all projects within the Airport Influence Area when the local jurisdiction's General Plan is not consistent with the applicable ALUCP. Since the General Plan is not consistent with the ALUCP and/or because the project contemplates amendment of a general plan or specific plan, or the adoption or approval of a zoning ordinance or building regulation, the ALUC requests that you submit the above-identified project(s) for its review. ALUC staff is also available to assist in bringing your jurisdiction's General Plan into consistency with the applicable ALUCP, if the local jurisdiction so desires.

If you have any questions, please contact Paul Rull, ALUC Urban Regional Planner IV, at (951) 955-6893 or John Guerin, ALUC Principal Planner, at (951) 955-0982.

Sincerely,

RIVERSIDE COUNTY AIRPORT LAND USE COMMISSION

Paul Rull

Paul Rull, ALUC Urban Regional Planner IV

From:	Terri Manuel
To:	Wes Speake
Cc:	Mark Hoffman; Nicole Vermilion
Subject:	RE: GPU NOP
Date:	Monday, August 27, 2018 3:06:11 PM

Hi Wes,
SOI is Sphere of Influence
The land use map is not changing. It's called proposed because it will be the map of the revised General Plan but it is not changing.
Traffic analysis is underway. The traffic experts are overseeing that aspect of the update and can respond further about the status.
Terri

From: Wes Speake <wspeake@yahoo.com>
Sent: Monday, August 27, 2018 2:53 PM
To: Terri Manuel <Terri.Manuel@CoronaCA.gov>
Subject: GPU NOP

Hi Terri,
I had a couple of questions regarding the NOP letter.

1. What does SOI mean in the table? Its definition isn't shown in the letter.
2. I see a Proposed Land Use Plan Map, is there a map that shows the specific changes or a list of changes that are being proposed?
3. Are traffic counts complete? Raw data?

Thank you,

From: Wes Speake
To: Terri Manuel
Cc: Mark Hoffman; Nicole Vermilion
Subject: Re: RE: GPU NOP
Date: Monday, August 27, 2018 3:40:10 PM

Thanks Terri,

I thought that's what it meant. Members of the public asked me, so I thought I would clarify.

- So, NO land use designation changes nor zone changes for any part of the city? No Land Use definition changes?

- In terms of the circulation element and its relation to 11,000 more homes. Will, there be an evaluation of traffic congestion? If so, will they be using SCAG's Travel Demand Model as the basis for traffic analysis? If not,which one will be used

- We believe the model is outdated and does not reflect traffic realty in Western Riverside County:
  - The model does not address traffic friction induced by the ingress-egress entrance to the new 91/15 toll lanes, severely hindering traffic flow during peak periods.
  - Improper design and operation of ramp meters on the 91 Freeway (especially at the Green River WB ramp), which are causing traffic shifting inconsistent with the model.
  - Limited access to toll lanes has shifted Corona traffic to East (Ontario Avenue on-ramp) and West (Green River and Serfas Club).
  - Elimination and deferral of critical elements of the 91 Express Lanes project which cause the morning peak duration on the 91 freeway to more than double, as well as, unreasonable delays at Corona freeway interchanges especially at Green River and Serfas Club. Adding 11,000 more home between now and 2040 with no specific infrastructure improvements to hand these volumes seems inconsistent.
  - Regional Model has not been updated to reflect accumulative effect of recent major and numerous amendments to land use throughout Western Riverside County.
  - The model does not reflect recent expansions of mining operations in the Corona area.
  - Model lacks updated and validated data on goods movement transported through our region, from the ports of LA and Long Beach. Nor increase trash truck traffic to El Sobrante Landfill. Both Rail and Truck
  - The model does not reflect the recent revision to the City of Eastvale

Circulation Element, which created an unmitigated gap in the east-west Arlington-Schliemann-Pine corridor. This corridor has been recognized for years as a critical component for the region's circulation network.

- In the Powerpoint it says the following (typo)

*Draft EIR (est. **Winter 2019**) - Circulation period of 45 days*

*Final EIR (est. **Spring 2019**) - Includes responses to comments - Final EIR available for review*

Thank you!

Wes Speake

On Monday, August 27, 2018, 3:06:06 PM PDT, Terri Manuel <Terri.Manuel@CoronaCA.gov> wrote:

Hi Wes,

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The land use map is not changing. It's called proposed because it will be the map of the revised General Plan but it is not changing.

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3. Are traffic counts complete? Raw data?

Thank you,

Verizon 11:17 PM 100%

Wes Speake shared a post to the group: Greater Corona Traffic Alliance.

9 mins ·

Attended the General Plan Update Scoping meeting tonight.

The growth projections below show 11K additional homes in Corona and its Sphere of Influence from now until the city is built out. This represents the totals presented in the existing Land Use policy. This area is not slated to be updated in this update.

The purpose of this meeting

2 1

Verizon 11:18 PM 100%

The purpose of this meeting was to get feedback on the specific sections that were being updated so they could be addressed in the CEQA document.

The specific sections that will be addressed include:

Transportation
Noise Study
Air Quality & GHG Emissions
Cultural & Historic Resources
Biological Resources
Healthy Communities

My comments tonight centered on Traffic and Circulation because these are the only hammers we have for

2 1

model, our 2004 plan will not work.. We will have Level of Service F all over the city and we certainly we did not evaluate the impact of diversion at ramps caused by meters not being set to optimize throughput. Additionally, the existing model use is dangerously outdated and doesn't reflect the explosive growth In Riverside County.

The good news is that this process the draft EIR won't be ready until Jan-Feb 2019. Therefore, it's CRITICAL that we elect leaders that can not only recognize something is wrong but understand how to put us on a path forward. I am that leader!

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 · www.aqmd.gov

SENT VIA USPS AND E-MAIL: September 6, 2018
Terri.manuel@ci.corona.ca.us
Terri Manuel, AICP, Planning Manager
City of Corona, Community Development Department
400 S. Victoria Avenue
Corona, CA 92882

Notice of Preparation of a Draft Environmental Impact Report for the Proposed City of Corona General Plan Update

The South Coast Air Quality Management District (SCAQMD) staff appreciates the opportunity to comment on the above-mentioned document. SCAQMD staff's comments are recommendations regarding the analysis of potential air quality impacts from the Proposed Project that should be included in the Draft Environmental Impact Report (DEIR). Please send SCAQMD a copy of the Draft EIR upon its completion. Note that copies of the Draft EIR that are submitted to the State Clearinghouse are not forwarded to SCAQMD. Please forward a copy of the Draft EIR directly to SCAQMD at the address shown in the letterhead. **In addition, please send with the Draft EIR all appendices or technical documents related to the air quality, health risk, and greenhouse gas analyses and electronic versions of all air quality modeling and health risk assessment files[1]. These include emission calculation spreadsheets and modeling input and output files (not PDF files). Without all files and supporting documentation, SCAQMD staff will be unable to complete our review of the air quality analyses in a timely manner. Any delays in providing all supporting documentation will require additional time for review beyond the end of the comment period.**

Air Quality Analysis

The SCAQMD adopted its California Environmental Quality Act (CEQA) Air Quality Handbook in 1993 to assist other public agencies with the preparation of air quality analyses. The SCAQMD staff recommends that the Lead Agency use this Handbook as guidance when preparing its air quality analyses. Copies of the Handbook are available from the SCAQMD's Subscription Services Department by calling (909) 396-3720. More recent guidance developed since this Handbook was published is also available on SCAQMD's website at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/ceqa-air-quality-handbook-(1993). The SCAQMD staff also recommends that the Lead Agency use the CalEEMod land use emissions software. This software has recently been updated to incorporate up-to-date state and locally approved emission factors and methodologies for estimating pollutant emissions from typical land use development. CalEEMod is the only software model maintained by the California Air Pollution Control Officers Association (CAPCOA) and replaces the now outdated URBEMIS. This model is available free of charge at: www.caleemod.com.

On March 3, 2017, the SCAQMD's Governing Board adopted the 2016 Air Quality Management Plan (2016 AQMP), which was later approved by the California Air Resources Board on March 23, 2017. Built upon the progress in implementing the 2007 and 2012 AQMPs, the 2016 AQMP provides a regional

[1] Pursuant to the CEQA Guidelines Section 15174, the information contained in an EIR shall include summarized technical data, maps, plot plans, diagrams, and similar relevant information sufficient to permit full assessment of significant environmental impacts by reviewing agencies and members of the public. Placement of highly technical and specialized analysis and data in the body of an EIR should be avoided through inclusion of supporting information and analyses as appendices to the main body of the EIR. Appendices to the EIR may be prepared in volumes separate from the basic EIR document, but shall be readily available for public examination and shall be submitted to all clearinghouses which assist in public review.

perspective on air quality and the challenges facing the South Coast Air Basin. The most significant air quality challenge in the Basin is to achieve an additional 45 percent reduction in nitrogen oxide (NOx) emissions in 2023 and an additional 55 percent NOx reduction beyond 2031 levels for ozone attainment. The 2016 AQMP is available on SCAQMD's website at: http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan.

SCAQMD staff recognizes that there are many factors Lead Agencies must consider when making local planning and land use decisions. To facilitate stronger collaboration between Lead Agencies and the SCAQMD to reduce community exposure to source-specific and cumulative air pollution impacts, the SCAQMD adopted the Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning in 2005. This Guidance Document provides suggested policies that local governments can use in their General Plans or through local planning to prevent or reduce potential air pollution impacts and protect public health. SCAQMD staff recommends that the Lead Agency review this Guidance Document as a tool when making local planning and land use decisions. This Guidance Document is available on SCAQMD's website at: http://www.aqmd.gov/docs/default-source/planning/air-quality-guidance/complete-guidance-document.pdf. Additional guidance on siting incompatible land uses (such as placing homes near freeways or other polluting sources) can be found in the California Air Resources Board's *Air Quality and Land Use Handbook: A Community Health Perspective*, which can be found at: http://www.arb.ca.gov/ch/handbook.pdf. Guidance[2] on strategies to reduce air pollution exposure near high-volume roadways can be found at: https://www.arb.ca.gov/ch/rd_technical_advisory_final.PDF.

The SCAQMD has also developed both regional and localized significance thresholds. SCAQMD staff requests that the Lead Agency compare the emission results to the recommended regional significance thresholds found here: http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf. In addition to analyzing regional air quality impacts, SCAQMD staff recommends calculating localized air quality impacts and comparing the results to localized significance thresholds (LSTs). LSTs can be used in addition to the recommended regional significance thresholds as a second indication of air quality impacts when preparing a CEQA document. Therefore, when preparing the air quality analysis for the Proposed Project, it is recommended that the Lead Agency perform a localized analysis by either using the LSTs developed by the SCAQMD or performing dispersion modeling as necessary. Guidance for performing a localized air quality analysis can be found at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/localized-significance-thresholds.

When specific development is reasonably foreseeable as result of the goals, policies, and guidelines in the Proposed Project, the Lead Agency should identify any potential adverse air quality impacts and sources of air pollution that could occur using its best efforts to find out and a good-faith effort at full disclosure in the Draft EIR. The degree of specificity will correspond to the degree of specificity involved in the underlying activity which is described in the Draft EIR (CEQA Guidelines Section 15146). When quantifying air quality emissions, emissions from both construction (including demolition, if any) and operations should be calculated. Construction-related air quality impacts typically include, but are not limited to, emissions from the use of heavy-duty equipment from grading, earth-loading/unloading, paving, architectural coatings, off-road mobile sources (e.g., heavy-duty construction equipment) and on-road mobile sources (e.g., construction worker vehicle trips, material transport trips). Operation-related air quality impacts may include, but are not limited to, emissions from stationary sources (e.g., boilers), area sources (e.g., solvents and coatings), and vehicular trips (e.g., on- and off-road tailpipe emissions and

[2] In April 2017, CARB published a technical advisory, *Strategies to Reduce Air Pollution Exposure Near High-Volume Roadways: Technical Advisory*, to supplement CARB's Air Quality and Land Use Handbook: A Community Health Perspective. This technical advisory is intended to provide information on strategies to reduce exposures to traffic emissions near high-volume roadways to assist land use planning and decision-making in order to protect public health and promote equity and environmental justice. The technical advisory is available at: https://www.arb.ca.gov/ch/landuse.htm.

entrained dust). Air quality impacts from indirect sources, such as sources that generate or attract vehicular trips, should be included in the analysis. Furthermore, for phased projects where there will be an overlap between construction and operation, the air quality impacts from the overlap should be combined and compared to SCAQMD's regional air quality CEQA operational thresholds to determine significance.

The Lead Agency should identify any potential adverse air quality impacts that could occur from all phases of the Proposed Project and all air pollutant sources related to the Proposed Project. Air quality impacts from both construction (including demolition, if any) and operations should be calculated. Construction-related air quality impacts typically include, but are not limited to, emissions from the use of heavy-duty equipment from grading, earth-loading/unloading, paving, architectural coatings, off-road mobile sources (e.g., heavy-duty construction equipment) and on-road mobile sources (e.g., construction worker vehicle trips, material transport trips). Operation-related air quality impacts may include, but are not limited to, emissions from stationary sources (e.g., boilers), area sources (e.g., solvents and coatings), and vehicular trips (e.g., on- and off-road tailpipe emissions and entrained dust). Air quality impacts from indirect sources, such as sources that generate or attract vehicular trips, should be included in the analysis.

Mobile Source Health Risk Assessment

Notwithstanding the court rulings, SCAQMD staff recognizes that the Lead Agencies that approve CEQA documents retain the authority to include any additional information they deem relevant to assessing and mitigating the environmental impacts of a project. Because of SCAQMD staff's concern about the potential public health impacts of siting sensitive populations within close proximity of, SCAQMD staff recommends that, prior to approving the project, Lead Agencies consider the impacts of air pollutants on people who will live in a new project and provide mitigation where necessary.

When specific development is reasonably foreseeable as result of the goals, policies, and guidelines in the Proposed Project, the Lead Agency should identify any potential adverse health risk impacts using its best efforts to find out and a good-faith effort at full disclosure in the CEQA document. Based on a review of aerial photographs and information in the NOP, SCAQMD staff found that the Proposed Project will be located immediately next to State Route 91 (SR-91). Because of the close proximity to the existing freeway, residents at the Proposed Project[3] would be exposed to diesel particulate matter (DPM), which is a toxic air contaminant and a carcinogen. Diesel particulate matter emitted from diesel powered engines (such as trucks) has been classified by the state as a toxic air contaminant and a carcinogen.

Since future residences of the Proposed Project would be exposed to toxic emissions from the nearby sources of air pollution (e.g., diesel fueled highway vehicles), SCAQMD staff recommends that the Lead Agency conduct a health risk assessment (HRA)[4] to disclose the potential health risks to the residents from the vehicle emissions coming from vehicles operating on the Harbor Freeway in the Draft EIR[5].

Guidance Regarding Residences Sited Near a High-Volume Freeway or Other Sources of Air Pollution

SCAQMD staff recognizes that there are many factors Lead Agencies must consider when making local planning and land use decisions. To facilitate stronger collaboration between Lead Agencies and the SCAQMD to reduce community exposure to source-specific and cumulative air pollution impacts, the

[3] According to the Project Description in the Notice of Preparation, the Proposed Project would include new construction of up to approximately 425 new housing units.

[4] "Health Risk Assessment Guidance for Analyzing Cancer Risk from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis," accessed at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/mobile-source-toxics-analysis.

[5] SCAQMD has developed the CEQA significance threshold of 10 in one million for cancer risk. When SCAQMD acts as the Lead Agency, SCAQMD staff conducts a HRA, compares the maximum cancer risk to the threshold of 10 in one million to determine the level of significance for health risk impacts, and identifies mitigation measures if the risk is found to be significant.

SCAQMD adopted the Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning in 2005. This Guidance Document provides suggested policies that local governments can use in their General Plans or through local planning to prevent or reduce potential air pollution impacts and protect public health. SCAQMD staff recommends that the Lead Agency review this Guidance Document as a tool when making local planning and land use decisions. This Guidance Document is available on SCAQMD's website at: http://www.aqmd.gov/docs/default-source/planning/air-quality-guidance/complete-guidance-document.pdf. Additional guidance on siting incompatible land uses (such as placing homes near freeways or other polluting sources) can be found in the California Air Resources Board's (CARB) *Air Quality and Land Use Handbook: A Community Health Perspective*, which can be found at: http://www.arb.ca.gov/ch/handbook.pdf. Guidance[6] on strategies to reduce air pollution exposure near high-volume roadways can be found at: https://www.arb.ca.gov/ch/rd_technical_advisory_final.PDF.

Mitigation Measures

In the event that the Proposed Project generates significant adverse air quality impacts, CEQA requires that all feasible mitigation measures that go beyond what is required by law be utilized during project construction and operation to minimize or eliminate these impacts. Pursuant to CEQA Guidelines Section 15126.4 (a)(1)(D), any impacts resulting from mitigation measures must also be discussed. Several resources are available to assist the Lead Agency with identifying possible mitigation measures for the Proposed Project, including:

- Chapter 11- Mitigating the Impact of a Project, of the SCAQMD *CEQA Air Quality Handbook*
- SCAQMD's CEQA web pages available here: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies
- SCAQMD's Rule 403 – Fugitive Dust, and the Implementation Handbook for controlling construction-related emissions and Rule 1403 – Asbestos Emissions from Demolition/Renovation Activities
- SCAG's MMRP for the 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy available here: http://scagrtpscs.net/Documents/2016/peir/final/2016fPEIR_ExhibitB_MMRP.pdf
- CAPCOA's *Quantifying Greenhouse Gas Mitigation Measures* available here: http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf

Alternatives

In the event that the Proposed Project generates significant adverse air quality impacts, CEQA requires the consideration and discussion of alternatives to the project or its location which are capable of avoiding or substantially lessening any of the significant effects of the project. The discussion of a reasonable range of potentially feasible alternatives, including a "no project" alternative, is intended to foster informed decision-making and public participation. Pursuant to CEQA Guidelines Section 15126.6(d), the Draft EIR shall include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the Proposed Project.

Permits

In the event that the Proposed Project requires a permit from SCAQMD, SCAQMD should be identified as a responsible agency for the Proposed Project. For more information on permits, please visit

[6] In April 2017, CARB published a technical advisory, *Strategies to Reduce Air Pollution Exposure Near High-Volume Roadways: Technical Advisory*, to supplement CARB's Air Quality and Land Use Handbook: A Community Health Perspective. This technical advisory is intended to provide information on strategies to reduce exposures to traffic emissions near high-volume roadways to assist land use planning and decision-making in order to protect public health and promote equity and environmental justice. The technical advisory is available at: https://www.arb.ca.gov/ch/landuse.htm.

SCAQMD webpage at: http://www.aqmd.gov/home/permits. Questions on permits can be directed to SCAQMD's Engineering and Permitting staff at (909) 396-3385.

Data Sources

SCAQMD rules and relevant air quality reports and data are available by calling the SCAQMD's Public Information Center at (909) 396-2039. Much of the information available through the Public Information Center is also available via the SCAQMD's webpage (http://www.aqmd.gov).

The SCAQMD staff is available to work with the Lead Agency to ensure that project air quality and health risk impacts are accurately evaluated and mitigated where feasible. Please contact Robert Dalbeck, Assistant Air Quality Specialist, at rdalbeck@aqmd.gov, if you have any questions regarding these comments.

Sincerely,

Daniel Garcia

Daniel Garcia
Program Supervisor, CEQA IGR
Planning, Rule Development & Area Sources

DG/RD
RVC180815-03
Control Number

STATE OF CALIFORNIA Edmund G. Brown Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
Cultural and Environmental Department
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
Phone (916) 373-3710
Email: nahc@nahc.ca.gov
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RECEIVED
SEP 06 2018
COMMUNITY DEVELOPMENT DEPT.

August 31, 2018

Terri Manuel
City of Corona
400 S. Vincentia Avenue
Corona, CA 92882

RE: SCH# 2018081039, Corona General Plan Update, Riverside County

Dear Ms. Manuel:

The Native American Heritage Commission (NAHC) has received the Notice of Preparation (NOP), Draft Environmental Impact Report (DEIR) or Early Consultation for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code §21000 et seq.), specifically Public Resources Code §21084.1, states 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. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, §15064.5 (b) (CEQA Guidelines §15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an Environmental Impact Report (EIR) shall be prepared. (Pub. Resources Code §21080 (d); Cal. Code Regs., tit. 14, § 5064 subd.(a)(1) (CEQA Guidelines §15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources within the area of potential effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code §21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code §21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code §21084.3 (a)). **AB 52 applies to any project for which a notice of preparation, a notice of negative declaration, or a mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements.** If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. §800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments.

Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.

AB 52

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

1. Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:
   a. A brief description of the project.
   b. The lead agency contact information.
   c. Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code §21080.3.1 (d)).
   d. A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code §21073).

2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code §21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or Environmental Impact Report. (Pub. Resources Code §21080.3.1(b)).
   a. For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code §65352.4 (SB 18). (Pub. Resources Code §21080.3.1 (b)).

3. Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:
   a. Alternatives to the project.
   b. Recommended mitigation measures.
   c. Significant effects. (Pub. Resources Code §21080.3.2 (a)).

4. Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:
   a. Type of environmental review necessary.
   b. Significance of the tribal cultural resources.
   c. Significance of the project's impacts on tribal cultural resources.
   d. If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code §21080.3.2 (a)).

5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code §6254 (r) and §6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code §21082.3 (c)(1)).

6. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:
   a. Whether the proposed project has a significant impact on an identified tribal cultural resource.
   b. Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code §21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code §21082.3 (b)).

7. Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:
    a. The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or
    b. A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code §21080.3.2 (b)).

8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code §21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code §21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code §21082.3 (a)).

9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code §21084.3 (b). (Pub. Resources Code §21082.3 (e)).

10. Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:
    a. Avoidance and preservation of the resources in place, including, but not limited to:
        i. Planning and construction to avoid the resources and protect the cultural and natural context.
        ii. Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.
    b. Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:
        i. Protecting the cultural character and integrity of the resource.
        ii. Protecting the traditional use of the resource.
        iii. Protecting the confidentiality of the resource.
    c. Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.
    d. Protecting the resource. (Pub. Resource Code §21084.3 (b)).
    e. Please note that a federally recognized California Native American tribe or a non-federally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code §815.3 (c)).
    f. Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code §5097.991).

11. Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An Environmental Impact Report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:
    a. The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code §21080.3.1 and §21080.3.2 and concluded pursuant to Public Resources Code §21080.3.2.
    b. The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.
    c. The lead agency provided notice of the project to the tribe in compliance with Public Resources Code §21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code §21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code §65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code §65352.3 (a)(2)).
2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.
3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code §65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code §5097.9 and §5097.993 that are within the city's or county's jurisdiction. (Gov. Code §65352.3 (b)).
4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:
    a. The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
    b. Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (http://ohp.parks.ca.gov/?page_id=1068) for an archaeological records search. The records search will determine:
    a. If part or all of the APE has been previously surveyed for cultural resources.
    b. If any known cultural resources have already been recorded on or adjacent to the APE.
    c. If the probability is low, moderate, or high that cultural resources are located in the APE.
    d. If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
    a. The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.
    b. The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:
    a. A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.
    b. A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.
    a. Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, §15064.5(f) (CEQA Guidelines §15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.
    b. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.
    c. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code §7050.5, Public Resources Code §5097.98, and Cal. Code Regs., tit. 14, §15064.5, subdivisions (d) and (e) (CEQA Guidelines §15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions or need additional information, please contact me at my email address: Frank.Lienert@nahc.ca.gov.

Sincerely,

for

Frank Lienert
Associate Governmental Program Analyst

cc: State Clearinghouse

CALIFORNIA NATIVE PLANT SOCIETY
Riverside-San Bernardino Chapter

Terri Manuel, AICP, Planning Manager
City of Corona
Planning Division
400 S. Vicentia Avenue
Corona, CA 92882

September 14, 2018

Re: NOP for the General Plan Interim Technical Update Environmental Impact Report (EIR)

The Riverside-San Bernardino Chapter of the California Native Plant Society (CNPS) appreciates the opportunity to comment on this Notice of Preparation of an EIR for the Interim Technical Update of the General Plan in accordance with the California Environmental Quality Act (CEQA). The CNPS is a non-profit volunteer organization dedicated to the conservation and preservation of California's native flora through science, education, advocacy, horticulture, and land stewardship. The CNPS is concerned with the preservation and protection of unique natural ecosystems that contain the rich biodiversity that makes the California Floristic Province one of only thirty-five biodiversity hotspots on the planet (Myers 2000; Lamoreux et al. 2006; Pimm et al. 2014); 42% of the California Floristic Province's plant species are found nowhere else on the planet (Burge et al. 2016) and are extremely threatened or have lost most of their historic species ranges. The CNPS is a leader in the study, protection and preservation California's rare plants and plant communities.

CNPS requests integrated and detailed study of the following factors: Air Quality, Greenhouse Gas Emissions (including effects of nitrogen deposition on native plant communities), Biological Resources, Hydrology, and Land Use and Planning in relation to the section on Environmental Resources which addresses the management of open spaces and conservation of natural resources such as water, soils, plants and animals, viewscapes, air and energy. We also request a thorough and updated treatment on how the configuration, type, and location of different types of development (land uses, including location and type of power corridors) can influence Environmental Resources and Public Safety through their influence on ignition probability, ensuing wildfire, erosion, and flooding. In addition, we request careful study of the environmental, sociological, water quality, and recreational benefits of having a system of buffers between all types of development (including mining) and watercourses, conservation lands, and open space lands. For example, improved protection of watercourses by requiring buffers can result in healthier and more vibrant riparian corridors, improved water quality, room for fuel modification outside protected habitat, heightened qroundwater recharge, improved habitat for wildlife and habitat connectivity, more attractive veiwscapes, and room for a system of highly accessible regional trails.

Explain how cumulative impacts will be considered in this EIR. No future project should be fast-tracked without a careful study of cumulative impacts. Below we provide some specific recommendations.

1. **Plant and Plant Community Surveys.**
Describe how the programmatic EIR will affect the need for surveys of each undeveloped site submitted for development. To reveal cumulative impacts, each site must be surveyed and quantified for sensitive vegetation types, plants, and animals. A table of all sensitive plant and wildlife species shall be prepared, recognizing at a minimum those expected by analysis of the CNDDB, in addition to site surveys done at the appropriate time of year in non-drought years. For standards for surveying sites for an EIR, CDFG (2009) states that a survey for SPECIAL STATUS PLANT OR NATURAL COMMUNITY OBSERVATIONS should:
Record the following information for locations of each special status plant or natural community detected during a field survey of a project site.

• A detailed map (1:24,000 or larger) showing locations and boundaries of each special status species occurrence or natural community found as related to the proposed project. Mark occurrences and boundaries as accurately as possible. Locations documented by use of global positioning system (GPS) coordinates must include the datum[18] in which they were collected;

• The site-specific characteristics of occurrences, such as associated species, habitat and microhabitat, structure of vegetation, topographic features, soil type, texture, and soil parent material. If the species is associated with a wetland, provide a description of the direction of flow and integrity of surface or subsurface hydrology and adjacent off-site hydrological influences as appropriate;

• The number of individuals in each special status plant population as counted (if population is small) or estimated (if population is large);

• If applicable, information about the percentage of individuals in each life stage such as seedlings vs. reproductive individuals;

• The number of individuals of the species per unit area, identifying areas of relatively high, medium and low density of the species over the project site; and

• Digital images of the target species and representative habitats to support information and descriptions.

Vegetation maps. Plant communities should be classified and mapped to the alliance or association level using classification methods and membership rules according to *A Manual of California Vegetation, 2nd* Edition (2009) (MCV"). This is the current standard in assessing vegetation in California and should be conducted by qualified consultants and trained personnel. "Natural Communities [described in MCV2] with [state rarity] ranks of S1-S3 are considered Sensitive Natural Communities to be addressed in the environmental review processes of California Environmental Quality Act and its equivalents" (California Department of Fish and Wildlife, Natural Communities). For example, four sensitive plant communities at the base of the Santa Ana Mountains in Corona include "Sycamore Woodland", "Coast Live Oak Woodland", various alliances under the umbrella of "Riversidean Sage Scrub", and Scalebroom Scrub, *Lepidospartum squamatum* shrubland alliance, 32.070.00, CNPS G3, S3 (aka Riversidean alluvial fan sage scrub, alluvial scrub).

The document also states that: "Surveys should be comprehensive over the entire site, including areas that will be directly or indirectly impacted by the project. Adjoining properties should also be surveyed where direct or indirect project effects, such as those from fuel modification or herbicide application, could potentially extend offsite. Pre-project surveys restricted to known CNDDB rare plant locations may not identify all special status plants and communities present and do not provide a sufficient level of information to determine potential impacts."

2. **Use new plant community names, not just old names like Riversidean Sage Scrub which includes numerous plant communities, some of which are rarer than others).** Refer to the updated methods for naming native plant communities as described in the MCV2. The updated list of sensitive plant communities uses this newer classification system. Natural Communities with ranks of S1-S3 are considered Sensitive Natural Communities to be addressed in the environmental review processes of California Environmental Quality Act and its equivalents" (California Department of Fish and Wildlife, Natural Communities).

3. One of the many ever-rarer natural plant communities within the California Floristic Province is the alluvial variant of coastal sage scrub known commonly in our region as Alluvial Fan Scrub, Riversidean Alluvial Fan Sage Scrub, or Alluvial Scrub which is an especially rare form of alluvial scrub vegetation (Smith 1980, Holland 1986, Sawyer et al. 2009, Buck-Diaz et al. 2011). Under the newer nomenclature, this includes the *Lepidospartum squamatum* scrub alliance (scalebroom scrub) for which scale broom is the indicator species. This vegetation type has become limited in range due to historic agriculture, dams, mining, urban, and industrial development to the extent that it has been given special protection by the California Department of Fish and Wildlife (CDFW). The plant community also houses several listed plants (including long-spined spineflower) and listed animal species. Even if destruction of such a sensitive plant community, plant, or animal is allowed through the Western Riverside County Multiple Species Habitat Conservation Plan, this does not mean that there would not be substantial cumulative impacts to this community or rare taxa within it across the City and the Santa Ana River Watershed, or substantial downstream impacts on water quality, conserved lands, or developments. For example, scaleboom is an indicator of unstable, alluvial habitats along watercourses and floodplains that receive intermittent scouring flood flows. Rather that requiring that scalebroom be eradicated within the City, **under Goal 10.6 and the technical tables cited in 10.6.2.**, the GP should recognize the importance and dynamic aspects of habitat occupied by this plant. Describe how the GP could include a policy that points out the benefits of preserving scalebroom scrub rather than eliminating scalebroom.

4. The City of Corona has annexed land in the Santa Ana Mountains and foothills that contain the rare plant **Chaparral Nolina, *Nolina cismontana*** as well as a rare plant community that contains this as a dominant plant. Under Goal 10.6, this rare plant and rare plant community should be added to the text and technical tables 4.2-1 and 4.2-2. It is a Forest Service sensitive species and CNPS 1B.2 species: The Chaparral Nolina was included as part of the taxon *Nolina parryii* prior to 1995 (Hess & Dice 1995) and Roberts (2009) recognized this new taxon. Hess & Dice 1995 noted that the plant is threatened by development. The taxon was not widely recognized as separate from *N. parryi* until the publication of the second edition of the Jepson Manual (Baldwin et al. 2012). The authors of MCV2 (Sawyer et al. 2009) recognized the split but were not aware of the extensive population of *N. cismontana* in the area

recently annexed by Corona. In one area, the Chaparral Nolina appears to be co-dominant in the shrub layer in with *Adenostoma fasciculatum, Ceanothus tomentosus* and *Salvia mellifera*, or with *Ceanothus crassifolius, Cercocarpus betuloides, Fraxinus dipetala, Quercus berberidifolia, Heteromeles arbutifolia* and other chaparral shrubs, depending on the slope aspect.

5. **Consideration of increased air pollution and nitrogen deposition on native plants and native plant communities.** The EIR needs to provide an analysis on the effects of increased traffic and nitrogen deposition on rare plants and sensitive plant communities. Excess nitrogen feeds weedy grasses and facilitates type conversion of shrublands toward non-native grassland. Corona has been expanding and developing right up to the boundaries of the Cleveland National Forest, most of which is in very steep terrain and occupied by chaparral and other scrub vegetation. Much of Corona is in a region of high nitrogen deposition. Increased traffic near wildland areas will only make that worse (Allen et al. 2016, Talluto and Suding 2008, Valliere et al. 2017). The cumulative effects of expanding roads and development up to the boundaries of the National Forest, other conserved lands, and undeveloped land within MSHCP criteria cells needs to be address. How will this be incorporated?

6. **Effects of development, increased ignition frequency, habitat conversion on sensitive native plant plants and communities and downslope development.** EIR needs to analyze effects of more development close to the National Forest and other protected or conserved habitat. Development brings higher ignition frequencies and more frequent fire in a high fire hazard area. Healthy shrubland and riparian plant communities stabilize steep slopes and stream channels and mitigate against massive erosion events during storms. Many listed plants and animals live within these communities. Changes in natural fire intervals can lead to habitat conversion and build-up of flashy fuels that carry fire (see Haidinger and Keeley 1993, Keeley and Syphard 2017) into native vegetation communities. This leaves denuded slopes, stream banks, and habitats with less shrub and tree vegetation that form the backbone of habitats and stabilize landscapes. Increased fire frequency increases the incidence of unstable, unvegetated slopes and streambanks and this is especially unfortunate to downslope natural communities and human communities built on or in close proximity to watercourses and alluvial fans. After fire, the downslope communities are highly vulnerable to massive erosion events and mud flows. How will the EIR examine these potential effects of encroaching development? What sorts of policies will be considered to mitigate the effects of expanding development to the edge of wildlands? Explain the benefits of buffers. Describe the environmental, social, and long-term financial costs of developing up to the steep slopes rather than leaving buffers of gently sloping to flat land between wildlands development. The environmental, societal, and financial cost (negative impacts) of placing fuel modification on steep slopes, on conserved lands, or within the National Forest must be studied and described. Describe how the GP can include policy to encourage fuel modification to be placed within the footprint of developments. How can the GP better encourage firewise landscaping within developments to prevent spread of fire from houses to wildlands?

7. Under Goal 10.11, describe how it would benefit plant and animal dispersal to include Conservation Bedford Wash as a viable wildlife corridor between Temescal Wash and the Santa Ana Mountains.

8. Address the need for recreational trails but also address the impacts from recreational trails through wildland areas. Placement of trails and proper use of trails is critical to preservation and conservation of natural resources. Too many unofficial mountain bike and dirt bike trails are ravaging natural areas. Many bike trails are being cut through areas without permission. Describe and initiate policies that can control the creation of unofficial trails and while creating a system of sensitively place trail networks. Include a policy for educating the public on proper trail use and maintenance of trails.

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Sincerely,

Arlee M. Montalvo

Dr. Arlee Montalvo
Co-Conservation Chair
Riverside-San Bernardino Chapter CNPS
4477 Picacho Drive
Riverside, CA 92507

INNOVATING FOR A BETTER TOMORROW

SOUTHERN CALIFORNIA
ASSOCIATION OF GOVERNMENTS
900 Wilshire Blvd., Ste. 1700
Los Angeles, CA 90017
T: (213) 236-1800
www.scag.ca.gov

September 14, 2018

Ms. Terri Manuel, AICP, Planning Manager
City of Corona
400 S. Vicentia Avenue
Corona, California 92882
Phone: (909) 279-3670
E-mail: Terri.Manuel@coronaca.gov

RE: SCAG Comments on the Notice of Preparation of a Draft Environmental Impact Report for the City of Corona General Plan Update [SCAG NO. IGR9700]

Dear Ms. Manuel,

Thank you for submitting the Notice of Preparation of a Draft Environmental Impact Report for the City of Corona General Plan Update ("proposed project") to the Southern California Association of Governments (SCAG) for review and comment. SCAG is the authorized regional agency for Inter-Governmental Review (IGR) of programs proposed for Federal financial assistance and direct Federal development activities, pursuant to Presidential Executive Order 12372. Additionally, SCAG reviews the Environmental Impact Reports of projects of regional significance for consistency with regional plans pursuant to the California Environmental Quality Act (CEQA) and CEQA Guidelines.

SCAG is also the designated Regional Transportation Planning Agency under state law, and is responsible for preparation of the Regional Transportation Plan (RTP) including the Sustainable Communities Strategy (SCS) pursuant to Senate Bill (SB) 375. As the clearinghouse for regionally significant projects per Executive Order 12372, SCAG reviews the consistency of local plans, projects, and programs with regional plans.[1] SCAG's feedback is intended to assist local jurisdictions and project proponents to implement projects that have the potential to contribute to attainment of Regional Transportation Plan/Sustainable Community Strategies (RTP/SCS) goals and align with RTP/SCS policies.

SCAG staff has reviewed the Notice of Preparation of a Draft Environmental Impact Report for the City of Corona General Plan Update in Riverside County. The proposed project includes an update to the City's General Plan for the horizon year of 2040.

When available, please send environmental documentation to *SCAG's Los Angeles office in Los Angeles (900 Wilshire Boulevard, Ste. 1700, Los Angeles, California 90017) or by email to* au@scag.ca.gov providing, at a minimum, the full public comment period for review.

If you have any questions regarding the attached comments, please contact the Inter-Governmental Review (IGR) Program, attn.: Anita Au, Associate Regional Planner, at (213) 236-1874 or au@scag.ca.gov. Thank you.

Sincerely,

Ping Chang

Ping Chang
Acting Manager, Compliance and Performance Monitoring

[1] Lead agencies such as local jurisdictions have the sole discretion in determining a local project's consistency with the 2016 RTP/SCS for the purpose of determining consistency for CEQA. Any "consistency" finding by SCAG pursuant to the IGR process should not be construed as a determination of consistency with the 2016 RTP/SCS for CEQA.

COMMENTS ON THE NOTICE OF PREPARATION OF A DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE CITY OF CORONA GENERAL PLAN UPDATE [SCAG NO. IGR9700]

CONSISTENCY WITH RTP/SCS

SCAG reviews environmental documents for regionally significant projects for their consistency with the adopted RTP/SCS. For the purpose of determining consistency with CEQA, lead agencies such as local jurisdictions have the sole discretion in determining a local project's consistency with the RTP/SCS.

2016 RTP/SCS GOALS

The SCAG Regional Council adopted the 2016 RTP/SCS in April 2016. The 2016 RTP/SCS seeks to improve mobility, promote sustainability, facilitate economic development and preserve the quality of life for the residents in the region. The long-range visioning plan balances future mobility and housing needs with goals for the environment, the regional economy, social equity and environmental justice, and public health (see http://scagrtpscs.net/Pages/FINAL2016RTPSCS.aspx). The goals included in the 2016 RTP/SCS may be pertinent to the proposed project. These goals are meant to provide guidance for considering the proposed project within the context of regional goals and policies. Among the relevant goals of the 2016 RTP/SCS are the following:

SCAG 2016 RTP/SCS GOALS	
RTP/SCS G1:	*Align the plan investments and policies with improving regional economic development and competitiveness*
RTP/SCS G2:	*Maximize mobility and accessibility for all people and goods in the region*
RTP/SCS G3:	*Ensure travel safety and reliability for all people and goods in the region*
RTP/SCS G4:	*Preserve and ensure a sustainable regional transportation system*
RTP/SCS G5:	*Maximize the productivity of our transportation system*
RTP/SCS G6:	*Protect the environment and health for our residents by improving air quality and encouraging active transportation (e.g., bicycling and walking)*
RTP/SCS G7:	*Actively encourage and create incentives for energy efficiency, where possible*
RTP/SCS G8:	*Encourage land use and growth patterns that facilitate transit and active transportation*
RTP/SCS G9:	*Maximize the security of the regional transportation system through improved system monitoring, rapid recovery planning, and coordination with other security agencies**
	***SCAG does not yet have an agreed-upon security performance measure.**

For ease of review, we encourage the use of a side-by-side comparison of SCAG goals with discussions of the consistency, non-consistency or non-applicability of the goals and supportive analysis in a table format. Suggested format is as follows:

SCAG 2016 RTP/SCS GOALS		
	Goal	Analysis
RTP/SCS G1:	*Align the plan investments and policies with improving regional economic development and competitiveness*	*Consistent: Statement as to why;* *Not-Consistent: Statement as to why;* *Or* *Not Applicable: Statement as to why;* *DEIR page number reference*
RTP/SCS G2:	*Maximize mobility and accessibility for all people and goods in the region*	*Consistent: Statement as to why;* *Not-Consistent: Statement as to why;* *Or* *Not Applicable: Statement as to why;* *DEIR page number reference*
etc.		etc.

2016 RTP/SCS STRATEGIES

To achieve the goals of the 2016 RTP/SCS, a wide range of land use and transportation strategies are included in the 2016 RTP/SCS. Technical appendances of the 2016 RTP/SCS provide additional supporting information in detail. To view the 2016 RTP/SCS, please visit: http://scagrtpscs.net/Pages/FINAL2016RTPSCS.aspx. The 2016 RTP/SCS builds upon the progress from the 2012 RTP/SCS and continues to focus on integrated, coordinated, and balanced planning for land use and transportation that the SCAG region strives toward a more sustainable region, while the region meets and exceeds in meeting all of applicable statutory requirements pertinent to the 2016 RTP/SCS. These strategies within the regional context are provided as guidance for lead agencies such as local jurisdictions when the proposed project is under consideration.

DEMOGRAPHICS AND GROWTH FORECASTS

Local input plays an important role in developing a reasonable growth forecast for the 2016 RTP/SCS. SCAG used a bottom-up local review and input process and engaged local jurisdictions in establishing the base geographic and socioeconomic projections including population, household and employment. At the time of this letter, the most recently adopted SCAG jurisdictional-level growth forecasts that were developed in accordance with the bottom-up local review and input process consist of the 2020, 2035, and 2040 population, households and employment forecasts. To view them, please visit http://www.scag.ca.gov/Documents/2016GrowthForecastByJurisdiction.pdf. The growth forecasts for the region and applicable jurisdictions are below.

	Adopted SCAG Region Wide Forecasts			Adopted City of Corona Forecasts		
	Year 2020	Year 2035	Year 2040	Year 2020	Year 2035	Year 2040
Population	19,663,000	22,091,000	22,138,800	166,100	170,500	172,300
Households	6,458,000	7,325,000	7,412,300	49,500	51,300	52,000
Employment	8,414,000	9,441,000	9,871,500	74,300	82,300	88,400

MITIGATION MEASURES

SCAG staff recommends that you review the Final Program Environmental Impact Report (Final PEIR) for the 2016 RTP/SCS for guidance, as appropriate. SCAG's Regional Council certified the Final PEIR and adopted the associated Findings of Fact and a Statement of Overriding Considerations (FOF/SOC) and Mitigation Monitoring and Reporting Program (MMRP) on April 7, 2016 (please see: http://scagrtpscs.net/Pages/FINAL2016PEIR.aspx). The Final PEIR includes a list of project-level performance standards-based mitigation measures that may be considered for adoption and implementation by lead, responsible, or trustee agencies in the region, as applicable and feasible. Project-level mitigation measures are within responsibility, authority, and/or jurisdiction of project-implementing agency or other public agency serving as lead agency under CEQA in subsequent project- and site- specific design, CEQA review, and decision-making processes, to meet the performance standards for each of the CEQA resource categories.

COUNTY OF RIVERSIDE
TRANSPORTATION AND LAND MANAGEMENT AGENCY

Patricia Romo, P.E.
Director of Transportation

Transportation Department

Mojahed Salama
Richard Lantis
Deputy Directors of Transportation

September 17, 2018

Terri Manuel, AICP, Planning Manager

City of Corona, Community Development Department

400 South Vicentia Avenue

Corona, CA 92882

RE: Notice of Preparation and Scoping Meeting for the City of Corona General Plan Interim Technical Update Environmental Impact Report

Thank you for the opportunity to comment for the Notice of Preparation (NOP) for the City of Corona General Plan Interim Technical Update Environmental Impact Report (EIR).

Based on a comparison between the County's General Plan Circulation Element and the City of Corona Circulation Element the inconsistencies between the County and City Circulation Elements are related to roadway widths and/or number of lanes at a number of locations both at the City/County boundary and within the City's Sphere of Influence.

The City Circulation Element classifies roadways with higher or lower designations than their respective counterparts on the County Circulation Element.

The Riverside County Transportation Department (County) requests the City to coordinate changes to its Circulation Element with County Transportation and Planning Departments to address inter-jurisdictional classification and transitions as well.

4080 Lemon Street, 8th Floor · Riverside, CA 92501 · (951) 955-6740
P.O. Box 1090 · Riverside, CA 92502-1090 · FAX (951) 955-3198

Thank you again for the opportunity to review the NOP. We look forward to receiving the Draft EIR for the project. Please contact me at (951) 955-2016 with questions or comments.

Sincerely,

RWill

Russell Williams
Development Review Manager

RUW: KKT/TT

cc: Juan C. Perez, Director of Transportation and Land Management
Patricia Romo, Director of Transportation
Richard Lantis, Deputy Director of Transportation

4080 Lemon Street, 8th Floor · Riverside, CA 92501 · (951) 955-6740
P.O. Box 1090 · Riverside, CA 92502-1090 · FAX (951) 955-3198

STATE OF CALIFORNIA

GOVERNOR'S OFFICE *of* PLANNING AND RESEARCH

EDMUND G. BROWN JR.
GOVERNOR

KEN ALEX
DIRECTOR

RECEIVED
AUG 20 2018
COMMUNITY DEVELOPMENT DEPT

Notice of Preparation

August 15, 2018

To: Reviewing Agencies

Re: Corona General Plan Update
SCH# 2018081039

Attached for your review and comment is the Notice of Preparation (NOP) for the Corona General Plan Update draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

Terri Manuel
City of Corona
400 S. Vincentia Avenue
Corona, CA 92882

with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

Scott Morgan
Director, State Clearinghouse

Attachments
cc: Lead Agency

Document Details Report
State Clearinghouse Data Base

SCH# **2018081039**
Project Title Corona General Plan Update
Lead Agency Corona, City of

Type **NOP** Notice of Preparation

Description The City of Corona is in process of preparing a technical update to its existing General Plan. The update will guide the City's development and conservation for the next 20 years to 2040. The purpose of the corona General Plan is to create a policy framework that articulates a vision for the city's longterm physical form and development, while preserving and enhancing the quality of life for Corona's residents.

Lead Agency Contact

Name Terri Manuel
Agency City of Corona
Phone 951-736-2299 ***Fax***
email
Address 400 S. Vincentia Avenue
City Corona ***State*** CA ***Zip*** 92882

Project Location

County Riverside
City Corona
Region
Cross Streets Citywide
Lat / Long
Parcel No. Various
Township ***Range*** ***Section*** ***Base***

Proximity to:

Highways SR-91, I-15
Airports Corona Municipal Airport
Railways BNSF
Waterways Various, Santa Ana River
Schools Various
Land Use Various

Project Issues

Reviewing Agencies

Date Received 08/15/2018 ***Start of Review*** 08/15/2018 ***End of Review*** 09/13/2018

Note: Blanks in data fields result from insufficient information provided by lead agency.

Print Form

Appendix C

2018081039

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH #

Project Title: Corona General Plan Update

Lead Agency: City of Corona | Contact Person: Terri Manuel
Mailing Address: 400 S. Vicentia Avenue | Phone: (951) 736-2299
City: Corona | Zip: 92882 | County: Riverside

Project Location: County: Riverside | City/Nearest Community: Corona
Cross Streets: Citywide | Zip Code:
Longitude/Latitude (degrees, minutes and seconds): ___° ___′ ___″ N / ___° ___′ ___″ W Total Acres:
Assessor's Parcel No.: Various | Section: | Twp.: | Range: | Base:
Within 2 Miles: State Hwy #: SR-91, I-15 | Waterways: Various, Santa Ana River
Airports: Corona Municipal Airport | Railways: BNSF | Schools: Various

Document Type:

CEQA: ☒ NOP ☐ Early Cons ☐ Neg Dec ☐ Mit Neg Dec ☐ Draft EIR ☐ Supplement/Subsequent EIR (Prior SCH No.) ____ Other: ____

NEPA: ☐ NOI ☐ EA ☐ Draft EIS ☐ FONSI

Other: ☐ Joint Document ☐ Final Document ☐ Other

Governor's Office of Planning & Research
AUG 15 2018
STATE CLEARINGHOUSE

Local Action Type:

- ☒ General Plan Update
- ☐ General Plan Amendment
- ☐ General Plan Element
- ☐ Community Plan
- ☐ Specific Plan
- ☐ Master Plan
- ☐ Planned Unit Development
- ☐ Site Plan
- ☐ Rezone
- ☐ Prezone
- ☐ Use Permit
- ☐ Land Division (Subdivision, etc.)
- ☐ Annexation
- ☐ Redevelopment
- ☐ Coastal Permit
- ☐ Other:

Development Type:

- ☒ Residential: Units ____ Acres ____
- ☒ Office: Sq.ft. ____ Acres ____ Employees ____
- ☒ Commercial: Sq.ft. ____ Acres ____ Employees ____
- ☒ Industrial: Sq.ft. ____ Acres ____ Employees ____
- ☒ Educational:
- ☒ Recreational:
- ☐ Water Facilities: Type ____ MGD ____
- ☐ Transportation: Type
- ☐ Mining: Mineral
- ☐ Power: Type ____ MW
- ☐ Waste Treatment: Type ____ MGD
- ☐ Hazardous Waste: Type
- ☐ Other:

Project Issues Discussed in Document:

- ☒ Aesthetic/Visual
- ☒ Agricultural Land
- ☒ Air Quality
- ☒ Archeological/Historical
- ☒ Biological Resources
- ☐ Coastal Zone
- ☒ Drainage/Absorption
- ☐ Economic/Jobs
- ☐ Fiscal
- ☒ Flood Plain/Flooding
- ☒ Forest Land/Fire Hazard
- ☒ Geologic/Seismic
- ☒ Minerals
- ☒ Noise
- ☒ Population/Housing Balance
- ☒ Public Services/Facilities
- ☒ Recreation/Parks
- ☒ Schools/Universities
- ☒ Septic Systems
- ☒ Sewer Capacity
- ☒ Soil Erosion/Compaction/Grading
- ☒ Solid Waste
- ☒ Toxic/Hazardous
- ☒ Traffic/Circulation
- ☐ Vegetation
- ☒ Water Quality
- ☒ Water Supply/Groundwater
- ☒ Wetland/Riparian
- ☐ Growth Inducement
- ☒ Land Use
- ☐ Cumulative Effects
- ☐ Other:

Present Land Use/Zoning/General Plan Designation:
Various

Project Description: *(please use a separate page if necessary)*
The City of Corona is in the process of preparing a technical update to its existing General Plan. The update will guide the City's development and conservation for the next 20 years to 2040. The purpose of the Corona General Plan is to create a policy framework that articulates a vision for the city's longterm physical form and development, while preserving and enhancing the quality of life for Corona's residents.

Note: The State Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

Revised 2010

NOP Distribution List SF

County: Riverside

SCH# 2018081059

Resources Agency

- [x] **Resources Agency**
  Nadell Gayou
  - [ ] **Dept. of Boating & Waterways**
    Denise Peterson
  - [ ] **California Coastal Commission**
    Allyson Hitt
  - [ ] **Colorado River Board**
    Elsa Contreras
  - [x] **Dept. of Conservation**
    Crina Chan
  - [x] **Cal Fire**
    Dan Foster
  - [ ] **Central Valley Flood Protection Board**
    James Herota
  - [ ] **Office of Historic Preservation**
    Ron Parsons
- [x] **Dept of Parks & Recreation**
  Environmental Stewardship Section
  - [ ] **S.F. Bay Conservation & Dev't. Comm.**
    Steve Goldbeck
  - [ ] **Dept. of Water Resources**
    Resources Agency
    Nadell Gayou

Fish and Game

- [ ] **Depart. of Fish & Wildlife**
  Scott Flint
  Environmental Services Division
- [ ] **Fish & Wildlife Region 1**
  Curt Babcock
- [ ] **Fish & Wildlife Region 1E**
  Laurie Harnsberger
- [ ] **Fish & Wildlife Region 2**
  Jeff Drongesen
- [ ] **Fish & Wildlife Region 3**
  Craig Weightman
- [ ] **Fish & Wildlife Region 4**
  Julie Vance
- [ ] **Fish & Wildlife Region 5**
  Leslie Newton-Reed
  Habitat Conservation Program
- [x] **Fish & Wildlife Region 6**
  Tiffany Ellis
  Habitat Conservation Program
- [ ] **Fish & Wildlife Region 6 I/M**
  Heidi Calvert
  Inyo/Mono, Habitat Conservation Program
- [ ] **Dept. of Fish & Wildlife M**
  William Paznokas
  Marine Region

Other Departments

- [ ] **California Department of Education**
  Lesley Taylor
- [x] **OES (Office of Emergency Services)**
  Monique Wilber
- [ ] **Food & Agriculture**
  Sandra Schubert
  Dept. of Food and Agriculture
- [ ] **Dept. of General Services**
  Cathy Buck
  Environmental Services Section
- [x] **Housing & Comm. Dev.**
  CEQA Coordinator
  Housing Policy Division

Independent Commissions,Boards

- [ ] **Delta Protection Commission**
  Erik Vink
- [ ] **Delta Stewardship Council**
  Anthony Navasero
- [x] **California Energy Commission**
  Eric Knight
- [x] **Native American Heritage Comm.**
  Debbie Treadway
  - [x] **Public Utilities Commission**
    Supervisor
  - [ ] **Santa Monica Bay Restoration**
    Guangyu Wang
  - [ ] **State Lands Commission**
    Jennifer Deleong
  - [ ] **Tahoe Regional Planning Agency (TRPA)**
    Cherry Jacques

Cal State Transportation Agency CalSTA

- [x] **Caltrans - Division of Aeronautics**
  Philip Crimmins
- [ ] **Caltrans – Planning HQ LD-IGR**
  Christian Bushong
- [x] **California Highway Patrol**
  Suzann Ikeuchi
  Office of Special Projects

Dept. of Transportation

- [ ] **Caltrans, District 1**
  Rex Jackman
- [ ] **Caltrans, District 2**
  Marcelino Gonzalez
- [ ] **Caltrans, District 3**
  Susan Zanchi - North
- [ ] **Caltrans, District 4**
  Patricia Maurice
- [ ] **Caltrans, District 5**
  Larry Newland
- [ ] **Caltrans, District 6**
  Michael Navarro
- [ ] **Caltrans, District 7**
  Dianna Watson
- [x] **Caltrans, District 8**
  Mark Roberts
- [ ] **Caltrans, District 9**
  Gayle Rosander
- [ ] **Caltrans, District 10**
  Tom Dumas
- [ ] **Caltrans, District 11**
  Jacob Armstrong
- [ ] **Caltrans, District 12**
  Maureen El Harake

Cal EPA

Air Resources Board

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  - [ ] **Transportation Projects**
    Nesamani Kalandiyur
  - [ ] **Industrial/Energy Projects**
    Mike Tollstrup
- [ ] **California Department of Resources, Recycling & Recovery**
  Kevin Taylor/Jeff Esquivel
- [ ] **State Water Resources Control Board**
  Regional Programs Unit
  Division of Financial Assistance
- [ ] **State Water Resources Control Board**
  Cindy Forbes – Asst Deputy
  Division of Drinking Water
- [ ] **State Water Resources Control Board**
  Div. Drinking Water #________
- [ ] **State Water Resources Control Board**
  Student Intern, 401 Water Quality Certification Unit
  Division of Water Quality
- [ ] **State Water Resouces Control Board**
  Phil Crader
  Division of Water Rights
- [ ] **Dept. of Toxic Substances Control Reg. #**________
  CEQA Tracking Center
- [ ] **Department of Pesticide Regulation**

Regional Water Quality Control Board (RWQCB)

- [ ] **RWQCB 1**
  Cathleen Hudson
  North Coast Region (1)
- [ ] **RWQCB 2**
  Environmental Document Coordinator
  San Francisco Bay Region (2)
- [ ] **RWQCB 3**
  Central Coast Region (3)
- [ ] **RWQCB 4**
  Teresa Rodgers
  Los Angeles Region (4)
- [ ] **RWQCB 5S**
  Central Valley Region (5)
  - [ ] **RWQCB 5F**
    Central Valley Region (5
    Fresno Branch Office
  - [ ] **RWQCB 5R**
    Central Valley Region (5
    Redding Branch Office
- [ ] **RWQCB 6**
  Lahontan Region (6)
  - [ ] **RWQCB 6V**
    Lahontan Region (6)
    Victorville Branch Office
- [ ] **RWQCB 7**
  Colorado River Basin Region (7
- [x] **RWQCB 8**
  Santa Ana Region (8)
- [ ] **RWQCB 9**
  San Diego Region (9)

- [ ] **Other** ________
- [ ] ________
  Conservancy

Last Updated 5/22/18

Appendix C Climate Action Plan and Screening Tables

Appendices

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CITY OF CORONA

CLIMATE ACTION PLAN UPDATE

March 2019

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CITY OF CORONA

CLIMATE ACTION PLAN UPDATE

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Funded by:

March 2019

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Executive Summary

The City of Corona (City) is committed to providing a more livable, equitable, and economically vibrant community through the reduction of greenhouse gas (GHG) emissions. By using energy more efficiently, harnessing renewable energy to power buildings, recycling waste, and enhancing access to sustainable transportation modes, the City will keep dollars in the local economy, create jobs, and improve the community's quality of life. The efforts towards increasing the reduction of City-wide greenhouse gas emissions described in this report would be done in coordination with the City's other planning and land use decisions. Through the Climate Action Plan Update (CAP Update), the City has established goals and policies that incorporate environmental responsibility into the everyday management of its community operations. The following presents a brief summary of the steps taken to prepare this CAP Update.

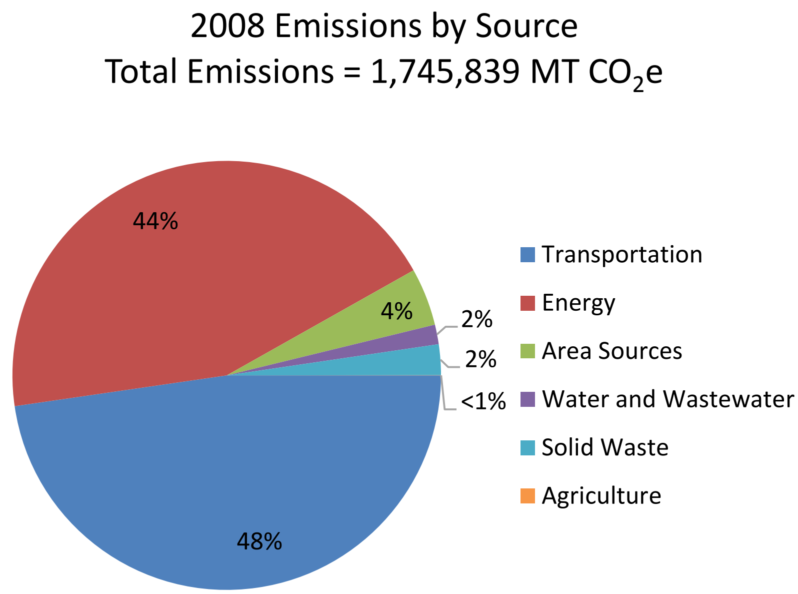
S.1 Inventory

The first step in completing the CAP Update was to update the City's GHG emissions inventory. The City completed a baseline year 2008 GHG inventory as part of the Corona Climate Action Plan (CAP) that was adopted in 2012. The City emitted approximately 1.7 million metric tons carbon dioxide equivalent (MMT CO_2e) in 2008. The largest portion of the City's 2008 emissions were from transportation (48 percent), followed by emissions from electricity and natural gas use in buildings (44 percent). For the purposes of CAP Update the City completed a 2016 emissions inventory for community-wide sectors. Figure ES-1 shows a sector level comparison of results for the 2008 and 2016 inventories.

The 2016 inventory indicated that the City emitted approximately 1.1 MMT CO_2e, which is approximately 35 percent lower than 2008 levels of emissions. The largest portion of emissions in the 2016 inventory came from the transportation sector which was 46 percent of the City's total GHG emissions. This is approximately a 1 percent reduction compared to the 2008 emissions inventory. Commercial and residential energy (both electricity and natural gas) uses were the second and third largest contributor of GHG emissions with 31 percent and 16 percent of total emissions, respectively which is also approximately 1 percent reduction of emissions when compared with 2008.

Solid waste accounted for 5 percent of total GHG emissions in 2016 (Solid waste was 2 percent in 2008). This was an increase in emissions of approximately 20,000 MT CO_2e.

Water-related GHG emissions accounted for 2 percent of total GHG emissions, and wastewater and off-road sectors emitted less than 1 percent. These levels of emissions are approximately the same when compared with the 2008 emissions inventory.



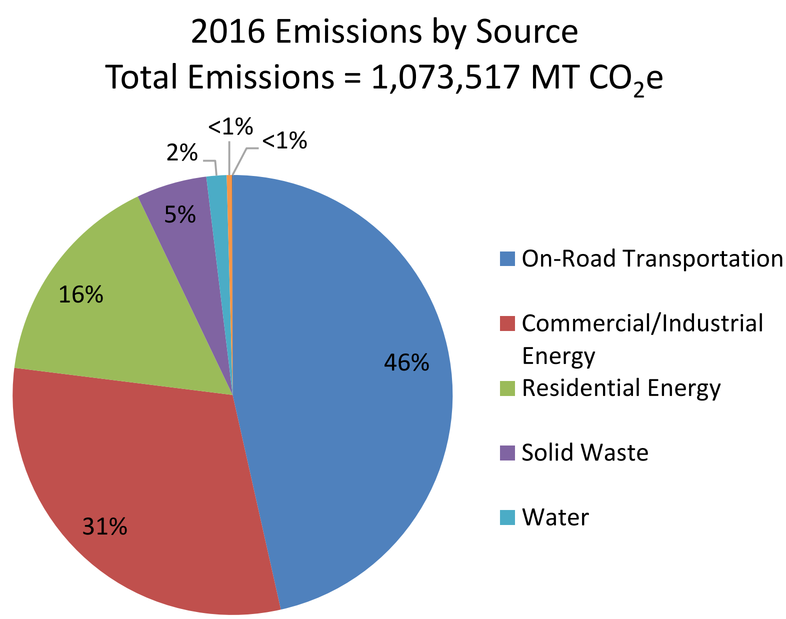


Figure ES-1: Community GHG Emissions by Sector for Years 2008 and 2016

S.2 Forecast and Target Setting

The next step after conducting the 2016 GHG inventory update was to estimate future emissions from different sectors in the city and to establish GHG reduction targets.

The City's future emissions were estimated using demographic indicators such as households and jobs growth. Growth indicators used are shown by sector in Table ES-1.

Table ES-1: Growth Indicators for 2016 and 2040

Sector	Demographic Indicator	2016	2040	2016–2040 CAGR[1] (percentage)
Residential Energy	Households	46,979	52,297	0.45
Commercial/ Industrial Energy	Jobs	70,972	84,395	0.72
N/A[2]	Population	165,366	184,086	0.45
Solid Waste, Water, Wastewater, and Off-road Sources	Service Population (Population + Jobs)	236,338	268,481	0.53
Transportation (Gasoline)	Vehicle Miles Traveled	1,169,706,600	1,336,928,145	0.56
Transportation (Diesel)	Vehicle Miles Traveled	150,934,699	177,578,872	0.68

Source: City of Corona General Plan Update, 2018

1 Compound annual growth rate.

2 Not Applicable. Population data are shown for informational purposes but are not used for forecasting any sector.

Future emissions estimates also included reductions that would happen with implementation of legislation adopted at the State level. That is, some level of emission reduction is anticipated within Corona as a result of policies implemented at the State level, including:

- Low Carbon Fuel Standards
- Assembly Bill (AB) 1493 and Advanced Clean Cars
- California Building Code Title 24
- Renewable Portfolio Standard

The resulting projected emissions are considered an "adjusted" business-as-usual (Adjusted BAU) forecast. Figure ES-2 shows historic emissions and Adjusted BAU forecasts.

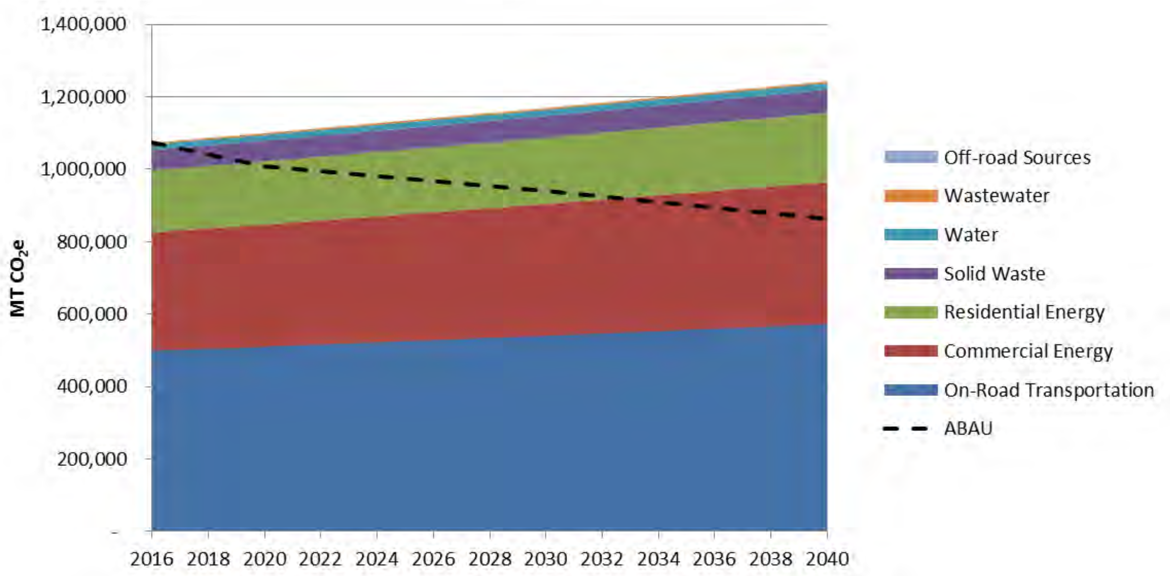


Figure ES-2: BAU and ABAU Emissions Forecast

ABAU: adjusted business as usual
BAU: business as usual
MT CO_2e = metric tons of carbon dioxide equivalent

GHG reductions targets were identified for 2020, 2030, and 2040. The City has established the following reduction targets that are consistent with current regulation.

Consistent with the State's adopted AB 32 GHG reduction target, the City has set a goal to reduce emissions to 1990 levels by the year 2020. This target was calculated as a 15-percent decrease from 2008 levels, as recommended in the AB 32 Scoping Plan. An interim goal for the City was created for 2030, which was to reduce emissions to 49 percent below 2008 levels. A longer-term goal was established for 2040, which was to reduce emissions to 66 percent below 2008 levels. The interim and longer-term goals would put the Corona on a path toward the State's long-term goal to reduce emissions 80 percent below 1990 levels by 2050 (Table ES-2).

Table ES-2: Mass GHG Reduction Targets for Community Emissions

Strategy	Target
2020 Target	15% below 2008 levels
2020 Emissions Goal (MT CO_2e)	1,483,963
2030 Target	49% below 2008 levels
2030 Emissions Goal (MT CO_2e)	890,378
2040 Target	66% below 2008 levels
2040 Emissions Goal (MT CO_2e)	593,585

Source: SEEC ClearPath Tool for the City of Corona, 2018.
MT CO_2e = metric tons of carbon dioxide equivalent

S.3 Reduction Measures

The City has already demonstrated its commitment to conserve energy and reduce emissions through a variety of programs and policies. In order to reach the reduction target, the City would also implement the additional local reduction measures described in this report. These measures encourage energy efficiency, water conservation, alternative transportation, solid waste reduction, and clean energy. Table ES-3 summarizes the reductions from measures that would be implemented to meet the Community GHG reduction goals for 2030 and 2040.

Table ES-3: Summary of Community GHG Reduction Strategies and Emission Reductions

Goals and Measures	2030 Emission Reductions (MT CO_2e)	2040 Emission Reductions (MT CO_2e)
Goal 1: Increase Energy Efficiency in Existing Residential Units		
1.1: Energy Efficiency Training, Education, and Recognition in the Residential Sector	Supporting Measure[1]	
1.2: Increase Community Participation in Existing Energy Efficiency Programs	3,715	3,885
1.3: Home Energy Evaluations	Supporting Measure[1]	
1.4: Residential Home Energy Renovations	2,276	2,380
Goal 2: Increase Energy Efficiency in New Residential Units		
2.1: Exceed Energy Efficiency Standards	3,918	4,097
Goal 3: Increase Energy Efficiency in Existing Commercial Units		
3.1: Energy Efficiency Training, Education, and Recognition in Commercial Sector	Supporting Measure[1]	
3.2: Increase Business Participation in Existing Energy Efficiency Programs	7,031	7,557
3.3: Nonresidential Building Energy Audits	Supporting Measure[1]	
3.4: Nonresidential Building Retrofits	37,592	40,406
Goal 4: Increase Energy Efficiency in New Commercial Units		
4.1: Exceed Energy Efficiency Standards	5,742	6,172
Goal 5: Increase Energy Efficiency through Water Efficiency		
5.1: Water Efficiency through Enhanced Implementation of Senate Bill X7-7	1,524	1,607
5.2: Exceed Water Efficiency Standards	Supporting Measure[1]	
Goal 6: Decrease Energy Demand through Reducing Urban Heat Island Effect per Title 24 Requirements		
6.1: Tree Planting for Shading and Energy Saving	Supporting Measure[1]	
6.2: Light-Reflecting Surfaces for Energy Saving	601	633
Goal 7: Decrease Greenhouse Gas Emissions through Reducing Vehicle Miles Traveled		
7.1: Alternative Transportation Options	53,944	57,849
7.2: Implement Bicycle Master Plan to Expand Bike Routes around the City	482	517
Goal 8: Decrease Greenhouse Gas Emissions through Reducing Solid Waste Generation		
8.1: Reduce Waste to Landfills	20,271	21,378

Table ES-3: Summary of Community GHG Reduction Strategies and Emission Reductions

Goals and Measures	2030 Emission Reductions (MT CO_2e)	2040 Emission Reductions (MT CO_2e)
Goal 9: Decrease Greenhouse Gas Emissions through Increasing Clean Energy Use		
9.1: Clean Energy	21,999	21,999
Total Community Measures without CCA	**159,096**	**168,481**
Goal 9: Decrease Greenhouse Gas Emissions through Increasing Clean Energy Use		
9.2: Join CCA Program	214,052	230,348
Total Community Measures with CCA	**373,148**	**398,829**

Note: [1] Supporting Measures are the measures that will reduce emissions but cannot be quantified. These measures enhance the quantifiable measures through education and outreach programs.
CCA = Community Choice Aggregation (See pages 13 and 40 for explanation of CCA)
MT CO_2e = metric tons of carbon dioxide equivalent

S.4 Adaptation

The City recognizes that planning sustainably is more than reducing GHG emissions; it also requires being prepared for changes that would impact the community's quality of life, its use of resources, and its economy. Preparedness, or adaptation, efforts seek to reduce vulnerability and increase the local capacity to adapt to changes. Corona may expect increased temperatures, variable precipitation, and increased extreme weather events. The City has developed adaptation strategies to reduce potential impacts and build resiliency among the communities. The adaptation strategies focus on public health and safety, electricity demand, water availability, infrastructure damage, wildfire, and social equity.

S.5 Implementation

Finally, the CAP in itself is not enough to meet the reduction goals without a commitment to implementation. The Implementation Chapter of the CAP Update identifies the process for implementing and monitoring the strategies described. Figure ES-3 summarizes the six-step process.

Figure ES-3: Process of Implementing the Climate Action Plan

Through successful implementation of this CAP Update, the City will demonstrate the potential economic, social, and environmental benefits of reducing GHG emissions and providing environmental stewardship within the community.

1.0 Introduction

The City of Corona (City) is committed to planning sustainably for the future while ensuring a livable, equitable, and economically vibrant community. Planning sustainably includes acknowledging the local role in climate change and how the City can mitigate their emissions and prepare for (i.e., adapt to) anticipated climate-related changes. By using energy more efficiently, harnessing renewable energy to power buildings, recycling waste, and enhancing access to sustainable transportation modes, Corona can keep dollars in its local economy, create new green jobs, and improve the community's health, safety, and welfare in addition to addressing climate change. To that end, the City has implemented a number of sustainability and conservation efforts and seeks to continue those efforts through local planning and partnerships. This Climate Action Plan Update (CAP Update) integrates the City's past and current efforts with future efforts to grow and thrive sustainably.

1.1 Climate Change Science

Climate change is a term used to describe large-scale shifts in historically observed patterns in earth's climate system. Although the climate has historically responded to natural drivers, recent climate change has been unequivocally linked to increasing concentrations of greenhouse gases (GHGs) in earth's atmosphere.

Gases that trap heat in the atmosphere are called GHGs because they transform the light of the sun into heat, similar to the glass walls of a greenhouse. Human-generated GHG emissions significantly contribute to the changes in the global climate, which have a number of physical and environmental effects. Effects associated with global climate change include sea level rise, an increase in the frequency and intensity of droughts, and increased temperature. Increased GHG emissions are largely the result of the increase in the combustion of fossil fuels.

The Intergovernmental Panel on Climate Change (IPCC)[1] assesses scientific, technical, and socioeconomic information relevant to the understanding of climate change, its potential impacts, and options for adaptation and mitigation. The IPCC identifies six key GHG compounds: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), perfluorocarbons (PFC), sulfur hexafluoride (SF_6), and hydrofluorocarbons (HFC). Each GHG has a different capacity to trap heat, and therefore, GHG emissions are generally reported in metric tons (MT) of carbon dioxide equivalent (CO_2e). Non-CO_2 emissions are converted to a CO_2e using each GHG's Global Warming Potential (GWP). IPCC defines the GWP of various GHG emissions on a normalized scale that recasts all GHG emissions in terms of CO_2e, which compares the gas in question to that of the same mass of CO_2 (CO_2 has a GWP of 1 by definition). Common GHGs included in the CAP Update are CO_2, CH_4, and N_2O, which are the GHGs that most commonly result from human activities, and are detailed below.

Carbon Dioxide is the most important anthropogenic GHG and accounts for more than 75 percent of all GHG emissions caused by humans. Its atmospheric lifetime of 50–200 years ensures that atmospheric concentrations of CO_2 will remain elevated for decades, even after mitigation efforts to

[1] Intergovernmental Panel on Climate Change (IPCC) https://www.ipcc.ch/ (accessed on November 15, 2018).

reduce GHG concentrations are implemented. The primary sources of anthropogenic CO_2 in the atmosphere include the burning of fossil fuels (including motor vehicles), gas flaring, cement production, and land use changes (e.g., deforestation, oxidation of elemental carbon). Transportation is the single largest source of CO_2 in California; which is primarily comprised of on-road travel. Electricity production, industrial, and residential sources also contribute to CO_2 emissions in California.[2] CO_2 can be removed from the atmosphere by photosynthetic organisms (e.g., plants and certain bacteria). Atmospheric CO_2 has increased from a preindustrial concentration of 280 parts per million (ppm) to 408 ppm in 2018.[3]

Methane (CH_4), the main component of natural gas, is the second most abundant GHG and has a GWP of 25. Agriculture accounts for the majority of methane emissions in California, resulting primarily from livestock enteric fermentation and manure management. Industrial sources and landfills are also sources of CH_4. Other sources contribute only a small fraction to CH_4 emissions including residential, transportation, electricity generation, and commercial sources.[4]Certain land uses also function as a both a source and sink for CH_4. For example, the primary terrestrial source of CH_4 are wetlands, whereas undisturbed, aerobic soils act as a CH_4 sink (i.e., they remove CH_4 from the atmosphere). Atmospheric CH_4 has increased from a pre-industrial concentration of 715 parts per billion (ppb) to 1,860 ppb in 2018.[5]

Nitrous Oxide (N_2O) is a powerful GHG, with a GWP of 298. In the United States, more than 70 percent of N_2O emissions are related to agricultural soil management practices, particularly fertilizer application. Agriculture accounts for the majority of N_2O emissions, primarily from fertilizer and manure added to soil. Commercial and residential use of nitrogen fertilizer on turf and transportation (through the combustion of fossil fuels) are also major sources of N_2O. Industrial sources of N_2O include solid waste and wastewater treatment, manufacturing, refining and other sources.[6] N_2O concentrations in the atmosphere have increased nearly 21 percent, from pre-industrial levels of 270 ppb to 330 ppb in 2018.[7]

1.2 Benefits of the CAP

This CAP Update, while addressing climate change, also benefits Corona in many direct and indirect ways.

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[2] California Air Resources Board, 2016 Carbon Dioxide (CO_2) https://www.arb.ca.gov/cc/inventory/background/co2.htm (accessed February 13, 2019)

[3] National Oceanic and Atmospheric Administration (NOAA). Annual Greenhouse Gas Index, Recent Monthly Average CO2. Website: https://www.esrl.noaa.gov/gmd/ccgg/trends/ (accessed December 26, 2018).

[4] California Air Resources Board, 2016 Methane (CH_4) https://www.arb.ca.gov/cc/inventory/background/ch4.htm (accessed February 13, 2019)

[5] NOAA, Annual Greenhouse Gas Index, Recent Monthly Mean CH_4. Website: https://www.esrl.noaa.gov/gmd/ccgg/trends_ch4/ (accessed December 26, 2018).

[6] California Air Resources Board, 2016 Nitrous Oxide (N_2O) https://www.arb.ca.gov/cc/inventory/background/n2o.htm (accessed February 13, 2019)

[7] NOAA, Annual Greenhouse Gas Index, Graph of N_2O Concentration. Website: https://www.esrl.noaa.gov/gmd/aggi/aggi.fig2.png (accessed December 26, 2018).

- **Local Control** — This CAP Update allows the city to identify strategies to reduce resource consumption, costs, and GHG emissions in all economic sectors in a way that maintains local control over the issues and fits the character of the community. It also may position Corona for funding to implement programs tied to climate goals.
- **Energy and Resource Efficiency** — This CAP Update identifies opportunities for the City to increase energy efficiency and lower GHG emissions in a manner that is most feasible in the community. Reducing energy consumption through increasing the efficiency of energy technologies, reducing energy use, and using alternative sustainable sources of energy are effective ways to reduce GHG emissions. Energy efficiency also provides opportunities for cost-savings.
- **Increased Public Health** — Many of the GHG reduction strategies identified in this CAP Update also have local public health benefits. Benefits include local air quality improvements; creating a more active community through implementing sustainable living practices; and reducing health risks, such as heat stroke, elevated by climate change impacts such as increased extreme heat days.
- **Demonstrating Consistency with State GHG Reduction Goals** — A GHG reduction plan may be used as GHG mitigation in a General Plan to demonstrate that Corona is aligned with State goals for reducing GHG emissions to a level less than cumulatively considerable.
- **Meeting California Environmental Quality Act Requirements** — California Environmental Quality Act (CEQA) requires review of impacts from GHG emissions. A Qualified GHG reduction plan may be used in future development projects as the GHG analysis for the projects' CEQA documents, resulting in greater certainty for developers and cost-effectiveness for developers and City staff.

1.3 Regulatory Setting

In an effort to stabilize GHG emissions and to reduce impacts associated with climate change, international agreements, as well as federal and State actions were implemented beginning as early as 1988. The government agencies discussed below work jointly, as well as individually, to address GHG emissions through legislation, regulations, planning, policy-making, education, and a variety of programs.

1.3.1 Federal

1.3.1.1 Clean Air Act

In 2007, through *Massachusetts v. Environmental Protection Agency* (Docket No. 05–1120), the United States Supreme Court held that the United States Environmental Protection Agency (USEPA) has authority to regulate GHGs. As such, the United States Supreme Court ruled that the USEPA should be required to regulate carbon dioxide and other GHGs as pollutants under Section 202(a)(1) of the federal Clean Air Act.

1.3.2 State

1.3.2.1 California Air Resources Board Standards and Programs

The California Air Resources Board (CARB), a part of the California Environmental Protection Agency, is responsible for the coordination and administration of both federal and State air pollution control and climate change programs within California. In this capacity, CARB conducts research, sets State ambient air quality standards (California Ambient Air Quality Standards), compiles emission inventories, develops suggested control measures, and provides oversight of local programs. CARB establishes emissions standards for motor vehicles sold in California, consumer products, and various types of commercial equipment.

1.3.2.2 Executive Order S-3-05

On June 1, 2005, California Governor Arnold Schwarzenegger announced through Executive Order S-3-05, the following GHG emissions targets:

- By 2010, California shall reduce GHG emissions to 2000 levels.
- By 2020, California shall reduce GHG emissions to 1990 levels.
- By 2050, California shall reduce GHG emissions to 80 percent below 1990 levels.

Executive Order S-3-05 also laid out responsibilities among State agencies for implementation and for reporting on progress toward the targets.

1.3.2.3 Executive Order B-30-15

On April 29, 2015, California Governor Jerry Brown announced, through Executive Order B-30-15, the following GHG emissions target:

- By 2030, California shall reduce GHG emissions to 40 percent below 1990 levels.

The emission reduction target of 40 percent below 1990 levels by 2030 is an interim-year goal to make it possible to reach the ultimate goal of reducing emissions 80 percent under 1990 levels by 2050. The order directs CARB to provide a plan with specific regulations to reduce statewide sources of GHG emissions. The Executive Order does not include a specific guideline for local governments.

1.3.2.4 Assembly Bill 1493, Clean Car Standards

Also known as “Pavley I,” Assembly Bill (AB) 1493 standards were the nation’s first GHG standards for automobiles. AB 1493 requires CARB to adopt vehicle standards that will lower GHG emissions from new light-duty autos to the maximum extent feasible. In January 2012, CARB adopted the Advanced Clean Cars Program to achieve additional GHG emission reductions for passenger vehicles for model years 2017–2025. The program includes low-emission vehicle regulations and zero-emission vehicle regulations. Together, the two standards are expected to increase average fuel economy to roughly 43 miles per gallon by 2020 (and more for years beyond 2020).

1.3.2.5 Assembly Bill 32, the California Global Warming Solutions Act of 2006

AB 32 requires CARB to reduce statewide GHG emissions to 1990 level by 2020. As part of this legislation, CARB was required to prepare a “Scoping Plan” that demonstrates how the State will achieve this goal. The Scoping Plan was adopted in 2011 and in it, local governments were described as “essential partners” in meeting the statewide goal, recommending a GHG reduction level 15 percent below 2005–2008 levels, depending on when a full emissions inventory is available, by 2020.

CARB released the 2017 Scoping Plan Update on January 20, 2017. The 2017 Scoping Plan Update provides strategies for achieving the 2030 target established by Executive Order B-30-15 and codified in Senate Bill (SB) 32 (40 percent below 1990 levels by 2030). The 2017 Scoping Plan Update recommends local plan level GHG emissions reduction goals. CARB recommends that local governments aim to achieve emissions of no more than 6 metric tons (MT) of CO_2e per capita by 2030 and no more than 2 MT CO_2e per capita by 2050.

1.3.2.6 Assembly Bill 341 (Commercial Recycling)

AB 341 sets a statewide goal of 75 percent recycling, composting, or source reduction of solid waste by the year 2020. As required by AB 341, the California Department of Resources Recycling and Recovery (CalRecycle) adopted the Mandatory Commercial Recycling Regulation on January 17, 2012. The regulation was approved by the Office of Administrative Law on May 7, 2012. It became effective immediately and clarifies the responsibilities in implementing mandatory commercial recycling. The Mandatory Commercial Recycling Regulation focuses on increased commercial waste diversion as a method to reduce GHG emissions. The regulation is designed to achieve a reduction in GHG emissions of 5 million MT of CO_2, which equates to roughly an additional 2 to 3 MT of currently disposed commercial solid waste being recycled by 2020 and thereafter.

1.3.2.7 Senate Bill 97

SB 97, enacted in 2007, amends the CEQA statute to clearly establish that GHG emissions and the effects of GHG emissions are appropriate subjects for CEQA analysis. The legislation directed the California Office of Planning and Research to develop draft CEQA Guidelines “for the mitigation of GHG emissions or the effects of GHG emissions” and directed the Resources Agency to certify and adopt the State CEQA Guidelines. CEQA Guidelines Section 15183.5, Tiering and Streamlining the Analysis of GHG Emissions, was added as part of the CEQA Guideline amendments that became effective in 2010 and describes the criteria needed in a GHG reduction plan that would allow for the tiering and streamlining of CEQA analysis for development projects.

1.3.2.8 Executive Order S-1-07, Low Carbon Fuel Standard

California Executive Order S-01-07 mandates (1) that a statewide goal be established to reduce the carbon intensity of California’s transportation fuels by at least 10 percent by 2020, and (2) that a low carbon fuel standard (LCFS) for transportation fuels be established in California. CARB developed the LCFS regulation pursuant to the authority under AB 32 and adopted it in 2009.

1.3.2.9 Executive Order S-13-08, The Climate Adaptation and Sea Level Rise Planning Directive

Executive Order S-13-08 provides clear direction for how the State should plan for future climate impacts. Executive Order S-13-08 calls for the implementation of four key actions to reduce the vulnerability of California to climate change:

- Initiate California's first statewide Climate Adaptation Strategy that will assess the State's expected climate change impacts, identify where California is most vulnerable, and recommend climate adaptation policies.
- Request that the National Academy of Sciences establish an expert panel to report on sea level rise impacts in California in order to inform State planning and development efforts.
- Issue interim guidance to State agencies for how to plan for sea level rise in designated coastal and floodplain areas for new and existing projects.
- Initiate studies on critical infrastructure and land-use policies vulnerable to sea level rise.

1.3.2.10 California Code of Regulations Title 24, Part 6

California Code of Regulations (CCR) Title 24, Part 6 (California's Energy Efficiency Standards for Residential and Nonresidential Buildings) (Title 24), was established in 1978 to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. Although it was not originally intended to reduce GHG emissions, electricity production by fossil fuels and natural gas use result in GHG emissions and energy-efficient buildings require less electricity and natural gas. Therefore, increased energy efficiency results in decreased GHG emissions.

The California Energy Commission adopted 2008 Standards on April 23, 2008, in response to AB 32. The Standards were adopted to provide California with an adequate, reasonably priced, and environmentally sound supply of energy; to pursue California energy policy, which states that energy efficiency is the resource of first choice for meeting California's energy needs; to meet the West Coast Governors' Global Warming Initiative commitment to include aggressive energy efficiency measures into updates of state building codes every 3 years; and to meet the Executive Order in the Green Building Initiative to improve the energy efficiency of nonresidential buildings through aggressive standards. The latest update of CCR Title 24, Part 6 went into effect July 1, 2014, which significantly increases the energy efficiency of new residential buildings.

1.3.2.11 Senate Bill 375, Sustainable Communities Strategy

SB 375 provides for a new planning process that coordinates land use planning, regional transportation plans, and funding priorities to help California meet the GHG reduction goals established in AB 32. SB 375 requires regional transportation plans, developed by metropolitan planning organizations to incorporate a sustainable communities strategy in their regional transportation plans. The goal of the sustainable communities strategy is to reduce regional vehicle miles traveled (VMT) through land use planning and consequent transportation patterns. SB 375 also includes provisions for streamlined CEQA review for some infill projects such as transit-oriented development.

1.3.2.12 CALGreen Building Code

CCR Title 24, Part 11 (California's Green Building Standard Code [CALGreen]), was adopted in 2010 and went into effect January 1, 2011. CALGreen is the first statewide mandatory green building code and significantly raises the minimum environmental standards for construction of new buildings in California. The mandatory provisions in CALGreen will reduce the use of volatile organic compound-emitting materials, will strengthen water conservation, and will require construction waste recycling.

1.3.2.13 SB X7-7

SB X7-7 requires water suppliers to reduce urban per capita water consumption 20 percent from a baseline level by 2020.

1.3.2.14 Renewable Portfolio Standard

The Renewable Portfolio Standard requires energy providers to derive 33 percent of their electricity from qualified renewable sources by 2020. In 2018, the State Legislature passed and Governor Jerry Brown signed SB 100, which requires energy providers to derive 60 percent of their electricity from qualified renewable sources by 2030, and 100 percent by 2045. The Renewable Portfolio Standard is anticipated to lower emission factors (i.e., fewer GHG emissions per kilowatt-hour used) from utilities across the State, including Southern California Edison (SCE).

1.3.2.15 Assembly Bill 117 Community Choice Aggregation Law

Passed in 2002, the Community Choice Aggregation (CCA) law (AB 117) allows cities and counties, or collections of cities and counties, to combine the electricity demand of customers in their jurisdictions and procure electricity through their own generation or through the market.[8] CCA allows communities to set rates for their customers and choose the form of energy generation, enabling communities to choose renewable energy sources rather than the local utility's mix of energy sources. Although a community choice aggregator (CCA, also used to denote community choice aggregation) purchases the electricity commodity, the local investor-owned utility still owns and maintains the transmission and delivery systems. When a CCA is formed, customers can opt out of the CCA if they wish to stay with their current provider.

1.4 City Setting

Corona is in northwestern Riverside County near the convergence of Los Angeles, Orange, and Riverside Counties. Corona covers a 39-square-mile area and is bounded by Riverside County and the Santa Ana Mountains to the west and the south, Norco to the north, and the city of Riverside to the east. Approximately 25 percent of Corona's land is undeveloped, with opportunity for growth. The City has an extensive park system with more than 394 acres of parks, with sports fields, basketball courts, playgrounds, tennis courts, two skate parks and an outdoor pool.

[8] Faulkner Katherine, 2010 Community Choice Aggregation in California https://nature.berkeley.edu/classes/es196/projects/2010final/FaulknerK_2010.pdf (accessed on February 12, 2019).

Corona is a community of more than 160,000 residents. Corona's age profile is 30 percent under age 18 and 7.3 percent over age 65, leaving 62.7 percent of the population between the ages of 18 and 65. Corona's ethnicity is approximately 38 percent white, 42 percent Latino, 11 percent Asian, 5 percent African-American, and 4 percent other. Corona has approximately 48,000 housing units, with more than 70 percent being single-family, nearly 25 percent as multifamily units, and the remaining as mobile home and other units.

1.5 Organization of the CAP

The remainder of this CAP Update includes four additional chapters:

- **Chapter 2** summarizes Corona's historic and future GHG emissions and the reduction targets the City has established.
- **Chapter 3** details the reduction strategies that will be implemented to meet the reduction targets identified in Chapter 2. Measures also include the potential energy savings and local cobenefits of the measures.
- **Chapter 4** discusses how Corona may be impacted by climate change and how it can adapt and become more resilient to climate change effects.
- **Chapter 5** includes the implementation of the measures, potential funding sources, and how the CAP Update will be monitored and updated over time. It also summarizes the outreach and CEQA review process conducted as part of this CAP Update.

2.0 GHG Emissions Inventory, Forecast, and Targets

2.1 GHG Emissions Inventory

GHG emissions inventories are the foundation of planning for future reductions. Establishing an inventory of emissions helps to identify and categorize the major sources of emissions produced over a single calendar year. A community inventory includes GHG emissions that result from the activities of Corona's residents and businesses. The inventories identify the major sources of GHGs emissions caused by activities in sectors that are specific to community activities.

The City prepared community inventories for the years 2008 and 2016. The 2008 inventory is considered the baseline year. A baseline year is established as a starting point against which other inventories may be compared and targets may be set and is generally the earliest year with a full emissions inventory. The most recent inventory has the most relevant data for planning purposes, whereas multiple inventory years provide context and may help identify trends or anomalies in the community emissions. The sectors evaluated in each inventory are provided in Table 1.

Table 1: Community Sectors Evaluated in the Inventory

Community Sectors
Residential Energy
Commercial/Industrial Energy
On-Road Transportation
Solid Waste
Water
Wastewater
Off-Road Sources

The City prepared a detailed GHG Inventory, Forecasting, and Target-Setting (IFT) Report, included as Appendix A, which contains detailed methodology of the information summarized in this chapter. Data were calculated and managed to best fit the GHG inventory and planning software tool used for this project, called ClearPath. ClearPath was developed by the Statewide Energy Efficiency Collaborative (SEEC), which is a partnership between several statewide agencies, utilities, and non-profits to assist cities and counties in climate mitigation planning. The ClearPath Tool is an all-in-one suite of online tool to help local agencies complete government operations and community-wide greenhouse gas inventories, forecasts and climate action plans. Appendix B contains input and output data from the ClearPath Tool for the City's GHG emissions inventory and forecasts.

2.1.1 2016 Greenhouse Gas Emissions Summary

Corona's total emissions in 2016 were 1,073,517 MT CO_2e. As shown in Figure 1 and Table 2, the On-road Transportation sector was the largest contributor to emissions in the 2016 inventor, with 46 percent of the City's total GHG emissions. Commercial and residential energy use were the second and third largest contributor of GHG emissions with 31 percent and 16 percent of total emissions, respectively. Solid waste accounted for 5 percent of total GHG emissions, water-related GHG emissions accounted for 2 percent of total GHG emissions, and wastewater and off-road sectors emitted less than 1 percent.

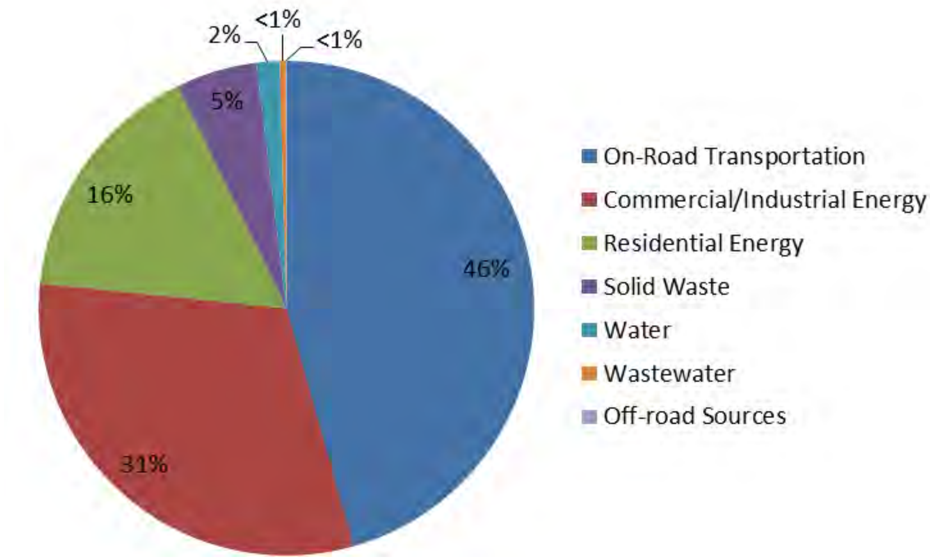


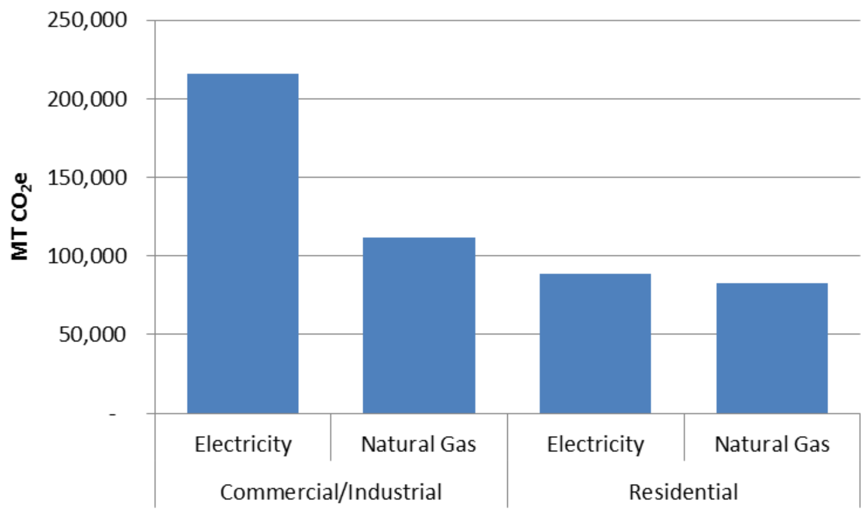
Figure 1: Community-Wide GHG Emissions by Sector For 2016

Table 2: Community-Wide GHG Emissions by Sector for 2016

Sector	2016 (MT CO_2e)	Percent of Total
On-road Transportation	498,985	46
Commercial Energy	327,311	31
Residential Energy	171,047	16
Solid Waste	55,642	5
Water	15,909	2
Wastewater	4,198	<1
Off-road Sources	426	<1
Total	**1,073,517**	100

Source: SEEC ClearPath Tool for the City of Corona, 2018.
MT CO_2e = metric tons of carbon dioxide equivalent

Energy is an area over which local agencies often have the greatest opportunities for effecting change. Therefore, electricity and natural gas use remains a key area for reduction opportunities. Emissions from commercial and residential sectors energy use account for 47 percent of total community emissions in 2016. Figure 2 shows the electricity and natural gas emissions from 2016 for the Commercial/Industrial and Residential sectors. Table 3 includes the activity data and GHG emissions for 2016.



Source: SEEC ClearPath Tool for the City of Corona, 2018.
MT CO_2e = metric tons of carbon dioxide equivalent

Figure 2: GHG Emissions for Community Electricity and Natural Gas, By Sector

Table 3: Activity Data and GHG Emissions for Energy in 2016

Sector	2016	
	Activity (kWh or therms)	Emissions (MT CO_2e)
Commercial/Industrial		
Electricity	898,057,448	215,534
Natural Gas	21,015,979	111,777
Residential		
Electricity	367,883,307	88,293
Natural Gas	15,559,287	82,754
Total	1,302,516,021	498,358

Source: SEEC ClearPath Tool for the City of Corona, 2018.
kWh = kilowatt hours
MT CO_2e = metric tons of carbon dioxide equivalent

2.1.2 Inventory Forecast

Forecasting future GHG emissions allows the City to understand how emissions are expected to increase or decrease in the future. Major changes in growth or land uses may affect how to best plan to reduce emissions in the future. GHG emissions are forecasted using two scenarios: a Business-as-Usual (BAU) and an Adjusted BAU (ABAU) scenario. The BAU scenario describes emissions based on projected growth in population and employment and does not consider policies that would reduce emissions in the future (that is, the policies and related efficiency levels in place in 2016 are assumed to remain constant through 2040). Projected growth is estimated using data from the City's 2018 General Plan Update. Growth calculation and methods are detailed in the IFT Report in Appendix A. In general, the City is expecting modest growth to 2040 as population, housing, and jobs are all expected to increase. Table 4 shows the growth projections used to develop the emissions forecasts.

Table 4: Growth Indicators for 2016 and 2040

Sector	Demographic Indicator	2016	2040	2016-2040 CAGR[1] (percent)
Residential Energy	Households	46,979	52,297	0.45
Commercial/Industrial Energy	Jobs	70,972	84,395	0.72
N/A[2]	Population	165,366	184,086	0.45
Solid Waste, Water, Wastewater, and Off-road Sources	Service Population (Population + Jobs)	236,338	268,481	0.53
Transportation[2]	VMT – Gas	1,169,706,600	1,336,928,145	0.56
	VMT – Diesel	150,934,699	177,578,872	0.68

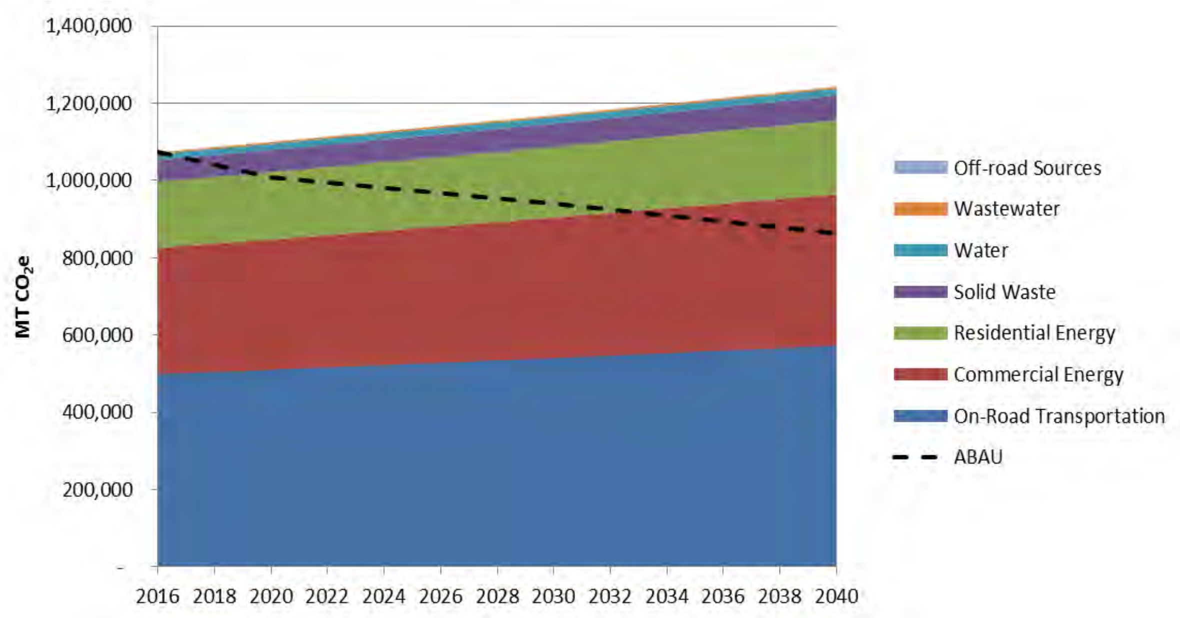
Source: City of Corona General Plan Update, 2018.
[1] CAGR = Compound annual growth rate.
[2] Not applicable. Population data are shown for informational purposes but are not used for forecasting any sector.
VMT = vehicle miles traveled

The Adjusted BAU scenario describes emissions based on projected growth *and* considers policies that will achieve GHG reductions in the future. Policies, described in the Regulatory Setting section of Chapter 1, include State-adopted or approved legislation that will affect future emissions. By evaluating the two scenarios, the City can evaluate the effect that existing policies may have on future emissions and determine which local measures would provide additional reductions.

Three future years are forecasted for each scenario: 2020, 2030 and 2040. The 2020 and 2030 forecast years are consistent with the goals identified in AB 32 and the corresponding Scoping Plan, which identifies statewide GHG reduction targets by 2020 and 2030. The 2040 forecast year is consistent with the City's 2018 General Plan Update buildout year and will allow the City to develop long-term strategies to continue GHG reductions.

2.1.2.1 Business-as-Usual Forecasts

The City's BAU emissions in 2020 are estimated to be 1,100,068 MT CO_2e, or a 2.5 percent increase from 2016 emissions. The 2030 BAU emissions are estimated to be 1,169,446 MT CO_2e, or an 8.9 percent increase from 2016 level. By 2040, emissions are estimated to increase 15.8 percent from the 2016 level to 1,243,348 MT CO_2e (Figure 3). Table 5 shows the BAU emissions for different sectors. For the BAU scenario, the energy sector emissions are going to rise substantially by up to 11 percent by 2030 and 20 percent by 2040 from 2016 baseline. The transportation sector will have a 7 percent increase in emissions by 2030 and 12 percent by 2040 compared to 2016 baseline.



Source: SEEC ClearPath Tool for the City of Corona, 2018.
ABAU: adjusted business as usual
BAU: business as usual
MT CO_2e = metric tons of carbon dioxide equivalent

Figure 3: Community BAU and ABAU Forecasts

Table 5: Community Business As Usual (BAU) Forecast Emissions

Sector	2016 (MT CO_2e)	2020 (MT CO_2e)	Percent Change 2016–2020	2030 (MT CO_2e)	Percent Change 2016–2030	2040 (MT CO_2e)	Percent Change 2016–2040
On-Road Transportation	482,354	491,602	1.9	515,513	6.9	540,596	12.1
Commercial/ Industrial Energy	327,311	337,321	3.1	363,708	11.1	392,158	19.8
Residential Energy	171,046	174,266	1.9	182,584	6.7	191,299	11.8
Solid Waste	55,642	56,889	2.2	60,132	8.1	63,560	14.2
Water	15,909	16,266	2.2	17,193	8.1	18,173	14.2
Wastewater	4,198	4,293	2.3	4,537	8.1	4,796	14.2
Off-road Sources	426	453	6.3	527	23.7	616	44.6
Total	**1,056,886**	**1,081,090**	**2.3**	**1,144,194**	**8.3**	**1,211,198**	**14.6**

Source: SEEC ClearPath Tool for the City of Corona, 2018.
BAU = Business-as-Usual
MT CO_2e = metric tons carbon dioxide equivalent

2.1.2.2 Adjusted Business-as-Usual Forecasts

The City's ABAU emissions are estimated to be 1,009,458 MT CO_2e in 2020, 939,423 MT CO_2e in 2030, and 862,279 MT CO_2e in 2040 (Figure 3). This change represents a 6.0 percent reduction from 2016 by 2020, 12.5 percent reduction by 2030, and 19.7 percent reduction by 2040. Table 6 shows the change in emissions from 2016 to 2040 under the ABAU scenario. Due to the stringent State vehicle standards, the emissions from the Transportation sector are expected to decrease significantly over time, while the proportion of emissions from Residential and Commercial/ Industrial Energy will increase. Emissions from Solid Waste are expected to increase over time but account for less than 10 percent of total emissions.

Table 6: Community Adjusted BAU (ABAU) Forecast Emissions

Sector	2016 (MT CO_2e)	2020 (MT CO_2e)	2020 Percent of Total	2030 (MT CO_2e)	2030 Percent of Total	2040 (MT CO_2e)	2040 Percent of Total
Transportation & Mobile Sources	482,779	446,052	45	387,245	42	336,282	40
Commercial/Industrial Energy	327,311	308,566	31	299,731	33	280,738	33
Residential Energy	171,047	162,292	16	156,221	17	146,591	17
Solid Waste	55,642	56,889	6	60,132	7	63,560	8
Water & Wastewater	20,108	18,457	2	17,150	2	15,146	2
Total	**1,056,887**	**992,256**	**-6.1**	**920,479**	**-12.9**	**842,317**	**-20.3**

Source: SEEC ClearPath Tool for the City of Corona, 2018.
ABAU = Adjusted Business-as-Usual
MT CO_2e = metric tons carbon dioxide equivalent

2.1.3 Reduction Targets

The State has set goals for reducing GHG emissions by 2020, 2030, and 2050 through AB 32, Executive Order S-3-05, and Executive Order B-30-15, respectively. The State has also provided guidance to local jurisdictions as "essential partners" in achieving the State's goals by identifying a 2020 recommended reduction goal. That goal, stated in the AB 32 Scoping Plan, was for local governments to achieve a 15-percent reduction below 2005 to 2008 levels by 2020, which aligns with the State's goal of not exceeding 1990 emissions levels by 2020. The State's long-term target is to emit no more than 20 percent of 1990 levels by 2050 (or, a reduction of 80 percent below 1990 levels by 2050).

The State has also provided an interim target, which is 40 percent below 1990 levels by 2030. It is clear that the issue of climate change will not end in 2030, and continued reduction goals should be implemented to keep the State on a path toward the 2050 goal. A straight-line projection from the 2030 to 2050 goals would result in a reduction goal of 66 percent below 2008 levels by 2040 midpoint.

2.1.4 Community Targets

Consistent with the State's adopted AB 32 GHG reduction target, the City has set a goal to reduce emissions to 1990 levels by 2020. This target was calculated as a 15-percent decrease from 2008 levels, as recommended in the AB 32 Scoping Plan. An interim goal for Corona was created for 2030, which was to reduce emissions to 49 percent below 2008 levels. A longer-term goal was established for 2040, which was to reduce emissions to 66 percent below 2008 levels. The 2030 interim and 2040 longer-term goals would put Corona on a path toward the State's long-term goal to reduce emissions 80 percent below 1990 levels by 2050 (Table 7).

Table 7: GHG Reduction Targets for Community Emissions

Strategy	Target
2020 Target	15 percent below 2008 levels
2020 Emissions Goal (MT CO_2e)	1,483,963
2030 Target	49 percent below 2008 levels
2030 Emissions Goal (MT CO_2e)	890,378
2040 Target	66 percent below 2008 levels
2040 Emissions Goal (MT CO_2e)	593,585

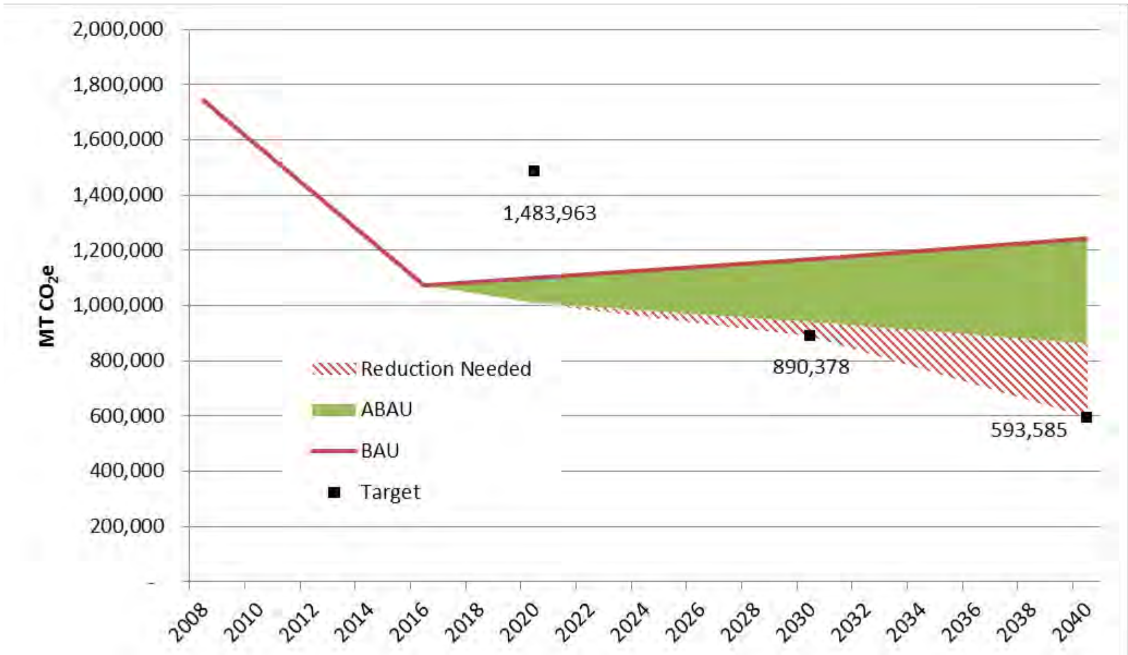
Notes and Acronyms
MT CO_2e = Metric tons of carbon dioxide equivalent

As shown in Table 8 and Figure 4, in 2020, Corona would meet the State Aligned performance GHG reduction targets under the ABAU scenario. In 2030, under the ABAU scenario, Corona would need to reduce 49,045 MT CO_2e to meet the target. In 2040, under the ABAU scenario, the City would need to reduce 268,694 MT CO_2e to meet the target.

Table 8: State-Aligned GHG Reduction Targets for Community Emissions by Year

Sector	2008[1]	2016	2020	2030	2040
BAU Emissions (MT CO_2e)	1,745,839	1,073,517	1,100,068	1,169,446	1,243,348
ABAU Emissions (MT CO_2e)	1,745,839	1,073,517	1,009,458	939,423	862,279
State-Aligned Target (Percentage change from 1990)	-	-	0	-40	-60
State-Aligned Target (Percentage change from 2008)[2]	-	-	-15	-49	-66
State-Aligned Emissions Goal (MT CO_2e)	-	-	1,483,963	890,378	593,585
Reductions from ABAU needed to meet the State-Aligned Target (MT CO_2e)	-	-	Target Met	49,045	268,694

Source: SEEC ClearPath Tool for the City of Corona, 2018.
[1] Baseline (2008) emissions are from the City's 2012 Climate Action Plan GHG inventory.
[2] Reduction targets calculation details are provided in Appendix A.
BAU = Business-as-Usual
ABAU= Adjusted BAU
GHG = greenhouse gas
MT CO_2e = metric tons of carbon dioxide equivalent



Source: SEEC ClearPath Tool for the City of Corona, 2018.
ABAU: adjusted business as usual
BAU: business as usual
MT CO2e = metric tons of carbon dioxide equivalent

Figure 4: Community Emissions Inventory, Forecasts, and Targets

3.0 GHG Reduction Measures

This chapter details how the City would meet its GHG reduction targets by implementing goals, measures, and actions at the community level. The goal describes the overarching objective related to increasing energy efficiency or decreasing energy consumption, such as increasing energy efficiency in residential units, as well as reducing vehicle miles traveled and solid waste generation.

Within each goal, one or more measures are presented indicating the City's commitment toward meeting the goal. The measures are either new measures or an enhancement and continuation of reduction measures proposed in the 2012 City of Corona Climate Action Plan (2012 CAP) as identified under the description of each reduction measure below. Within each measure, one or more actions are presented that indicate the steps the City may take in achieving the measure.

Each measure includes the GHG reduction potential in 2030 and 2040. Actions are designed to include the steps needed to implement the measure. Actions may be added or removed over time, depending on their relevancy, funding availability, and whether the actions are successful in supporting measures as they are monitored over time but are considered essential to guiding staff in implementation. Actions include a performance indicator, an implementation timeframe, department or agency responsible for implementation, and cost information, where applicable. In addition, the implementation of the measures presented below would result in local benefits while reducing GHG emissions, called cobenefits. The cobenefits associated with implementing the GHG reduction measures can range from providing improved air quality and mobility to increased awareness about sustainability. The cobenefits are identified for each measure and represented by an icon.

Local Cobenefits		
Increased energy efficiency/reduced demand	Water conservation	Improved public health
Improved air quality	Increased renewable energy	Increased non-motorized transportation
Sustainability education and awareness	Enhanced land use/ community design	Increased resiliency

3.1 Energy Efficiency

As discussed in Chapter 2, GHG emissions from Corona's commercial/industrial and residential energy sectors accounted for 47 percent of the total community emissions in 2016. Energy use includes electricity and natural gas consumption within Corona. There are many opportunities to conserve energy from existing and future development.

Goal 1: Increase Energy Efficiency in Existing Residential Units

The following measures are focused on increasing energy efficiency in existing residential buildings through behavior modification of residents and encouraging and incentivizing home energy retrofits. As discussed in Chapter 2, in 2016, residential consumers used 367,883,307 kilowatt hours (kWh) of electricity and 15,559,287 therms of natural gas.

- **Measure 1.1:** Energy Efficiency Training, Education, and Recognition in the Residential Sector

Opportunities for residents to improve energy efficiency in their homes include changes to their behaviors and physical modifications or improvements to their homes. Education of the public is at the core of attaining energy efficiency goals. While most of the measures include an outreach component, creating a specific education measure would emphasize the critical role of education in achieving energy efficiency. An education measure would also provide City staff with a framework to educate community members about behavioral and technological changes that can increase energy efficiency. This is an enhancement of Measure R3-E2 proposed in the 2012 CAP. Potential actions for this measure include:

- ☐ Post energy efficiency information or links on websites and/or social media and provide materials at public events
- ☐ Promote an annual energy efficiency fair
- ☐ Promote a home energy efficiency resource center
- ☐ Invite building inspectors to hold trainings semi-annually on energy efficiency and Title 24 requirements

GHG Reduction Potential	*Supporting Measure*
Co-Benefits	

➢ **Measure 1.2:** Increase Community Participation in Existing Energy Efficiency Programs

There are many energy efficiency opportunities that are low cost for residents to initiate and would result in cost savings over time. These opportunities are generally from existing programs, such as Southern California Edison (SCE) and Southern California Gas Company (SoCalGas), which offer rebates and incentives to purchase energy-efficient appliances and lights. Through this measure, the City would work to increase residents' participation in existing energy efficiency programs that are low-cost and would provide a financial benefit to the residents. As programs change over time, continued and up-to-date outreach would be necessary. This is an enhancement of the City's existing Community Energy Partnership program and Measure R3-E4 proposed in the 2012 CAP. Potential action for this measure includes:

☐ Partner with the Southern California Association of Governments (SCAG), SCE, and SoCalGas for outreach events

GHG Reduction Potential (2030)	*3,715 MT CO_2e*
GHG Reduction Potential (2040)	*3,885 MT CO_2e*
kWh Savings (2030)	*11,797,498 kWh*
Therms Savings (2030)	*166,205 therms*
Co-Benefits	

GHG = greenhouse gas
kWh = kilowatt hours
MT CO_2e = metric tons of carbon dioxide equivalent

- **Measure 1.3:** Promote Home Energy Evaluations

Home energy evaluations are necessary to identify cost-effective opportunities for energy savings and for residents to take practical actions to achieve energy efficiency. Home energy evaluations can be established or promoted by a variety of existing programs. This is a new measure and was not proposed in the 2012 CAP. A potential action for this measure is:

☐ Promote energy audits through programs such as Energy Upgrade California

GHG Reduction Potential	*Supporting Measure*
Co-Benefits	

- **Measure 1.4:** Promote Residential Home Energy Renovations

Approximately 27 percent of Corona's residential buildings were constructed before the adoption of Title 24 (SCAG 2017). Renovations to buildings constructed before the adoption of Title 24 would evidently improve energy efficiency. Many federal and State programs and incentives support home energy renovations, including city-supervised funding, permit process improvements, and city ordinances. This is an enhancement of Measures R1-E4, R1-E5, R2-E3, and R2-E4 proposed in the 2012 CAP. Potential actions for this measure include:

☐ Enhance enforcement of Title 24 compliance for existing residential buildings

☐ Promote existing home energy renovation programs

☐ Promote participation in green building programs, such as Leadership in Energy and Environmental Design (LEED) and Energy Upgrade California

☐ Promote financing programs for home upgrades, such as Home Energy Renovation Opportunity (HERO) and Property Assessed Clean Energy (PACE)

☐ Establish online permitting to facilitate upgrades

GHG Reduction Potential (2030)	*2,276 MT CO_2e*
GHG Reduction Potential (2040)	*2,380 MT CO_2e*
kWh Savings (2030)	*8,646,290 kWh*
Therms Savings (2030)	*37,727 therms*
Co-Benefits	

Goal 2: Increase Energy Efficiency in New Residential Units

The following measures focus on increasing energy efficiency in new residential buildings through encouraging and incentivizing green buildings. As discussed in Chapter 2, energy use for the residential sector in Corona is anticipated to increase by 12 percent by 2040 compared to 2016, which is attributable to new residential units.

- **Measure 2.1:** Exceed Energy Efficiency Standards

City staff has a unique opportunity to encourage or inform developers of new energy efficiency opportunities for new development. This measure would educate City staff to encourage and implement energy efficiency measures beyond those required in current Title 24 standards. This measure would also ensure that as Title 24 standards are updated, City staff are well informed and can implement updates quickly and effectively. This is an enhancement of Measures R2-E1 and R2-E2 proposed in the 2012 CAP. Potential actions for this measure include:

☐ Educate City staff and developers on future Title 24 updates and new energy efficiency opportunities for new residential development

☐ Promote Tier 1 and Tier 2 green building ratings such as LEED, Build It Green, or Energy Star®- certified buildings

☐ Establish online permitting to facilitate new residential building energy efficiency opportunities

GHG Reduction Potential (2030)	*3,918 MT CO_2e*
GHG Reduction Potential (2040)	*4,097 MT CO_2e*
kWh Savings (2030)	*3,918,684 kWh*
Therms Savings (2030)	*559,809 therms*
Co-Benefits	

GHG = greenhouse gas
kWh = kilowatt hours
MT CO_2e = metric tons of carbon dioxide equivalent

Goal 3: Increase Energy Efficiency in Existing Commercial Units

The following measures focus on increasing energy efficiency in existing commercial buildings through behavior modification and encouraging and incentivizing commercial building retrofits. As discussed in Chapter 2, in 2016, Corona's commercial/industrial consumers used 898,057,448 kWh of electricity and 21,015,979 therms of natural gas.

- **Measure 3.1:** Energy Efficiency Training, Education, and Recognition in Commercial Sector

Education is at the core of attaining energy efficiency goals. A specific education measure would emphasize the critical role of education in achieving energy efficiency. This measure would provide City staff with a framework to interact with and educate the commercial property owners and operators about behavioral and technological changes that can increase energy efficiency in commercial buildings. This is an enhancement of Measure R3-E2 proposed in the 2012 CAP. Potential actions for this measure include:

- ☐ Post energy efficiency information or links on websites and/or social media and provide materials at public events
- ☐ Promote an annual energy efficiency fair
- ☐ Promote commercial energy efficiency resource center
- ☐ Invite building inspectors to hold trainings semi-annually on energy efficiency and Title 24

GHG Reduction Potential	*Supporting Measure*
Cobenefits	

➢ **Measure 3.2:** Increase Business Participation in Existing Energy Efficiency Programs

There are many energy efficiency opportunities that are low-cost for businesses to initiate that would result in cost-savings over time. SCE and the SoCalGas offer many rebates and incentives to purchasing energy-efficient appliances and lights. As many business owners may be unaware that the opportunities exist, this measure would allow for the City to increase the participation of businesses in existing energy-efficiency programs that are low-cost and would provide financial benefits. This is an enhancement of the City's existing Community Energy Partnership program and Measure R3-E4 proposed in the 2012 CAP. Potential action for this measure includes:

☐ Partner with the Southern California Association of Governments (SCAG), SCE, and SoCalGas for outreach events

GHG Reduction Potential (2030)	*7,031 MT CO_2e*
GHG Reduction Potential (2040)	*7,557 MT CO_2e*
kWh Savings (2030)	*24,108,652 kWh*
Therms Savings (2030)	*234,074 therms*
Cobenefits	

GHG = greenhouse gases
kWh = kilowatt hours
MT CO_2e = metric tons of carbon dioxide equivalent

- **Measure 3.3:** Nonresidential Building Energy Audits

Commercial energy audits are necessary to identify cost-effective opportunities for energy savings and for business owners to take practical actions to increase energy efficiency. The audits can be established or promoted by various existing programs. This is a new measure and was not proposed in the 2012 CAP. Potential action for this measure includes:

☐ Promote energy audits through programs such as Energy Upgrade California

GHG Reduction Potential	*Supporting Measure*
Cobenefits	

- **Measure 3.4:** Nonresidential Building Retrofits

As many of Corona's commercial buildings were constructed before the adoption of Title 24, their facilities and equipment are not considered energy efficient. Therefore, retrofits are necessary to achieve higher energy efficiency. Many federal and State programs and incentives support nonresidential building energy retrofits, including City-supervised funding, permit process improvements, and City ordinances. This is an enhancement of Measures R1-E4, R1-E5, and R2-E7 proposed in the 2012 CAP. Potential actions for this measure include:

☐ Enhance enforcement of Title 24 compliance for existing nonresidential buildings
☐ Promote existing nonresidential building retrofit programs
☐ Promote participation in green building programs, such as California Solar Initiative
☐ Promote financing programs such as Property Assessed Clean Energy Program (PACE)
☐ Establish online permitting to facilitate retrofits

GHG Reduction Potential (2030)	*37,592 MT CO_2e*
GHG Reduction Potential (2040)	*40,406 MT CO_2e*
kWh Savings (2030)	*36,917,528 kWh*
Therms Savings (2030)	*5,402,144 therms*
Co-Benefits	

GHG = greenhouse gas
kWh = kilowatt hours
MT CO_2e = metric tons of carbon dioxide equivalent

Goal 4: Increase Energy Efficiency in New Commercial Units

The following measures focus on increasing energy efficiency in new commercial buildings through encouraging and incentivizing green buildings. As discussed in Chapter 2, energy use for the commercial building sector in Corona is anticipated to increase by 20 percent by 2040 compared to 2016, which would be attributable to new commercial buildings.

- **Measure 4.1:** Exceed Energy Efficiency Standards

City staff has a unique opportunity to inform and encourage developers to apply new energy efficiency opportunities in new development. This measure would educate City staff to encourage and implement energy efficiency beyond that required by current Title 24 standards. This measure would also ensure that as Title 24 standards are updated, City staff would be well informed and could implement updates quickly and effectively. This is an enhancement of Measures R2-E5 and R2-E6 proposed in the 2012 CAP. Potential actions for this measure include:

- ☐ Educate City staff and developers on future Title 24 updates and additional energy efficiency opportunities for new nonresidential development
- ☐ Promote Tier 1 and Tier 2 Green Building Ratings, such as LEED, Build It Green, or Energy Star®- certified buildings
- ☐ Establish online permitting to facilitate new nonresidential building energy efficiency programs

GHG Reduction Potential (2030)	*5,742 MT CO_2e*
GHG Reduction Potential (2040)	*6,172 MT CO_2e*
kWh Savings (2030)	*15,755,654 kWh*
Therms Savings (2030)	*368,707 therms*
Co-Benefits	

3.2 Water Efficiency

As discussed in Chapter 2, GHG emissions from Corona consumers' water use and wastewater treatment accounted for 3 percent of the total community emissions in 2016. GHG emissions are generated by the transport and consumption of water due to the energy needed to supply water to the end users. There are many opportunities to reduce water consumption throughout Corona.

Goal 5: Increase Energy Efficiency through Water Efficiency

The following measures focus on increasing water efficiency through community behavior modification.

- **Measure 5.1:** Water Efficiency through Enhanced Implementation of Senate Bill X7-7

SB X7-7, or The Water Conservation Act of 2009, requires all water suppliers to increase water-use efficiency. The legislation set an overall goal of reducing per capita urban water consumption by 20 percent from a baseline level by 2020. This goal can be met by taking a variety of actions, including targeted public outreach and promoting water efficiency measures such as low-irrigation landscaping. This is an enhancement of Measure R3-W1 proposed in the 2012 CAP. Potential actions for this measure include:

- ☐ Post water efficiency information or links on the City's website and/or social media and provide materials at public events
- ☐ Require low-irrigation landscaping

GHG Reduction Potential (2030)	*1,524 MT CO_2e*
GHG Reduction Potential (2040)	*1,607 MT CO_2e*
kWh Savings (2030)	*6,351,024 kWh*
Co-Benefits	

GHG = greenhouse gas
kWh = kilowatt hours
MT CO_2e = metric tons of carbon dioxide equivalent

- **Measure 5.2:** Exceed Water Efficiency Standards

In addition to SB X7-7, more actions are being studied or have been taken to exceed water efficiency standards. These efforts include education and outreach practices that could be combined with residential and commercial actions that promote reuse or recycled water, use of gray water and the collection and use of harvested rainwater. This is an enhancement of Measure R2-W1 proposed in the 2012 CAP. Potential action for this measure includes:

☐ Conduct direct outreach to homeowner associations, businesses, and other community groups to inform them about water efficiency standards. The City would implement this in conjunction with the existing water conservation outreach efforts by the City's Department of Water and Power so that any necessary efforts are not duplicated.

GHG Reduction Potential	*Supporting Measure*
Cobenefits	

3.3 Advanced Goals and Measures

Goal 6: Decrease Energy Demand through Reducing Urban Heat Island Effect

The following measures focus on reducing urban heat island effect and therefore indirectly reducing energy use throughout Corona.

- **Measure 6.1:** Tree Planting for Shading and Energy Efficiency

Trees and vegetation lower surface and air temperatures by providing shade and through evapotranspiration, making vegetation a simple and effective way to reduce urban heat islands. Shaded surfaces may be 20 to 45 degrees Fahrenheit ([°F], equal to 11 to 25 degrees Celsius [°C]) cooler than the peak temperatures of unshaded materials. In addition, evapotranspiration, alone or in combination with shading, can help reduce peak summer temperatures by 2 to 9 °F (or 1 to 5 °C). Trees and vegetation that directly shade buildings can reduce energy use by decreasing demand for air conditioning. This is a new measure and was not proposed in the 2012 CAP. Potential action for this measure includes:

☐ Promote tree planting at plan check for private properties

GHG Reduction Potential	*Supporting Measure*
Cobenefits	

➢ **Measure 6.2:** Light-Reflecting Surfaces for Energy Saving

Replacing surface areas with light-reflecting materials can decrease heat absorption and lower outside air temperature. Both roofs and pavements are ideal surfaces for taking advantage of this advanced technology.

A cool roof is built from materials with high thermal emittance and high solar reflectance—or albedo—to help reflect sunlight and the associated energy away from a building. These properties help roofs absorb less heat and stay up to 50 to 60 °F (or 28 to 33 °C) cooler than conventional materials during peak summer weather. Cool roofs may be installed on low-slope roofs (such as the flat or gently sloping roofs typically found on commercial, industrial, and office buildings) or the steep-sloped roofs used in many residences and retail buildings.

Cool pavement is built from materials that reflect more solar energy, enhance water evaporation, or have been otherwise modified to remain cooler than conventional pavements. Cool pavement can be created with existing paving technologies as well as newer approaches such as the use of coatings, permeable paving, or grass paving. Cool pavements save energy by lowering the outside air temperature. This allows air conditioners to cool buildings with less energy, and the reflective qualities of cool pavements reduce the need for electric street lighting at night.

This is a new measure and was not proposed in the 2012 CAP. Potential actions for this measure include:

- ☐ Promote cool roofs on the residential, commercial, industrial or office buildings where feasible
- ☐ Promote cool pavements in Corona where feasible

GHG Reduction Potential (2030)	*601 MT CO_2e*
GHG Reduction Potential (2040)	*633 MT CO_2e*
kWh Savings (2030)	*2,502,246 kWh*
Cobenefits	

GHG = greenhouse gas
kWh = kilowatt hours
MT CO_2e = metric tons of carbon dioxide equivalent

3.4 Transportation

As discussed in Chapter 2, GHG emissions from Corona's on-road transportation accounted for 46 percent of the total community emissions in 2016. There are many opportunities to reduce VMT and improve mobility within Corona to achieve the 2030 and 2040 targets as described below.

Goal 7: Decrease Greenhouse Gas Emissions through Reducing Vehicle Miles Traveled

- **Measure 7.1:** Alternative Transportation Options

Alternative transportation includes taking transit and non-motorized transportation options, among them walking and bicycling, and variants such as small-wheeled transport like skates, skateboards, push scooters and handcarts, and wheelchair travel. These modes provide both recreation and transportation, and can reduce VMT by removing automobiles from the road.

This is an enhancement of Measures R2-T1 and R3-T1 proposed in the 2012 CAP. Potential actions for this measure include:

- ☐ Work with SCAG and the community to remove barriers to alternative transportation
- ☐ Create additional active transportation routes from Corona Transit Center to surrounding residential areas
- ☐ Evaluate parking requirements to identify areas such as transit districts and mixed use developments for shared or reduced parking requirement opportunities

GHG Reduction Potential (2030)	*53,944 MT CO_2e*
GHG Reduction Potential (2040)	*57,849 MT CO_2e*
VMT Reduction (2030)	*169,761,409 miles*
Cobenefits	

GHG = greenhouse gas
MT CO_2e = metric tons of carbon dioxide equivalent
VMT = vehicle miles traveled

- **Measure 7.2:** Implement Bicycle Master Plan to Expand Bicycle Routes Around the City

Bicycle-friendly roads are crucial to promoting bicycle use as a transportation method. People tend to bicycle if routes are available to separate them from motor vehicles and bicyclists' safety can be ensured. The City's existing bicycle master plan was adopted in 2001 and has not been updated since then. Thus, updating and implementing the bicycle master plan and constructing more bicycle routes would encourage more bicycle rides and would help to reduce VMT. This is an enhancement of Measure R2-T3 proposed in the 2012 CAP. Potential action for this measure includes:

- ☐ Expand bicycle routes and prioritize funding for Class I bicycle lanes to improve bicycle transit

GHG Reduction Potential (2030)	*482 MT CO_2e*
GHG Reduction Potential (2040)	*517 MT CO_2e*
VMT Reduction (2030)	*1,518,191 miles*
Cobenefits	

GHG = greenhouse gas
MT CO_2e = metric tons of carbon dioxide equivalent
VMT = vehicle miles traveled

3.5 Solid Waste

As discussed in Chapter 2, GHG emissions from Corona's solid waste generation accounted for 5 percent of the total community emissions in 2016. There are many opportunities to reduce waste disposal and increase waste recycling and composting.

Goal 8: Decrease Greenhouse Gas Emissions through Reducing Solid Waste Generation

- **Measure 8.1:** Reduce Waste to Landfills

According to 2014 Statewide Waste Characterization data,[9] much of the waste disposed in landfills is readily recyclable. Increasing the recovery of recyclable materials will directly reduce GHG emissions. In particular, recycled materials can reduce the GHG emissions from multiple phases of product production, including extraction of raw materials, preprocessing, and manufacturing. This is an enhancement of Measures R1-S1, R2-S1, and R3-S2 proposed in the 2012 CAP. Potential actions for this measure include:

- ☐ Promote waste recycling and diversion in the community
- ☐ Add additional recycling containers in public places where possible and needed

9 CalRecycle, 2014 Statewide Waste Characterization data https://www2.calrecycle.ca.gov/WasteCharacterization/

☐ Promote a waste reduction, recycling, and composting program

GHG Reduction Potential (2030)	*20,271 MT CO_2e*
GHG Reduction Potential (2040)	*21,378 MT CO_2e*
Cobenefits	

3.6 Clean Energy

Goal 9: Decrease Greenhouse Gas Emissions through Increasing Clean Energy Use

➢ **Measure 9.1:** Clean Energy

Clean energy includes energy efficiency and clean energy supply options such as highly efficient combined heat and power as well as renewable energy sources. Installing solar photovoltaic panels on residential and commercial building rooftops is an effective way to save energy use. Moreover, when combined with energy storage systems, solar panels could continuously meet residential and commercial energy demand. By identifying, designing, and implementing clean energy measures and technology solutions, Corona would receive environmental and economic benefits, including reductions in GHG emissions. This is an enhancement of Measures R1-E6 and R3-E3 proposed in the 2012 CAP. Potential actions for this measure include:

☐ Promote clean energy incentives to the community

☐ Encourage solar panel installation on existing residential buildings

☐ Encourage solar panel installation on existing commercial buildings and commercial parking lots

☐ Encourage energy storage system installation with solar panels

GHG Reduction Potential (2030)	*21,999 MT CO_2e*
GHG Reduction Potential (2040)	*21,999 MT CO_2e*
kWh Savings (2030)	*91,660,465 kWh*
Cobenefits	

GHG = greenhouse gas
kWh = kilowatt hours
MT CO_2e = metric tons of carbon dioxide equivalent

Measure 9.2 Community Choice Aggregation

AB 117, which was signed into law in 2002, allows California cities and counties to either individually or collectively supply electricity to customers within their borders through the establishment of a Community Choice Aggregation (CCA) program. The City could also seek opportunities to join the regional CCA program, which would allow Corona's energy users to choose an alternative option to SCE and to use more renewable energy. The ongoing CCA programs have renewable energy percentages between 33 and 100, and the national opt-out rates for the program range from 3 to 8 percent, with most programs at or below 5 percent.[10] Participation in a regional CCA district could provide a significant source of future emission reductions.

The advantages of regional CCAs that include participation from multiple local jurisdictions would be the creation of efficiencies. The City could seek opportunities for collaboration with other local jurisdictions to develop and implement a CCA that would produce mutually beneficial results. Developing a CCA would require a detailed analysis of energy demand, efficiency opportunities, and available clean electricity sources for purchase.

10 There are 17 operational CCA programs in California as of September 2018. Source: Local Energy Aggregation Network. Website: http://leanenergyus.org/cca-by-state/california/ (accessed September 2018).

This is a new measure and was not proposed in 2012 CAP. Potential action for this measure includes:

☐ Explore opportunities to join a CCA program

GHG Reduction Potential (2030)	*214,559 MT CO_2e*
GHG Reduction Potential (2040)	*230,348 MT CO_2e*
kWh Savings (2030)	*891,882,228 kWh*
Cobenefits	

GHG = greenhouse gas
kWh = kilowatt hours
MT CO_2e = metric tons of carbon dioxide equivalent

3.7 Summary of Reductions

By implementing the statewide and all of the local reduction measures described above, the City would reduce its community-wide GHG emissions by 14 percent compared to the 2030 BAU emissions and 14 percent compared to the 2040 BAU emissions. Table 9 summarizes the strategies and the potential GHG reductions for community operations.

Table 9: Summary of Community GHG Reduction Strategies and Emission Reductions

Goals and Measures	2030 Emission Reductions (MT CO_2e)	2040 Emission Reductions (MT CO_2e)
Goal 1: Increase Energy Efficiency in Existing Residential Units		
1.1: Energy Efficiency Training, Education, and Recognition in the Residential Sector	Supporting Measure[1]	
1.2: Increase Community Participation in Existing Energy Efficiency Programs	3,715	3,885
1.3: Home Energy Evaluations	Supporting Measure[1]	
1.4: Residential Home Energy Renovations	2,276	2,380
Goal 2: Increase Energy Efficiency in New Residential Units		
2.1: Exceed Energy Efficiency Standards	3,918	4,097
Goal 3: Increase Energy Efficiency in Existing Commercial Units		
3.1: Energy Efficiency Training, Education, and Recognition in Commercial Sector	Supporting Measure[1]	
3.2: Increase Business Participation in Existing Energy Efficiency Programs	7,031	7,557
3.3: Nonresidential Building Energy Audits	Supporting Measure[1]	
3.4: Nonresidential Building Retrofits	37,592	40,406
Goal 4: Increase Energy Efficiency in New Commercial Units		
4.1: Exceed Energy Efficiency Standards	5,742	6,172
Goal 5: Increase Energy Efficiency through Water Efficiency		
5.1: Water Efficiency through Enhanced Implementation of Senate Bill X7-7	1,524	1,607
5.2: Exceed Water Efficiency Standards	Supporting Measure[1]	
Goal 6: Decrease Energy Demand through Reducing Urban Heat Island Effect per Title 24 Requirements		
6.1: Tree Planting for Shading and Energy Saving	Supporting Measure[1]	
6.2: Light-Reflecting Surfaces for Energy Saving	601	633
Goal 7: Decrease Greenhouse Gas Emissions through Reducing Vehicle Miles Traveled		
7.1: Alternative Transportation Options	53,944	57,849
7.2: Implement Bicycle Master Plan to Expand Bicycle Routes around Corona	482	517
Goal 8: Decrease Greenhouse Gas Emissions through Reducing Solid Waste Generation		
8.1: Reduce Waste to Landfills	20,271	21,378
Goal 9: Decrease Greenhouse Gas Emissions through Increasing Clean Energy Use		
9.1: Clean Energy	21,999	21,999
Total Community Measures without CCA	**159,096**	**168,481**
Goal 9: Decrease Greenhouse Gas Emissions through Increasing Clean Energy Use		
9.2: Join CCA Program	214,052	230,348
Total Community Measures with CCA	**373,148**	**398,829**

[1] Supporting Measures are the measures that will reduce emissions but cannot be quantified. These measures enhance the quantifiable measures through education and outreach programs.
CCA = Community Choice Aggregation (see pages 13 and 40 for more explanation of CCA)
MT CO_2e = metric tons of carbon dioxide equivalent

3.8 Comparison of Reductions to Targets

Table 10 and Figure 5 summarize the baseline 2008 and updated 2016 community emissions, the projected 2020, 2030, and 2040 emission inventories, as well as the reduced 2030 and 2040 inventories after implementation of the reduction measures for community operations.

By 2030, without implementation of the CCA program, the statewide and local measures together would reduce Corona's community GHG emissions from the 2030 BAU level to 780,327 MT CO_2e, which would exceed the 49 percent below 2008 levels reduction target of 890,378 MT CO_2e for 2030. Implementation of CCA would provide an additional 214,052 in MT CO_2e reductions. In 2040, without the CCA, implementation of statewide and local measures together would reduce emissions from the 2040 BAU level to 693,798 MT CO_2e, which would not meet the 66 percent below 2008 levels reduction target of 593,585 MT CO_2e for 2040. Implementation of the CCA would provide an additional 230,348 in MT CO_2e reductions and would result in emission levels that would meet the target.

Table 10: Community Emissions and Targets Comparison

Sector	2008 MT CO_2e	2016 MT CO_2e	2020 MT CO_2e	2030 MT CO_2e	2040 MT CO_2e
BAU Emissions	1,745,839	1,073,517	1,100,068	1,169,446	1,243,348
State and Federal Reductions	-	-	*90,610*	*230,023*	*381,069*
ABAU Emissions			1,009,458	939,423	862,279
Local Measures Reductions without CCA	-	-	--[1]	*159,096*	*168,481*
Total Adjusted Emissions without CCA	-	-	1,009,458	780,327	693,798
Reduction Target	-	-	1,483,963	890,378	593,585
Additional Reductions Needed without CCA	-	-	Target Met	Target Met	100,213
Local Measures Reductions with CCA	-	-	--	*373,148*	*398,829*
Total Adjusted Emissions with CCA	-	-	1,009,458	566,275	463,450
Additional Reductions Needed with CCA	-	-	Target Met	Target Met	Target Met

[1] No local reduction measures are proposed for 2020 because the ABAU emissions are below the target level.
ABAU = Adjusted Business as Usual
BAU = Business as Usual
CCA = Community Choice Aggregation
MT CO_2e = metric tons of carbon dioxide equivalent

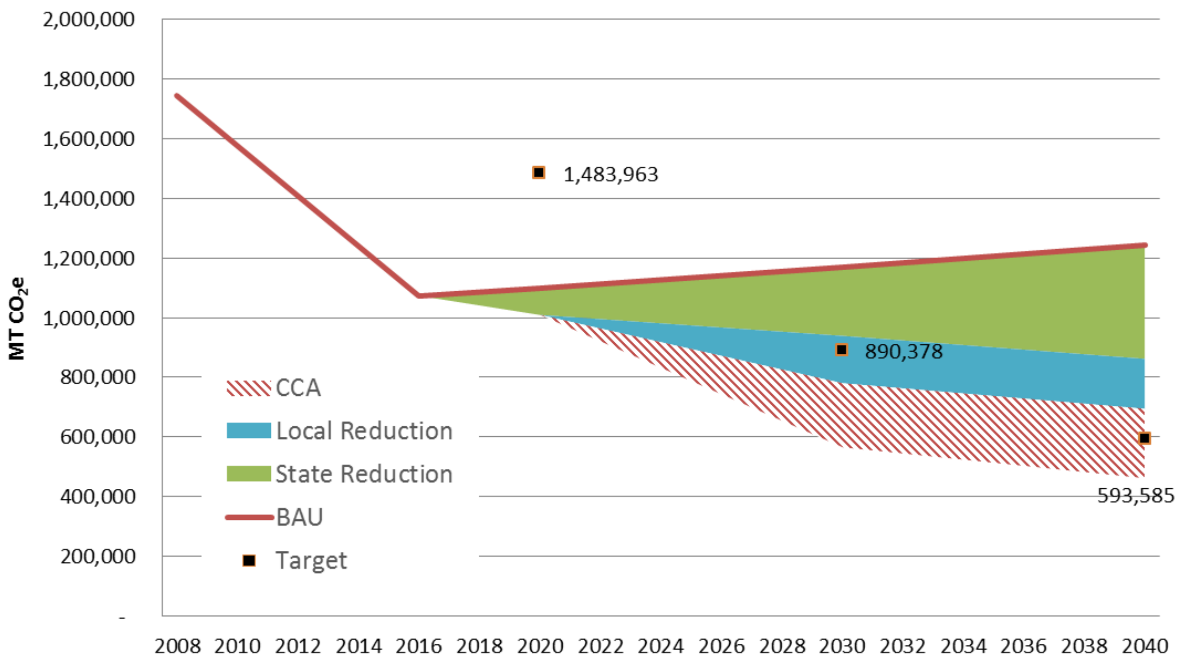


Figure 5: State and Local Reductions Comparison with Targets for Community

3.9 Beyond 2030 Target

The City's emission reduction targets for the years 2020 and 2030 discussed in this CAP are consistent with the goals identified in AB 32 and the corresponding Scoping Plan, which identifies statewide GHG reduction targets by 2020 and 2030. The 2040 forecast year is consistent with the City's 2018 General Plan Update buildout year. It is important to note that 2030 is only a milestone in GHG reduction planning. To be consistent with the State regulations, the City would need to look beyond 2030 and take into consideration Executive Order S-03-05, which calls for a reduction of GHG emissions to a level of 80 percent below 1990 levels by 2050. The City has already set a target for 2040 GHG reductions in this CAP Update at 66 percent below baseline 2008 levels by 2040, which would align the City on a right trajectory to meet the 2050 emissions reduction target.

As the City proceeds with implementing the measures identified above, the reduction targets may need adjustments to reflect updates in the inventory and resultant GHG emission reductions achieved through implementation of these measures from now until 2030. In future when the City would be close to meeting 2030 target per this CAP Update and would have a better understanding of the effectiveness and efficiency of different reduction strategies and approaches, the current 2040 GHG reduction target and measures may need adjustments.

Furthermore, the federal, State, and local programs and policies for the GHG reductions for the near term (2020–2030) are likely to be well underway and continuing technological change in the fields of energy efficiency, alternative energy generation, vehicles, fuels, methane capture and other areas will have taken place. The City will then be able to take the local, regional, State and federal context into account and may consider updating the GHG reduction targets post-2030. The potential new CAP update will include a specific target for GHG reductions for 2050. The targets will be consistent with broader State and federal reduction targets and will take into consideration the effectiveness and applicability of the reduction measures identified in this CAP Update.

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4.0 Adaptation

The City recognizes that planning sustainably is more than reducing GHG emissions; it also requires being prepared for changes that would impact the community's quality of life, use of resources, and economy. Preparedness, or adaptation, efforts seek to reduce vulnerability and increase the local capacity to adapt to changes. Therefore, this CAP Update summarizes changes in average and extreme weather that may occur in the next several decades and identifies actions to build resilience to and adapt to those changes.

4.1 Projections of Future Climate

There is a scientific consensus that California will experience warmer temperatures, increased drought, and more extreme weather events due to climate change.[11] The latest fourth Climate Change Assessment Report further underscores the vulnerability and impacts of climate change on California.[12] The Los Angeles Region[13] Report[14] of the California's Fourth Climate Change Assessment, summarizes the key impacts of climate change as continued future warming, rise in extreme temperatures and number of extreme hot days, variable precipitation with increase in dry and wet extremes and continued sea-level rise. The impacts of Climate Change to Corona are expected to be similar. As a result of Climate Change Corona may expect:

- **Increased temperatures**. By the end of this century, the average United States temperatures are predicted to increase by 3 °F to 12 °F, depending upon the amount of future emissions and how the earth responds to those emissions.[15] For California, the average annual temperature is expected to rise by 2.7 °F by 2050 and 4.1 to 8.6 °F by the end of the century.[16] For Corona, average temperatures are expected to increase between about 8 °F and 10 °F by the end of the century, depending on the emission scenario.[17]

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11 California Natural Resources Agency and California Energy Commission. 2012. *Our Changing Climate 2012: Vulnerability & Adaptation to the Increasing Risks from Climate Change in California.* CEC-500-2012-007. July.

12 California's Fourth Climate Change Assessment Report, 2018 California's Changing Climate http://www.climateassessment.ca.gov/state/docs/20180827-SummaryBrochure.pdf (accessed on February 11, 2019)

13 The Los Angeles region contains all of Ventura, Los Angeles, and Orange Counties, along with adjacent urbanized portions of San Bernardino and Riverside Counties.

14 California's Fourth Climate Change Assessment, Los Angeles Region Report. 2018. Website: http://www.climateassessment.ca.gov/regions/docs/20180928-LosAngeles.pdf (accessed on February 11, 2019).

15 U.S. Global Change Research Program. 2014. *Climate Change Impacts in the United States: The Third National Climate Assessment*. Melillo, Jerry M., Terese (T.C.) Richmond, and Gary W. Yohe, Eds.

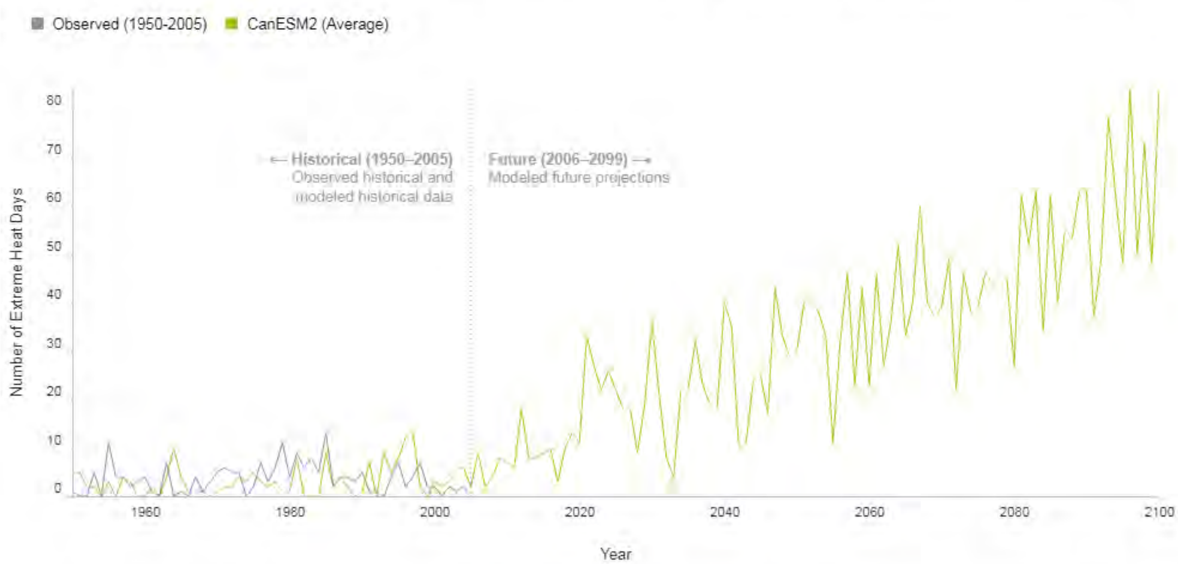
16 California Natural Resources Agency and California Energy Commission. 2012. *Our Changing Climate 2012: Vulnerability & Adaptation to the Increasing Risks from Climate Change in California.* CEC-500-2012-007. July.

17 Cal-Adapt. 2018. https://cal-adapt.org/tools/annual-averages/.

- **Variable precipitation**. Globally, future precipitation is highly variable, and California is no exception. Annual precipitation in California is expected to increase by more than 12 percent through the end of the 21st century. Most of this increase is expected in Northern and Central California; precipitation in Southern California is expected to decrease by 3.3 percent. All regions of California are expected experience wetter winters, with Southern California rain increasing by 11 percent during the rainy months of December, January, and February.[18]
- **Increase in extreme weather events**. Corona currently experiences up to 20 extreme heat days (days warmer than 102 °F) per year. By 2050, the number of extreme heat days in the City could increase to more than 30 days per year, and by the end of the century, the number of extreme heat days could exceed 80 per year (Figure 6).[19]

Number of Extreme Heat Days by Year

This chart shows number of days in a year when daily maximum temperature is above the extreme heat threshold of 102.1 °F. Data is shown for Corona under the RCP 8.5 scenario in which emissions continue to rise strongly through 2050 and plateau around 2100.



- Source: Cal-Adapt. Data: LOCA Downscaled Climate Projections (Scripps Institution of Oceanography), Gridded Historical Observed Meteorological and Hydrological Data (University of Colorado, Boulder)
- Four models have been selected by California's Climate Action Team Research Working Group as priority models for research contributing to California's Fourth Climate Change Assessment. Projected future climate from these four models can be described as producing:
  - A *warm/dry* simulation (HadGEM2-ES)
  - A *cooler/wetter* simulation (CNRM-CM5)
  - An *average* simulation (CanESM2)
  - The model simulation that is most unlike the first three for the best coverage of different possibilities (MIROC5)

Figure 6: Number of Extreme Heat Days per Year for Corona (Observed and Modeled Historical data 1950-2005 and Modeled Future Projections 2006-2099)

18 Allen, Robert J., and Rainer Luptowitz. 2017. El Niño-like Teleconnection Increases California Precipitation in Response to Warming. *Nature Communications* 8: 16055. doi:10.1038/ncomms16055.

19 Cal-Adapt. 2018. Website: https://cal-adapt.org/tools/extreme-heat/.

4.2 Impacts of Climate Change and Adaptation Strategies

Increasing awareness and concern regarding potential climate change impacts has led to some policy responses and programs aimed at providing direction on how the State and Cities, such as Corona, can plan for and respond to the impacts of climate change, such as Executive Order S-13-08, discussed in Chapter 1. Impacts of climate change are already being seen and other more serious consequences are likely to occur in the future. The exact nature of the climate change impacts is unknown and also depends on near-term emissions, but the most likely climate change impacts to the State and to Corona over the next century are discussed below along with strategies to reduce these potential impacts or to build resiliency among communities.

4.2.1 Public Health & Safety

Periods of increased high temperatures or extended high temperatures can lead to increased heat-related, cardiovascular-related, and respiratory illnesses and diseases, and other health impacts. Emergency medical services and hospital visits also increase during heat waves. Changes in temperature are also expected to worsen air quality by increasing ozone and particulate matter concentrations, which can cause or exacerbate respiratory symptoms such as asthma attacks. The City recognizes that climate change will not impact all populations equally. Especially sensitive populations include the young (under 5 years of age) and the elderly (over 65). While Corona has a significantly smaller proportion of elderly residents (7.3 percent) when compared to Riverside County (11.8 percent), the percentage that falls within this age group is trending upwards. Other populations that could be affected by extreme temperatures include outdoor workers such as construction and maintenance employees. This places limits on work hours and may require additional training and understanding of heat-related illnesses that workers should be aware of.

4.2.1.1 Strategies

- Map neighborhoods that could be more vulnerable to the effects of climate change, such as flooding, fire, and the urban heat island effect is important in identifying high-risk areas of the city
- Create cooling centers at public spaces, such as libraries, for populations without air conditioning.
- Implement cooling technologies such as cool roofs and cool pavements
- Strategically place shade trees near buildings, in parking lots, and along bike and pedestrian pathways

4.2.2 Electricity Demand

In addition to the health and public safety risks, Corona may face challenges to its energy supply due to warmer temperatures. Peak demand for electricity may increase due to the increased use of air conditioners in the city and other regions of the City's Department of Water and Power and SCE territory, which may cause brownouts or blackouts. Additionally, efficiencies of electricity generation and transmission decrease as air temperatures increase, which further inhibit the ability of electric providers to meet increased demand.

4.2.2.1 Strategies

- ☐ Educate the public to become more energy efficient and to reduce demand
- ☐ Encourage solar-based or other renewable energy sources to supplement the grid and to reduce peak demand on the grid
- ☐ Improve building envelopes by adding insulation and placing trees to provide shade
- ☐ Encourage cooling technologies
- ☐ Increase the use of smart meter devices to allow appliances to run during off-peak hours

4.2.3 Water Availability

Water availability is and has been a vital economic, natural resource, and public health issue in California. Governor Jerry Brown declared a drought State of Emergency in January 2015 and the State Water Resources Control Board (SWRCB) announced in March 2015 that water suppliers were encouraged to go beyond the minimum requirements to safeguard remaining water supplies. In April 2015, the Governor issued Executive Order B-29-15 that directs the SWRCB to implement mandatory water reductions to reduce water usage by 25 percent. Multiyear droughts decrease water supplies, while population growth exacerbates the problem by increasing demand. Supply limitations will only intensify as climate change causes reduced rainfall and increased temperatures. Water demand in California is already increasing because of population expansion. In addition, demand for water for irrigation rises with warmer temperatures. Summers with higher temperatures and even less rainfall and runoff than usual will exacerbate demands for water in California.

4.2.3.1 Strategies

- ☐ Educate the public about water conservation.
- ☐ Encourage low-impact development.
- ☐ Expand water recycling and graywater systems.
- ☐ Promote conversion of turf grass to xeriscaping.

4.2.4 Infrastructure Damage

Cities, including Corona, rely on infrastructure for commuting, working, and other basic services. Roadways and buildings are constructed for long-term use; however, infrastructure is also susceptible to the impacts of climate change as it is generally built to meet historic climate conditions. Therefore, infrastructure is also vulnerable to climate change impacts. Many roadways and railways are dark or metal-based, conducting heat and raising temperatures well beyond the observed air temperature. Increased temperatures can cause pavement to soften and to expand, causing potholes. Railways can buckle under extreme heat, requiring trains to slow to navigate the buckle or stop service for repairs. Flooding can also shorten the life of roadway infrastructure, require more maintenance, and cause traffic delays. Building infrastructure likewise may have shortened lifetimes due to flooding.

4.2.4.1 Strategies

- ☐ Evaluate infrastructure vulnerability based on current degradation and expected climate-related impacts
- ☐ Prioritize and plan for infrastructure improvements
- ☐ Identify alternative routes where infrastructure damage may occur

4.2.5 Wildfire

Wildfire in Southern California is influenced by a multitude of factors, including a dry and warm Mediterranean climate with periodic episodes of Santa Ana winds and droughts, the type and spatial distribution of vegetation (along with dead/ dry vegetation caused by pests), varying topography, large urban-wildland interfaces, past fire suppression attempts, and human activities. Projections indicate that wildfire may increase over Southern California, but there remains uncertainty in quantifying future changes of burned area over the LA region[20]. This uncertainty applies to Corona too. However, it is important that the City is prepared to deal with any wildfire situation and take preventative steps to mitigate risks.

About 14 percent of Corona is covered by open space, which is the type of land most vulnerable to wildfire. Homes and buildings near open space areas could also be threatened by future wildfires. Effects from wildfire can include eye and respiratory illness, worsening asthma, allergies, chronic obstructive pulmonary disease, and other cardiovascular and respiratory diseases. All new buildings within a State Responsibility Area, Local Agency Very-High Fire Hazard Severity Zone, or Wildland-Urban Interface Fire Area designated by the enforcing agency must comply with all sections of the Wildland-Urban Interface Fire Area Building Standards. These standards provide a reasonable level of exterior wildfire exposure protection for buildings within these hazard areas and establish minimum standards for materials and material assemblies to lessen the vulnerability of a building to resist the intrusion of flames and burning embers projected during a conflagration or wildfire.[21] Additional resources may be needed to combat additional wildfires in the region, including water.

[20] California's Fourth Climate Change Assessment, Los Angeles Region Report, 2018 http://www.climateassessment.ca.gov/regions/docs/20180928-LosAngeles.pdf (accessed on February 11, 2019)

[21] Department of Forestry and Fire Protection, Office of the State Fire Marshal. 2007. *Wildland-Urban Interface Building Standards Information Bulletin*. Website: http://www.fire.ca.gov/fire_prevention/downloads/IB_LRA_Effective_Date.pdf (accessed December 5, 2017).

4.2.5.1 Strategies

- ☐ Educate the public on the importance of fire safety.
- ☐ Encourage buffer zones between vegetation and infrastructure.
- ☐ Identify fire-prone habitats, evaluate and plan for increased risk of larger and more frequent wildfires.

4.2.6 Social Equity

The City recognizes that some disadvantaged populations (e.g., youth, elderly, low-income) may need special assistance in adapting to future climate changes. Disadvantaged populations are more likely to be without air conditioning and may need assistance in accessing cooling locations, especially if they do not have cars or cannot drive. Disadvantaged populations may also face increased financial hardships with increased energy use. While the City may not be able to change the underlying factors of disadvantaged populations (e.g., age, health status, socio-economics) it can provide information and access to resources to help these populations adapt to future climate changes.

4.2.6.1 Strategies

- ☐ Increase public outreach and educational programs to inform the public of health and safety resources
- ☐ Assist in facilitating access to cooling centers for the public
- ☐ Provide information about available low-income weatherization programs and identify other outreach methods to increase visibility and familiarity with these programs
- ☐ Educate the public on the benefits of improved occupant comfort and reduced utility bills

5.0 Plan Implementation

This chapter describes implementation steps for the CAP Update to support achievement of the energy efficiency and GHG reduction goals for the community at large. Success in meeting the City's energy efficiency and GHG emission reduction goals will depend on cooperation, innovation, and participation by the City, residents, businesses, and local government entities. This section outlines key steps that the City would follow for the implementation of this CAP Update.

Successful implementation of the CAP will require the following components. These are described in more detail the sections below.

- Administration and staffing
- Financing and budgeting
- Timelines for measure implementation
- Community outreach and education
- Monitoring, reporting, and adaptive management

The steps above are basic steps that any city might take or that other California communities have taken to implement a GHG reduction plan. These are suggested—not required—and are intended to guide a city in its implementation planning.

5.1 Administration and Staffing

The CAP Update's success will require coordination with other regional agencies. The City will work with these agencies and will designate staff to oversee the successful implementation and the tracking of all selected GHG reduction strategies. The City will primarily be responsible for coordinating with contacts across departments to gather data, to report on progress, to track completed projects, and to ensure that scheduling and funding of upcoming projects is discussed at key City meetings. The City may identify one or more staff to act as the Plan Implementation Administrator(s) to guide monitoring, reporting, and dissemination of information to the public. Where possible, the City may use assistants from programs such as CivicSpark, an AmeriCorps program designed to build capacity for local governments to address climate change.

The Administrator could have the following responsibilities:

- Secure long-term financing for the energy efficiency and GHG reduction measures (i.e., grant applications)
- Coordinate CAP Update implementation-related meetings
- Serve as the external communication hub to local and regional climate action organizations, including SCAG
- Conduct public outreach to inform the community of the City's reduction planning efforts

- Investigate methods to use existing resources and harness community support to better streamline implementation of the Plan
- Monitor implementation of reduction measures and success of the CAP Update
- Develop a protocol for monitoring the effectiveness of emission-reduction programs
- Establish guidelines for reporting and documenting emission-reduction progress.
- Submit annual reports to the City Council
- Develop a protocol for using the real-time information collected through the verification process to modify and revise existing reduction programs
- Track State and federal legislation and its applicability to the City

In general, the goal in implementing the CAP is not to create new administrative tasks or new staff positions necessarily, but rather to leverage existing programs and staff to the maximum extent feasible. Cities should seek to fold GHG planning and long-term reduction into their existing procedures, institutional organization, reporting, and long-term planning.

5.2 Financing and Budgeting

Implementation of the local GHG reduction measures may require investment for the capital improvements and other investments, and increased operations and maintenance costs. However, in some cases operating costs are anticipated to decrease, resulting in offset savings. This section presents a summary of funding and financing options (Table 11) available at the time of writing this document. Some funding sources are not necessarily directed towards a city, but to a larger regional agency such as SCAG, or a waste services provider serving multiple jurisdictions. The City should monitor private and public funding sources for new grant and rebate opportunities and to better understand how larger agencies are accessing funds that can be used for GHG reductions in their areas. Leveraging financing sources is one of the most important roles a local government can play in helping the community to implement many of the GHG reduction measures.

Table 11: Potential Funding Sources to Support GHG Reduction Measures

Funding Source	Description
State and Federal Funds	
Federal Tax Credits for Energy Efficiency	■ Tax credits for energy efficiency can be promoted to residents.
Energy Efficient Mortgages (EEM)	■ An EEM is a mortgage that credits a home’s energy efficiency in the mortgage itself. ■ Residents can finance energy-saving measures as part of a single mortgage. ■ To verify a home’s energy efficiency, an EEM typically requires a home energy rating of the house by a home energy rater before financing is approved. ■ EEMs are typically used to purchase a new home that is already energy efficient, such as an ENERGY STAR®-qualified home.

Table 11: Potential Funding Sources to Support GHG Reduction Measures

Funding Source	Description
California Department of Resources Recycling and Recovery (CalRecycle)	■ CalRecycle grant programs allow jurisdictions to assist public and private entities in management of waste streams. ■ Incorporated cities and counties in California are eligible for funds. ■ Program funds are intended to: ○ Reduce, reuse, and recycle all waste ○ Encourage development of recycled-content products and markets ○ Protect public health and safety and foster environmental sustainability
California Energy Commission (CEC)	■ CEC has energy efficiency financing options for projects with proven energy savings. These options include 0% interest rate loans for K–12 school districts, county offices of education, State special schools, community colleges, and 1% interest rate loans for cities, counties, special districts, public colleges or universities, public care institutions/public hospitals, University of California campuses, and California State University campuses. ■ Projects eligible for the CEC energy efficiency financing low interest loans include: ○ Lighting system upgrades ○ Pumps and motors ○ Streetlights and light-emitting diode (LED) traffic signals ○ Building insulation ○ Heating, ventilation and air conditioning equipment ○ Water and waste water treatment equipment
California Air Resources Board (CARB)	■ CARB offers several grants, incentives, and credits programs to reduce on-road and off-road transportation emissions. Residents, businesses, and fleet operators can receive funds or incentives depending on the program. ■ The following programs can be utilized to fund local measures: ○ Air Quality Improvement Program (Assembly Bill 118) ○ Carl Moyer Program – Voucher Incentive Program ○ Goods Movement Emission Reduction Program (Proposition 1B Incentives) ○ Loan Incentives Program ○ Lower-Emission School Bus Program/School Bus Retrofit and Replacement Account (Proposition 1B and United States Environmental Protection Agency Incentives)
Existing Capital Improvement Program	■ State and federal funds would most likely continue to local governments, builders, and homeowners in the following forms: ○ Grants ○ Transportation and transit funding ○ Tax credit and rebate programs ○ The Capital Improvement Program can be used for measures relating to traffic or transit.
State Funding for Infrastructure	■ The State's Infill Infrastructure Grant Program may potentially be used to help fund measures that promote infill housing development. ■ Grants can be used for gap funding for infrastructure improvements necessary for specific residential or mixed-use infill development projects.

Table 11: Potential Funding Sources to Support GHG Reduction Measures

Funding Source	Description
Transportation-Related Federal and State Funding	■ For funding measures related to transit, bicycle, or pedestrian improvements, the following funding sources from SCAG may be used. ○ Sustainability Planning Grant ○ California Active Transportation Program ■ Caltrans Transportation Planning Grant Program provides funding that would lead to programming and implementation of transportation improvement projects. ○ Sustainable Communities Grants ○ Strategic Partnerships Grants ○ Adaptation Planning Grants
Utility Rebates	■ Department of Water and Power offers a variety of residential and commercial rebate programs: ○ Residential and Commercial Turf Replacement Program ○ Pool/Spa Cover Rebates ○ Rebates for Water-Efficient Devices ○ Recirculating Pump Rebate ○ Free Urinal Flush Valve Upgrades and Installation ■ Southern California Edison is one of the utilities participating in the California Solar Initiative. ■ A variety of rebates are available for existing and new homes. ■ Photovoltaics, thermal technologies, and solar hot water projects are eligible. ■ Single-family homes, commercial development, and affordable housing are eligible.
Energy Upgrade California	■ The program is intended for home energy upgrades. ■ Funding comes from the American Recovery and Reinvestment Act, California utility ratepayers, and private contributions. ■ Utilities administer the program, offering homeowners the choice of one of two upgrade packages—basic or advanced. ■ Homeowners are connected to home energy professionals. ■ Rebates, incentives, and financing are available. ■ Homeowners can receive up to $4,000 back on an upgrade through the local utility.
Private Funding	
Private Funding	■ Private equity can be used to finance energy improvements, with returns realized as future cost savings. ■ Rent increases can fund retrofits in commercial buildings. ■ Net energy cost savings can fund retrofits in households. ■ Power Purchase Agreements involve a private company that purchases, installs, and maintains a renewable energy technology through a contract that typically lasts 15 years. After 15 years, the company would uninstall the technology or sign a new contract. ■ On-Bill Financing (OBF) can be promoted to businesses for energy-efficiency retrofits. OBF funding is a no-interest loan that is paid back through monthly utility bills. Lighting, refrigeration, HVAC, and LED streetlights are all eligible projects.

Table 11: Potential Funding Sources to Support GHG Reduction Measures

Funding Source	Description
Other Funding Mechanisms for Implementation	
Other Funding	■ Increased operating costs can be supported by grants from the Strategic Growth Council or the State Department of Conservation to fund sustainable community planning, natural resource conservation and development, and adoption.
Future Funding Options: Funding Mechanisms for Capital and/or Implementation Costs	
New Development Impact Fees	■ These types of fees may have some potential to provide funding, but such fees are best implemented when the real estate market and overall regional economic conditions are strong.
General Obligation Bond	■ A general obligation bond is a form of long-term borrowing and could be used to fund municipal improvements.
AB 811 Districts Property-Assessed Clean Energy (PACE)	■ Assembly Bill (AB) 811 is intended to help municipalities accomplish the goals outlined in Assembly Bill 32. ■ The PACE finance program is intended to finance energy and water improvements within a home or business through a land-secured loan, and funds are repaid through property assessments. ■ Municipalities are authorized to designate areas where property owners can enter into contractual assessments to receive long-term, low-interest loans for energy and water efficiency improvements, and renewable energy installation on their property. ■ Financing is repaid through property tax bills. ■ AB 811 and the PACE program are currently on hold for residential properties due to potential violation of standard Federal Housing Finance Agency federally guaranteed (Fannie Mae/Freddie Mac) residential mortgage contracts. ■ The Western Riverside Council of Governments (WRCOG) has implemented the Home Energy Renovation Opportunity (HERO; a PACE program) in Riverside County to assist residents in financing residential energy efficiency and solar retrofits.

HVAC = heating, ventilation, and air conditioning
SCAG = Southern California Association of Governments
WRCOG = Western Riverside Council of Governments

In addition to pursuing the funding options above and monitoring the availability of others, the City should take the following steps to best inform decisions related to the cost of GHG reduction measures:

- **Perform and refine cost estimates.** Cost estimates for local reduction measures should be performed to identify the cost-effectiveness of each measure to inform and to guide the implementation process. This analysis will likely be based on a variety of participation, per-unit, and other assumptions. As programs are developed, cost estimates should be refined and updated over time with more precise implementation-level data.
- **Integrate GHG reduction into existing City budget and Capital Improvements Program.** Certain capital improvements may need to be added to the City's Capital Improvements Program (CIP) and facility master plan programs, as well as those of the City utility enterprises and other public agencies that have control for project implementation. For CIPs

completely under the City's control, new projects would need to be assessed for consistency with the CAP.

- **Adopt or update ordinances and/or codes:** Some local reduction measures may require new or revised ordinances. Staff would need to coordinate these efforts in conjunction with planning departments, planning commissions, and City councils.
- **Pursue outside funding sources:** A range of funding from State and federal agencies has been identified. The City would need to pursue these (and other emerging) funding sources as a part of implementation efforts.
- **Implement and direct preferred City funding sources:** While City funding sources are limited, the City, when financially able, as a part of its budget process, could appropriate funding from general sources or make changes in its fee schedules, utility rates, and other sources as needed to support funding the implementation of the GHG reduction measures.
- **Create monitoring/tracking processes:** Local reduction measures would require program development, tracking, and/or monitoring.
- **Identify economic indicators to consider future funding options:** Economic recovery may occur rapidly or slowly. Whatever the timeframe, the City would need to determine the point at which certain additional funding sources may become feasible and/or favorable. Identification and monitoring of economic indicators and trends, such as home prices, energy prices, cost per kWh on solar installations, unemployment rates, or real wage increases, can help the City decide when to further explore the potential for funding local reduction measures through different financing mechanisms.

5.3 Timelines for Measure Implementation

After taking into account the reductions in energy and water usage and the GHG emissions resulting from statewide measures, the City would need to implement the local reduction measures to reach its reduction targets.

The City has developed an implementation schedule for the local reduction measures. Prioritization was based on the following factors:

- Cost effectiveness
- GHG reduction efficiency
- Availability of funding
- Level of City Control
- Ease of implementation
- Time to implement

To encourage implementation of all reduction measures, City staff would develop a CAP Update Implementation Timeline. Measure prioritization could be based on the following factors.

- **Cost/Funding:** How much does the measure cost? Is funding already in place for the measure?

- **Greenhouse Gas Reductions:** How effective is the measure at reducing greenhouse gases?
- **Other Benefits:** For example, does the measure improve water quality or conserve resources? Would it create jobs or enhance community well-being?
- **Consistency with Existing Programs:** Does the measure complement or extend existing programs?
- **Impact on the Community:** What are the advantages and disadvantages of the measure to the community as a whole?
- **Speed of Implementation:** How quickly can the measure be implemented and when would the City begin to see benefits?
- **Implementation Effort:** How difficult will it be to develop and implement the program?

A qualitative appraisal of implementation effort for the City is also provided. Measures can be categorized based on the convention of low, medium, or high, with low-level measures requiring the least level of effort by the City and being the most likely to be pursued immediately (i.e., the low-hanging fruit). Sample criteria are shown in Table 12.

Table 12: Implementation Matrix

Implementation Effort Level	Sample Criteria
Low	■ Requires limited staff resources to develop. ■ Existing programs in place to support implementation. ■ Required internal and external coordination is limited. ■ Required revisions to policy or code are limited.
Medium	■ Requires staff resources beyond the typical daily level. ■ Policy or code revisions become necessary. ■ Internal and external coordination (e.g., with stakeholders, other cities or agencies, or general public) is necessary.
High	■ Requires extensive staff time and resources. ■ Requires the development of completely new policies or programs and potential changes to the general plan. ■ Requires a robust outreach program to alert residents and businesses of program requirements and eligibility. ■ Requires regional cooperation and securing long-term funding.

5.4 Community Outreach and Education

Corona's citizens and businesses are integral to the success of the CAP Update and to overall GHG reduction for the region. Their involvement is essential, considering that several measures depend on the voluntary commitment, creativity, and participation of the community.

The City would educate stakeholders, such as businesses, business groups, residents, developers, and property owners about the GHG reduction measures that require their participation, encourage participation in these programs, and alert them to program requirements, incentives and/or rebate availability, depending on the measure. City staff would schedule periodic meetings to facilitate formal community involvement in CAP Update implementation and adaptation over time. This could include focused meetings for a specific measure or program such as the PACE program and/or agenda items at City Council or other public meetings. These meetings would be targeted to particular stakeholder groups and provide information on CAP implementation progress as well as the implementation of a specific program or new policy. Alternatively, periodic written updates could be provided in City newsletters, SCAG's newsletter, on City websites, or through other media communications with the general public, such as press releases and public service announcements. Stakeholders would be provided an opportunity to comment on potential improvements or changes to the CAP Update. The City would also sponsor periodic outreach events to directly inform and solicit the input, suggestions, and participation of the community at large.

5.5 Monitoring, Reporting, and Adaptive Management

Regular monitoring is important to ensure programs function as they were originally intended. Early identification of effective strategies and potential issues would enable the City to make informed decisions on future priorities, funding, and scheduling. Moreover, monitoring provides concrete data to document the City's progress in reducing GHG emissions. The City would be responsible for developing a protocol for monitoring the effectiveness of emission reduction programs as well as for undertaking emission inventory updates:

- **Update GHG Inventory:** The City would update inventory emissions prior to 2030 to ensure they meet their GHG reduction goals. This includes regular data collection in each of the primary inventory sectors (utility, regional VMT, waste, wastewater, and water), and comparing the inventory to the City's baseline GHG emissions in 2008. The City would consolidate information in a database or spreadsheet that could be used to evaluate the effectiveness of individual reduction measures.
- **Track State Progress:** The CAP Update will rely heavily on State-level measures. The City would be responsible for tracking the State's progress on implementing State-level programs. Close monitoring of the real gains being achieved by State programs would allow the City to adjust its CAP, if needed.
- **Track Completion of GHG Reduction Measures:** The City would keep track of measures implemented as scheduled in the CAP Update, including progress reports on each measure, funding, and savings. This will allow at least a rough attribution of gains when combined with regular GHG inventory updates.
- **Regular Progress Reports:** The City may report annually (or semi-annually or at other assigned intervals) to the City Council on CAP Update implementation progress. If annual reports, periodic inventories, or other information indicates that the GHG reduction measures are not as effective as originally anticipated, the CAP may need to be adjusted, amended, or supplemented.

5.6 Tracking Tools

5.6.1 Screening Tables

The purpose of the screening tables is to provide a measurable way of determining if a development project is implementing the GHG Performance Standard and is able to quantify the reduction of emissions attributable to certain design and construction measures incorporated into development projects. The screening table assigns points for each option incorporated into a project as mitigation or a project design feature (collectively referred to as "feature"). The point values correspond to the minimum emission reduction expected from each feature. The menu of features allows maximum flexibility and options for how development projects can implement the GHG Performance Standard. Projects that earn enough points would be consistent with the reductions anticipated in the City's CAP Update.

The City would use a Screening Tables tracker tool, which is a Microsoft Excel-based spreadsheet program that can be used to track implementation of the various menu options within the screening tables. This spreadsheet would allow the City to track cumulative points garnered by projects and to predict emission reductions. These values of reductions can then be input into the GHG Performance Standard within the Plan Implementation Tracker Tool (PITT) described in more detail below.

5.6.2 Plan Implementation Tracker Tool (PITT)

The City's PITT is integrated into the City's Trak-it permit application tracking software that will help the City track GHG reductions achieved through implementation of the GHG reduction measures within the CAP Update, to monitor the plan's implementation progress, and to share findings with stakeholders, partners, and the community.

The PITT will help derive estimates for annual GHG reductions achieved by State, County, and local reduction measures to track progress toward meeting the City's GHG reduction targets. This is achieved by monitoring trends over time on a live feed from the PITT to a web-based dashboard incorporated into the City's website. The dashboard will focus on progress in local reductions and used as a reporting mechanism. City staff will review the monitoring dashboard and assess if the City needs to revise reduction measures based on results to achieve the reduction targets.

Once implemented the PITT will demonstrate climate action planning leadership and initiative, to assist the State and the region in meeting the reduction targets outlined under AB 32, to demonstrate CAP Update progress, to show and communicate results, and to adaptively manage the CAP's implementation to ensure achievement of the reduction target.

5.6.3 Progress Reports

The CAP Update will be tracked continuously through the City's Trak-it permitting software and reported continuously in a live feed to a CAP Reporting Dashboard on the City's website. This automated tracking system will be used by the City to report progress toward the CAP Goals. Metrics would be established for all measures to more specifically track implementation progress.

Sector summaries would be provided on the dashboard to identify each measure, the tracking metric, and emission reductions achieved to date.

The City will use the CAP Reporting Dashboard to assess progress toward the reduction targets and to highlight any adaptive management of the reduction strategies needed to achieve the targets.

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APPENDIX A

GHG INVENTORY, FORECASTING, AND TARGET-SETTING REPORT

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CITY OF CORONA
GHG INVENTORY, FORECASTING, AND TARGET-SETTING REPORT FOR A CLIMATE ACTION PLAN

CLIMATE ACTION PLAN UPDATE

CITY OF CORONA, CALIFORNIA

LSA

August 2018

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CITY OF CORONA
GHG INVENTORY, FORECASTING, AND TARGET-SETTING REPORT FOR A CLIMATE ACTION PLAN

CLIMATE ACTION PLAN UPDATE

CITY OF CORONA, CALIFORNIA

Prepared for:

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August 2018

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LIST OF ABBREVIATIONS AND ACRONYMS

AB	Assembly Bill
ADC	Alternative Daily Cover
BAU	Business-as-Usual
CAFE	Corporate Average Fuel Economy
CAP	Climate Action Plan
CARB	California Air Resources Board
CH_4	Methane
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalents
EO	Executive Order
GHG	Greenhouse Gas
GWP	Global Warming Potential
IFT	Inventory, Forecasting, and Target-Setting
IPCC	Intergovernmental Panel on Climate Change
kWh	Kilowatt-hour
LCFS	Low Carbon Fuel Standard
MT	Metric Tons
N/DN	Nitrification/denitrification
N_2O	Nitrous Oxide
RPS	Renewable Portfolio Standard
SCAG	Southern California Association of Governments
SCE	Southern California Edison
SEEC	Statewide Energy Efficiency Collaborative

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KEY FINDINGS

The GHG inventory, Forecasting, and Target-Setting Report was developed to summarize the review of the greenhouse gas (GHG) emissions inventory and forecasts update and based upon that review recommend GHG reduction targets for the City of Corona to incorporate into a Climate Action Plan. Key findings are summarized below.

- The City of Corona 2016 greenhouse gas (GHG) emission was 1,073,517 metric tons carbon dioxide equivalent (MT CO_2e).

- On-road Transportation was the largest contributor of emissions, accounting for 46 percent (498,985 MT CO_2e) of total emissions.

- Energy-related emissions including thee Commercial/Industrial Energy sector and Residential Energy sector, which account for 31 percent and 16 percent of the total community emissions, respectively.

- Under the Business-as-Usual (BAU) forecast, emissions will be 1,100,068 MT CO_2e in 2020, 1,169,446 MT CO_2e in 2030, and 1,243,348 MT CO_2e in 2040. These emissions levels are 2.5 percent higher in 2020 than 2016, 8.9 percent higher in 2030 than 2016, and 15.8 percent higher than 2016 by 2040.

- Under the Adjusted BAU forecast, emissions will be 1,009,458 MT CO_2e in 2020, 939,423 MT CO_2e in 2030, and 862,279 MT CO_2e in 2040. These emissions levels are 6.0 percent lower in 2020 than 2016, 12.5 percent lower in 2030 than 2016, and 19.7 percent lower than 2016 by 2040.

- The City should choose a reduction target that is feasible and ambitious. The State recommends reducing GHG emissions to 1990 levels by 2020, which is equal to a 15 percent reduction below baseline (2008) levels. The City would achieve this target from an Adjusted BAU forecast by 2020 which includes statewide reductions in combination with continued implementation of the currently adopted Corona CAP.

- To continue reductions consistent with the State's interim emissions reduction goal of lowering emissions 40 percent below 1990 levels by 2030 and long-term goal of 80 percent below 1990 levels by 2050, the City would need to reduce emissions 49,045 MT CO_2e by 2030 and 268,694 MT CO_2e by 2040 from Adjusted BAU forecasts. These are equivalent to 49 percent and 66 percent reduction, respectively, from baseline (2008) levels.

- The CAP update will focus on developing reduction strategies toward achieving the 2030 and 2040 reduction goals.

INTRODUCTION

The Greenhouse Gas (GHG) Inventory, Forecasting, and Target-Setting (IFT) Report contains the first steps toward the City of Corona (City) identifying GHG reduction measures in a Climate Action Plan (CAP). The inventory describes historic energy use and GHG emissions and the forecasts describe projected future emissions in the City. The target-setting section describes GHG reduction recommendations that are consistent with State goals and may assist the City in establishing local GHG reduction targets. The inventory and recommended reduction targets will help the City in the next step of the CAP, which is to identify GHG reduction measures that are relevant, meaningful, and feasible.

Specifically, the IFT Report includes (key terms are described in Table 1):

- Historic GHG emissions in **community inventory** for 2016;
- Future GHG emissions for 2020, 2030 and 2040 under a **business-as-usual** forecast scenario and **adjusted business-as-usual** forecast scenario; and
- Recommended GHG **reduction targets** for 2020, 2030 and 2040.

Table 1. Key Terms in the Report[1]

Term	Definition
Adjusted business-as-usual	A GHG forecast scenario that accounts for known policies and regulations that will affect future emissions. Generally, these are state and federal initiatives that will reduce emissions from the business-as-usual scenario.
Baseline year	The inventory year used for setting targets and comparing future inventories against.
Business-as-usual	A GHG forecast scenario that assumes no change in policy affecting emissions since the most recent inventory. Changes in emissions are driven primarily through changes in demographics.
Community Inventory	GHG emissions that result from the activities by residents and businesses in the city. An inventory reports emissions that occur over a single calendar year.
Emission factors	The GHG-intensity of an activity.
Reduction targets	GHG emissions levels not to be exceeded by a specific date. Local reduction targets are often informed by state recommendations and different targets may be established for different years.
Sector	A subset of the emissions inventory classified by a logical grouping such as economic or municipal-specific category.

Source: AEP White Paper: Forecasting Community-wide GHG Emissions and Setting Reduction Targets (AEP May 2012).

[1] A glossary of terms is also included as Appendix A.

GHG EMISSIONS INVENTORY

GHG emissions inventories are the foundation of planning for future reductions. Establishing an existing inventory of emissions helps to identify and categorize the major sources of emissions currently being produced. A **baseline year** was identified as the year of 2008 in the City's 2012 CAP. A baseline year is established as a starting point against which other inventories may be compared and targets may be set, and is generally the earliest year with a full emissions inventory. In this report, the year of 2016 is presented for the community inventory to show the major sources of emissions in the City and the City's progress towards reduction targets.

EMISSIONS REPORTING

The primary GHGs from the community operations are from carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Because each of these gases has a different capacity for trapping heat in the atmosphere, known as its global warming potential (GWP), a method of reporting is needed to be able to compare gases in the same terms. As a result, emissions are reported in carbon dioxide equivalents, or CO_2e, with each GHG normalized and calculated relative to CO_2 using its GWP. Table 2 describes the GHGs analyzed in this report, their symbol, GWP, and primary community sources of emissions. While N_2O has the highest GWP and may be considered the most dangerous on a per-molecule basis, CO_2 is by far the most prevalent, accounting for 83 percent of statewide emissions in 2016 (CARB 2018).

Table 2. GHGs Analyzed in the Inventories

Greenhouse Gas	Symbol	Global Warming Potential	Primary Community Sources
Carbon Dioxide	CO_2	1	Fossil fuel combustion
Methane	CH_4	28	Fossil fuel combustion, landfills, wastewater treatment
Nitrous Oxide	N_2O	265	Fossil fuel combustion, wastewater treatment

Source: IPCC Fifth Assessment Report, 2014.

Emissions Sectors

The inventory identifies the major sources of GHG emissions caused by activities in sectors that are specific to community activities. A **sector** is a subset of the economy or society whose components share similar characteristics. An emissions sector can also contain subsectors that provide more specificity about the source of emissions (e.g., natural gas and electricity are subsectors of the energy sector).

The community inventory is categorized by sectors based on the sector's ability to be affected through regional and local programs, incentives, zoning, and other policies. The City's community inventory was divided into the following sectors:

- **Energy** in the Community Inventory is further broken down into two sectors:
  - **Commercial/Industrial Energy** includes emissions from electricity and natural gas consumption in non-residential buildings and facilities (including outdoor lighting) in the City.
  - **Residential Energy** includes emissions from electricity and natural gas consumption in residential buildings in the City.
- **On-road Transportation** includes emissions from vehicle fuel use in trips wholly within the City (in-boundary) and trips that either originate or end in the City (cross-boundary). Emissions from in-boundary trips are fully accounted for in the inventory, whereas only half of the emissions from cross-boundary trips are accounted for. Trips that pass-through the City, such as on SR-91 or I-15, are not accounted for in the inventory because the City has little or no control of these emissions. As a result, this methodology reflects only trips or parts of trips within City borders that the City has the ability to affect.
- **Solid Waste** includes emissions from waste that is generated in the community and sent to landfills.
- **Water** includes emissions from the electricity used to source, treat, and deliver imported water in the community that is not accounted for in the community utility data.
- **Wastewater** includes emissions from treating wastewater generated in the community.
- **Off-road Sources** include emissions from operating equipment for construction, commercial, light industrial and agricultural activities; lawn and garden equipment; and recreational vehicles such as all-terrain vehicles.

Calculation Methodology

GHG emissions were calculated using activity data available (e.g., kilowatt-hours of electricity) for each sector and protocols for converting activity data to emissions output using relevant **emission factors**. Emission factors relate the activity to GHG emissions and may vary by year (e.g., for electricity) and often are not affected by local actions or behavior, unlike activity data. The U.S. Community Protocol for Accounting and Reporting Greenhouse Gas Emissions (ICLEI 2012) was the primary protocol used for developing the community inventory. Activity data are reported in the community emissions subsection below, and emission factors are detailed in Appendix B.

COMMUNITY EMISSIONS

The community inventory includes the GHG emissions that result from activities within City boundaries. This section presents the findings of the community inventory for the year of 2016, and more specific detail and findings on the energy sectors.

2016 Emissions Summary

As shown in Figure 1 and Table 3, the On-Road Transportation sector was the largest contributor to emissions in 2016 (46 percent) by producing 498,985 MT CO_2e. Commercial/Industrial energy is the second-largest contributor to emissions, adding 31 percent in 2016. The emissions from the Residential energy sector were 171,047 MT CO_2e in 2016, taking 16 percent of the total emissions. The Residential and Commercial/Industrial energy combined took 47 percent of the total emissions. Solid waste comprised 5 percent of the total (55,642 MT CO_2e). Water, Wastewater, and Off-road sources made up the remaining emissions. Water and Wastewater emissions comprised 2 percent of the total emissions, while Off-road sources comprise a very small percentage of overall emissions.

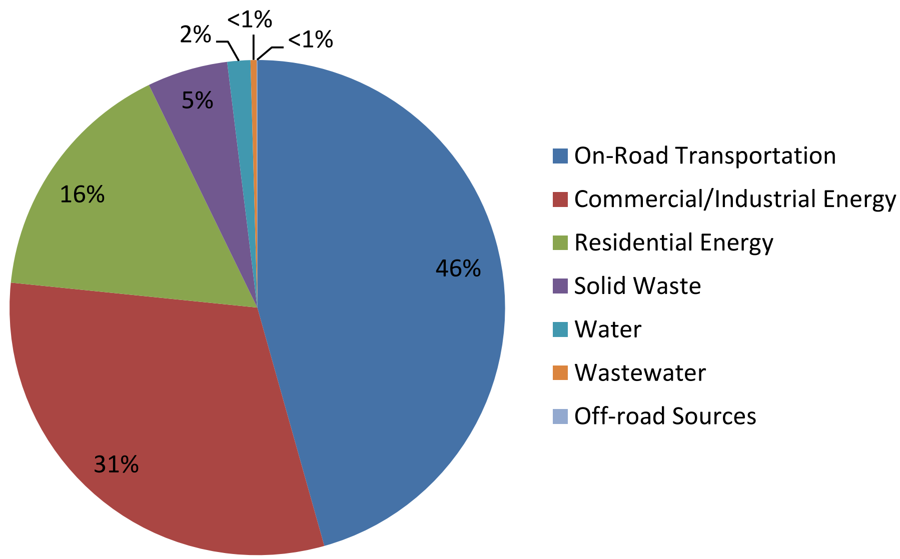


Figure 1. Community-Wide GHG Emissions by Sector for 2016

Table 3. Community-Wide GHG Emissions by Sector for 2016

Sector	2016 (MT CO_2e)	Percent of Total
On-Road Transportation	498,985	46
Commercial/Industrial Energy	327,311	31
Residential Energy	171,047	16
Solid Waste	55,642	5
Water	15,909	2
Wastewater	4,198	<1
Off-road Sources	426	<1
Total	**1,073,517**	**100**

Source: SEEC ClearPath Tool for the City of Corona, 2018.

Activity data can provide more insight into behavioral changes in the community, as these data are not affected by emission factors. Table 4 summarizes activity data for each sector and subsector. Wastewater and Off-road emissions use indicator data to attribute county-level emissions to the City and the indicator data are also shown in Table 4.

Table 4. Activity Data used in 2016 Community Inventory

Sector	Data
On-road Transportation	
Total Vehicle Miles Traveled	1,303,740,162
Commercial/Industrial Energy	
Electricity (kWh)	898,057,448
Natural Gas (therms)	21,015,979
Residential Energy	
Electricity (kWh)	367,883,307
Natural Gas (therms)	15,559,287
Solid Waste	
Landfilled (tons)	204,211
ADC (tons) [1]	147
Water and Wastewater	
Commercial/Industrial Water (million gallons)	3,501
Residential Water (million gallons)	6,515
Wastewater (City population)	165,366
Off-road sources[2] (Percent of Riverside County emissions attributed to the City)	
Lawn & Garden (Percent of Households)	6.6
Construction (Percent of Building permits)	1.3
Industrial (Percent of Manufacturing jobs)	11.5
Light Commercial (Percent of Other jobs)	9.9
Recreation (Population weighted by income)	9.3
Agriculture (Percent of Ag. Jobs)	4.7

Source: SEEC ClearPath Tool for the City of Corona, 2018.

1 ADC is Alternative Daily Cover, which is green waste (grass, leaves, and branches) that is used to cover landfill emissions. They are reported separately by CalRecycle and therefore shown separately here.

2 Off-road emissions are available at the county level through CARB's OFFROAD model. Emissions attributable to the City were derived using indicator data related to the Off-road source. For example, the percentage of households in the City compared to the county was used to attribute the same percentage of lawn & garden equipment emissions to the City. See Appendix B for more methodology details.

Demographic data also help provide perspective to changes in emissions over time. Table 5 shows the number of households, jobs, population, and service population (jobs + population) for 2016.

Table 5. Demographic Data for 2016

	2016
Households	46,979
Jobs	70,972
Population	165,366
Service Population (Population + Jobs)	236,338

Source: City of Corona General Plan Update, 2018.

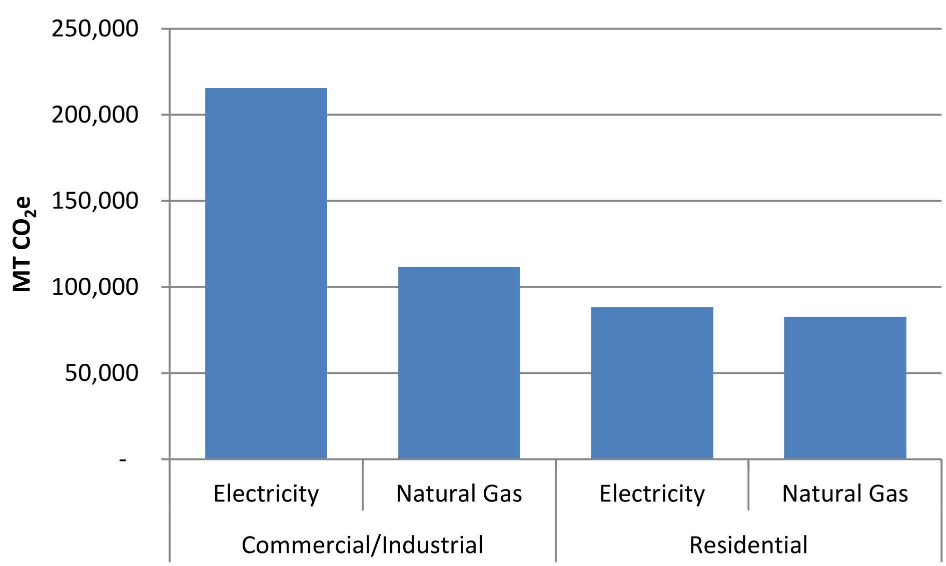
Energy

Energy is an area over which local agencies often have the greatest opportunities for affecting change. Energy use consists of electricity and natural gas. Emissions from Commercial/Industrial and Residential energy use account for 47 percent of the total community emissions in 2016. Table 6 shows the breakdown in activity (kWh or therms) and GHG emissions by sector and energy source. Figure 2 shows electricity and natural gas emissions for the Commercial/Industrial and Residential sectors.

Table 6. Activity Data and GHG Emissions of Energy in 2016

	2016	
Sector	**Activity (kWh or therms)**	**Emissions (MT CO_2e)**
Commercial/Industrial Energy		
Electricity	898,057,448	215,534
Natural Gas	21,015,979	111,777
Residential Energy		
Electricity	367,883,307	88,292
Natural Gas	15,559,287	82,754
Total (MT CO_2e)		**261,060**

Source: SEEC ClearPath Tool for the City of Corona, 2018.



Source: SEEC ClearPath Tool for the City of Corona, 2018

Figure 2. GHG Emissions for Community Electricity and Natural Gas, by Sector

INVENTORY FORECASTS

The City developed two forecasts for GHG emissions, a Business-as-Usual (BAU) and an Adjusted BAU scenario. The BAU scenario describes emissions based on projected growth in population and employment and does not consider policies that will reduce emissions in the future (that is, the policies in place in 2016 that would remain constant through 2040). The City developed GHG reduction measures in the 2012 CAP that constitute policies in place in 2016. These measures have been implemented and are reflected in the 2016 GHG emissions inventory, and will continue reducing emissions through 2020. Therefore, the BAU and ABAU forecasts included reductions from 2012 CAP GHG reduction measures. The Adjusted BAU scenario describes emissions based on projected growth *and* considers all policies that will achieve GHG reductions in the future. Policies, described in detail below, include State-adopted or approved legislation that will affect future emissions.

By evaluating the two scenarios, the City can determine the effect that existing policies may have on future emissions and assess what local measures can provide additional reductions. Three future years were forecasted for each scenario: 2020, 2030 and 2040. The 2020 and 2030 forecast years are consistent with the goals identified in Assembly Bill (AB) 32 and the corresponding Scoping Plan (CARB 2017), which identifies statewide GHG reduction targets by 2020 and 2030. The 2040 forecast year is consistent with the City's 2018 General Plan Update buildout year and will allow the City to develop long-term strategies to continue GHG reductions.

BUSINESS-AS-USUAL FORECAST

The BAU forecasts estimates future emissions using current (2016) consumption patterns and emission factors with the anticipated growth in the City. Anticipated growth is estimated using data from the City's 2018 General Plan Update (Table 7). The most relevant growth factors are used to project emissions by sector. For example, future Residential Energy emissions were developed using current energy use per household (from the 2016 inventory) and the anticipated number of households in 2040. Actual energy use is a function of several variables, not only the number of households; however, this approach is supported by current protocols and best practices within the State and provides a consistent approach to forecasting. Compound annual growth rates were developed using the growth projections from 2016 to 2040, as shown Table 7. In general, the City is expecting modest growth to 2040 as population, housing, jobs, and vehicle miles traveled are all expected to increase.

Community Business-as-Usual Forecast

The City's BAU emissions in 2020 are estimated to be 1,100,068 MT CO_2e, or a 2.5 percent increase from 2016 emissions. By 2030, emissions are estimated to increase 8.9 percent from the 2016 level to 1,169,446 MT CO_2e. By 2040, emissions are estimated to increase 15.8 percent from the 2016 level to 1,243,348 MT CO_2e (Table 8).

Table 7. Growth Factors for 2016 and 2040

Sector	Demographic Indicator	2016	2040	2016-2040 CAGR[1] (percent)
Residential Energy	Households	46,979	52,297	0.45
Commercial/ Industrial Energy	Jobs	70,972	84,395	0.72
N/A[2]	Population	165,366	184,086	0.45
Solid Waste, Water, Wastewater, and Off-road Sources	Service Population (Population + Jobs)	236,338	268,481	0.53
Transportation (Gasoline)	Vehicle Miles Traveled	1,169,706,600	1,336,928,145	0.56
Transportation (Diesel)	Vehicle Miles Traveled	150,934,699	177,578,872	0.68

Source: City of Corona General Plan Update, 2018

[1] Compound annual growth rate.

[2] Not Applicable. Population data are shown for informational purposes but are not used for forecasting any sector.

Table 8. Community BAU Forecast Emissions

Sector	2016 (MT CO_2e)	2020 (MT CO_2e)	Percent Change 2016-2020	2030 (MT CO_2e)	Percent Change 2016-2030	2040 (MT CO_2e)	Percent Change 2016-2040
On-Road Transportation	498,985	510,580	2.3	540,765	8.4	572,746	14.8
Commercial/ Industrial Energy	327,311	337,321	3.1	363,708	11.1	392,158	19.8
Residential Energy	171,046	174,266	1.9	182,584	6.7	191,299	11.8
Solid Waste	55,642	56,889	2.2	60,132	8.1	63,560	14.2
Water	15,909	16,266	2.2	17,193	8.1	18,173	14.2
Wastewater	4,198	4,293	2.3	4,537	8.1	4,796	14.2
Off-road Sources	426	453	6.3	527	23.7	616	44.6
Total	**1,073,519**	**1,100,068**	**2.5**	**1,169,446**	**8.9**	**1,243,348**	**15.8**

Source: SEEC ClearPath Tool for the City of Corona, 2018.

BAU = Business-as-Usual

MT CO_2e = metric tons carbon dioxide equivalent

Adjusted Business-as-Usual Forecast

State legislation that has been approved and/or adopted will reduce GHG emissions in the City. These policies do not require additional local action, but should be accounted for in the City's emissions forecasts to provide a more accurate picture of future emissions and the level of local action needed to reduce emissions to levels consistent with State recommendations. This forecast is called the Adjusted BAU forecast. The measures are described briefly below.

Low Carbon Fuel Standard

The Low Carbon Fuel Standard (LCFS) was developed as a result of Executive Order S-1-07, which mandates that the carbon intensity of transportation fuels in California are lowered 10 percent by

2020. The State is currently implementing this standard, which is being phased in and will achieve full implementation in 2020. The LCFS target would be maintained beyond 2020.

Assembly Bill (AB) 1493 and Advanced Clean Cars

AB 1493 directed CARB to adopt GHG standards for motor vehicles through model year 2015 that would result in reductions in GHG emissions by up to 25 percent in 2030. In addition, the State's Advanced Clean Cars program includes additional components that will further reduce GHG emissions statewide, including more stringent fuel efficiency standards for model years 2017—2025 and support infrastructure for the commercialization of zero-emission vehicles. CARB anticipates additional GHG reductions of 3 percent by 2020, 27 percent by 2035, and 33 percent by 2050[1]. These are also known as "Pavley I" and "Pavley II" regulations.

California Building Code Title 24

California's building efficiency standards are updated regularly to incorporate new energy efficiency technologies. The code was most recently updated in 2016 and went into effect for new development in 2017. For projects implemented after January 1, 2017, the California Energy Commission estimates that the 2016 Title 24 energy efficiency standards will reduce consumption by an estimated 28 percent for residential buildings and 5 percent for commercial buildings, relative to the 2013 standards. These percentage savings relate to heating, cooling, lighting, and water heating only; therefore, these percentage savings were applied to the estimated percentage of energy use by Title 24.

Renewable Portfolio Standard

The Renewable Portfolio Standard (RPS) requires energy providers to derive 33 percent and 50 percent of their electricity from qualified renewable sources by 2020 and 2030, respectively. This is anticipated to lower emission factors (i.e., fewer GHG emissions per kilowatt-hour used) statewide. Therefore, reductions from RPS are taken for energy embedded in water, as well as commercial/industrial and residential electricity.

Community Adjusted Business-as-Usual Forecast

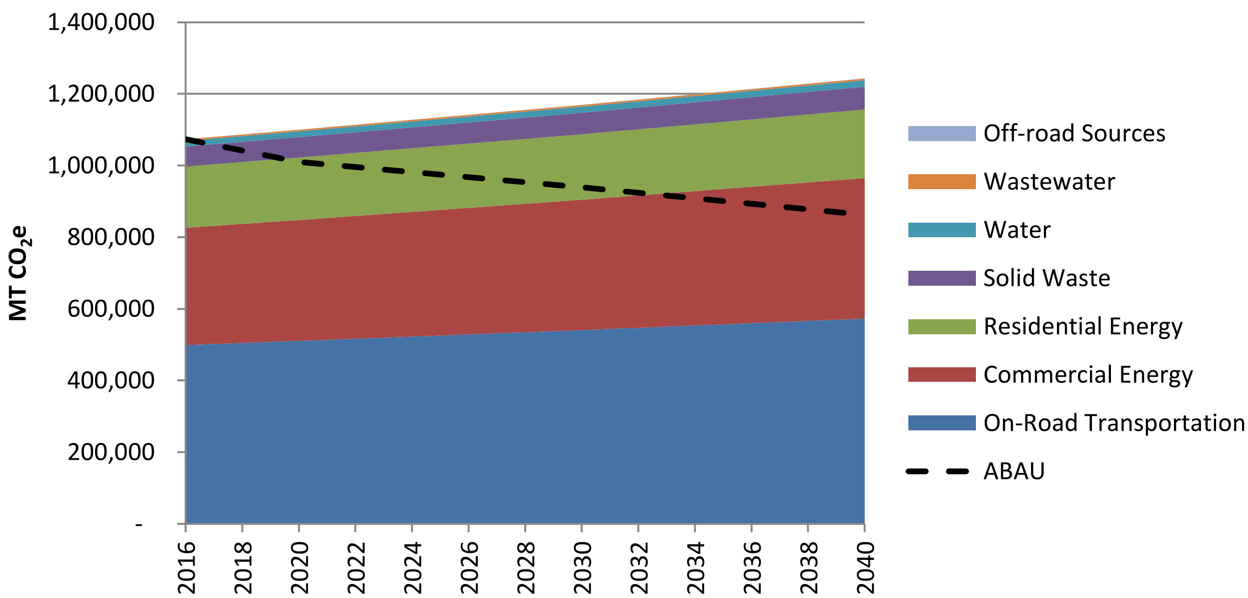
The City's Adjusted BAU emissions in 2020 are estimated to be 992,256 MT CO_2e in 2020, 920,479 MT CO_2e in 2030, and 842,317 MT CO_2e in 2040 (Table 9). This change represents a 6.1 percent reduction from 2016 by 2020, 12.9 percent reduction by 2030, and 20.3 percent reduction by 2040. Due to the stringent State vehicle standards, the emissions from the Transportation sector are expected to decrease significantly over time, while the proportion of emissions from Residential and Commercial/Industrial Energy will increase. Emissions from Solid Waste are expected to increase over time but account for less than 10 percent of total emissions. Figure 3 shows community BAU and Adjusted BAU forecasts.

[1] CARB Advanced Clean Cars Summary Sheet.

Table 9. Community Adjusted BAU Forecast Emissions

Sector	2016 (MT CO_2e)	2020 (MT CO_2e)	2020 Percent of Total	2030 (MT CO_2e)	2030 Percent of Total	2040 (MT CO_2e)	2040 Percent of Total
Transportation & Mobile Sources	499,411	463,254	46	406,189	43	356,244	41
Commercial/Industrial Energy	327,311	308,566	31	299,731	32	280,738	33
Residential Energy	171,047	162,292	16	156,221	17	146,591	17
Solid Waste	55,642	56,889	6	60,132	6	63,560	7
Water & Wastewater	20,108	18,457	2	17,150	2	15,146	2
Total	**1,073,519**	**1,009,458**	**-6.0**	**939,423**	**-12.5**	**842,317**	**-19.7**

Source: SEEC ClearPath Tool for the City of Corona, 2018.
BAU = Business-as-Usual
MT CO_2e = metric tons carbon dioxide equivalent



Source: SEEC ClearPath Tool for the City of Corona, 2018.

Figure 3. Community BAU and Adjusted BAU Forecasts

REDUCTION TARGETS

The State has set goals for reducing GHG emissions by 2020, 2030, and 2050 through AB 32, Executive Order (EO) S-3-05, and EO B-30-15, respectively. The State has also provided guidance to local jurisdictions as "essential partners" in achieving the State's goals by identifying a 2020 recommended reduction goal. That goal, stated in the AB 32 Scoping Plan, was for local governments to achieve a 15 percent reduction below 2005 to 2008 levels by 2020, which aligns with the State's goal of not exceeding 1990 emissions levels by 2020. The State's long-term target is to emit no more than 20 percent of 1990 levels by 2050 (or, a reduction of 80 percent below 1990 levels by 2050). The State has also provided an interim target, which is 40 percent below 1990 levels by 2030. It is clear that the issue of climate change will not end in 2030 and continued reduction goals should be implemented to keep the State on a path toward the 2050 goal. A straight-line projection from the 2030 to 2050 goals would result in a reduction goal of 66 percent below 2008 levels by 2040 midpoint.

Ultimately, the City will determine the level of reductions that it can and should achieve. The recommended targets provided below are guidance based on consistency with the State's goals.

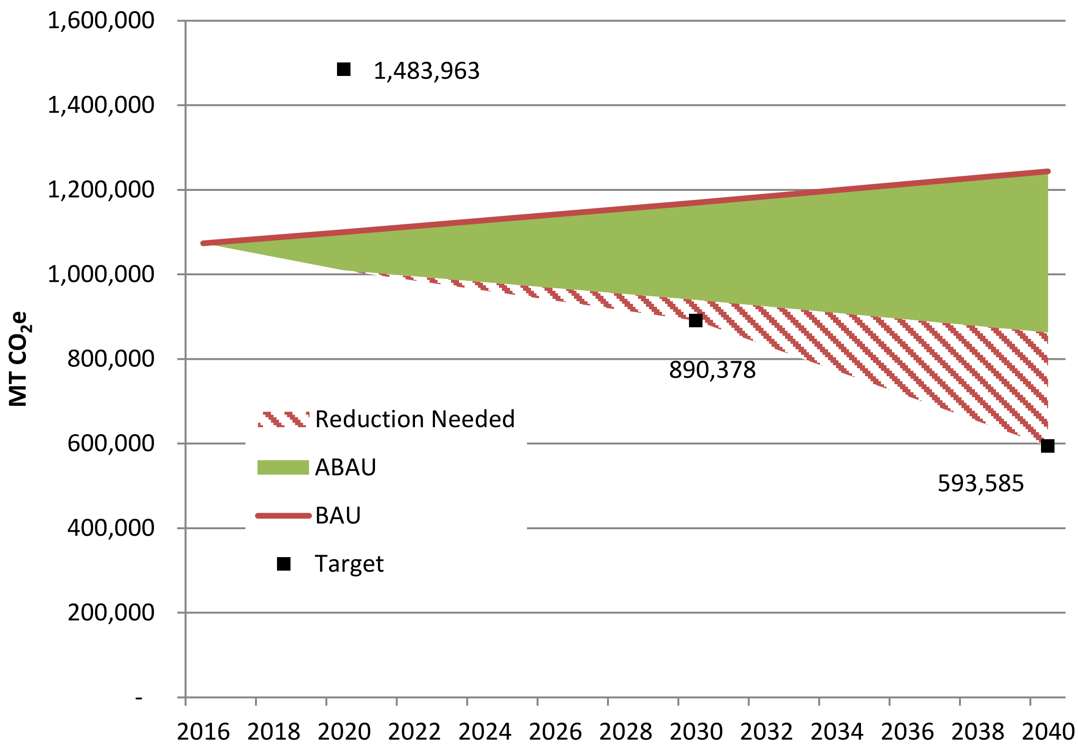
RECOMMENDED COMMUNITY TARGETS

In order to keep the City of Corona CAP in line with the State's reduction goals the following targets are recommended. In 2020, the City would meet the reduction target from an Adjusted BAU forecast. In 2030, the City would need to reduce 49,045 MT CO_2e emissions below the Adjusted BAU scenario to meet the reduction target. In 2040, the City would need to reduce 268,694 MT CO_2e emissions below the Adjusted BAU scenario to meet the State-Aligned target (Table 10 and Figure 4).

Table 10. State-Aligned GHG Emission Reduction Targets By Year

Sector	2008[1]	2016	2020	2030	2040
BAU Emissions (MT CO_2e)	1,745,839	1,073,517	1,100,068	1,169,446	1,243,348
Adjusted BAU Emissions (MT CO_2e)	1,745,839	1,073,517	1,009,458	939,423	862,279
State-Aligned Target (Percent change from 1990)			0	-40	-60
State-Aligned Target (Percent change from 2008)[2]			-15	-49	-66
State-Aligned Emissions Goal (MT CO_2e)			1,483,963	890,378	593,585
Reductions from Adjusted BAU needed to meet the State-Aligned Target (MT CO_2e)			-	49,045	268,694

Source: SEEC ClearPath Tool for the City of Corona, 2018.
Note: [1] Baseline (2008) emissions are from the City's 2012 Climate Action Plan GHG inventory.
[2] Reduction targets calculation details are provided in Appendix B.
BAU = Business-as-Usual
GHG = greenhouse gas
MT CO_2e = metric tons carbon dioxide equivalent



Source: SEEC ClearPath Tool for the City of Corona, 2018.

Figure 4. Community Emissions Inventory, Forecasts, and Targets

CONCLUSIONS AND NEXT STEPS

This IFT Report presents the City's community inventory, forecasts, and describes recommendation reduction targets. It is the foundation of the CAP and provides the City a first look at what will be needed to meet emissions reductions that are aligned with the State goals and would mitigate the City's impacts on climate change. This report is also intended to guide the City in determining feasible GHG reduction opportunities by detailing the sources of emissions by sector.

The next steps in the CAP process are to review the information provided in this IFT Report and to determine preliminary GHG reduction targets for the community operations. The City should also begin to identify local GHG reduction measures that could be implemented to reach the City's emissions targets.

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APPENDIX A

GLOSSARY OF TERMS

Adjusted Business-as-Usual: A GHG forecast scenario that accounts for known policies and regulations that will affect future emissions. Generally, these are state and federal initiatives that will reduce emissions from the business-as-usual scenario.

Baseline Year: The inventory year used for setting targets and comparing future inventories against.

Business-as-Usual (BAU): A GHG forecast scenario used for the estimation of greenhouse gas emissions at a future date based on current technologies and regulatory requirements and in the absence of other reduction strategies.

Carbon Dioxide Equivalent (CO_2e): This is a common unit for normalizing greenhouse gases with different levels of heat trapping potential. For carbon dioxide itself, emissions in tons of CO_2 and tons of CO_2e are the same, whereas one ton of nitrous oxide equates to 265 tons of CO_2e and one ton of methane equates to 28 tons of CO_2e. The values are based on the gases' global warming potentials.

Community Inventory: GHG emissions that result from the activities by residents and businesses in the city. An inventory reports emissions that occur over a single calendar year.

Emissions Factor: A coefficient used to convert activity data into greenhouse gas emissions. The factor is a measure of the greenhouse gas intensity of an activity, such as the amount of CO_2 in one kilowatt-hour of electricity.

Global Warming Potential (GWP): The relative effectiveness of a molecule of a greenhouse gas at trapping heat compared with one molecule of CO_2.

Metric Ton (MT): Common international measurement for the quantity of greenhouse gas emissions. A metric ton is equal to 2205 lbs. or 1.1 short tons.

Reduction targets: GHG emissions levels not to be exceeded by a specific date. Reduction targets are often informed by state recommendations and different targets may be established for different years.

Sector: A subset of the emissions inventory classified by a logical grouping such as economic or municipal-specific category.

State-Aligned targets: The State's goals for reducing GHG emissions by 2020, 2030, and 2050 through AB 32, Executive Order (EO) S-3-05, and EO B-30-15, respectively.

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APPENDIX B

METHODOLOGY

This appendix provides a detailed description of the data sources, emission factors, policies, and assumptions used to develop the greenhouse gas (GHG) emissions inventories, forecasts under a business-as-usual (BAU) scenario, forecasts under an Adjusted BAU scenario, and the State-Aligned GHG reduction targets.

PROTOCOLS

The GHG inventory was developed using tools and guidance documents developed or supported by government agencies such as Environmental Protection Agency. Calculation protocols have been developed to ensure consistency among community inventories. Specifically, the U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions (Community Protocol)[1] and the California Supplement[2] were used for the community inventory. These protocols often have multiple calculation methods for a single emission source depending on the data available. There are two broad approaches for calculating emissions: "bottom-up" and "top-down". A bottom-up approach relies on end-use data, such as the city-level electricity usage. A top-down approach relies on aggregated data that is allocated to the city based on population, employment, or other relevant indicator. Bottom-up calculations were performed whenever possible to provide the most detailed and likely accurate picture of emissions within a jurisdiction; however, when detailed data were not available, other appropriate methods were used and are described in this appendix. Data were also calculated and managed to best fit the GHG inventory and planning software tool used for this project, called ClearPath. ClearPath was developed by the Statewide Energy Efficiency Collaborative (SEEC) which is a partnership between several statewide agencies, utilities, and non-profits to assist cities and counties in climate mitigation planning. ClearPath is further described at californiaseec.org. In addition, a User's Guide has been developed as part of this project to help the City to maintain the data and provide for consistent reporting of emissions over time.

GLOBAL WARMING POTENTIAL FACTORS

The inventory includes the three GHGs most relevant to community emissions: CO_2, CH_4, and N_2O since they are most relevant to human activities[3]. Each GHG differs in its ability to absorb heat in the atmosphere based on their molecular properties and expected lifetime in the atmosphere, and it is useful to describe emissions in one unit of measurement. That unit of measurement is a CO_2-equivalent, or CO_2e, and Global Warming Potential (GWP) factors are used to standardize emissions from various GHGs. GWP factors, developed by the Intergovernmental Panel on Climate Change

1 ICLEI 2012. U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions version 1.0.
2 Association of Environmental Professionals. 2013. The California Supplement to the United States Community-Wide Greenhouse Gas (GHG) Emissions Protocol.
3 Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report. 2014.

(IPCC), represent the heat-trapping ability of each GHG relative to that of CO_2. For example, the GWP factor of CH_4 is 28 because one metric ton (MT) of CH_4 has 28 times the heat-trapping capacity as one MT CO_2 (over a 100-year period). IPCC periodically updates the GWP factors of GHGs based on new science and updated background mixing ratios of CO_2. CO_2 always has a GWP factor of 1 and the other GHGs are calculated relative to CO_2. The GWP factors are shown in Table B-1. GWP factors are unitless. Emissions in the inventory are reported in units of CO_2e.

Table B-1. Global Warming Potentials

	CO_2	CH_4	N_2O
GWP	1	28	265

Source: IPCC Fifth Assessment Report, 2014.

ACTIVITY DATA

Activity data is the end-use consumption amount of a sector, such as kilowatt hours of electricity, therms of natural gas, and vehicle miles traveled for on-road transportation. In estimating the City's historic GHG emissions, activity data at the City level were obtained when possible (a "bottom-up" approach). When not available, other data sources were used, generally at the county level (a "top-down" approach). Activity data were provided by the sources as identified Table B-2.

Table. B-2. Activity Data Sources

Data	Data Source	Notes
Community Electricity	Southern California Edison (SCE), City of Corona Department of Water and Energy	City-wide data
Community Natural Gas	Southern California Gas (SCG)	City-wide data
Community Water	City of Corona Department of Water and Energy	City-wide data
Vehicle Miles Traveled	City of Corona General Plan Update	Origin-destination approach, described below
Demographic Data	City of Corona General Plan Update	City-wide data
Off-road Emissions	OFFROAD Model	County-level data
Community Solid Waste	CalRecycle	City-wide data

Origin-Destination VMT

For the community inventory, activity data, in this case, vehicle miles traveled (VMT), were based on an origin-destination approach used by the State in developing emissions target for metropolitan planning organizations under SB 375. This approach has also been the typical approach used in estimating emission within a city. This approach accounts for:

- All of the emissions where the trip begins and ends within the City.

- Half of the emissions where one endpoint is in the City, for example either the origin or destination of the trip.

- None of the emissions that are “pass-through”; that is, a trip passes through the City but does not begin or end within its boundary.

This approach is used to account for trips or portions of trips that the city may have some control over. The City does not have any control over pass-through trips because both the origin and destination that generated the trip are outside of the City’s jurisdiction.

Community Activity Data

Community activity data are shown in Table B-3, except for Off-road emissions, which are shown as the City’s proportion of countywide emissions. Total countywide Off-road emissions by GHG are shown in Table B-4.

Table B-3. Community Inventory Activity Data

Sector	2016
On-road Transportation	
Total Vehicle Miles Traveled	1,303,740,162
Commercial/Industrial Energy	
Electricity (kWh)	898,057,448
Natural Gas (therms)	21,015,979
Residential Energy	
Electricity (kWh)	367,883,307
Natural Gas (therms)	15,559,287
Solid Waste	
Landfilled (tons)	204,211
ADC (tons) [1]	147
Water and Wastewater	
Commercial/Industrial Water (million gallons)	3,501
Residential Water (million gallons)	6,515
Wastewater (City population)	165,366
Off-road sources[2] (Percent of Riverside County emissions attributed to the City)	
Lawn & Garden (Percent of Households)	6.6
Construction (Percent of Building permits)	1.3
Industrial (Percent of Manufacturing jobs)	11.5
Light Commercial (Percent of Other jobs)	9.9
Recreation (Population weighted by income)	9.3
Agriculture (Percent of Agriculture Jobs)	4.7

1 ADC is Alternative Daily Cover, which is green waste (grass, leaves, and branches) that is used to cover landfill emissions. They are reported separately by CalRecycle and therefore shown separately here.

2 Off-road emissions are available at the county level through CARB’s OFFROAD model. Emissions attributable to the City were derived using indicator data related to the Off-road source. For example, the percentage of households in the City compared to the county was used to attribute the same percentage of lawn & garden equipment emissions to the City. See below for more methodology details.

Table B-4. Emissions from Off-road Categories for Riverside County

Off-road Class	GHG Type	2016 (MT CO_2e /year)
Agricultural Equipment	CO_2	1,588
	CH_4	0.157
	N_2O	0.019
Construction and Mining Equipment	CO_2	7,336
	CH_4	0.669
	N_2O	0.040
Industrial Equipment	CO_2	719
	CH_4	0.245
	N_2O	0.037
Lawn and Garden Equipment	CO_2	755
	CH_4	1.107
	N_2O	0.486
Light Commercial Equipment	CO_2	500
	CH_4	0.137
	N_2O	0.081
Recreational Equipment	CO_2	425
	CH_4	1.804
	N_2O	0.640

Source: CARB 2007. *OFFROAD model*.
GHG = Greenhouse Gas
MT CO_2e = metric tons carbon dioxide equivalent

EMISSION FACTORS

Emissions factors are used to convert activity data to GHG emissions. An emission factor is defined as the average emission rate of a given GHG for a given source, relative to units of activity. By definition, an emission factor is related to activity data. The emission factors used in the inventory are described by sector below.

Electricity

California utilities report the average CO_2 content per output of electricity on an intermittent basis. The CO_2-intensity of electricity varies by utility and year, due to changes in supply, renewable generation, and other factors. The community operations use electricity provided by Southern California Edison (SCE) except for embedded energy in water, which travels throughout the state and therefore utilizes electricity from multiple utilities (and are shown under the Water Sector).

Southern California Edison

SCE reported CO_2 factors for 2016 through the Corporate Responsibility and Sustainability Report[1], as shown in Table B-5.

1 Southern California Edison. 2016 Corporate Responsibility and Sustainability Report. Website: https://www.edison.com/content/dam/eix/documents/investors/corporate_responsibility/2016-eix-corporate-responsibility-and-sustainability-report.pdf.

Table B-5. Southern California Edison Emission Factor

Year	CO_2e (lbs/MWh)
2016	529.11

Source: Southern California Edison 2016 Corporate Responsibility and Sustainability Report.

Natural Gas Combustion

Emission factors for natural gas do not vary greatly over time or by supplier. Therefore, natural gas emission factors from the United States Community Protocol for Accounting and Reporting GHG Emissions, which are U.S. averages, were used (Table B-6).

Table B-6. Natural Gas Emission Factors

	CO_2	CH_4	N_2O
kg /MMBtu	53.02	0.005	0.0001

Source: ICLEI 2012. U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions version 1.0.

Transportation and Mobile Sources

EMFAC Model

CO_2 emission factors for transportation and mobile sources are calculated using the State-developed Emissions Factor (EMFAC) model, version 2017, which can be accessed at http://www.arb.ca.gov/emfac/. Emissions are available at the county level and emission factors were developed and applied to VMT for 2016. Data are aggregated as annual emissions for all vehicle model years and speeds, but separated by vehicle category. Vehicle categories include passenger vehicles, light-duty trucks, and heavy-duty trucks. These categorizations are used to develop an emissions factor for gasoline and diesel vehicles. Emission factors were developed using total CO_2 exhaust, which includes emissions from vehicles in motion, idling, and ignition. While emissions from idling and ignitions are not directly related to mileage, they were included so that reductions from measures that may decrease idling could be accounted for in future inventories.

On-Road Transportation

Emissions were converted to emission factors as grams of CO_2 per mile for gasoline and diesel vehicle using EMFAC and a 3-step process:

1. Calculate the vehicle-class average fuel efficiency (miles/gallon) using EMFAC vehicle miles traveled and gallons of fuel consumed for Riverside County;

2. Calculate the vehicle-class average CO_2 emission factor using EMFAC CO_2 emissions[1] and gallons of fuel consumed for Riverside County;

[1] The emissions factors take in to account existing policies (Pavley and Low Carbon Fuel Standard).

3. Calculate the average grams CO_2/mile traveled factor weighted by vehicle class miles traveled for Riverside County.

CH_4 and N_2O emission factors for gasoline and diesel vehicle were derived from the Community Protocol (Table B-7).

Table B-7. Fleet-Average Emission Factors

Year	Vehicle Type	Gasoline On-Road Average Factor (grams/mile)			Diesel On-Road Average Factor (grams/mile)		
		CO_2	CH_4	N_2O	CO_2	CH_4	N_2O
2016	Passenger Vehicle	342.194	0.028	0.029	248.633	0.001	0.001
	Light Truck	439.612	0.028	0.029	355.279	0.001	0.001
	Heavy Truck	936.062	0.028	0.029	579.563	0.001	0.001

Source: CARB 2017. EMFAC2017 Web Database.

Off-Road

Off-road emissions include emissions from agriculture, construction, industrial, lawn and garden, light commercial, and recreational equipment. Annual emissions of CO_2, CH_4, and N_2O are available at the county level from the State's OFFROAD model. To estimate values for the City, relevant indicator data are used to estimate the proportion of county level emissions attributable to the City[1]. Table B-8 lists the indicator data used to estimate the City's portion of emissions for each category and Table B-9 shows City-specific data. City and county level indicator data were obtained from City's General Plan Update and Southern California Association of Governments (SCAG) Local Profile for the City of Corona and the County of Riverside.

Table B-8. Off-road Emissions Indicators

Category	Indicator
Agriculture Equipment	Agriculture Jobs
Construction Equipment	Building Permits Issued
Industrial Equipment	Manufacturing Jobs
Lawn and Garden Equipment	Households
Light Commercial Equipment	Non- Manufacturing or Agriculture Jobs
Recreational Equipment	Population, Weighted by Median Income

Source: SCAG 2017. Profile of the City of Corona and Profile of Riverside County.

[1] For example, the indicator for Off-road emissions from construction equipment is building permits. The City issued 66 building permits in 2016, and 5,136 building permits were issued County-wide. As such, City building permits account for 1.3 percent of the County's total building permits. It is assumed that the City's proportion of building permits is equal to the City's proportion of the County's Off-road emissions. Based on this assumption, 1.3 of the County's 2016 Off-road CO_2 emissions are attributable to the City. Similar methodology applies to the remaining year and Off-road emissions sources.

Table B-9. Off-road Emissions Indicator Data

		Ag. Jobs	Building Permits	Mfg. Jobs	Households	Other Jobs[1]	Population	Income ($)
2016	City	500	66	11,862	46,979	59,005	165,366	76,065
	County	10,700	5,136	103,633	713,205	595,607	2,347828	57,367
	Percent of County	4.7	1.3	11.5	6.6	9.9	9.3	

Source: SCAG 2017. Profile of the City of Corona and Profile of Riverside County.
Note: Some percentages may appear off due to rounding. Ag. = Agriculture. Mfg. = Manufacturing.
[1] Other indicates non-manufacturing and non-agricultural.

Water

Emissions from water are indirect. Water requires energy to move from its source to final treatment and the energy for most of these processes is not captured in local utility data (i.e., the portion that is used in a home or business and therefore contained in the owner's utility bill). This portion is termed the "embedded energy" in water and particularly for Southern California, the energy embedded in water is high and should be accounted for in a community inventory. The California Energy Commission (CEC) developed a report that estimates the energy required to supply, convey, distribute, and treat water in northern and southern California.[1] Local groundwater is less energy-intensive because it does not require the supply and conveyance energy. Outdoor water infiltrates into the ground and therefore does not have the wastewater energy treatment component. Therefore, the emission factors are adjusted to account for the proportion of local groundwater and outdoor water. Approximately 56 percent of the water use in the City comes from local groundwater. The amount of water used for indoor or outdoor use was not available at the City level. It is assumed that 50 percent of water is for outdoor use. Therefore, the embedded energy in a million gallon (MG) of water in the City is estimated in Table B-10 using the CEC report and estimated local groundwater and indoor versus outdoor water usage assumption.

Table B-10. Energy Embedded in Water

	Indoor (kWh/MG)	Outdoor (kWh/MG)
Supply and Conveyance	9,727	9,727
Treatment	111	111
Distribution	1,272	1,272
Wastewater Treatment	1,911	--
Total	13,022	11,111
Indoor/Outdoor Percentage	50	50
Corona Factor	**6,618.38**[1]	

Source: California Energy Commission. 2006. *Refining Estimates for Water-Related Energy Use in California*. December.
[1] Corona factor for conventional water is weighed by local groundwater and indoor versus outdoor water usage breakdown.

[1] California Energy Commission. 2006. Refining Estimates for Water Related Energy Use in California.December.

Statewide Average Electricity

For energy embedded in water, a statewide average emission factor is applied because water in the City is supplied from various regions in the State. These emissions factors are listed in Table B-11.

Table B-11. California Statewide Electricity Emission Factors

Year	CO_2 (lbs/MWh)	CH_4 (lbs/MWh)	N_2O (lbs/MWh)
2016	527.9	0.033	0.004

Source: US Environmental Protection Agency. Emissions & Generation Resource Integrated Database (eGRID) 2016. Website: https://www.epa.gov/energy/emissions-generation-resource-integrated-database-egrid.

Wastewater

The emissions for wastewater include the CH_4 and N_2O emissions from processing which consist of three sources: **stationary**, **process**, and **fugitive** emissions.

Stationary emissions are derived from combustion of digester gas at a centralized treatment facility. Detailed information regarding the amount of digester gas produces was not available, so an alternative method using City population information was used. Default factors from the Community Protocol were applied to estimate CH_4 and N_2O emissions for stationary emissions. Although CO_2 emissions are also produced, the fuel source is considered a biofuel, and the resulting CO_2 emissions are considered "biogenic" and are not reported[1].

Process emissions include N_2O emissions as a result of nitrification/denitrification (N/DN) processes at the treatment facility. All wastewater facilities have emissions from N/DN—some facilities have a formal N/DN process, which would result in greater N/DN emissions, but for the City, N/DN emissions are solely a result of natural processes. The recommended approach to estimating these emissions is through the population served and default factors listed in the Community Protocol. In an advanced, centralized treatment facility, stationary and process emissions are relatively small compared to fugitive emissions. The Community Protocol, and likewise ClearPath, recommends multiplying the population-derived emissions by 1.25 to account for commercial and industrial discharges to the system.

Fugitive emissions occur from inflow (septic systems) and effluent discharge. Daily nitrogen load was not available; therefore, service population was used to estimate process N_2O from effluent discharge to rivers and estuaries.

Solid Waste

Emissions from solid waste are primarily in the form of fugitive emissions of methane from decomposition, and only organic waste may decompose. Emission factors are derived from the Community Protocol, based on the type of waste disposed. The State conducts a Waste

[1] Emissions from digester gas combustion are automatically calculated in ClearPath when population is entered.

Characterization Study (Study) every 4 to 6 years to determine the amount of waste attributable to each waste type. The Study is conducted at the State level by economic sector; therefore, community-level characterizations are not available. For the community inventory, the overall composition of California's disposed waste stream was used to convert total tons into waste types. In addition to community-generated waste, some diverted green waste is used as landfill cover rather than importing landfill cover from other regions. This green waste is known as alternative daily cover (ADC) and is reported by CalRecycle for each community. The ADC characterization was determined through communication with the developers of ClearPath and does not vary by year or community. The emission factor to determine methane generation varies if the landfill operates a methane flare or generates electricity from methane capture. The Community Protocol recommends using an average factor of 75 percent recovery from landfill gas, although some landfills have much higher gas recovery systems, and other landfills do not have any. Carbon dioxide generated by decomposition of waste in landfills is not considered anthropogenic because it would be produced through the natural decomposition process regardless of its disposition in the landfill. Nitrous oxide is not a by-product of decomposition and therefore no fugitive emissions of N_2O are anticipated from this source. The waste characterizations and emission factors used to estimate emissions from solid waste are provided in Table B-12. The "Category in the 2014 Study" details which Study categories make up the ClearPath Category.

Table B-12. Waste Characterization and Emission Factors for Solid Waste

ClearPath Category	Category in 2014 Studies	Alternative Daily Cover[1] (percent)	2014 Study[2] (percent)	Emission Factor
Newspaper	Newspaper	0	1.2	0.043
Office Paper	White/Colored Ledger Paper + Other Office Paper + Other Miscellaneous Paper	0	4.6	0.203
Cardboard	Uncoated Corrugated Cardboard + Paper Bags	0	3.3	0.120
Magazine/Third Class Mail	Magazines and Catalogs + Remainder/ Composite Paper	0	8.1	0.049
Food Scraps	Food	0	18.1	0.078
Grass	Leaves and Grass	30	1.9	0.038
Leaves	Leaves and Grass	40	1.9	0.013
Lumber	Branches and Stumps + Prunings and Trimmings	0	11.9	0.062
Branches	Lumber	30	4.8	0.062

Source: CalRecycle 2015. 2014 Disposal-Facility-Based Characterization of Solid Waste in California.
[1] Breakdown from ClearPath Developers via e-mail dated June 19, 2014.
[2] 2016 Waste Characterization Study for California, Overall Waste Stream. Totals do not sum to 100 percent because not all waste is organic.

FORECASTS

The forecasts are an estimate of what emissions in the City may be in 2020, 2030 and 2040. The forecasts were developed using standard methodologies under two scenarios: Business-as-Usual (BAU) and Adjusted BAU.

Business-as-Usual Forecasts

The BAU scenario uses current (2016) consumption patterns and predicted growth in the City in the absence of state and federal legislation that would reduce future emissions. The growth assumptions are based on City of Corona General Plan Update estimates[1] and are applied to emissions sectors based on their relevance. For example, future Residential Energy emissions were developed using current energy use per household (from the 2016 inventory) and the anticipated number of households in the future. Table B-13 shows the growth factors used to project emissions in the City.

Table B-13. Emissions Sectors and Demographic Growth Indicators

Sector	Demographic Indicator
Residential Energy	Households
Commercial/ Industrial Energy	Jobs
Solid Waste, Water, Wastewater, Off-road Sources	Service Population (Population + Jobs)
Transportation	VMT

Source: AEP White Paper: California Community-Wide GHG Baseline Inventory Protocol (June 2011)

Adjusted Business-as-Usual Forecasts

The Adjusted BAU scenario also uses growth estimates for the City, but accounts for legislation that will reduce emissions in the future, regardless of City actions. The legislation is detailed in the IFT Report under Adjusted Business-as-Usual Forecasts section and summarized in Table B-14.

Low Carbon Fuel Standard, AB 1493, and Advanced Clean Cars

Changes in on-road emissions in Riverside County were modeled using EMFAC2017. Additional modeling was conducted to estimate the change in emissions due to the State's Advanced Clean Cars program, which includes additional components that will further reduce GHG emissions statewide, including more stringent fuel efficiency standards for model years 2017—2025 and support infrastructure for the commercialization of zero-emission vehicles. The rate of reductions from on-road transportation measures through 2020 was assumed to be 2.602 percent per year for gasoline and 1.908 percent per year for diesel. After 2020, the rate of reductions was assumed to be 1.412 percent per year for gasoline and 1.695 percent per year for diesel.

[1] City of Corona General Plan Update. 2018.

Table B-14. Legislation Applied to Adjusted BAU Forecasts

Legislation	Description	Emissions Sector Affected
Low Carbon Fuel Standard	Reduce carbon intensity of transportation fuels 10 percent by 2020 and maintain the target beyond 2020.	On-road Transportation
AB 1493 and Advanced Clean Cars	Implement GHG standards for passenger vehicles, implement zero-emission vehicle program, support clean fuels outlet regulation.	On-road Transportation
California Building Code Title 24	Improved energy efficiency standards for new residential and non-residential construction.	Residential Energy, Commercial/Industrial Energy
Renewable Portfolio Standard	Provide 33 percent and 50 percent of electricity from renewable sources by 2020 and 2030, respectively.	Water Energy, Residential Energy, Commercial/Industrial Energy

Source: California Air Resources Board Low Carbon Fuel Standard Webpage https://www.arb.ca.gov/fuels/lcfs/lcfs.htm
California Air Resources Board Clean Car Standards (AB 1493) Webpage: https://www.arb.ca.gov/cc/ccms/ccms.htm
California Air Resources Board California Green Building Standards Code (CALGreen) Webpage: https://www.arb.ca.gov/research/indoor/greenbuildings.htm
California Air Resources Board Renewable Portfolio Standard Webpage: https://www.arb.ca.gov/energy/rps/rps.htm
All webpages accessed on August 13, 2018

California Building Code Title 24

Title 24 updates will raise the minimum energy efficiency standards for new buildings, thereby decreasing the expected energy consumption of future development in the City. Under the adjusted BAU scenario, it was assumed that the 2016 Title 24 standards that went into effect in 2017 will make new residential and commercial/industrial buildings more efficient than they would be under the 2013 Title 24 standards for new residential and commercial/industrial buildings. The energy savings were estimated using analyses developed by the CEC and applied to the expected new development in the City from 2016 to 2040. The rate of reductions was applied to the City's 2016 energy use (kWh or therms) per household (for Residential energy) or per job (for Commercial/Industrial energy). Savings were applied to new development anticipated in the City. Detailed energy savings assumptions are below.

Residential

Residential electricity is estimated to be 13.3 percent lower under the new standards.[1] This percentage savings is relative to heating, cooling, lighting and water heating only and do not include other appliances, outdoor lighting that is not attached to buildings, plug loads, or other energy uses. Electricity consumption due to heating, cooling, lighting, and water heating accounts for 34 percent of total household electricity use.[2] Therefore, the percentage of total residential electricity that will be reduced as a result of the 2016 Title 24 standards is 4.5 percent.

Residential natural gas savings under the new standards are estimated to be 25.1 percent. Again, this percentage savings pertains only to the energy sources affected by Title 24 Standards. Natural gas consumption due to space and water heating accounts for 86 percent of total household natural

1 CEC Impact Analysis, California's 2016 Building Energy Efficiency Standards, June 2015.
2 CEC 2009 California Residential Appliance Saturation Appliance Study, October 2010. CEC-200-2010-004.

gas use.[1] Therefore, the percentage of total residential natural gas that will be reduced as a result of the 2016 Title 24 standards is 21.6 percent.

Commercial/Industrial

Commercial/Industrial Electricity savings were estimated to be 4.6 percent lower under the new standards. Title 24-related measures would impact 77.2 percent of total electricity use in commercial buildings[2]; therefore, 3.6 percent reduction in electricity consumption may be expected in new commercial/industrial development.

Natural gas savings were estimated to be 0.5 percent under the new standards compared to the previous standards. Heating and cooling account for 69.7 percent of natural gas consumption in commercial facilities; therefore, 0.35 percent reduction in natural gas consumption may be expected from 2016 Title 24 standards applied to new commercial/industrial development.

Renewable Portfolio Standard

The Renewable Portfolio Standard requires energy providers to derive 33 percent and 50 percent of their electricity from qualified renewable sources by 2020 and 2030, respectively. The level of implementation varies by utility; however, ICLEI estimates that SCE's level of implementation is 3.4 percent per year before 2020, compounded annually. It is assumed that between 2020 and 2030, the level of implementation is 1.7 percent. The reduction is taken for electricity within SCE's territory as well as the delivery and treatment of water[3].

TARGET SETTING

The State-Aligned targets are provided to assist the City in determining appropriate emission reduction goals. Recommended targets are based on existing California climate change legislation and State guidance relevant to establishing a GHG reduction target. While State goals are based on a 1990 baseline year, the City's baseline year is 2008. Therefore, the reduction targets are expressed as a percent reduction below 2008 levels. Targets are recommended for 2020 to align with AB 32, 2030 to align with EO B-30-15, and 2040 to align with the City's General Plan Update buildout year. Planning beyond 2040 is considered speculative, as legislation and technology may change significantly before 2050. While it is important for continued reductions well beyond 2040, no local 2050 targets are recommended at this time.

Table B-15 provides a summary of the State's goals and the State's guidance to local governments regarding GHG reduction targets. This guidance applies to community-wide emissions reductions efforts.

1 CEC 2009 California Residential Appliance Saturation Appliance Study, October 2010. CEC-200-2010-004.
2 CEC 2006. California Commercial End-Use Survey. March 2006. CEC-400-2006-005.
3 SEEC ClearPath California Reference Sheet – Default Carbon Intensity Factors

Table B-15. Summary of State Reduction Targets and Guidance on Local Government Targets Aligned with State Targets

	2020	2030	2050
State Targets (AB 32, and B-30-15)	1990 levels	40 percent below 1990 levels	80 percent below 1990 levels
State Guidance on Local Government Targets (AB 32 Scoping Plan)	15 percent below current levels	Demonstrate a trajectory toward statewide 2050 levels	NA

Source: California Air Resources Board: AB 32 Scoping Plan Update (2013), and California's 2017 Climate Change Scoping Plan (2017)
Office of Governor Edmund G. Brown Jr., Executive Order B-30-15 (2015)

Table B-16 demonstrates how the recommendations for local targets that do not have a 1990 emissions inventory were derived and how they align with State targets.

Table B-16. Comparison of 1990 Baseline Targets vs. 2008 Baseline Targets

Target Year	Percent below 1990 Emission Levels	Percent below 2008 Emission Levels
2020	**0.0**	**15.0**
2021	4.0	18.4
2022	8.0	21.8
2023	12.0	25.2
2024	16.0	28.6
2025	20.0	32.0
2026	24.0	35.4
2027	28.0	38.8
2028	32.0	42.2
2029	36.0	45.6
2030	**40.0**	**49.0**
2031	42.0	50.7
2032	44.0	52.4
2033	46.0	54.1
2034	48.0	55.8
2035	50.0	57.5
2036	52.0	59.2
2037	54.0	60.9
2038	56.0	62.6
2039	58.0	64.3
2040	**60.0**	**66.0**

Source: LSA 2018

APPENDIX B

SUPPORTING DATA

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APPENDIX B SUPPORTING DATA

This appendix contains input and output data from the ClearPath Tool for the City of Corona's greenhouse gas (GHG) emissions inventory and forecasts. ClearPath Tool was developed by the Statewide Energy Efficiency Collaborative (SEEC) which is a partnership between several statewide agencies, utilities, and non-profits to assist cities and counties in climate mitigation planning. The ClearPath Tool is an all-in-one suite of online tool to help local agencies complete government operations and community-wide greenhouse gas inventories, forecasts and climate action plans. The tools are offered at no-cost to California local governments through the SEEC partnership.

The following tables are provided in this appendix:

- Factor Sets
- Community Inventory Input (Excluding Off-Road Sector)
- Community Business-As-Usual Forecast Input
- Community Adjusted Business-As-Usual Forecast Input
- Community Inventories, Business-As-Usual Forecast, and Adjusted Business-As-Usual Forecast Output

Grid Electricity Factor Sets Inputs

SCE Electricity

Year	GHG	SEEC Entry Name	Units	Factor	Source
2016	CO2e	SCE_2016	MT CO2e/MWh	0.24	SCE 2016 Corporate Responsibility & Sustainability Report
2016	CO2e	SCE_2016	lbs CO2e/MWh	529.11	SCE 2016 Corporate Responsibility & Sustainability Report

Statewide Electricity (For Water-related Energy)

Year	GHG	SEEC Entry Name	Units	Factor	Source	ClearPath FS Name	Notes
2016	CO2		lbs CO2/MWh	527.9	EPA eGRID 2016 data summary table	CA_2013_2009proxy	
2016	CH4	CA_2016	lbs CH4/MWh	0.033	WECC California total output emission rates	CA_2013_2009proxy	
2016	N2O		lbs N2O/MWh	0.004	https://www.epa.gov/energy/emissions-generation-resource-integrated-database-egrid	CA_2013_2009proxy	

Waste Characterization Factor Sets Inputs

	Alternative Daily Cover (ADC)	Landfilled Solid Waste	
SEEC Entry Name	ADC_2016	CalRecycle_2016	Corresponding Name in California Integrated Waste Management Board Report
Year	2016	2016	
Unit	%	%	
Mixed MSW	0	0	All other paper
Newspaper	0	1.2	Newspaper
Office Paper	0	4.6	White/Colored Ledger Paper + Other Office Paper + Other Miscellaneous Paper
Cardboard	0	3.3	Uncoated Corrugated Cardboard + Paper Bags
Magazine/Third Class Mail	0	8.1	Magazines and Catalogs + Remainder/Composite Paper
Food Scraps	0	18.1	Food
Grass	30	1.9	Leaves and Grass (Half)
Leaves	40	1.9	Leaves and Grass (Half)
Branches	30	4.8	Branches and Stumps + Prunings and Trimmings
Lumber	0	11.9	Lumber

Transportation Factor Sets Inputs

		On Road Average Factor (g/mile)			
SEEC Entry Name	FleetAverage_2016				
Year	2016				
	MPG	CO2	CH4	N2O	Percentage
Gasonline Passenger Vehicle	27.68572889	342.1941835	0.028	0.029	68.27%
Gasonline Light Truck	21.55059521	439.6117741	0.028	0.029	29.43%
Gasoline Heavy Truck	10.12100817	936.0624197	0.028	0.029	2.30%
Diesel Passenger Vehicle	45.12851448	248.6331411	0.001	0.001	15.02%
Diesel Light Truck	31.5821063	355.2785305	0.001	0.001	1.86%
Diesel Heavy Truck	19.36018961	579.5627283	0.001	0.001	83.12%
Source	EMFAC2017	EMFAC2017	Community Protocol Appendix D Table TR.1.4		

Note: EMFAC Vehicle Categories: Passenger Vehicle = LDA, Light Truck = LDT1+LDT2, Heavy Truck = LHD1+LHD2

	2016	2040
Gasoline	0.89719304	0.846626545
Diesel	0.115770537	0.112454052

Note: Total percentage is less than 100% because of electrical vehicles.

Unit Conversions	
lb/MT	2204.623
therm/MMBTU	0.10000040
kg/MT	0.001

Conversions for Water to Energy (For Inventory Water Sector)

	Indoor	Outdoor	Units
Supply and Convey	9,727	9,727	kWh/MG
Treatment	111	111	kWh/MG
Distribution	1,272	1,272	kWh/MG
Wastewater Treatment	1,911	0	kWh/MG
Total (Adjusted by Water Source)	7,574	5,663	kWh/MG
Conversion factor for Corona	**6618.38**		kWh/MG

Notes:

Conversion from MG to kWh uses CEC 2006 Refining Estimates for Water-Related Energy Use in California for Southern California.

Approximately 44% of Corona's water was imported from Metropolitan Water District of Southern California (MWD) through Western Municipal Water District (WMWD) and 56% came from local groundwater sources.

Assume no Supply and Convey energy consumption for local groundwater sources.

Adjusted to account for indoor vs outdoor water use, assume 50% indoor and 50% outdoor.

Community Inventory Input

Year	Variable	SEEC Entry Name	Corona	Riverside County	Data Source
2016	Population	Multiple Entries	164,659	2,347,828	SCAG 2017 Local Profile
2017	Population		165,366		GP Update
2040	Population	NA (For Forecast Growth Rate Calculation Only)	184,086		
2016	Households	Multiple Entries	46,873	713,205	SCAG 2017 Local Profile
2017	Households		46,979		GP Update
2040	Households	NA (For Forecast Growth Rate Calculation Only)	52,297		
2016	Total Jobs	Multiple Entries	71,367	709,940	SCAG 2017 Local Profile (2015 Number of Jobs)
2017	Total Jobs		70,972		GP Update
2040	Total Jobs	NA (For Forecast Growth Rate Calculation Only)	84,395		
2016	Residential Electricity SCE (kWh)	Residential_Electricity_SCE_2016	350,354,664	NA	SCE
2016	Commercial Electricity SCE (kWh)	Commercial_Electricity_SCE_2016	638,381,587	NA	SCE
2016	Residential Electricity DWP (kWh)	Residential_Electricity_DWP_2016	17,528,643	NA	City Department of Water and Power
2016	Commercial Electricity DWP (kWh)	Commercial_Electricity_DWP_2016	259,675,861	NA	City Department of Water and Power
2016	Residential Natural Gas (therms)	Residential_NaturalGas_2016	15,559,287	NA	SCG
2016	Commercial Natural Gas (therms)	Commercial_NaturalGas_2016	21,015,979	NA	SCG
2017	Vehicle Miles Traveled_Gasoline (miles)	On-road_Gasoline_2016	1,169,706,600		Calculated from total and gas/diesel breakdown from EMFAC2017
2017	Vehicle Miles Traveled_Diesel (miles)	On-road_Diesel_2016	150,934,699		Calculated from total and gas/diesel breakdown from EMFAC2017
2017	Vehicle Miles Traveled_Total (miles)	NA (For Gas/Diesel VMT Calculation Only)	1,303,740,162		Fehr&Peers
2040	Vehicle Miles Traveled_Gasoline (miles)	NA (For Forecast Growth Rate Calculation Only)	1,336,928,145		Calculated from total and gas/diesel breakdown from EMFAC2017
2040	Vehicle Miles Traveled_Diesel (miles)	NA (For Forecast Growth Rate Calculation Only)	177,578,872		Calculated from total and gas/diesel breakdown from EMFAC2017
2040	Vehicle Miles Traveled_Total (miles)	NA (For Gas/Diesel VMT Calculation Only)	1,579,123,821		Fehr&Peers
2016	Landfilled Solid Waste (tons)	SolidWaste_Landfilled_2016	204,211	2,158,648	CalRecycle DRS Single-year Countywide Origin Detail
2016	ADC Solid Waste (tons)	SolidWaste_ADC_2016	147	23,709	CalRecycle DRS Single-year Countywide Origin Detail
2016	Residential Water Consumption (Million Gallons per year)	Residential_Water_2016	6,515	N/A	2018 General Plan Update
2016	Residential Water Energy Consumption (kWh)	Residential_Water_2016	43,119,577	N/A	Conversions using 2006 CEC Report
2016	Commercial Water Consumption (Million Gallons per year)	Commercial_Water_2016	3,501	N/A	2018 General Plan Update
2016	Commercial Water Energy Consumption (kWh)	Commercial_Water_2016	23,167,982	N/A	Conversions using 2006 CEC Report

Business-As-Usual Forecast Growth Rates Inputs

Variable	SEEC Entry Name	Corona	Notes
Annual Growth Rate_Jobs_2016-2040	CAGR_Jobs_2016-2040	0.007243723	CAGR calculation formula: (Future/Past)^(1/years)-1
Annual Growth Rate_Households_2016-2040	CAGR_Households_2016-2040	0.004478261	Growth rate is calculated from 2017 to buildout year, but is used for 2016 to 2030
Annual Growth Rate_Population_2016-2040	CAGR_Population_2016-2040	0.004478408	
Annual Growth Rate_ServPop_2016-2040	CAGR_ServPop_2016-2040	0.005327355	Service Population = Population + Jobs
Annual Growth Rate_VMT_Gas_2016-2040	CAGR_VMT_Gas_2016-2040	0.005583095	
Annual Growth Rate_VMT_Diesel_2016-2040	CAGR_VMT_Diesel_2016-2040	0.006796642	
Annual Growth Rate_VMT_2016-2040	CAGR_VMT_Total_2016-2040	0.00801667	

Adjusted Business-As-Usual Forecast Inputs

Variable	SEEC Entry Name	Corona	Notes
On-Road Transportation (Change Carbon Intensity)	State_On-RoadTrans_Gasoline_2016-2020	-2.602%	Calculated from EMFAC2017 CO2 emission factors change between 2016, 2020, and 2040.
On-Road Transportation (Change Carbon Intensity)	State_On-RoadTrans_Gasoline_2021-2040	-1.908%	Aggregated from all EMFAC vehicle categories.
On-Road Transportation (Change Carbon Intensity)	State_On-RoadTrans_Diesel_2016-2020	-1.412%	
On-Road Transportation (Change Carbon Intensity)	State_On-RoadTrans_Diesel_2021-2040	-1.695%	
kWh per household x 4.5% (residential savings from Title 24)	State_Title24_Res_Electricity_2016-2040	336.4	Impact Analysis, California Energy Commission
kWh per job x 3.6% (commercial savings from Title 24)	State_Title24_Comm_Electricity_2016-2040	322.0	2016 Update to the California Energy Efficiency Standards for Residential and Nonresidential Buildings
therm per household x 21.6% (residential savings from Title 24	State_Title24_Res_NatGas_2016-2040	71.7	Table 2 for residential and commercial electricity savings
therm per job x 0.35% (commercial savings from Title 24)	State_Title24_Comm_NatGas_2016-2040	1.0	Table 4 for residenital and commercial natural gas savings
Primary Driver_Household_2016-2040 (units/yr)	State_Title24_Res_Electricity/NatGas_2016-2040	226	
Primary Driver_Total Jobs_2016-2040 (jobs/yr)	State_Title24_Comm_Electricity/NatGas_2016-2040	543	
Renewable Portfolio Standards (Change Carbon Intensity)	State_Water_RPS_2016-2020	-3.4%	ICLEI Reference Sheet https://s3.amazonaws.com/CEMS_Docs/SEEC+ClearPath+Carbon+Intensity+Reference+Sheet.pdf
Renewable Portfolio Standards (Change Carbon Intensity)	State_Water_RPS_2021-2030	-1.7%	Renewable energy 33% by 2020 and 50% by 2030, 1.7% reduction per year
Renewable Portfolio Standards (Change Carbon Intensity)	State_Water_RPS_2031-2050	-2.5%	Renewable energy 50% by 2030 and 100% by 2050, 2.5% reduction per year
Renewable Portfolio Standards (Change Carbon Intensity)	State_Res_Electricity_RPS_2016-2020	-3.4%	ICLEI Reference Sheet https://s3.amazonaws.com/CEMS_Docs/SEEC+ClearPath+Carbon+Intensity+Reference+Sheet.pdf
Renewable Portfolio Standards (Change Carbon Intensity)	State_Res_Electricity_RPS_2021-2030	-1.7%	Renewable energy 33% by 2020 and 50% by 2030, 1.7% reduction per year
Renewable Portfolio Standards (Change Carbon Intensity)	State_Res_Electricity_RPS_2031-2050	-2.5%	Renewable energy 50% by 2030 and 100% by 2050, 2.5% reduction per year
Renewable Portfolio Standards (Change Carbon Intensity)	State_Comm_Electricity_RPS_2016-2020	-3.4%	ICLEI Reference Sheet https://s3.amazonaws.com/CEMS_Docs/SEEC+ClearPath+Carbon+Intensity+Reference+Sheet.pdf
Renewable Portfolio Standards (Change Carbon Intensity)	State_Comm_Electricity_RPS_2021-2030	-1.7%	Renewable energy 33% by 2020 and 50% by 2030, 1.7% reduction per year
Renewable Portfolio Standards (Change Carbon Intensity)	State_Comm_Electricity_RPS_2031-2050	-2.5%	Renewable energy 50% by 2030 and 100% by 2050, 2.5% reduction per year
Water Conservation SBX7-7 (Reduce Energy Use)	State_Water_SBx7-7	0	Metropolitan Water District of Southern California 2015 Urban Water Management Plan, Section 3.7
			2020 reduction target is 145 GPCD, 2015 usage was 131 GPCD, therefore no more reduction.

Community Inventory Input (Off-Road Sector)

Class	Values	2016	2020	2030
Agricultural Equipment	Sum of Annual_MT_CO2 Exhaust	1,588	1555.507142	1480.952819
	Sum of Annual_MT_CH4 Exhaust	0.157	0.109236125	0.063077023
	Sum of Annual_MT_N2O Exhaust	0.019	0.018495839	0.019197948
Construction and Mining Equipment	Sum of Annual_MT_CO2 Exhaust	7,336	7750.019526	8799.428507
	Sum of Annual_MT_CH4 Exhaust	0.669	0.543639627	0.403223312
	Sum of Annual_MT_N2O Exhaust	0.040	0.03953828	0.041731386
Industrial Equipment	Sum of Annual_MT_CO2 Exhaust	719	755.1735718	862.2508771
	Sum of Annual_MT_CH4 Exhaust	0.245	0.253665736	0.306946916
	Sum of Annual_MT_N2O Exhaust	0.037	0.037184466	0.039770136
Lawn and Garden Equipment	Sum of Annual_MT_CO2 Exhaust	755	894.0844133	1485.748141
	Sum of Annual_MT_CH4 Exhaust	1.107	1.295721634	2.136058128
	Sum of Annual_MT_N2O Exhaust	0.486	0.569949576	0.941689256
Light Commercial Equipment	Sum of Annual_MT_CO2 Exhaust	500	508.7459046	544.9366109
	Sum of Annual_MT_CH4 Exhaust	0.137	0.119330142	0.111932274
	Sum of Annual_MT_N2O Exhaust	0.081	0.07910845	0.082541373
Recreational Equipment	Sum of Annual_MT_CO2 Exhaust	425	470.8609351	583.0182602
	Sum of Annual_MT_CH4 Exhaust	1.804	2.062785554	2.880822248
	Sum of Annual_MT_N2O Exhaust	0.640	0.718535945	0.942353847

For Projections		
Indicator	2016 MT	2040 MT
% Ag jobs	1588.114498	1409.583073
	0.156688451	0.05558469
	0.019404633	0.020693111
% Building Permits	7335.683628	9840.499547
	0.668899819	0.39447395
	0.039568328	0.04412217
% Manufacturing Jobs	718.9539603	989.5865666
	0.244824174	0.38234071
	0.036870438	0.042318824
% Households	755.0643289	2417.844359
	1.107483422	3.476388727
	0.485837252	1.532590585
% Other Jobs	500.3438994	579.5979854
	0.136762261	0.117313195
	0.080745877	0.087628879
% Population weighted by Income	424.5671197	752.1139357
	1.803759137	4.112737071
	0.640037435	1.279972404
Total MT CO2e	11770.84082	16999.63781
CAGR_Offroad_2016-2040	0.015433158	

	Corona	County	Sources:
BuildingPermits	66	5,136	US Census Bureau https://www2.census.gov/econ/bps/
Population	165,366	2,347,828	SCAG 2017 Local Profile
Portion Population weighted by Income	9.34%		
Households	46,979	713,205	SCAG 2017 Local Profile
Portion Households	6.59%		
Jobs_Total	71,367	709,940	SCAG 2017 Local Profile (2015 Number of Jobs)
Portion Other Jobs	9.91%		
Jobs_Agriculture	500	10,700	SCAG 2017 Local Profile (2015 Jobs in Agriculture 0.7%)
Portion Ag jobs	4.67%		
Jobs_Manufacturing	11,862	103,633	SCAG 2017 Local Profile (2015 Jobs in Manufacturing)
Portion Manufacturing Jobs	11.45%		
Median_Income	76,065	57,367	SCAG 2017 Local Profile
Portion Building Permits	1.29%		
Other Jobs	59,005	595,607	

SEEC Entry Name		Corona
Offroad_Agriculture_2016	CO2	74.14698799
	CH4	0.00731558
	N2O	0.00090598
Offroad_Construction_2016	CO2	94.26696251
	CH4	0.00859568
	N2O	0.00050847
Offroad_Industrial_2016	CO2	82.29262761
	CH4	0.02802297
	N2O	0.00422025
Offroad_Lawn&Garden_2016	CO2	49.73628495
	CH4	0.07295022
	N2O	0.03200223
Offroad_Commercial_2016	CO2	49.56793226
	CH4	0.01354873
	N2O	0.00799931
Offroad_Recreation_2016	CO2	39.65053319
	CH4	0.16845396
	N2O	0.05977341

Output from SEEC - Community Inventory

Inventory Record	2016 MT CO2e
Residential_Electricity_DWP_2016	4,207
Residential_Electricity_SCE_2016	84,085
Residential_NaturalGas_2016	82,754
Commercial_Electricity_DWP_2016	62,322
Commercial_Electricity_SCE_2016	153,212
Commercial_NaturalGas_2016	111,777
On-road_Gasoline_2016	426,742
On-road_Diesel_2016	72,243
Offroad_Agriculture_2016	75
Offroad_Construction_2016	95
Offroad_Industrial_2016	84
Offroad_Lawn&Garden_2016	60
Offroad_Recreation_2016	60
Offroad_Commercial_2016	52
SolidWaste_ADC_2016	33
SolidWaste_Landfilled_2016	55,609
Wastewater_Digester_2016	10
Residential_Water_2016	10,349
Commercial_Water_2016	5,560
Wastewater_Nitrification_2016	175
Wastewater_Effluent_2016	4,013
Total	**1,073,517**

Output from SEEC - Community Business-As-Usual Forecasts

Year	Usage	CO2e	Output Name
2016	204358	55642	Waste Generated (wet tons)
2020	208941	56889	Waste Generated (wet tons)
2030	220852	60132	Waste Generated (wet tons)
2040	233442	63560	Waste Generated (wet tons)
2016	59825	88292	Res Electricity Energy Equivalent (MMBtu)
2020	60951	89954	Res Electricity Energy Equivalent (MMBtu)
2030	63860	94248	Res Electricity Energy Equivalent (MMBtu)
2040	66908	98746	Res Electricity Energy Equivalent (MMBtu)
2016	1555929	82754	Res Natural Gas - Energy Equivalent (MMBtu)
2020	1585219	84312	Res Natural Gas - Energy Equivalent (MMBtu)
2030	1660881	88336	Res Natural Gas - Energy Equivalent (MMBtu)
2040	1740154	92553	Res Natural Gas - Energy Equivalent (MMBtu)
2016	599173	215534	Comm Electricity Energy Equivalent (MMBtu)
2020	617498	222126	Comm Electricity Energy Equivalent (MMBtu)
2030	665800	239502	Comm Electricity Energy Equivalent (MMBtu)
2040	717881	258236	Comm Electricity Energy Equivalent (MMBtu)
2016	2101598	111777	Comm Natural Gas - Energy Equivalent (MMBtu)
2020	2165873	115195	Comm Natural Gas - Energy Equivalent (MMBtu)
2030	2335294	124206	Comm Natural Gas - Energy Equivalent (MMBtu)
2040	2517968	133922	Comm Natural Gas - Energy Equivalent (MMBtu)
2016	1	84	Ships and Boats - Off Road Fuel Use
2020	1	90	Ships and Boats - Off Road Fuel Use
2030	1	104	Ships and Boats - Off Road Fuel Use
2040	1	122	Ships and Boats - Off Road Fuel Use
2016	1	60	Locomotives - Off Road Fuel Use
2020	1	64	Locomotives - Off Road Fuel Use
2030	1	75	Locomotives - Off Road Fuel Use
2040	1	87	Locomotives - Off Road Fuel Use
2016	1	75	Agricultural - Off Road Fuel Use
2020	1	79	Agricultural - Off Road Fuel Use
2030	1	92	Agricultural - Off Road Fuel Use
2040	1	108	Agricultural - Off Road Fuel Use
2016	1	95	Construction - Off Road Fuel Use
2020	1	101	Construction - Off Road Fuel Use
2030	1	117	Construction - Off Road Fuel Use
2040	1	137	Construction - Off Road Fuel Use
2016	1	60	Snowmobiles and Recreational - Off Road Fuel Use
2020	1	64	Snowmobiles and Recreational - Off Road Fuel Use
2030	1	74	Snowmobiles and Recreational - Off Road Fuel Use
2040	1	87	Snowmobiles and Recreational - Off Road Fuel Use
2016	1	52	Small Utility - Off Road Fuel Use
2020	1	55	Small Utility - Off Road Fuel Use
2030	1	65	Small Utility - Off Road Fuel Use
2040	1	75	Small Utility - Off Road Fuel Use
2016	1130718822	412519	Gasoline - On Road VMT
2020	1151592261	420134	Gasoline - On Road VMT
2030	1205477276	439793	Gasoline - On Road VMT
2040	1261883665	460371	Gasoline - On Road VMT
2016	145903858	69835	Diesel - On Road VMT
2020	149315905	71468	Diesel - On Road VMT
2030	158199209	75720	Diesel - On Road VMT
2040	167611012	80225	Diesel - On Road VMT
2016	60399932	10	Annual Gas Production (scf / Year)
2020	61754378	11	Annual Gas Production (scf / Year)
2030	65274869	11	Annual Gas Production (scf / Year)
2040	68996057	12	Annual Gas Production (scf / Year)
2016	165366	175	Process N2O Population Served
2020	169074	179	Process N2O Population Served
2030	178713	189	Process N2O Population Served
2040	188901	200	Process N2O Population Served
2016	198740	15909	Water Supply Energy Equivalent (MMBtu)
2020	203196	16266	Water Supply Energy Equivalent (MMBtu)
2030	214780	17193	Water Supply Energy Equivalent (MMBtu)
2040	227024	18173	Water Supply Energy Equivalent (MMBtu)
2016	5281	4013	Daily N Load at Facility with Release to Environment (kg N/day)
2020	5400	4103	Daily N Load at Facility with Release to Environment (kg N/day)
2030	5708	4337	Daily N Load at Facility with Release to Environment (kg N/day)
2040	6033	4584	Daily N Load at Facility with Release to Environment (kg N/day)

Output from SEEC - Community Adjusted Business-As-Usual Forecasts

Year	Category	CO2e
2016	Transportation & Mobile Sources	482779
2020	Transportation & Mobile Sources	446052
2030	Transportation & Mobile Sources	387245
2040	Transportation & Mobile Sources	336282
2016	Water & Wastewater	20108
2020	Water & Wastewater	18457
2030	Water & Wastewater	17150
2040	Water & Wastewater	15146
2016	Residential Energy	171047
2020	Residential Energy	162292
2030	Residential Energy	156221
2040	Residential Energy	146591
2016	Commercial Energy	327311
2020	Commercial Energy	308566
2030	Commercial Energy	299731
2040	Commercial Energy	280738
2016	Solid Waste	55642
2020	Solid Waste	56889
2030	Solid Waste	60132
2040	Solid Waste	63560

APPENDIX C

SCREENING TABLES

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City of Corona

GREENHOUSE GAS EMISSIONS

Screening Tables

March 2019

Prepared for:

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400 S Vincentia Avenue
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Prepared by:

LSA

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APPENDIX A – GHG Development Review Process Flow Chart Diagram

APPENDIX B – Transit Priority Project and Sustainable Community Project Checklist

APPENDIX C – Methodology for the Development and Application of the Screening Tables

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Introduction

The City of Corona Climate Action Plan Update (CAP Update) includes an interim goal of reducing greenhouse gas (GHG) emissions to 49 percent below 2008 levels by the year 2030, and a longer-term GHG reduction goal of 66 percent below 2008 levels by 2040. The interim and longer-term goals would put the City of Corona (City) on a path toward the State's long-term goal to reduce emissions 80 percent below 1990 levels by 2050. Reductions related to transportation, water, solid waste, energy, and renewable energy sources all play a crucial part in gaining the level of efficiency needed within the new development across the City.

Mitigation of GHG emissions impacts through the Development Review Process (DRP) provides one of the most substantial reduction strategies for reducing community-wide emissions associated with new development. The DRP procedures for evaluating GHG impacts and determining significance for CEQA purposes will be streamlined by utilizing Screening Tables to mitigate project GHG emissions and demonstrating compliance with the CAP Update. Projects will have the option of preparing a project-specific technical analysis to quantify and mitigate GHG emissions or completing the Screening Tables to demonstrate compliance.

The California Environmental Quality Act (CEQA) requires the assessment of environmental impacts for proposed projects including the impacts of GHG emissions. The purpose of this document is to provide guidance on how to analyze GHG emissions and determine the significance of those emissions during CEQA review of proposed development projects within the City. The analysis, methodology, and significance determination (thresholds) are based upon the CAP Update, the GHG emission inventories within the CAP Update, and the GHG reduction measures that reduce emissions to the State-aligned reduction target of the CAP Update. The Screening Tables can be used by the City for review of development projects in order to ensure that the specific reduction strategies in the CAP Update are implemented as part of the CEQA process for development projects. The Screening Tables provide a menu of options that ensures both implementation of the reduction strategies and flexibility on how development projects would implement the reduction strategies to achieve an overall reduction of emissions, consistent with the reduction targets of the CAP Update.

California Environmental Quality Act

CEQA Mandates for Analysis of Impacts

CEQA requires that Lead Agencies inform decision makers and the public regarding the following: potential significant environmental effects of proposed projects; feasible ways that environmental damage can be avoided or reduced through the use of feasible mitigation measures and/or project alternatives; and the reasons why the Lead Agency approved a project if significant environmental effects are involved (CEQA Guidelines §15002). CEQA also requires Lead Agencies to evaluate potential environmental effects based to the fullest extent possible on scientific and factual data (CEQA Guidelines §15064[b]). A determination of whether or not a particular environmental impact would be significant shall be based on substantial evidence, which includes facts, reasonable assumptions predicated upon facts, and expert opinion supported by facts (CEQA Guidelines §15064f[5]).

The recently amended CEQA Guidelines (CEQA Guidelines §15064.4[a] [b]) explicitly require Lead Agencies to evaluate GHG emissions during CEQA review of potential environmental impacts generated by a proposed project. To assist in this effort, two questions were added to Appendix G of the CEQA Guidelines:

- Would the project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?
- Would the project conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs?

Finally, under the “rule of reason,” an Environmental Impact Report (EIR) is required to evaluate impacts to the extent that is reasonably feasible (CEQA Guidelines § 15151; *San Francisco Ecology Center v. City and County of San Francisco* [1975] 48 Cal.App.3rd 584). While CEQA does require Lead Agencies to make a good faith effort to disclose what they reasonably can, CEQA does not demand what is not realistically possible (*Residents at Hawks Stadium Committee v. Board of Trustees* [1979] 89 Cal.App.3rd 274, 286).

Greenhouse Gas Impact Determination

Statewide or Regional Thresholds of Significance

There are currently no published statewide thresholds of significance for measuring the impact of GHG emissions generated by a proposed project. CEQA Guidelines §15064.7 indicates only that, “each public agency is encouraged to develop and publish thresholds of significance that the agency uses in the determination of the significance of environmental effects.” South Coast Air Quality Management District (SCAQMD) has published draft thresholds that, when finalized, jurisdictions within the SCAQMD boundary can use if they do not have their own thresholds and GHG mitigation plans. However, the CAP Update for the City addresses cumulative GHG emissions, has reduction targets that reduces the cumulative GHG impacts to less than significant, has a set of reduction measures that achieves the reduction targets, and provides an implementation plan to implement the reduction measures. This document provides guidance in how to address GHG emissions in CEQA analysis and determine the significance of project generated GHG emissions.

Quantitative Analysis Relative to the Climate Action Plan

METHODOLOGY OVERVIEW

An individual project cannot generate enough GHG emissions to influence global climate change. The project participates in climate change by its incremental contribution combined with the cumulative increase of all other sources of GHGs, which when taken together may have a significant impact on global climate change (AEP 2007). To address the State's requirement to reduce GHG emissions, the City prepared the CAP Update with targets of reducing GHG emissions within the City by 15 percent below 2008 baseline emission levels by year 2020, 49 percent below 2008 baseline by 2030, and 66 percent below the 2008 baseline by 2040. The City's targets are consistent with Assembly Bill (AB) 32 and Senate Bill (SB) 32, and ensure that the City is providing GHG reductions locally that will complement the State and international efforts of stabilizing climate change.

Because the City's CAP Update addresses GHG emissions reduction, in concert with AB 32, SB 32, and international efforts to address global climate change, and includes specific local requirements that would substantially lessen the cumulative problem, compliance with the CAP Update fulfills the description of mitigation found in CEQA Guidelines §15130(a)(3) and §15183.5.

GHG emissions are only important in the context of cumulative emissions; therefore, the focus of the analysis is on answering the question of whether incremental contributions of GHGs are a cumulatively considerable contribution to climate change impacts. The CAP Update includes a set of reduction measures designed to substantially lessen cumulative impacts associated with GHG emissions as described in CEQA Guidelines §15130(a)(3), in determining if a project's effects would result in significant impacts. The CAP Update has the following components that fulfill cumulative mitigation for GHG emissions:

1. The CAP Update provides a community-wide GHG emissions reduction target that would substantially lessen the cumulative impact;
2. The CAP Update provides measures that new development projects shall follow to meet the City's reduction target and substantially lessen the cumulative impact;
3. The CAP Update provides a set of GHG emission inventories that provides quantitative facts and analysis for how the measures within the CAP Update meet the reduction targets that substantially lessen the cumulative impact; and
4. The CAP Update provides an implementation, monitoring, and update program to ensure that the reduction target is met.

The CAP Update satisfies the first condition by adopting targets of reducing GHG emissions within the City by 15 percent below 2008 levels by 2020, 49 percent by 2030, and 66 percent by 2040. The 2020 reduction target is compliant with AB 32. The AB 32 Climate Change Scoping Plan states: "In recognition of the critical role local governments will play in the successful implementation of AB 32, ARB recommended a greenhouse gas reduction goal for local governments of 15 percent below existing levels by 2020 to ensure that their municipal and community-wide emissions match the State's reduction target" (Scoping Plan page ES-5, CARB, December 2008). In this way, the City is teaming with the State's efforts to reduce GHG emissions globally and substantially lessen cumulative emissions. The 2030 reduction target is compliant with SB 32, and the 2040 reduction target continues the GHG reduction trend (AEP 2012).

The CAP Update satisfies the second condition through the implementation of the reduction measures for new development. This document supplies the specific criteria that new development shall follow to ensure that the reduction measures associated with new development are implemented and the reduction targets are met.

The CAP Update satisfies the third criteria by providing a set of community-wide GHG emissions inventories for existing conditions (2008 baseline); and future 2020, 2030, and 2040 GHG emissions that are anticipated without the reduction measures (Adjusted Business-As-Usual, or ABAU); and the CAP Update also demonstrates reduced levels of 2020, 2030, and 2040 GHG emissions that demonstrate how the implementation of reduction measures achieves the reduction targets. These community-wide GHG emission inventories are found in Appendix A of the CAP Update.

The Development Review Process

Integrating the reduction measures of the CAP Update into the CEQA development review process is the first step in determining how a proposed project will implement the GHG reduction measures within the CAP Update. The GHG emissions development review process is predicated on responses to two questions. Appendix A of this document contains a flow chart that diagrams this development review process. The questions are as follows:

Question 1: Is the proposed activity a "Project" as defined by CEQA? If the activity is not a project under CEQA, no further action is required concerning GHG emissions in the development review process.

Question 2: Is the project exempt under CEQA? If so, then the California Air Resources Board has determined that GHG emissions are less than significant and no additional GHG reductions are needed. A list of CEQA Exemptions are found in CEQA Guidelines §15300 through §15332.

There are also exemption opportunities associated with transit-oriented development (TOD) associated with the Sustainable Communities Strategy (SCS) for the region developed by the Southern California Association of Governments (SCAG) and first introduced in the 2012 Regional Transportation Plan (RTP). Exemptions associated with TOD are divided into two categories: transit priority projects (TPP) and Sustainable Community Projects (SCP). A TPP and SCP Checklist is provided in Appendix B of this document to assist project applicants in determining if a project qualifies for these exemptions under

CEQA. If the project does not qualify for a CEQA exemption, then the applicant can move on to the Methods for the Calculation of GHG Emissions and Screening Tables.

METHODOLOGY FOR THE CALCULATION OF GHG EMISSIONS

Analysis of development projects can either be done through emissions calculations or by using the Screening Tables beginning on page 7.

Total GHG emissions are the sum of emissions from both direct and indirect sources. Direct sources include mobile sources such as construction equipment, motor vehicles, landscape equipment; and stationary sources such as cooling and heating equipment. Indirect sources are comprised of electrical, and potable water use, and the generation of solid waste, and wastewater.

Direct GHG emissions from mobile and stationary sources are determined as the sum of the annual GHG emissions from construction equipment, motor vehicles, landscape equipment, and heating and cooling equipment.

Indirect sources are determined based on source as follows. Electrical usage is reported as annual emissions from electrical usage. Potable water usage is reported as the annual emissions from electricity used for potable water treatment and transportation. Solid waste is reported as the sum of annual emissions from solid waste disposal treatment, transportation, and fugitive emissions of methane at the solid waste facilities. Wastewater usage is reported as the annual emissions from wastewater transport and treatment.

Analysis of development projects not using the screening tables should use the emission factors found in the latest version of the California Climate Action Registry (CCAR) General Reporting Protocol (CCAR, January 2009), and guidance in the Association of Environmental Professionals' (AEP) *White Paper: Community-Wide Greenhouse Gas Emission Inventory Protocols* (AEP, June 2011). Quantification of emissions from electricity used for potable water treatment and transportation as well as wastewater transport and treatment can be found in the California Energy Commission (CEC) document titled *Refining Estimates of Water-Related Energy Use in California* (CEC 2006).

Screening Tables

The purpose of the Screening Tables is to provide guidance in measuring the reduction of GHG emissions attributable to certain design and construction measures incorporated into development projects. The analysis, methodology, and significance determination (thresholds) are based upon the CAP and CAP Update, which include GHG emission inventories (2008 and 2016); forecasts for years 2020, 2030, and 2040; 2020, 2030, and 2040 emission reduction targets; and the goals and policies to reach the targets. The methodology for the development and application of the Screening Tables is set forth in Appendix C of this document and uses the California Air Pollution Control Officers Association (CAPCOA) guidance on quantifying project level GHG reductions (CAPCOA 2010).

INSTRUCTIONS FOR RESIDENTIAL, COMMERCIAL, OR INDUSTRIAL PROJECTS

The Screening Tables assign points for each option incorporated into a project as mitigation or a project design feature (collectively referred to as “feature”). The point values correspond to the minimum emissions reduction expected from each feature. The menu of features allows maximum flexibility and options for how development projects can implement the GHG reduction measures. The point levels are based upon improvements compared to 2017 emission levels of efficiency. Projects that garner at least 100 points will be consistent with the reduction quantities anticipated in the CAP Update. Consistent with CEQA Guidelines, such projects would be determined to have a less than significant individual and cumulative impact for GHG emissions.

Note that the Screening Tables use a base level of efficiency that corresponds to the California Building Energy Efficiency Standards for Residential and Non-residential Buildings (Title 24, Part 6) that became effective January 1, 2017. These are the statewide minimum requirements of efficiency that are currently in effect.

INSTRUCTIONS FOR MIXED-USE PROJECTS

Mixed-use projects provide additional opportunities to reduce emissions by combining complementary land uses in a manner that can reduce vehicle trips. Mixed-use projects also have the potential to complement energy efficient infrastructure in a way that reduces emissions. For mixed-use projects, both Table 1 and Table 2 should be filled out, but the points should be proportioned identical to the proportioning of the mix of uses. For example, a mixed-use project that is 50 percent commercial uses and 50 percent residential uses will show ½ point for each assigned point value in Table 1 and Table 2, and the points will be added from both tables. Mixed use Projects that garner at least 100 points will be consistent with the reduction quantities in the City’s CAP Update and would be considered less than significant for GHG emissions.

Those projects that do not garner 100 points using the Screening Tables will need to provide additional analysis to determine the significance of GHG emissions. Nothing in this guidance shall be construed as limiting the City’s authority to adopt a statement of overriding consideration for projects that require the preparation of an EIR due to significant GHG impacts. The following tables provides a menu of performance standards/options related to GHG mitigation measures and design features that can be used to demonstrate consistency with the reduction measures and GHG reduction quantities in the CAP Update.

Table 1: Screening Table for GHG Reduction Measures for Residential Development

Feature	Description	Assigned Point Values	Project Points
Reduction Measure 2.1: Exceed Energy Efficiency Standards in New Residential Units			
2.1.A Building Envelope			
2.1.A.1 Insulation	• 2016 Title 24 Requirements (walls R-13, roof/attic R-30) • Modestly Enhanced Insulation (walls R-15, roof/attic R-38) • Enhanced Insulation (rigid wall insulation R-13, roof/attic R-38) • Greatly Enhanced Insulation (spray foam wall insulated walls R-18 or higher, roof/attic R-38 or higher)	0 points 7 points 9 points 11 points	
2.1.A.2 Windows	• 2016 Title 24 Windows (0.57 U-factor, 0.4 solar heat gain coefficient [SHGC]) • Modestly Enhanced Window (0.4 U-Factor, 0.32 SHGC) • Enhanced Window (0.32 U-Factor, 0.25 SHGC) • Greatly Enhanced Window (0.28 or less U-Factor, 0.22 or less SHGC)	0 points 3 points 4 points 5 points	
2.1.A.3 Cool Roofs	• Modest Cool Roof (CRRC Rated 0.15 aged solar reflectance, 0.75 thermal emittance) • Enhanced Cool Roof (CRRC Rated 0.2 aged solar reflectance, 0.75 thermal emittance) • Greatly Enhanced Cool Roof (CRRC Rated 0.35 aged solar reflectance, 0.75 thermal emittance)	6 points 7 points 8 points	
2.1.A.4 Air Infiltration	Minimizing leaks in the building envelope is as important as the insulation properties of the building. Insulation does not work effectively if there is excess air leakage. • Air barrier applied to exterior walls, calking, and visual inspection such as the HERS Verified Quality Insulation Installation (QII or equivalent) • Blower Door HERS Verified Envelope Leakage or equivalent	6 points 5 points	
2.1.A.5 Thermal Storage of Building	Thermal storage is a design characteristic that helps keep a constant temperature in the building. Common thermal storage devices include strategically placed water filled columns, water storage tanks, and thick masonry walls. • Modest Thermal Mass (10% of floor or 10% of walls 12" or more thick exposed concrete or masonry with no permanently installed floor covering such as carpet, linoleum, wood, or other insulating materials) • Enhanced Thermal Mass (20% of floor or 20% of walls 12" or more thick exposed concrete or masonry with no permanently installed floor covering such as carpet, linoleum, wood, or other insulating materials)	1 point 2 points	
2.1.B Indoor Space Efficiencies			
2.1.B.1 Heating/ Cooling Distribution System	• Minimum Duct Insulation (R-4.2 required) • Modest Duct insulation (R-6) • Enhanced Duct Insulation (R-8) • Distribution loss reduction with inspection (HERS Verified Duct Leakage or equivalent)	0 points 4 points 5 points 7 points	
2.1.B.2 Space Heating/ Cooling Equipment	• 2016 Title 24 Minimum HVAC Efficiency (SEER 13/75% AFUE or 7.7 HSPF) • Improved Efficiency HVAC (SEER 14/78% AFUE or 8 HSPF) • High Efficiency HVAC (SEER 15/80% AFUE or 8.5 HSPF) • Very High Efficiency HVAC (SEER 16/82% AFUE or 9 HSPF)	0 points 2 points 4 points 5 points	
2.1.B.3 Water Heaters	• 2016 Title 24 Minimum Efficiency (0.57 Energy Factor) • Improved Efficiency Water Heater (0.675 Energy Factor) • High Efficiency Water Heater (0.72 Energy Factor) • Very High Efficiency Water Heater (0.92 Energy Factor) • Solar Pre-heat System (0.2 Net Solar Fraction) • Enhanced Solar Pre-heat System (0.35 Net Solar Fraction)	0 points 7 points 9 points 11 points 2 points 5 points	

Feature	Description	Assigned Point Values	Project Points
2.1.B.4 Daylighting	Daylighting is the ability of each room within the building to provide outside light during the day reducing the need for artificial lighting during daylight hours. • All peripheral rooms within the living space have at least one window (required) • All rooms within the living space have daylight (through use of windows, solar tubes, skylights, etc.) • All rooms daylighted	0 points 1 point 1 point	
2.1.B.5 Artificial Lighting	• Efficient Lights (25% of in-unit fixtures considered high efficacy. High efficiency is defined as 40 lumens/watt for 15 watt or less fixtures; 50 lumens/watt for 15-40 watt fixtures, 60 lumens/watt for fixtures >40watt) • High Efficiency Lights (50% of in-unit fixtures are high efficiency) • Very High Efficiency Lights (100% of in-unit fixtures are high efficiency)	5 points 6 points 7 points	
2.1.B.6 Appliances	• Energy Star Refrigerator (new) • Energy Star Dishwasher (new) • Energy Star Washing Machine (new)	1 point 1 point 1 point	
2.1.C Miscellaneous Residential Building Efficiencies			
2.1.C.1 Building Placement	North/south alignment of building or other building placement such that the orientation of the buildings optimizes natural heating, cooling, and lighting.	3 points	
2.1.C.2 Shading	At least 90% of south-facing glazing will be shaded by vegetation or overhangs at noon on June 21st.	2 points	
2.1.C.3 Energy Star Homes	EPA Energy Star for Homes (version 3 or above)	15 points	
2.1.C.4 Independent Energy Efficiency Calculations	Provide point values based upon energy efficiency modeling of the project. Note that engineering data will be required documenting the energy efficiency and point values based upon the proven efficiency beyond Title 24 Energy Efficiency Standards.	TBD	
2.1.C.5 Other	This allows innovation by the applicant to provide design features that increase the energy efficiency of the project not provided in the table. Note that engineering data will be required documenting the energy efficiency of innovative designs and point values given based upon the proven efficiency beyond Title 24 Energy Efficiency Standards.	TBD	
2.1.C.6 Existing Residential Retrofits	Having residential developments within walking and biking distances of local retail helps to reduce vehicle trips and/or vehicle miles traveled. The point value of residential projects in close proximity to local retail will be determined based upon traffic studies that demonstrate trip reductions and/or reductions in vehicle miles traveled (VMT). The suburban project will have at least three of the following on site and/or off site within ¼-mile: Residential Development, Retail Development, Park, Open Space, or Office. The mixed-use development should encourage walking and other non-auto modes of transport from residential to office/commercial locations (and vice versa). The project should minimize the need for external trips by including services/facilities for daycare, banking/ATM, restaurants, vehicle refueling, and shopping.	TBD	

Feature	Description	Assigned Point Values	Project Points
Reduction Measure 9.1: Clean Energy			
9.1.A Residential Renewable Energy Generation			
9.1.A.1 Photovoltaic	Solar Photovoltaic panels installed on individual homes or in collective neighborhood arrangements such that the total power provided augments: • 30 percent of the power needs of the project • 40 percent of the power needs of the project • 50 percent of the power needs of the project • 60 percent of the power needs of the project • 70 percent of the power needs of the project • 80 percent of the power needs of the project • 90 percent of the power needs of the project • 100 percent of the power needs of the project	9 points 12 points 17 points 20 points 23 points 25 points 28 points 31 points	
9.1.A.2 Wind Turbines	Some areas of the City lend themselves to wind turbine applications. Analysis of the areas' capability to support wind turbines should be evaluated prior to choosing this feature. Individual wind turbines at homes or collective neighborhood arrangements of wind turbines such that the total power provided augments: • 30 percent of the power needs of the project • 40 percent of the power needs of the project • 50 percent of the power needs of the project • 60 percent of the power needs of the project • 70 percent of the power needs of the project • 80 percent of the power needs of the project • 90 percent of the power needs of the project • 100 percent of the power needs of the project	9 points 12 points 17 points 21 points 23 points 25 points 28 points 31 points	
9.1.A.3 Off-site Renewable Energy Project	The applicant may submit a proposal to supply an off-site renewable energy project such as renewable energy retrofits of existing homes. These off-site renewable energy retrofit project proposals will be determined on a case-by-case basis and shall be accompanied by a detailed plan that documents the quantity of renewable energy the proposal would generate. Point values will be determined based upon the energy generated by the proposal.	TBD	
9.1.A.4 Other Renewable Energy Generation	The applicant may have innovative designs or unique site circumstances (such as geothermal) that allow the project to generate electricity from renewable energy not provided in the table. The ability to supply other renewable energy and the point values allowed will be decided based upon engineering data documenting the ability to generate electricity.	TBD	
Reduction Measure 5.2: Exceed Water Efficiency Standards			
5.2.A Residential Irrigation and Landscaping			
5.2.A.1 Water Efficient Landscaping	• Limit conventional turf to < 25% of required landscape area • Limit conventional turf to < 50% of required landscape area • No conventional turf (warm season turf to < 50% of required landscape area and/or low water using plants are allowed) • Only California Native Plants that requires no irrigation or some supplemental irrigation	0 points 2 points 4 points 5 points	
5.2.A.2 Water Efficient Irrigation Systems	• Low precipitation spray heads < .75"/hr or drip irrigation • Weather based irrigation control systems or moisture sensors (demonstrate 20% reduced water use)	1 point 2 points	

Feature	Description	Assigned Point Values	Project Points
5.2.A.3 Stormwater Reuse Systems	Innovative on-site stormwater collection, filtration, and reuse systems are being developed that provide supplemental irrigation water and provide vector control. These systems can greatly reduce the irrigation needs of a project. Point values for these types of systems will be determined based upon design and engineering data documenting the water savings.	TBD	
5.2.B Residential Potable Water			
5.2.B.1 Showers	Water Efficient Showerheads (2.0 gpm)	2 points	
5.2.B.2 Toilets	Water Efficient Toilets (1.5 gpm)	2 points	
5.2.B.3 Faucets	Water Efficient faucets (1.28 gpm)	2 points	
5.2.B.4 Dishwasher	Water Efficient Dishwasher (6 gallons per cycle or less)	1 point	
5.2.B.5 Washing Machine	Water Efficient Washing Machine (Water factor <5.5)	1 point	
5.2.B.6 WaterSense	EPA WaterSense Certification	7 points	
5.2.C Increase Residential Reclaimed Water Use			
5.2.C.1 Recycled Water	5% of the total project's water use comes from recycled/reclaimed water	5 points	
Reduction Measure 7.1: Alternative Transportation Options			
7.1.A Increase Residential Density			
7.1.A.1 Residential Density	Designing the project with increased densities, where allowed by the General Plan and/or Zoning Ordinance, reduces GHG emissions associated with traffic in several ways. Increased densities affect the distance people travel and provide greater options for the modes of travel they choose. This strategy also provides a foundation for implementation of many other strategies, which would benefit from increased densities. 1 point is allowed for each 10% increase in density beyond 7 units/acre, up to 500% (50 points)	1–50 points	
7.1.B Mixed-Use Development			
7.1.B.1 Mixed-Use	Mixes of land uses that complement one another in a way that reduces the need for vehicle trips can greatly reduce GHG emissions. The point value of mixed-use projects will be determined based upon a Transportation Impact Analysis (TIA) demonstrating trip reductions and/or reductions in vehicle miles traveled. Suggested ranges: • Diversity of land uses complementing each other (2–28 points) • Increased destination accessibility other than transit (1–18 points) • Increased Transit Accessibility (1–25 points) • Infill location that reduces vehicle trips or VMT beyond the measures described above (points TBD based on traffic data).	TBD	

Feature	Description	Assigned Point Values	Project Points
7.1.B.2 Residential Near Local Retail (Residential only Projects)	Having residential developments within walking and biking distance of local retail helps to reduce vehicle trips and/or vehicle miles traveled. The point value of residential projects in close proximity to local retail will be determined based upon traffic studies that demonstrate trip reductions and/or reductions in vehicle miles traveled (VMT). The suburban project will have at least three of the following on site and/or off site within ¼-mile: Residential Development, Retail Development, Park, Open Space, or Office. The mixed-use development should encourage walking and other non-auto modes of transport from residential to office/commercial locations (and vice versa). The project should minimize the need for external trips by including services/facilities for day care, banking/ATM, restaurants, vehicle refueling, and shopping.	1–16 points	
7.1.C Traffic Flow Management Improvements			
7.1.C.1 Signal Synchronization	Techniques for improving traffic flow include: traffic signal coordination to reduce delay, incident management to increase response time to breakdowns and collisions, Intelligent Transportation Systems (ITS) to provide real-time information regarding road conditions and directions, and speed management to reduce high free-flow speeds. • Signal synchronization • Traffic signals connected to existing ITS	1 point/signal 3 points/signal	
7.1.D Increase Public Transit			
7.1.D.1 Public Transit Access	The point value of a projects ability to increase public transit use will be determined based upon a Transportation Impact Analysis (TIA) demonstrating decreased use of private vehicles and increased use of public transportation. Increased transit accessibility (1–15 points)	TBD	
Reduction Measure 7.2: Adopt and Implement a Bicycle Master Plan to Expand Bike Routes around the City			
7.2.A.1 Sidewalks	• Provide sidewalks on one side of the street (required) • Provide sidewalks on both sides of the street • Provide pedestrian linkage between residential and commercial uses within 1 mile	0 points 1 point 3 points	
7.2.A.2 Bicycle Paths	• Provide bicycle paths within project boundaries • Provide bicycle path linkages between residential and other land uses • Provide bicycle path linkages between residential and transit	TBD 2 points 5 points	
Reduction Measure 8.1: Reduce Waste to Landfills			
8.1.A.1 Recycling	City-initiated recycling program diverting 100% of waste requires coordination in neighborhoods to realize this goal. The following recycling features will help the City fulfill this goal: • Provide green waste composting bins at each residential unit • Multi-family residential projects that provide dedicated recycling bins separated by types of recyclables combined with instructions/education program explaining how to use the bins and the importance or recycling	4 points 3 points	
Other GHG Reduction Feature Implementation			
O.A.1 Other GHG Emissions Reduction Features	This allows innovation by the applicant to provide residential design features for the GHG emissions from construction and/or operation of the project not provided in the table. Note that engineering data will be required documenting the GHG reduction amount and point values given based upon emission reductions calculations using approved models, methods, and protocols.	TBD	
Total Points Earned by Residential Project:			

Table 2: Screening Table for GHG Reduction Measures for Commercial Development and Public Facilities

Feature	Description	Assigned Point Values	Project Points
Reduction Measure 4.1: Exceed Energy Efficiency Standards in New Commercial Units			
4.1.A Building Envelope			
4.1.A.1 Insulation	• 2017 Title 24 Requirements (walls R-13; roof/attic R-30) • Modestly Enhanced Insulation (walls R-13, roof/attic R-38) • Enhanced Insulation (rigid wall insulation R-13, roof/attic R-38) • Greatly Enhanced Insulation (spray foam insulated walls R-15 or higher, roof/attic R-38 or higher)	0 points 9 points 11 points 12 points	
4.1.A.2 Windows	• 2016 Title 24 Windows (0.57 U-factor, 0.4 SHGC) • Modestly Enhanced Window Insulation (0.4 U-factor, 0.32 SHGC) • Enhanced Window Insulation (0.32 U-factor, 0.25 SHGC) • Greatly Enhanced Window Insulation (0.28 or less U-factor, 0.22 or less SHGC)	0 points 4 points 5 points 7 points	
4.1.A.3 Cool Roofs	• Modest Cool Roof (CRRC Rated 0.15 aged solar reflectance, 0.75 thermal emittance) • Enhanced Cool Roof (CRRC Rated 0.2 aged solar reflectance, 0.75 thermal emittance) • Greatly Enhanced Cool Roof (CRRC Rated 0.35 aged solar reflectance, 0.75 thermal emittance)	7 points 8 points 10 points	
4.1.A.4 Air Infiltration	Minimizing leaks in the building envelope is as important as the insulation properties of the building. Insulation does not work effectively if there is excess air leakage. • Air barrier applied to exterior walls, calking, and visual inspection such as the HERS Verified Quality Insulation Installation (QII or equivalent) • Blower Door HERS Verified Envelope Leakage or equivalent	 7 points 6 points	
4.1.A.5 Thermal Storage of Building	Thermal storage is a design characteristic that helps keep a constant temperature in the building. Common thermal storage devices include strategically placed water filled columns, water storage tanks, and thick masonry walls. • Modest Thermal Mass (10% of floor or 10% of walls 12" or more thick exposed concrete or masonry with no permanently installed floor covering such as carpet, linoleum, wood, or other insulating materials) • Enhanced Thermal Mass (20% of floor or 20% of walls 12" or more thick exposed concrete or masonry with no permanently installed floor covering such as carpet, linoleum, wood, or other insulating materials) • Enhanced Thermal Mass (80% of floor or 80% of walls 12" or more thick exposed concrete or masonry with no permanently installed floor covering such as carpet, linoleum, wood, or other insulating materials)	 2 points 4 points 14 points	
4.1.B Indoor Space Efficiencies			
4.1.B.1 Heating/ Cooling Distribution System	• Minimum Duct Insulation (R-4.2 required) • Modest Duct insulation (R-6) • Enhanced Duct Insulation (R-8) • Distribution loss reduction with inspection (HERS Verified Duct Leakage or equivalent)	0 points 5 points 6 points 8 points	

Feature	Description	Assigned Point Values	Project Points
4.1.B.2 Space Heating/ Cooling Equipment	• 2016 Title 24 Minimum HVAC Efficiency (EER 13/75% AFUE or 7.7 HSPF) • Improved Efficiency HVAC (EER 14/78% AFUE or 8 HSPF) • High Efficiency HVAC (EER 15/80% AFUE or 8.5 HSPF) • Very High Efficiency HVAC (EER 16/82% AFUE or 9 HSPF)	0 points 4 points 5 points 7 points	
4.1.B.3 Commercial Heat Recovery Systems	Heat recovery strategies employed with commercial laundry, cooking equipment, and other commercial heat sources for reuse in HVAC air intake or other appropriate heat recovery technology. Point values for these types of systems will be determined based upon design and engineering data documenting the energy savings.	TBD	
4.1.B.4 Water Heaters	• 2016 Title 24 Minimum Efficiency (0.57 Energy Factor) • Improved Efficiency Water Heater (0.675 Energy Factor) • High Efficiency Water Heater (0.72 Energy Factor) • Very High Efficiency Water Heater (0.92 Energy Factor) • Solar Pre-heat System (0.2 Net Solar Fraction) • Enhanced Solar Pre-heat System (0.35 Net Solar Fraction)	0 points 8 points 10 points 11 points 2 points 5 points	
4.1.B.5 Daylighting	Daylighting is the ability of each room within the building to provide outside light during the day reducing the need for artificial lighting during daylight hours. • All peripheral rooms within building have at least one window or skylight • All rooms within building have daylight (through use of windows, solar tubes, skylights, etc.) • All rooms daylighted	 0 points 1 point 1 point	
4.1.B.6 Artificial Lighting	• Efficient Lights (25% of in-unit fixtures considered high efficiency. High efficiency is defined as 40 lumens/watt for 15 watt or less fixtures; 50 lumens/watt for 15-40 watt fixtures, 60 lumens/watt for fixtures >40watt) • High Efficiency Lights (50% of in-unit fixtures are high efficiency) • Very High Efficiency Lights (100% of in-unit fixtures are high efficiency)	5 points 7 points 8 points	
4.1.B.7 Appliances	• Energy Star Commercial Refrigerator (new) • Energy Star Commercial Dishwasher (new) • Energy Star Commercial Clothes Washer	2 points 2 points 2 points	
4.1.C Miscellaneous Commercial Building Efficiencies			
4.1.C.1 Building Placement	North/south alignment of building or other building placement such that the orientation of the buildings optimizes conditions for natural heating, cooling, and lighting.	4 points	
4.1.C.2 Shading	At least 90% of south-facing glazing will be shaded by vegetation or overhangs at noon on Jun 21st.	6 points	
4.1.C.3 Other	This allows innovation by the applicant to provide design features that increases the energy efficiency of the project not provided in the table. Note that engineering data will be required documenting the energy efficiency of innovative designs and point values given based upon the proven efficiency beyond Title 24 Energy Efficiency Standards.	TBD	
4.1.C.4 Existing Commercial Buildings Retrofits	The applicant may wish to provide energy efficiency retrofit projects to existing commercial buildings to further the point value of their project. Retrofitting existing commercial buildings within the City is a key reduction measure that is needed to reach the reduction goal. The potential for an applicant to take advantage of this program will be decided on a case-by-case basis and shall have the approval from the City of Corona Planning Department. The decision to allow applicants to participate in this program will be evaluated based upon, but not limited to the following: Will the energy efficiency retrofit project benefit low income or disadvantaged communities?	TBD	

Feature	Description	Assigned Point Values	Project Points
	Does the energy efficiency retrofit project provide co-benefits important to the City? Point value will be determined based upon engineering and design criteria of the energy efficiency retrofit project.		
Reduction Measure 9.1: Clean Energy			
9.1.B Commercial/Industrial Renewable Energy Generation			
9.1.B.1 Photovoltaic	Solar Photovoltaic panels installed on commercial buildings or in collective arrangements within a commercial development such that the total power provided augments: • 30 percent of the power needs of the project • 40 percent of the power needs of the project • 50 percent of the power needs of the project • 60 percent of the power needs of the project • 70 percent of the power needs of the project • 80 percent of the power needs of the project • 90 percent of the power needs of the project • 100 percent of the power needs of the project	8 points 12 points 16 points 19 points 23 points 26 points 30 points 34 points	
9.1.B.2 Wind Turbines	Some areas of the City lend themselves to wind turbine applications. Analysis of the areas capability to support wind turbines should be evaluated prior to choosing this feature. Wind turbines as part of the commercial development such that the total power provided augments: • 30 percent of the power needs of the project • 40 percent of the power needs of the project • 50 percent of the power needs of the project • 60 percent of the power needs of the project • 70 percent of the power needs of the project • 80 percent of the power needs of the project • 90 percent of the power needs of the project • 100 percent of the power needs of the project	8 points 12 points 16 points 19 points 23 points 26 points 30 points 34 points	
9.1.B.3 Off-site Renewable Energy Project	The applicant may submit a proposal to supply an off-site renewable energy project such as renewable energy retrofits of existing residential or existing commercial/industrial. These off-site renewable energy retrofit project proposals will be determined on a case-by-case basis accompanied by a detailed plan documenting the quantity of renewable energy the proposal will generate. Point values will be based upon the energy generated by the proposal.	TBD	
9.1.A.4 Other Renewable Energy Generation	The applicant may have innovative designs or unique site circumstances (such as geothermal) that allow the project to generate electricity from renewable energy not provided in the table. The ability to supply other renewable energy and the point values allowed would be decided based upon engineering data documenting the ability to generate electricity.	TBD	
Reduction Measure 5.2: Exceed Water Efficiency Standards			
5.2.D Commercial Irrigation and Landscaping			
5.2.D.1 Water Efficient Landscaping	• Eliminate conventional turf from landscaping • Only moderate water using plants • Only low water using plants • Only California Native landscape that requires no or only supplemental irrigation	0 point 2 points 3 points 5 points	

Feature	Description	Assigned Point Values	Project Points
5.2.D.2 Water Efficient Irrigation Systems	• Low precipitation spray heads< .75"/hr or drip irrigation • Weather based irrigation control systems combined with drip irrigation (demonstrate 20% reduced water use)	1 point 3 points	
5.2.D.3 Stormwater Reuse Systems	Innovative on-site stormwater collection, filtration, and reuse systems are being developed that provide supplemental irrigation water and provide vector control. These systems can greatly reduce the irrigation needs of a project. Point values for these types of systems will be determined based upon design and engineering data documenting the water savings.	TBD	
5.2.E Commercial Potable Water			
5.2.E.1 Showers	Water Efficient Showerheads (2.0 gpm)	2 points	
5.2.E.2 Toilets	• Water Efficient Toilets/Urinals (1.5 gpm) • Waterless Urinals (note that commercial buildings having both waterless urinals and high efficiency toilets will have a combined point value of 6 points)	3 points 3 points	
5.2.E.3 Faucets	Water Efficient faucets (1.28 gpm)	2 points	
5.2.E.4 Commercial Dishwashers	Water Efficient dishwashers (20% water savings)	2 points	
5.2.E.5 Commercial Laundry Washers	• Water Efficient laundry (15% water savings) • High Efficiency laundry Equipment that captures and reuses rinse water (30% water savings)	2 points 4 points	
5.2.E.6 Commercial Water Operations Program	Establish an operational program to reduce water loss from pools, water features, etc., by covering pools, adjusting fountain operational hours, and using water treatment to reduce draw down and replacement of water. Point values for these types of plans will be determined based upon design and engineering data documenting the water savings.	TBD	
5.2.F Increase Commercial/Industrial Reclaimed Water Use			
5.2.F.1 Recycled Water	Graywater (purple pipe) irrigation system on site	5 points	
Reduction Measure 7.1: Alternative Transportation Options			
7.1.E Mixed-Use Development			
7.1.E.1 Mixed-Use	Mixes of land uses that complement one another in a way that reduces the need for vehicle trips can greatly reduce GHG emissions. The point value of mixed-use projects will be determined based upon traffic studies that demonstrate trip reductions and/or reductions in vehicle miles traveled.	TBD	
7.1.E.2 Local Retail Near Residential (Commercial only Projects)	Having residential developments within walking and biking distance of local retail helps to reduce vehicle trips and/or vehicle miles traveled. The point value of residential projects in close proximity to local retail will be determined based upon traffic studies that demonstrate trip reductions and/or reductions in vehicle miles traveled.	TBD	
7.1.F Preferential Parking			
7.1.F.1 Parking	• Provide reserved preferential parking spaces for car-share, carpool, and ultra-low or zero emission vehicles. • Provide larger parking spaces that can accommodate vans used for ride-sharing programs and reserve them for vanpools and include adequate passenger waiting/loading areas.	1 point 1 point	

Feature	Description	Assigned Point Values	Project Points
7.1.G Signal Synchronization and Intelligent Traffic Systems			
7.1.G.1 Signal Improvements	Techniques for improving traffic flow include: traffic signal coordination to reduce delay, incident management to increase response time to breakdowns and collisions, Intelligent Transportation Systems (ITS) to provide real-time information regarding road conditions and directions, and speed management to reduce high free-flow speeds. • Synchronize signals along arterials used by project. • Connect signals along arterials to existing ITS.	1 point/signal 3 points/signal	
7.1.H Increase Public Transit			
7.1.H.1 Public Transit	The point value of a projects ability to increase public transit use will be determined based upon a Transportation Impact Analysis (TIA) demonstrating decreased use of private vehicles and increased use of public transportation. Increased transit accessibility (1-15 points)	TBD	
Reduction Measure 7.2: Adopt and Implement a Bicycle Master Plan to Expand Bike Routes around the City			
7.2.B.1 Sidewalks	• Provide sidewalks on one side of the street (required) • Provide sidewalks on both sides of the street • Provide pedestrian linkage between commercial and residential land uses within 1 mile	0 point 1 point 3 points	
7.2.B.2 Bicycle Paths	• Provide bicycle paths within project boundaries • Provide bicycle path linkages between commercial and other land uses • Provide bicycle path linkages between commercial and transit	1 point 2 points 5 points	
Reduction Measure 8.1: Reduce Waste to Landfills			
8.1.B.1 Recycling	City initiated recycling program diverting 80% of waste requires coordination with commercial development to realize this goal. The following recycling features will help the City fulfill this goal: • Provide separated recycling bins within each commercial building/floor and provide large external recycling collection bins at central location for collection truck pick-up • Provide commercial/industrial recycling programs that fulfills an on-site goal of 80% diversion of solid waste	2 points 5 points	
Other GHG Reduction Feature Implementation			
O.B.1 Other GHG Emissions Reduction Features	This allows innovation by the applicant to provide commercial design features that the GHG emissions from construction and/or operation of the project not provided in the table. Note that engineering data will be required documenting the GHG reduction amount and point values given based upon emission reductions calculations using approved models, methods, and protocols.	TBD	
Total Points Earned by Commercial/Industrial Project:			

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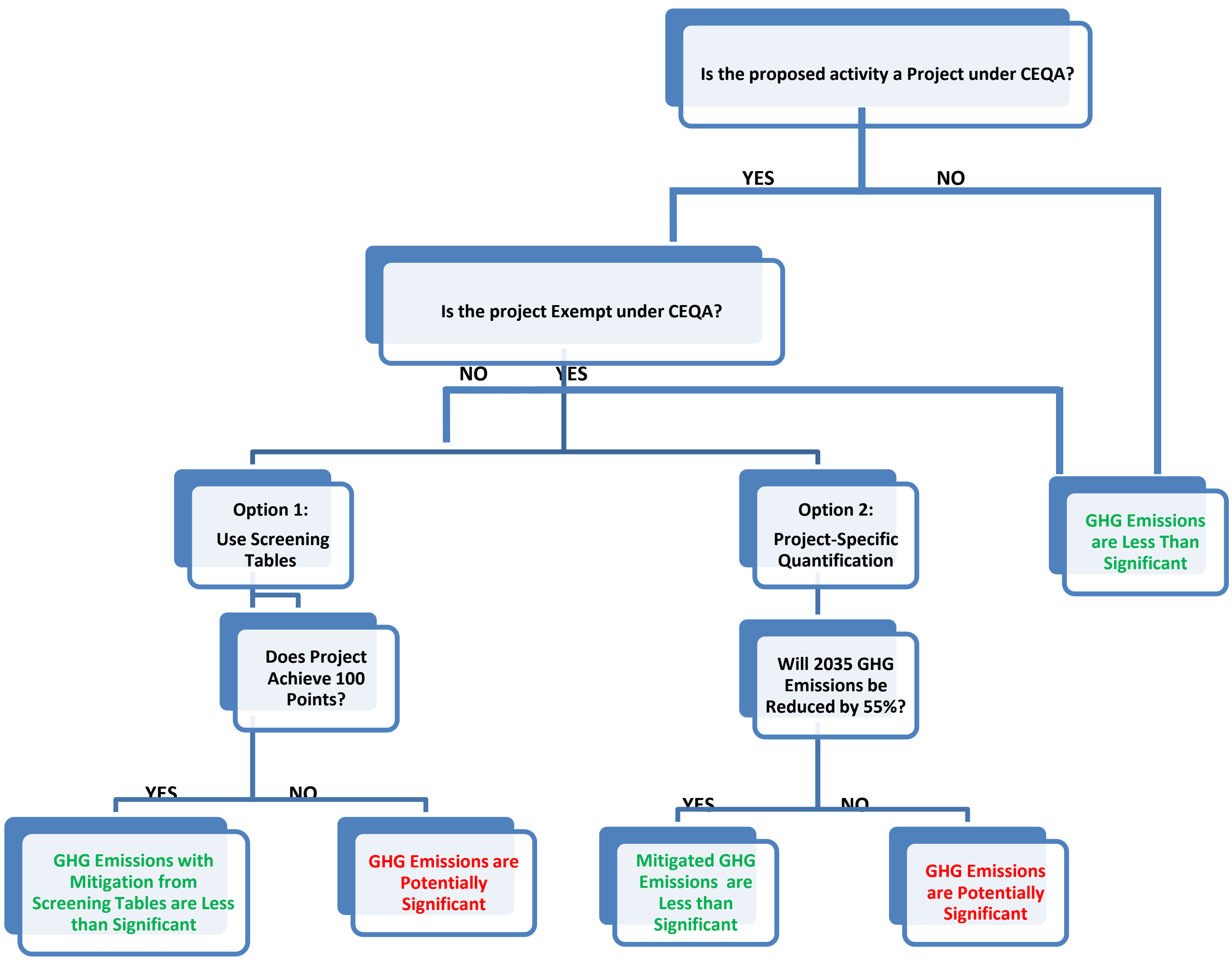
APPENDIX A: GHG DEVELOPMENT REVIEW PROCESS FLOW CHART DIAGRAM

Approach to Implementation of GHG Development Review



APPENDIX B: TRANSIT PRIORITY PROJECT AND SUSTAINABLE COMMUNITY PROJECT CHECKLIST

TRANSIT PRIORITY PROJECT CHECKLIST

The following checklist will assist in determining if your project qualifies as a Transit Priority Project (TPP) and a Sustainable Community Project (SCP) as defined in PRC 21155(a), (b), and PRC 21152.

Yes	No		**Is the project:**
☐	☐	1.	Located within ½ mile of a Trolley Station, future Station, or Transit Center?
☐	☐	2.	At least 50% residential use, based upon total square footage, and non-residential uses within the project between 26% to 50% of total square footage with FAR of not less than 0.75?
☐	☐	3.	At or above a minimum net density of at least 20 dwelling units per acre?
☐	☐	4.	Is your project consistent with the general land use designations in the SCP (if you answered yes to questions 1 through 3, then answer yes to this one)?

If you answered **Yes** to questions 1 through 4 then your project is a Transit Priority Project (TPP) as defined by PRC Section 21155(b). Continue with the next list of environmental questions:

Yes	No		**Does the project:**
☐	☐	5.	Contain sites on the Cortese List?
☐	☐	6.	Site contain any hazardous substances, contaminated soil or hazardous material?
☐	☐	7.	Site include historical resources?
☐	☐	8.	Have an unusually high risk of fire or explosion from material stored or used at properties within ¼ mile of the project site?
☐	☐	9.	Site currently include areas developed as Open Space (parks, habitat, etc.)?

Continue with the next list of land use questions below:

Yes	No		
☐	☐	10.	Does the project design have all the buildings at least 15% more efficient than Title 24 energy standards and uses 25% or less water than average households?
☐	☐	11.	Is the project site eight acres or less in size?
☐	☐	12.	The project does not include any single level of a building exceeding 75 TSF?
☐	☐	13.	The project does not conflict with nearby industrial uses?
☐	☐	14.	The project will sell at least 20% of housing to families of moderate income, or 10% of housing will be rented to families of low income, or at least 5% of housing will be rented to families of very low income, or the project provides open space equal or greater than 5 acres per 1,000 residents, or the developer will pay in-lieu fees sufficient to result in the development of affordable housing meeting one of the criteria described above?

Determining Eligibility based upon the answers:

Full CEQA Exemption for Sustainable Community Projects (SCPs)

If you answered **Yes** to all the TPP questions 1 through 4, **No** to all the environmental questions 5 through 9, and **Yes** to all the land use questions 10 through 14, then your project is an SCP and is eligible for a full CEQA Exemption under SB 375.

Transit Priority Projects (TPP)

If you answered **Yes** to all the TPP questions 1 through 4, but did not qualify as an SCP then your project is a TPP. Your TPP needs to incorporate all appropriate mitigation measures required by an applicable CEQA document (such as an adopted EIR for a Specific Plan) for your project location. If your TPP meets these two criteria then your TPP does not need to analyze the following impacts in the Sustainable Communities Environmental Assessment (SCEA) or CEQA analysis:

- Growth-inducing impacts,
- Regional transportation impacts, and
- GHG emissions related to passenger cars and light-duty trucks.

The impacts listed above are considered less than significant because the project is a TPP and the SCEA or CEQA document should reference PRC Section 21155.2(c)

Other Residential and Mixed-Use Projects

If you answered Yes to question 4, but did not qualify as an SCP or TPP, your project may not need to analyze some of the impacts in the CEQA analysis if your project is a **residential project or mixed-use project with 75%** of the total building square footage of the project is residential units. In addition, your project needs to incorporate all appropriate mitigation measures required by an applicable prior CEQA document (such as an adopted EIR for a Specific Plan) for your project location. If your project meets these criteria, then the CEQA analysis of your project does not need to analyze the following impacts:

- Growth-inducing impacts,
- Regional transportation impacts, and
- GHG emissions related to passenger cars and light-duty trucks.

The impacts listed above are considered less than significant because the project meets the criteria in PRC Section 21155.2(c)

APPENDIX C:
METHODOLOGY FOR THE DEVELOPMENT AND APPLICATION OF THE SCREENING TABLES

METHODS SUMMARY

The point values in the Screening Tables were derived from the projected emissions reductions that would be achieved by each of the reduction measures associated with new development within the City of Corona CAP Update. The points within the Screening Tables were proportioned by residential unit or square footage of commercial/industrial uses. This was accomplished by taking the predicted growth in households and commercial uses in 2030 and proportioning the appropriate reduction quantities for new development to the residential, commercial, and industrial land use sectors within the Screening Tables. This results in point values that are proportioned by residential unit or commercial/industrial square footage. Because of this outcome, the size of the project is not relevant to the Screening Tables. Regardless of size, each project needs to garner 100 points to demonstrate consistency with the CAP Update. Efficiency, not size of the project, is critical.

Note that the Screening Tables and point values are best used for typical development projects processed by the City. Examples of typical development projects include residential subdivisions, multi-family residential apartments, condominiums and townhouses, retail commercial, big box retail, office buildings, business parks, and typical warehousing. Mixed-use projects can use the instructions at the beginning of the Screening Tables. Transit-oriented development (TOD), and infill projects are able to use the Screening Tables; however, the Screening Tables points are likely to underestimate total emission reductions afforded these types of projects. Note that the Screening Tables include the opportunity to custom develop points in order to provide points in the sections of the Screening Tables marked TBD and account for the predicted reductions in vehicle trips and vehicle miles traveled within a project-specific traffic study and GHG analysis. TOD and infill projects can be more accurately assessed and points allocated using this method.

However, more unusual types of industrial projects, such as cement manufacturing, metal foundries, refrigerant manufacturing, electric generating stations—including large alternative energy electric generation, and oil refineries, cannot use the Screening Tables because the emission sources for those types of uses were not contemplated in the CAP Update.

DEVELOPMENT OF THE POINT VALUES

Within the local reduction measures, 16,090 MT CO_2e would be reduced using the Screening Tables for new development. The Screening Tables and the point allocation within the Screening Tables are tied to 16,090 MT CO_2e of reductions.

The first step in allocating point values is to determine the number of new homes and commercial buildings that are anticipated by year 2030. The City predicts that a total of 3,026 new residential units will be needed by 2030 and a total of approximately 4,970,550 square feet of new commercial and industrial buildings within the City is needed to accommodate anticipated job growth.

Approximately 3,026 new residential units and 4,970,550 square feet of new commercial and industrial buildings within the City are anticipated to either use the Screening Tables or provide an independent analysis demonstrating reductions. Evaluating the growth in residential and commercial/industrial land uses, approximately 38 percent is attributable to residential and 62 percent is attributable to commercial/industrial land uses. Using those ratios, the Screening Tables would need to reduce 6,147 MT CO_2e from residential development and 9,943 MT CO_2e from commercial/industrial development by 2030.

Dividing the 6,147 MT CO_2e reductions of emissions afforded the Screening Table for new residential development by the anticipated 3,026 new residential units that will be built yields 2.03 MT CO_2e per residential unit that needs to be reduced to fulfill the anticipated reductions of the CAP Update. Using the same process, the Screening Tables for new commercial/industrial development would need to reduce 2.00 MT CO_2e per 1,000 gross square feet of commercial/industrial building area.

The levels of reduction efficiency for typical residential units in this climate zone yields:

0.0203 MT CO_2e per Point per Residential Unit

The levels of reduction efficiency for the mix of commercial/industrial uses in this climate zone yields:

0.0200 MT CO_2e per Point per 1,000 Square Feet of Gross Commercial/Industrial Building Area

Since each residential unit needs to reduce 2.03 MT CO_2e and each 1,000 square feet of commercial/ industrial building area needs to reduce 2.00 MT CO_2e, each project needs to gain 100 points to provide the expected reductions from the Screening Tables.

Draft

City of Corona

GREENHOUSE GAS EMISSIONS

Screening Tables

March 2019

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Introduction

The City of Corona Climate Action Plan Update (CAP Update) includes an interim goal of reducing greenhouse gas (GHG) emissions to 49 percent below 2008 levels by the year 2030, and a longer-term GHG reduction goal of 66 percent below 2008 levels by 2040. The interim and longer-term goals would put the City of Corona (City) on a path toward the State's long-term goal to reduce emissions 80 percent below 1990 levels by 2050. Reductions related to transportation, water, solid waste, energy, and renewable energy sources all play a crucial part in gaining the level of efficiency needed within the new development across the City.

Mitigation of GHG emissions impacts through the Development Review Process (DRP) provides one of the most substantial reduction strategies for reducing community-wide emissions associated with new development. The DRP procedures for evaluating GHG impacts and determining significance for CEQA purposes will be streamlined by utilizing Screening Tables to mitigate project GHG emissions and demonstrating compliance with the CAP Update. Projects will have the option of preparing a project-specific technical analysis to quantify and mitigate GHG emissions or completing the Screening Tables to demonstrate compliance.

The California Environmental Quality Act (CEQA) requires the assessment of environmental impacts for proposed projects including the impacts of GHG emissions. The purpose of this document is to provide guidance on how to analyze GHG emissions and determine the significance of those emissions during CEQA review of proposed development projects within the City. The analysis, methodology, and significance determination (thresholds) are based upon the CAP Update, the GHG emission inventories within the CAP Update, and the GHG reduction measures that reduce emissions to the State-aligned reduction target of the CAP Update. The Screening Tables can be used by the City for review of development projects in order to ensure that the specific reduction strategies in the CAP Update are implemented as part of the CEQA process for development projects. The Screening Tables provide a menu of options that ensures both implementation of the reduction strategies and flexibility on how development projects would implement the reduction strategies to achieve an overall reduction of emissions, consistent with the reduction targets of the CAP Update.

California Environmental Quality Act

CEQA Mandates for Analysis of Impacts

CEQA requires that Lead Agencies inform decision makers and the public regarding the following: potential significant environmental effects of proposed projects; feasible ways that environmental damage can be avoided or reduced through the use of feasible mitigation measures and/or project alternatives; and the reasons why the Lead Agency approved a project if significant environmental effects are involved (CEQA Guidelines §15002). CEQA also requires Lead Agencies to evaluate potential environmental effects based to the fullest extent possible on scientific and factual data (CEQA Guidelines §15064[b]). A determination of whether or not a particular environmental impact would be significant shall be based on substantial evidence, which includes facts, reasonable assumptions predicated upon facts, and expert opinion supported by facts (CEQA Guidelines §15064f[5]).

The recently amended CEQA Guidelines (CEQA Guidelines §15064.4[a] [b]) explicitly require Lead Agencies to evaluate GHG emissions during CEQA review of potential environmental impacts generated by a proposed project. To assist in this effort, two questions were added to Appendix G of the CEQA Guidelines:

- Would the project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?
- Would the project conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs?

Finally, under the "rule of reason," an Environmental Impact Report (EIR) is required to evaluate impacts to the extent that is reasonably feasible (CEQA Guidelines § 15151; *San Francisco Ecology Center v. City and County of San Francisco* [1975] 48 Cal.App.3rd 584). While CEQA does require Lead Agencies to make a good faith effort to disclose what they reasonably can, CEQA does not demand what is not realistically possible (*Residents at Hawks Stadium Committee v. Board of Trustees* [1979] 89 Cal.App.3rd 274, 286).

Greenhouse Gas Impact Determination

Statewide or Regional Thresholds of Significance

There are currently no published statewide thresholds of significance for measuring the impact of GHG emissions generated by a proposed project. CEQA Guidelines §15064.7 indicates only that, "each public agency is encouraged to develop and publish thresholds of significance that the agency uses in the determination of the significance of environmental effects." South Coast Air Quality Management District (SCAQMD) has published draft thresholds that, when finalized, jurisdictions within the SCAQMD boundary can use if they do not have their own thresholds and GHG mitigation plans. However, the CAP Update for the City addresses cumulative GHG emissions, has reduction targets that reduces the cumulative GHG impacts to less than significant, has a set of reduction measures that achieves the reduction targets, and provides an implementation plan to implement the reduction measures. This document provides guidance in how to address GHG emissions in CEQA analysis and determine the significance of project generated GHG emissions.

Quantitative Analysis Relative to the Climate Action Plan

METHODOLOGY OVERVIEW

An individual project cannot generate enough GHG emissions to influence global climate change. The project participates in climate change by its incremental contribution combined with the cumulative increase of all other sources of GHGs, which when taken together may have a significant impact on global climate change (AEP 2007). To address the State's requirement to reduce GHG emissions, the City prepared the CAP Update with targets of reducing GHG emissions within the City by 15 percent below 2008 baseline emission levels by year 2020, 49 percent below 2008 baseline by 2030, and 66 percent below the 2008 baseline by 2040. The City's targets are consistent with Assembly Bill (AB) 32 and Senate Bill (SB) 32, and ensure that the City is providing GHG reductions locally that will complement the State and international efforts of stabilizing climate change.

Because the City's CAP Update addresses GHG emissions reduction, in concert with AB 32, SB 32, and international efforts to address global climate change, and includes specific local requirements that would substantially lessen the cumulative problem, compliance with the CAP Update fulfills the description of mitigation found in CEQA Guidelines §15130(a)(3) and §15183.5.

GHG emissions are only important in the context of cumulative emissions; therefore, the focus of the analysis is on answering the question of whether incremental contributions of GHGs are a cumulatively considerable contribution to climate change impacts. The CAP Update includes a set of reduction measures designed to substantially lessen cumulative impacts associated with GHG emissions as described in CEQA Guidelines §15130(a)(3), in determining if a project's effects would result in significant impacts. The CAP Update has the following components that fulfill cumulative mitigation for GHG emissions:

1. The CAP Update provides a community-wide GHG emissions reduction target that would substantially lessen the cumulative impact;
2. The CAP Update provides measures that new development projects shall follow to meet the City's reduction target and substantially lessen the cumulative impact;
3. The CAP Update provides a set of GHG emission inventories that provides quantitative facts and analysis for how the measures within the CAP Update meet the reduction targets that substantially lessen the cumulative impact; and
4. The CAP Update provides an implementation, monitoring, and update program to ensure that the reduction target is met.

The CAP Update satisfies the first condition by adopting targets of reducing GHG emissions within the City by 15 percent below 2008 levels by 2020, 49 percent by 2030, and 66 percent by 2040. The 2020 reduction target is compliant with AB 32. The AB 32 Climate Change Scoping Plan states: "In recognition of the critical role local governments will play in the successful implementation of AB 32, ARB recommended a greenhouse gas reduction goal for local governments of 15 percent below existing levels by 2020 to ensure that their municipal and community-wide emissions match the State's reduction target" (Scoping Plan page ES-5, CARB, December 2008). In this way, the City is teaming with the State's efforts to reduce GHG emissions globally and substantially lessen cumulative emissions. The 2030 reduction target is compliant with SB 32, and the 2040 reduction target continues the GHG reduction trend (AEP 2012).

The CAP Update satisfies the second condition through the implementation of the reduction measures for new development. This document supplies the specific criteria that new development shall follow to ensure that the reduction measures associated with new development are implemented and the reduction targets are met.

The CAP Update satisfies the third criteria by providing a set of community-wide GHG emissions inventories for existing conditions (2008 baseline); and future 2020, 2030, and 2040 GHG emissions that are anticipated without the reduction measures (Adjusted Business-As-Usual, or ABAU); and the CAP Update also demonstrates reduced levels of 2020, 2030, and 2040 GHG emissions that demonstrate how the implementation of reduction measures achieves the reduction targets. These community-wide GHG emission inventories are found in Appendix A of the CAP Update.

The Development Review Process

Integrating the reduction measures of the CAP Update into the CEQA development review process is the first step in determining how a proposed project will implement the GHG reduction measures within the CAP Update. The GHG emissions development review process is predicated on responses to two questions. Appendix A of this document contains a flow chart that diagrams this development review process. The questions are as follows:

Question 1: Is the proposed activity a "Project" as defined by CEQA? If the activity is not a project under CEQA, no further action is required concerning GHG emissions in the development review process.

Question 2: Is the project exempt under CEQA? If so, then the California Air Resources Board has determined that GHG emissions are less than significant and no additional GHG reductions are needed. A list of CEQA Exemptions are found in CEQA Guidelines §15300 through §15332.

There are also exemption opportunities associated with transit-oriented development (TOD) associated with the Sustainable Communities Strategy (SCS) for the region developed by the Southern California Association of Governments (SCAG) and first introduced in the 2012 Regional Transportation Plan (RTP). Exemptions associated with TOD are divided into two categories: transit priority projects (TPP) and Sustainable Community Projects (SCP). A TPP and SCP Checklist is provided in Appendix B of this document to assist project applicants in determining if a project qualifies for these exemptions under

CEQA. If the project does not qualify for a CEQA exemption, then the applicant can move on to the Methods for the Calculation of GHG Emissions and Screening Tables.

METHODOLOGY FOR THE CALCULATION OF GHG EMISSIONS

Analysis of development projects can either be done through emissions calculations or by using the Screening Tables beginning on page 7.

Total GHG emissions are the sum of emissions from both direct and indirect sources. Direct sources include mobile sources such as construction equipment, motor vehicles, landscape equipment; and stationary sources such as cooling and heating equipment. Indirect sources are comprised of electrical, and potable water use, and the generation of solid waste, and wastewater.

Direct GHG emissions from mobile and stationary sources are determined as the sum of the annual GHG emissions from construction equipment, motor vehicles, landscape equipment, and heating and cooling equipment.

Indirect sources are determined based on source as follows. Electrical usage is reported as annual emissions from electrical usage. Potable water usage is reported as the annual emissions from electricity used for potable water treatment and transportation. Solid waste is reported as the sum of annual emissions from solid waste disposal treatment, transportation, and fugitive emissions of methane at the solid waste facilities. Wastewater usage is reported as the annual emissions from wastewater transport and treatment.

Analysis of development projects not using the screening tables should use the emission factors found in the latest version of the California Climate Action Registry (CCAR) General Reporting Protocol (CCAR, January 2009), and guidance in the Association of Environmental Professionals' (AEP) *White Paper: Community-Wide Greenhouse Gas Emission Inventory Protocols* (AEP, June 2011). Quantification of emissions from electricity used for potable water treatment and transportation as well as wastewater transport and treatment can be found in the California Energy Commission (CEC) document titled *Refining Estimates of Water-Related Energy Use in California* (CEC 2006).

Screening Tables

The purpose of the Screening Tables is to provide guidance in measuring the reduction of GHG emissions attributable to certain design and construction measures incorporated into development projects. The analysis, methodology, and significance determination (thresholds) are based upon the CAP and CAP Update, which include GHG emission inventories (2008 and 2016); forecasts for years 2020, 2030, and 2040; 2020, 2030, and 2040 emission reduction targets; and the goals and policies to reach the targets. The methodology for the development and application of the Screening Tables is set forth in Appendix C of this document and uses the California Air Pollution Control Officers Association (CAPCOA) guidance on quantifying project level GHG reductions (CAPCOA 2010).

INSTRUCTIONS FOR RESIDENTIAL, COMMERCIAL, OR INDUSTRIAL PROJECTS

The Screening Tables assign points for each option incorporated into a project as mitigation or a project design feature (collectively referred to as “feature”). The point values correspond to the minimum emissions reduction expected from each feature. The menu of features allows maximum flexibility and options for how development projects can implement the GHG reduction measures. The point levels are based upon improvements compared to 2017 emission levels of efficiency. Projects that garner at least 100 points will be consistent with the reduction quantities anticipated in the CAP Update. Consistent with CEQA Guidelines, such projects would be determined to have a less than significant individual and cumulative impact for GHG emissions.

Note that the Screening Tables use a base level of efficiency that corresponds to the California Building Energy Efficiency Standards for Residential and Non-residential Buildings (Title 24, Part 6) that became effective January 1, 2017. These are the statewide minimum requirements of efficiency that are currently in effect.

INSTRUCTIONS FOR MIXED-USE PROJECTS

Mixed-use projects provide additional opportunities to reduce emissions by combining complementary land uses in a manner that can reduce vehicle trips. Mixed-use projects also have the potential to complement energy efficient infrastructure in a way that reduces emissions. For mixed-use projects, both Table 1 and Table 2 should be filled out, but the points should be proportioned identical to the proportioning of the mix of uses. For example, a mixed-use project that is 50 percent commercial uses and 50 percent residential uses will show ½ point for each assigned point value in Table 1 and Table 2, and the points will be added from both tables. Mixed use Projects that garner at least 100 points will be consistent with the reduction quantities in the City’s CAP Update and would be considered less than significant for GHG emissions.

Those projects that do not garner 100 points using the Screening Tables will need to provide additional analysis to determine the significance of GHG emissions. Nothing in this guidance shall be construed as limiting the City’s authority to adopt a statement of overriding consideration for projects that require the preparation of an EIR due to significant GHG impacts. The following tables provides a menu of performance standards/options related to GHG mitigation measures and design features that can be used to demonstrate consistency with the reduction measures and GHG reduction quantities in the CAP Update.

Table 1: Screening Table for GHG Reduction Measures for Residential Development

Feature	Description	Assigned Point Values	Project Points
Reduction Measure 2.1: Exceed Energy Efficiency Standards in New Residential Units			
2.1.A Building Envelope			
2.1.A.1 Insulation	• 2016 Title 24 Requirements (walls R-13, roof/attic R-30) • Modestly Enhanced Insulation (walls R-15, roof/attic R-38) • Enhanced Insulation (rigid wall insulation R-13, roof/attic R-38) • Greatly Enhanced Insulation (spray foam wall insulated walls R-18 or higher, roof/attic R-38 or higher)	0 points 7 points 9 points 11 points	
2.1.A.2 Windows	• 2016 Title 24 Windows (0.57 U-factor, 0.4 solar heat gain coefficient [SHGC]) • Modestly Enhanced Window (0.4 U-Factor, 0.32 SHGC) • Enhanced Window (0.32 U-Factor, 0.25 SHGC) • Greatly Enhanced Window (0.28 or less U-Factor, 0.22 or less SHGC)	0 points 3 points 4 points 5 points	
2.1.A.3 Cool Roofs	• Modest Cool Roof (CRRC Rated 0.15 aged solar reflectance, 0.75 thermal emittance) • Enhanced Cool Roof (CRRC Rated 0.2 aged solar reflectance, 0.75 thermal emittance) • Greatly Enhanced Cool Roof (CRRC Rated 0.35 aged solar reflectance, 0.75 thermal emittance)	6 points 7 points 8 points	
2.1.A.4 Air Infiltration	Minimizing leaks in the building envelope is as important as the insulation properties of the building. Insulation does not work effectively if there is excess air leakage. • Air barrier applied to exterior walls, calking, and visual inspection such as the HERS Verified Quality Insulation Installation (QII or equivalent) • Blower Door HERS Verified Envelope Leakage or equivalent	6 points 5 points	
2.1.A.5 Thermal Storage of Building	Thermal storage is a design characteristic that helps keep a constant temperature in the building. Common thermal storage devices include strategically placed water filled columns, water storage tanks, and thick masonry walls. • Modest Thermal Mass (10% of floor or 10% of walls 12" or more thick exposed concrete or masonry with no permanently installed floor covering such as carpet, linoleum, wood, or other insulating materials) • Enhanced Thermal Mass (20% of floor or 20% of walls 12" or more thick exposed concrete or masonry with no permanently installed floor covering such as carpet, linoleum, wood, or other insulating materials)	1 point 2 points	
2.1.B Indoor Space Efficiencies			
2.1.B.1 Heating/ Cooling Distribution System	• Minimum Duct Insulation (R-4.2 required) • Modest Duct insulation (R-6) • Enhanced Duct Insulation (R-8) • Distribution loss reduction with inspection (HERS Verified Duct Leakage or equivalent)	0 points 4 points 5 points 7 points	
2.1.B.2 Space Heating/ Cooling Equipment	• 2016 Title 24 Minimum HVAC Efficiency (SEER 13/75% AFUE or 7.7 HSPF) • Improved Efficiency HVAC (SEER 14/78% AFUE or 8 HSPF) • High Efficiency HVAC (SEER 15/80% AFUE or 8.5 HSPF) • Very High Efficiency HVAC (SEER 16/82% AFUE or 9 HSPF)	0 points 2 points 4 points 5 points	
2.1.B.3 Water Heaters	• 2016 Title 24 Minimum Efficiency (0.57 Energy Factor) • Improved Efficiency Water Heater (0.675 Energy Factor) • High Efficiency Water Heater (0.72 Energy Factor) • Very High Efficiency Water Heater (0.92 Energy Factor) • Solar Pre-heat System (0.2 Net Solar Fraction) • Enhanced Solar Pre-heat System (0.35 Net Solar Fraction)	0 points 7 points 9 points 11 points 2 points 5 points	

Feature	Description	Assigned Point Values	Project Points
2.1.B.4 Daylighting	Daylighting is the ability of each room within the building to provide outside light during the day reducing the need for artificial lighting during daylight hours. • All peripheral rooms within the living space have at least one window (required) • All rooms within the living space have daylight (through use of windows, solar tubes, skylights, etc.) • All rooms daylighted	0 points 1 point 1 point	
2.1.B.5 Artificial Lighting	• Efficient Lights (25% of in-unit fixtures considered high efficacy. High efficiency is defined as 40 lumens/watt for 15 watt or less fixtures; 50 lumens/watt for 15-40 watt fixtures, 60 lumens/watt for fixtures >40watt) • High Efficiency Lights (50% of in-unit fixtures are high efficiency) • Very High Efficiency Lights (100% of in-unit fixtures are high efficiency)	5 points 6 points 7 points	
2.1.B.6 Appliances	• Energy Star Refrigerator (new) • Energy Star Dishwasher (new) • Energy Star Washing Machine (new)	1 point 1 point 1 point	
2.1.C Miscellaneous Residential Building Efficiencies			
2.1.C.1 Building Placement	North/south alignment of building or other building placement such that the orientation of the buildings optimizes natural heating, cooling, and lighting.	3 points	
2.1.C.2 Shading	At least 90% of south-facing glazing will be shaded by vegetation or overhangs at noon on June 21st.	2 points	
2.1.C.3 Energy Star Homes	EPA Energy Star for Homes (version 3 or above)	15 points	
2.1.C.4 Independent Energy Efficiency Calculations	Provide point values based upon energy efficiency modeling of the project. Note that engineering data will be required documenting the energy efficiency and point values based upon the proven efficiency beyond Title 24 Energy Efficiency Standards.	TBD	
2.1.C.5 Other	This allows innovation by the applicant to provide design features that increase the energy efficiency of the project not provided in the table. Note that engineering data will be required documenting the energy efficiency of innovative designs and point values given based upon the proven efficiency beyond Title 24 Energy Efficiency Standards.	TBD	
2.1.C.6 Existing Residential Retrofits	Having residential developments within walking and biking distances of local retail helps to reduce vehicle trips and/or vehicle miles traveled. The point value of residential projects in close proximity to local retail will be determined based upon traffic studies that demonstrate trip reductions and/or reductions in vehicle miles traveled (VMT). The suburban project will have at least three of the following on site and/or off site within ¼-mile: Residential Development, Retail Development, Park, Open Space, or Office. The mixed-use development should encourage walking and other non-auto modes of transport from residential to office/commercial locations (and vice versa). The project should minimize the need for external trips by including services/facilities for daycare, banking/ATM, restaurants, vehicle refueling, and shopping.	TBD	

Feature	Description	Assigned Point Values	Project Points
Reduction Measure 9.1: Clean Energy			
9.1.A Residential Renewable Energy Generation			
9.1.A.1 Photovoltaic	Solar Photovoltaic panels installed on individual homes or in collective neighborhood arrangements such that the total power provided augments: • 30 percent of the power needs of the project • 40 percent of the power needs of the project • 50 percent of the power needs of the project • 60 percent of the power needs of the project • 70 percent of the power needs of the project • 80 percent of the power needs of the project • 90 percent of the power needs of the project • 100 percent of the power needs of the project	9 points 12 points 17 points 20 points 23 points 25 points 28 points 31 points	
9.1.A.2 Wind Turbines	Some areas of the City lend themselves to wind turbine applications. Analysis of the areas' capability to support wind turbines should be evaluated prior to choosing this feature. Individual wind turbines at homes or collective neighborhood arrangements of wind turbines such that the total power provided augments: • 30 percent of the power needs of the project • 40 percent of the power needs of the project • 50 percent of the power needs of the project • 60 percent of the power needs of the project • 70 percent of the power needs of the project • 80 percent of the power needs of the project • 90 percent of the power needs of the project • 100 percent of the power needs of the project	9 points 12 points 17 points 21 points 23 points 25 points 28 points 31 points	
9.1.A.3 Off-site Renewable Energy Project	The applicant may submit a proposal to supply an off-site renewable energy project such as renewable energy retrofits of existing homes. These off-site renewable energy retrofit project proposals will be determined on a case-by-case basis and shall be accompanied by a detailed plan that documents the quantity of renewable energy the proposal would generate. Point values will be determined based upon the energy generated by the proposal.	TBD	
9.1.A.4 Other Renewable Energy Generation	The applicant may have innovative designs or unique site circumstances (such as geothermal) that allow the project to generate electricity from renewable energy not provided in the table. The ability to supply other renewable energy and the point values allowed will be decided based upon engineering data documenting the ability to generate electricity.	TBD	
Reduction Measure 5.2: Exceed Water Efficiency Standards			
5.2.A Residential Irrigation and Landscaping			
5.2.A.1 Water Efficient Landscaping	• Limit conventional turf to < 25% of required landscape area • Limit conventional turf to < 50% of required landscape area • No conventional turf (warm season turf to < 50% of required landscape area and/or low water using plants are allowed) • Only California Native Plants that requires no irrigation or some supplemental irrigation	0 points 2 points 4 points 5 points	
5.2.A.2 Water Efficient Irrigation Systems	• Low precipitation spray heads < .75"/hr or drip irrigation • Weather based irrigation control systems or moisture sensors (demonstrate 20% reduced water use)	1 point 2 points	

Feature	Description	Assigned Point Values	Project Points
5.2.A.3 Stormwater Reuse Systems	Innovative on-site stormwater collection, filtration, and reuse systems are being developed that provide supplemental irrigation water and provide vector control. These systems can greatly reduce the irrigation needs of a project. Point values for these types of systems will be determined based upon design and engineering data documenting the water savings.	TBD	
5.2.B Residential Potable Water			
5.2.B.1 Showers	Water Efficient Showerheads (2.0 gpm)	2 points	
5.2.B.2 Toilets	Water Efficient Toilets (1.5 gpm)	2 points	
5.2.B.3 Faucets	Water Efficient faucets (1.28 gpm)	2 points	
5.2.B.4 Dishwasher	Water Efficient Dishwasher (6 gallons per cycle or less)	1 point	
5.2.B.5 Washing Machine	Water Efficient Washing Machine (Water factor <5.5)	1 point	
5.2.B.6 WaterSense	EPA WaterSense Certification	7 points	
5.2.C Increase Residential Reclaimed Water Use			
5.2.C.1 Recycled Water	5% of the total project's water use comes from recycled/reclaimed water	5 points	
Reduction Measure 7.1: Alternative Transportation Options			
7.1.A Increase Residential Density			
7.1.A.1 Residential Density	Designing the project with increased densities, where allowed by the General Plan and/or Zoning Ordinance, reduces GHG emissions associated with traffic in several ways. Increased densities affect the distance people travel and provide greater options for the modes of travel they choose. This strategy also provides a foundation for implementation of many other strategies, which would benefit from increased densities. 1 point is allowed for each 10% increase in density beyond 7 units/acre, up to 500% (50 points)	1–50 points	
7.1.B Mixed-Use Development			
7.1.B.1 Mixed-Use	Mixes of land uses that complement one another in a way that reduces the need for vehicle trips can greatly reduce GHG emissions. The point value of mixed-use projects will be determined based upon a Transportation Impact Analysis (TIA) demonstrating trip reductions and/or reductions in vehicle miles traveled. Suggested ranges: • Diversity of land uses complementing each other (2–28 points) • Increased destination accessibility other than transit (1–18 points) • Increased Transit Accessibility (1–25 points) • Infill location that reduces vehicle trips or VMT beyond the measures described above (points TBD based on traffic data).	TBD	

Feature	Description	Assigned Point Values	Project Points
7.1.B.2 Residential Near Local Retail (Residential only Projects)	Having residential developments within walking and biking distance of local retail helps to reduce vehicle trips and/or vehicle miles traveled. The point value of residential projects in close proximity to local retail will be determined based upon traffic studies that demonstrate trip reductions and/or reductions in vehicle miles traveled (VMT). The suburban project will have at least three of the following on site and/or off site within ¼-mile: Residential Development, Retail Development, Park, Open Space, or Office. The mixed-use development should encourage walking and other non-auto modes of transport from residential to office/commercial locations (and vice versa). The project should minimize the need for external trips by including services/facilities for day care, banking/ATM, restaurants, vehicle refueling, and shopping.	1–16 points	
7.1.C Traffic Flow Management Improvements			
7.1.C.1 Signal Synchronization	Techniques for improving traffic flow include: traffic signal coordination to reduce delay, incident management to increase response time to breakdowns and collisions, Intelligent Transportation Systems (ITS) to provide real-time information regarding road conditions and directions, and speed management to reduce high free-flow speeds. • Signal synchronization • Traffic signals connected to existing ITS	 1 point/signal 3 points/signal	
7.1.D Increase Public Transit			
7.1.D.1 Public Transit Access	The point value of a projects ability to increase public transit use will be determined based upon a Transportation Impact Analysis (TIA) demonstrating decreased use of private vehicles and increased use of public transportation. Increased transit accessibility (1–15 points)	TBD	
Reduction Measure 7.2: Adopt and Implement a Bicycle Master Plan to Expand Bike Routes around the City			
7.2.A.1 Sidewalks	• Provide sidewalks on one side of the street (required) • Provide sidewalks on both sides of the street • Provide pedestrian linkage between residential and commercial uses within 1 mile	0 points 1 point 3 points	
7.2.A.2 Bicycle Paths	• Provide bicycle paths within project boundaries • Provide bicycle path linkages between residential and other land uses • Provide bicycle path linkages between residential and transit	TBD 2 points 5 points	
Reduction Measure 8.1: Reduce Waste to Landfills			
8.1.A.1 Recycling	City-initiated recycling program diverting 100% of waste requires coordination in neighborhoods to realize this goal. The following recycling features will help the City fulfill this goal: • Provide green waste composting bins at each residential unit • Multi-family residential projects that provide dedicated recycling bins separated by types of recyclables combined with instructions/education program explaining how to use the bins and the importance or recycling	 4 points 3 points	
Other GHG Reduction Feature Implementation			
O.A.1 Other GHG Emissions Reduction Features	This allows innovation by the applicant to provide residential design features for the GHG emissions from construction and/or operation of the project not provided in the table. Note that engineering data will be required documenting the GHG reduction amount and point values given based upon emission reductions calculations using approved models, methods, and protocols.	TBD	
Total Points Earned by Residential Project:			

Table 2: Screening Table for GHG Reduction Measures for Commercial Development and Public Facilities

Feature	Description	Assigned Point Values	Project Points
Reduction Measure 4.1: Exceed Energy Efficiency Standards in New Commercial Units			
4.1.A Building Envelope			
4.1.A.1 Insulation	• 2017 Title 24 Requirements (walls R-13; roof/attic R-30) • Modestly Enhanced Insulation (walls R-13, roof/attic R-38) • Enhanced Insulation (rigid wall insulation R-13, roof/attic R-38) • Greatly Enhanced Insulation (spray foam insulated walls R-15 or higher, roof/attic R-38 or higher)	0 points 9 points 11 points 12 points	
4.1.A.2 Windows	• 2016 Title 24 Windows (0.57 U-factor, 0.4 SHGC) • Modestly Enhanced Window Insulation (0.4 U-factor, 0.32 SHGC) • Enhanced Window Insulation (0.32 U-factor, 0.25 SHGC) • Greatly Enhanced Window Insulation (0.28 or less U-factor, 0.22 or less SHGC)	0 points 4 points 5 points 7 points	
4.1.A.3 Cool Roofs	• Modest Cool Roof (CRRC Rated 0.15 aged solar reflectance, 0.75 thermal emittance) • Enhanced Cool Roof (CRRC Rated 0.2 aged solar reflectance, 0.75 thermal emittance) • Greatly Enhanced Cool Roof (CRRC Rated 0.35 aged solar reflectance, 0.75 thermal emittance)	7 points 8 points 10 points	
4.1.A.4 Air Infiltration	Minimizing leaks in the building envelope is as important as the insulation properties of the building. Insulation does not work effectively if there is excess air leakage. • Air barrier applied to exterior walls, calking, and visual inspection such as the HERS Verified Quality Insulation Installation (QII or equivalent) • Blower Door HERS Verified Envelope Leakage or equivalent	7 points 6 points	
4.1.A.5 Thermal Storage of Building	Thermal storage is a design characteristic that helps keep a constant temperature in the building. Common thermal storage devices include strategically placed water filled columns, water storage tanks, and thick masonry walls. • Modest Thermal Mass (10% of floor or 10% of walls 12" or more thick exposed concrete or masonry with no permanently installed floor covering such as carpet, linoleum, wood, or other insulating materials) • Enhanced Thermal Mass (20% of floor or 20% of walls 12" or more thick exposed concrete or masonry with no permanently installed floor covering such as carpet, linoleum, wood, or other insulating materials) • Enhanced Thermal Mass (80% of floor or 80% of walls 12" or more thick exposed concrete or masonry with no permanently installed floor covering such as carpet, linoleum, wood, or other insulating materials)	2 points 4 points 14 points	
4.1.B Indoor Space Efficiencies			
4.1.B.1 Heating/ Cooling Distribution System	• Minimum Duct Insulation (R-4.2 required) • Modest Duct insulation (R-6) • Enhanced Duct Insulation (R-8) • Distribution loss reduction with inspection (HERS Verified Duct Leakage or equivalent)	0 points 5 points 6 points 8 points	

Feature	Description	Assigned Point Values	Project Points
4.1.B.2 Space Heating/ Cooling Equipment	• 2016 Title 24 Minimum HVAC Efficiency (EER 13/75% AFUE or 7.7 HSPF) • Improved Efficiency HVAC (EER 14/78% AFUE or 8 HSPF) • High Efficiency HVAC (EER 15/80% AFUE or 8.5 HSPF) • Very High Efficiency HVAC (EER 16/82% AFUE or 9 HSPF)	0 points 4 points 5 points 7 points	
4.1.B.3 Commercial Heat Recovery Systems	Heat recovery strategies employed with commercial laundry, cooking equipment, and other commercial heat sources for reuse in HVAC air intake or other appropriate heat recovery technology. Point values for these types of systems will be determined based upon design and engineering data documenting the energy savings.	TBD	
4.1.B.4 Water Heaters	• 2016 Title 24 Minimum Efficiency (0.57 Energy Factor) • Improved Efficiency Water Heater (0.675 Energy Factor) • High Efficiency Water Heater (0.72 Energy Factor) • Very High Efficiency Water Heater (0.92 Energy Factor) • Solar Pre-heat System (0.2 Net Solar Fraction) • Enhanced Solar Pre-heat System (0.35 Net Solar Fraction)	0 points 8 points 10 points 11 points 2 points 5 points	
4.1.B.5 Daylighting	Daylighting is the ability of each room within the building to provide outside light during the day reducing the need for artificial lighting during daylight hours. • All peripheral rooms within building have at least one window or skylight • All rooms within building have daylight (through use of windows, solar tubes, skylights, etc.) • All rooms daylighted	0 points 1 point 1 point	
4.1.B.6 Artificial Lighting	• Efficient Lights (25% of in-unit fixtures considered high efficiency. High efficiency is defined as 40 lumens/watt for 15 watt or less fixtures; 50 lumens/watt for 15-40 watt fixtures, 60 lumens/watt for fixtures >40watt) • High Efficiency Lights (50% of in-unit fixtures are high efficiency) • Very High Efficiency Lights (100% of in-unit fixtures are high efficiency)	5 points 7 points 8 points	
4.1.B.7 Appliances	• Energy Star Commercial Refrigerator (new) • Energy Star Commercial Dishwasher (new) • Energy Star Commercial Clothes Washer	2 points 2 points 2 points	
4.1.C Miscellaneous Commercial Building Efficiencies			
4.1.C.1 Building Placement	North/south alignment of building or other building placement such that the orientation of the buildings optimizes conditions for natural heating, cooling, and lighting.	4 points	
4.1.C.2 Shading	At least 90% of south-facing glazing will be shaded by vegetation or overhangs at noon on Jun 21st.	6 points	
4.1.C.3 Other	This allows innovation by the applicant to provide design features that increases the energy efficiency of the project not provided in the table. Note that engineering data will be required documenting the energy efficiency of innovative designs and point values given based upon the proven efficiency beyond Title 24 Energy Efficiency Standards.	TBD	
4.1.C.4 Existing Commercial Buildings Retrofits	The applicant may wish to provide energy efficiency retrofit projects to existing commercial buildings to further the point value of their project. Retrofitting existing commercial buildings within the City is a key reduction measure that is needed to reach the reduction goal. The potential for an applicant to take advantage of this program will be decided on a case-by-case basis and shall have the approval from the City of Corona Planning Department. The decision to allow applicants to participate in this program will be evaluated based upon, but not limited to the following: Will the energy efficiency retrofit project benefit low income or disadvantaged communities?	TBD	

Feature	Description	Assigned Point Values	Project Points
	Does the energy efficiency retrofit project provide co-benefits important to the City? Point value will be determined based upon engineering and design criteria of the energy efficiency retrofit project.		
Reduction Measure 9.1: Clean Energy			
9.1.B Commercial/Industrial Renewable Energy Generation			
9.1.B.1 Photovoltaic	Solar Photovoltaic panels installed on commercial buildings or in collective arrangements within a commercial development such that the total power provided augments: • 30 percent of the power needs of the project • 40 percent of the power needs of the project • 50 percent of the power needs of the project • 60 percent of the power needs of the project • 70 percent of the power needs of the project • 80 percent of the power needs of the project • 90 percent of the power needs of the project • 100 percent of the power needs of the project	8 points 12 points 16 points 19 points 23 points 26 points 30 points 34 points	
9.1.B.2 Wind Turbines	Some areas of the City lend themselves to wind turbine applications. Analysis of the areas capability to support wind turbines should be evaluated prior to choosing this feature. Wind turbines as part of the commercial development such that the total power provided augments: • 30 percent of the power needs of the project • 40 percent of the power needs of the project • 50 percent of the power needs of the project • 60 percent of the power needs of the project • 70 percent of the power needs of the project • 80 percent of the power needs of the project • 90 percent of the power needs of the project • 100 percent of the power needs of the project	8 points 12 points 16 points 19 points 23 points 26 points 30 points 34 points	
9.1.B.3 Off-site Renewable Energy Project	The applicant may submit a proposal to supply an off-site renewable energy project such as renewable energy retrofits of existing residential or existing commercial/industrial. These off-site renewable energy retrofit project proposals will be determined on a case-by-case basis accompanied by a detailed plan documenting the quantity of renewable energy the proposal will generate. Point values will be based upon the energy generated by the proposal.	TBD	
9.1.A.4 Other Renewable Energy Generation	The applicant may have innovative designs or unique site circumstances (such as geothermal) that allow the project to generate electricity from renewable energy not provided in the table. The ability to supply other renewable energy and the point values allowed would be decided based upon engineering data documenting the ability to generate electricity.	TBD	
Reduction Measure 5.2: Exceed Water Efficiency Standards			
5.2.D Commercial Irrigation and Landscaping			
5.2.D.1 Water Efficient Landscaping	• Eliminate conventional turf from landscaping • Only moderate water using plants • Only low water using plants • Only California Native landscape that requires no or only supplemental irrigation	0 point 2 points 3 points 5 points	

Feature	Description	Assigned Point Values	Project Points
5.2.D.2 Water Efficient Irrigation Systems	• Low precipitation spray heads< .75”/hr or drip irrigation • Weather based irrigation control systems combined with drip irrigation (demonstrate 20% reduced water use)	1 point 3 points	
5.2.D.3 Stormwater Reuse Systems	Innovative on-site stormwater collection, filtration, and reuse systems are being developed that provide supplemental irrigation water and provide vector control. These systems can greatly reduce the irrigation needs of a project. Point values for these types of systems will be determined based upon design and engineering data documenting the water savings.	TBD	
5.2.E Commercial Potable Water			
5.2.E.1 Showers	Water Efficient Showerheads (2.0 gpm)	2 points	
5.2.E.2 Toilets	• Water Efficient Toilets/Urinals (1.5 gpm) • Waterless Urinals (note that commercial buildings having both waterless urinals and high efficiency toilets will have a combined point value of 6 points)	3 points 3 points	
5.2.E.3 Faucets	Water Efficient faucets (1.28 gpm)	2 points	
5.2.E.4 Commercial Dishwashers	Water Efficient dishwashers (20% water savings)	2 points	
5.2.E.5 Commercial Laundry Washers	• Water Efficient laundry (15% water savings) • High Efficiency laundry Equipment that captures and reuses rinse water (30% water savings)	2 points 4 points	
5.2.E.6 Commercial Water Operations Program	Establish an operational program to reduce water loss from pools, water features, etc., by covering pools, adjusting fountain operational hours, and using water treatment to reduce draw down and replacement of water. Point values for these types of plans will be determined based upon design and engineering data documenting the water savings.	TBD	
5.2.F Increase Commercial/Industrial Reclaimed Water Use			
5.2.F.1 Recycled Water	Graywater (purple pipe) irrigation system on site	5 points	
Reduction Measure 7.1: Alternative Transportation Options			
7.1.E Mixed-Use Development			
7.1.E.1 Mixed-Use	Mixes of land uses that complement one another in a way that reduces the need for vehicle trips can greatly reduce GHG emissions. The point value of mixed-use projects will be determined based upon traffic studies that demonstrate trip reductions and/or reductions in vehicle miles traveled.	TBD	
7.1.E.2 Local Retail Near Residential (Commercial only Projects)	Having residential developments within walking and biking distance of local retail helps to reduce vehicle trips and/or vehicle miles traveled. The point value of residential projects in close proximity to local retail will be determined based upon traffic studies that demonstrate trip reductions and/or reductions in vehicle miles traveled.	TBD	
7.1.F Preferential Parking			
7.1.F.1 Parking	• Provide reserved preferential parking spaces for car-share, carpool, and ultra-low or zero emission vehicles. • Provide larger parking spaces that can accommodate vans used for ride-sharing programs and reserve them for vanpools and include adequate passenger waiting/loading areas.	1 point 1 point	

Feature	Description	Assigned Point Values	Project Points
7.1.G Signal Synchronization and Intelligent Traffic Systems			
7.1.G.1 Signal Improvements	Techniques for improving traffic flow include: traffic signal coordination to reduce delay, incident management to increase response time to breakdowns and collisions, Intelligent Transportation Systems (ITS) to provide real-time information regarding road conditions and directions, and speed management to reduce high free-flow speeds. • Synchronize signals along arterials used by project. • Connect signals along arterials to existing ITS.	1 point/signal 3 points/signal	
7.1.H Increase Public Transit			
7.1.H.1 Public Transit	The point value of a projects ability to increase public transit use will be determined based upon a Transportation Impact Analysis (TIA) demonstrating decreased use of private vehicles and increased use of public transportation. Increased transit accessibility (1-15 points)	TBD	
Reduction Measure 7.2: Adopt and Implement a Bicycle Master Plan to Expand Bike Routes around the City			
7.2.B.1 Sidewalks	• Provide sidewalks on one side of the street (required) • Provide sidewalks on both sides of the street • Provide pedestrian linkage between commercial and residential land uses within 1 mile	0 point 1 point 3 points	
7.2.B.2 Bicycle Paths	• Provide bicycle paths within project boundaries • Provide bicycle path linkages between commercial and other land uses • Provide bicycle path linkages between commercial and transit	1 point 2 points 5 points	
Reduction Measure 8.1: Reduce Waste to Landfills			
8.1.B.1 Recycling	City initiated recycling program diverting 80% of waste requires coordination with commercial development to realize this goal. The following recycling features will help the City fulfill this goal: • Provide separated recycling bins within each commercial building/floor and provide large external recycling collection bins at central location for collection truck pick-up • Provide commercial/industrial recycling programs that fulfills an on-site goal of 80% diversion of solid waste	2 points 5 points	
Other GHG Reduction Feature Implementation			
O.B.1 Other GHG Emissions Reduction Features	This allows innovation by the applicant to provide commercial design features that the GHG emissions from construction and/or operation of the project not provided in the table. Note that engineering data will be required documenting the GHG reduction amount and point values given based upon emission reductions calculations using approved models, methods, and protocols.	TBD	
Total Points Earned by Commercial/Industrial Project:			

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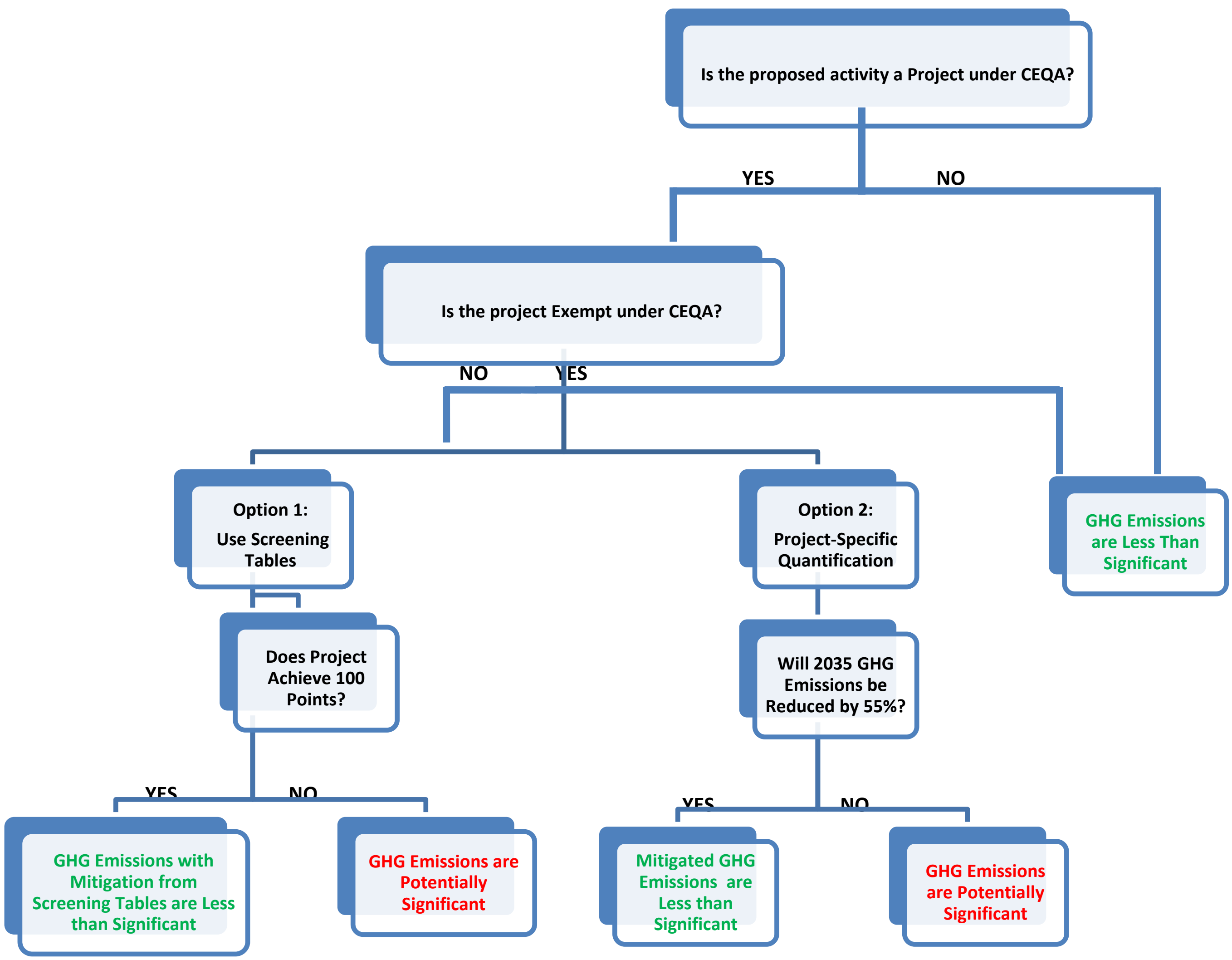
APPENDIX A:
GHG DEVELOPMENT REVIEW PROCESS FLOW CHART DIAGRAM

Approach to Implementation of GHG Development Review



APPENDIX B: TRANSIT PRIORITY PROJECT AND SUSTAINABLE COMMUNITY PROJECT CHECKLIST

TRANSIT PRIORITY PROJECT CHECKLIST

The following checklist will assist in determining if your project qualifies as a Transit Priority Project (TPP) and a Sustainable Community Project (SCP) as defined in PRC 21155(a), (b), and PRC 21152.

Yes	No		Is the project:
☐	☐	1.	Located within ½ mile of a Trolley Station, future Station, or Transit Center?
☐	☐	2.	At least 50% residential use, based upon total square footage, and non-residential uses within the project between 26% to 50% of total square footage with FAR of not less than 0.75?
☐	☐	3.	At or above a minimum net density of at least 20 dwelling units per acre?
☐	☐	4.	Is your project consistent with the general land use designations in the SCP (if you answered yes to questions 1 through 3, then answer yes to this one)?

If you answered **Yes** to questions 1 through 4 then your project is a Transit Priority Project (TPP) as defined by PRC Section 21155(b). Continue with the next list of environmental questions:

Yes	No		Does the project:
☐	☐	5.	Contain sites on the Cortese List?
☐	☐	6.	Site contain any hazardous substances, contaminated soil or hazardous material?
☐	☐	7.	Site include historical resources?
☐	☐	8.	Have an unusually high risk of fire or explosion from material stored or used at properties within ¼ mile of the project site?
☐	☐	9.	Site currently include areas developed as Open Space (parks, habitat, etc.)?

Continue with the next list of land use questions below:

Yes	No		
☐	☐	10.	Does the project design have all the buildings at least 15% more efficient than Title 24 energy standards and uses 25% or less water than average households?
☐	☐	11.	Is the project site eight acres or less in size?
☐	☐	12.	The project does not include any single level of a building exceeding 75 TSF?
☐	☐	13.	The project does not conflict with nearby industrial uses?
☐	☐	14.	The project will sell at least 20% of housing to families of moderate income, or 10% of housing will be rented to families of low income, or at least 5% of housing will be rented to families of very low income, or the project provides open space equal or greater than 5 acres per 1,000 residents, or the developer will pay in-lieu fees sufficient to result in the development of affordable housing meeting one of the criteria described above?

Determining Eligibility based upon the answers:

Full CEQA Exemption for Sustainable Community Projects (SCPs)

If you answered **Yes** to all the TPP questions 1 through 4, **No** to all the environmental questions 5 through 9, and **Yes** to all the land use questions 10 through 14, then your project is an SCP and is eligible for a full CEQA Exemption under SB 375.

Transit Priority Projects (TPP)

If you answered **Yes** to all the TPP questions 1 through 4, but did not qualify as an SCP then your project is a TPP. Your TPP needs to incorporate all appropriate mitigation measures required by an applicable CEQA document (such as an adopted EIR for a Specific Plan) for your project location. If your TPP meets these two criteria then your TPP does not need to analyze the following impacts in the Sustainable Communities Environmental Assessment (SCEA) or CEQA analysis:

- Growth-inducing impacts,
- Regional transportation impacts, and
- GHG emissions related to passenger cars and light-duty trucks.

The impacts listed above are considered less than significant because the project is a TPP and the SCEA or CEQA document should reference PRC Section 21155.2(c)

Other Residential and Mixed-Use Projects

If you answered Yes to question 4, but did not qualify as an SCP or TPP, your project may not need to analyze some of the impacts in the CEQA analysis if your project is a **residential project or mixed-use project with 75%** of the total building square footage of the project is residential units. In addition, your project needs to incorporate all appropriate mitigation measures required by an applicable prior CEQA document (such as an adopted EIR for a Specific Plan) for your project location. If your project meets these criteria, then the CEQA analysis of your project does not need to analyze the following impacts:

- Growth-inducing impacts,
- Regional transportation impacts, and
- GHG emissions related to passenger cars and light-duty trucks.

The impacts listed above are considered less than significant because the project meets the criteria in PRC Section 21155.2(c)

APPENDIX C: METHODOLOGY FOR THE DEVELOPMENT AND APPLICATION OF THE SCREENING TABLES

METHODS SUMMARY

The point values in the Screening Tables were derived from the projected emissions reductions that would be achieved by each of the reduction measures associated with new development within the City of Corona CAP Update. The points within the Screening Tables were proportioned by residential unit or square footage of commercial/industrial uses. This was accomplished by taking the predicted growth in households and commercial uses in 2030 and proportioning the appropriate reduction quantities for new development to the residential, commercial, and industrial land use sectors within the Screening Tables. This results in point values that are proportioned by residential unit or commercial/industrial square footage. Because of this outcome, the size of the project is not relevant to the Screening Tables. Regardless of size, each project needs to garner 100 points to demonstrate consistency with the CAP Update. Efficiency, not size of the project, is critical.

Note that the Screening Tables and point values are best used for typical development projects processed by the City. Examples of typical development projects include residential subdivisions, multi-family residential apartments, condominiums and townhouses, retail commercial, big box retail, office buildings, business parks, and typical warehousing. Mixed-use projects can use the instructions at the beginning of the Screening Tables. Transit-oriented development (TOD), and infill projects are able to use the Screening Tables; however, the Screening Tables points are likely to underestimate total emission reductions afforded these types of projects. Note that the Screening Tables include the opportunity to custom develop points in order to provide points in the sections of the Screening Tables marked TBD and account for the predicted reductions in vehicle trips and vehicle miles traveled within a project-specific traffic study and GHG analysis. TOD and infill projects can be more accurately assessed and points allocated using this method.

However, more unusual types of industrial projects, such as cement manufacturing, metal foundries, refrigerant manufacturing, electric generating stations—including large alternative energy electric generation, and oil refineries, cannot use the Screening Tables because the emission sources for those types of uses were not contemplated in the CAP Update.

DEVELOPMENT OF THE POINT VALUES

Within the local reduction measures, 16,090 MT CO_2e would be reduced using the Screening Tables for new development. The Screening Tables and the point allocation within the Screening Tables are tied to 16,090 MT CO_2e of reductions.

The first step in allocating point values is to determine the number of new homes and commercial buildings that are anticipated by year 2030. The City predicts that a total of 3,026 new residential units will be needed by 2030 and a total of approximately 4,970,550 square feet of new commercial and industrial buildings within the City is needed to accommodate anticipated job growth.

Approximately 3,026 new residential units and 4,970,550 square feet of new commercial and industrial buildings within the City are anticipated to either use the Screening Tables or provide an independent analysis demonstrating reductions. Evaluating the growth in residential and commercial/industrial land uses, approximately 38 percent is attributable to residential and 62 percent is attributable to commercial/industrial land uses. Using those ratios, the Screening Tables would need to reduce 6,147 MT CO_2e from residential development and 9,943 MT CO_2e from commercial/industrial development by 2030.

Dividing the 6,147 MT CO_2e reductions of emissions afforded the Screening Table for new residential development by the anticipated 3,026 new residential units that will be built yields 2.03 MT CO_2e per residential unit that needs to be reduced to fulfill the anticipated reductions of the CAP Update. Using the same process, the Screening Tables for new commercial/industrial development would need to reduce 2.00 MT CO_2e per 1,000 gross square feet of commercial/industrial building area.

The levels of reduction efficiency for typical residential units in this climate zone yields:

0.0203 MT CO_2e per Point per Residential Unit

The levels of reduction efficiency for the mix of commercial/industrial uses in this climate zone yields:

0.0200 MT CO_2e per Point per 1,000 Square Feet of Gross Commercial/Industrial Building Area

Since each residential unit needs to reduce 2.03 MT CO_2e and each 1,000 square feet of commercial/ industrial building area needs to reduce 2.00 MT CO_2e, each project needs to gain 100 points to provide the expected reductions from the Screening Tables.

Appendix D Air Quality and GHG Modeling

Appendices

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CITY OF CORONA+SOI - CRITERIA AIR POLLUTANT INVENTORY

EXISTING BASELINE	2018 - lbs/day					
SECTORS	**ROG**	**NO_x**	**CO**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**
Transportation	422	4,261	11,274	37	558	266
Energy - Residential (Natural Gas)	68	579	246	4	47	47
Energy - Nonresidential* (Natural Gas)	62	564	474	3	43	43
Energy sub-total	*130*	*1,143*	*720*	*7*	*90*	*90*
Area Sources (Light Commercial Equipment)	87	565	2,249	1	29	25
Area (Construction and Agricultural Equipment) **	18	155	268	0.20	7.77	7.04
Area Source - Consumer Products	3,652	0	0	0	0	0
Total	4,309	6,125	14,511	45	684	388

EXISTING w/2040 EMISSION RATES	2040 Existing Land Uses - lbs/day					
SECTORS	**ROG**	**NO_x**	**CO**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**
Transportation	96	1,129	4,239	23	491	204
Energy - Residential (Natural Gas)	68	579	246	4	47	47
Energy - Nonresidential* (Natural Gas)	62	564	474	3	43	43
Energy sub-total	*130*	*1,143*	*720*	*7*	*90*	*90*
Area Sources (Light Commercial Equipment)	87	565	2,249	1	29	25
Area (Construction and Agricultural Equipment) **	18	155	268	0.20	7.77	7.04
Area Sources - Consumer Products	3,652	0	0	0	0	0
Total	3,983	2,993	7,476	32	617	325
Net Change from Baseline (2018)	-326	-3,132	-7,035	-14	-66	-62

FORECAST YEAR 2040	2040 Land Uses - lbs/day					
SECTORS	**ROG**	**NO_x**	**CO**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**
Transportation	125	1,474	5,533	31	641	266
Energy - Residential (Natural Gas)	79	677	288	4.32	55	55
Energy - Nonresidential* (Natural Gas)	87	791	664	4.74	60	60
Energy sub-total	166	1,468	952	9.07	115	115
Area Sources (Landscaping, Light Commercial Equipment)	124	799	3,180	1	41	35
Area (Construction and Agricultural Equipment) **	17	153	234	0.20	8	7
Area Sources - Consumer Products	4,773	0	0	0.00	0	0
Total	5,205	3,894	9,899	41	804	423
Net Change from Baseline (2018 Existing)	895	-2,230	-4,612	-4	120	35
Net Change from Baseline (2040 Existing)	1,221	901	2,423	10	187	98

Notes:

Transportation. EMFAC2017, Version 1.0.2 and Fehr and Peers.

Emissions forecasts estimated based on changes in population (residential energy), employment (nonresidential energy), or service population (transportation)

Energy. Based on a five-year average (2012-2016) of natural gas data as provided by SoCal Gas.

Area Sources. OFFROAD2007. Estimated based on population (Landscaping) and employment (Light Commercial Equipment) for City of Corona as a percentage of Riverside County. Does not include emissions from wood-burning fireplaces.

Other Sources. OFFROAD2007. Agricultural equipment emissions are based the proportion of farmland within the City of Corona compared to Riverside County. Construction emissions estimated based on housing permit data for Riverside County and City of Corona from the US Census. **Excludes fugitive emissions from construction sites.

Excludes Permitted Sources: Because the reductions associated with the Industrial sector are regulated separately by SCAQMD and are not under the jurisdiction of the City of Corona, these emissions are not included in the emissions inventory.

CITY OF CORONA+SOI - COMMUNITY GHG EMISSIONS INVENTORY

	MTCO$_2$e			
SECTORS	**2018**	**Percent of Total**	**2040**	**Percent of Total**
Transportation	617,849	50%	419,014	35%
Residential (Natural Gas and Electricity)	226,671	18%	266,135	22%
Nonresidential* (Natural Gas and Electricity)	319,752	26%	409,435	34%
Solid Waste (Waste Commitment)	34,616	3%	39,324	3%
Water/Wastewater	28,802	2%	32,719	3%
Other - Offroad Equipment	19,473	2%	23,287	2%
Total Community Emissions	1,247,164	100%	1,189,915	100%
Service Population	277,948		348,402	
MTCO$_2$e/SP	4.49		3.42	
SCAQMD GHG GP Threshold (PROGRAM LEVEL)	NA		2.67	

Notes: Based on IPCC's Fifth Assessment Report GWPs

Emissions forecast based on changes in population (residential energy), employment (nonresidential energy), or service population (City energy, waste, water/wastewater, transportation).

Transportation. EMFAC2017, Version 1.0.2 and Fehr and Peers.

Energy. Energy use utilizes a five-year (2012-2016) average annual electricity consumption average based on data provided by Southern California Edison (SCE) and Corona Department of Water and Power and natural gas consumption average based on data provided by SoCal Gas. Emissions from electricity utilizes a CO_2e intensity factor based on the SCE CO_2 intensity factor reported for year 2018 identified in the SCE 2018 Corporate Responsibility & Sustainability report and the CH_4 and N_2O intensity factors from the latest US EPA eGRID data. Electricity and natural gas use from industrial and permitted facilities may be included with the overall amounts for non-residential uses as the 15/15 Rule was triggered.

Water/Wastewater. Includes fugitive emissions from wastewater processing and energy associated with water/wastewater treatment and conveyance. Water use is estimated based on data provided by Fuscoe Engineering.

Waste. Landfill Emissions Tool Version 1.3 and CalRecycle. Waste generation based on three year average (2015-2017) waste commitment for the City of Corona obtained from CalRecycle and adjusted to include solid waste from the SOI. Assumes 75 percent of fugitive GHG emissions are captured within the landfill's Landfill Gas Capture System with a landfill gas capture efficiency of 75%. The Landfill gas capture efficiency is based on the California Air Resources Board's (CARB) Local Government Operations Protocol (LGOP), Version 1.1. Significant CH_4 production typically begins one or two years after waste disposal in a landfill and continues for 10 to 60 years or longer. Consequently, the highest CH_4 emissions from waste disposal in a given year are reported and have been adjusted to utilize IPCC's Fourth Assessment global warming potential assigned for CH_4.

Other Sources. OFFROAD2017, Version 1.0.1. Estimated based on population (Landscaping) and employment (Light Commercial Equipment)for the City of Corona as a percentage of Riverside County. Excludes SCAQMD permitted sources. Agricultural equipment emissions are based on the proportion of farmland within the City of Corona compared to Riverside Valley. Construction is estimated based on housing permit data for the City of Corona and County of Riverside. Daily construction emissions multiplied by 347 days/year to account for reduced/limited construction activity on weekends and holidays.

Industrial Sector are "point" sources that are permitted by SCAQMD and are not under the jurisdiction of the City of Corona; and therefore, not included in the City of Corona's community GHG emissions inventory.

CITY OF CORONA+SOI - GHG EMISSIONS INVENTORY COMPARISON

	Substantial Increase Change from 2018 MTCO$_2$e	
SECTORS	**2040 Buildout**	**Percent Change from 2018**
Transportation	(198,835)	-32%
Residential (Natural Gas and Electricity)	39,464	17%
Nonresidential* (Natural Gas and Electricity)	89,683	28%
Waste	4,708	14%
Water/Wastewater	3,917	14%
Other - Offroad Equipment	3,815	20%
Total Community Emissions	(57,249)	-4.6%

Model Inputs

	Baseline Year 2018			Proposed GP 2040		
	City	SOI	Total	City	SOI	Total
Households	46,979	10,896	57,875	52,297	16,067	68,364
Non-Residential Square Footage	52,278,846	3,436,459	55,715,305	61,794,650	20,397,007	82,191,657
Population	165,366	37,264	202,630	184,086	57,842	241,928
Employment	70,972	4,346	75,318	84,395	22,079	106,474
Service Population	**236,338**	**41,610**	**277,948**	**268,481**	**79,921**	**348,402**

Growth Rates from Baseline	Existing-City	Existing-SOI	2040 - City	2040 - SOI	2040 - Combined
Housing Growth Rate	1.00	1.00	1.11	1.47	1.18
Population Growth Rate	1.00	1.00	1.11	1.55	1.19
Employment Growth Rate	1.00	1.00	1.19	5.08	1.41
Service Population Growth Rate	1.00	1.00	1.14	1.92	1.25

	City+SOI	**Proposed GP 2040**
ELECTRICITY	2018	2040
City		
Residential Electricity (kWh)	371,670,609	413,743,542
Nonresidential Electricity (kWh)	821,574,727	976,959,914
Municipal	85,334,805	96,940,712
SOI		
Residential Electricity (kWh)	83,753,212	123,500,629
Nonresidential Electricity (kWh)	50,309,471	255,587,392
Total Electricity (kWh)	**1,412,642,823**	**1,866,732,188**
NATURAL GAS	2018	2040
City		
Residential Natural Gas (Therms)	19,377,837	21,571,399
Nonresidential Natural Gas (Therms)	19,858,113	23,613,897
SOI		
Residential Natural Gas (Therms)	3,563,617	5,254,831
Nonresidential Natural Gas (Therms)	1,145,853	5,821,282
Total Natural Gas (Therms)	**43,945,421**	**45,185,296**
TRANSPORTATION	2018	2040
City		
VMT/Day	3,634,563	4,298,441
SOI		
VMT/Day	604,393	1,235,176
WATER	2018	2040
City		
Water (gallons/day)	22,147,437	24,619,203
SOI		
Water (gallons/day)	5,557,468	9,052,794
Total Water Demand	**27,704,905**	**33,671,997**
WASTEWATER	2018	2035
City		
Indoor Water as a Percent of Total Water Use	69%	69%
Wastewater (gallons/day)	15,270,981	17,101,221
SOI		
Indoor Water as a Percent of Total Water Use	60%	61%
Wastewater (gallons/day)	3,331,095	5,559,401
SOLID WASTE	2018	2040
City		
Waste Generation (tons/year)	214,228	243,364
Waste Generation ADC (tons/year)	119	136
SOI		
Waste Generation (tons/year)	37,717	72,444
Waste Generation ADC (tons/year)	21	40
Total Waste Disposal (tons/year)	**252,086**	**315,985**

Sources:

Energy use utilizes a five-year (2012-2016) average annual electricity consumption average based on data provided by Southern California Edison (SCE) and Corona Department of Water and Power and natural gas consumption average based on data provided by SoCal Gas. Forecasts in energy are based on the change in population and employment.

VMT provided by Fehr and Peers and adjusted for Population and Employment. Adjusted daily vehicles miles traveled (VMT) multiplied by 347 days/year to account for reduced traffic on weekends and holidays. This assumption is consistent with the California Air Resources Board's (CARB) methodology within the Climate Change Scoping Plan Measure Documentation Supplement.

Total water demand and wastewater generation based on rates provided by Fuscoe Engineering, Inc.

Waste generation based on waste commitment for the City of Corona is obtained from CalRecycle. Forecasts are based on an average 2015-2017 disposal rate and adjusted for increases in population and employment for the City and SOI.

GHG Emissions Target Setting - Forecasting the 2040 Efficiency Target

2020 Scoping Plan Emissions Inventory

Source: CARB 1990 Inventory. California Air Resources Board. 2007, November. California Greenhouse Gas Inventory (millions of metric tonnes of CO2 equivalent) — Summary by Economic Sector. https://www.arb.ca.gov/cc/inventory/1990level/1990data.htm

1990 End Use Sector	MTCO2e	MMTCO2e	Notes
Electricity	94,754,207	94.8	Removed Industrial
Transportation	137,901,182	137.9	On-Road Only
Landfills	7,447,544	7.4	Landfill
Wastewater	3,183,648	3.2	Domestic Wastewater Treatment
Commercial	13,848,597	13.8	Removed National Security
Residential	29,740,487	29.7	Includes all
TOTAL LAND USE	286,875,666	286.9	

2017 Scoping Plan Emissions Inventory

Source: Pathways Main Outputs Final (Dec 2017). California Air Resources Board. 2017, December. The 2017 Climate Change Scoping Plan Update: The Proposed Strategy for Achieving California's 2030 Greenhouse Gas Target. https://www.arb.ca.gov/cc/scopingplan/2030sp_pp_final.pdf.

End Use Sector 2030	MMTCO2e				
	Reference Scenario	Scoping Plan Scenario	Change	Percent Change	Sector Definition
Residential	46.5	41.4	-5.1	-11.0%	Residential final energy consumption
Commercial	36.00	30.1	-5.90	-16.4%	Commercial final energy consumption
Transportation	123.1	105.1	-18	-14.6%	Transportation energy consumption
Industrial*	33.8	30.7	-3.1	-9.2%	Industrial manufacturing final energy consumption,
Oil & Gas Extraction*	19.5	19.4	-0.1	-0.5%	Energy used in the extraction of oil and gas
Petroleum Refining*	32.6	32.5	-0.1	-0.3%	Energy used in petroleum Refining
Agriculture	7.7	6.8	-0.9	-11.7%	Energy use of physical infrastructure of agriculture, like buildings and pumps
Transportation Communications and Utilities	5.5	5.00	-0.5	-9.1%	Transportation Communications and Utilities (TCU) energy supports public infrastructure, like street lighting and waste treatment facilities
Non-Energy GHGs*	84.3	49.4	-34.9	-41.40%	Examples of non-energy GHG emissions include methane and N2O emissions from agriculture and waste, refrigerant F-gases, and emissions from cement production
Solid Waste Non-Energy GHGs	10.7	9.1	-1.6	-14.95%	Isolated the Solid Waste Subsector
Unspecified	0	0	0	n/a	
	389	320.4	-68.6	-17.63%	
Target	260	260			
Gap	-129	-60.4			

CARB 2017 Scoping Plan Assumes GAP from the Scoping Plan Scenario is closed by the Cap-and-Trade

STATEWIDE SERVICE POPULATION CALCULATIONS

GHG Emissions Target Setting - Forecasting the 2040 Efficiency Target

Population

2020	40,639,392
2021	40,980,939
2022	41,321,565
2023	41,659,526
2024	41,994,283
2025	42,326,397
2026	42,655,695
2027	42,981,484
2028	43,304,691
2029	43,624,393
2030	43,939,250
2031	44,250,503
2032	44,556,617
2033	44,856,079
2034	45,150,800
2035	45,440,735
2036	45,726,459
2037	46,006,009
2038	46,277,743
2039	46,544,307
2040	46,804,202
2050	49,077,801

California Department of Finance. 2018, March 8. Report P-1 (County): State and County Total Population Projections, 2010-2060 (1 -year increments).http://www.dof.ca.gov/Forecasting/Demographics/Projections/

CALIFORNIA SERVICE POPULATION (ESTIMATE)

Employment

	Total Employment	Farm Employment	Natural Resources and Mining Employment	Manufacturing + Durable Manufacturing Employment	Employment w/o Industrial and Agricultural Sectors
2020	17,630,930	418,171	22,268	2,177,747	15,012,744
2021	17,787,640	417,961	22,388	2,184,418	15,162,873
2022	17,939,780	418,291	22,578	2,190,008	15,308,902
2023	18,083,910	418,582	22,538	2,192,829	15,449,961
2024	18,224,870	418,862	22,398	2,195,081	15,588,529
2025	18,370,230	419,122	22,188	2,204,979	15,723,941
2026	18,511,920	419,372	22,198	2,215,447	15,854,903
2027	18,648,200	419,612	22,408	2,224,416	15,981,764
2028	18,808,150	419,872	22,438	2,229,397	16,136,443
2029	18,971,340	420,142	22,478	2,234,398	16,294,322
2030	19,137,080	420,402	22,508	2,239,408	16,454,761
2031	19,299,670	420,673	22,538	2,244,399	16,612,060
2032	19,458,160	420,933	22,578	2,249,420	16,765,229
2033	19,615,470	421,203	22,608	2,254,441	16,917,218
2034	19,770,890	421,463	22,648	2,259,502	17,067,277
2035	19,924,140	421,733	22,678	2,264,562	17,215,166
2036	20,078,780	421,993	22,718	2,269,643	17,364,425
2037	20,235,200	422,263	22,748	2,274,724	17,515,465
2038	20,395,030	422,523	22,788	2,279,835	17,669,884
2039	20,551,830	422,794	22,818	2,284,955	17,821,263
2040	20,709,630	423,054	22,859	2,290,086	17,973,632
2050	22,371,010	425,715	23,209	2,342,246	19,579,840

California Department of Transportation. 2017. Long-Term Socio-Economic Forecasts by County. http://www.dot.ca.gov/hq/tpp/offices/eab/socio_economic.html

GHG Emissions Target Setting - Forecasting the 2040 Efficiency Target

Service Population (SP)

	Total Employment	Employment w/o Industrial and Agricultural Sectors
2020	58,270,322	55,652,136
2021	58,768,579	56,143,812
2022	59,261,345	56,630,467
2023	59,743,436	57,109,487
2024	60,219,153	57,582,812
2025	60,696,627	58,050,338
2026	61,167,615	58,510,598
2027	61,629,684	58,963,248
2028	62,112,841	59,441,134
2029	62,595,733	59,918,715
2030	63,076,330	60,394,011
2031	63,550,173	60,862,563
2032	64,014,777	61,321,846
2033	64,471,549	61,773,297
2034	64,921,690	62,218,077
2035	65,364,875	62,655,901
2036	65,805,239	63,090,884
2037	66,241,209	63,521,474
2038	66,672,773	63,947,627
2039	67,096,137	64,365,570
2040	67,513,832	64,777,834
2050	71,448,811	68,657,641

Project Horizon Year Estimate	2040
2040 population	46,804,202
2040 employment (w/o industrial & Ag)	17,973,632
2040 GP	64,777,834

2030 Scoping Plan - Efficiency Metric

Year 2020 Plan-Level			
2020 Target (Plan-Level)	MMTCO2e	431	
2020 Per Capita Target	MTCO2e/pc	10.6	
2020 Per Service Population Target (Plan-Level)	MTCO2e/sp	7.7	
Year 2020 Project-Level			
2020 Target (Project-Level)	MMTCO2e	286.9	
2020 Per Capita Target	MTCO2e/pc	7.1	
2020 Per Service Population Target (Project-Level)	MTCO2e/sp	5.2	
Year 2030 Plan-Level			
2030 Target (Plan-Level)	MMTCO2e	260	
2030 Per Capita Target	MTCO2e/pc	5.9	
2030 Per Service Population Target (Plan-Level)	MTCO2e/sp	4.3	
Year 2030 Project-Level			
Land Use Inventory (Project-Level)	MMTCO2e	190.7	
2030 Per Capita Target	MTCO2e/pc	4.3	
2030 Per Service Population Target (Project-Level)	MTCO2e/sp	3.2	
Year 2050 Plan-Level			
2050 Target estimated (Plan-Level)	MMTCO2e	86	
2050 Per Capita Target	MTCO2e/pc	1.8	
2050 Per Service Population Target (Plan-Level)	MTCO2e/sp	1.3	
Year 2050 Project-Level			
2050 Target estimated (Plan-Level)	MMTCO2e	57	
2050 Per Capita Target	MTCO2e/pc	1.2	
2050 Per Service Population Target (Plan-Level)	MTCO2e/sp	0.8	
Project Horizon Year Estimate	2040		
Land Use Inventory (Plan-Level)	MMTCO2e	173.1	-40%
2040 Per Service Population Target (Project-Level)	MTCO2e/sp	2.67	

Water and Wastewater

Water Demand/Wastewater Generation Calculations

Source: Fuscoe Engineering, Inc. 2018.

	Water Demand (acre-feet/year)	Water Demand (gallons/year)
Year	Total	Total
2018	31,033.44	10,112,290,325
2040	37,717.43	12,290,278,905

	Wastewater Generation (acre-feet/year)	Wastewater Generation (gallons/year)
Year	Total	Total
2018	20,836.97	6,789,757,740
2040	25,383.12	8,271,127,030

Wastewater, Percent of total Water Use: 67%

Fugitive Emissions - Process Emissions from WWTP with Nitrification/Denitrification

CH_4 - Microorganisms can biodegrade soluble organic material in wastewater under aerobic (presence of oxygen) or anaerobic (absence of oxygen) conditions. Anaerobic conditions result in the production of CH_4.

N_2O - Treatment of domestic wastewater during both nitrification and denitrification of the nitrogen present leads to the formation of N_2O, usually in the form of urea, ammonia, and proteins. These compounds are converted to nitrate through the aerobic process of nitrification. Denitrification occurs under anoxic conditions (without free oxygen), and involves the biological conversion of nitrate into dinitrogen. N_2O can be an intermediate product of both processes, but more often is associated with denitrification.

Fugitive Emissions - Process Emissions from WWTP with Nitrification/Denitrification for combustion of biogas.

Anaerobic digesters produce methane-rich biogas which is typically combusted on-site. In some cases the biogas is combusted simply for the purpose of converting methane to CO_2, which has a lower global warming potential than methane. In many cases, a cogeneration system is used to harvest the heat from combustion and use it to generate electricity for on-site energy needs. In both cases, inherent inefficiencies in the system result in incomplete combustion of the biogas, which results in remaining methane emissions. Excludes biogenic emissions from combustion of biogas.

LGOP Version 1.1. Equation 10.1.

CH_4 = Wastewater x Digester Gas x FCH_4 x $Þ_{CH4}$ x (1-DE) x 0.0283 x 10^-3 x 10^-3

	CEQA Baseline	Proposed Project	2020 AB32 Target	Current GP
wastewater (gallons)=	15,270,981	17,101,221	0	0

Digester gas	0.01	ft^3 biogas/gallon wastewater
FCH_4	0.65	fraction of CH4 in biogas
$Þ_{CH4}$	662.00	g/m^3; density of CH_4 at standard conditions
DE	0.99	CH4 destruction efficiency
0.0283 =	0.0283	m^3/ft^3; conversion factor
10^-3 =	1.00E-03	MT/kg conversion factor
10^-3 =	1.00E-03	kg/g conversion factor

	CEQA Baseline	Proposed Project	2020 AB32 Target	Current GP
	MTons		MTons	
CH_4 =	0.02	0.02	0.00	0.00
CO_2e =	1	1	0	0

Source: California Air Resources Board (CARB). 2010, May. Local Government Operations Protocol (LGOP), Version 1.1. The LGOP protocol provides default values for all the terms except the digester gas, which is assumed to be 0.1 cubic feet of biogas per gallon of wastewater effluent based on USEPA methodology outlined in the CalEEMod program manual. California Air Pollution COntrol Officers Association (CAPCOA). 2017. California Emissions Estimator Model (CalEEMod), Version 2016.3.2. User's Manual. USEPA. 2008. Page 8-12. USEPA cites Metcalf & Eddy, Inc., 1991, "Wastewater Engineering: Treatment Disposal, and Reuse," 3rd Ed. McGraw Hill Publishing.

Water and Wastewater

Buildout Fugitive Emissions - Process Emissions from WWTP with Nitrification/Denitrification from discharge into aquatic environments

LGOP Version 1.1. Equation 10.9.

N_2O = Wastewater x 10^-6 x Nload x 44/28 x EF effluent x 10^3

	2018	2040	2020	Current GP
wastewater (Liters)=	57,800,663	64,728,121	0	0

10^-6 =	1.00E-06	conversion factor; kg/mg
N Load	26.00	mg/L of wastewater
44/28	1.57	Ratio of molecular weights for N_2O and N_2
EF effluent	0.005	kg/N_2O/kg N
10^-3 =	1.00E-03	conversion factor: MTons/kg

	2018	**2040**	**2020**	**Current GP**
	MTons		**MTons**	
N_2O	0.01	0.01	0	0.00
CO_2e =	3	4	0	0

Source: California Air Resources Board (CARB). 2010, May. Local Government Operations Protocol (LGOP), Version 1.1. The LGOP protocol provides default values for all the terms except the Nitrogen Load, which is assumed to be 26 mg of N per Liter of wastewater effluent based on USEPA methodology outlined in the CalEEMod program manual. California Air Pollution Control Officers Association (CAPCOA). 2017. California Emissions Estimator Model (CalEEMod), Version 2016.3.2. Appendix A. USEPA 2013. California Statewide average. USEPA Database at http://cfpub.epa.gov/dmr/ez_search.cfm.

Total Fugitive Emissions - Process Emissions from WWTP with Nitrification/Denitrification

	2018	**2040**		
CO_2e =	4	4	0	0

Wastewater Modeling assumes 0% septic treatment for years 2018 and 2040.

Water and Wastewater

Energy for Water Conveyance, Treatment, Distribution, and Wastewater Treatment (Southern California)

Water Supply and Conveyance	Water Treatment	Water Distribution	Total Water	Wastewater Treatment (Tertiary)
	kWhr/million gallons			
9,727	111	1,272	11,110	1,911

Source: California Energy Commission (CEC). 2006, December. Refining Estimates of Water-Related Energy Use in California. CEC-500-2006-118. Prepared by Navigant Consulting, Inc. Based on the electricity use for Southern California.

SCE

	WCI -WECC Region Intensity factor			CO_2e
	CO_2 MTons/MWH[1,2]	CH_4 MTons/MWH[3]	N_2O MTons/MWH[3]	MTons/MWh
2016	0.229	0.000015	0.000002	0.230

[1] Southern California Edison. 2019. 2018 Sustainability Report. https://www.edison.com/content/dam/eix/documents/sustainability/eix-2018-sustainability-report.pdf.

[2] Based on SCE 2018 reported CO_2e intensity factor of 507 lbs/MWh subtracted by the CH_4 intensity factor of 0.033 lb/MWh and the N_20 intensity factor of 0.004 lb/MWh utilizing the IPCC Fourth Assessment Report global warming potentials of 25 and 298, respectively, to avoid double counting. Per methodology utilized in CalEEMod. Version 2016.3.2, User's Guide, however N2O and CH4 intensity factors based on US EPA eGRID2016 data.

[3] United State Environmental Protection Agency. 2018, February 15. eGRID2016 Total Output Emission Rates, WECC California Region. (CH_4 = 0.033 lbs/MWh & N_2O = 0.0004 lbs/MWh)

GHG Emissions from Energy Associated with Water/Wastewater

Energy Associated with Water Use	2018	2040
	MwH/Year	
Water	112,348	136,545
Wastewater	12,975	15,806
Total Water/Wastewater	125,323	152,351

Wastewater Modeling assumes 0% septic treatment for years 2018 and 2040.

GHG Emissions from Energy Associated with Water Use/Wastewater Generation	2018	2040
	$MTCO_2e$/Year	
Water	25,817	29,320
Wastewater	2,982	3,394
Total Water/Wastewater	28,798	32,715

Total GHGs

GHG Emissions from Water/Wastewater Use	2018	2040
	$MTCO_2e$/Year	
Water	25,817	29,320
Wastewater	2,985	3,398
Total Water/Wastewater	28,802	32,719

General Conversion Factors

lbs to kg	0.4536
kg to MTons	0.001
Mmbtu to Therm	0.1
Therms to kwh	29.30711111
kilowatt hrs to megawatt hrs	0.001
lbs to Tons	2000
Tons to MTon	0.9071847

Source: California Air Resources Board (CARB). 2010. Local Government Operations Protocol. Version 1.1. Appendix F, Standard Conversion Factors

General Conversion Factors

	Global Warming Potentials (GWP)
CO_2	1
CH_4	28
N_2O	265

Source: Intergovernmental Panel on Climate Change (IPCC). 2013. Fifth Assessment Report: Climate Change 2013. New York: Cambridge University Press.

gallons to Liters	3.785
killowatt hrs to megawatt hrs	0.001
gallons to AF	325851.4290

Solid Waste Disposal - City of Corona Emissions

Source: CalRecycle Disposal By Facility - City of Corona (Disposal Reporting System)

Waste Generated Within City Limits

Year	Interstate Tons + Transform Tons	ADC+AIC	Total
2015	195,052	104	
2016	204,319	147	
2017	243,314	107	
Three-Year Average	214,228	119	214,348
Disposal Rate / SP	0.906	0.001	0.907
2018 (City)	***214,228***	***119***	***214,348***
2018 (SOI)	***37,717***	***21***	***37,738***
2018 Total	**251,946**	**140**	**252,086**
Year 2040 Buildout - City	***243,364***	***136***	***243,500***
Year 2040 Buildout - SOI	***72,444***	***40***	***72,485***
Year 2040 - Buildout Total	**315,809**	**176**	**315,985**
Increase from 2018	63,863	36	63,899

Average 3-year disposal used to forecast waste disposal in 2040

Source: CalRecycle, 2016, Disposal Reporting System, Jurisdiction Reporting by Facility, https://www2.calrecycle.ca.gov/LGCentral/DisposalReporting/Destination/DisposalByFacility

Landfill Emission Tool (version 1.3) Model Results using the Methane Commitment Method (~50 years of decomposition)

	MT CH_4 in CO_2e	MTCO_2e w/LFG Capture		MTCO_2e w/LFG Capture	
Year	2018 Disposal	2018 Disposal	2018 Disposal (AR5 GWPs)*	2040 Disposal	2040 Disposal (AR5 GWPs)*
1	1,834	459	611	521	695
2	3,620	905	1,207	1,028	1,371
3	3,548	887	1,183	1,008	1,344
4	3,478	869	1,159	988	1,317
5	3,409	852	1,136	968	1,291
6	3,342	835	1,114	949	1,265
7	3,275	819	1,092	930	1,240
8	3,211	803	1,070	912	1,216
9	3,147	787	1,049	894	1,192
10	3,085	771	1,028	876	1,168
11	3,024	756	1,008	859	1,145
12	2,964	741	988	842	1,122
13	2,905	726	968	825	1,100
14	2,828	707	943	803	1,071
15	2,763	691	921	785	1,046
16	2,699	675	900	766	1,022
17	2,634	658	878	748	997
18	2,569	642	856	729	973
19	2,504	626	835	711	948
20	2,439	610	813	693	923
21	2,374	593	791	674	899
22	2,309	577	770	656	874
23	2,244	561	748	637	850
24	2,179	545	726	619	825
25	2,114	528	705	600	800
26	2,049	512	683	582	776
27	1,984	496	661	563	751
28	1,919	480	640	545	727
29	1,854	464	618	527	702
30	1,789	447	596	508	678
31	1,724	431	575	490	653
32	1,659	415	553	471	628
33	1,594	399	531	453	604
34	1,529	382	510	434	579
35	1,464	366	488	416	555
36	1,400	350	467	397	530
37	1,335	334	445	379	505
38	1,270	317	423	361	481
39	1,205	301	402	342	456
40	1,140	285	380	324	432
41	1,075	269	358	305	407
42	1,010	252	337	287	382
43	945	236	315	268	358
44	880	220	293	250	333
45	815	204	272	231	309
46	750	188	250	213	284
47	685	171	228	195	259
48	620	155	207	176	235
49	555	139	185	158	210
50	490	123	163	139	186
51	425	106	142	121	161
52	360	90	120	102	136
53	295	74	98	84	112
54	230	58	77	65	87
55	166	41	55	47	63
56	101	25	34	29	38
57	36	9	12	10	13
TOTAL	**103,849**	**25,962**	**34,616**	**29,493**	**39,324**

*Landfill Emissions Tool Version 1.3 is based on the IPCC Second Assessment Report global warming potential. The numbers in this column are the CO_2e emissions from CH_4 based on IPCC's Fourth Assessment GWPs.

Conversion

SAR GWP CH4:*	21
AR5 GWP CH4:**	28

*Intergovernmental Panel on Climate Change (IPCC). 1995. Second Assessment Report: Climate Change 1995.

**Intergovernmental Panel on Climate Change (IPCC). 2013. Fifth Assessment Report: Climate Change 2013.

Waste. Landfill Emissions Tool Version 1.3 and CalRecycle. Biogenic CO_2 emissions are not included.
Notes

LFG capture Efficiency 0.75
Waste generation based on three year average (2015-2017) waste commitment for the City of Corona obtained from CalRecycle. This sector captures only the waste that is generated by the City of Corona residents in the inventory year. This sector does not include historically generated waste disposal.

This method assumes that the degradable organic component (degradable organic carbon, DOC) in waste decays slowly throughout a few decades, during which CH_4 and biogenic CO_2 are formed. If conditions are constant, the rate of CH_4 production depends solely on the amount of carbon remaining in the waste. As a result emissions of CH_4 from waste deposited in a disposal site are highest in the first few years after deposition, then gradually decline as the degradable carbon in the waste is consumed by the bacteria responsible for the decay. Significant CH_4 production typically begins one or two years after waste disposal in a landfill and continues for 10 to 60 years or longer.
Decomposition based on an average annual rainfall of 12.71 inches per year average in Corona (anaerobic decomposition factor (k) of 0.020) (Western Regional Climate Center. 2018. https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca2031).

The Landfill Gas Estimator only includes the landfill gas (LFG) capture in the landfill gas heat output and therefore the reduction and emissions from landfill gas capture are calculated separately. Assumes 75 percent of fugitive GHG emissions are captured within the landfill's Landfill Gas Capture System with a landfill gas capture efficiency of 75%. The Landfill gas capture efficiency is based on the California Air Resources Board's (CARB) Local Government Operations Protocol (LGOP), Version 1.1.
Biogenic CO_2 emissions are not included.

Solid Waste Disposal - Sphere of Influence Emissions

Source: CalRecycle Disposal By Facility - City of Corona (Disposal Reporting System)

Waste Generated Within City Limits

Year	Interstate Tons + Transform Tons	ADC+AIC	Total
2015	195,052	104	
2016	204,319	147	
2017	243,314	107	
Three-Year Average	214,228	119	214,348
Disposal Rate / SP	0.906	0.001	0.907
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2018 Total	**251,946**	**140**	**252,086**
Year 2040 Buildout - City	***243,364***	***136***	***243,500***
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Year 2040 - Buildout Total	**315,809**	**176**	**315,985**
Increase from 2018	63,863	36	63,899

Average 3-year disposal used to forecast waste disposal in 2040

Source: CalRecycle, 2016, Disposal Reporting System, Jurisdiction Reporting by Facility, https://www2.calrecycle.ca.gov/LGCentral/DisposalReporting/Destination/DisposalByFacility

Landfill Emission Tool (version 1.3) Model Results using the Methane Commitment Method (~50 years of decomposition)

	MT CH_4 in CO_2e	$MTCO_2e$ w/LFG Capture		$MTCO_2e$ w/LFG Capture	
Year	2018 Disposal	2018 Disposal	2018 Disposal (AR5 GWPs)*	2040 Disposal	2040 Disposal (AR5 GWPs)*
1	323	81	108	92	122
2	637	159	212	181	241
3	625	156	208	177	237
4	612	153	204	174	232
5	600	150	200	170	227
6	588	147	196	167	223
7	577	144	192	164	218
8	565	141	188	161	214
9	554	139	185	157	210
10	543	136	181	154	206
11	532	133	177	151	202
12	522	130	174	148	198
13	511	128	170	145	194
14	498	124	166	141	189
15	487	122	162	138	184
16	475	119	158	135	180
17	464	116	155	132	176
18	452	113	151	128	171
19	441	110	147	125	167
20	429	107	143	122	163
21	418	104	139	119	158
22	406	102	135	115	154
23	395	99	132	112	150
24	384	96	128	109	145
25	372	93	124	106	141
26	361	90	120	102	137
27	349	87	116	99	132
28	338	84	113	96	128
29	326	82	109	93	124
30	315	79	105	89	119
31	304	76	101	86	115
32	292	73	97	83	111
33	281	70	94	80	106
34	269	67	90	76	102
35	258	64	86	73	98
36	246	62	82	70	93
37	235	59	78	67	89
38	224	56	75	63	85

39	212	53	71	60	80
40	201	50	67	57	76
41	189	47	63	54	72
42	178	44	59	50	67
43	166	42	55	47	63
44	155	39	52	44	59
45	143	36	48	41	54
46	132	33	44	38	50
47	121	30	40	34	46
48	109	27	36	31	41
49	98	24	33	28	37
50	86	22	29	25	33
51	75	19	25	21	28
52	63	16	21	18	24
53	52	13	17	15	20
54	41	10	14	12	15
55	29	7	10	8	11
56	18	4	6	5	7
57	6	2	2	2	2
TOTAL	**18,284**	**4,571**	**6,095**	**5,193**	**6,924**

*Landfill Emissions Tool Version 1.3 is based on the IPCC Second Assessment Report global warming potential. The numbers in this column are the CO_2e emissions from CH_4 based on IPCC's Fourth Assessment GWPs.

Conversion

SAR GWP CH4:*	21
AR5 GWP CH4:**	28

*Intergovernmental Panel on Climate Change (IPCC). 1995. Second Assessment Report: Climate Change 1995.

**Intergovernmental Panel on Climate Change (IPCC). 2013. Fifth Assessment Report: Climate Change 2013.

Waste. Landfill Emissions Tool Version 1.3 and CalRecycle. Biogenic CO_2 emissions are not included.
Notes

LFG capture Efficiency 0.75

Waste generation based on three year average (2015-2017) waste commitment for the City of Corona obtained from CalRecycle. This sector captures only the waste that is generated by the City of Corona residents in the inventory year. This sector does not include historically generated waste disposal.

This method assumes that the degradable organic component (degradable organic carbon, DOC) in waste decays slowly throughout a few decades, during which CH_4 and biogenic CO_2 are formed. If conditions are constant, the rate of CH_4 production depends solely on the amount of carbon remaining in the waste. As a result emissions of CH_4 from waste deposited in a disposal site are highest in the first few years after deposition, then gradually decline as the degradable carbon in the waste is consumed by the bacteria responsible for the decay. Significant CH_4 production typically begins one or two years after waste disposal in a landfill and continues for 10 to 60 years or longer.

Decomposition based on an average annual rainfall of 12.71 inches per year average in Corona (anaerobic decomposition factor (k) of 0.020) (Western Regional Climate Center. 2018. https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca2031).

The Landfill Gas Estimator only includes the landfill gas (LFG) capture in the landfill gas heat output and therefore the reduction and emissions from landfill gas capture are calculated separately. Assumes 75 percent of fugitive GHG emissions are captured within the landfill's Landfill Gas Capture System with a landfill gas capture efficiency of 75%. The Landfill gas capture efficiency is based on the California Air Resources Board's (CARB) Local Government Operations Protocol (LGOP), Version 1.1.
Biogenic CO_2 emissions are not included.

Electricity and Natural Gas Use Consumption for City of Corona+SOI

Southern California Edison Electricity Use

Annual KWH

	2012	2013	2014	2015	2016	Average 2012-2016 Annual KWH
Residential	368,272,473	353,194,073	362,030,964	361,774,382	350,354,664	359,125,311
Commercial + Industrial	645,928,560	651,546,315	643,075,398	653,622,893	638,381,587	646,510,951

Corona Department of Water and Power Electricity Use

Annual KWH

	2012	2013	2014	2015	2016	Average 2012-2016 Annual KWH
Residential	9,905,280	9,555,189	11,766,020	13,971,357	17,528,643	12,545,298
Commercial + Industrial	176,333,012	173,803,849	174,574,777	175,049,670	175,557,572	175,063,776
City	87,233,754	82,125,347	87,199,281	85,997,356	84,118,289	85,334,805

SoCal Gas Natural Gas Use

Annual Therms

	2012	2013	2014	2015	2016	Average 2012-2016 Annual Therms
Residential	16,650,661	17,869,684	14,168,455	14,823,014	15,559,287	15,814,220
Commercial + Industrial	16,373,445	17,424,533	19,287,544	19,459,801	21,015,979	18,712,260

Sphere of Influence (SOI) and Planning Area Outside City and SOI

Area	Population	Employment
City	165,366	70,972
SOI	37,264	4,346

*Electricity**

Residential Annual KWH/Resident:	2,248	kWH/resident
Non-Residential Annual KWH/Employee:	11,576	kWH/employee

** Annual use divided by residents/employees within the City of Corona boundaries.*

Area	Residential Annual kWH	Commercial + Industrial Annual kWH
SOI	83,753,212	50,309,471

*Natural Gas**

Residential Annual Therms/Resident:	96	kWH/resident
Non-Residential Annual Therms/Employee:	264	kWH/employee

** Annual use divided by residents/employees within the City of Corona boundaries.*

Area	Residential Annual Therms	Commercial + Industrial Annual Therms
SOI	3,563,617	1,145,853

Disclaimer. The 15/15 Rule is intended to protect customer confidentiality by reducing the possibility of identifying customers through the release of usage information. The utilities apply the 15/15 Rule in releasing aggregated customer information. The rule was initially implemented by the California Public Utilities Commission during Direct Access proceedings in 1997 and was adopted through D. 97-10-031. The 15/15 rule requires that any aggregated information provided by the Utilities must be made up of at least 15 customers, and a customer's load must be less than 15% of an assigned category. If the number of customers in the compiled data is below 15, or if a single customer's load is more than 15% of the total data, categories (e.g., rate classes) must be combined before the information is released. The rule further requires that if the 15/15 rule is triggered for a second time after the data has been screened once already using the 15/15 rule, then the customer is dropped from the information provided.

Energy

Natural Gas Emission Factors

Natural Gas	Intensity factor			CO_2e
	$MTCO_2$/Therm	CH_4 MT/Therm	N_2O MT/Therm	MT/Therm
All Years	0.005302	5.E-07	1.E-08	**0.00532**

Source: CO_2, CH_4 and N_2O intensity based on Table G.3 of the LGOP for residential and non-residential (CO_2, 53.02 kg/Mmbtu; CH_4: 0.005 kg/MMBtu; N_2O: 0.0001 kg/MMBtu)

SCE

	WCI -WECC Region Intensity factor			CO_2e
	CO_2 MTons/MWH[1,2]	CH_4 MTons/MWH[3]	N_2O MTons/MWH[3]	MTons/MWh
2018	0.229	0.000015	0.000002	0.230

[1] Southern California Edison. 2019. 2018 Sustainability Report. https://www.edison.com/content/dam/eix/documents/sustainability/eix-2018-sustainability-report.pdf.

[2] Based on SCE 2018 reported CO_2e intensity factor of 507 lbs/MWh subtracted by the CH_4 intensity factor of 0.033 lb/MWh and the N_20 intensity factor of 0.004 lb/MWh utilizing the IPCC Fourth Assessment Report global warming potentials of 25 and 298, respectively, to avoid double counting. Per methodology utilized in CalEEMod. Version 2016.3.2, User's Guide, however N2O and CH4 intensity factors based on US EPA eGRID2016 data.

[3] United State Environmental Protection Agency. 2018, February 15. eGRID2016 Total Output Emission Rates, WECC California Region. (CH_4 = 0.033 lbs/MWh & N_2O = 0.0004 lbs/MWh)

GHG Emissions from Energy Use

		Proposed Project
	2018	2040
Electricity	**$MTCO_2e$/Year**	
Residential Electricity - City	85,408	95,076
Residential Electricity - SOI	19,246	28,380
Commercial + Industrial - City	188,793	224,500
Commercial + Industrial - SOI	19,246	28,380
Municipal	19,609	22,276
Total	332,303	398,612

		Proposed Project
	2018	2040
Natural Gas		
Residential Electricity - City	103,064	114,731
Residential Electricity - SOI	18,954	27,949
Commercial + Industrial - City	105,618	125,594
Commercial + Industrial - SOI	6,094	30,961
Total	233,730	299,235

		Proposed Project
Summary	2018	2040
Residential Total - City	188,472	209,807
Residential Total - SOI	38,200	56,328
Commercial Total - City	294,412	350,094
Commercial Total - SOI	25,340	59,341
Municipal	19,609	22,276
Total	566,033	697,847

General Conversion Factors

lbs to kg	0.4536
kg to MTons	0.001
Mmbtu to Therm	0.1
Therms to kwh	29.30711111
kilowatt hrs to megawatt hrs	0.001
lbs to Tons	2000
Tons to MTon	0.9071847

Source: California Air Resources Board (CARB). 2010. Local Government Operations Protocol. Version 1.1. Appendix F, Standard Conversion Factors

	Global Warming Potentials (GWP)
CO_2	1
CH_4	28
N_2O	265

Source: Intergovernmental Panel on Climate Change (IPCC). 2013. Fifth Assessment Report: Climate Change 2013. New York: Cambridge University Press.

Criteria Air Pollutants from Natural Gas

Rate	lbs/MBTU					
Natural Gas	**ROG**	**NO_x**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Residential	0.01078431	0.09215686	0.03921569	0.00058824	0.00745098	0.00745098
Non-Residential	0.01078431	0.09803922	0.08235294	0.00058824	0.00745098	0.00745098
Source: CalEEMod Version 2016.3.2						

Natural Gas	**2018 lbs/day**					
	ROG	**NO_x**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Residential	68	579	246	4	47	47
Nonresidential	62	564	474	3	43	43
Total	130	1143	720	7	90	90

Natural Gas	**Project 2040 lbs/day**					
	ROG	**NO_x**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Residential	79	677	288	4	55	55
Nonresidential	87	791	664	5	60	60
Total	166	1468	952	9	115	115
Increase from Baseline	36	325	232	2	25	25

General Conversion Factors	
Mmbtu to Therm	0.1
lbs to Tons	2000
Tons to MTon	0.9071847

Source: California Air Resources Board (CARB). 2010. Local Government Operations Protocol. Version 1.1. Appendix F, Standard Conversion Factors

City of Corona & SOI — TRANSPORTATION SECTOR

CRITERIA AIR POLLUTANTS

	lbs/day					
	ROG	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**
Year 2018						
City	362	3,653	9,635	32	478	228
SOI	60	608	1,639	5	80	38
Total	**422**	**4,261**	**11,274**	**37**	**558**	**266**
Year 2040						
City	97	1,145	4,298	24	498	207
SOI	28	329	1,235	7	143	59
Total	**125**	**1,474**	**5,533**	**31**	**641**	**266**
Baseline in 2040						
City	82	968	3,634	20	421	175
SOI	14	161	604	3	70	29
Total	**96**	**1,129**	**4,239**	**23**	**491**	**204**

Source: EMFAC2017, Version 1.0.2.

GHG EMISSIONS

	MTons/year			
	N_2O	**CO_2**	**CH_4**	**CO_2e**
Year 2018				
City	30	521,522	10	529,756
SOI	5	86,724	2	88,093
Total	**35**	**608,246**	**11**	**617,849**
Year 2040				
City	19	358,761	10	364,027
SOI	3	54,192	1	54,987
Total	**22**	**412,953**	**11**	**419,014**

Source: EMFAC2017, Version 1.0.2

Note: MTons = metric tons; CO_2e = carbon dioxide-equivalent.

Source: EMFAC2017 v1.0.2 Web Database, https://www.arb.ca.gov/emfac/2017/. Based on the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5) Global Warming Potentials (GWPs)

Note: MTons = metric tons; CO_2e = carbon dioxide-equivalent. Includes Pavley + California Advanced Clean Car Standards, the Low Carbon Fuel Standard (LCFS), on-road diesel fleet rules, and the Smartway/Phase I Heavy Duty Vehicle Greenhouse Gas Regulation.

Scenario	Area	Raw Model VMT					Raw Model LU			Conversion Factors					Actual General Plan LU			Final VMT for GHG Calcs				
		I-I	I-X	X-I	Total	Total with RTAC VMT (50% ixxi)	Population	Emp	Service Pop	*I-I /SP*	*I-X /SP*	*X-I /SP*	*Total/SP*	*Total with RTAC VMT (50% ixxi)/SP*	Populatior	Emp	Service Pop	I-I	I-X	X-I	Total	Total with RTAC VMT (50% ixxi)
Corona Base Year	**City**	485,575	3,811,887	3,873,861	8,171,323	4,328,449	202,661	78,797	281,458	*1.73*	*13.54*	*13.76*	*29.03*	*15.38*	165,366	70,972	236,338	407,734	3,200,810	3,252,849	6,861,393	3,634,563
	SOI	26,557	728,528	754,717	1,509,802	768,179	47,068	5,818	52,886	*0.50*	*13.78*	*14.27*	*28.55*	*14.53*	37,264	4,346	41,610	20,895	573,196	593,801	1,187,892	604,393
	Total	512,132	4,540,415	4,628,577	9,681,125	5,096,628	249,729	84,615	334,344	*1.53*	*13.58*	*13.84*	*28.96*	*15.24*	202,630	75,318	277,948	425,747	3,774,553	3,847,845	8,048,146	4,236,947
Corona Future Year 2040	**City**	626,455	5,297,313	5,305,994	11,229,761	5,928,108	243,136	127,092	370,227	*1.69*	*14.31*	*14.33*	*30.33*	*16.01*	184,055	84,395	268,450	454,239	3,841,054	3,847,349	8,142,642	4,298,441
	SOI	36,173	1,102,917	1,135,415	2,274,505	1,155,339	62,674	12,081	74,755	*0.48*	*14.75*	*15.19*	*30.43*	*15.45*	57,842	22,079	79,921	38,672	1,179,131	1,213,875	2,431,679	1,235,176
	Total	662,628	6,400,230	6,441,408	13,504,266	7,083,447	305,810	139,173	444,983	*1.49*	*14.38*	*14.48*	*30.35*	*15.92*	241,897	106,474	348,371	518,763	5,010,655	5,042,893	10,572,311	5,545,537

Source *: Fehr & Peers*

Year 2018 Existing: Criteria Air Pollutants

Based on EMFAC2017, Version 1.0.2., Riverside County - South Coast Air Basin

	VMT Per Trip Type			
Plan Area	I-I	I-X	X-I	Total
City	407,734	1,600,405	1,626,425	3,634,563
SOI	20,895	286,598	296,901	604,393
TOTAL	428,628	1,887,003	1,923,325	4,238,957

[1.] Based on VMT data provided Fehr & Peers.

Emission year

		Year 2018		lbs/day					
Vehicle Type	Fuel Type	Speed	Percent of VMT of SpeedBin	ROG	NOx	CO	SOx	PM10	PM2.5
City of Corona									
All Other Buses	DSL	Aggregated	0.02%	0.64	11.26	1.94	0.02	0.67	0.50
LDA	GAS	Aggregated	52.79%	69.03	262.68	3,775.53	12.04	195.34	80.65
LDA	DSL	Aggregated	0.44%	0.68	5.03	7.94	0.07	1.96	1.00
LDA	ELEC	Aggregated	0.30%	0.00	0.00	0.00	0.00	1.07	0.42
LDT1	GAS	Aggregated	5.02%	22.71	89.37	930.00	1.35	19.12	8.17
LDT1	DSL	Aggregated	0.00%	0.04	0.24	0.25	0.00	0.04	0.03
LDT1	ELEC	Aggregated	0.00%	0.00	0.00	0.00	0.00	0.01	0.01
LDT2	GAS	Aggregated	16.30%	35.21	176.14	1,693.69	4.81	60.49	25.05
LDT2	DSL	Aggregated	0.07%	0.12	0.50	0.74	0.01	0.30	0.15
LDT2	ELEC	Aggregated	0.03%	0.00	0.00	0.00	0.00	0.13	0.05
LHD1	GAS	Aggregated	1.34%	5.04	33.87	136.86	0.86	9.23	3.86
LHD1	DSL	Aggregated	1.38%	12.05	433.46	82.48	0.52	12.48	6.55
LHD2	GAS	Aggregated	0.19%	0.42	3.99	11.42	0.14	1.46	0.61
LHD2	DSL	Aggregated	0.52%	3.81	130.91	25.78	0.22	5.15	2.59
MCY	GAS	Aggregated	0.47%	83.80	43.04	775.73	0.08	0.65	0.28
MDV	GAS	Aggregated	14.41%	43.43	199.97	1,790.80	5.19	53.47	22.15
MDV	DSL	Aggregated	0.26%	0.28	2.04	4.02	0.08	1.06	0.50
MDV	ELEC	Aggregated	0.00%	0.00	0.00	0.00	0.00	0.02	0.01
MH	GAS	Aggregated	0.12%	0.79	5.38	25.97	0.16	1.36	0.57
MH	DSL	Aggregated	0.04%	0.26	17.12	1.28	0.03	1.06	0.74
Motor Coach	DSL	Aggregated	0.01%	0.25	5.81	0.96	0.01	0.28	0.19
OBUS	GAS	Aggregated	0.04%	0.30	2.50	8.31	0.06	0.48	0.20
PTO	DSL	Aggregated	0.08%	3.38	53.58	11.58	0.13	1.12	1.07
SBUS	GAS	Aggregated	0.03%	0.19	1.03	4.36	0.02	2.06	0.88
SBUS	DSL	Aggregated	0.06%	0.68	38.80	1.80	0.06	3.84	1.77
T6 Ag	DSL	Aggregated	0.00%	0.01	0.21	0.03	0.00	0.01	0.01
T6 CAIRP heavy	DSL	Aggregated	0.02%	0.08	2.71	0.34	0.01	0.29	0.16
T6 CAIRP small	DSL	Aggregated	0.00%	0.02	0.48	0.08	0.00	0.05	0.03
T6 instate construction heavy	DSL	Aggregated	0.10%	1.78	38.51	5.81	0.08	2.38	1.65
T6 instate construction small	DSL	Aggregated	0.16%	2.42	47.23	9.09	0.12	3.70	2.57
T6 instate heavy	DSL	Aggregated	0.53%	9.45	205.05	30.74	0.39	12.56	8.71
T6 instate small	DSL	Aggregated	0.82%	13.39	253.62	51.16	0.62	20.26	14.29
T6 OOS heavy	DSL	Aggregated	0.01%	0.05	1.51	0.20	0.01	0.17	0.09
T6 OOS small	DSL	Aggregated	0.00%	0.01	0.28	0.05	0.00	0.03	0.02
T6 Public	DSL	Aggregated	0.03%	0.12	17.08	0.35	0.02	0.39	0.21
T6 utility	DSL	Aggregated	0.01%	0.01	0.94	0.04	0.00	0.08	0.04
T6TS	GAS	Aggregated	0.12%	1.12	8.22	31.59	0.16	1.36	0.57
T7 Ag	DSL	Aggregated	0.00%	0.03	0.48	0.10	0.00	0.01	0.01
T7 CAIRP	DSL	Aggregated	0.64%	4.76	183.03	19.77	0.67	8.21	4.86
T7 CAIRP construction	DSL	Aggregated	0.07%	0.53	20.24	2.20	0.08	0.92	0.54
T7 NNOOS	DSL	Aggregated	0.78%	5.83	184.74	26.35	0.78	10.57	6.47
T7 NOOS	DSL	Aggregated	0.25%	1.88	71.86	7.80	0.26	3.23	1.92
T7 POLA	DSL	Aggregated	0.57%	5.03	228.41	15.11	0.67	6.33	3.41
T7 Public	DSL	Aggregated	0.04%	0.25	35.74	1.03	0.05	0.51	0.31
T7 Single	DSL	Aggregated	0.43%	6.45	172.22	26.68	0.46	8.03	5.70
T7 single construction	DSL	Aggregated	0.18%	3.85	98.55	15.34	0.20	4.02	3.02
T7 SWCV	DSL	Aggregated	0.01%	0.00	16.52	0.02	0.04	0.10	0.04
T7 SWCV	NG	Aggregated	0.01%	0.48	4.55	13.41	0.00	0.11	0.05
T7 tractor	DSL	Aggregated	1.00%	17.75	465.26	68.24	1.09	18.25	12.80
T7 tractor construction	DSL	Aggregated	0.15%	3.09	75.55	11.82	0.17	2.95	2.14
T7 utility	DSL	Aggregated	0.01%	0.02	1.82	0.07	0.01	0.05	0.02
T7IS	GAS	Aggregated	0.00%	0.11	0.73	4.68	0.00	0.01	0.00
UBUS	GAS	Aggregated	0.05%	0.05	0.81	0.98	0.06	0.50	0.21
UBUS	DSL	Aggregated	0.00%	0.00	0.01	0.00	0.00	0.00	0.00
UBUS	ELEC	Aggregated	0.00%	0.00	0.00	0.00	0.00	0.00	0.00
UBUS	NG	Aggregated	0.06%	0.00	0.00	0.00	0.00	0.00	0.00
		100.0000000%	**TOTAL**	**361.69**	**3,653.10**	**9,634.52**	**31.79**	**477.93**	**227.86**

SOI									
All Other Buses	DSL	Aggregated	0.0224%	0.11	1.87	0.32	0.00	0.11	0.08
LDA	GAS	Aggregated	52.7884%	11.48	43.68	627.83	2.00	32.48	13.41
LDA	DSL	Aggregated	0.4360%	0.11	0.84	1.32	0.01	0.33	0.17
LDA	ELEC	Aggregated	0.2987%	0.00	0.00	0.00	0.00	0.18	0.07
LDT1	GAS	Aggregated	5.0177%	3.78	14.86	154.65	0.22	3.18	1.36
LDT1	DSL	Aggregated	0.0021%	0.01	0.04	0.04	0.00	0.01	0.01
LDT1	ELEC	Aggregated	0.0036%	0.00	0.00	0.00	0.00	0.00	0.00
LDT2	GAS	Aggregated	16.3043%	5.85	29.29	281.64	0.80	10.06	4.17
LDT2	DSL	Aggregated	0.0662%	0.02	0.08	0.12	0.00	0.05	0.03
LDT2	ELEC	Aggregated	0.0349%	0.00	0.00	0.00	0.00	0.02	0.01
LHD1	GAS	Aggregated	1.3444%	0.84	5.63	22.76	0.14	1.53	0.64
LHD1	DSL	Aggregated	1.3775%	2.00	72.08	13.72	0.09	2.08	1.09
LHD2	GAS	Aggregated	0.1860%	0.07	0.66	1.90	0.02	0.24	0.10
LHD2	DSL	Aggregated	0.5241%	0.63	21.77	4.29	0.04	0.86	0.43
MCY	GAS	Aggregated	0.4705%	13.94	7.16	129.00	0.01	0.11	0.05
MDV	GAS	Aggregated	14.4072%	7.22	33.25	297.79	0.86	8.89	3.68
MDV	DSL	Aggregated	0.2558%	0.05	0.34	0.67	0.01	0.18	0.08
MDV	ELEC	Aggregated	0.0049%	0.00	0.00	0.00	0.00	0.00	0.00
MH	GAS	Aggregated	0.1178%	0.13	0.90	4.32	0.03	0.23	0.09
MH	DSL	Aggregated	0.0435%	0.04	2.85	0.21	0.01	0.18	0.12
Motor Coach	DSL	Aggregated	0.0125%	0.04	0.97	0.16	0.00	0.05	0.03
OBUS	GAS	Aggregated	0.0420%	0.05	0.42	1.38	0.01	0.08	0.03
PTO	DSL	Aggregated	0.0847%	0.56	8.91	1.93	0.02	0.19	0.18
SBUS	GAS	Aggregated	0.0342%	0.03	0.17	0.72	0.00	0.34	0.15
SBUS	DSL	Aggregated	0.0592%	0.11	6.45	0.30	0.01	0.64	0.29
T6 Ag	DSL	Aggregated	0.0003%	0.00	0.04	0.01	0.00	0.00	0.00
T6 CAIRP heavy	DSL	Aggregated	0.0197%	0.01	0.45	0.06	0.00	0.05	0.03
T6 CAIRP small	DSL	Aggregated	0.0027%	0.00	0.08	0.01	0.00	0.01	0.01
T6 instate construction heavy	DSL	Aggregated	0.1002%	0.30	6.40	0.97	0.01	0.40	0.28
T6 instate construction small	DSL	Aggregated	0.1564%	0.40	7.85	1.51	0.02	0.62	0.43
T6 instate heavy	DSL	Aggregated	0.5340%	1.57	34.10	5.11	0.06	2.09	1.45
T6 instate small	DSL	Aggregated	0.8236%	2.23	42.17	8.51	0.10	3.37	2.38
T6 OOS heavy	DSL	Aggregated	0.0112%	0.01	0.25	0.03	0.00	0.03	0.02
T6 OOS small	DSL	Aggregated	0.0016%	0.00	0.05	0.01	0.00	0.00	0.00
T6 Public	DSL	Aggregated	0.0258%	0.02	2.84	0.06	0.00	0.06	0.04
T6 utility	DSL	Aggregated	0.0064%	0.00	0.16	0.01	0.00	0.01	0.01
T6TS	GAS	Aggregated	0.1184%	0.19	1.37	5.25	0.03	0.23	0.09
T7 Ag	DSL	Aggregated	0.0004%	0.00	0.08	0.02	0.00	0.00	0.00
T7 CAIRP	DSL	Aggregated	0.6427%	0.79	30.44	3.29	0.11	1.36	0.81
T7 CAIRP construction	DSL	Aggregated	0.0720%	0.09	3.37	0.37	0.01	0.15	0.09
T7 NNOOS	DSL	Aggregated	0.7835%	0.97	30.72	4.38	0.13	1.76	1.08
T7 NOOS	DSL	Aggregated	0.2525%	0.31	11.95	1.30	0.04	0.54	0.32
T7 POLA	DSL	Aggregated	0.5676%	0.84	37.98	2.51	0.11	1.05	0.57
T7 Public	DSL	Aggregated	0.0397%	0.04	5.94	0.17	0.01	0.09	0.05
T7 Single	DSL	Aggregated	0.4264%	1.07	28.64	4.44	0.08	1.33	0.95
T7 single construction	DSL	Aggregated	0.1785%	0.64	16.39	2.55	0.03	0.67	0.50
T7 SWCV	DSL	Aggregated	0.0104%	0.00	2.75	0.00	0.01	0.02	0.01
T7 SWCV	NG	Aggregated	0.0130%	0.08	0.76	2.23	0.00	0.02	0.01
T7 tractor	DSL	Aggregated	1.0031%	2.95	77.37	11.35	0.18	3.04	2.13
T7 tractor construction	DSL	Aggregated	0.1473%	0.51	12.56	1.97	0.03	0.49	0.36
T7 utility	DSL	Aggregated	0.0052%	0.00	0.30	0.01	0.00	0.01	0.00
T7IS	GAS	Aggregated	0.0014%	0.02	0.12	0.78	0.00	0.00	0.00
UBUS	GAS	Aggregated	0.0546%	0.01	0.13	0.16	0.01	0.08	0.03
UBUS	DSL	Aggregated	0.0001%	0.00	0.00	0.00	0.00	0.00	0.00
UBUS	ELEC	Aggregated	0.0000%	0.00	0.00	0.00	0.00	0.00	0.00
UBUS	NG	Aggregated	0.0633%	0.07	0.37	36.93	0.00	0.10	0.04
			TOTAL	**60.21**	**607.85**	**1,639.06**	**5.29**	**79.57**	**37.93**

Based on EMFAC2017, Version 1.0.2, emission factors for Riverside County - South Coast Air Basin

Year 2040 Existing: Criteria Air Pollutants

Based on EMFAC2017, Version 1.0.2., Riverside County - South Coast Air Basin

Plan Area	VMT Per Trip Type I-I	I-X	X-I	Total
City	407,734	1,600,405	1,626,425	3,634,563
SOI	20,895	286,598	296,901	604,393
TOTAL	428,628	1,887,003	1,923,325	4,238,957

1. Based on VMT data provided Fehr & Peers.

Emission year

		Year 2040		lbs/day					
Vehicle Type	Fuel Type	Speed	Percent of VMT of SpeedBin	ROG	NOx	CO	SOx	PM10	PM2.5
City of Corona									
All Other Buses	DSL	Aggregated	0.02%	0.01	2.03	0.11	0.01	0.29	0.13
LDA	GAS	Aggregated	53.05%	7.81	72.17	1,642.55	8.15	192.52	77.56
LDA	DSL	Aggregated	0.66%	0.20	0.46	6.50	0.07	2.40	0.98
LDA	ELEC	Aggregated	3.08%	0.00	0.00	0.00	0.00	11.05	4.38
LDT1	GAS	Aggregated	5.37%	1.07	8.51	176.46	0.96	19.51	7.87
LDT1	DSL	Aggregated	0.00%	0.00	0.00	0.01	0.00	0.00	0.00
LDT1	ELEC	Aggregated	0.19%	0.00	0.00	0.00	0.00	0.66	0.26
LDT2	GAS	Aggregated	16.29%	3.80	24.95	598.81	2.88	59.15	23.84
LDT2	DSL	Aggregated	0.17%	0.16	0.36	1.65	0.02	0.65	0.29
LDT2	ELEC	Aggregated	0.46%	0.00	0.00	0.00	0.00	1.66	0.66
LHD1	GAS	Aggregated	0.90%	0.21	2.35	7.75	0.46	6.18	2.58
LHD1	DSL	Aggregated	0.94%	2.39	17.87	12.20	0.27	7.11	3.13
LHD2	GAS	Aggregated	0.14%	0.03	0.40	1.18	0.08	1.09	0.46
LHD2	DSL	Aggregated	0.37%	1.03	10.31	5.41	0.12	3.39	1.58
MCY	GAS	Aggregated	0.34%	54.25	29.73	450.98	0.06	0.48	0.22
MDV	GAS	Aggregated	10.45%	2.85	18.88	396.37	2.26	37.95	15.31
MDV	DSL	Aggregated	0.37%	0.13	0.31	4.11	0.07	1.37	0.56
MDV	ELEC	Aggregated	0.35%	0.00	0.00	0.00	0.00	1.24	0.49
MH	GAS	Aggregated	0.05%	0.03	0.37	0.57	0.05	0.52	0.22
MH	DSL	Aggregated	0.02%	0.07	3.89	0.28	0.01	0.34	0.19
Motor Coach	DSL	Aggregated	0.01%	0.02	1.46	0.14	0.01	0.17	0.08
OBUS	GAS	Aggregated	0.03%	0.03	0.28	0.64	0.03	0.32	0.13
PTO	DSL	Aggregated	0.11%	0.23	40.77	3.61	0.13	0.04	0.04
SBUS	GAS	Aggregated	0.03%	0.02	0.30	0.44	0.02	1.51	0.65
SBUS	DSL	Aggregated	0.07%	0.12	10.79	0.81	0.05	4.17	1.79
T6 Ag	DSL	Aggregated	0.00%	0.00	0.00	0.00	0.00	0.00	0.00
T6 CAIRP heavy	DSL	Aggregated	0.02%	0.01	1.25	0.09	0.01	0.26	0.12
T6 CAIRP small	DSL	Aggregated	0.00%	0.00	0.17	0.01	0.00	0.03	0.02
T6 instate construction heavy	DSL	Aggregated	0.08%	0.05	6.49	0.37	0.04	0.94	0.43
T6 instate construction small	DSL	Aggregated	0.12%	0.06	7.92	0.51	0.06	1.44	0.64
T6 instate heavy	DSL	Aggregated	0.56%	0.32	41.51	2.53	0.29	6.84	3.08
T6 instate small	DSL	Aggregated	0.75%	0.40	50.04	3.23	0.40	9.11	4.07
T6 OOS heavy	DSL	Aggregated	0.01%	0.01	0.69	0.05	0.01	0.14	0.06
T6 OOS small	DSL	Aggregated	0.00%	0.00	0.10	0.01	0.00	0.02	0.01
T6 Public	DSL	Aggregated	0.01%	0.01	1.09	0.06	0.01	0.15	0.07
T6 utility	DSL	Aggregated	0.01%	0.00	0.25	0.02	0.00	0.07	0.03
T6TS	GAS	Aggregated	0.14%	0.09	0.92	1.89	0.14	1.58	0.66
T7 Ag	DSL	Aggregated	0.00%	0.00	0.00	0.00	0.00	0.00	0.00
T7 CAIRP	DSL	Aggregated	0.67%	0.87	86.91	7.68	0.44	6.48	3.09
T7 CAIRP construction	DSL	Aggregated	0.05%	0.07	7.16	0.63	0.04	0.53	0.25
T7 NNOOS	DSL	Aggregated	0.82%	1.00	96.40	8.78	0.54	7.71	3.59
T7 NOOS	DSL	Aggregated	0.26%	0.34	34.21	3.02	0.17	2.55	1.22
T7 POLA	DSL	Aggregated	1.09%	1.51	155.77	13.24	0.80	10.78	5.26
T7 Public	DSL	Aggregated	0.03%	0.05	4.84	0.28	0.02	0.24	0.11
T7 Single	DSL	Aggregated	0.55%	0.63	60.33	5.55	0.44	5.09	2.31
T7 single construction	DSL	Aggregated	0.14%	0.16	15.19	1.37	0.11	1.25	0.57
T7 SWCV	DSL	Aggregated	0.00%	0.00	1.06	0.00	0.00	0.01	0.00
T7 SWCV	NG	Aggregated	0.06%	0.31	2.28	66.20	0.00	0.46	0.17
T7 tractor	DSL	Aggregated	0.97%	1.28	128.67	11.21	0.67	9.43	4.51
T7 tractor construction	DSL	Aggregated	0.11%	0.15	15.73	1.34	0.09	1.10	0.53
T7 utility	DSL	Aggregated	0.00%	0.00	0.40	0.04	0.00	0.04	0.02
T7IS	GAS	Aggregated	0.00%	0.03	0.30	2.69	0.00	0.01	0.00
UBUS	GAS	Aggregated	0.05%	0.04	0.60	0.87	0.04	0.44	0.18
UBUS	DSL	Aggregated	0.00%	0.00	0.00	0.00	0.00	0.00	0.00
UBUS	NG	Aggregated	0.05%	0.36	1.95	192.20	0.00	0.50	0.20
			TOTAL	**82.22**	**968.39**	**3,634.42**	**20.06**	**421.00**	**174.61**

SOI									
All Other Buses	DSL	Aggregated	0.0236%	0.00	0.34	0.02	0.00	0.05	0.02
LDA	GAS	Aggregated	53.0520%	1.30	12.00	273.14	1.36	32.01	12.90
LDA	DSL	Aggregated	0.6576%	0.03	0.08	1.08	0.01	0.40	0.16
LDA	ELEC	Aggregated	3.0823%	0.00	0.00	0.00	0.00	1.84	0.73
LDT1	GAS	Aggregated	5.3686%	0.18	1.41	29.34	0.16	3.24	1.31
LDT1	DSL	Aggregated	0.0007%	0.00	0.00	0.00	0.00	0.00	0.00
LDT1	ELEC	Aggregated	0.1853%	0.00	0.00	0.00	0.00	0.11	0.04
LDT2	GAS	Aggregated	16.2922%	0.63	4.15	99.58	0.48	9.84	3.96
LDT2	DSL	Aggregated	0.1662%	0.03	0.06	0.27	0.00	0.11	0.05
LDT2	ELEC	Aggregated	0.4639%	0.00	0.00	0.00	0.00	0.28	0.11
LHD1	GAS	Aggregated	0.9034%	0.04	0.39	1.29	0.08	1.03	0.43
LHD1	DSL	Aggregated	0.9369%	0.40	2.97	2.03	0.05	1.18	0.52
LHD2	GAS	Aggregated	0.1388%	0.01	0.07	0.20	0.01	0.18	0.08
LHD2	DSL	Aggregated	0.3727%	0.17	1.71	0.90	0.02	0.56	0.26
MCY	GAS	Aggregated	0.3366%	9.02	4.94	74.99	0.01	0.08	0.04
MDV	GAS	Aggregated	10.4457%	0.47	3.14	65.91	0.38	6.31	2.55
MDV	DSL	Aggregated	0.3735%	0.02	0.05	0.68	0.01	0.23	0.09
MDV	ELEC	Aggregated	0.3452%	0.00	0.00	0.00	0.00	0.21	0.08
MH	GAS	Aggregated	0.0455%	0.00	0.06	0.09	0.01	0.09	0.04
MH	DSL	Aggregated	0.0217%	0.01	0.65	0.05	0.00	0.06	0.03
Motor Coach	DSL	Aggregated	0.0129%	0.00	0.24	0.02	0.00	0.03	0.01
OBUS	GAS	Aggregated	0.0275%	0.00	0.05	0.11	0.00	0.05	0.02
PTO	DSL	Aggregated	0.1095%	0.04	6.78	0.60	0.02	0.01	0.01
SBUS	GAS	Aggregated	0.0250%	0.00	0.05	0.07	0.00	0.25	0.11
SBUS	DSL	Aggregated	0.0682%	0.02	1.79	0.14	0.01	0.69	0.30
T6 Ag	DSL	Aggregated	0.0000%	0.00	0.00	0.00	0.00	0.00	0.00
T6 CAIRP heavy	DSL	Aggregated	0.0216%	0.00	0.21	0.01	0.00	0.04	0.02
T6 CAIRP small	DSL	Aggregated	0.0028%	0.00	0.03	0.00	0.00	0.01	0.00
T6 instate construction heavy	DSL	Aggregated	0.0760%	0.01	1.08	0.06	0.01	0.16	0.07
T6 instate construction small	DSL	Aggregated	0.1186%	0.01	1.32	0.08	0.01	0.24	0.11
T6 instate heavy	DSL	Aggregated	0.5585%	0.05	6.90	0.42	0.05	1.14	0.51
T6 instate small	DSL	Aggregated	0.7498%	0.07	8.32	0.54	0.07	1.52	0.68
T6 OOS heavy	DSL	Aggregated	0.0120%	0.00	0.12	0.01	0.00	0.02	0.01
T6 OOS small	DSL	Aggregated	0.0016%	0.00	0.02	0.00	0.00	0.00	0.00
T6 Public	DSL	Aggregated	0.0125%	0.00	0.18	0.01	0.00	0.03	0.01
T6 utility	DSL	Aggregated	0.0058%	0.00	0.04	0.00	0.00	0.01	0.00
T6TS	GAS	Aggregated	0.1378%	0.01	0.15	0.31	0.02	0.26	0.11
T7 Ag	DSL	Aggregated	0.0000%	0.00	0.00	0.00	0.00	0.00	0.00
T7 CAIRP	DSL	Aggregated	0.6690%	0.15	14.45	1.28	0.07	1.08	0.51
T7 CAIRP construction	DSL	Aggregated	0.0546%	0.01	1.19	0.10	0.01	0.09	0.04
T7 NNOOS	DSL	Aggregated	0.8155%	0.17	16.03	1.46	0.09	1.28	0.60
T7 NOOS	DSL	Aggregated	0.2628%	0.06	5.69	0.50	0.03	0.42	0.20
T7 POLA	DSL	Aggregated	1.0851%	0.25	25.90	2.20	0.13	1.79	0.87
T7 Public	DSL	Aggregated	0.0259%	0.01	0.81	0.05	0.00	0.04	0.02
T7 Single	DSL	Aggregated	0.5516%	0.11	10.03	0.92	0.07	0.85	0.38
T7 single construction	DSL	Aggregated	0.1354%	0.03	2.53	0.23	0.02	0.21	0.09
T7 SWCV	DSL	Aggregated	0.0008%	0.00	0.18	0.00	0.00	0.00	0.00
T7 SWCV	NG	Aggregated	0.0565%	0.05	0.38	11.01	0.00	0.08	0.03
T7 tractor	DSL	Aggregated	0.9704%	0.21	21.40	1.86	0.11	1.57	0.75
T7 tractor construction	DSL	Aggregated	0.1117%	0.03	2.62	0.22	0.01	0.18	0.09
T7 utility	DSL	Aggregated	0.0047%	0.00	0.07	0.01	0.00	0.01	0.00
T7IS	GAS	Aggregated	0.0013%	0.00	0.05	0.45	0.00	0.00	0.00
UBUS	GAS	Aggregated	0.0471%	0.01	0.10	0.14	0.01	0.07	0.03
UBUS	DSL	Aggregated	0.0000%	0.00	0.00	0.00	0.00	0.00	0.00
UBUS	NG	Aggregated	0.0548%	0.06	0.32	31.96	0.00	0.08	0.03
			TOTAL	**13.67**	**161.03**	**604.37**	**3.34**	**70.01**	**29.04**

Based on EMFAC2017, Version 1.0.2, emission factors for Riverside County - South Coast Air Basin

Year 2040 Project: Criteria Air Pollutants

Based on EMFAC2017, Version 1.0.2., Riverside County - South Coast Air Basin

	VMT Per Trip Type			
Plan Area	I-I	I-X	X-I	Total
City	454,239	1,920,527	1,923,674	4,298,441
SOI	38,672	589,566	606,937	1,235,176
TOTAL	492,912	2,510,093	2,530,612	5,533,617

1. Based on VMT data provided Fehr & Peers.

Emission year

Year 2040				lbs/day					
Vehicle Type	**Fuel Type**	**Speed**	**Percent of VMT of SpeedBin**	**ROG**	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**
City of Corona									
All Other Buses	DSL	Aggregated	0.02%	0.02	2.40	0.13	0.02	0.35	0.16
LDA	GAS	Aggregated	53.05%	9.24	85.35	1,942.57	9.64	227.69	91.73
LDA	DSL	Aggregated	0.66%	0.24	0.54	7.69	0.09	2.84	1.16
LDA	ELEC	Aggregated	3.08%	0.00	0.00	0.00	0.00	13.07	5.18
LDT1	GAS	Aggregated	5.37%	1.26	10.06	208.69	1.14	23.07	9.31
LDT1	DSL	Aggregated	0.00%	0.00	0.00	0.01	0.00	0.00	0.00
LDT1	ELEC	Aggregated	0.19%	0.00	0.00	0.00	0.00	0.79	0.31
LDT2	GAS	Aggregated	16.29%	4.50	29.50	708.19	3.41	69.95	28.20
LDT2	DSL	Aggregated	0.17%	0.19	0.43	1.95	0.03	0.77	0.34
LDT2	ELEC	Aggregated	0.46%	0.00	0.00	0.00	0.00	1.97	0.78
LHD1	GAS	Aggregated	0.90%	0.25	2.78	9.17	0.54	7.31	3.05
LHD1	DSL	Aggregated	0.94%	2.82	21.13	14.43	0.32	8.40	3.70
LHD2	GAS	Aggregated	0.14%	0.04	0.48	1.39	0.10	1.29	0.54
LHD2	DSL	Aggregated	0.37%	1.22	12.19	6.40	0.14	4.00	1.87
MCY	GAS	Aggregated	0.34%	64.16	35.16	533.35	0.07	0.57	0.26
MDV	GAS	Aggregated	10.45%	3.37	22.33	468.77	2.67	44.88	18.11
MDV	DSL	Aggregated	0.37%	0.16	0.36	4.86	0.09	1.62	0.66
MDV	ELEC	Aggregated	0.35%	0.00	0.00	0.00	0.00	1.46	0.58
MH	GAS	Aggregated	0.05%	0.03	0.43	0.67	0.06	0.62	0.26
MH	DSL	Aggregated	0.02%	0.08	4.60	0.33	0.02	0.40	0.22
Motor Coach	DSL	Aggregated	0.01%	0.02	1.73	0.16	0.01	0.20	0.09
OBUS	GAS	Aggregated	0.03%	0.03	0.33	0.75	0.03	0.37	0.16
PTO	DSL	Aggregated	0.11%	0.27	48.22	4.27	0.16	0.05	0.05
SBUS	GAS	Aggregated	0.03%	0.03	0.36	0.52	0.02	1.79	0.76
SBUS	DSL	Aggregated	0.07%	0.14	12.77	0.96	0.06	4.93	2.12
T6 Ag	DSL	Aggregated	0.00%	0.00	0.00	0.00	0.00	0.00	0.00
T6 CAIRP heavy	DSL	Aggregated	0.02%	0.01	1.48	0.10	0.01	0.31	0.14
T6 CAIRP small	DSL	Aggregated	0.00%	0.00	0.20	0.01	0.00	0.04	0.02
T6 instate construction heavy	DSL	Aggregated	0.08%	0.06	7.68	0.44	0.05	1.11	0.51
T6 instate construction small	DSL	Aggregated	0.12%	0.08	9.36	0.60	0.08	1.71	0.76
T6 instate heavy	DSL	Aggregated	0.56%	0.37	49.09	2.99	0.34	8.09	3.65
T6 instate small	DSL	Aggregated	0.75%	0.48	59.18	3.82	0.48	10.78	4.82
T6 OOS heavy	DSL	Aggregated	0.01%	0.01	0.82	0.06	0.01	0.17	0.08
T6 OOS small	DSL	Aggregated	0.00%	0.00	0.12	0.01	0.00	0.02	0.01
T6 Public	DSL	Aggregated	0.01%	0.01	1.29	0.07	0.01	0.18	0.08
T6 utility	DSL	Aggregated	0.01%	0.00	0.29	0.02	0.00	0.08	0.04
T6TS	GAS	Aggregated	0.14%	0.11	1.09	2.24	0.17	1.87	0.78
T7 Ag	DSL	Aggregated	0.00%	0.00	0.01	0.00	0.00	0.00	0.00
T7 CAIRP	DSL	Aggregated	0.67%	1.03	102.78	9.08	0.52	7.67	3.66
T7 CAIRP construction	DSL	Aggregated	0.05%	0.08	8.47	0.75	0.05	0.63	0.30
T7 NNOOS	DSL	Aggregated	0.82%	1.18	114.01	10.38	0.64	9.12	4.24
T7 NOOS	DSL	Aggregated	0.26%	0.41	40.45	3.57	0.21	3.01	1.44
T7 POLA	DSL	Aggregated	1.09%	1.78	184.22	15.66	0.95	12.74	6.22
T7 Public	DSL	Aggregated	0.03%	0.06	5.73	0.33	0.03	0.28	0.12
T7 Single	DSL	Aggregated	0.55%	0.75	71.35	6.57	0.52	6.02	2.73
T7 single construction	DSL	Aggregated	0.14%	0.19	17.96	1.62	0.13	1.48	0.67
T7 SWCV	DSL	Aggregated	0.00%	0.00	1.25	0.00	0.00	0.01	0.00
T7 SWCV	NG	Aggregated	0.06%	0.37	2.69	78.29	0.00	0.54	0.21
T7 tractor	DSL	Aggregated	0.97%	1.51	152.18	13.26	0.80	11.15	5.33
T7 tractor construction	DSL	Aggregated	0.11%	0.18	18.60	1.58	0.10	1.30	0.63
T7 utility	DSL	Aggregated	0.00%	0.01	0.48	0.05	0.00	0.05	0.02
T7IS	GAS	Aggregated	0.00%	0.03	0.35	3.18	0.00	0.01	0.00
UBUS	GAS	Aggregated	0.05%	0.05	0.71	1.02	0.05	0.52	0.22
UBUS	DSL	Aggregated	0.00%	0.00	0.00	0.00	0.00	0.00	0.00
UBUS	NG	Aggregated	0.05%	0.42	2.30	227.30	0.00	0.59	0.23
			TOTAL	**97.24**	**1,145.27**	**4,298.27**	**23.72**	**497.89**	**206.51**

SOI									
All Other Buses	DSL	Aggregated	0.0236%	0.00	0.69	0.04	0.00	0.10	0.05
LDA	GAS	Aggregated	53.0520%	2.66	24.53	558.21	2.77	65.43	26.36
LDA	DSL	Aggregated	0.6576%	0.07	0.16	2.21	0.03	0.82	0.33
LDA	ELEC	Aggregated	3.0823%	0.00	0.00	0.00	0.00	3.76	1.49
LDT1	GAS	Aggregated	5.3686%	0.36	2.89	59.97	0.33	6.63	2.68
LDT1	DSL	Aggregated	0.0007%	0.00	0.00	0.00	0.00	0.00	0.00
LDT1	ELEC	Aggregated	0.1853%	0.00	0.00	0.00	0.00	0.23	0.09
LDT2	GAS	Aggregated	16.2922%	1.29	8.48	203.50	0.98	20.10	8.10
LDT2	DSL	Aggregated	0.1662%	0.05	0.12	0.56	0.01	0.22	0.10
LDT2	ELEC	Aggregated	0.4639%	0.00	0.00	0.00	0.00	0.57	0.22
LHD1	GAS	Aggregated	0.9034%	0.07	0.80	2.63	0.15	2.10	0.88
LHD1	DSL	Aggregated	0.9369%	0.81	6.07	4.15	0.09	2.42	1.06
LHD2	GAS	Aggregated	0.1388%	0.01	0.14	0.40	0.03	0.37	0.16
LHD2	DSL	Aggregated	0.3727%	0.35	3.50	1.84	0.04	1.15	0.54
MCY	GAS	Aggregated	0.3366%	18.44	10.10	153.26	0.02	0.16	0.07
MDV	GAS	Aggregated	10.4457%	0.97	6.42	134.70	0.77	12.90	5.20
MDV	DSL	Aggregated	0.3735%	0.04	0.10	1.40	0.02	0.47	0.19
MDV	ELEC	Aggregated	0.3452%	0.00	0.00	0.00	0.00	0.42	0.17
MH	GAS	Aggregated	0.0455%	0.01	0.12	0.19	0.02	0.18	0.07
MH	DSL	Aggregated	0.0217%	0.02	1.32	0.09	0.00	0.12	0.06
Motor Coach	DSL	Aggregated	0.0129%	0.01	0.50	0.05	0.00	0.06	0.03
OBUS	GAS	Aggregated	0.0275%	0.01	0.09	0.22	0.01	0.11	0.04
PTO	DSL	Aggregated	0.1095%	0.08	13.86	1.23	0.04	0.01	0.01
SBUS	GAS	Aggregated	0.0250%	0.01	0.10	0.15	0.01	0.51	0.22
SBUS	DSL	Aggregated	0.0682%	0.04	3.67	0.28	0.02	1.42	0.61
T6 Ag	DSL	Aggregated	0.0000%	0.00	0.00	0.00	0.00	0.00	0.00
T6 CAIRP heavy	DSL	Aggregated	0.0216%	0.00	0.43	0.03	0.00	0.09	0.04
T6 CAIRP small	DSL	Aggregated	0.0028%	0.00	0.06	0.00	0.00	0.01	0.01
T6 instate construction heavy	DSL	Aggregated	0.0760%	0.02	2.21	0.13	0.02	0.32	0.15
T6 instate construction small	DSL	Aggregated	0.1186%	0.02	2.69	0.17	0.02	0.49	0.22
T6 instate heavy	DSL	Aggregated	0.5585%	0.11	14.11	0.86	0.10	2.32	1.05
T6 instate small	DSL	Aggregated	0.7498%	0.14	17.01	1.10	0.14	3.10	1.38
T6 OOS heavy	DSL	Aggregated	0.0120%	0.00	0.24	0.02	0.00	0.05	0.02
T6 OOS small	DSL	Aggregated	0.0016%	0.00	0.03	0.00	0.00	0.01	0.00
T6 Public	DSL	Aggregated	0.0125%	0.00	0.37	0.02	0.00	0.05	0.02
T6 utility	DSL	Aggregated	0.0058%	0.00	0.08	0.01	0.00	0.02	0.01
T6TS	GAS	Aggregated	0.1378%	0.03	0.31	0.64	0.05	0.54	0.22
T7 Ag	DSL	Aggregated	0.0000%	0.00	0.00	0.00	0.00	0.00	0.00
T7 CAIRP	DSL	Aggregated	0.6690%	0.30	29.53	2.61	0.15	2.20	1.05
T7 CAIRP construction	DSL	Aggregated	0.0546%	0.02	2.43	0.21	0.01	0.18	0.09
T7 NNOOS	DSL	Aggregated	0.8155%	0.34	32.76	2.98	0.18	2.62	1.22
T7 NOOS	DSL	Aggregated	0.2628%	0.12	11.62	1.03	0.06	0.87	0.41
T7 POLA	DSL	Aggregated	1.0851%	0.51	52.94	4.50	0.27	3.66	1.79
T7 Public	DSL	Aggregated	0.0259%	0.02	1.65	0.09	0.01	0.08	0.04
T7 Single	DSL	Aggregated	0.5516%	0.22	20.50	1.89	0.15	1.73	0.78
T7 single construction	DSL	Aggregated	0.1354%	0.05	5.16	0.47	0.04	0.43	0.19
T7 SWCV	DSL	Aggregated	0.0008%	0.00	0.36	0.00	0.00	0.00	0.00
T7 SWCV	NG	Aggregated	0.0565%	0.10	0.77	22.50	0.00	0.16	0.06
T7 tractor	DSL	Aggregated	0.9704%	0.43	43.73	3.81	0.23	3.20	1.53
T7 tractor construction	DSL	Aggregated	0.1117%	0.05	5.35	0.45	0.03	0.37	0.18
T7 utility	DSL	Aggregated	0.0047%	0.00	0.14	0.01	0.00	0.01	0.01
T7IS	GAS	Aggregated	0.0013%	0.01	0.10	0.91	0.00	0.00	0.00
UBUS	GAS	Aggregated	0.0471%	0.01	0.20	0.29	0.01	0.15	0.06
UBUS	DSL	Aggregated	0.0000%	0.00	0.00	0.00	0.00	0.00	0.00
UBUS	NG	Aggregated	0.0548%	0.12	0.66	65.32	0.00	0.17	0.07
			TOTAL	**27.94**	**329.10**	**1,235.13**	**6.82**	**143.07**	**59.34**

Based on EMFAC2017, Version 1.0.2, emission factors for Riverside County - South Coast Air Basin

Year 2018 GHG Emissions: Existing

Based on EMFAC2017, Version 1.0.2., Riverside County - South Coast Air Basin

Days per year[1] 347

Plan Area	VMT Per Trip Type[2] I-I	I-X	X-I	Total	Annual
City	407,734	1,600,405	1,626,425	3,634,563	1,261,193,519
SOI	20,895	286,598	296,901	604,393	209,724,492
TOTAL	428,628	1,887,003	1,923,325	4,238,957	1,470,918,011

[1] Adjusted Daily vehicles miles traveled (VMT) multiplied by 347 days/year to account for reduced traffic on weekends and holidays. This assumption is consistent with the California Air Resources Board's (CARB) methodology within the Climate Change Scoping Plan Measure Documentation Supplement.
[2] Based on data provided Fehr & Peers.

		Emission year		N_2O	CO_2 (Pavley)	CH_4	
				AR5 GWP	AR5 GWP	AR5 GWP	
		Year 2018		265	1	28	
Vehicle Type	**Fuel Type**	**Speed**	**Percent of VMT of SpeedBin**	**N_2O**	**CO_2 (Pavley)**	**CH_4**	**CO_2e w/ Pavley + LCFS**
City of Corona							
All Other Buses	DSL	Aggregated	0.02%	0.05	287.82	0.00	300
LDA	GAS	Aggregated	52.79%	4.06	191,567.60	2.61	192,717
LDA	DSL	Aggregated	0.44%	0.19	1,179.06	0.00	1,228
LDA	ELEC	Aggregated	0.30%	0.00	0.00	0.00	0
LDT1	GAS	Aggregated	5.02%	0.94	21,437.97	0.78	21,710
LDT1	DSL	Aggregated	0.00%	0.00	10.83	0.00	11
LDT1	ELEC	Aggregated	0.00%	0.00	0.00	0.00	0
LDT2	GAS	Aggregated	16.30%	2.05	76,442.46	1.26	77,021
LDT2	DSL	Aggregated	0.07%	0.04	244.26	0.00	254
LDT2	ELEC	Aggregated	0.03%	0.00	0.00	0.00	0
LHD1	GAS	Aggregated	1.34%	0.31	13,685.30	0.16	13,773
LHD1	DSL	Aggregated	1.38%	1.37	8,710.43	0.09	9,076
LHD2	GAS	Aggregated	0.19%	0.04	2,166.56	0.01	2,178
LHD2	DSL	Aggregated	0.52%	0.57	3,608.25	0.03	3,759
MCY	GAS	Aggregated	0.47%	0.39	1,231.69	1.92	1,389
MDV	GAS	Aggregated	14.41%	2.26	82,482.04	1.47	83,123
MDV	DSL	Aggregated	0.26%	0.20	1,262.29	0.00	1,315
MDV	ELEC	Aggregated	0.00%	0.00	0.00	0.00	0
MH	GAS	Aggregated	0.12%	0.05	2,533.40	0.03	2,547
MH	DSL	Aggregated	0.04%	0.08	523.67	0.00	546
Motor Coach	DSL	Aggregated	0.01%	0.04	237.34	0.00	247
OBUS	GAS	Aggregated	0.04%	0.02	900.73	0.01	906
PTO	DSL	Aggregated	0.08%	0.35	2,235.53	0.02	2,329
SBUS	GAS	Aggregated	0.03%	0.01	389.93	0.01	393
SBUS	DSL	Aggregated	0.06%	0.15	952.30	0.00	992
T6 Ag	DSL	Aggregated	0.00%	0.00	3.51	0.00	4
T6 CAIRP heavy	DSL	Aggregated	0.02%	0.04	223.43	0.00	233
T6 CAIRP small	DSL	Aggregated	0.00%	0.01	32.32	0.00	34
T6 instate construction heavy	DSL	Aggregated	0.10%	0.20	1,262.01	0.01	1,315
T6 instate construction small	DSL	Aggregated	0.16%	0.31	1,951.38	0.02	2,033
T6 instate heavy	DSL	Aggregated	0.53%	1.01	6,446.49	0.07	6,717
T6 instate small	DSL	Aggregated	0.82%	1.62	10,288.62	0.10	10,720
T6 OOS heavy	DSL	Aggregated	0.01%	0.02	127.19	0.00	133
T6 OOS small	DSL	Aggregated	0.00%	0.00	18.62	0.00	19
T6 Public	DSL	Aggregated	0.03%	0.05	347.70	0.00	362
T6 utility	DSL	Aggregated	0.01%	0.01	78.66	0.00	82
T6TS	GAS	Aggregated	0.12%	0.06	2,506.35	0.03	2,523
T7 Ag	DSL	Aggregated	0.00%	0.00	6.23	0.00	6
T7 CAIRP	DSL	Aggregated	0.64%	1.81	11,507.59	0.03	11,988
T7 CAIRP construction	DSL	Aggregated	0.07%	0.19	1,190.74	0.00	1,240
T7 NNOOS	DSL	Aggregated	0.78%	2.13	13,528.86	0.04	14,094
T7 NOOS	DSL	Aggregated	0.25%	0.78	4,933.94	0.02	5,140
T7 POLA	DSL	Aggregated	0.57%	1.82	11,594.78	0.03	12,078
T7 Public	DSL	Aggregated	0.04%	0.11	721.02	0.00	751
T7 Single	DSL	Aggregated	0.43%	1.27	8,062.81	0.07	8,401

T7 single construction	DSL	Aggregated	0.18%	1.74	11,091.81	0.00	11,554
T7 SWCV	DSL	Aggregated	0.01%	0.09	443.87	0.73	488
T7 SWCV	NG	Aggregated	0.01%	0.04	235.33	0.00	245
T7 tractor	DSL	Aggregated	1.00%	2.99	19,017.46	0.15	19,814
T7 tractor construction	DSL	Aggregated	0.15%	0.45	2,855.55	0.00	2,975
T7 utility	DSL	Aggregated	0.01%	0.01	145.28	0.01	149
T7IS	GAS	Aggregated	0.00%	0.00	25.29	0.00	25
UBUS	GAS	Aggregated	0.05%	0.12	785.24	0.03	819
UBUS	DSL	Aggregated	0.00%	0.00	0.00	0.00	0
UBUS	ELEC	Aggregated	0.00%	0.00	0.07	0.00	0
UBUS	NG	Aggregated	0.06%	0.00	0.00	0.00	0
				30.04	**521,521.62**	**9.77**	**529,755.77**
SOI							
All Other Buses	DSL	Aggregated	0.02%	0.01	47.86	0.00	50
LDA	GAS	Aggregated	52.79%	0.68	31,855.87	0.43	32,047
LDA	DSL	Aggregated	0.44%	0.03	196.07	0.00	204
LDA	ELEC	Aggregated	0.30%	0.00	0.00	0.00	0
LDT1	GAS	Aggregated	5.02%	0.16	3,564.93	0.13	3,610
LDT1	DSL	Aggregated	0.00%	0.00	1.80	0.00	2
LDT1	ELEC	Aggregated	0.00%	0.00	0.00	0.00	0
LDT2	GAS	Aggregated	16.30%	0.34	12,711.65	0.21	12,808
LDT2	DSL	Aggregated	0.07%	0.01	40.62	0.00	42
LDT2	ELEC	Aggregated	0.03%	0.00	0.00	0.00	0
LHD1	GAS	Aggregated	1.34%	0.05	2,275.73	0.03	2,290
LHD1	DSL	Aggregated	1.38%	0.23	1,448.46	0.01	1,509
LHD2	GAS	Aggregated	0.19%	0.01	360.28	0.00	362
LHD2	DSL	Aggregated	0.52%	0.09	600.02	0.00	625
MCY	GAS	Aggregated	0.47%	0.07	204.82	0.32	231
MDV	GAS	Aggregated	14.41%	0.38	13,715.98	0.24	13,823
MDV	DSL	Aggregated	0.26%	0.03	209.91	0.00	219
MDV	ELEC	Aggregated	0.00%	0.00	0.00	0.00	0
MH	GAS	Aggregated	0.12%	0.01	421.28	0.00	424
MH	DSL	Aggregated	0.04%	0.01	87.08	0.00	91
Motor Coach	DSL	Aggregated	0.01%	0.01	39.47	0.00	41
OBUS	GAS	Aggregated	0.04%	0.00	149.78	0.00	151
PTO	DSL	Aggregated	0.08%	0.06	371.75	0.00	387
SBUS	GAS	Aggregated	0.03%	0.00	64.84	0.00	65
SBUS	DSL	Aggregated	0.06%	0.02	158.36	0.00	165
T6 Ag	DSL	Aggregated	0.00%	0.00	0.58	0.00	1
T6 CAIRP heavy	DSL	Aggregated	0.02%	0.01	37.15	0.00	39
T6 CAIRP small	DSL	Aggregated	0.00%	0.00	5.37	0.00	6
T6 instate construction heavy	DSL	Aggregated	0.10%	0.03	209.86	0.00	219
T6 instate construction small	DSL	Aggregated	0.16%	0.05	324.50	0.00	338
T6 instate heavy	DSL	Aggregated	0.53%	0.17	1,071.99	0.01	1,117
T6 instate small	DSL	Aggregated	0.82%	0.27	1,710.90	0.02	1,783
T6 OOS heavy	DSL	Aggregated	0.01%	0.00	21.15	0.00	22
T6 OOS small	DSL	Aggregated	0.00%	0.00	3.10	0.00	3
T6 Public	DSL	Aggregated	0.03%	0.01	57.82	0.00	60
T6 utility	DSL	Aggregated	0.01%	0.00	13.08	0.00	14
T6TS	GAS	Aggregated	0.12%	0.01	416.78	0.01	419
T7 Ag	DSL	Aggregated	0.00%	0.00	1.04	0.00	1
T7 CAIRP	DSL	Aggregated	0.64%	0.30	1,913.60	0.01	1,993
T7 CAIRP construction	DSL	Aggregated	0.07%	0.03	198.01	0.00	206
T7 NNOOS	DSL	Aggregated	0.78%	0.35	2,249.72	0.01	2,344
T7 NOOS	DSL	Aggregated	0.25%	0.13	820.47	0.00	855
T7 POLA	DSL	Aggregated	0.57%	0.30	1,928.10	0.00	2,009
T7 Public	DSL	Aggregated	0.04%	0.02	119.90	0.00	125
T7 Single	DSL	Aggregated	0.43%	0.21	1,340.77	0.01	1,397
T7 single construction	DSL	Aggregated	0.18%	0.29	1,844.46	0.00	1,921
T7 SWCV	DSL	Aggregated	0.01%	0.02	73.81	0.12	81
T7 SWCV	NG	Aggregated	0.01%	0.01	39.13	0.00	41
T7 tractor	DSL	Aggregated	1.00%	0.50	3,162.42	0.03	3,295
T7 tractor construction	DSL	Aggregated	0.15%	0.07	474.85	0.00	495
T7 utility	DSL	Aggregated	0.01%	0.00	24.16	0.00	25
T7IS	GAS	Aggregated	0.00%	0.00	4.21	0.00	4

UBUS	GAS	Aggregated	0.05%	0.02	130.58	0.00	136
UBUS	DSL	Aggregated	0.00%	0.00	0.00	0.00	0
UBUS	ELEC	Aggregated	0.00%	0.00	0.01	0.00	0
UBUS	NG	Aggregated	0.06%	0.00	0.00	0.00	0
				5.00	**86,724.09**	**1.63**	**88,093.35**

Based on EMFAC2017, Version 1.0.2, emission factors for Riverside County - South Coast Air Basin

Year 2040 GHG Emissions: Project

Based on EMFAC2017, Version 1.0.2., Riverside County - South Coast Air Basin

Days per year[1] 347

Plan Area	VMT Per Trip Type[2] I-I	I-X	X-I	Total	Annual
City	454,239	1,920,527	1,626,425	4,001,191	1,388,413,369
SOI	20,895	286,598	296,901	604,393	209,724,492
TOTAL	475,134	2,207,125	1,923,325	4,605,585	1,598,137,861

[1] Adjusted Daily vehicles miles traveled (VMT) multiplied by 347 days/year to account for reduced traffic on weekends and holidays. This assumption is consistent with the California Air Resources Board's (CARB) methodology within the Climate Change Scoping Plan Measure Documentation Supplement.

[2] Based on data provided Fehr & Peers.

		Emission year		N_2O AR5 GWP	CO_2 (Pavley) AR5 GWP	CH_4 AR5 GWP	
		Year 2040		265	1	28	
Vehicle Type	**Fuel Type**	**Speed***	**Percent of VMT of SpeedBin**	**N_2O**	**CO_2 (Pavley)**	**CH_4**	**CO_2e w/ Pavley + LCFS**
City of Corona							
All Other Buses	DSL	Aggregated	0.02%	0.04	248.80	0.00	259
LDA	GAS	Aggregated	53.05%	2.12	142,717.02	0.48	143,293
LDA	DSL	Aggregated	0.66%	0.21	1,364.45	0.00	1,421
LDA	ELEC	Aggregated	3.08%	0.00	0.00	0.00	0
LDT1	GAS	Aggregated	5.37%	0.23	16,827.26	0.06	16,890
LDT1	DSL	Aggregated	0.00%	0.00	2.89	0.00	3
LDT1	ELEC	Aggregated	0.19%	0.00	0.00	0.00	0
LDT2	GAS	Aggregated	16.29%	0.67	50,448.06	0.21	50,632
LDT2	DSL	Aggregated	0.17%	0.07	457.07	0.00	476
LDT2	ELEC	Aggregated	0.46%	0.00	0.00	0.00	0
LHD1	GAS	Aggregated	0.90%	0.04	7,984.33	0.01	7,995
LHD1	DSL	Aggregated	0.94%	0.78	4,990.45	0.02	5,199
LHD2	GAS	Aggregated	0.14%	0.01	1,408.51	0.00	1,410
LHD2	DSL	Aggregated	0.37%	0.34	2,182.59	0.01	2,274
MCY	GAS	Aggregated	0.34%	0.30	965.85	1.42	1,085
MDV	GAS	Aggregated	10.45%	0.47	39,559.49	0.15	39,687
MDV	DSL	Aggregated	0.37%	0.21	1,346.87	0.00	1,403
MDV	ELEC	Aggregated	0.35%	0.00	0.00	0.00	0
MH	GAS	Aggregated	0.05%	0.01	837.11	0.00	839
MH	DSL	Aggregated	0.02%	0.04	236.99	0.00	247
Motor Coach	DSL	Aggregated	0.01%	0.03	197.64	0.00	206
OBUS	GAS	Aggregated	0.03%	0.00	497.22	0.00	498
PTO	DSL	Aggregated	0.11%	0.38	2,405.53	0.00	2,506
SBUS	GAS	Aggregated	0.03%	0.00	265.37	0.00	267
SBUS	DSL	Aggregated	0.07%	0.14	869.44	0.00	906
T6 Ag	DSL	Aggregated	0.00%	0.00	0.12	0.00	0
T6 CAIRP heavy	DSL	Aggregated	0.02%	0.03	187.34	0.00	195
T6 CAIRP small	DSL	Aggregated	0.00%	0.00	27.28	0.00	28
T6 instate construction heavy	DSL	Aggregated	0.08%	0.13	813.03	0.00	847
T6 instate construction small	DSL	Aggregated	0.12%	0.18	1,165.55	0.00	1,214
T6 instate heavy	DSL	Aggregated	0.56%	0.83	5,278.39	0.00	5,498
T6 instate small	DSL	Aggregated	0.75%	1.16	7,371.80	0.00	7,679
T6 OOS heavy	DSL	Aggregated	0.01%	0.02	103.62	0.00	108
T6 OOS small	DSL	Aggregated	0.00%	0.00	15.83	0.00	16
T6 Public	DSL	Aggregated	0.01%	0.02	129.60	0.00	135
T6 utility	DSL	Aggregated	0.01%	0.01	55.78	0.00	58
T6TS	GAS	Aggregated	0.14%	0.01	2,466.51	0.00	2,470
T7 Ag	DSL	Aggregated	0.00%	0.00	0.33	0.00	0
T7 CAIRP	DSL	Aggregated	0.67%	1.27	8,101.74	0.01	8,439
T7 CAIRP construction	DSL	Aggregated	0.05%	0.12	732.10	0.00	763
T7 NNOOS	DSL	Aggregated	0.82%	1.55	9,862.83	0.01	10,274
T7 NOOS	DSL	Aggregated	0.26%	0.50	3,185.37	0.00	3,318
T7 POLA	DSL	Aggregated	1.09%	2.31	14,707.41	0.01	15,320
T7 Public	DSL	Aggregated	0.03%	0.06	403.11	0.00	420
T7 Single	DSL	Aggregated	0.55%	1.27	8,054.95	0.01	8,391
T7 single construction	DSL	Aggregated	0.14%	0.31	1,983.05	0.00	2,066
T7 SWCV	DSL	Aggregated	0.00%	0.01	51.20	0.00	53

T7 SWCV	NG	Aggregated	0.06%	0.42	2,053.26	3.15	2,253
T7 tractor	DSL	Aggregated	0.97%	1.94	12,365.57	0.01	12,881
T7 tractor construction	DSL	Aggregated	0.11%	0.25	1,600.66	0.00	1,667
T7 utility	DSL	Aggregated	0.00%	0.01	69.75	0.00	73
T7IS	GAS	Aggregated	0.00%	0.00	26.68	0.00	27
UBUS	GAS	Aggregated	0.05%	0.01	722.20	0.00	725
UBUS	DSL	Aggregated	0.00%	0.00	0.00	0.00	0
UBUS	NG	Aggregated	0.05%	0.29	1,413.21	4.31	1,610
				18.82	**358,761.22**	**9.90**	**364,026.71**
SOI							
All Other Buses	DSL	Aggregated	0.02%	0.01	37.58	0.00	39
LDA	GAS	Aggregated	53.05%	0.32	21,557.88	0.07	21,645
LDA	DSL	Aggregated	0.66%	0.03	206.10	0.00	215
LDA	ELEC	Aggregated	3.08%	0.00	0.00	0.00	0
LDT1	GAS	Aggregated	5.37%	0.03	2,541.81	0.01	2,551
LDT1	DSL	Aggregated	0.00%	0.00	0.44	0.00	0
LDT1	ELEC	Aggregated	0.19%	0.00	0.00	0.00	0
LDT2	GAS	Aggregated	16.29%	0.10	7,620.35	0.03	7,648
LDT2	DSL	Aggregated	0.17%	0.01	69.04	0.00	72
LDT2	ELEC	Aggregated	0.46%	0.00	0.00	0.00	0
LHD1	GAS	Aggregated	0.90%	0.01	1,206.06	0.00	1,208
LHD1	DSL	Aggregated	0.94%	0.12	753.82	0.00	785
LHD2	GAS	Aggregated	0.14%	0.00	212.76	0.00	213
LHD2	DSL	Aggregated	0.37%	0.05	329.69	0.00	343
MCY	GAS	Aggregated	0.34%	0.05	145.89	0.21	164
MDV	GAS	Aggregated	10.45%	0.07	5,975.59	0.02	5,995
MDV	DSL	Aggregated	0.37%	0.03	203.45	0.00	212
MDV	ELEC	Aggregated	0.35%	0.00	0.00	0.00	0
MH	GAS	Aggregated	0.05%	0.00	126.45	0.00	127
MH	DSL	Aggregated	0.02%	0.01	35.80	0.00	37
Motor Coach	DSL	Aggregated	0.01%	0.00	29.85	0.00	31
OBUS	GAS	Aggregated	0.03%	0.00	75.11	0.00	75
PTO	DSL	Aggregated	0.11%	0.06	363.36	0.00	379
SBUS	GAS	Aggregated	0.03%	0.00	40.09	0.00	40
SBUS	DSL	Aggregated	0.07%	0.02	131.33	0.00	137
T6 Ag	DSL	Aggregated	0.00%	0.00	0.02	0.00	0
T6 CAIRP heavy	DSL	Aggregated	0.02%	0.00	28.30	0.00	29
T6 CAIRP small	DSL	Aggregated	0.00%	0.00	4.12	0.00	4
T6 instate construction heavy	DSL	Aggregated	0.08%	0.02	122.81	0.00	128
T6 instate construction small	DSL	Aggregated	0.12%	0.03	176.06	0.00	183
T6 instate heavy	DSL	Aggregated	0.56%	0.13	797.32	0.00	831
T6 instate small	DSL	Aggregated	0.75%	0.18	1,113.53	0.00	1,160
T6 OOS heavy	DSL	Aggregated	0.01%	0.00	15.65	0.00	16
T6 OOS small	DSL	Aggregated	0.00%	0.00	2.39	0.00	2
T6 Public	DSL	Aggregated	0.01%	0.00	19.58	0.00	20
T6 utility	DSL	Aggregated	0.01%	0.00	8.43	0.00	9
T6TS	GAS	Aggregated	0.14%	0.00	372.57	0.00	373
T7 Ag	DSL	Aggregated	0.00%	0.00	0.05	0.00	0
T7 CAIRP	DSL	Aggregated	0.67%	0.19	1,223.79	0.00	1,275
T7 CAIRP construction	DSL	Aggregated	0.05%	0.02	110.59	0.00	115
T7 NNOOS	DSL	Aggregated	0.82%	0.23	1,489.81	0.00	1,552
T7 NOOS	DSL	Aggregated	0.26%	0.08	481.16	0.00	501
T7 POLA	DSL	Aggregated	1.09%	0.35	2,221.60	0.00	2,314
T7 Public	DSL	Aggregated	0.03%	0.01	60.89	0.00	63
T7 Single	DSL	Aggregated	0.55%	0.19	1,216.73	0.00	1,267
T7 single construction	DSL	Aggregated	0.14%	0.05	299.55	0.00	312
T7 SWCV	DSL	Aggregated	0.00%	0.00	7.73	0.00	8
T7 SWCV	NG	Aggregated	0.06%	0.06	310.15	0.48	340
T7 tractor	DSL	Aggregated	0.97%	0.29	1,867.86	0.00	1,946
T7 tractor construction	DSL	Aggregated	0.11%	0.04	241.79	0.00	252
T7 utility	DSL	Aggregated	0.00%	0.00	10.54	0.00	11
T7IS	GAS	Aggregated	0.00%	0.00	4.03	0.00	4
UBUS	GAS	Aggregated	0.05%	0.00	109.09	0.00	110
UBUS	DSL	Aggregated	0.00%	0.00	0.00	0.00	0
UBUS	NG	Aggregated	0.05%	0.04	213.47	0.65	243
				2.84	**54,192.08**	**1.50**	**54,987.45**

Based on EMFAC2017, Version 1.0.2, emission factors for Riverside County - South Coast Air Basin

2018 Riverside (SC) - Annual

g/mile

calendar_year	season_month	sub_area	vehicle_class	Fuel	MdlYr	Speed	ROG_RUNEX	NOx_RUNEX	CO_RUNEX	SOx_RUNEX	PM10_PMTW	PM10_PMBW	PM10_RUNEX	PM10_Total	PM2_5_PMTW	PM2_5_PMBW	PM2_5_RUNEX	PM2_5_Total	CO2(Pavley+ACC)_RUNEX	CH4_RUNEX	N2O_RUNEX	VMT	%VMT Total
2018	Annual	Riverside (SC)	All Other Buses	DSL	Aggregated	Aggregated	0.3540921	6.273688	1.0802248	0.0096274	0.012	0.13034	0.2286225	3.71E-01	0.003	0.05586	0.2187324	2.78E-01	1019.0	0.016446663	0.160178535	9,285	0.0224%
2018	Annual	Riverside (SC)	LDA	GAS	Aggregated	Aggregated	0.0163207	0.0621021	0.8926021	0.0028474	0.008	0.03675	0.001431	4.62E-02	0.002	0.01575	0.0013161	1.91E-02	287.7413246	0.003927691	0.006098569	21,886,505	52.7884%
2018	Annual	Riverside (SC)	LDA	DSL	Aggregated	Aggregated	0.0193268	0.144097	0.2273585	0.0020268	0.008	0.03675	0.0113945	5.61E-02	0.002	0.01575	0.0109015	2.87E-02	214.3980961	0.000897694	0.033700395	180,789	0.4360%
2018	Annual	Riverside (SC)	LDA	ELEC	Aggregated	Aggregated	0	0	0	0	0.008	0.03675	0	4.48E-02	0.002	0.01575	0	1.78E-02	0	0	0	123,847	0.2987%
2018	Annual	Riverside (SC)	LDT1	GAS	Aggregated	Aggregated	0.0564868	0.2222716	2.3131161	0.0033523	0.008	0.03675	0.0028012	4.76E-02	0.002	0.01575	0.0025768	2.03E-02	338.764006	0.012260389	0.014924931	2,080,382	5.0177%
2018	Annual	Riverside (SC)	LDT1	DSL	Aggregated	Aggregated	0.2533029	1.4593192	1.5128506	0.0038836	0.008	0.03675	0.1992451	2.44E-01	0.002	0.01575	0.1906259	2.08E-01	410.803667	0.011765436	0.064572616	866	0.0021%
2018	Annual	Riverside (SC)	LDT1	ELEC	Aggregated	Aggregated	0	0	0	0	0.008	0.03675	0	4.48E-02	0.002	0.01575	0	1.78E-02	0	0	0	1,483	0.0036%
2018	Annual	Riverside (SC)	LDT2	GAS	Aggregated	Aggregated	0.0269497	0.1348249	1.2964338	0.0036788	0.008	0.03675	0.0015508	4.63E-02	0.002	0.01575	0.0014267	1.92E-02	371.7498948	0.006135387	0.009976777	6,759,902	16.3043%
2018	Annual	Riverside (SC)	LDT2	DSL	Aggregated	Aggregated	0.0224637	0.0945271	0.1401521	0.0027672	0.008	0.03675	0.0119065	5.67E-02	0.002	0.01575	0.0113915	2.91E-02	292.7118864	0.001043397	0.046010232	27,433	0.0662%
2018	Annual	Riverside (SC)	LDT2	ELEC	Aggregated	Aggregated	0	0	0	0	0.008	0.03675	0	4.48E-02	0.002	0.01575	0	1.78E-02	0	0	0	14,487	0.0349%
2018	Annual	Riverside (SC)	LHD1	GAS	Aggregated	Aggregated	0.0467505	0.3143846	1.270461	0.0079872	0.008	0.07644	0.0012057	8.56E-02	0.002	0.03276	0.0011109	3.59E-02	807.1287357	0.009209913	0.018556342	557,401	1.3444%
2018	Annual	Riverside (SC)	LHD1	DSL	Aggregated	Aggregated	0.1091746	3.9271023	0.7472485	0.0047398	0.012	0.07644	0.0246671	1.13E-01	3.000E-03	3.276E-02	0.0236	5.94E-02	501.3704868	0.005070952	0.078808459	571,133	1.3775%
2018	Annual	Riverside (SC)	LHD2	GAS	Aggregated	Aggregated	0.0280766	0.2678379	0.7663736	0.0091379	0.008	0.08918	0.0009613	9.81E-02	0.002	0.03822	0.000884	4.11E-02	923.4156914	0.006187685	0.017054601	77,131	0.1860%
2018	Annual	Riverside (SC)	LHD2	DSL	Aggregated	Aggregated	0.0907308	3.1176185	0.6138291	0.005161	0.012	0.08918	0.0214306	1.23E-01	0.003	0.03822	0.0205036	6.17E-02	545.9248546	0.004214271	0.085811785	217,280	0.5241%
2018	Annual	Riverside (SC)	MCY	GAS	Aggregated	Aggregated	2.2228144	1.1416476	20.575192	0.0020539	0.004	0.01176	0.001561	1.73E-02	0.001	0.00504	0.0014649	7.50E-03	207.5566169	0.3236514	0.065871603	195,083	0.4705%
2018	Annual	Riverside (SC)	MDV	GAS	Aggregated	Aggregated	0.037617	0.1732241	1.5512591	0.0044921	0.008	0.03675	0.0015635	4.63E-02	0.002	0.01575	0.0014396	1.92E-02	453.9384923	0.008087889	0.012457695	5,973,364	14.4072%
2018	Annual	Riverside (SC)	MDV	DSL	Aggregated	Aggregated	0.0136046	0.0997019	0.1962468	0.0036993	0.008	0.03675	0.006988	5.17E-02	0.002	0.01575	0.0066857	2.44E-02	391.3118004	0.000631907	0.061508766	106,046	0.2558%
2018	Annual	Riverside (SC)	MDV	ELEC	Aggregated	Aggregated	0	0	0	0	0.008	0.03675	0	4.48E-02	0.002	0.01575	0	1.78E-02	0	0	0	2,024	0.0049%
2018	Annual	Riverside (SC)	MH	GAS	Aggregated	Aggregated	0.0835618	0.5704852	2.7520224	0.0168796	0.012	0.13034	0.0013842	1.44E-01	0.003	0.05586	0.0012745	6.01E-02	1705.735164	0.017961081	0.032091265	48,826	0.1178%
2018	Annual	Riverside (SC)	MH	DSL	Aggregated	Aggregated	0.0754492	4.911257	0.3667984	0.0090217	0.016	0.13034	0.1587474	3.05E-01	0.004	0.05586	0.1518801	2.12E-01	954.3175829	0.00350447	0.150005434	18,039	0.0435%
2018	Annual	Riverside (SC)	Motor Coach	DSL	Aggregated	Aggregated	0.2545752	5.8176347	0.9627293	0.0142749	0.012	0.13034	0.1417464	2.84E-01	0.003	0.05586	0.1356145	1.94E-01	1510.966824	0.011824357	0.237502943	5,164	0.0125%
2018	Annual	Riverside (SC)	OBUS	GAS	Aggregated	Aggregated	0.0889031	0.7428776	2.472496	0.0168444	0.012	0.13034	0.0006712	1.43E-01	0.003	0.05586	0.0006181	5.95E-02	1702.172628	0.018070401	0.034266494	17,396	0.0420%
2018	Annual	Riverside (SC)	PTO	DSL	Aggregated	Aggregated	0.498857	7.897805	1.7067874	0.0197807	0	0	0.1652562	1.65E-01	0	0	0.1581073	1.58E-01	2093.748598	0.023170618	0.329108123	35,100	0.0847%
2018	Annual	Riverside (SC)	SBUS	GAS	Aggregated	Aggregated	0.0690589	0.3765468	1.5895394	0.0089463	0.008	0.7448002	0.0007369	7.54E-01	0.002	0.3192001	0.0006775	3.22E-01	904.0519178	0.013309052	0.022660083	14,179	0.0342%
2018	Annual	Riverside (SC)	SBUS	DSL	Aggregated	Aggregated	0.1441832	8.1855962	0.3792288	0.0120595	0.012	0.7448002	0.053155	8.10E-01	0.003	0.3192001	0.0508555	3.73E-01	1276.47381	0.006696935	0.200643907	24,526	0.0592%
2018	Annual	Riverside (SC)	T6 Ag	DSL	Aggregated	Aggregated	0.5113913	9.8973732	1.5100875	0.0098302	0.012	0.13034	0.2751337	4.17E-01	0.003	0.05586	0.2632315	3.22E-01	1040.507709	0.023752801	0.163553322	111	0.0003%
2018	Annual	Riverside (SC)	T6 CAIRP heavy	DSL	Aggregated	Aggregated	0.0528866	1.7186568	0.2143998	0.0085113	0.012	0.13034	0.0444215	1.87E-01	0.003	0.05586	0.0424999	1.01E-01	900.9039036	0.002456447	0.141609548	8,153	0.0197%
2018	Annual	Riverside (SC)	T6 CAIRP small	DSL	Aggregated	Aggregated	0.0976949	2.24075	0.3927365	0.0089897	0.012	0.13034	0.0842671	2.27E-01	0.003	0.05586	0.0806217	1.39E-01	951.5376102	0.004537676	0.149568461	1,117	0.0027%
2018	Annual	Riverside (SC)	T6 instate construction heavy	DSL	Aggregated	Aggregated	0.221646	4.7969713	0.7238785	0.0094365	0.012	0.13034	0.1538201	2.96E-01	0.003	0.05586	0.1471659	2.06E-01	998.8384024	0.010294881	0.157003487	41,536	0.1002%
2018	Annual	Riverside (SC)	T6 instate construction small	DSL	Aggregated	Aggregated	0.1931188	3.7699706	0.725789	0.0093486	0.012	0.13034	0.152902	2.95E-01	0.003	0.05586	0.1462875	2.05E-01	989.5291716	0.00896987	0.155540206	64,829	0.1564%
2018	Annual	Riverside (SC)	T6 instate heavy	DSL	Aggregated	Aggregated	0.2207604	4.792175	0.7185158	0.009043	0.012	0.13034	0.1512692	2.94E-01	0.003	0.05586	0.1447254	2.04E-01	957.1801139	0.010253751	0.150455384	221,405	0.5340%
2018	Annual	Riverside (SC)	T6 instate small	DSL	Aggregated	Aggregated	0.2029124	3.8431833	0.7752307	0.009358	0.012	0.13034	0.1647429	3.07E-01	0.003	0.05586	0.1576162	2.16E-01	990.5285596	0.009424754	0.155697296	341,465	0.8236%
2018	Annual	Riverside (SC)	T6 OOS heavy	DSL	Aggregated	Aggregated	0.0528159	1.6795247	0.2195046	0.0085165	0.012	0.13034	0.0454799	1.88E-01	0.003	0.05586	0.0435124	1.02E-01	901.4564863	0.002453162	0.141696406	4,639	0.0112%
2018	Annual	Riverside (SC)	T6 OOS small	DSL	Aggregated	Aggregated	0.0983438	2.244463	0.3965189	0.0089927	0.012	0.13034	0.0851159	2.27E-01	0.003	0.05586	0.0814338	1.40E-01	951.862933	0.004567816	0.149619598	643	0.0016%
2018	Annual	Riverside (SC)	T6 Public	DSL	Aggregated	Aggregated	0.0584234	8.2621102	0.1693253	0.0100954	0.012	0.13034	0.0453224	1.88E-01	0.003	0.05586	0.0433618	1.02E-01	1068.575522	0.002713616	0.167965191	10,697	0.0258%
2018	Annual	Riverside (SC)	T6 utility	DSL	Aggregated	Aggregated	0.0173594	1.8239802	0.0680807	0.0091676	0.012	0.13034	0.0118493	1.54E-01	0.003	0.05586	0.0113367	7.02E-02	970.3751686	0.000806299	0.152529463	2,665	0.0064%
2018	Annual	Riverside (SC)	T6TS	GAS	Aggregated	Aggregated	0.1185535	0.8669098	3.3304576	0.0166156	0.012	0.13034	0.001044	1.43E-01	0.003	0.05586	0.0009618	5.98E-02	1679.051963	0.023059596	0.038727655	49,072	0.1184%
2019	Annual	Riverside (SC)	T7 Ag	DSL	Aggregated	Aggregated	0.9324654	16.646549	3.5012862	0.0152188	0.036	0.06174	0.4193426	5.17E-01	0.009	0.02646	0.401202	4.37E-01	1610.881596	0.043310604	0.253208154	150	0.0004%
2020	Annual	Riverside (SC)	T7 CAIRP	DSL	Aggregated	Aggregated	0.092498	3.5542427	0.3839447	0.0129248	0.036	0.06174	0.061619	1.59E-01	0.009	0.02646	0.0589534	9.44E-02	1368.063372	0.004296292	0.215040511	266,457	0.6427%
2016	Annual	Riverside (SC)	T7 CAIRP construction	DSL	Aggregated	Aggregated	0.0916693	3.5109993	0.3809339	0.0134132	0.036	0.06174	0.0610289	1.59E-01	0.009	0.02646	0.0583888	9.38E-02	1419.757405	0.004257802	0.223166093	29,836	0.0720%
2016	Annual	Riverside (SC)	T7 NNOOS	DSL	Aggregated	Aggregated	0.0928414	2.9427615	0.4197506	0.0123952	0.036	0.06174	0.0706196	1.68E-01	0.009	0.02646	0.0675646	1.03E-01	1312.01077	0.004312243	0.206229822	324,834	0.7835%
2016	Annual	Riverside (SC)	T7 NOOS	DSL	Aggregated	Aggregated	0.0930539	3.551748	0.3853159	0.0129352	0.036	0.06174	0.0619924	1.60E-01	0.009	0.02646	0.0593107	9.48E-02	1369.166164	0.004322114	0.215213854	104,686	0.2525%
2016	Annual	Riverside (SC)	T7 POLA	DSL	Aggregated	Aggregated	0.1106733	5.0219616	0.3322485	0.0146379	0.036	0.06174	0.0414027	1.39E-01	0.009	0.02646	0.0396116	7.51E-02	1549.392423	0.005140489	0.243542912	235,343	0.5676%
2016	Annual	Riverside (SC)	T7 Public	DSL	Aggregated	Aggregated	0.0786395	11.228091	0.3226871	0.0153015	0.036	0.06174	0.0637183	1.61E-01	0.009	0.02646	0.0609618	9.64E-02	1619.63603	0.0036526	0.254584229	16,468	0.0397%
2016	Annual	Riverside (SC)	T7 Single	DSL	Aggregated	Aggregated	0.1886806	5.0412013	0.7809259	0.0135979	0.036	0.06174	0.1372114	2.35E-01	0.009	0.02646	0.1312757	1.67E-01	1439.310135	0.008763725	0.22623951	176,773	0.4264%
2016	Annual	Riverside (SC)	T7 single construction	DSL	Aggregated	Aggregated	0.269355	6.8897334	1.0726427	0.0141659	0.036	0.06174	0.1833587	2.81E-01	0.009	0.02646	0.1754267	2.11E-01	1499.435234	0.012510844	0.235690338	74,017	0.1785%
2016	Annual	Riverside (SC)	T7 SWCV	DSL	Aggregated	Aggregated	0.0031535	19.864945	0.0238285	0.046542	0.036	0.06174	0.0182729	1.16E-01	0.009	0.02646	0.0174824	5.29E-02	4926.379377	0.000146474	0.774358234	4,304	0.0104%
2016	Annual	Riverside (SC)	T7 SWCV	NG	Aggregated	Aggregated	0.464211	4.3705599	12.886099	0	0.036	0.06174	0.0085708	1.06E-01	9.000E-03	2.646E-02	0.0082	4.37E-02	3390.077554	5.578321069	0.691089486	5,385	0.0130%
2016	Annual	Riverside (SC)	T7 tractor	DSL	Aggregated	Aggregated	0.2207992	5.7882832	0.8489915	0.0135715	0.036	0.06174	0.1293672	2.27E-01	0.009	0.02646	0.1237708	1.59E-01	1436.522079	0.01025555	0.225801266	415,914	1.0031%
2016	Annual	Riverside (SC)	T7 tractor construction	DSL	Aggregated	Aggregated	0.2621852	6.4027176	1.0018527	0.0142011	0.036	0.06174	0.152155	2.50E-01	0.009	0.02646	0.1455728	1.81E-01	1503.161899	0.012177823	0.236276118	61,057	0.1473%
2016	Annual	Riverside (SC)	T7 utility	DSL	Aggregated	Aggregated	0.0392248	4.3656633	0.157141	0.0145253	0.036	0.06174	0.0210387	1.19E-01	0.009	0.02646	0.0201286	5.56E-02	1537.475754	0.00182189	0.241669778	2,153	0.0052%
2016	Annual	Riverside (SC)	T7IS	GAS	Aggregated	Aggregated	1.0215609	6.7001651	42.954456	0.0219502	0.02	0.06174	0.0017682	8.35E-02	0.005	0.02646	0.001649	3.31E-02	2218.131977	0.174581754	0.201233616	564	0.0014%
2016	Annual	Riverside (SC)	UBUS	GAS	Aggregated	Aggregated	0.0119256	0.1845304	0.2243831	0.0145969	0.0095462	0.1050908	0.0003403	1.15E-01	0.0023866	0.0450389	0.0003129	4.77E-02	1475.060624	0.003963582	0.017998277	22,621	0.0546%
2016	Annual	Riverside (SC)	UBUS	DSL	Aggregated	Aggregated	0.0005351	0.4774607	0.0571564	0.0107879	0.012	0.1303401	0.0042703	1.47E-01	0.003	0.05586	0.0040856	6.29E-02	1141.140363	0.037451096	0.179371374	59	0.0001%
2016	Annual	Riverside (SC)	UBUS	ELEC	Aggregated	Aggregated	0	0	0	0	0.012	0.1303401	0	1.42E-01	0.003	0.05586	0	5.89E-02	0	0	0	1	0.0000%
2016	Annual	Riverside (SC)	UBUS	NG	Aggregated	Aggregated	0.0809672	0.4428518	43.798745	0	0.0294594	0.0804354	0.0030354	1.13E-01	0.0073648	0.0344723	0.0029041	4.47E-02	1857.263508	5.666787124	0.378615316	26,236	0.0633%
																						41,460,862	

Source: EMFAC2017, V1.0.2

2018 Riverside (SC) - Annual

calendar_year	season_month	sub_area	vehicle_class	Fuel	MdlYr	Speed	lbs/Mile														
							ROG_RUNEX	NOx_RUNEX	CO_RUNEX	SOx_RUNEX	PM10_PMTW	PM10_PMBW	PM10_RUNEX	PM10_Total	PM2_5_PMTW	PM2_5_PMBW	PM2_5_RUNEX	PM2_5_Total	CO2(Pavley+ACC)_RUNEX	CH4_RUNEX	N2O_RUNEX
2018	Annual	Riverside (SC)	All Other Buses	DSL	Aggregated	Aggregated	7.806E-04	1.383E-02	2.381E-03	2.122E-05	2.646E-05	2.873E-04	5.040E-04	8.178E-04	6.614E-06	1.231E-04	4.822E-04	6.120E-04	2.247E+00	3.626E-05	3.531E-04
2018	Annual	Riverside (SC)	LDA	GAS	Aggregated	Aggregated	3.598E-05	1.369E-04	1.968E-03	6.277E-06	1.764E-05	8.102E-05	3.155E-06	1.018E-04	4.409E-06	3.472E-05	2.901E-06	4.203E-05	6.344E-01	8.659E-06	1.344E-05
2018	Annual	Riverside (SC)	LDA	DSL	Aggregated	Aggregated	4.261E-05	3.177E-04	5.012E-04	4.468E-06	1.764E-05	8.102E-05	2.512E-05	1.238E-04	4.409E-06	3.472E-05	2.403E-05	6.317E-05	4.727E-01	1.979E-06	7.430E-05
2018	Annual	Riverside (SC)	LDA	ELEC	Aggregated	Aggregated	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.764E-05	8.102E-05	0.000E+00	9.866E-05	4.409E-06	3.472E-05	0.000E+00	3.913E-05	0.000E+00	0.000E+00	0.000E+00
2018	Annual	Riverside (SC)	LDT1	GAS	Aggregated	Aggregated	1.245E-04	4.900E-04	5.099E-03	7.391E-06	1.764E-05	8.102E-05	6.175E-06	1.048E-04	4.409E-06	3.472E-05	5.681E-06	4.481E-05	7.468E-01	2.703E-05	3.290E-05
2018	Annual	Riverside (SC)	LDT1	DSL	Aggregated	Aggregated	5.584E-04	3.217E-03	3.335E-03	8.562E-06	1.764E-05	8.102E-05	4.393E-04	5.379E-04	4.409E-06	3.472E-05	4.203E-04	4.594E-04	9.057E-01	2.594E-05	1.424E-04
2018	Annual	Riverside (SC)	LDT1	ELEC	Aggregated	Aggregated	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.764E-05	8.102E-05	0.000E+00	9.866E-05	4.409E-06	3.472E-05	0.000E+00	3.913E-05	0.000E+00	0.000E+00	0.000E+00
2018	Annual	Riverside (SC)	LDT2	GAS	Aggregated	Aggregated	5.941E-05	2.972E-04	2.858E-03	8.110E-06	1.764E-05	8.102E-05	3.419E-06	1.021E-04	4.409E-06	3.472E-05	3.145E-06	4.228E-05	8.196E-01	1.353E-05	2.199E-05
2018	Annual	Riverside (SC)	LDT2	DSL	Aggregated	Aggregated	4.952E-05	2.084E-04	3.090E-04	6.101E-06	1.764E-05	8.102E-05	2.625E-05	1.249E-04	4.409E-06	3.472E-05	2.511E-05	6.425E-05	6.453E-01	2.300E-06	1.014E-04
2018	Annual	Riverside (SC)	LDT2	ELEC	Aggregated	Aggregated	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.764E-05	8.102E-05	0.000E+00	9.866E-05	4.409E-06	3.472E-05	0.000E+00	3.913E-05	0.000E+00	0.000E+00	0.000E+00
2018	Annual	Riverside (SC)	LHD1	GAS	Aggregated	Aggregated	1.031E-04	6.931E-04	2.801E-03	1.761E-05	1.764E-05	1.685E-04	2.658E-06	1.888E-04	4.409E-06	7.222E-05	2.449E-06	7.908E-05	1.779E+00	2.030E-05	4.091E-05
2018	Annual	Riverside (SC)	LHD1	DSL	Aggregated	Aggregated	2.407E-04	8.658E-03	1.647E-03	1.045E-05	2.646E-05	1.685E-04	5.438E-05	2.494E-04	6.614E-06	7.222E-05	5.203E-05	1.309E-04	1.105E+00	1.118E-05	1.737E-04
2018	Annual	Riverside (SC)	LHD2	GAS	Aggregated	Aggregated	6.190E-05	5.905E-04	1.690E-03	2.015E-05	1.764E-05	1.966E-04	2.119E-06	2.164E-04	4.409E-06	8.426E-05	1.949E-06	9.062E-05	2.036E+00	1.364E-05	3.760E-05
2018	Annual	Riverside (SC)	LHD2	DSL	Aggregated	Aggregated	2.000E-04	6.873E-03	1.353E-03	1.138E-05	2.646E-05	1.966E-04	4.725E-05	2.703E-04	6.614E-06	8.426E-05	4.520E-05	1.361E-04	1.204E+00	9.291E-06	1.892E-04
2018	Annual	Riverside (SC)	MCY	GAS	Aggregated	Aggregated	4.900E-03	2.517E-03	4.536E-02	4.528E-06	8.818E-06	2.593E-05	3.441E-06	3.819E-05	2.205E-06	1.111E-05	3.229E-06	1.655E-05	4.576E-01	7.135E-04	1.452E-04
2018	Annual	Riverside (SC)	MDV	GAS	Aggregated	Aggregated	8.293E-05	3.819E-04	3.420E-03	9.903E-06	1.764E-05	8.102E-05	3.447E-06	1.021E-04	4.409E-06	3.472E-05	3.174E-06	4.231E-05	1.001E+00	1.783E-05	2.746E-05
2018	Annual	Riverside (SC)	MDV	DSL	Aggregated	Aggregated	2.999E-05	2.198E-04	4.326E-04	8.155E-06	1.764E-05	8.102E-05	1.541E-05	1.141E-04	4.409E-06	3.472E-05	1.474E-05	5.387E-05	8.627E-01	1.393E-06	1.356E-04
2018	Annual	Riverside (SC)	MDV	ELEC	Aggregated	Aggregated	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.764E-05	8.102E-05	0.000E+00	9.866E-05	4.409E-06	3.472E-05	0.000E+00	3.913E-05	0.000E+00	0.000E+00	0.000E+00
2018	Annual	Riverside (SC)	MH	GAS	Aggregated	Aggregated	1.842E-04	1.258E-03	6.067E-03	3.721E-05	2.646E-05	2.873E-04	3.052E-06	3.169E-04	6.614E-06	1.231E-04	2.810E-06	1.326E-04	3.760E+00	3.960E-05	7.075E-05
2018	Annual	Riverside (SC)	MH	DSL	Aggregated	Aggregated	1.663E-04	1.083E-02	8.086E-04	1.989E-05	3.527E-05	2.873E-04	3.500E-04	6.726E-04	8.818E-06	1.231E-04	3.348E-04	4.668E-04	2.104E+00	7.726E-06	3.307E-04
2018	Annual	Riverside (SC)	Motor Coach	DSL	Aggregated	Aggregated	5.612E-04	1.283E-02	2.122E-03	3.147E-05	2.646E-05	2.873E-04	3.125E-04	6.263E-04	6.614E-06	1.231E-04	2.990E-04	4.287E-04	3.331E+00	2.607E-05	5.236E-04
2018	Annual	Riverside (SC)	OBUS	GAS	Aggregated	Aggregated	1.960E-04	1.638E-03	5.451E-03	3.714E-05	2.646E-05	2.873E-04	1.480E-06	3.153E-04	6.614E-06	1.231E-04	1.363E-06	1.311E-04	3.753E+00	3.984E-05	7.554E-05
2018	Annual	Riverside (SC)	PTO	DSL	Aggregated	Aggregated	1.100E-03	1.741E-02	3.763E-03	4.361E-05	0.000E+00	0.000E+00	3.643E-04	3.643E-04	0.000E+00	0.000E+00	3.486E-04	3.486E-04	4.616E+00	5.108E-05	7.256E-04
2018	Annual	Riverside (SC)	SBUS	GAS	Aggregated	Aggregated	1.522E-04	8.301E-04	3.504E-03	1.972E-05	1.764E-05	1.642E-03	1.625E-06	1.661E-03	4.409E-06	7.037E-04	1.494E-06	7.096E-04	1.993E+00	2.934E-05	4.996E-05
2018	Annual	Riverside (SC)	SBUS	DSL	Aggregated	Aggregated	3.179E-04	1.805E-02	8.360E-04	2.659E-05	2.646E-05	1.642E-03	1.172E-04	1.786E-03	6.614E-06	7.037E-04	1.121E-04	8.224E-04	2.814E+00	1.476E-05	4.423E-04
2018	Annual	Riverside (SC)	T6 Ag	DSL	Aggregated	Aggregated	1.127E-03	2.182E-02	3.329E-03	2.167E-05	2.646E-05	2.873E-04	6.066E-04	9.204E-04	6.614E-06	1.231E-04	5.803E-04	7.101E-04	2.294E+00	5.237E-05	3.606E-04
2018	Annual	Riverside (SC)	T6 CAIRP heavy	DSL	Aggregated	Aggregated	1.166E-04	3.789E-03	4.727E-04	1.876E-05	2.646E-05	2.873E-04	9.793E-05	4.117E-04	6.614E-06	1.231E-04	9.370E-05	2.235E-04	1.986E+00	5.415E-06	3.122E-04
2018	Annual	Riverside (SC)	T6 CAIRP small	DSL	Aggregated	Aggregated	2.154E-04	4.940E-03	8.658E-04	1.982E-05	2.646E-05	2.873E-04	1.858E-04	4.996E-04	6.614E-06	1.231E-04	1.777E-04	3.075E-04	2.098E+00	1.000E-05	3.297E-04
2018	Annual	Riverside (SC)	T6 instate construction heavy	DSL	Aggregated	Aggregated	4.886E-04	1.058E-02	1.596E-03	2.080E-05	2.646E-05	2.873E-04	3.391E-04	6.529E-04	6.614E-06	1.231E-04	3.244E-04	4.542E-04	2.202E+00	2.270E-05	3.461E-04
2018	Annual	Riverside (SC)	T6 instate construction small	DSL	Aggregated	Aggregated	4.257E-04	8.311E-03	1.600E-03	2.061E-05	2.646E-05	2.873E-04	3.371E-04	6.509E-04	6.614E-06	1.231E-04	3.225E-04	4.523E-04	2.182E+00	1.977E-05	3.429E-04
2018	Annual	Riverside (SC)	T6 instate heavy	DSL	Aggregated	Aggregated	4.867E-04	1.056E-02	1.584E-03	1.994E-05	2.646E-05	2.873E-04	3.335E-04	6.473E-04	6.614E-06	1.231E-04	3.191E-04	4.488E-04	2.110E+00	2.261E-05	3.317E-04
2018	Annual	Riverside (SC)	T6 instate small	DSL	Aggregated	Aggregated	4.473E-04	8.473E-03	1.709E-03	2.063E-05	2.646E-05	2.873E-04	3.632E-04	6.770E-04	6.614E-06	1.231E-04	3.475E-04	4.772E-04	2.184E+00	2.078E-05	3.433E-04
2018	Annual	Riverside (SC)	T6 OOS heavy	DSL	Aggregated	Aggregated	1.164E-04	3.703E-03	4.839E-04	1.878E-05	2.646E-05	2.873E-04	1.003E-04	4.141E-04	6.614E-06	1.231E-04	9.593E-05	2.257E-04	1.987E+00	5.408E-06	3.124E-04
2018	Annual	Riverside (SC)	T6 OOS small	DSL	Aggregated	Aggregated	2.168E-04	4.948E-03	8.742E-04	1.983E-05	2.646E-05	2.873E-04	1.876E-04	5.014E-04	6.614E-06	1.231E-04	1.795E-04	3.093E-04	2.098E+00	1.007E-05	3.299E-04
2018	Annual	Riverside (SC)	T6 Public	DSL	Aggregated	Aggregated	1.288E-04	1.821E-02	3.733E-04	2.226E-05	2.646E-05	2.873E-04	9.992E-05	4.137E-04	6.614E-06	1.231E-04	9.560E-05	2.254E-04	2.356E+00	5.982E-06	3.703E-04
2018	Annual	Riverside (SC)	T6 utility	DSL	Aggregated	Aggregated	3.827E-05	4.021E-03	1.501E-04	2.021E-05	2.646E-05	2.873E-04	2.612E-05	3.399E-04	6.614E-06	1.231E-04	2.499E-05	1.548E-04	2.139E+00	1.778E-06	3.363E-04
2018	Annual	Riverside (SC)	T6TS	GAS	Aggregated	Aggregated	2.614E-04	1.911E-03	7.342E-03	3.663E-05	2.646E-05	2.873E-04	2.302E-06	3.161E-04	6.614E-06	1.231E-04	2.120E-06	1.319E-04	3.702E+00	5.084E-05	8.538E-05
2019	Annual	Riverside (SC)	T7 Ag	DSL	Aggregated	Aggregated	2.056E-03	3.670E-02	7.719E-03	3.355E-05	7.937E-05	1.361E-04	9.245E-04	1.140E-03	1.984E-05	5.833E-05	8.845E-04	9.627E-04	3.551E+00	9.548E-05	5.582E-04
2020	Annual	Riverside (SC)	T7 CAIRP	DSL	Aggregated	Aggregated	2.039E-04	7.836E-03	8.464E-04	2.849E-05	7.937E-05	1.361E-04	1.358E-04	3.513E-04	1.984E-05	5.833E-05	1.300E-04	2.081E-04	3.016E+00	9.472E-06	4.741E-04
2016	Annual	Riverside (SC)	T7 CAIRP construction	DSL	Aggregated	Aggregated	2.021E-04	7.740E-03	8.398E-04	2.957E-05	7.937E-05	1.361E-04	1.345E-04	3.500E-04	1.984E-05	5.833E-05	1.287E-04	2.069E-04	3.130E+00	9.387E-06	4.920E-04
2016	Annual	Riverside (SC)	T7 NNOOS	DSL	Aggregated	Aggregated	2.047E-04	6.488E-03	9.254E-04	2.733E-05	7.937E-05	1.361E-04	1.557E-04	3.712E-04	1.984E-05	5.833E-05	1.490E-04	2.271E-04	2.892E+00	9.507E-06	4.547E-04
2016	Annual	Riverside (SC)	T7 NOOS	DSL	Aggregated	Aggregated	2.051E-04	7.830E-03	8.495E-04	2.852E-05	7.937E-05	1.361E-04	1.367E-04	3.521E-04	1.984E-05	5.833E-05	1.308E-04	2.089E-04	3.018E+00	9.529E-06	4.745E-04
2016	Annual	Riverside (SC)	T7 POLA	DSL	Aggregated	Aggregated	2.440E-04	1.107E-02	7.325E-04	3.227E-05	7.937E-05	1.361E-04	9.128E-05	3.068E-04	1.984E-05	5.833E-05	8.733E-05	1.655E-04	3.416E+00	1.133E-05	5.369E-04
2016	Annual	Riverside (SC)	T7 Public	DSL	Aggregated	Aggregated	1.734E-04	2.475E-02	7.114E-04	3.373E-05	7.937E-05	1.361E-04	1.405E-04	3.560E-04	1.984E-05	5.833E-05	1.344E-04	2.126E-04	3.571E+00	8.053E-06	5.613E-04
2016	Annual	Riverside (SC)	T7 Single	DSL	Aggregated	Aggregated	4.160E-04	1.111E-02	1.722E-03	2.998E-05	7.937E-05	1.361E-04	3.025E-04	5.180E-04	1.984E-05	5.833E-05	2.894E-04	3.676E-04	3.173E+00	1.932E-05	4.988E-04
2016	Annual	Riverside (SC)	T7 single construction	DSL	Aggregated	Aggregated	5.938E-04	1.519E-02	2.365E-03	3.123E-05	7.937E-05	1.361E-04	4.042E-04	6.197E-04	1.984E-05	5.833E-05	3.867E-04	4.649E-04	3.306E+00	2.758E-05	5.196E-04
2016	Annual	Riverside (SC)	T7 SWCV	DSL	Aggregated	Aggregated	6.952E-06	4.379E-02	5.253E-05	1.026E-04	7.937E-05	1.361E-04	4.028E-05	2.558E-04	1.984E-05	5.833E-05	3.854E-05	1.167E-04	1.086E+01	3.229E-07	1.707E-03
2016	Annual	Riverside (SC)	T7 SWCV	NG	Aggregated	Aggregated	1.023E-03	9.635E-03	2.841E-02	0.000E+00	7.937E-05	1.361E-04	1.890E-05	2.344E-04	1.984E-05	5.833E-05	1.808E-05	9.625E-05	7.474E+00	1.230E-02	1.524E-03
2016	Annual	Riverside (SC)	T7 tractor	DSL	Aggregated	Aggregated	4.868E-04	1.276E-02	1.872E-03	2.992E-05	7.937E-05	1.361E-04	2.852E-04	5.007E-04	1.984E-05	5.833E-05	2.729E-04	3.510E-04	3.167E+00	2.261E-05	4.978E-04
2016	Annual	Riverside (SC)	T7 tractor construction	DSL	Aggregated	Aggregated	5.780E-04	1.412E-02	2.209E-03	3.131E-05	7.937E-05	1.361E-04	3.354E-04	5.509E-04	1.984E-05	5.833E-05	3.209E-04	3.991E-04	3.314E+00	2.685E-05	5.209E-04
2016	Annual	Riverside (SC)	T7 utility	DSL	Aggregated	Aggregated	8.647E-05	9.625E-03	3.464E-04	3.202E-05	7.937E-05	1.361E-04	4.638E-05	2.619E-04	1.984E-05	5.833E-05	4.438E-05	1.226E-04	3.390E+00	4.017E-06	5.328E-04
2016	Annual	Riverside (SC)	T7IS	GAS	Aggregated	Aggregated	2.252E-03	1.477E-02	9.470E-02	4.839E-05	4.409E-05	1.361E-04	3.898E-06	1.841E-04	1.102E-05	5.833E-05	3.635E-06	7.299E-05	4.890E+00	3.849E-04	4.436E-04
2016	Annual	Riverside (SC)	UBUS	GAS	Aggregated	Aggregated	2.629E-05	4.068E-04	4.947E-04	3.218E-05	2.105E-05	2.317E-04	7.502E-07	2.535E-04	5.261E-06	9.929E-05	6.898E-07	1.052E-04	3.252E+00	8.738E-06	3.968E-05
2016	Annual	Riverside (SC)	UBUS	DSL	Aggregated	Aggregated	1.180E-06	1.053E-03	1.260E-04	2.378E-05	2.646E-05	2.873E-04	9.414E-06	3.232E-04	6.614E-06	1.231E-04	9.007E-06	1.388E-04	2.516E+00	8.256E-05	3.954E-04
2016	Annual	Riverside (SC)	UBUS	ELEC	Aggregated	Aggregated	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.646E-05	2.873E-04	0.000E+00	3.138E-04	6.614E-06	1.231E-04	0.000E+00	1.298E-04	0.000E+00	0.000E+00	0.000E+00
2016	Annual	Riverside (SC)	UBUS	NG	Aggregated	Aggregated	1.785E-04	9.763E-04	9.656E-02	0.000E+00	6.495E-05	1.773E-04	6.692E-06	2.490E-04	1.624E-05	7.600E-05	6.402E-06	9.864E-05	4.095E+00	1.249E-02	8.347E-04

Source: EMFAC2017, V1.0.2

2018 Riverside (SC) - Annual 1.0E-06 MTons/Mile

calendar_year	season_month	sub_area	vehicle_class	Fuel	MdlYr	Speed	ROG_RUNEX	NOx_RUNEX	CO_RUNEX	SOx_RUNEX	PM10_PMTW	PM10_PMBW	PM10_RUNEX	PM10_Total	PM2_5_PMTW	PM2_5_PMBW	PM2_5_RUNEX	PM2_5_Total	CO2(Pavley+ACC)_RUNEX	CH4_RUNEX	N2O_RUNEX
2018	Annual	Riverside (SC)	All Other Buses	DSL	Aggregated	Aggregated	3.541E-07	6.274E-06	1.080E-06	9.627E-09	1.200E-08	1.303E-07	2.286E-07	3.710E-07	3.000E-09	5.586E-08	2.187E-07	2.776E-07	1.019E-03	1.645E-08	1.602E-07
2018	Annual	Riverside (SC)	LDA	GAS	Aggregated	Aggregated	1.632E-08	6.210E-08	8.926E-07	2.847E-09	8.000E-09	3.675E-08	1.431E-09	4.618E-08	2.000E-09	1.575E-08	1.316E-09	1.907E-08	2.877E-04	3.928E-09	6.099E-09
2018	Annual	Riverside (SC)	LDA	DSL	Aggregated	Aggregated	1.933E-08	1.441E-07	2.274E-07	2.027E-09	8.000E-09	3.675E-08	1.139E-08	5.614E-08	2.000E-09	1.575E-08	1.090E-08	2.865E-08	2.144E-04	8.977E-10	3.370E-08
2018	Annual	Riverside (SC)	LDA	ELEC	Aggregated	Aggregated	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.000E-09	3.675E-08	0.000E+00	4.475E-08	2.000E-09	1.575E-08	0.000E+00	1.775E-08	0.000E+00	0.000E+00	0.000E+00
2018	Annual	Riverside (SC)	LDT1	GAS	Aggregated	Aggregated	5.649E-08	2.223E-07	2.313E-06	3.352E-09	8.000E-09	3.675E-08	2.801E-09	4.755E-08	2.000E-09	1.575E-08	2.577E-09	2.033E-08	3.388E-04	1.226E-08	1.492E-08
2018	Annual	Riverside (SC)	LDT1	DSL	Aggregated	Aggregated	2.533E-07	1.459E-06	1.513E-06	3.884E-09	8.000E-09	3.675E-08	1.992E-07	2.440E-07	2.000E-09	1.575E-08	1.906E-07	2.084E-07	4.108E-04	1.177E-08	6.457E-08
2018	Annual	Riverside (SC)	LDT1	ELEC	Aggregated	Aggregated	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.000E-09	3.675E-08	0.000E+00	4.475E-08	2.000E-09	1.575E-08	0.000E+00	1.775E-08	0.000E+00	0.000E+00	0.000E+00
2018	Annual	Riverside (SC)	LDT2	GAS	Aggregated	Aggregated	2.695E-08	1.348E-07	1.296E-06	3.679E-09	8.000E-09	3.675E-08	1.551E-09	4.630E-08	2.000E-09	1.575E-08	1.427E-09	1.918E-08	3.717E-04	6.135E-09	9.977E-09
2018	Annual	Riverside (SC)	LDT2	DSL	Aggregated	Aggregated	2.246E-08	9.453E-08	1.402E-07	2.767E-09	8.000E-09	3.675E-08	1.191E-08	5.666E-08	2.000E-09	1.575E-08	1.139E-08	2.914E-08	2.927E-04	1.043E-09	4.601E-08
2018	Annual	Riverside (SC)	LDT2	ELEC	Aggregated	Aggregated	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.000E-09	3.675E-08	0.000E+00	4.475E-08	2.000E-09	1.575E-08	0.000E+00	1.775E-08	0.000E+00	0.000E+00	0.000E+00
2018	Annual	Riverside (SC)	LHD1	GAS	Aggregated	Aggregated	4.675E-08	3.144E-07	1.270E-06	7.987E-09	8.000E-09	7.644E-08	1.206E-09	8.565E-08	2.000E-09	3.276E-08	1.111E-09	3.587E-08	8.071E-04	9.210E-09	1.856E-08
2018	Annual	Riverside (SC)	LHD1	DSL	Aggregated	Aggregated	1.092E-07	3.927E-06	7.472E-07	4.740E-09	1.200E-08	7.644E-08	2.467E-08	1.131E-07	3.000E-09	3.276E-08	2.360E-08	5.936E-08	5.014E-04	5.071E-09	7.881E-08
2018	Annual	Riverside (SC)	LHD2	GAS	Aggregated	Aggregated	2.808E-08	2.678E-07	7.664E-07	9.138E-09	8.000E-09	8.918E-08	9.613E-10	9.814E-08	2.000E-09	3.822E-08	8.840E-10	4.110E-08	9.234E-04	6.188E-09	1.705E-08
2018	Annual	Riverside (SC)	LHD2	DSL	Aggregated	Aggregated	9.073E-08	3.118E-06	6.138E-07	5.161E-09	1.200E-08	8.918E-08	2.143E-08	1.226E-07	3.000E-09	3.822E-08	2.050E-08	6.172E-08	5.459E-04	4.214E-09	8.581E-08
2018	Annual	Riverside (SC)	MCY	GAS	Aggregated	Aggregated	2.223E-06	1.142E-06	2.058E-05	2.054E-09	4.000E-09	1.176E-08	1.561E-09	1.732E-08	1.000E-09	5.040E-09	1.465E-09	7.505E-09	2.076E-04	3.237E-07	6.587E-08
2018	Annual	Riverside (SC)	MDV	GAS	Aggregated	Aggregated	3.762E-08	1.732E-07	1.551E-06	4.492E-09	8.000E-09	3.675E-08	1.563E-09	4.631E-08	2.000E-09	1.575E-08	1.440E-09	1.919E-08	4.539E-04	8.088E-09	1.246E-08
2018	Annual	Riverside (SC)	MDV	DSL	Aggregated	Aggregated	1.360E-08	9.970E-08	1.962E-07	3.699E-09	8.000E-09	3.675E-08	6.988E-09	5.174E-08	2.000E-09	1.575E-08	6.686E-09	2.444E-08	3.913E-04	6.319E-10	6.151E-08
2018	Annual	Riverside (SC)	MDV	ELEC	Aggregated	Aggregated	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.000E-09	3.675E-08	0.000E+00	4.475E-08	2.000E-09	1.575E-08	0.000E+00	1.775E-08	0.000E+00	0.000E+00	0.000E+00
2018	Annual	Riverside (SC)	MH	GAS	Aggregated	Aggregated	8.356E-08	5.705E-07	2.752E-06	1.688E-08	1.200E-08	1.303E-07	1.384E-09	1.437E-07	3.000E-09	5.586E-08	1.275E-09	6.013E-08	1.706E-03	1.796E-08	3.209E-08
2018	Annual	Riverside (SC)	MH	DSL	Aggregated	Aggregated	7.545E-08	4.911E-06	3.668E-07	9.022E-09	1.600E-08	1.303E-07	1.587E-07	3.051E-07	4.000E-09	5.586E-08	1.519E-07	2.117E-07	9.543E-04	3.504E-09	1.500E-07
2018	Annual	Riverside (SC)	Motor Coach	DSL	Aggregated	Aggregated	2.546E-07	5.818E-06	9.627E-07	1.427E-08	1.200E-08	1.303E-07	1.417E-07	2.841E-07	3.000E-09	5.586E-08	1.356E-07	1.945E-07	1.511E-03	1.182E-08	2.375E-07
2018	Annual	Riverside (SC)	OBUS	GAS	Aggregated	Aggregated	8.890E-08	7.429E-07	2.472E-06	1.684E-08	1.200E-08	1.303E-07	6.712E-10	1.430E-07	3.000E-09	5.586E-08	6.181E-10	5.948E-08	1.702E-03	1.807E-08	3.427E-08
2018	Annual	Riverside (SC)	PTO	DSL	Aggregated	Aggregated	4.989E-07	7.898E-06	1.707E-06	1.978E-08	0.000E+00	0.000E+00	1.653E-07	1.653E-07	0.000E+00	0.000E+00	1.581E-07	1.581E-07	2.094E-03	2.317E-08	3.291E-07
2018	Annual	Riverside (SC)	SBUS	GAS	Aggregated	Aggregated	6.906E-08	3.765E-07	1.590E-06	8.946E-09	8.000E-09	7.448E-07	7.369E-10	7.535E-07	2.000E-09	3.192E-07	6.775E-10	3.219E-07	9.041E-04	1.331E-08	2.266E-08
2018	Annual	Riverside (SC)	SBUS	DSL	Aggregated	Aggregated	1.442E-07	8.186E-06	3.792E-07	1.206E-08	1.200E-08	7.448E-07	5.316E-08	8.100E-07	3.000E-09	3.192E-07	5.086E-08	3.731E-07	1.276E-03	6.697E-09	2.006E-07
2018	Annual	Riverside (SC)	T6 Ag	DSL	Aggregated	Aggregated	5.114E-07	9.897E-06	1.510E-06	9.830E-09	1.200E-08	1.303E-07	2.751E-07	4.175E-07	3.000E-09	5.586E-08	2.632E-07	3.221E-07	1.041E-03	2.375E-08	1.636E-07
2018	Annual	Riverside (SC)	T6 CAIRP heavy	DSL	Aggregated	Aggregated	5.289E-08	1.719E-06	2.144E-07	8.511E-09	1.200E-08	1.303E-07	4.442E-08	1.868E-07	3.000E-09	5.586E-08	4.250E-08	1.014E-07	9.009E-04	2.456E-09	1.416E-07
2018	Annual	Riverside (SC)	T6 CAIRP small	DSL	Aggregated	Aggregated	9.769E-08	2.241E-06	3.927E-07	8.990E-09	1.200E-08	1.303E-07	8.427E-08	2.266E-07	3.000E-09	5.586E-08	8.062E-08	1.395E-07	9.515E-04	4.538E-09	1.496E-07
2018	Annual	Riverside (SC)	T6 instate construction heavy	DSL	Aggregated	Aggregated	2.216E-07	4.797E-06	7.239E-07	9.437E-09	1.200E-08	1.303E-07	1.538E-07	2.962E-07	3.000E-09	5.586E-08	1.472E-07	2.060E-07	9.988E-04	1.029E-08	1.570E-07
2018	Annual	Riverside (SC)	T6 instate construction small	DSL	Aggregated	Aggregated	1.931E-07	3.770E-06	7.258E-07	9.349E-09	1.200E-08	1.303E-07	1.529E-07	2.952E-07	3.000E-09	5.586E-08	1.463E-07	2.051E-07	9.895E-04	8.970E-09	1.555E-07
2018	Annual	Riverside (SC)	T6 instate heavy	DSL	Aggregated	Aggregated	2.208E-07	4.792E-06	7.185E-07	9.043E-09	1.200E-08	1.303E-07	1.513E-07	2.936E-07	3.000E-09	5.586E-08	1.447E-07	2.036E-07	9.572E-04	1.025E-08	1.505E-07
2018	Annual	Riverside (SC)	T6 instate small	DSL	Aggregated	Aggregated	2.029E-07	3.843E-06	7.752E-07	9.358E-09	1.200E-08	1.303E-07	1.647E-07	3.071E-07	3.000E-09	5.586E-08	1.576E-07	2.165E-07	9.905E-04	9.425E-09	1.557E-07
2018	Annual	Riverside (SC)	T6 OOS heavy	DSL	Aggregated	Aggregated	5.282E-08	1.680E-06	2.195E-07	8.517E-09	1.200E-08	1.303E-07	4.548E-08	1.878E-07	3.000E-09	5.586E-08	4.351E-08	1.024E-07	9.015E-04	2.453E-09	1.417E-07
2018	Annual	Riverside (SC)	T6 OOS small	DSL	Aggregated	Aggregated	9.834E-08	2.244E-06	3.965E-07	8.993E-09	1.200E-08	1.303E-07	8.512E-08	2.275E-07	3.000E-09	5.586E-08	8.143E-08	1.403E-07	9.519E-04	4.568E-09	1.496E-07
2018	Annual	Riverside (SC)	T6 Public	DSL	Aggregated	Aggregated	5.842E-08	8.262E-06	1.693E-07	1.010E-08	1.200E-08	1.303E-07	4.532E-08	1.877E-07	3.000E-09	5.586E-08	4.336E-08	1.022E-07	1.069E-03	2.714E-09	1.680E-07
2018	Annual	Riverside (SC)	T6 utility	DSL	Aggregated	Aggregated	1.736E-08	1.824E-06	6.808E-08	9.168E-09	1.200E-08	1.303E-07	1.185E-08	1.542E-07	3.000E-09	5.586E-08	1.134E-08	7.020E-08	9.704E-04	8.063E-10	1.525E-07
2018	Annual	Riverside (SC)	T6TS	GAS	Aggregated	Aggregated	1.186E-07	8.669E-07	3.330E-06	1.662E-08	1.200E-08	1.303E-07	1.044E-09	1.434E-07	3.000E-09	5.586E-08	9.618E-10	5.982E-08	1.679E-03	2.306E-08	3.873E-08
2019	Annual	Riverside (SC)	T7 Ag	DSL	Aggregated	Aggregated	9.325E-07	1.665E-05	3.501E-06	1.522E-08	3.600E-08	6.174E-08	4.193E-07	5.171E-07	9.000E-09	2.646E-08	4.012E-07	4.367E-07	1.611E-03	4.331E-08	2.532E-07
2020	Annual	Riverside (SC)	T7 CAIRP	DSL	Aggregated	Aggregated	9.250E-08	3.554E-06	3.839E-07	1.292E-08	3.600E-08	6.174E-08	6.162E-08	1.594E-07	9.000E-09	2.646E-08	5.895E-08	9.441E-08	1.368E-03	4.296E-09	2.150E-07
2016	Annual	Riverside (SC)	T7 CAIRP construction	DSL	Aggregated	Aggregated	9.167E-08	3.511E-06	3.809E-07	1.341E-08	3.600E-08	6.174E-08	6.103E-08	1.588E-07	9.000E-09	2.646E-08	5.839E-08	9.385E-08	1.420E-03	4.258E-09	2.232E-07
2016	Annual	Riverside (SC)	T7 NNOOS	DSL	Aggregated	Aggregated	9.284E-08	2.943E-06	4.198E-07	1.240E-08	3.600E-08	6.174E-08	7.062E-08	1.684E-07	9.000E-09	2.646E-08	6.756E-08	1.030E-07	1.312E-03	4.312E-09	2.062E-07
2016	Annual	Riverside (SC)	T7 NOOS	DSL	Aggregated	Aggregated	9.305E-08	3.552E-06	3.853E-07	1.294E-08	3.600E-08	6.174E-08	6.199E-08	1.597E-07	9.000E-09	2.646E-08	5.931E-08	9.477E-08	1.369E-03	4.322E-09	2.152E-07
2016	Annual	Riverside (SC)	T7 POLA	DSL	Aggregated	Aggregated	1.107E-07	5.022E-06	3.322E-07	1.464E-08	3.600E-08	6.174E-08	4.140E-08	1.391E-07	9.000E-09	2.646E-08	3.961E-08	7.507E-08	1.549E-03	5.140E-09	2.435E-07
2016	Annual	Riverside (SC)	T7 Public	DSL	Aggregated	Aggregated	7.864E-08	1.123E-05	3.227E-07	1.530E-08	3.600E-08	6.174E-08	6.372E-08	1.615E-07	9.000E-09	2.646E-08	6.096E-08	9.642E-08	1.620E-03	3.653E-09	2.546E-07
2016	Annual	Riverside (SC)	T7 Single	DSL	Aggregated	Aggregated	1.887E-07	5.041E-06	7.809E-07	1.360E-08	3.600E-08	6.174E-08	1.372E-07	2.350E-07	9.000E-09	2.646E-08	1.313E-07	1.667E-07	1.439E-03	8.764E-09	2.262E-07
2016	Annual	Riverside (SC)	T7 single construction	DSL	Aggregated	Aggregated	2.694E-07	6.890E-06	1.073E-06	1.417E-08	3.600E-08	6.174E-08	1.834E-07	2.811E-07	9.000E-09	2.646E-08	1.754E-07	2.109E-07	1.499E-03	1.251E-08	2.357E-07
2016	Annual	Riverside (SC)	T7 SWCV	DSL	Aggregated	Aggregated	3.154E-09	1.986E-05	2.383E-08	4.654E-08	3.600E-08	6.174E-08	1.827E-08	1.160E-07	9.000E-09	2.646E-08	1.748E-08	5.294E-08	4.926E-03	1.465E-10	7.744E-07
2016	Annual	Riverside (SC)	T7 SWCV	NG	Aggregated	Aggregated	4.642E-07	4.371E-06	1.289E-05	0.000E+00	3.600E-08	6.174E-08	8.571E-09	1.063E-07	9.000E-09	2.646E-08	8.200E-09	4.366E-08	3.390E-03	5.578E-06	6.911E-07
2016	Annual	Riverside (SC)	T7 tractor	DSL	Aggregated	Aggregated	2.208E-07	5.788E-06	8.490E-07	1.357E-08	3.600E-08	6.174E-08	1.294E-07	2.271E-07	9.000E-09	2.646E-08	1.238E-07	1.592E-07	1.437E-03	1.026E-08	2.258E-07
2016	Annual	Riverside (SC)	T7 tractor construction	DSL	Aggregated	Aggregated	2.622E-07	6.403E-06	1.002E-06	1.420E-08	3.600E-08	6.174E-08	1.522E-07	2.499E-07	9.000E-09	2.646E-08	1.456E-07	1.810E-07	1.503E-03	1.218E-08	2.363E-07
2016	Annual	Riverside (SC)	T7 utility	DSL	Aggregated	Aggregated	3.922E-08	4.366E-06	1.571E-07	1.453E-08	3.600E-08	6.174E-08	2.104E-08	1.188E-07	9.000E-09	2.646E-08	2.013E-08	5.559E-08	1.537E-03	1.822E-09	2.417E-07
2016	Annual	Riverside (SC)	T7IS	GAS	Aggregated	Aggregated	1.022E-06	6.700E-06	4.295E-05	2.195E-08	2.000E-08	6.174E-08	1.768E-09	8.351E-08	5.000E-09	2.646E-08	1.649E-09	3.311E-08	2.218E-03	1.746E-07	2.012E-07
2016	Annual	Riverside (SC)	UBUS	GAS	Aggregated	Aggregated	1.193E-08	1.845E-07	2.244E-07	1.460E-08	9.546E-09	1.051E-07	3.403E-10	1.150E-07	2.387E-09	4.504E-08	3.129E-10	4.774E-08	1.475E-03	3.964E-09	1.800E-08
2016	Annual	Riverside (SC)	UBUS	DSL	Aggregated	Aggregated	5.351E-10	4.775E-07	5.716E-08	1.079E-08	1.200E-08	1.303E-07	4.270E-09	1.466E-07	3.000E-09	5.586E-08	4.086E-09	6.295E-08	1.141E-03	3.745E-08	1.794E-07
2016	Annual	Riverside (SC)	UBUS	ELEC	Aggregated	Aggregated	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.200E-08	1.303E-07	0.000E+00	1.423E-07	3.000E-09	5.586E-08	0.000E+00	5.886E-08	0.000E+00	0.000E+00	0.000E+00
2016	Annual	Riverside (SC)	UBUS	NG	Aggregated	Aggregated	8.097E-08	4.429E-07	4.380E-05	0.000E+00	2.946E-08	8.044E-08	3.035E-09	1.129E-07	7.365E-09	3.447E-08	2.904E-09	4.474E-08	1.857E-03	5.667E-06	3.786E-07

Source: EMFAC2017, V1.0.2

2040 Riverside (SC) - Annual

calendar_year	season_month	sub_area	vehicle_class	Fuel	MdlYr	Speed	ROG_RUNEX (g/mile)	NOx_RUNEX (g/mile)	CO_RUNEX (g/mile)	SOx_RUNEX (g/mile)	PM10_PMTW (g/mile)	PM10_PMBW (g/mile)	PM10_RUNEX (g/mile)	PM10_Total (g/mile)	PM2_5_PMTW (g/mile)	PM2_5_PMBW (g/mile)	PM2_5_RUNEX (g/mile)	PM2_5_Total (g/mile)	CO2(Pavley+ACC)_RUNEX (g/mile)	CH4_RUNEX (g/mile)	N2O_RUNEX (g/mile)	VMT	%VMT Total
2040	Annual	Riverside (SC)	All Other Buses	DSL	Aggregated	Aggregated	0.0075038	1.0701546	0.0601663	0.0071607	0.012	0.13034	0.0120105	1.54E-01	0.003	0.05586	0.011491	7.04E-02	757.9	0.000348534	0.119138245	12,847	0.0236%
2040	Annual	Riverside (SC)	LDA	GAS	Aggregated	Aggregated	0.001838	0.0169778	0.3863973	0.0019174	0.008	0.03675	0.0005394	4.53E-02	0.002	0.01575	0.000496	1.82E-02	193.7559849	0.000648263	0.002883082	28,828,531	53.0520%
2040	Annual	Riverside (SC)	LDA	DSL	Aggregated	Aggregated	0.0038601	0.0086682	0.1234309	0.0014127	0.008	0.03675	0.000826	4.56E-02	0.002	0.01575	0.0007902	1.85E-02	149.4381893	0.000179292	0.023489602	357,353	0.6576%
2040	Annual	Riverside (SC)	LDA	ELEC	Aggregated	Aggregated	0	0	0	0	0.008	0.03675	0	4.48E-02	0.002	0.01575	0	1.78E-02	0	0	0	1,674,934	3.0823%
2040	Annual	Riverside (SC)	LDT1	GAS	Aggregated	Aggregated	0.0024822	0.0197763	0.4102102	0.002234	0.008	0.03675	0.0006036	4.54E-02	0.002	0.01575	0.000555	1.83E-02	225.7546335	0.000805763	0.003105487	2,917,284	5.3686%
2040	Annual	Riverside (SC)	LDT1	DSL	Aggregated	Aggregated	0.0126072	0.0394606	0.1323314	0.0026914	0.008	0.03675	0.0043962	4.91E-02	0.002	0.01575	0.004206	2.20E-02	284.6987673	0.000585582	0.044750682	398	0.0007%
2040	Annual	Riverside (SC)	LDT1	ELEC	Aggregated	Aggregated	0	0	0	0	0.008	0.03675	0	4.48E-02	0.002	0.01575	0	1.78E-02	0	0	0	100,694	0.1853%
2040	Annual	Riverside (SC)	LDT2	GAS	Aggregated	Aggregated	0.0029117	0.0191102	0.4586994	0.002207	0.008	0.03675	0.0005597	4.53E-02	0.002	0.01575	0.0005147	1.83E-02	223.0213349	0.000947656	0.002972565	8,853,194	16.2922%
2040	Annual	Riverside (SC)	LDT2	DSL	Aggregated	Aggregated	0.0120491	0.0271532	0.1238943	0.001873	0.008	0.03675	0.0040134	4.88E-02	0.002	0.01575	0.0038398	2.16E-02	198.1276981	0.000559656	0.031142915	90,290	0.1662%
2040	Annual	Riverside (SC)	LDT2	ELEC	Aggregated	Aggregated	0	0	0	0	0.008	0.03675	0	4.48E-02	0.002	0.01575	0	1.78E-02	0	0	0	252,075	0.4639%
2040	Annual	Riverside (SC)	LHD1	GAS	Aggregated	Aggregated	0.0029332	0.0325	0.1070857	0.006299	0.008	0.07644	0.0009845	8.54E-02	0.002	0.03276	0.0009052	3.57E-02	636.5296282	0.000923188	0.003168983	490,933	0.9034%
2040	Annual	Riverside (SC)	LHD1	DSL	Aggregated	Aggregated	0.0317951	0.237984	0.1625559	0.0036269	0.012	0.07644	0.0062261	9.47E-02	3.000E-03	3.276E-02	0.0059568	4.17E-02	383.648813	0.00147682	0.060304251	509,105	0.9369%
2040	Annual	Riverside (SC)	LHD2	GAS	Aggregated	Aggregated	0.0029038	0.0361144	0.1057261	0.0072302	0.008	0.08918	0.000973	9.82E-02	0.002	0.03822	0.0008946	4.11E-02	730.6320516	0.000917134	0.003564743	75,451	0.1388%
2040	Annual	Riverside (SC)	LHD2	DSL	Aggregated	Aggregated	0.0344285	0.345174	0.1812601	0.0039872	0.012	0.08918	0.0121933	1.13E-01	0.003	0.03822	0.0116659	5.29E-02	421.7609039	0.001599136	0.066294941	202,538	0.3727%
2040	Annual	Riverside (SC)	MCY	GAS	Aggregated	Aggregated	2.0114316	1.1022442	16.721392	0.0020452	0.004	0.01176	0.0021416	1.79E-02	0.001	0.00504	0.0019966	8.04E-03	206.6752722	0.302853447	0.063846482	182,904	0.3366%
2040	Annual	Riverside (SC)	MDV	GAS	Aggregated	Aggregated	0.0034057	0.0225535	0.473564	0.0026993	0.008	0.03675	0.0005885	4.53E-02	0.002	0.01575	0.0005411	1.83E-02	272.7681005	0.001063768	0.003210369	5,676,217	10.4457%
2040	Annual	Riverside (SC)	MDV	DSL	Aggregated	Aggregated	0.0044139	0.0102178	0.13742	0.0024554	0.008	0.03675	0.0010305	4.58E-02	0.002	0.01575	0.0009859	1.87E-02	259.7295165	0.000205016	0.040825863	202,958	0.3735%
2040	Annual	Riverside (SC)	MDV	ELEC	Aggregated	Aggregated	0	0	0	0	0.008	0.03675	0	4.48E-02	0.002	0.01575	0	1.78E-02	0	0	0	187,585	0.3452%
2040	Annual	Riverside (SC)	MH	GAS	Aggregated	Aggregated	0.0080935	0.1005268	0.1560201	0.0131145	0.012	0.13034	0.0009516	1.43E-01	0.003	0.05586	0.000875	5.97E-02	1325.260137	0.002941268	0.011897797	24,722	0.0455%
2040	Annual	Riverside (SC)	MH	DSL	Aggregated	Aggregated	0.0406414	2.2409846	0.1588413	0.0074522	0.016	0.13034	0.0507306	1.97E-01	0.004	0.05586	0.048536	1.08E-01	788.2896076	0.001887717	0.123908149	11,766	0.0217%
2040	Annual	Riverside (SC)	Motor Coach	DSL	Aggregated	Aggregated	0.0148276	1.410983	0.1301301	0.0103872	0.012	0.13034	0.0189404	1.61E-01	0.003	0.05586	0.018121	7.70E-02	1099.469374	0.000688703	0.172821275	7,036	0.0129%
2040	Annual	Riverside (SC)	OBUS	GAS	Aggregated	Aggregated	0.0125082	0.1251438	0.288123	0.0128842	0.012	0.13034	0.0009757	1.43E-01	0.003	0.05586	0.0008971	5.98E-02	1301.988541	0.003006724	0.009314554	14,947	0.0275%
2040	Annual	Riverside (SC)	PTO	DSL	Aggregated	Aggregated	0.0256492	4.6459134	0.4110156	0.0149459	0	0	0.0049552	4.96E-03	0	0	0.0047408	4.74E-03	1581.993276	0.00119134	0.248667312	59,513	0.1095%
2040	Annual	Riverside (SC)	SBUS	GAS	Aggregated	Aggregated	0.0118298	0.1503876	0.2176633	0.0075556	0.008	0.7448002	0.0013623	7.54E-01	0.002	0.3192001	0.0012526	3.22E-01	763.5198722	0.002603345	0.013331897	13,603	0.0250%
2040	Annual	Riverside (SC)	SBUS	DSL	Aggregated	Aggregated	0.0223924	1.9758397	0.1486588	0.0086775	0.012	0.7448002	0.005895	7.63E-01	0.003	0.3192001	0.00564	3.28E-01	918.4982486	0.001040071	0.144375134	37,048	0.0682%
2040	Annual	Riverside (SC)	T6 Ag	DSL	Aggregated	Aggregated	0.0101599	2.1442525	0.081422	0.0095437	0.012	0.13034	0.0207858	1.63E-01	0.003	0.05586	0.0198866	7.87E-02	1010.185938	0.000471902	0.158787162	5	0.0000%
2040	Annual	Riverside (SC)	T6 CAIRP heavy	DSL	Aggregated	Aggregated	0.0062232	0.7235363	0.0499028	0.0058915	0.012	0.13034	0.0078222	1.50E-01	0.003	0.05586	0.0074839	6.63E-02	623.6091158	0.000289053	0.098022669	11,758	0.0216%
2040	Annual	Riverside (SC)	T6 CAIRP small	DSL	Aggregated	Aggregated	0.0063336	0.7480292	0.0507878	0.006531	0.012	0.13034	0.0081821	1.51E-01	0.003	0.05586	0.0078281	6.67E-02	691.2928551	0.000294179	0.10866161	1,545	0.0028%
2040	Annual	Riverside (SC)	T6 instate construction heavy	DSL	Aggregated	Aggregated	0.007715	1.0657264	0.0608698	0.0072783	0.012	0.13034	0.0121531	1.54E-01	0.003	0.05586	0.0116273	7.05E-02	770.3987347	0.000358341	0.121095953	41,304	0.0760%
2040	Annual	Riverside (SC)	T6 instate construction small	DSL	Aggregated	Aggregated	0.0066992	0.8330089	0.053696	0.0066852	0.012	0.13034	0.009363	1.52E-01	0.003	0.05586	0.008958	6.78E-02	707.6137306	0.000311162	0.111227024	64,467	0.1186%
2040	Annual	Riverside (SC)	T6 instate heavy	DSL	Aggregated	Aggregated	0.0070483	0.927498	0.0565171	0.0064305	0.012	0.13034	0.0105168	1.53E-01	0.003	0.05586	0.0100619	6.89E-02	680.6511655	0.000327376	0.106988885	303,514	0.5585%
2040	Annual	Riverside (SC)	T6 instate small	DSL	Aggregated	Aggregated	0.0066968	0.8328885	0.0537001	0.0066901	0.012	0.13034	0.0093673	1.52E-01	0.003	0.05586	0.008962	6.78E-02	708.1344131	0.000311051	0.111308868	407,436	0.7498%
2040	Annual	Riverside (SC)	T6 OOS heavy	DSL	Aggregated	Aggregated	0.0062165	0.7220031	0.0498488	0.005888	0.012	0.13034	0.0078003	1.50E-01	0.003	0.05586	0.0074628	6.63E-02	623.2300788	0.00028874	0.097963089	6,507	0.0120%
2040	Annual	Riverside (SC)	T6 OOS small	DSL	Aggregated	Aggregated	0.006352	0.7526581	0.050935	0.0065424	0.012	0.13034	0.0082421	1.51E-01	0.003	0.05586	0.0078855	6.67E-02	692.4998295	0.000295032	0.10885133	895	0.0016%
2040	Annual	Riverside (SC)	T6 Public	DSL	Aggregated	Aggregated	0.0095551	1.0959693	0.0559349	0.0070755	0.012	0.13034	0.0084576	1.51E-01	0.003	0.05586	0.0080917	6.70E-02	748.9281728	0.000443812	0.117721079	6,773	0.0125%
2040	Annual	Riverside (SC)	T6 utility	DSL	Aggregated	Aggregated	0.0053716	0.5339324	0.0430735	0.0065357	0.012	0.13034	0.0050453	1.47E-01	0.003	0.05586	0.004827	6.37E-02	691.7919024	0.000249495	0.108740053	3,156	0.0058%
2040	Annual	Riverside (SC)	T6TS	GAS	Aggregated	Aggregated	0.0080802	0.0831113	0.1712939	0.0127589	0.012	0.13034	0.0009868	1.43E-01	0.003	0.05586	0.0009073	5.98E-02	1289.319558	0.002132158	0.007463035	74,873	0.1378%
2040	Annual	Riverside (SC)	T7 Ag	DSL	Aggregated	Aggregated	0.0220361	3.8110198	0.1931353	0.0148581	0.036	0.06174	0.0399071	1.38E-01	0.009	0.02646	0.0381808	7.36E-02	1572.704563	0.001023518	0.247207256	8	0.0000%
2040	Annual	Riverside (SC)	T7 CAIRP	DSL	Aggregated	Aggregated	0.0163188	1.6212846	0.1432187	0.0082408	0.036	0.06174	0.0232102	1.21E-01	0.009	0.02646	0.0222061	5.77E-02	872.2689202	0.000757967	0.137108527	363,521	0.6690%
2040	Annual	Riverside (SC)	T7 CAIRP construction	DSL	Aggregated	Aggregated	0.016424	1.6361478	0.1441414	0.009124	0.036	0.06174	0.0235112	1.21E-01	0.009	0.02646	0.0224941	5.80E-02	965.7629245	0.00076285	0.151804483	29,669	0.0546%
2040	Annual	Riverside (SC)	T7 NNOOS	DSL	Aggregated	Aggregated	0.0153112	1.4753207	0.1343751	0.00823	0.036	0.06174	0.0203242	1.18E-01	0.009	0.02646	0.019445	5.49E-02	871.1262709	0.000711163	0.136928919	443,121	0.8155%
2040	Annual	Riverside (SC)	T7 NOOS	DSL	Aggregated	Aggregated	0.0163386	1.6243469	0.1433923	0.0082472	0.036	0.06174	0.0232669	1.21E-01	0.009	0.02646	0.0222604	5.77E-02	872.9501108	0.000758886	0.137215601	142,814	0.2628%
2040	Annual	Riverside (SC)	T7 POLA	DSL	Aggregated	Aggregated	0.017355	1.7914777	0.1523088	0.0092224	0.036	0.06174	0.0261821	1.24E-01	0.009	0.02646	0.0250495	6.05E-02	976.1761665	0.000806096	0.153441299	589,671	1.0851%
2040	Annual	Riverside (SC)	T7 Public	DSL	Aggregated	Aggregated	0.022855	2.3352533	0.1329853	0.0105949	0.036	0.06174	0.0158518	1.14E-01	0.009	0.02646	0.015166	5.06E-02	1121.448679	0.001061554	0.176276115	14,069	0.0259%
2040	Annual	Riverside (SC)	T7 Single	DSL	Aggregated	Aggregated	0.0143205	1.3650372	0.1256746	0.0099374	0.036	0.06174	0.0174966	1.15E-01	0.009	0.02646	0.0167397	5.22E-02	1051.849376	0.000665151	0.165336074	299,717	0.5516%
2040	Annual	Riverside (SC)	T7 single construction	DSL	Aggregated	Aggregated	0.0145382	1.3991482	0.1265246	0.0099622	0.036	0.06174	0.0176804	1.15E-01	0.009	0.02646	0.0169155	5.24E-02	1054.480701	0.000675261	0.165749682	73,603	0.1354%
2040	Annual	Riverside (SC)	T7 SWCV	DSL	Aggregated	Aggregated	0.0050817	17.293414	0.0227853	0.0457529	0.036	0.06174	0.0123074	1.10E-01	0.009	0.02646	0.011775	4.72E-02	4842.860002	0.000236032	0.761230152	414	0.0008%
2040	Annual	Riverside (SC)	T7 SWCV	NG	Aggregated	Aggregated	0.068248	0.5030751	14.632072	0	0.036	0.06174	0.0031828	1.01E-01	9.000E-03	2.646E-02	0.0030451	3.85E-02	2619.087599	4.023427451	0.533918141	30,683	0.0565%
2040	Annual	Riverside (SC)	T7 tractor	DSL	Aggregated	Aggregated	0.0164308	1.6548257	0.1441978	0.0086707	0.036	0.06174	0.0235345	1.21E-01	0.009	0.02646	0.0225164	5.80E-02	917.7759009	0.000763167	0.144261591	527,326	0.9704%
2040	Annual	Riverside (SC)	T7 tractor construction	DSL	Aggregated	Aggregated	0.0170674	1.7567762	0.1494465	0.009748	0.036	0.06174	0.025223	1.23E-01	0.009	0.02646	0.0241318	5.96E-02	1031.802333	0.000792737	0.162184958	60,716	0.1117%
2040	Annual	Riverside (SC)	T7 utility	DSL	Aggregated	Aggregated	0.0118547	1.0669833	0.1040208	0.0100793	0.036	0.06174	0.0104828	1.08E-01	0.009	0.02646	0.0100293	4.55E-02	1066.878854	0.000550618	0.167698499	2,559	0.0047%
2040	Annual	Riverside (SC)	T7IS	GAS	Aggregated	Aggregated	0.2686461	2.8972579	26.223008	0.0148801	0.02	0.06174	0.0009902	8.27E-02	0.005	0.02646	0.0009105	3.24E-02	1503.675531	0.06203429	0.127288702	695	0.0013%
2040	Annual	Riverside (SC)	UBUS	GAS	Aggregated	Aggregated	0.0101594	0.1592068	0.2290872	0.0109204	0.0095462	0.1050908	0.0015211	1.16E-01	0.0023866	0.0450389	0.0013986	4.88E-02	1103.539732	0.003418268	0.015642855	25,614	0.0471%
2040	Annual	Riverside (SC)	UBUS	DSL	Aggregated	Aggregated	0	0	0	0	0	0	0	0.00E+00	0	0	0	0.00E+00	0	0	0	0	0.0000%
2040	Annual	Riverside (SC)	UBUS	NG	Aggregated	Aggregated	0.0809768	0.4430393	43.776926	0	0.0294197	0.0805489	0.0030317	1.13E-01	0.0073549	0.034521	0.0029006	4.48E-02	1857.673012	5.667455554	0.378698796	29,774	0.0548%
																						54,340,129	

Source: EMFAC2017, V1.0.2

2040 Riverside (SC) - Annual

calendar_year	season_month	sub_area	vehicle_class	Fuel	MdlYr	Speed	ROG_RUNEX	ROG_RUNEX	NOx_RUNEX	CO_RUNEX	SOx_RUNEX	PM10_PMTW	PM10_PMBW	PM10_RUNEX	PM10_Total	PM2_5_PMTW	PM2_5_PMBW	PM2_5_RUNEX	PM2_5_Total	CO2(Pavley+ACC)_RUNEX	CH4_RUNEX	N2O_RUNEX
								lbs/Mile														
2040	Annual	Riverside (SC)	All Other Buses	DSL	Aggregated	Aggregated	0.0075038	1.654E-05	2.359E-03	1.326E-04	1.579E-05	2.646E-05	2.873E-04	2.648E-05	3.403E-04	6.614E-06	1.231E-04	2.533E-05	1.551E-04	1.671E+00	7.684E-07	2.627E-04
2040	Annual	Riverside (SC)	LDA	GAS	Aggregated	Aggregated	0.001838	4.052E-06	3.743E-05	8.519E-04	4.227E-06	1.764E-05	8.102E-05	1.189E-06	9.985E-05	4.409E-06	3.472E-05	1.093E-06	4.023E-05	4.272E-01	1.429E-06	6.356E-06
2040	Annual	Riverside (SC)	LDA	DSL	Aggregated	Aggregated	0.0038601	8.510E-06	1.911E-05	2.721E-04	3.115E-06	1.764E-05	8.102E-05	1.821E-06	1.005E-04	4.409E-06	3.472E-05	1.742E-06	4.087E-05	3.295E-01	3.953E-07	5.179E-05
2040	Annual	Riverside (SC)	LDA	ELEC	Aggregated	Aggregated	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.764E-05	8.102E-05	0.000E+00	9.866E-05	4.409E-06	3.472E-05	0.000E+00	3.913E-05	0.000E+00	0.000E+00	0.000E+00
2040	Annual	Riverside (SC)	LDT1	GAS	Aggregated	Aggregated	0.0024822	5.472E-06	4.360E-05	9.043E-04	4.925E-06	1.764E-05	8.102E-05	1.331E-06	9.999E-05	4.409E-06	3.472E-05	1.223E-06	4.036E-05	4.977E-01	1.776E-06	6.846E-06
2040	Annual	Riverside (SC)	LDT1	DSL	Aggregated	Aggregated	0.0126072	2.779E-05	8.699E-05	2.917E-04	5.934E-06	1.764E-05	8.102E-05	9.692E-06	1.083E-04	4.409E-06	3.472E-05	9.273E-06	4.840E-05	6.276E-01	1.291E-06	9.866E-05
2040	Annual	Riverside (SC)	LDT1	ELEC	Aggregated	Aggregated	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.764E-05	8.102E-05	0.000E+00	9.866E-05	4.409E-06	3.472E-05	0.000E+00	3.913E-05	0.000E+00	0.000E+00	0.000E+00
2040	Annual	Riverside (SC)	LDT2	GAS	Aggregated	Aggregated	0.0029117	6.419E-06	4.213E-05	1.011E-03	4.866E-06	1.764E-05	8.102E-05	1.234E-06	9.989E-05	4.409E-06	3.472E-05	1.135E-06	4.027E-05	4.917E-01	2.089E-06	6.553E-06
2040	Annual	Riverside (SC)	LDT2	DSL	Aggregated	Aggregated	0.0120491	2.656E-05	5.986E-05	2.731E-04	4.129E-06	1.764E-05	8.102E-05	8.848E-06	1.075E-04	4.409E-06	3.472E-05	8.465E-06	4.760E-05	4.368E-01	1.234E-06	6.866E-05
2040	Annual	Riverside (SC)	LDT2	ELEC	Aggregated	Aggregated	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.764E-05	8.102E-05	0.000E+00	9.866E-05	4.409E-06	3.472E-05	0.000E+00	3.913E-05	0.000E+00	0.000E+00	0.000E+00
2040	Annual	Riverside (SC)	LHD1	GAS	Aggregated	Aggregated	0.0029332	6.467E-06	7.165E-05	2.361E-04	1.389E-05	1.764E-05	1.685E-04	2.170E-06	1.883E-04	4.409E-06	7.222E-05	1.996E-06	7.863E-05	1.403E+00	2.035E-06	6.986E-06
2040	Annual	Riverside (SC)	LHD1	DSL	Aggregated	Aggregated	0.0317951	7.010E-05	5.247E-04	3.584E-04	7.996E-06	2.646E-05	1.685E-04	1.373E-05	2.087E-04	6.614E-06	7.222E-05	1.313E-05	9.197E-05	8.458E-01	3.256E-06	1.329E-04
2040	Annual	Riverside (SC)	LHD2	GAS	Aggregated	Aggregated	0.0029038	6.402E-06	7.962E-05	2.331E-04	1.594E-05	1.764E-05	1.966E-04	2.145E-06	2.164E-04	4.409E-06	8.426E-05	1.972E-06	9.064E-05	1.611E+00	2.022E-06	7.859E-06
2040	Annual	Riverside (SC)	LHD2	DSL	Aggregated	Aggregated	0.0344285	7.590E-05	7.610E-04	3.996E-04	8.790E-06	2.646E-05	1.966E-04	2.688E-05	2.499E-04	6.614E-06	8.426E-05	2.572E-05	1.166E-04	9.298E-01	3.525E-06	1.462E-04
2040	Annual	Riverside (SC)	MCY	GAS	Aggregated	Aggregated	2.0114316	4.434E-03	2.430E-03	3.686E-02	4.509E-06	8.818E-06	2.593E-05	4.721E-06	3.947E-05	2.205E-06	1.111E-05	4.402E-06	1.772E-05	4.556E-01	6.677E-04	1.408E-04
2040	Annual	Riverside (SC)	MDV	GAS	Aggregated	Aggregated	0.0034057	7.508E-06	4.972E-05	1.044E-03	5.951E-06	1.764E-05	8.102E-05	1.298E-06	9.995E-05	4.409E-06	3.472E-05	1.193E-06	4.032E-05	6.013E-01	2.345E-06	7.078E-06
2040	Annual	Riverside (SC)	MDV	DSL	Aggregated	Aggregated	0.0044139	9.731E-06	2.253E-05	3.030E-04	5.413E-06	1.764E-05	8.102E-05	2.272E-06	1.009E-04	4.409E-06	3.472E-05	2.174E-06	4.131E-05	5.726E-01	4.520E-07	9.000E-05
2040	Annual	Riverside (SC)	MDV	ELEC	Aggregated	Aggregated	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.764E-05	8.102E-05	0.000E+00	9.866E-05	4.409E-06	3.472E-05	0.000E+00	3.913E-05	0.000E+00	0.000E+00	0.000E+00
2040	Annual	Riverside (SC)	MH	GAS	Aggregated	Aggregated	0.0080935	1.784E-05	2.216E-04	3.440E-04	2.891E-05	2.646E-05	2.873E-04	2.098E-06	3.159E-04	6.614E-06	1.231E-04	1.929E-06	1.317E-04	2.922E+00	6.484E-06	2.623E-05
2040	Annual	Riverside (SC)	MH	DSL	Aggregated	Aggregated	0.0406414	8.960E-05	4.940E-03	3.502E-04	1.643E-05	3.527E-05	2.873E-04	1.118E-04	4.345E-04	8.818E-06	1.231E-04	1.070E-04	2.390E-04	1.738E+00	4.162E-06	2.732E-04
2040	Annual	Riverside (SC)	Motor Coach	DSL	Aggregated	Aggregated	0.0148276	3.269E-05	3.111E-03	2.869E-04	2.290E-05	2.646E-05	2.873E-04	4.176E-05	3.556E-04	6.614E-06	1.231E-04	3.995E-05	1.697E-04	2.424E+00	1.518E-06	3.810E-04
2040	Annual	Riverside (SC)	OBUS	GAS	Aggregated	Aggregated	0.0125082	2.758E-05	2.759E-04	6.352E-04	2.840E-05	2.646E-05	2.873E-04	2.151E-06	3.160E-04	6.614E-06	1.231E-04	1.978E-06	1.317E-04	2.870E+00	6.629E-06	2.053E-05
2040	Annual	Riverside (SC)	PTO	DSL	Aggregated	Aggregated	0.0256492	5.655E-05	1.024E-02	9.061E-04	3.295E-05	0.000E+00	0.000E+00	1.092E-05	1.092E-05	0.000E+00	0.000E+00	1.045E-05	1.045E-05	3.488E+00	2.626E-06	5.482E-04
2040	Annual	Riverside (SC)	SBUS	GAS	Aggregated	Aggregated	0.0118298	2.608E-05	3.315E-04	4.799E-04	1.666E-05	1.764E-05	1.642E-03	3.003E-06	1.663E-03	4.409E-06	7.037E-04	2.761E-06	7.109E-04	1.683E+00	5.739E-06	2.939E-05
2040	Annual	Riverside (SC)	SBUS	DSL	Aggregated	Aggregated	0.0223924	4.937E-05	4.356E-03	3.277E-04	1.913E-05	2.646E-05	1.642E-03	1.300E-05	1.681E-03	6.614E-06	7.037E-04	1.243E-05	7.228E-04	2.025E+00	2.293E-06	3.183E-04
2040	Annual	Riverside (SC)	T6 Ag	DSL	Aggregated	Aggregated	0.0101599	2.240E-05	4.727E-03	1.795E-04	2.104E-05	2.646E-05	2.873E-04	4.582E-05	3.596E-04	6.614E-06	1.231E-04	4.384E-05	1.736E-04	2.227E+00	1.040E-06	3.501E-04
2040	Annual	Riverside (SC)	T6 CAIRP heavy	DSL	Aggregated	Aggregated	0.0062232	1.372E-05	1.595E-03	1.100E-04	1.299E-05	2.646E-05	2.873E-04	1.724E-05	3.310E-04	6.614E-06	1.231E-04	1.650E-05	1.463E-04	1.375E+00	6.372E-07	2.161E-04
2040	Annual	Riverside (SC)	T6 CAIRP small	DSL	Aggregated	Aggregated	0.0063336	1.396E-05	1.649E-03	1.120E-04	1.440E-05	2.646E-05	2.873E-04	1.804E-05	3.318E-04	6.614E-06	1.231E-04	1.726E-05	1.470E-04	1.524E+00	6.485E-07	2.396E-04
2040	Annual	Riverside (SC)	T6 instate construction heavy	DSL	Aggregated	Aggregated	0.007715	1.701E-05	2.350E-03	1.342E-04	1.605E-05	2.646E-05	2.873E-04	2.679E-05	3.406E-04	6.614E-06	1.231E-04	2.563E-05	1.554E-04	1.698E+00	7.900E-07	2.670E-04
2040	Annual	Riverside (SC)	T6 instate construction small	DSL	Aggregated	Aggregated	0.0066992	1.477E-05	1.836E-03	1.184E-04	1.474E-05	2.646E-05	2.873E-04	2.064E-05	3.344E-04	6.614E-06	1.231E-04	1.975E-05	1.495E-04	1.560E+00	6.860E-07	2.452E-04
2040	Annual	Riverside (SC)	T6 instate heavy	DSL	Aggregated	Aggregated	0.0070483	1.554E-05	2.045E-03	1.246E-04	1.418E-05	2.646E-05	2.873E-04	2.319E-05	3.370E-04	6.614E-06	1.231E-04	2.218E-05	1.519E-04	1.501E+00	7.217E-07	2.359E-04
2040	Annual	Riverside (SC)	T6 instate small	DSL	Aggregated	Aggregated	0.0066968	1.476E-05	1.836E-03	1.184E-04	1.475E-05	2.646E-05	2.873E-04	2.065E-05	3.345E-04	6.614E-06	1.231E-04	1.976E-05	1.495E-04	1.561E+00	6.857E-07	2.454E-04
2040	Annual	Riverside (SC)	T6 OOS heavy	DSL	Aggregated	Aggregated	0.0062165	1.370E-05	1.592E-03	1.099E-04	1.298E-05	2.646E-05	2.873E-04	1.720E-05	3.310E-04	6.614E-06	1.231E-04	1.645E-05	1.462E-04	1.374E+00	6.366E-07	2.160E-04
2040	Annual	Riverside (SC)	T6 OOS small	DSL	Aggregated	Aggregated	0.006352	1.400E-05	1.659E-03	1.123E-04	1.442E-05	2.646E-05	2.873E-04	1.817E-05	3.320E-04	6.614E-06	1.231E-04	1.738E-05	1.471E-04	1.527E+00	6.504E-07	2.400E-04
2040	Annual	Riverside (SC)	T6 Public	DSL	Aggregated	Aggregated	0.0095551	2.107E-05	2.416E-03	1.233E-04	1.560E-05	2.646E-05	2.873E-04	1.865E-05	3.324E-04	6.614E-06	1.231E-04	1.784E-05	1.476E-04	1.651E+00	9.784E-07	2.595E-04
2040	Annual	Riverside (SC)	T6 utility	DSL	Aggregated	Aggregated	0.0053716	1.184E-05	1.177E-03	9.496E-05	1.441E-05	2.646E-05	2.873E-04	1.112E-05	3.249E-04	6.614E-06	1.231E-04	1.064E-05	1.404E-04	1.525E+00	5.500E-07	2.397E-04
2040	Annual	Riverside (SC)	T6TS	GAS	Aggregated	Aggregated	0.0080802	1.781E-05	1.832E-04	3.776E-04	2.813E-05	2.646E-05	2.873E-04	2.175E-06	3.160E-04	6.614E-06	1.231E-04	2.000E-06	1.318E-04	2.842E+00	4.701E-06	1.645E-05
2040	Annual	Riverside (SC)	T7 Ag	DSL	Aggregated	Aggregated	0.0220361	4.858E-05	8.402E-03	4.258E-04	3.276E-05	7.937E-05	1.361E-04	8.798E-05	3.035E-04	1.984E-05	5.833E-05	8.417E-05	1.623E-04	3.467E+00	2.256E-06	5.450E-04
2040	Annual	Riverside (SC)	T7 CAIRP	DSL	Aggregated	Aggregated	0.0163188	3.598E-05	3.574E-03	3.157E-04	1.817E-05	7.937E-05	1.361E-04	5.117E-05	2.666E-04	1.984E-05	5.833E-05	4.896E-05	1.271E-04	1.923E+00	1.671E-06	3.023E-04
2040	Annual	Riverside (SC)	T7 CAIRP construction	DSL	Aggregated	Aggregated	0.016424	3.621E-05	3.607E-03	3.178E-04	2.011E-05	7.937E-05	1.361E-04	5.183E-05	2.673E-04	1.984E-05	5.833E-05	4.959E-05	1.278E-04	2.129E+00	1.682E-06	3.347E-04
2040	Annual	Riverside (SC)	T7 NNOOS	DSL	Aggregated	Aggregated	0.0153112	3.375E-05	3.252E-03	2.962E-04	1.814E-05	7.937E-05	1.361E-04	4.481E-05	2.603E-04	1.984E-05	5.833E-05	4.287E-05	1.210E-04	1.920E+00	1.568E-06	3.019E-04
2040	Annual	Riverside (SC)	T7 NOOS	DSL	Aggregated	Aggregated	0.0163386	3.602E-05	3.581E-03	3.161E-04	1.818E-05	7.937E-05	1.361E-04	5.129E-05	2.668E-04	1.984E-05	5.833E-05	4.908E-05	1.273E-04	1.925E+00	1.673E-06	3.025E-04
2040	Annual	Riverside (SC)	T7 POLA	DSL	Aggregated	Aggregated	0.017355	3.826E-05	3.949E-03	3.358E-04	2.033E-05	7.937E-05	1.361E-04	5.772E-05	2.732E-04	1.984E-05	5.833E-05	5.522E-05	1.334E-04	2.152E+00	1.777E-06	3.383E-04
2040	Annual	Riverside (SC)	T7 Public	DSL	Aggregated	Aggregated	0.022855	5.039E-05	5.148E-03	2.932E-04	2.336E-05	7.937E-05	1.361E-04	3.495E-05	2.504E-04	1.984E-05	5.833E-05	3.344E-05	1.116E-04	2.472E+00	2.340E-06	3.886E-04
2040	Annual	Riverside (SC)	T7 Single	DSL	Aggregated	Aggregated	0.0143205	3.157E-05	3.009E-03	2.771E-04	2.191E-05	7.937E-05	1.361E-04	3.857E-05	2.541E-04	1.984E-05	5.833E-05	3.690E-05	1.151E-04	2.319E+00	1.466E-06	3.645E-04
2040	Annual	Riverside (SC)	T7 single construction	DSL	Aggregated	Aggregated	0.0145382	3.205E-05	3.085E-03	2.789E-04	2.196E-05	7.937E-05	1.361E-04	3.898E-05	2.545E-04	1.984E-05	5.833E-05	3.729E-05	1.155E-04	2.325E+00	1.489E-06	3.654E-04
2040	Annual	Riverside (SC)	T7 SWCV	DSL	Aggregated	Aggregated	0.0050817	1.120E-05	3.813E-02	5.023E-05	1.009E-04	7.937E-05	1.361E-04	2.713E-05	2.426E-04	1.984E-05	5.833E-05	2.596E-05	1.041E-04	1.068E+01	5.204E-07	1.678E-03
2040	Annual	Riverside (SC)	T7 SWCV	NG	Aggregated	Aggregated	0.068248	1.505E-04	1.109E-03	3.226E-02	0.000E+00	7.937E-05	1.361E-04	7.017E-06	2.225E-04	1.984E-05	5.833E-05	6.713E-06	8.489E-05	5.774E+00	8.870E-03	1.177E-03
2040	Annual	Riverside (SC)	T7 tractor	DSL	Aggregated	Aggregated	0.0164308	3.622E-05	3.648E-03	3.179E-04	1.912E-05	7.937E-05	1.361E-04	5.188E-05	2.674E-04	1.984E-05	5.833E-05	4.964E-05	1.278E-04	2.023E+00	1.682E-06	3.180E-04
2040	Annual	Riverside (SC)	T7 tractor construction	DSL	Aggregated	Aggregated	0.0170674	3.763E-05	3.873E-03	3.295E-04	2.149E-05	7.937E-05	1.361E-04	5.561E-05	2.711E-04	1.984E-05	5.833E-05	5.320E-05	1.314E-04	2.275E+00	1.748E-06	3.576E-04
2040	Annual	Riverside (SC)	T7 utility	DSL	Aggregated	Aggregated	0.0118547	2.613E-05	2.352E-03	2.293E-04	2.222E-05	7.937E-05	1.361E-04	2.311E-05	2.386E-04	1.984E-05	5.833E-05	2.211E-05	1.003E-04	2.352E+00	1.214E-06	3.697E-04
2040	Annual	Riverside (SC)	T7IS	GAS	Aggregated	Aggregated	0.2686461	5.923E-04	6.387E-03	5.781E-02	3.280E-05	4.409E-05	1.361E-04	2.183E-06	1.824E-04	1.102E-05	5.833E-05	2.007E-06	7.136E-05	3.315E+00	1.368E-04	2.806E-04
2040	Annual	Riverside (SC)	UBUS	GAS	Aggregated	Aggregated	0.0101594	2.240E-05	3.510E-04	5.050E-04	2.408E-05	2.105E-05	2.317E-04	3.353E-06	2.561E-04	5.261E-06	9.929E-05	3.083E-06	1.076E-04	2.433E+00	7.536E-06	3.449E-05
2040	Annual	Riverside (SC)	UBUS	DSL	Aggregated	Aggregated	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2040	Annual	Riverside (SC)	UBUS	NG	Aggregated	Aggregated	0.0809768	1.785E-04	9.767E-04	9.651E-02	0.000E+00	6.486E-05	1.776E-04	6.684E-06	2.491E-04	1.621E-05	7.610E-05	6.395E-06	9.871E-05	4.095E+00	1.249E-02	8.349E-04

Source: EMFAC2017, V1.0.2

2040 Riverside (SC) - Annual

MTons/Mile

calendar_year	season_month	sub_area	vehicle_class	Fuel	MdlYr	Speed	ROG_RUNEX	ROG_RUNEX	NOx_RUNEX	CO_RUNEX	SOx_RUNEX	PM10_PMTW	PM10_PMBW	PM10_RUNEX	PM10_Total	PM2_5_PMTW	PM2_5_PMBW	PM2_5_RUNEX	PM2_5_Total	CO2(Pavley+ACC)_RUNEX	CH4_RUNEX	N2O_RUNEX
2040	Annual	Riverside (SC)	All Other Buses	DSL	Aggregated	Aggregated	0.0075038	7.504E-09	1.070E-06	6.017E-08	7.161E-09	1.200E-08	1.303E-07	1.201E-08	1.544E-07	3.000E-09	5.586E-08	1.149E-08	7.035E-08	7.579E-04	3.485E-10	1.191E-07
2040	Annual	Riverside (SC)	LDA	GAS	Aggregated	Aggregated	0.001838	1.838E-09	1.698E-08	3.864E-07	1.917E-09	8.000E-09	3.675E-08	5.394E-10	4.529E-08	2.000E-09	1.575E-08	4.960E-10	1.825E-08	1.938E-04	6.483E-10	2.883E-09
2040	Annual	Riverside (SC)	LDA	DSL	Aggregated	Aggregated	0.0038601	3.860E-09	8.668E-09	1.234E-07	1.413E-09	8.000E-09	3.675E-08	8.260E-10	4.558E-08	2.000E-09	1.575E-08	7.902E-10	1.854E-08	1.494E-04	1.793E-10	2.349E-08
2040	Annual	Riverside (SC)	LDA	ELEC	Aggregated	Aggregated	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.000E-09	3.675E-08	0.000E+00	4.475E-08	2.000E-09	1.575E-08	0.000E+00	1.775E-08	0.000E+00	0.000E+00	0.000E+00
2040	Annual	Riverside (SC)	LDT1	GAS	Aggregated	Aggregated	0.0024822	2.482E-09	1.978E-08	4.102E-07	2.234E-09	8.000E-09	3.675E-08	6.036E-10	4.535E-08	2.000E-09	1.575E-08	5.550E-10	1.830E-08	2.258E-04	8.058E-10	3.105E-09
2040	Annual	Riverside (SC)	LDT1	DSL	Aggregated	Aggregated	0.0126072	1.261E-08	3.946E-08	1.323E-07	2.691E-09	8.000E-09	3.675E-08	4.396E-09	4.915E-08	2.000E-09	1.575E-08	4.206E-09	2.196E-08	2.847E-04	5.856E-10	4.475E-08
2040	Annual	Riverside (SC)	LDT1	ELEC	Aggregated	Aggregated	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.000E-09	3.675E-08	0.000E+00	4.475E-08	2.000E-09	1.575E-08	0.000E+00	1.775E-08	0.000E+00	0.000E+00	0.000E+00
2040	Annual	Riverside (SC)	LDT2	GAS	Aggregated	Aggregated	0.0029117	2.912E-09	1.911E-08	4.587E-07	2.207E-09	8.000E-09	3.675E-08	5.597E-10	4.531E-08	2.000E-09	1.575E-08	5.147E-10	1.826E-08	2.230E-04	9.477E-10	2.973E-09
2040	Annual	Riverside (SC)	LDT2	DSL	Aggregated	Aggregated	0.0120491	1.205E-08	2.715E-08	1.239E-07	1.873E-09	8.000E-09	3.675E-08	4.013E-09	4.876E-08	2.000E-09	1.575E-08	3.840E-09	2.159E-08	1.981E-04	5.597E-10	3.114E-08
2040	Annual	Riverside (SC)	LDT2	ELEC	Aggregated	Aggregated	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.000E-09	3.675E-08	0.000E+00	4.475E-08	2.000E-09	1.575E-08	0.000E+00	1.775E-08	0.000E+00	0.000E+00	0.000E+00
2040	Annual	Riverside (SC)	LHD1	GAS	Aggregated	Aggregated	0.0029332	2.933E-09	3.250E-08	1.071E-07	6.299E-09	8.000E-09	7.644E-08	9.845E-10	8.542E-08	2.000E-09	3.276E-08	9.052E-10	3.567E-08	6.365E-04	9.232E-10	3.169E-09
2040	Annual	Riverside (SC)	LHD1	DSL	Aggregated	Aggregated	0.0317951	3.180E-08	2.380E-07	1.626E-07	3.627E-09	1.200E-08	7.644E-08	6.226E-09	9.467E-08	3.000E-09	3.276E-08	5.957E-09	4.172E-08	3.836E-04	1.477E-09	6.030E-08
2040	Annual	Riverside (SC)	LHD2	GAS	Aggregated	Aggregated	0.0029038	2.904E-09	3.611E-08	1.057E-07	7.230E-09	8.000E-09	8.918E-08	9.730E-10	9.815E-08	2.000E-09	3.822E-08	8.946E-10	4.111E-08	7.306E-04	9.171E-10	3.565E-09
2040	Annual	Riverside (SC)	LHD2	DSL	Aggregated	Aggregated	0.0344285	3.443E-08	3.452E-07	1.813E-07	3.987E-09	1.200E-08	8.918E-08	1.219E-08	1.134E-07	3.000E-09	3.822E-08	1.167E-08	5.289E-08	4.218E-04	1.599E-09	6.629E-08
2040	Annual	Riverside (SC)	MCY	GAS	Aggregated	Aggregated	2.0114316	2.011E-06	1.102E-06	1.672E-05	2.045E-09	4.000E-09	1.176E-08	2.142E-09	1.790E-08	1.000E-09	5.040E-09	1.997E-09	8.037E-09	2.067E-04	3.029E-07	6.385E-08
2040	Annual	Riverside (SC)	MDV	GAS	Aggregated	Aggregated	0.0034057	3.406E-09	2.255E-08	4.736E-07	2.699E-09	8.000E-09	3.675E-08	5.885E-10	4.534E-08	2.000E-09	1.575E-08	5.411E-10	1.829E-08	2.728E-04	1.064E-09	3.210E-09
2040	Annual	Riverside (SC)	MDV	DSL	Aggregated	Aggregated	0.0044139	4.414E-09	1.022E-08	1.374E-07	2.455E-09	8.000E-09	3.675E-08	1.030E-09	4.578E-08	2.000E-09	1.575E-08	9.859E-10	1.874E-08	2.597E-04	2.050E-10	4.083E-08
2040	Annual	Riverside (SC)	MDV	ELEC	Aggregated	Aggregated	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.000E-09	3.675E-08	0.000E+00	4.475E-08	2.000E-09	1.575E-08	0.000E+00	1.775E-08	0.000E+00	0.000E+00	0.000E+00
2040	Annual	Riverside (SC)	MH	GAS	Aggregated	Aggregated	0.0080935	8.094E-09	1.005E-07	1.560E-07	1.311E-08	1.200E-08	1.303E-07	9.516E-10	1.433E-07	3.000E-09	5.586E-08	8.750E-10	5.973E-08	1.325E-03	2.941E-09	1.190E-08
2040	Annual	Riverside (SC)	MH	DSL	Aggregated	Aggregated	0.0406414	4.064E-08	2.241E-06	1.588E-07	7.452E-09	1.600E-08	1.303E-07	5.073E-08	1.971E-07	4.000E-09	5.586E-08	4.854E-08	1.084E-07	7.883E-04	1.888E-09	1.239E-07
2040	Annual	Riverside (SC)	Motor Coach	DSL	Aggregated	Aggregated	0.0148276	1.483E-08	1.411E-06	1.301E-07	1.039E-08	1.200E-08	1.303E-07	1.894E-08	1.613E-07	3.000E-09	5.586E-08	1.812E-08	7.698E-08	1.099E-03	6.887E-10	1.728E-07
2040	Annual	Riverside (SC)	OBUS	GAS	Aggregated	Aggregated	0.0125082	1.251E-08	1.251E-07	2.881E-07	1.288E-08	1.200E-08	1.303E-07	9.757E-10	1.433E-07	3.000E-09	5.586E-08	8.971E-10	5.976E-08	1.302E-03	3.007E-09	9.315E-09
2040	Annual	Riverside (SC)	PTO	DSL	Aggregated	Aggregated	0.0256492	2.565E-08	4.646E-06	4.110E-07	1.495E-08	0.000E+00	0.000E+00	4.955E-09	4.955E-09	0.000E+00	0.000E+00	4.741E-09	4.741E-09	1.582E-03	1.191E-09	2.487E-07
2040	Annual	Riverside (SC)	SBUS	GAS	Aggregated	Aggregated	0.0118298	1.183E-08	1.504E-07	2.177E-07	7.556E-09	8.000E-09	7.448E-07	1.362E-09	7.542E-07	2.000E-09	3.192E-07	1.253E-09	3.225E-07	7.635E-04	2.603E-09	1.333E-08
2040	Annual	Riverside (SC)	SBUS	DSL	Aggregated	Aggregated	0.0223924	2.239E-08	1.976E-06	1.487E-07	8.678E-09	1.200E-08	7.448E-07	5.895E-09	7.627E-07	3.000E-09	3.192E-07	5.640E-09	3.278E-07	9.185E-04	1.040E-09	1.444E-07
2040	Annual	Riverside (SC)	T6 Ag	DSL	Aggregated	Aggregated	0.0101599	1.016E-08	2.144E-06	8.142E-08	9.544E-09	1.200E-08	1.303E-07	2.079E-08	1.631E-07	3.000E-09	5.586E-08	1.989E-08	7.875E-08	1.010E-03	4.719E-10	1.588E-07
2040	Annual	Riverside (SC)	T6 CAIRP heavy	DSL	Aggregated	Aggregated	0.0062232	6.223E-09	7.235E-07	4.990E-08	5.892E-09	1.200E-08	1.303E-07	7.822E-09	1.502E-07	3.000E-09	5.586E-08	7.484E-09	6.634E-08	6.236E-04	2.891E-10	9.802E-08
2040	Annual	Riverside (SC)	T6 CAIRP small	DSL	Aggregated	Aggregated	0.0063336	6.334E-09	7.480E-07	5.079E-08	6.531E-09	1.200E-08	1.303E-07	8.182E-09	1.505E-07	3.000E-09	5.586E-08	7.828E-09	6.669E-08	6.913E-04	2.942E-10	1.087E-07
2040	Annual	Riverside (SC)	T6 instate construction heavy	DSL	Aggregated	Aggregated	0.007715	7.715E-09	1.066E-06	6.087E-08	7.278E-09	1.200E-08	1.303E-07	1.215E-08	1.545E-07	3.000E-09	5.586E-08	1.163E-08	7.049E-08	7.704E-04	3.583E-10	1.211E-07
2040	Annual	Riverside (SC)	T6 instate construction small	DSL	Aggregated	Aggregated	0.0066992	6.699E-09	8.330E-07	5.370E-08	6.685E-09	1.200E-08	1.303E-07	9.363E-09	1.517E-07	3.000E-09	5.586E-08	8.958E-09	6.782E-08	7.076E-04	3.112E-10	1.112E-07
2040	Annual	Riverside (SC)	T6 instate heavy	DSL	Aggregated	Aggregated	0.0070483	7.048E-09	9.275E-07	5.652E-08	6.430E-09	1.200E-08	1.303E-07	1.052E-08	1.529E-07	3.000E-09	5.586E-08	1.006E-08	6.892E-08	6.807E-04	3.274E-10	1.070E-07
2040	Annual	Riverside (SC)	T6 instate small	DSL	Aggregated	Aggregated	0.0066968	6.697E-09	8.329E-07	5.370E-08	6.690E-09	1.200E-08	1.303E-07	9.367E-09	1.517E-07	3.000E-09	5.586E-08	8.962E-09	6.782E-08	7.081E-04	3.111E-10	1.113E-07
2040	Annual	Riverside (SC)	T6 OOS heavy	DSL	Aggregated	Aggregated	0.0062165	6.217E-09	7.220E-07	4.985E-08	5.888E-09	1.200E-08	1.303E-07	7.800E-09	1.501E-07	3.000E-09	5.586E-08	7.463E-09	6.632E-08	6.232E-04	2.887E-10	9.796E-08
2040	Annual	Riverside (SC)	T6 OOS small	DSL	Aggregated	Aggregated	0.006352	6.352E-09	7.527E-07	5.094E-08	6.542E-09	1.200E-08	1.303E-07	8.242E-09	1.506E-07	3.000E-09	5.586E-08	7.886E-09	6.675E-08	6.925E-04	2.950E-10	1.089E-07
2040	Annual	Riverside (SC)	T6 Public	DSL	Aggregated	Aggregated	0.0095551	9.555E-09	1.096E-06	5.593E-08	7.076E-09	1.200E-08	1.303E-07	8.458E-09	1.508E-07	3.000E-09	5.586E-08	8.092E-09	6.695E-08	7.489E-04	4.438E-10	1.177E-07
2040	Annual	Riverside (SC)	T6 utility	DSL	Aggregated	Aggregated	0.0053716	5.372E-09	5.339E-07	4.307E-08	6.536E-09	1.200E-08	1.303E-07	5.045E-09	1.474E-07	3.000E-09	5.586E-08	4.827E-09	6.369E-08	6.918E-04	2.495E-10	1.087E-07
2040	Annual	Riverside (SC)	T6TS	GAS	Aggregated	Aggregated	0.0080802	8.080E-09	8.311E-08	1.713E-07	1.276E-08	1.200E-08	1.303E-07	9.868E-10	1.433E-07	3.000E-09	5.586E-08	9.073E-10	5.977E-08	1.289E-03	2.132E-09	7.463E-09
2040	Annual	Riverside (SC)	T7 Ag	DSL	Aggregated	Aggregated	0.0220361	2.204E-08	3.811E-06	1.931E-07	1.486E-08	3.600E-08	6.174E-08	3.991E-08	1.376E-07	9.000E-09	2.646E-08	3.818E-08	7.364E-08	1.573E-03	1.024E-09	2.472E-07
2040	Annual	Riverside (SC)	T7 CAIRP	DSL	Aggregated	Aggregated	0.0163188	1.632E-08	1.621E-06	1.432E-07	8.241E-09	3.600E-08	6.174E-08	2.321E-08	1.210E-07	9.000E-09	2.646E-08	2.221E-08	5.767E-08	8.723E-04	7.580E-10	1.371E-07
2040	Annual	Riverside (SC)	T7 CAIRP construction	DSL	Aggregated	Aggregated	0.016424	1.642E-08	1.636E-06	1.441E-07	9.124E-09	3.600E-08	6.174E-08	2.351E-08	1.213E-07	9.000E-09	2.646E-08	2.249E-08	5.795E-08	9.658E-04	7.629E-10	1.518E-07
2040	Annual	Riverside (SC)	T7 NNOOS	DSL	Aggregated	Aggregated	0.0153112	1.531E-08	1.475E-06	1.344E-07	8.230E-09	3.600E-08	6.174E-08	2.032E-08	1.181E-07	9.000E-09	2.646E-08	1.944E-08	5.490E-08	8.711E-04	7.112E-10	1.369E-07
2040	Annual	Riverside (SC)	T7 NOOS	DSL	Aggregated	Aggregated	0.0163386	1.634E-08	1.624E-06	1.434E-07	8.247E-09	3.600E-08	6.174E-08	2.327E-08	1.210E-07	9.000E-09	2.646E-08	2.226E-08	5.772E-08	8.730E-04	7.589E-10	1.372E-07
2040	Annual	Riverside (SC)	T7 POLA	DSL	Aggregated	Aggregated	0.017355	1.736E-08	1.791E-06	1.523E-07	9.222E-09	3.600E-08	6.174E-08	2.618E-08	1.239E-07	9.000E-09	2.646E-08	2.505E-08	6.051E-08	9.762E-04	8.061E-10	1.534E-07
2040	Annual	Riverside (SC)	T7 Public	DSL	Aggregated	Aggregated	0.022855	2.285E-08	2.335E-06	1.330E-07	1.059E-08	3.600E-08	6.174E-08	1.585E-08	1.136E-07	9.000E-09	2.646E-08	1.517E-08	5.063E-08	1.121E-03	1.062E-09	1.763E-07
2040	Annual	Riverside (SC)	T7 Single	DSL	Aggregated	Aggregated	0.0143205	1.432E-08	1.365E-06	1.257E-07	9.937E-09	3.600E-08	6.174E-08	1.750E-08	1.152E-07	9.000E-09	2.646E-08	1.674E-08	5.220E-08	1.052E-03	6.652E-10	1.653E-07
2040	Annual	Riverside (SC)	T7 single construction	DSL	Aggregated	Aggregated	0.0145382	1.454E-08	1.399E-06	1.265E-07	9.962E-09	3.600E-08	6.174E-08	1.768E-08	1.154E-07	9.000E-09	2.646E-08	1.692E-08	5.238E-08	1.054E-03	6.753E-10	1.657E-07
2040	Annual	Riverside (SC)	T7 SWCV	DSL	Aggregated	Aggregated	0.0050817	5.082E-09	1.729E-05	2.279E-08	4.575E-08	3.600E-08	6.174E-08	1.231E-08	1.100E-07	9.000E-09	2.646E-08	1.178E-08	4.724E-08	4.843E-03	2.360E-10	7.612E-07
2040	Annual	Riverside (SC)	T7 SWCV	NG	Aggregated	Aggregated	0.068248	6.825E-08	5.031E-07	1.463E-05	0.000E+00	3.600E-08	6.174E-08	3.183E-09	1.009E-07	9.000E-09	2.646E-08	3.045E-09	3.851E-08	2.619E-03	4.023E-06	5.339E-07
2040	Annual	Riverside (SC)	T7 tractor	DSL	Aggregated	Aggregated	0.0164308	1.643E-08	1.655E-06	1.442E-07	8.671E-09	3.600E-08	6.174E-08	2.353E-08	1.213E-07	9.000E-09	2.646E-08	2.252E-08	5.798E-08	9.178E-04	7.632E-10	1.443E-07
2040	Annual	Riverside (SC)	T7 tractor construction	DSL	Aggregated	Aggregated	0.0170674	1.707E-08	1.757E-06	1.494E-07	9.748E-09	3.600E-08	6.174E-08	2.522E-08	1.230E-07	9.000E-09	2.646E-08	2.413E-08	5.959E-08	1.032E-03	7.927E-10	1.622E-07
2040	Annual	Riverside (SC)	T7 utility	DSL	Aggregated	Aggregated	0.0118547	1.185E-08	1.067E-06	1.040E-07	1.008E-08	3.600E-08	6.174E-08	1.048E-08	1.082E-07	9.000E-09	2.646E-08	1.003E-08	4.549E-08	1.067E-03	5.506E-10	1.677E-07
2040	Annual	Riverside (SC)	T7IS	GAS	Aggregated	Aggregated	0.2686461	2.686E-07	2.897E-06	2.622E-05	1.488E-08	2.000E-08	6.174E-08	9.902E-10	8.273E-08	5.000E-09	2.646E-08	9.105E-10	3.237E-08	1.504E-03	6.203E-08	1.273E-07
2040	Annual	Riverside (SC)	UBUS	GAS	Aggregated	Aggregated	0.0101594	1.016E-08	1.592E-07	2.291E-07	1.092E-08	9.546E-09	1.051E-07	1.521E-09	1.162E-07	2.387E-09	4.504E-08	1.399E-09	4.882E-08	1.104E-03	3.418E-09	1.564E-08
2040	Annual	Riverside (SC)	UBUS	DSL	Aggregated	Aggregated	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2040	Annual	Riverside (SC)	UBUS	NG	Aggregated	Aggregated	0.0809768	8.098E-08	4.430E-07	4.378E-05	0.000E+00	2.942E-08	8.055E-08	3.032E-09	1.130E-07	7.355E-09	3.452E-08	2.901E-09	4.478E-08	1.858E-03	5.667E-06	3.787E-07

Source: EMFAC2017, V1.0.2

Area Sources - Criteria Air Pollutants

2018	OFFROAD2007 Estimate based on:	ROG Exhaust lbs/day	NO_x Exhaust	CO Exhaust	SO_2 Exhaust	PM_{10} Exhaust	$PM_{2.5}$ Exhaust*
Construction Equipment	Based on the percentage of building permits issued in Corona compared to Riverside County.	14	145	114	0	7	6
Agricultural Equipment	Based on the percentage of agricultural land in Corona compared to Riverside County.	4	10	154	0	1	1
Light Commercial Equipment	Based on the percentage of employment in Corona compared to Riverside County.	87	565	2,249	1	29	25
TOTAL		105	720	2,517	1	36	32

Proposed Project 2040	Forecast Adjusted for:	ROG Exhaust lbs/day	NO_x Exhaust	CO Exhaust	SO2 Exhaust	PM10 Exhaust	PM2.5 Exhaust*
Construction Equipment	similar to historic	14	145	114	0	7	6
Agricultural Equipment	Based on the decrease in agricultural land	3	8	120	0	1	0
Light Commercial Equipment	proportional to employment growth	124	799	3,180	1	41	35
TOTAL		141	952	3,414	2	48	42

Agricultural Land with the City + Planning Area

2018	2040**	% Change
2,751	2,140	-22%

* assumes PM2.5 is 99 percent of PM10

**Based on forecasted rate of change for the County of Riverside for years from 2002 to 2016.

Sources

Building Permits

Source: U.S. Census Bureau. https://www.census.gov/construction/bps/

Employment

Source. U.S. Census Bureau. 2010. Longitudinal Employer-Household Dynamics. http://lehd.ces.census.gov/

Population

Source. U.S. Census Bureau, 2010. https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml#

Farmland

Source: California Department of Conservation data: http://www.conservation.ca.gov/dlrp/fmmp/Documents/fmmp/pubs/2012-2014/conversion_tables/sjqcon14.xls

Other Emissions Sources - Off-road Equipment

Source: OFFROAD2017, Version 1.0.1. Based on equipment use in Riverside County (South Coast).

Year 2018	2018 MTons of CO_2e	Notes
Construction Equipment	3,179	Based on the percentage of residential building permits issued in the City of Corona compared to Riverside County.
Agricultural Equipment	239	Based on the percentage of agricultural land in the City of Corona compared to Riverside County
Light Commercial Equipment	16,054	Based on the percentage of employment in the City of Corona compared to Riverside County.
TOTAL	19,473	

Year 2040	2040 MTons of CO_2e	Notes
Construction Equipment	3,179	similar to historic
Agricultural Equipment	186	proportional to change in farmland
Light Commercial Equipment	22,695	proportional to employment growth
TOTAL	26,060	

Adjusted Business as Usual - Low Carbon Fuel Standard

Year 2040 Adjusted	2040 MTons of CO_2e	Notes
Construction Equipment	2,861	With LCFS (10% reduction)
Light Commercial Equipment	20,426	With LCFS (10% reduction)
TOTAL	23,287	
reduction	2,773	

Sources

Building Permits

Source: U.S. Census Bureau. https://www.census.gov/construction/bps/

Employment

Source. U.S. Census Bureau. 2010. Longitudinal Employer-Household Dynamics. http://lehd.ces.census.gov/

Population

Source. U.S. Census Bureau, 2010. https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml#

Farmland

Source: California Department of Conservation data: http://www.conservation.ca.gov/dlrp/fmmp/Documents/fmmp/pubs/2012-2014/conversion_tables/sjqcon14.xls

Corona GP OFFROAD2017- 2018

Source: OFFROAD2017, Version 1.0.1. Based on equipment use in Riverside County (South Coast).

Region	CalYr	VehClass	Fuel	ROG_tpd	NOx_tpd	CO_tpd	SOx_tpd	PM10_tpd	PM2_5_tpd	PM_tpd	CO2_tpd	CO2 MT/yr
South Coast Air Basin												
Riverside (SC)	2018	OFFROAD - Agricultural	Gasoline	0.03	0.03	1.60	0.00	0.00	0.00	0.00	5	1781
Riverside (SC)	2018	OFFROAD - Agricultural	Diesel	0.01	0.08	0.05	0.00	0.00	0.00	0.00	10	3333
TOTAL AGRICULTURE OFFROAD				0.04	0.11	1.65	0.00	0.01	0.01	0.01	15	5113
ESTIMATED CITY (Tons/day)				0.00	0.01	0.08	0.00	0.00	0.00	0.00	0.72	238.94
ESTIMATED CITY (lbs/day)				3.90	10.28	154.06	0.02	0.66	0.55	0.71	1,443.19	NA
Riverside (SC)	2018	Construction and Mining	Diesel	0.52	5.58	3.47	0.01	0.26	0.24	0.26	740	245155
Riverside (SC)	2018	OFFROAD - Construction and Mining	Gasoline	0.02	0.02	0.93	0.00	0.01	0.01	0.01	3	830
Riverside (SC)	2018	OFFROAD - Construction and Mining	Diesel	0.00	0.03	0.02	0.00	0.00	0.00	0.00	4	1421
TOTAL CONSTRUCTION OFFROAD				0.54	5.64	4.43	0.01	0.28	0.25	0.28	747	247407
ESTIMATED CITY (Tons/day)				0.01	0.07	0.06	0.00	0.00	0.00	0.00	9.60	3,179.29
ESTIMATED CITY (lbs/day)				13.98	144.89	113.79	0.18	7.10	6.49	7.13	19,203.11	NA
Riverside (SC)	2018	OFFROAD - Light Commercial	Gasoline	0.19	0.17	8.84	0.00	0.04	0.03	0.04	25	8362
Riverside (SC)	2018	OFFROAD - Light Commercial	Diesel	0.02	0.09	0.08	0.00	0.01	0.00	0.01	11	3629
Riverside (SC)	2018	OFFROAD - Light Commercial	Nat Gas	0.00	0.02	0.23	0.00	0.00	0.00	0.00	6	2110
Riverside (SC)	2018	Portable Equipment	Diesel	0.20	2.33	1.24	0.00	0.09	0.08	0.09	406	134337
TOTAL LIGHT COMMERCIAL + PORTABLE OFFROAD				0.40	2.61	10.40	0.00	0.13	0.12	0.14	448	148438
ESTIMATED CITY (Tons/day)				0.04	0.28	1.12	0.00	0.01	0.01	0.01	48.48	16,054.31
ESTIMATED CITY (lbs/day)				87.42	565.31	2,249.46	0.96	28.69	24.98	29.77	96,969.03	NA
TOTAL OFFROAD in City				0.053	0.360	1.259	0.001	0.018	0.016	0.019	58.808	19,473

Region	CalYr	VehClass	Fuel	ROG_tpd	NOx_tpd	CO_tpd	SOx_tpd	PM10_tpd	PM2_5_tpd	PM_tpd	CO2_tpd	CO2 MT/yr

	Tons/Day								MT/Yr
	ROG	NOx	CO	SOx	PM10	PM2.5			CO2
Agriculture	0.0019	0.0051	0.0770	0.0000	0.0003	0.0003	0.0004	0.7216	239
Construction	0.0070	0.0724	0.0569	0.0001	0.0036	0.0032	0.0036	9.6016	3,179
Light Commercial	0.0437	0.2827	1.1247	0.0005	0.0143	0.0125	0.0149	48.4845	16,054
TOTAL CITY	0.053	0.360	1.259	0.001	0.018	0.016	0.019	58.808	19,473

	Pounds/Day								MT/Yr
	ROG	NOx	CO	SOx	PM10	PM2.5			CO2
Agriculture	3.90	10.28	154.06	0.02	0.66	0.55	7.1348	19,203.1098	NA
Construction	13.98	144.89	113.79	0.18	7.10	6.49	0.0149	48.4845	16,054
Light Commercial	87.42	565.31	2,249.46	0.96	28.69	24.98	0.0000	0.0000	CO2
TOTAL CITY	105.293	720.478	2,517.322	1.156	36.462	32.013	7.150	19,251.594	16,054

Assumptions

Agricultural Jobs[1]

County	10,700	jobs
City	500	jobs
Percent in City	4.67%	

Construction Permits[1]

County	5,136	permits
City	66	permits
Percent in City	1.29%	

Employment

Employment in Riverside County [2]	696,391	jobs
Employment in Plan Area	75,318	jobs
Percent in Plan Area	11%	

[1]LSA. 2018, August. Draft City of Corona GHG Inventory, Forecasting, and Target-Setting Report for a Climate Action Plan.

[2]U.S. Census Bureau. 2010. Longitudinal Employer-Household Dynamics. http://lehd.ces.census.gov/

Available Farmland Worksheet

Riverside County

Available Farmland (Acreage)[a]

	2002	2004	2006	2008	2010	2012	2014	2016	Forecast 2018	Forecast 2040
Prime Farmland	141,715	134,429	128,505	122,935	119,635	119,309	118,077	117,484	110,140	73,177
Farmland of Statewide Importance	48,046	48,499	46,916	44,653	44,086	43,919	44,002	43,757	42,160	34,032
Unique Farmland	39,049	38,691	37,949	37,133	35,391	33,342	32,582	32,565	30,936	18,955
Farmland of Local Importance	240,672	244,848	231,085	229,156	229,877	229,661	228,809	226,029	222,540	198,150
Total Farmland	469,482	466,467	444,455	433,877	428,989	426,231	423,470	419,835	405,775	324,313
Percent Change from Prior Year	NA	-0.64%	-4.72%	-2.38%	-1.13%	-0.64%	-0.65%	-0.86%		
		-1.90%								
							Average Yearly Change (2002 to 2040):			**-0.34%**

City of Corona

Available Farmland (Acreage)

	2002	2004	2006	2008	2010	2012	2014	2016	2017	2018[b]	2040[c]
Prime Farmland										116	
Farmland of Statewide Importance										73	
Unique Farmland										487	
Farmland of Local Importance										2,075	
Estimated Total Farmland[d]	3,097	3,077	2,932	2,862	2,830	2,812	2,794	2,770	2,760	**2,751**	**2,140**
Percent Change from Prior Year	**NA**	-0.64%	-4.72%	-2.38%	-1.13%	-0.64%	-0.65%	-0.86%	-0.34%		

Sources:

a.County acreage based on the California Department of Conservation data: https://www.conservation.ca.gov/dlrp/fmmp/Pages/Riverside.aspx

b. City acreage from Table 5.2-1 of the DEIR.

c. Forecasted based the available farmland in the City of Corona and on the percent change in farmland in County of Riverside from year 2002 to 2016.

d. Forecasted based the available farmland in the City of Corona and on the percent change in farmland in County of Riverside.

Area Sources - Consumer Products

Source: CalEEMod Users Guide. Version 2016.3.2

Residential and Non-Residential Consumer Product Use[a]

Emissions = EF x Building Area

Non-SCAQMD EF = 2.14E-05 lbs/sqft/day

Sources/Notes:

a. California Emissions Estimator Model, Version 2016.3.2, Users Guide. Appendix A.

AVERAGE HOUSING SQFT ASSUMPTIONS

Year Structure was Built	Percent of Housing Stock [a]	Average Square Feet of New Single Family Homes[b]	Average Square Feet (Weighted)
2010 or later	1.8%	2,533	46
2000 to 2009	18.1%	2,404	436
1980 to 1999	53.6%	1,968	1,056
1979 or earlier	26.4%	1,699	449
	100%		1,986

Sources/Notes:

a. United States Cenus Bureau, American FactFinder, City of Corona, Riverside, California, Selected Housing Characteristics, 2016 American Community Survey 5-Year Estimates, Year structure built. https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF

b. United States Census Bureau, Characteristics of New Housing, Characteristics of New Single-Family Houses Completed, Median and Average Square Feet by Location. Obtained from http://www.census.gov/construction/chars/

	2018	2040
	CEQA Baseline	**Proposed Project**
Non-Residential SQFT	55,715,305	82,191,657
Housing Units	57,875	68,364
Residential SQFT	114,949,217	140,825,580
lbs VOC per day	3,652	4,773

Source

1 New housing units constructed post-2014 assumed to be 2,467 square feet (based on Source 2).

Peak Hour Turning Movement Worksheet

Intersection #	Intersection		Existing AM	Existing PM	2040 AM	2040 PM	Net Change - AM	Net Change - PM
1	**91 WB**	**Green River**	1,905	1,280	2,650	1,930	745	650
2	**91 EB**	**Green River**	1,744	2,144	2,550	2,830	806	686
3	**Green River**	**Palisades**	1,564	1,832	2,830	3,100	1,266	1,268
4	**Auto Center**	**Wardlow**	1,118	1,291	1,290	1,510	172	219
5	**Dwy/Serfas Club**	**Green River**	2,107	2,131	2,950	3,190	843	1,059
6	**Green River /Foothill Pkwy**	**Paseo Grande**	1,630	1,562	2,240	2,430	610	868
7	**Corydon**	**River**	3,174	3,348	4,380	4,700	1,206	1,352
8	**Smith**	**Railroad**	2,377	2,341	2,980	3,170	603	829
9	**Smith**	**W. Sixth**	1,948	2,726	3,010	4,310	1,062	1,584
10	**Lincoln**	**W. Sixth**	2,591	3,732	3,440	4,340	849	608
11	**S Lincoln**	**Ontario/Ontario**	2,956	2,875	3,580	3,700	624	825
12	**S Lincoln**	**Foothill**	1,852	1,882	2,700	2,880	848	998
13	**Magnolia**	**Ontario**	3,087	3,418	3,870	4,060	783	642
14	**15 SB onramp**	**Hidden Valley.**	1,618	2,921	2,970	3,500	1,352	579
15	**15 NB offramp/Lonesome Dove**	**Hidden Valley.**	1,990	3,004	2,460	3,220	470	216
16	**15 SB**	**Magnolia.**	4,030	4,377	5,370	5,560	1,340	1,183
17	**15 NB**	**Magnolia.**	3,293	3,461	4,660	4,730	1,367	1,269
18	**California**	**Ontario**	3,190	3,893	4,320	5,270	1,130	1,377
19	**15 SB**	**Ontario**	3,566	3,769	5,270	5,870	1,704	2,101
20	**15 NB**	**Ontario**	2,697	3,000	4,240	5,460	1,543	2,460
21	**California**	**Foothill /Foothill Pkwy**	3,020	2,904	3,980	4,120	960	1,216
22	**15 SB**	**Foothill /El Cerrito**	2,387	2,126	3,870	4,300	1,483	2,174
23	**15 NB**	**El Cerrito**	2,391	1,241	3,970	2,940	1,579	1,699
24	**Temescal Canyon**	**Cajalco**	3,371	3,145	4,760	5,400	1,389	2,255
25	**15 SB**	**Weirick**	1,643	1,615	2,400	3,040	757	1,425
26	**15 NB**	**Weirick**	1,757	1,590	3,300	3,050	1,543	1,460
27	**15 SB**	**Temescal Canyon**	1,819	1,596	2,660	2,800	841	1,204
28	**15 NB**	**Temescal Canyon**	1,853	1,257	2,980	2,590	1,127	1,333
29	**15 SB**	**Indian Truck Trail**	885	1,148	1,110	1,380	225	232
30	**15 NB**	**Indian Truck Trail**	1,037	624	1,260	830	223	206
31	**E. Magnolia/Promenade**	**Sixth/Magnolia**	2,683	3,601	3,580	4,340	897	739
32	**McKinley**	**Promenade**	2,891	3,985	3,490	4,719	599	734
33	**McKinley**	**91 EB Offramp**	3,271	4,164	4,290	4,980	1,019	816
34	**McKinley**	**Sixth/Magnolia**	1,846	3,077	3,300	4,380	1,454	1,303
		MAX Peak Intersection Volume:	**4,030**	**4,377**	**5,370**	**5,870**	**1,704**	**2,460**

Source: Fehr & Peers. 2019, July. Draft Transportation Impact Study: Corona General Plan Update.

Energy Worksheets

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Operation-Related Annual Vehicle Fuel/Energy Usage Summary

Existing - Baseline Year 2018

Full VMT Scenario

Year	Gas			Diesel			CNG			Electricity		
	VMT	Gallons	Miles/Gal	VMT	Gallons	Miles/Gal	VMT	Gallons	Miles/Gal	VMT	kWh	Miles/kWh
Existing Baseline	2,537,668,340	104,432,661	24.30	243,354,087	26,083,846	9.33	2,129,944	579,469	3.68	9,554,194	3,211,752	2.97

VMT with RTAC Methodology Scenario

Year	Gas			Diesel			CNG			Electricity		
	VMT	Gallons	Miles/Gal	VMT	Gallons	Miles/Gal	VMT	Gallons	Miles/Gal	VMT	kWh	Miles/kWh
Existing Baseline	1,335,955,575	54,978,577	24.30	128,113,767	13,731,841	9.33	1,121,309	305,062	3.68	5,029,806	1,690,827	2.97

Existing - Year 2040

Full VMT Scenario

Year	Gas			Diesel			CNG			Electricity		
	VMT	Gallons	Miles/Gal	VMT	Gallons	Miles/Gal	VMT	Gallons	Miles/Gal	VMT	kWh	Miles/kWh
Existing Year 2040	2,424,233,784	63,669,201	38.08	251,515,265	18,892,861	13.31	3,107,071	903,469	3.44	113,850,446	32,072,295	3.55

VMT with RTAC Methodology Scenario

Year	Gas			Diesel			CNG			Electricity		
	VMT	Gallons	Miles/Gal	VMT	Gallons	Miles/Gal	VMT	Gallons	Miles/Gal	VMT	kWh	Miles/kWh
Existing Year 2040	1,276,237,950	33,518,653	38.08	132,410,219	9,946,147	13.31	1,635,718	475,631	3.44	59,936,571	16,884,461	3.55

Proposed Project

Full VMT Scenario

Year	Gas			Diesel			CNG			Electricity		
	VMT	Gallons	Miles/Gal	VMT	Gallons	Miles/Gal	VMT	Gallons	Miles/Gal	VMT	kWh	Miles/kWh
Proposed Project	3,184,553,773	83,637,971	38.08	330,398,780	24,818,288	13.31	4,081,551	1,186,827	3.44	149,557,715	42,131,229	3.55

VMT with RTAC Methodology Scenario

Year	Gas			Diesel			CNG			Electricity		
	VMT	Gallons	Miles/Gal	VMT	Gallons	Miles/Gal	VMT	Gallons	Miles/Gal	VMT	kWh	Miles/kWh
Proposed Project	1,670,406,808	43,870,962	38.08	173,305,402	13,018,036	13.31	2,140,912	622,531	3.44	78,448,110	22,099,263	3.55

Net Change

Full VMT Scenario

Year	Gas			Diesel			CNG			Electricity		
	VMT	Gallons	Miles/Gal	VMT	Gallons	Miles/Gal	VMT	Gallons	Miles/Gal	VMT	kWh	Miles/kWh
From Existing Baseline	646,885,433	-20,794,690	13.78	87,044,693	-1,265,558	3.98	1,951,607	607,357	-0.24	140,003,522	38,919,478	0.58
From Existing 2040	760,319,989	19,968,770	0.00	78,883,516	5,925,427	0.00	974,480	283,358	0.00	35,707,270	10,058,934	0.00

VMT with RTAC Methodology Scenario

Year	Gas			Diesel			CNG			Electricity		
	VMT	Gallons	Miles/Gal	VMT	Gallons	Miles/Gal	VMT	Gallons	Miles/Gal	VMT	kWh	Miles/kWh
From Existing Baseline	334,451,233	-11,107,616	13.78	45,191,635	-713,805	3.98	1,019,603	317,469	-0.24	73,418,305	20,408,437	0.58
From Existing 2040	394,168,858	10,352,309	0.00	40,895,183	3,071,889	0.00	505,195	146,900	0.00	18,511,540	5,214,802	0.00

Notes

** VMT based on VMT data provided by Fehr & Peers.*

*** Fuel consumption rates based on data obtained from EMFAC2017 Web Database, Version 1.0.2. https://www.arb.ca.gov/emfac/2017/*

**** VMT with RTAC methodology is based on the accounting rules recommended by the California Air Resources Board's Regional Targets Advisory Committee (RTAC) created under Senate Bill 375. The accounting rules include the full trip length for internal-internal trips and 50 percent trip length for external-internal/internal-external trips.*

***** VMT per year based on a conversion of VMT x 347 days per year to account for less travel on weekend, consistent with CARB statewide GHG emissions inventory methodology. California Air Resources Board. 2008, October. Climate Change Proposed Scoping Plan: A Framework for Change.*

Existing Baseline Year 2018: Full VMT

Vehicle type	Fleet percent	VMT
LDA	53.52%	1,494,743,271
LDT1	5.02%	140,287,908
LDT2	16.41%	458,154,787
MDV	14.67%	409,631,154
LHD1	2.72%	76,015,430
LHD2	0.71%	19,830,891
MHD	1.80%	50,271,082
HHD	4.14%	115,716,534
OBUS	0.04%	1,171,753
UBUS	0.12%	3,294,943
MCY	0.47%	13,140,356
SBUS	0.09%	2,607,050
MH	0.16%	4,503,873
All Other Buses	0.02%	625,420
Motor Coach	0.01%	347,830
PTO	0.08%	2,364,283
	100%	2,792,706,565

Vehicle type	Gas percent	Diesel percent	CNG percent	Electricity percent	
LDA	98.63%	0.81%	0.00%	0.56%	
LDT1	99.89%	0.04%	0.00%	0.07%	
LDT2	99.38%	0.40%	0.00%	0.21%	
MDV	98.22%	1.74%	0.00%	0.03%	
LHD1	49.39%	50.61%	0.00%	0.00%	
LHD2	26.20%	73.80%	0.00%	0.00%	
MHD	6.58%	93.42%	0.00%	0.00%	<< Equal to T6 (https://www.arb.ca.gov/msei/downloads/emfac2014/emfac2014-vol3-technical-documentation-052015.pdf)
HHD	0.03%	99.65%	0.31%	0.00%	<< Equal to T7 (https://www.arb.ca.gov/msei/downloads/emfac2014/emfac2014-vol3-technical-documentation-052015.pdf)
OBUS	54.63%	45.37%	0.00%	0.00%	<< Motor coach, all other buses, and OBUS (https://www.arb.ca.gov/msei/downloads/emfac2014/emfac2014-vol3-technical-documentation-052015.pdf)
UBUS	46.24%	0.12%	53.63%	0.00%	
MCY	100.00%	0.00%	0.00%	0.00%	
SBUS	36.63%	63.37%	0.00%	0.00%	
MH	73.02%	26.98%	0.00%	0.00%	
All Other Buses	0.00%	100.00%	0.00%	0.00%	
Motor Coach	0.00%	100.00%	0.00%	0.00%	
PTO	0.00%	100.00%	0.00%	0.00%	

Vehicle type	Gasoline			Diesel			CNG			Electricity		
	VMT	mpg	Gallons	VMT	mpg	Gallons	VMT	mpg	Gallons	VMT	m/kWh	kWh
LDA	1,474,223,730	29.20	50,489,749	12,177,513	47.48	256,492	0	0	0	8,342,028	2.97	2,804,293
LDT1	140,129,648	24.75	5,661,729	58,365	24.78	2,355	0	0	0	99,895	2.97	33,581
LDT2	455,331,156	22.57	20,174,470	1,847,800	34.77	53,136	0	0	0	975,831	2.97	328,040
MDV	402,351,803	18.46	21,795,273	7,142,995	26.01	274,598	0	0	0	136,356	2.97	45,838
LHD1	37,545,249	10.49	3,579,874	38,470,181	20.15	1,909,389	0	0	0	0	0.00	0
LHD2	5,195,386	9.17	566,487	14,635,505	18.44	793,673	0	0	0	0	0.00	0
MHD	3,305,378	5.01	659,365	46,965,704	10.24	4,588,289	0	0	0	0	0.00	0
HHD	37,970	3.84	9,897	115,315,816	6.70	17,198,694	362,749	2.25	161,290	0	0.00	0
OBUS	640,094	4.98	128,620	531,659	8.61	61,757	0	0	0	0	0.00	0
UBUS	1,523,718	5.82	261,788	3,945	8.92	442	1,767,196	4.23	418,180	84	0.00	0
MCY	13,140,356	38.24	343,586	0	0.00	0	0	0	0	0	0.00	0
SBUS	955,068	8.76	108,987	1,651,982	7.29	226,640	0	0	0	0	0.00	0
MH	3,288,783	5.04	652,837	1,215,090	10.67	113,919	0	0	0	0	0.00	0
All Other Buses	0	0	0	625,420	9.86	63,415	0	0	0	0	0.00	0
Motor Coach	0	0	0	347,830	6.36	54,732	0	0	0	0	0.00	0
PTO	0	0	0	2,364,283	4.86	486,315	0	0	0	0	0.00	0
	2,537,668,340		**104,432,661**	**243,354,087**		**26,083,846**	**2,129,944**		**579,469**	**9,554,194**		**3,211,752**

Existing Baseline Year 2018: VMT with RTAC

Vehicle type	Fleet percent	VMT
LDA	53.52%	786,907,641
LDT1	5.02%	73,854,573
LDT2	16.41%	241,195,602
MDV	14.67%	215,650,334
LHD1	2.72%	40,018,325
LHD2	0.71%	10,439,973
MHD	1.80%	26,465,213
HHD	4.14%	60,918,973
OBUS	0.04%	616,869
UBUS	0.12%	1,734,623
MCY	0.47%	6,917,741
SBUS	0.09%	1,372,481
MH	0.16%	2,371,064
All Other Buses	0.02%	329,253
Motor Coach	0.01%	183,115
PTO	0.08%	1,244,677
	100%	1,470,220,457

Vehicle type	Gas percent	Diesel percent	CNG percent	Electricity percent	
LDA	98.63%	0.81%	0.00%	0.56%	
LDT1	99.89%	0.04%	0.00%	0.07%	
LDT2	99.38%	0.40%	0.00%	0.21%	
MDV	98.22%	1.74%	0.00%	0.03%	
LHD1	49.39%	50.61%	0.00%	0.00%	
LHD2	26.20%	73.80%	0.00%	0.00%	
MHD	6.58%	93.42%	0.00%	0.00%	<< Equal to T6 (https://www.arb.ca.gov/msei/downloads/emfac2014/emfac2014-vol3-technical-documentation-052015.pdf)
HHD	0.03%	99.65%	0.31%	0.00%	<< Equal to T7 (https://www.arb.ca.gov/msei/downloads/emfac2014/emfac2014-vol3-technical-documentation-052015.pdf)
OBUS	54.63%	45.37%	0.00%	0.00%	<< Motor coach, all other buses, and OBUS (https://www.arb.ca.gov/msei/downloads/emfac2014/emfac2014-vol3-technical-documentation-052015.pdf)
UBUS	46.24%	0.12%	53.63%	0.00%	
MCY	100.00%	0.00%	0.00%	0.00%	
SBUS	36.63%	63.37%	0.00%	0.00%	
MH	73.02%	26.98%	0.00%	0.00%	
All Other Buses	0.00%	100.00%	0.00%	0.00%	
Motor Coach	0.00%	100.00%	0.00%	0.00%	
PTO	0.00%	100.00%	0.00%	0.00%	

Vehicle type	Gasoline			Diesel			CNG			Electricity		
	VMT	mpg	Gallons	VMT	mpg	Gallons	VMT	mpg	Gallons	VMT	m/kWh	kWh
LDA	776,105,128	29.20	26,580,330	6,410,852	47.48	135,030	0	0	0	4,391,661	2.97	1,476,320
LDT1	73,771,258	24.75	2,980,617	30,726	24.78	1,240	0	0	0	52,590	2.97	17,679
LDT2	239,709,101	22.57	10,620,850	972,774	34.77	27,973	0	0	0	513,726	2.97	172,696
MDV	211,818,119	18.46	11,474,122	3,760,430	26.01	144,562	0	0	0	71,785	2.97	24,131
LHD1	19,765,697	10.49	1,884,625	20,252,628	20.15	1,005,198	0	0	0	0	0.00	0
LHD2	2,735,111	9.17	298,227	7,704,862	18.44	417,829	0	0	0	0	0.00	0
MHD	1,740,116	5.01	347,123	24,725,096	10.24	2,415,505	0	0	0	0	0.00	0
HHD	19,989	3.84	5,210	60,708,015	6.70	9,054,253	190,969	2.25	84,911	0	0.00	0
OBUS	336,978	4.98	67,712	279,892	8.61	32,512	0	0	0	0	0.00	0
UBUS	802,161	5.82	137,818	2,077	8.92	233	930,340	4.23	220,151	44	0.00	0
MCY	6,917,741	38.24	180,881	0	0.00	0	0	0	0	0	0.00	0
SBUS	502,796	8.76	57,376	869,686	7.29	119,315	0	0	0	0	0.00	0
MH	1,731,380	5.04	343,686	639,684	10.67	59,973	0	0	0	0	0.00	0
All Other Buses	0	0	0	329,253	9.86	33,385	0	0	0	0	0.00	0
Motor Coach	0	0	0	183,115	6.36	28,813	0	0	0	0	0.00	0
PTO	0	0	0	1,244,677	4.86	256,021	0	0	0	0	0.00	0
	1,335,955,575		**54,978,577**	**128,113,767**		**13,731,841**	**1,121,309**		**305,062**	**5,029,806**		**1,690,827**

Existing Year 2040: Full VMT

Vehicle type	Fleet percent	VMT
LDA	56.79%	1,586,032,495
LDT1	5.55%	155,123,589
LDT2	16.92%	472,588,098
MDV	11.16%	311,789,461
LHD1	1.84%	51,395,020
LHD2	0.51%	14,286,699
MHD	1.70%	47,396,306
HHD	4.75%	132,521,489
OBUS	0.03%	768,148
UBUS	0.10%	2,846,542
MCY	0.34%	9,400,000
SBUS	0.09%	2,603,106
MH	0.07%	1,875,243
All Other Buses	0.02%	660,260
Motor Coach	0.01%	361,578
PTO	0.11%	3,058,532
	100%	2,792,706,565

Vehicle type	Gas percent	Diesel percent	CNG percent	Electricity percent	
LDA	93.41%	1.16%	0.00%	5.43%	
LDT1	96.65%	0.01%	0.00%	3.34%	
LDT2	96.28%	0.98%	0.00%	2.74%	
MDV	93.56%	3.35%	0.00%	3.09%	
LHD1	49.09%	50.91%	0.00%	0.00%	
LHD2	27.14%	72.86%	0.00%	0.00%	
MHD	8.12%	91.88%	0.00%	0.00%	<< Equal to T6 (https://www.arb.ca.gov/msei/downloads/emfac2014/emfac2014-vol3-technical-documentation-052015.pdf)
HHD	0.03%	98.78%	1.19%	0.00%	<< Equal to T7 (https://www.arb.ca.gov/msei/downloads/emfac2014/emfac2014-vol3-technical-documentation-052015.pdf)
OBUS	42.91%	57.09%	0.00%	0.00%	<< Motor coach, all other buses, and OBUS (https://www.arb.ca.gov/msei/downloads/emfac2014/emfac2014-vol3-technical-documentation-052015.pdf)
UBUS	46.24%	0.00%	53.76%	0.00%	
MCY	100.00%	0.00%	0.00%	0.00%	
SBUS	26.86%	73.14%	0.00%	0.00%	
MH	67.75%	32.25%	0.00%	0.00%	
All Other Buses	0.00%	100.00%	0.00%	0.00%	
Motor Coach	0.00%	100.00%	0.00%	0.00%	
PTO	0.00%	100.00%	0.00%	0.00%	

Vehicle type	Gasoline			Diesel			CNG			Electricity		
	VMT	mpg	Gallons	VMT	mpg	Gallons	VMT	mpg	Gallons	VMT	m/kWh	kWh
LDA	1,481,586,997	43.14	34,346,218	18,365,476	68.12	269,624	0	0	0	86,080,022	3.55	24,249,215
LDT1	149,928,193	36.99	4,053,674	20,443	35.75	572	0	0	0	5,174,953	3.55	1,457,813
LDT2	454,992,892	37.43	12,156,087	4,640,300	51.38	90,320	0	0	0	12,954,906	3.55	3,649,468
MDV	291,718,251	30.56	9,544,866	10,430,646	39.19	266,150	0	0	0	9,640,564	3.55	2,715,800
LHD1	25,230,541	13.27	1,901,523	26,164,479	26.27	995,794	0	0	0	0	0.00	0
LHD2	3,877,636	11.56	335,538	10,409,063	23.77	437,885	0	0	0	0	0.00	0
MHD	3,847,945	6.52	590,297	43,548,361	14.34	3,037,551	0	0	0	0	0.00	0
HHD	35,693	5.68	6,279	130,908,908	10.10	12,955,291	1,576,887	2.91	541,295	0	0.00	0
OBUS	329,640	6.48	50,890	438,508	11.64	37,670	0	0	0	0	0.00	0
UBUS	1,316,359	7.78	169,207	0	0.00	0	1,530,183	4.22	362,174	0	0.00	0
MCY	9,400,000	37.62	249,888	0	0.00	0	0	0	0	0	0.00	0
SBUS	699,101	10.16	68,783	1,904,005	10.10	188,454	0	0	0	0	0.00	0
MH	1,270,535	6.48	195,950	604,708	12.91	46,830	0	0	0	0	0.00	0
All Other Buses	0	0	0	660,260	13.25	49,836	0	0	0	0	0.00	0
Motor Coach	0	0	0	361,578	8.71	41,536	0	0	0	0	0.00	0
PTO	0	0	0	3,058,532	6.43	475,348	0	0	0	0	0.00	0
	2,424,233,784		**63,669,201**	**251,515,265**		**18,892,861**	**3,107,071**		**903,469**	**113,850,446**		**32,072,295**

Existing Year 2040: VMT with RTAC

Vehicle type	Fleet percent	VMT
LDA	56.79%	834,966,856
LDT1	5.55%	81,664,818
LDT2	16.92%	248,794,018
MDV	11.16%	164,141,571
LHD1	1.84%	27,056,910
LHD2	0.51%	7,521,233
MHD	1.70%	24,951,787
HHD	4.75%	69,765,942
OBUS	0.03%	404,392
UBUS	0.10%	1,498,562
MCY	0.34%	4,948,630
SBUS	0.09%	1,370,405
MH	0.07%	987,222
All Other Buses	0.02%	347,594
Motor Coach	0.01%	190,353
PTO	0.11%	1,610,164
	100%	1,470,220,457

Vehicle type	Gas percent	Diesel percent	CNG percent	Electricity percent	
LDA	93.41%	1.16%	0.00%	5.43%	
LDT1	96.65%	0.01%	0.00%	3.34%	
LDT2	96.28%	0.98%	0.00%	2.74%	
MDV	93.56%	3.35%	0.00%	3.09%	
LHD1	49.09%	50.91%	0.00%	0.00%	
LHD2	27.14%	72.86%	0.00%	0.00%	
MHD	8.12%	91.88%	0.00%	0.00%	<< Equal to T6 (https://www.arb.ca.gov/msei/downloads/emfac2014/emfac2014-vol3-technical-documentation-052015.pdf)
HHD	0.03%	98.78%	1.19%	0.00%	<< Equal to T7 (https://www.arb.ca.gov/msei/downloads/emfac2014/emfac2014-vol3-technical-documentation-052015.pdf)
OBUS	42.91%	57.09%	0.00%	0.00%	<< Motor coach, all other buses, and OBUS (https://www.arb.ca.gov/msei/downloads/emfac2014/emfac2014-vol3-technical-documentation-052015.pdf)
UBUS	46.24%	0.00%	53.76%	0.00%	
MCY	100.00%	0.00%	0.00%	0.00%	
SBUS	26.86%	73.14%	0.00%	0.00%	
MH	67.75%	32.25%	0.00%	0.00%	
All Other Buses	0.00%	100.00%	0.00%	0.00%	
Motor Coach	0.00%	100.00%	0.00%	0.00%	
PTO	0.00%	100.00%	0.00%	0.00%	

Vehicle type	Gasoline			Diesel			CNG			Electricity		
	VMT	mpg	Gallons	VMT	mpg	Gallons	VMT	mpg	Gallons	VMT	m/kWh	kWh
LDA	779,981,520	43.14	18,081,568	9,668,505	68.12	141,943	0	0	0	45,316,830	3.55	12,766,000
LDT1	78,929,702	36.99	2,134,057	10,762	35.75	301	0	0	0	2,724,354	3.55	767,466
LDT2	239,531,022	37.43	6,399,573	2,442,886	51.38	47,549	0	0	0	6,820,110	3.55	1,921,263
MDV	153,575,082	30.56	5,024,895	5,491,214	39.19	140,115	0	0	0	5,075,275	3.55	1,429,733
LHD1	13,282,619	13.27	1,001,057	13,774,291	26.27	524,236	0	0	0	0	0.00	0
LHD2	2,041,382	11.56	176,644	5,479,851	23.77	230,524	0	0	0	0	0.00	0
MHD	2,025,751	6.52	310,762	22,926,036	14.34	1,599,119	0	0	0	0	0.00	0
HHD	18,791	5.68	3,306	68,916,999	10.10	6,820,314	830,152	2.91	284,965	0	0.00	0
OBUS	173,539	6.48	26,791	230,852	11.64	19,831	0	0	0	0	0.00	0
UBUS	692,997	7.78	89,079	0	0.00	0	805,565	4.22	190,667	0	0.00	0
MCY	4,948,630	37.62	131,553	0	0.00	0	0	0	0	0	0.00	0
SBUS	368,042	10.16	36,211	1,002,363	10.10	99,211	0	0	0	0	0.00	0
MH	668,873	6.48	103,158	318,348	12.91	24,654	0	0	0	0	0.00	0
All Other Buses	0	0	0	347,594	13.25	26,236	0	0	0	0	0.00	0
Motor Coach	0	0	0	190,353	8.71	21,867	0	0	0	0	0.00	0
PTO	0	0	0	1,610,164	6.43	250,247	0	0	0	0	0.00	0
	1,276,237,950		**33,518,653**	**132,410,219**		**9,946,147**	**1,635,718**		**475,631**	**59,936,571**		**16,884,461**

Project Horizon Year 2040: Full VMT

Vehicle type	Fleet percent	VMT
LDA	56.79%	2,083,464,805
LDT1	5.55%	203,775,483
LDT2	16.92%	620,807,374
MDV	11.16%	409,576,961
LHD1	1.84%	67,514,200
LHD2	0.51%	18,767,481
MHD	1.70%	62,261,357
HHD	4.75%	174,084,616
OBUS	0.03%	1,009,065
UBUS	0.10%	3,739,312
MCY	0.34%	12,348,152
SBUS	0.09%	3,419,526
MH	0.07%	2,463,381
All Other Buses	0.02%	867,339
Motor Coach	0.01%	474,981
PTO	0.11%	4,017,788
	100.000000%	3,668,591,820

Vehicle type	Gas percent	Diesel percent	CNG percent	Electricity percent	
LDA	93.41%	1.16%	0.00%	5.43%	
LDT1	96.65%	0.01%	0.00%	3.34%	
LDT2	96.28%	0.98%	0.00%	2.74%	
MDV	93.56%	3.35%	0.00%	3.09%	
LHD1	49.09%	50.91%	0.00%	0.00%	
LHD2	27.14%	72.86%	0.00%	0.00%	
MHD	8.12%	91.88%	0.00%	0.00%	<< Equal to T6 (https://www.arb.ca.gov/msei/downloads/emfac2014/emfac2014-vol3-technical-documentation-052015.pdf)
HHD	0.03%	98.78%	1.19%	0.00%	<< Equal to T7 (https://www.arb.ca.gov/msei/downloads/emfac2014/emfac2014-vol3-technical-documentation-052015.pdf)
OBUS	42.91%	57.09%	0.00%	0.00%	<< Motor coach, all other buses, and OBUS (https://www.arb.ca.gov/msei/downloads/emfac2014/emfac2014-vol3-technical-documentation-052015.pdf)
UBUS	46.24%	0.00%	53.76%	0.00%	
MCY	100.00%	0.00%	0.00%	0.00%	
SBUS	26.86%	73.14%	0.00%	0.00%	
MH	67.75%	32.25%	0.00%	0.00%	
All Other Buses	0.00%	100.00%	0.00%	0.00%	
Motor Coach	0.00%	100.00%	0.00%	0.00%	
PTO	0.00%	100.00%	0.00%	0.00%	

Vehicle type	Gasoline			Diesel			CNG			Electricity		
	VMT	mpg	Gallons	VMT	mpg	Gallons	VMT	mpg	Gallons	VMT	m/kWh	kWh
LDA	1,946,261,740	43.14	45,118,330	24,125,497	68.12	354,186	0	0	0	113,077,568	3.55	31,854,572
LDT1	196,950,639	36.99	5,325,041	26,854	35.75	751	0	0	0	6,797,990	3.55	1,915,031
LDT2	597,693,730	37.43	15,968,639	6,095,651	51.38	118,648	0	0	0	17,017,993	3.55	4,794,062
MDV	383,210,754	30.56	12,538,452	13,702,042	39.19	349,624	0	0	0	12,664,165	3.55	3,567,565
LHD1	33,143,674	13.27	2,497,904	34,370,526	26.27	1,308,108	0	0	0	0	0.00	0
LHD2	5,093,791	11.56	440,774	13,673,690	23.77	575,220	0	0	0	0	0.00	0
MHD	5,054,788	6.52	775,434	57,206,569	14.34	3,990,227	0	0	0	0	0.00	0
HHD	46,888	5.68	8,249	171,966,276	10.10	17,018,500	2,071,452	2.91	711,063	0	0.00	0
OBUS	433,027	6.48	66,850	576,038	11.64	49,484	0	0	0	0	0.00	0
UBUS	1,729,213	7.78	222,276	0	0.00	0	2,010,100	4.22	475,764	0	0.00	0
MCY	12,348,152	37.62	328,261	0	0.00	0	0	0	0	0	0.00	0
SBUS	918,362	10.16	90,355	2,501,164	10.10	247,559	0	0	0	0	0.00	0
MH	1,669,016	6.48	257,407	794,364	12.91	61,518	0	0	0	0	0.00	0
All Other Buses	0	0	0	867,339	13.25	65,466	0	0	0	0	0.00	0
Motor Coach	0	0	0	474,981	8.71	54,564	0	0	0	0	0.00	0
PTO	0	0	0	4,017,788	6.43	624,433	0	0	0	0	0.00	0
	3,184,553,773		**83,637,971**	**330,398,780**		**24,818,288**	**4,081,551**		**1,186,827**	**149,557,715**		**42,131,229**

Project Horizon Year 2040: VMT with RTAC

Vehicle type	Fleet percent	VMT
LDA	56.79%	1,092,848,179
LDT1	5.55%	106,887,174
LDT2	16.92%	325,634,591
MDV	11.16%	214,837,052
LHD1	1.84%	35,413,495
LHD2	0.51%	9,844,182
MHD	1.70%	32,658,200
HHD	4.75%	91,313,304
OBUS	0.03%	529,289
UBUS	0.10%	1,961,396
MCY	0.34%	6,477,026
SBUS	0.09%	1,793,658
MH	0.07%	1,292,127
All Other Buses	0.02%	454,949
Motor Coach	0.01%	249,144
PTO	0.11%	2,107,467
	100.000000%	1,924,301,232

Vehicle type	Gas percent	Diesel percent	CNG percent	Electricity percent	
LDA	93.41%	1.16%	0.00%	5.43%	
LDT1	96.65%	0.01%	0.00%	3.34%	
LDT2	96.28%	0.98%	0.00%	2.74%	
MDV	93.56%	3.35%	0.00%	3.09%	
LHD1	49.09%	50.91%	0.00%	0.00%	
LHD2	27.14%	72.86%	0.00%	0.00%	
MHD	8.12%	91.88%	0.00%	0.00%	<< Equal to T6 (https://www.arb.ca.gov/msei/downloads/emfac2014/emfac2014-vol3-technical-documentation-052015.pdf)
HHD	0.03%	98.78%	1.19%	0.00%	<< Equal to T7 (https://www.arb.ca.gov/msei/downloads/emfac2014/emfac2014-vol3-technical-documentation-052015.pdf)
OBUS	42.91%	57.09%	0.00%	0.00%	<< Motor coach, all other buses, and OBUS (https://www.arb.ca.gov/msei/downloads/emfac2014/emfac2014-vol3-technical-documentation-052015.pdf)
UBUS	46.24%	0.00%	53.76%	0.00%	
MCY	100.00%	0.00%	0.00%	0.00%	
SBUS	26.86%	73.14%	0.00%	0.00%	
MH	67.75%	32.25%	0.00%	0.00%	
All Other Buses	0.00%	100.00%	0.00%	0.00%	
Motor Coach	0.00%	100.00%	0.00%	0.00%	
PTO	0.00%	100.00%	0.00%	0.00%	

Vehicle type	Gasoline			Diesel			CNG			Electricity		
	VMT	mpg	Gallons	VMT	mpg	Gallons	VMT	mpg	Gallons	VMT	m/kWh	kWh
LDA	1,020,880,503	43.14	23,666,099	12,654,644	68.12	185,783	0	0	0	59,313,032	3.55	16,708,807
LDT1	103,307,311	36.99	2,793,165	14,086	35.75	394	0	0	0	3,565,777	3.55	1,004,499
LDT2	313,510,698	37.43	8,376,094	3,197,376	51.38	62,235	0	0	0	8,926,516	3.55	2,514,649
MDV	201,007,079	30.56	6,576,845	7,187,187	39.19	183,389	0	0	0	6,642,785	3.55	1,871,309
LHD1	17,384,985	13.27	1,310,235	18,028,510	26.27	686,147	0	0	0	0	0.00	0
LHD2	2,671,867	11.56	231,201	7,172,315	23.77	301,722	0	0	0	0	0.00	0
MHD	2,651,408	6.52	406,742	30,006,792	14.34	2,093,010	0	0	0	0	0.00	0
HHD	24,594	5.68	4,327	90,202,163	10.10	8,926,782	1,086,547	2.91	372,977	0	0.00	0
OBUS	227,137	6.48	35,065	302,152	11.64	25,956	0	0	0	0	0.00	0
UBUS	907,031	7.78	116,591	0	0.00	0	1,054,366	4.22	249,554	0	0.00	0
MCY	6,477,026	37.62	172,184	0	0.00	0	0	0	0	0	0.00	0
SBUS	481,712	10.16	47,394	1,311,945	10.10	129,853	0	0	0	0	0.00	0
MH	875,456	6.48	135,019	416,671	12.91	32,268	0	0	0	0	0.00	0
All Other Buses	0	0	0	454,949	13.25	34,339	0	0	0	0	0.00	0
Motor Coach	0	0	0	249,144	8.71	28,621	0	0	0	0	0.00	0
PTO	0	0	0	2,107,467	6.43	327,536	0	0	0	0	0.00	0
	1,670,406,808		**43,870,962**	**173,305,402**		**13,018,036**	**2,140,912**		**622,531**	**78,448,110**		**22,099,263**

EMFAC Fuel Usage: Year 2018

Vehicle type	Gasoline VMT/day	Gasoline Gallons/day	Gasoline Miles/gallon	Diesel VMT/day	Diesel Gallons/day	Diesel Miles/gallon	Natural Gas VMT/day	Natural Gas Gallons/day	Natural Gas Miles/gallon	Electricity VMT/day
All other buses	0	0	0.00	9,285	941	9.86	0	0	0.00	0
LDA	21,886,505	749,577	29.20	180,789	3,808	47.48	0	0	0.00	123,847
LDT1	2,080,382	84,055	24.75	866	35	24.78	0	0	0.00	1,483
LDT2	6,759,902	299,513	22.57	27,433	789	34.77	0	0	0.00	14,487
LHD1	557,401	53,147	10.49	571,133	28,347	20.15	0	0	0.00	0
LHD2	77,131	8,410	9.17	217,280	11,783	18.44	0	0	0.00	0
MCY	195,083	5,101	38.24	0	0	0.00	0	0	0.00	0
MDV	5,973,364	323,575	18.46	106,046	4,077	26.01	0	0	0.00	2,024
MH	48,826	9,692	5.04	18,039	1,691	10.67	0	0	0.00	0
Motor coach	0	0	0.00	5,164	813	6.36	0	0	0.00	0
OBUS	17,396	3,496	4.98	0	0	0.00	0	0	0.00	0
PTO	0	0	0.00	35,100	7,220	4.86	0	0	0.00	0
SBUS	14,179	1,618	8.76	24,526	3,365	7.29	0	0	0.00	0
T6	49,072	9,789	5.01	697,259	68,118	10.24	0	0	0.00	0
T7	564	147	3.84	1,711,993	255,334	6.70	5,385	2,395	2.25	0
UBUS	22,621	3,887	5.82	59	7	8.92	26,236	6,208	4.23	1
Total	**37,682,427**	**1,552,006**	**24.28**	**3,604,971**	**386,327**	**9.33**	**31,621**	**8,603**	**3.68**	**141,843**

EMFAC2017 (v1.0.2) Emissions Inventory
Region Type: Sub-Area
Region: Riverside (SC)
Calendar Year: 2018
Season: Annual
Vehicle Classification: EMFAC2011 Categories
Units: miles/day for VMT, trips/day for Trips, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	VMT	Trips	Fuel_Consumption
Riverside (SC)	2018	All Other Buses	Aggregated	Aggregated	DSL	181.0464797	9285.068407	1520.79043	0.941469137
Riverside (SC)	2018	LDA	Aggregated	Aggregated	GAS	506416.9341	21886505.2	2394720.611	749.5769664
Riverside (SC)	2018	LDA	Aggregated	Aggregated	DSL	3972.142218	180788.8494	18989.08486	3.807909778
Riverside (SC)	2018	LDA	Aggregated	Aggregated	ELEC	3353.4939	123846.7604	17034.19648	0
Riverside (SC)	2018	LDT1	Aggregated	Aggregated	GAS	54073.32552	2080381.839	242724.9474	84.05471244
Riverside (SC)	2018	LDT1	Aggregated	Aggregated	DSL	39.67801488	866.4912044	131.6189082	0.034969752
Riverside (SC)	2018	LDT1	Aggregated	Aggregated	ELEC	44.27373647	1483.049212	217.2199587	0
Riverside (SC)	2018	LDT2	Aggregated	Aggregated	GAS	163935.0153	6759901.851	764833.1584	299.5126369
Riverside (SC)	2018	LDT2	Aggregated	Aggregated	DSL	550.4581733	27432.66729	2717.115602	0.788864622
Riverside (SC)	2018	LDT2	Aggregated	Aggregated	ELEC	417.386745	14487.3033	2146.939848	0
Riverside (SC)	2018	LHD1	Aggregated	Aggregated	GAS	16493.20118	557401.343	245724.1228	53.14724579
Riverside (SC)	2018	LHD1	Aggregated	Aggregated	DSL	15589.55126	571132.9909	196096.9432	28.34701779
Riverside (SC)	2018	LHD2	Aggregated	Aggregated	GAS	2243.091526	77131.32966	33418.72153	8.410127649
Riverside (SC)	2018	LHD2	Aggregated	Aggregated	DSL	5832.260313	217280.4939	73362.49775	11.78296431

Riverside (SC)	2018 MCY	Aggregated	Aggregated	GAS	27046.02448	195083.3295	54092.04897	5.100919981
Riverside (SC)	2018 MDV	Aggregated	Aggregated	GAS	153860.1899	5973363.917	707853.7687	323.5752779
Riverside (SC)	2018 MDV	Aggregated	Aggregated	DSL	2274.968291	106045.7708	11206.48527	4.076715291
Riverside (SC)	2018 MDV	Aggregated	Aggregated	ELEC	59.95139476	2024.361014	305.163866	0
Riverside (SC)	2018 MH	Aggregated	Aggregated	GAS	5776.734287	48825.67457	577.904498	9.69209849
Riverside (SC)	2018 MH	Aggregated	Aggregated	DSL	1998.535936	18039.37033	199.8535936	1.691252239
Riverside (SC)	2018 Motor Coach	Aggregated	Aggregated	DSL	41.18755006	5163.933802	601.3382308	0.812551917
Riverside (SC)	2018 OBUS	Aggregated	Aggregated	GAS	451.6254813	17395.98667	9036.12263	3.495537759
Riverside (SC)	2018 PTO	Aggregated	Aggregated	DSL	0	35100.4302	0	7.219897927
Riverside (SC)	2018 SBUS	Aggregated	Aggregated	GAS	376.9613183	14179.05722	1507.845273	1.618035537
Riverside (SC)	2018 SBUS	Aggregated	Aggregated	DSL	772.6394382	24525.52044	8916.151995	3.364731885
Riverside (SC)	2018 T6 Ag	Aggregated	Aggregated	DSL	4.54134074	110.9131324	19.98189925	0.011632988
Riverside (SC)	2018 T6 CAIRP heavy	Aggregated	Aggregated	DSL	40.26973847	8152.934877	587.9381816	0.724181049
Riverside (SC)	2018 T6 CAIRP small	Aggregated	Aggregated	DSL	20.86222108	1116.633958	304.5884278	0.105743858
Riverside (SC)	2018 T6 instate construction heavy	Aggregated	Aggregated	DSL	625.4942766	41536.06086	2827.835305	4.117288508
Riverside (SC)	2018 T6 instate construction small	Aggregated	Aggregated	DSL	1305.204485	64829.0034	5900.778731	6.390126142
Riverside (SC)	2018 T6 instate heavy	Aggregated	Aggregated	DSL	1751.299763	221404.5589	20209.75645	20.93670248
Riverside (SC)	2018 T6 instate small	Aggregated	Aggregated	DSL	7080.643518	341465.3138	81709.6445	33.70697143
Riverside (SC)	2018 T6 OOS heavy	Aggregated	Aggregated	DSL	22.87897595	4638.51566	334.0330489	0.412265014
Riverside (SC)	2018 T6 OOS small	Aggregated	Aggregated	DSL	12.05860434	643.0243651	176.0556234	0.060917214
Riverside (SC)	2018 T6 Public	Aggregated	Aggregated	DSL	726.300785	10696.874	2203.112379	1.36969006
Riverside (SC)	2018 T6 utility	Aggregated	Aggregated	DSL	159.1754021	2664.730657	1830.517124	0.282774479
Riverside (SC)	2018 T6TS	Aggregated	Aggregated	GAS	1231.972811	49072.04487	24649.31201	9.789008661
Riverside (SC)	2018 T7 Ag	Aggregated	Aggregated	DSL	9.720345203	149.7649902	42.76951889	0.025364781
Riverside (SC)	2018 T7 CAIRP	Aggregated	Aggregated	DSL	1364.991098	266456.8911	19928.87003	39.28759845
Riverside (SC)	2018 T7 CAIRP construction	Aggregated	Aggregated	DSL	152.0502794	29835.71333	687.4134014	4.220948318
Riverside (SC)	2018 T7 NNOOS	Aggregated	Aggregated	DSL	1573.363326	324834.226	22971.10457	46.47692396
Riverside (SC)	2018 T7 NOOS	Aggregated	Aggregated	DSL	537.1436595	104686.0143	7842.297429	15.78313565
Riverside (SC)	2018 T7 POLA	Aggregated	Aggregated	DSL	2014.878168	235343.1329	15313.07408	37.70936693
Riverside (SC)	2018 T7 Public	Aggregated	Aggregated	DSL	811.9336307	16468.36866	2462.865344	2.895172428
Riverside (SC)	2018 T7 Single	Aggregated	Aggregated	DSL	2383.543566	176772.7825	27505.76229	25.98743491
Riverside (SC)	2018 T7 single construction	Aggregated	Aggregated	DSL	1082.078253	74016.91708	4892.033713	11.23594766
Riverside (SC)	2018 T7 SWCV	Aggregated	Aggregated	DSL	105.3473108	4304.320432	410.8545122	2.128770941
Riverside (SC)	2018 T7 SWCV	Aggregated	Aggregated	NG	132.6075958	5385.40989	517.1696238	2.394527709
Riverside (SC)	2018 T7 tractor	Aggregated	Aggregated	DSL	2924.636212	415913.9029	37142.87989	59.91183144
Riverside (SC)	2018 T7 tractor construction	Aggregated	Aggregated	DSL	872.1792709	61057.44008	3943.088574	9.327313292
Riverside (SC)	2018 T7 utility	Aggregated	Aggregated	DSL	106.0360241	2153.181766	1219.414277	0.344091484
Riverside (SC)	2018 T7IS	Aggregated	Aggregated	GAS	10.15655092	563.7048197	203.2122708	0.146934121
Riverside (SC)	2018 UBUS	Aggregated	Aggregated	GAS	160.6686045	22621.30502	642.6744181	3.886537124
Riverside (SC)	2018 UBUS	Aggregated	Aggregated	DSL	1.105797941	58.57190354	4.423191762	0.006566327
Riverside (SC)	2018 UBUS	Aggregated	Aggregated	ELEC	0.058469431	1.251702935	0.233877724	0
Riverside (SC)	2018 UBUS	Aggregated	Aggregated	NG	199.3922535	26236.00395	797.5690139	6.208345577

EMFAC Fuel Usage: Year 2040

Vehicle type	Gasoline			Diesel			Natural Gas			Electricity
	VMT/day	Gallons/day	Miles/gallon	VMT/day	Gallons/day	Miles/gallon	VMT/day	Gallons/day	Miles/gallon	VMT/day
All other buses	0	0	0.00	12,847	970	13.25	0	0	0.00	0
LDA	28,828,531	668,304	43.14	357,353	5,246	68.12	0	0	0.00	1,674,934
LDT1	2,917,284	78,876	36.99	398	11	35.75	0	0	0.00	100,694
LDT2	8,853,194	236,532	37.43	90,290	1,757	51.38	0	0	0.00	252,075
LHD1	490,933	37,000	13.27	509,105	19,376	26.27	0	0	0.00	0
LHD2	75,451	6,529	11.56	202,538	8,520	23.77	0	0	0.00	0
MCY	182,904	4,862	37.62	0	0	0.00	0	0	0.00	0
MDV	5,676,217	185,723	30.56	202,958	5,179	39.19	0	0	0.00	187,585
MH	24,722	3,813	6.48	11,766	911	12.91	0	0	0.00	0
Motor coach	0	0	0.00	7,036	808	8.71	0	0	0.00	0
OBUS	14,947	2,307	6.48	0	0	0.00	0	0	0.00	0
PTO	0	0	0.00	59,513	9,249	6.43	0	0	0.00	0
SBUS	13,603	1,338	10.16	37,048	3,667	10.10	0	0	0.00	0
T6	74,873	11,486	6.52	847,358	59,104	14.34	0	0	0.00	0
T7	695	122	5.68	2,547,209	252,082	10.10	30,683	10,532	2.91	0
UBUS	25,614	3,292	7.78	0	0	0.00	29,774	7,047	4.22	0
Total	**47,178,965**	**1,240,184**	**38.04**	**4,885,420**	**366,882**	**13.32**	**60,457**	**17,580**	**3.44**	**2,215,287**

EMFAC2017 (v1.0.2) Emissions Inventory
Region Type: Sub-Area
Region: Riverside (SC)
Calendar Year: 2040
Season: Annual
Vehicle Classification: EMFAC2011 Categories
Units: miles/day for VMT, trips/day for Trips, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	VMT	Trips	Fuel_Consumption
Riverside (SC)	2040	All Other Buses	Aggregated	Aggregated	DSL	248.152905	12847.24746	2084.484402	0.969704932
Riverside (SC)	2040	LDA	Aggregated	Aggregated	GAS	852555.6492	28828531.06	3992443.135	668.3043382
Riverside (SC)	2040	LDA	Aggregated	Aggregated	DSL	10443.92772	357353.0917	49163.70723	5.246301255
Riverside (SC)	2040	LDA	Aggregated	Aggregated	ELEC	52845.7585	1674934.107	251487.5439	0
Riverside (SC)	2040	LDT1	Aggregated	Aggregated	GAS	90264.3132	2917283.683	415139.7563	78.87588172
Riverside (SC)	2040	LDT1	Aggregated	Aggregated	DSL	12.06522994	397.7699388	56.06289505	0.011125297
Riverside (SC)	2040	LDT1	Aggregated	Aggregated	ELEC	3205.210505	100693.5818	15205.77842	0
Riverside (SC)	2040	LDT2	Aggregated	Aggregated	GAS	267281.1831	8853193.744	1242641.877	236.5315997
Riverside (SC)	2040	LDT2	Aggregated	Aggregated	DSL	2669.202637	90290.35875	12564.36276	1.757440608
Riverside (SC)	2040	LDT2	Aggregated	Aggregated	ELEC	11506.89393	252074.9044	54727.42969	0
Riverside (SC)	2040	LHD1	Aggregated	Aggregated	GAS	16331.79402	490932.6532	243319.3965	36.99959375
Riverside (SC)	2040	LHD1	Aggregated	Aggregated	DSL	17335.07519	509105.1029	218053.4383	19.37603734
Riverside (SC)	2040	LHD2	Aggregated	Aggregated	GAS	2556.874497	75450.55392	38093.62027	6.528863038
Riverside (SC)	2040	LHD2	Aggregated	Aggregated	DSL	7240.680011	202538.2176	91078.64576	8.520303804

Riverside (SC)	2040 MCY	Aggregated	Aggregated	GAS	34845.94277	182904.0071	69691.88555	4.862284163
Riverside (SC)	2040 MDV	Aggregated	Aggregated	GAS	179699.1479	5676216.57	824712.5138	185.7227814
Riverside (SC)	2040 MDV	Aggregated	Aggregated	DSL	6247.352713	202958.1774	29135.98582	5.178714221
Riverside (SC)	2040 MDV	Aggregated	Aggregated	ELEC	8569.582824	187584.8748	40751.38161	0
Riverside (SC)	2040 MH	Aggregated	Aggregated	GAS	2983.257089	24721.90276	298.4450392	3.81277647
Riverside (SC)	2040 MH	Aggregated	Aggregated	DSL	1687.17327	11766.32886	168.717327	0.911215016
Riverside (SC)	2040 Motor Coach	Aggregated	Aggregated	DSL	56.88874385	7035.537335	830.5756602	0.808211724
Riverside (SC)	2040 OBUS	Aggregated	Aggregated	GAS	493.5220247	14946.53169	9874.38867	2.307433448
Riverside (SC)	2040 PTO	Aggregated	Aggregated	DSL	0	59512.51841	0	9.249261258
Riverside (SC)	2040 SBUS	Aggregated	Aggregated	GAS	452.1810879	13603.01699	1808.724352	1.338361572
Riverside (SC)	2040 SBUS	Aggregated	Aggregated	DSL	1158.764484	37047.88258	13371.98149	3.666909428
Riverside (SC)	2040 T6 Ag	Aggregated	Aggregated	DSL	0.918017838	4.746044178	4.039278486	0.000529971
Riverside (SC)	2040 T6 CAIRP heavy	Aggregated	Aggregated	DSL	70.6149844	11757.50126	1030.978772	0.723680151
Riverside (SC)	2040 T6 CAIRP small	Aggregated	Aggregated	DSL	36.03872602	1544.693318	526.1653999	0.106621403
Riverside (SC)	2040 T6 instate construction heavy	Aggregated	Aggregated	DSL	630.0967973	41304.01807	2848.643123	3.159324831
Riverside (SC)	2040 T6 instate construction small	Aggregated	Aggregated	DSL	1295.686724	64466.8337	5857.749303	4.545481504
Riverside (SC)	2040 T6 instate heavy	Aggregated	Aggregated	DSL	3093.728678	303513.9593	35701.20001	20.45618015
Riverside (SC)	2040 T6 instate small	Aggregated	Aggregated	DSL	9105.72702	407436.1822	105078.8274	28.79452281
Riverside (SC)	2040 T6 OOS heavy	Aggregated	Aggregated	DSL	38.83493518	6507.058665	566.9900537	0.400256789
Riverside (SC)	2040 T6 OOS small	Aggregated	Aggregated	DSL	21.11202421	894.6493743	308.2355535	0.061873049
Riverside (SC)	2040 T6 Public	Aggregated	Aggregated	DSL	438.9090347	6772.911114	1331.357404	0.616619918
Riverside (SC)	2040 T6 utility	Aggregated	Aggregated	DSL	189.2344079	3155.912392	2176.195691	0.239184248
Riverside (SC)	2040 T6TS	Aggregated	Aggregated	GAS	2095.927505	74872.81877	41935.31751	11.48592975
Riverside (SC)	2040 T7 Ag	Aggregated	Aggregated	DSL	9.571301812	8.312085264	42.11372797	0.003221052
Riverside (SC)	2040 T7 CAIRP	Aggregated	Aggregated	DSL	1718.261678	363521.1716	25086.62049	34.47773787
Riverside (SC)	2040 T7 CAIRP construction	Aggregated	Aggregated	DSL	166.1331359	29669.03498	751.0814483	2.863858832
Riverside (SC)	2040 T7 NNOOS	Aggregated	Aggregated	DSL	2661.637899	443120.8629	38859.91332	44.31555174
Riverside (SC)	2040 T7 NOOS	Aggregated	Aggregated	DSL	682.7176091	142814.4328	9967.677093	13.89001298
Riverside (SC)	2040 T7 POLA	Aggregated	Aggregated	DSL	2833.288081	589671.1952	21532.98941	58.31300206
Riverside (SC)	2040 T7 Public	Aggregated	Aggregated	DSL	694.2498393	14068.57495	2105.891177	1.726496572
Riverside (SC)	2040 T7 Single	Aggregated	Aggregated	DSL	3691.661228	299716.9383	42601.25874	32.56769021
Riverside (SC)	2040 T7 single construction	Aggregated	Aggregated	DSL	966.7874481	73603.41875	4370.808464	7.931212362
Riverside (SC)	2040 T7 SWCV	Aggregated	Aggregated	DSL	10.12692843	413.7698875	39.49502087	0.201379616
Riverside (SC)	2040 T7 SWCV	Aggregated	Aggregated	NG	752.7479905	30682.87514	2935.717163	10.53244372
Riverside (SC)	2040 T7 tractor	Aggregated	Aggregated	DSL	4247.828799	527326.0511	53947.42575	49.10311503
Riverside (SC)	2040 T7 tractor construction	Aggregated	Aggregated	DSL	810.1977382	60716.34037	3662.872474	6.404895636
Riverside (SC)	2040 T7 utility	Aggregated	Aggregated	DSL	126.2323815	2558.753395	1451.672388	0.284237564
Riverside (SC)	2040 T7IS	Aggregated	Aggregated	GAS	8.124886922	694.511498	162.5627375	0.122185316
Riverside (SC)	2040 UBUS	Aggregated	Aggregated	GAS	181.921075	25613.54248	727.6843	3.292408178
Riverside (SC)	2040 UBUS	Aggregated	Aggregated	DSL	0	0	0	0
Riverside (SC)	2040 UBUS	Aggregated	Aggregated	NG	227.0851731	29774.11319	908.3406924	7.04713801

Electric Vehicle Energy Consumption Assumptions

Appendix C: Evidence Used to Define the Average Number of KWH Required to Displace a Gallong of Gasoline

Table A 3: Evidence from U.S. Department of Energy and U.S. Environmental Protection Agency's fuel economy website[32]

Vehicle	Model year	Electric consumption	Gasoline fuel economy	Number of kWh that are equivalent to 1 gallon
Ford Fusion Energi & Ford C-Max Energi	2013	0.34 kWh per mile	43 mpg	14.6
Chevrolet Volt	2013	0.35 kWh per mile	37 mpg	12.9
Chevrolet Volt	2012	0.36 kWh per mile	37 mpg	13.3
Fisker Karma	2012	0.62 kWh per mile	20 mpg	12.4
Toyota Prius	2013	0.29 kWh per mile & 0.2 gal	50 mpg	13.1
Average for five models	-	-	-	13.3 +/- 0.8

Table A 5: Average power consumption per mile traveled over time for different PEV categories

Year range	2012- 2020	2020-2030	2030-2040	2040-2050	2050
Efficiency improvement per year	0.3%	0.8%	0.9%	0.9%	
Year	2012	2020	2030	2040	2050
Relative energy efficiency	1.000	0.976	0.901	0.823	0.752

https://www.fhwa.dot.gov/environment/climate_change/mitigation/publications_and_tools/ev_deployment/page08.cfm

Electric Consumption Estimated Average

Vehicle	Electric Consumption (kWh/mi)	One Gal Equivalent
Ford Fusion & Ford C-Max MY 2013	0.34	14.6
Chevy Volt MY 2013	0.35	12.9
Chevy Volt MY 2012	0.36	13.3
Estimated Average	**0.34**	**13.3**

Forecasted Consumption

Year	Electric Consumption (kWh/mi)
2013	0.34
2014	0.34
2015	0.34
2016	0.34
2017	0.34
2018	0.34
2019	0.34
2020	0.33
2021	0.33
2022	0.33
2023	0.33
2024	0.32
2025	0.32
2026	0.32
2027	0.32
2028	0.31
2029	0.31
2030	0.31
2031	0.31
2032	0.30
2033	0.30
2034	0.30
2035	0.29
2036	0.29
2037	0.29
2038	0.29
2039	0.28
2040	0.28

Appendix F Cultural Resources Report

Appendices

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City of Corona General Plan Update: Biological Resources Technical Report

January 2018

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January 2018

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1 INTRODUCTION

SWCA Environmental Consultants (SWCA) was retained on behalf of PlaceWorks to provide biological resources services in support of the City of Corona General Plan Interim Technical Update and Environmental Analysis (project) for the City of Corona, Riverside County, California (City). SWCA performed a desktop analysis to assess biological conditions throughout the project area, and reviewed relevant technical documents and agency-maintained databases on biological resources. This desktop research is summarized in this biological resources technical report (BRTR), which documents the existing biological resources within the project area, including the City and its Sphere of Influence (SOI) areas. Primary vegetation communities and habitats, special-status species of flora and fauna either known or likely to occur, and potential wildlife corridors are described. The interim technical update to the General Plan, which was last updated in 2004, will ensure that all technical data and policies remain current, and will guide decisions carried out by the City. The General Plan addresses an area encompassing the 39.2 square miles within the City boundaries and an additional 26.5 square miles within the SOI.

2 REGULATORY SETTING

A complex network of federal, state and local regulations governs the biological resources of California. This section is intended as an overview of these regulations rather than an in-depth review. This section reviews the federal, state, and local regulations and policies that may be pertinent to the update to the City General Plan.

2.1 Federal Regulations

2.1.1 Federal Endangered Species Act (ESA)

The federal Endangered Species Act (FESA) protects endangered and threatened species (federally listed species). The ESA operates in conjunction with the National Environmental Policy Act (NEPA) to help protect the ecosystems upon which endangered and threatened species depend, as well as the species themselves. Under the FESA, a species listed as federally endangered is one facing extinction throughout all or a significant portion of its geographic range. A species listed as threatened is one likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Section 9 of the FESA prohibits the “take” of endangered or threatened wildlife species. “Take” is defined as to “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct” (16 United States Code [USC] 1532 [19]). “Harm” is defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns (50 Code of Federal Regulations [CFR] 17.3). “Harassment” is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns (50 CFR 17.3). Actions that result in take can result in civil or criminal penalties.

The U.S. Fish and Wildlife Service (USFWS) is authorized under the FESA to issue permits under Sections 7 and 10 of that act. Section 7 mandates that all federal agencies consult with the USFWS for terrestrial species and/or National Marine Fisheries Service (NMFS) for marine species to ensure that federal agency actions do not jeopardize the continued existence of a listed species or adversely modify critical habitat for listed species. Any anticipated adverse effects require preparation of a biological assessment to determine potential effects of a proposed project on listed species and critical habitat. “Critical habitat” is defined in the FESA as specific geographic areas that contain features essential to the conservation of an endangered or threatened species. If a project adversely affects a listed species or its habitat, the USFWS or NMFS prepares a Biological Opinion. The Biological Opinion may recommend “reasonable and prudent alternatives” to the project to avoid jeopardizing or adversely modifying habitat including take limits.

The FESA defines critical habitat as habitat deemed essential to the survival of a federally listed species. The FESA requires the federal government to designate critical habitat for any species it lists under the ESA. Under Section 7, all federal agencies must ensure that any actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of a listed species, or destroy or adversely modify its designated critical habitat. Critical habitat requirements do not apply to activities on private land that do not involve a federal nexus.

Section 10 of the FESA includes provisions to authorize take that is incidental to, but not the purpose of, activities that are otherwise lawful. Under Section 10(a)(1)(B), the USFWS may issue incidental take permits for take of FESA-listed species if the take is incidental and does not jeopardize the survival and recovery of the species.

2.1.2 Clean Water Act

The Federal Water Pollution Control Act, known as the Clean Water Act (33 USC sections 1251 et seq.), is the principal federal statute for water quality protection. The Clean Water Act requires each state to adopt water quality standards and to submit those standards for approval by the U.S. Environmental Protection Agency (EPA). For point source discharges to surface water, the Clean Water Act authorizes the EPA and/or approved states to administer the National Pollutant Discharge Elimination System program (NPDES). Clean Water Act section 303(d) requires states to list surface waters not attaining (or not expected to attain) water quality standards after the application of technology-based effluent limits. Typically, states must prepare and implement a Total Maximum Daily Load (TMDL) for all waters on the Clean Water Act section 303(d) list of impaired waters.

2.1.3 Migratory Bird Treaty Act

The federal Migratory Bird Treaty Act (MBTA) of 1918 prohibits any person, unless permitted by regulations, to "…pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatsoever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention … for the protection of migratory birds ... or any part, nest, or egg of any such bird" (16 USC 703). The list of migratory birds includes nearly all bird species native to the United States. The Migratory Bird Treaty Reform Act of 2004 further defined species protected under the act and excluded all non-native species. The statute was extended in 1974 to include parts of birds, as well as eggs and nests. Thus, it is illegal under MBTA to directly kill, or destroy a nest of nearly any native bird species, not just endangered species. Activities that result in removal or destruction of an active nest (a nest with eggs or young being attended by one or more adults) would violate the MBTA. Removal of unoccupied nests, and bird mortality resulting indirectly from disturbance activities, are not considered violations of the MBTA.

2.1.4 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 USC 668–668c) prohibits anyone from "taking" bald eagles (*Haliaeetus leucocephalus*), including their parts, nests, or eggs without a permit issued by the Secretary of the Interior. In 1962, Congress amended the act to cover golden eagles (*Aquila chrysaetos*). The act provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle ... [or any golden eagle], alive or dead, or any part, nest, or egg thereof." The act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." The 1962 amendments included a specific exemption for possession of eagles for religious purposes of Native American tribes; however, an Indian Religious Permit is required.

On November 10, 2009, the USFWS implemented new rules under the existing Bald and Golden Eagle Protection Act (BGEPA), requiring USFWS permits for all activities that may disturb or incidentally take an eagle or its nest as a result of an otherwise legal activity. Under USFWS rules (16 USC § 22.3; 72 Federal Register 31,132, June 5, 2007), "disturb" means "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior." In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death, or nest abandonment.

2.2 State Regulations

2.2.1 California Government Code – Title 7. Planning and Land Use

Under Title 7 of the California Government Code Section 65300 et seq. it is required that the Conservation Element of all General Plans include provisions for "the conservation, development, and utilization of natural resources including water and its hydraulic force, soil, rivers and other waters, harbors, fisheries, wildlife, minerals, and other natural resources." The Open Space Element may also provide for "the preservation of natural resources including, but not limited to, areas required for the preservation of plant and animal life, including habitat for fish and wildlife species; areas required for ecological and other scientific study purposes; rivers, streams, bays and estuaries; and coastal beaches, lake shore, banks of rivers and streams, and watershed lands." Lastly, part of the Land Use Element must designate "the proposed general distribution and general location and extent of the uses of the land for housing, business, industry, open space, including agriculture, natural resources, recreation, and enjoyment of scenic beauty, education, public buildings and grounds, solid and liquid waste disposal facilities, and other categories of public and private uses of land."

2.2.2 California Endangered Species Act

The California Department of Fish and Wildlife (CDFW) administers the California Endangered Species Act (CESA) which states that "all native species of fishes, amphibians, reptiles, birds, mammals, invertebrates, and plants, and their habitats, threatened with extinction and those experiencing a significant decline which, if not halted, would lead to a threatened or endangered designation, will be protected or preserved." The CESA, prohibits the "taking" of listed species except as otherwise provided in state law. Section 86 of the Fish and Game Code defines "take" as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." Under certain circumstances, the CESA applies these take prohibitions to candidates for listing. Under the CESA, state lead agencies (defined in California Environmental Quality Act (CEQA) Code Section 21067) are required to consult with the CDFW to ensure that any action or project is not likely to jeopardize the continued existence of any endangered or threatened species or result in destruction or adverse modification of essential habitat. Additionally, the CDFW encourages informal consultation on any proposed project that may impact a candidate species. The CESA requires the CDFW to maintain a list of threatened and endangered species. The CDFW also maintains a list of candidates for listing under the CESA and of species of special concern (or watch list species).

The State of California considers an endangered species as one whose prospects of survival and reproduction are in immediate jeopardy, a threatened species as one present in such small numbers throughout its range that it is likely to become an endangered species in the near future in the absence of special protection or management, and a rare species as one present in such small numbers throughout its range that it may become endangered if its present environment worsens. Rare species apply primarily to California native plants.

2.2.3 Fully Protected Species Act

The California Fish and Game Code provides protection from take for a variety of species, referred to as fully protected species. Except for take related to scientific research, all take of fully protected species is prohibited.

Section 5050 lists protected amphibians and reptiles, and Section 3515 prohibits take of fully protected fish species. Eggs and nests of fully protected birds are under Section 3511. Migratory nongame birds are protected under Section 3800, and mammals are protected under Section 4700.

2.2.4 Nesting Birds and Raptors

Section 3503 of the Fish and Game Code states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto. Section 3503.5 specifically provides protection for all birds of prey, including their eggs and nests.

2.2.5 Migratory Bird Protection

Take or possession any migratory non-game bird as designated in the MBTA is prohibited by Section 3513 of the Fish and Game Code.

2.2.6 Nesting Birds and Raptors

Fish and Game Code Section 3503 states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto. Section 3503.5 specifically provides protection for all birds of prey, including their eggs and nests.

2.2.7 Native Plant Protection Act

The Native Plant Protection Act (NPPA) of 1977 (Fish and Game Code Section 1900-1913) directed the California Department of Fish and Game (now known as CDFW) to carry out the Legislature's intent to “preserve, protect and enhance rare and endangered plants in this State.” The NPPA gave the California Fish and Game Commission the power to designate native plants as “endangered” or “rare” and protected endangered and rare plants from take. The NPPA thus includes measures to preserve, protect, and enhance rare and endangered native plants.

CESA has largely superseded NPPA for all plants designated as endangered by the NPPA. The NPPA nevertheless provides limitations on take of rare and endangered species as follows: “...no person will import into this state, or take, possess, or sell within this State” any rare or endangered native plant, except in compliance with provisions of the CESA. Individual land owners are required to notify the CDFW at least 10 days in advance of changing land uses to allow the CDFW to salvage any rare or endangered native plant material.

2.2.7.1 INVENTORY OF RARE AND ENDANGERED PLANTS

Operating under a Memorandum of Understanding with the CDFW, the California Native Plant Society (CNPS) maintains an inventory of plants believed or known to be rare in the State of California. This list includes species not protected under federal or state endangered species legislation. Plants in the inventory are assigned a Rare Plant Rank (RPR). The major categories of plants under the CNPS scheme are:

- List 1A - Plants presumed extinct.
- List 1B - Plants rare, threatened, or endangered in California and elsewhere.
- List 2 - Plants rare, threatened, or endangered in California, but more numerous elsewhere.
- List 3 - A review list of plants for which the CNPS requires more information.
- List 4 - A watch list of plants of limited distribution.

Plants on CNPS List 1 or 2 generally meet the CEQA Section 15380 definitions of rare or endangered. These plants also meet the definitions of CESA, and as such are eligible for state listing.

2.2.7.2 CALIFORNIA DESERT NATIVE PLANTS ACT

The California Desert Native Plants Act (CDNPA) protects non-listed California desert native plants from unlawful harvesting on public and private lands in the counties of Riverside, San Bernardino, Imperial, Inyo, Kern, Los Angeles, Mono, and San Diego (California Food and Agriculture Code, Sections 80001-80006, Division 23). A wide range of desert plants are protected under this act, including all species in the agave and cactus families. Harvest, transport, sale, or possession of specific native desert plants is prohibited without a valid permit or wood receipt, and the required tags and seals. Listed rare, endangered, or threatened under federal or state law or regulations are excluded from this provision.

The CDNPA was taken into consideration in this evaluation due to the presence of both Joshua trees (agave family) and cacti in the City of Corona and its SOI.

2.2.7.3 CALIFORNIA FISH AND GAME CODE (SECTIONS 1601-1607)

These sections prohibit alteration of any lake or streambed under CDFW jurisdiction, including intermittent and seasonal channels and many artificial channels, without execution of a Lake and Streambed Alteration Agreement (LSA) through the CDFW. This applies to any channel modifications that would be required to meet drainage, transportation, or flood control objectives.

2.2.7.4 CALIFORNIA PORTER-COLOGNE WATER QUALITY ACT

The State Water Resources Control Board (State Water Board) and California's nine Regional Water Quality Control Boards implement many of the Clean Water Act's provisions. The Porter-Cologne Water Quality Control Act is the principal law governing water quality regulation in California, establishing a comprehensive program to protect water quality and the beneficial uses of water. The Porter-Cologne Act applies to surface waters, wetlands, and groundwater and to both point and nonpoint sources of pollution.

The Porter-Cologne Act implements many provisions of the Clean Water Act, such as NPDES permitting program. Section 401 of the Clean Water Act gives the State Water Board the authority to review any proposed federally permitted or federally licensed activity that may impact water quality and to certify, condition, or deny the activity if it does not comply with State water quality standards. If the State Water Board imposes a condition on its certification, those conditions must be included in the federal permit or license.

The Regional Water Quality Control Board (RWQCB) regulates discharge of waste in any region that could affect the Waters of the State under the California Porter-Cologne Water Quality Control Act. Under the act, a Report of Waste Discharge must be submitted prior to discharging waste, or proposing to discharge waste, within any region that could affect the quality of the Waters of the State (California Water Code Section 13260). Waste Discharge Requirements (WDRs) or a waiver of WDRs will then be issued by the RWQCB. Waters of the State are defined as any surface water or groundwater, including saline waters that are within the boundaries of the state (California Codes: Public Resource Code Section 71200). This differs from the CWA definition of waters of the United States by its inclusion of groundwater and waters outside the ordinary high water mark in its jurisdiction.

2.2.7.5 CALIFORNIA ENVIRONMENTAL QUALITY ACT

The California Environmental Quality Act (CEQA) was adopted in 1970 and applies to discretionary actions directly undertaken, financed or permitted by State or local government lead agencies. CEQA requires that a project's effects on environmental resources must be analyzed and assessed using criteria determined by the lead agency. CEQA defines a rare species in a broader sense than the definitions of threatened, endangered, or California species of concern. Under this definition, the CDFW can request additional consideration of species not otherwise protected.

CEQA Significance Criteria

Section 15064.7 of the CEQA guidelines encourages local agencies to develop and publish the thresholds that the agency will use in determining the significance of environmental effects caused by projects or actions under its review. Appendix G of the CEQA guidelines provides thresholds to evaluate impacts that would normally be considered significant. Based upon these guidelines, impacts to biological resources would normally be considered significant if the project,

- Has 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;
- Has a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations, or by the CDFW or USFWS;
- Has 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, hydrological interruption, or other means;
- Interferes substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impedes the use of native wildlife nursery sites; or
- Conflicts with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance, or conflicts with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan.

An evaluation of whether an impact to biological resources would be significant must consider both the resource itself and how that resource fits into a regional or local context. Significant impacts would be those that would diminish, or result in the loss of, an important biological resource, or those that would obviously conflict with local, state, or federal resource conservation plans, goals, or regulations. The evaluation of impacts considers direct impacts, indirect impacts, cumulative impacts, as well as temporary and permanent impacts.

2.3 Local Regulations

2.3.1 Riverside County

The Riverside County Environmental Programs Department (EPD) is responsible for overseeing implementation programs for three regional habitat conservation plans and insuring consistency with the County's existing land development process. EPD staff work closely with local, state, and federal entities to develop and implement regional environmental procedures. EPD staff also review and approve habitat assessments, focused surveys, and biological reports for environmental impact reports.

2.3.2 Western Riverside County Multi-species Habitat Conservation Plan

The Western Riverside County Multi-Species Habitat Conservation Plan (MSHCP) is a comprehensive, multi-jurisdictional plan that addresses biological and ecological diversity by conserving species and associated habitats, while allowing approval of development in western Riverside County (County of Riverside 2003). It is administered by the Regional Conservation Authority Western Riverside County (RCA).

The MSHCP functions as a Habitat Conservation Plan (HCP) pursuant to Section 10(a)(1)(B) of the federal ESA, and as a Natural Community Conservation Plan (NCCP) pursuant to California's Natural Communities Conservation Planning Act. The MSHCP provides a framework for the USFWS and CDFW to grant take authorization (i.e., incidental take permits) for species covered by the MSHCP which are ESA and/or CESA listed as threatened or endangered; take of these species without a permit would be unlawful. The MSHCP covers 146 species, not all of which are ESA or CESA listed. However, mitigation for impacts to both listed and non-listed species may be required pursuant to CEQA or other regulatory processes, and the MSHCP's Conservation Area provides an avenue for this mitigation. Furthermore, should any of the non-listed covered species be subsequently ESA- or CESA-listed, take authorization may be granted through the MSHCP framework.

The MSHCP was approved and permits issued in 2004 by the USFWS and the CDFW. The MSHCP Plan Area encompasses approximately 1.26 million acres (approximately 1,967 square miles) in western Riverside County and addresses 146 sensitive plant and animal species and the vegetation communities on which they depend. Fourteen of these animal species and 11 plant species are designated by the USFWS as federally listed under the ESA. Several of these species also have federally designated critical habitat within the MSHCP jurisdiction (USFWS 2011). The MSHCP encompasses the City of Corona along with many other city, county, and state entities. It should be noted that the listing status of plants and animals may change over time, with species added or deleted from listing. This report describes the species used to define the original planning subunits.

The MSHCP originally set a target conservation area of 500,000 acres for Western Riverside County that comprised the following: (1) conservation of existing publicly owned lands; (2) voluntary acquisition of privately held lands by the cities, the county, or other involved agencies; (3) voluntary acquisition of privately held lands by state and/or federal agencies; and (4) contribution from public and private development. The Implementing Agreement (IA) for the MSHCP between the City of Corona and other appropriate implementing agencies (Permittees) outlined a strategy for assembling the 500,000-acre MSHCP Conservation Area. Local Permittees would be responsible for contributing approximately 97,000 acres of Additional Reserve Lands through the development review process. If it is determined that all or a portion of a property is needed for inclusion as Additional Reserve Lands, various incentives may be available to the property owner in lieu of, or in addition to, monetary compensation in exchange for conveyance of property interest such as development rights.

Approval of the MSHCP and execution of the IA by the USFWS and CDFW allows the agencies to issue Take Authorizations, including the City of Corona. Issuance of Take Authorization to the City would allow implementation of land use decisions consistent with the MSHCP without project-by-project review and permitting by USFWS and CDFW.

2.3.2.1 PERMITS AND FEES

The MSHCP requires that individuals, businesses, or public agencies proposing development in the "criteria area" of the MSHCP obtain approval from the RCA and a permit from the local responsible agency. Criteria areas include the Cell Groups described below. Projects that are approved must pay fees for review and construction of the project. Ordinance 2678 and Resolution 2003141 of the City of Corona describes this process.

Temescal Canyon Area Plan

The MSHCP was divided into 14 area plans for planning, rather than biological purposes, with specific conservation goals defined for each. The City of Corona and its SOI are almost entirely within the Temescal Area Plan (TCAP; Figure 1). The SOI extends slightly into the area covered by the Lake Matthews/ Woodcrest Area Plan; the approximately 3.2 acre area within the Lake Mathews/Woodcrest Area Plan is an approximately 60-foot-wide strip along an unimproved road that connects Tin Mine Road and Lakepointe Drive. Approximately 128 acres of the SOI extend into the Lake Elsinore Area Plan; this area consists of the I-15 and undeveloped land in the hills northeast of Lee Lake. The City of Corona is not mentioned in the Lake Elsinore Area Plan and is not discussed in detail in the Lake Mathews/Woodcrest Area Plan. The TCAP is divided into five subunits, defined by the presence or potential occurrence of listed species, those with specific habitat requirements, and key biological issues and considerations, such as habitat linkages. It should be noted that the listing status of plants and animals may change over time, with species added or deleted from listing. This report describes the species used to define the original planning subunits.

Additionally, areas of the MSHCP were futhre divided into cells. A "Cell" is a 160-acre area (one-quarter of a quadrangle section; not tied to specific assessor parcels), also defined strictly for planning purposes. Several Cell Groups are defined which meet MSHCP criteria for conservation (Figure 2). Cells boundaries can extend between subunits as well as Area Plans.

Subunit 1 (Santa Ana River to Santa Ana Mountains) is located in the northwest portion of the Temescal Canyon Area Plan, encompassing the westernmost portion of the City along with parts of the Prado Basin in the West SOI. The target acreage range for Additional Reserve Lands within this subunit is 250-550 acres. Planning species include the coast range newt (*Taricha torosa*), coastal California gnatcatcher (*Polioptila californica californica*), Cooper's hawk (*Accipiter cooperi*), bobcat (*Lynx rufus*), mountain lion (*Puma concolor*), and western pond turtle (*Emys marmorata*). Biological issues and considerations, which are not MSHCP requirements, but should be considered during assembly of reserve lands for this subunit include the following:

- Provide for and maintain connection(s) from Prado Basin and the Santa Ana River to Chino Hills State Park outside the Plan Area.
- Maintain linkage area for bobcat.
- Maintain linkage area for mountain lion.
- Maintain Core and Linkage Habitat for coast range newt.
- Maintain Core and Linkage Habitat for western pond turtle.

Subunit 2 (Prado Basin) is located north of Subunit 1 in the northwest portion of the Temescal Canyon Area Plan. This subunit also encompasses parts of the West SOI and the westernmost portion of the City of Corona. Target acreage range for Additional Reserve Lands within this subunit is 200 to 395 acres. Planning species include the coast range newt, cactus wren (*Campylorhynchus brunneicapillus)*, California horned lark (*Eremophila alpestris actia*), northern harrier (*Circus cyaneus*), white-tailed kite (*Elanus leucurus*), bobcat, mountain lion, and western pond turtle. Biological issues and considerations for the Prado Basin

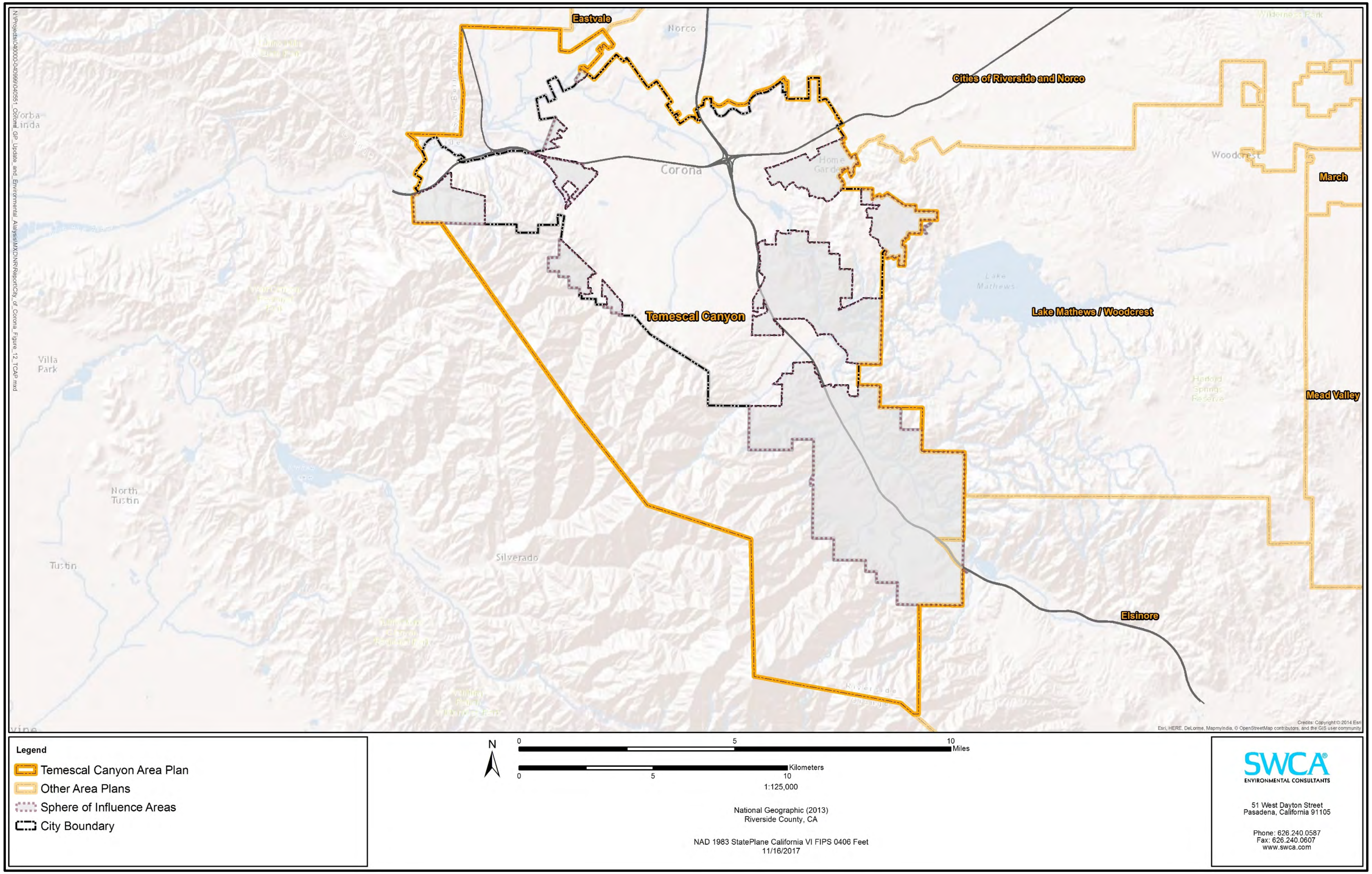

Figure 1: Area Plans of the MSHCP in the Vicinity of the City and SOI.

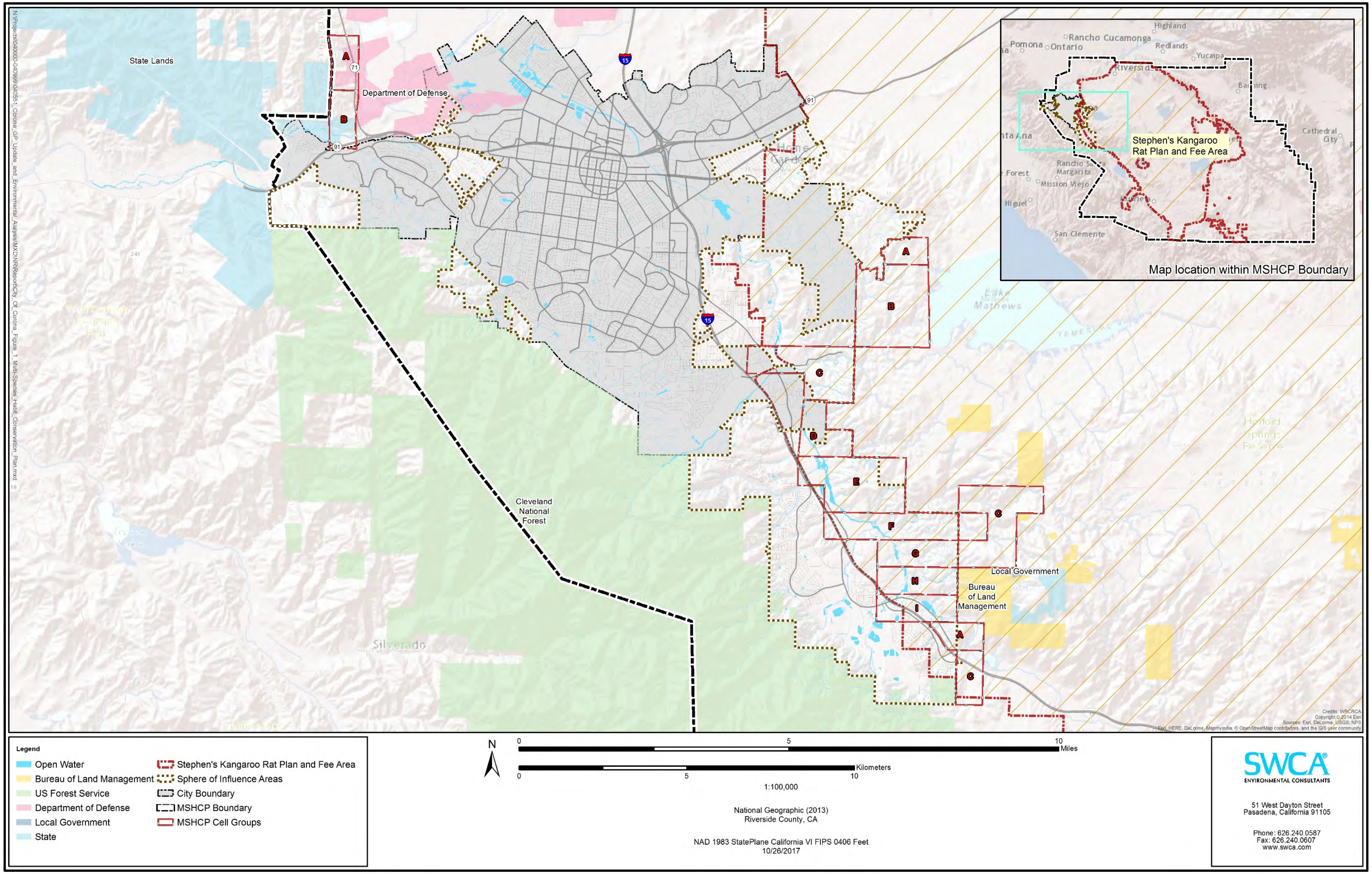

Figure 2. Elements of the Western Riverside County MSHCP in the Vicinity of the City and SOI.

Subunit, which are not MSHCP requirements, but should be considered during assembly of reserve lands, include the following:

- Provide and maintain connection(s) from Prado Basin and the Santa Ana River to Chino Hills State Park outside the Plan Area.
- Maintain linkage area for bobcat and mountain lion.
- Maintain Core and Linkage Habitat for coast range newt and western pond turtle.

Subunit 3 (Temescal Wash—West) is located in the southeast portion of the City of Corona and SOI, encompassing the eastern half of the South Sphere, much of the El Cerrito area of the East Sphere, and small portions of the City of Corona. Target acreage range for Additional Reserve Lands within this subunit is 2,790 to 4,415 acres. Planning species include Bell's sage sparrow (*Artemisiospiza belli*), coastal California gnatcatcher, Cooper's hawk, downy woodpecker (*Picoides pubescens*), least Bell's vireo (*Vireo bellii pusillus*), loggerhead shrike (*Lanius ludovicianus*), Southern California rufous-crowned sparrow (*Aimophila ruficeps*), southwestern willow flycatcher (*Empidonax traillii extimus*), white-tailed kite, yellow-breasted chat (*Icteria virens*), yellow warbler (*Setophaga petechial*), bobcat, mountain lion, Stephen's kangaroo rat, Coulter's Matilija poppy (*Romneya coulteri*), long-spined spineflower (*Chorizanthe polygonoides*), many-stemmed dudleya (*Dudleya multicaulis*), Munz's onion (*Allium munzii)*, Palmer's grapplinghook (*Harpagonella palmeri*), peninsular spine flower (*Chorizanthe leptotheca*), small-flowered microseris (*Microseris douglasii*), small-flowered morning glory (*Convolvulus simulans*), and smooth tarplant (*Centromadia pungens* ssp. *laevis*). Biological issues and considerations include the following:

- Conserve existing wetlands in Temescal Wash with a focus on conservation of existing riparian, woodland, coastal sage scrub, alluvial fan scrub, and open water habitats.
- Conserve upland habitat adjacent to Temescal Wash to augment existing upland habitat conservation in the Lake Matthews/Estelle Mountain Reserve areas and provide for contiguous connection of upland habitat blocks from the existing reserve to Temescal Wash. Habitat conservation should focus on blocks of existing upland habitat east of Temescal Wash connecting to the Lake Matthews/Estelle Mountain Reserve.
- Conserve habitat for least Bell's vireo and southwestern willow flycatcher along Temescal Wash.
- Conserve clay soils supporting sensitive plant species know to occur in the Temescal Area Plan including Munz's onion, Palmer's grapplinghook, small-flowered morning glory, long-spined spine flower, small-flowered microseris, and many-stemmed dudleya.
- Conserve floodplain areas supporting sensitive plant species known to occur in the Temescal Area Plan including peninsular spine flower, smooth tarplant, and Coulter's Matilija poppy.
- Provide for and maintain a continuous linkage along Temescal Wash from the southern boundary of the Temescal Area Plan to the Santa Ana River. It is recognized that the connection from the northern boundary of the Criteria Area along Temescal Wash to the Santa Ana River generally consists of a concrete channel. This channel will remain in its existing condition with implementation of the MSHCP Plan.
- Maintain core and linkage habitat for bobcat.
- Maintain linkage area for mountain lion, and for Stephen's kangaroo rat along Temescal Wash.

Subunit 4 (La Sierra Hills/Lake Mathews-West) is located in the eastern portion of the City of Corona and SOI area, encompassing the easternmost portion of the City and a portion of the El Cerrito area of the East Sphere. Target acreage range for Additional Reserve Lands within this subunit is 210 to 355 acres. Planning species include Bell's sage sparrow, coastal California gnatcatcher, Cooper's hawk, loggerhead shrike, Southern California rufous-crowned sparrow, white-tailed kite, bobcat, mountain lion, and Stephen's kangaroo rat. Biological issues and considerations include the following:

- Provide for and maintain a connection from the eastern edge of Temescal Wash to the existing Lake Mathews/Estelle Mountain Reserve.
- Augment upland conservation in the La Sierra Hills area provided within Subunit 1 of the Lake Mathews Area Plan.
- Maintain core area for bobcat and Stephens' kangaroo rat.
- Maintain linkage area for mountain lion.

Subunit 5 (Temescal/Santa Ana Mountains) is located in the southeast portion of the Temescal Canyon area of the South Sphere. Target acreage range for Additional Reserve Lands within this subunit is 35 to 85 acres. Planning species include Bell's sage sparrow, coastal California gnatcatcher, and bobcat. Biological issues and considerations, which are not MSHCP requirements include the following:

- Provide for upland linkage from Temescal Wash to Santa Ana Mountains.
- Maintain linkage area for bobcat.

2.3.3 Stephens' Kangaroo Rat Habitat Conservation Plan

In addition to the Western Riverside County MSHCP, there is a long-term (30-year) HCP for Stephens' kangaroo rat (*Dipodomys stephensi*). Approved by the USFWS in 1996, the HCP granted an incidental take permit for Riverside County. The HCP covers 533,954 acres of Riverside County, including an estimated 30,000 acres of occupied habitat. The plan authorizes the incidental take of up to half of the occupied habitat remaining in the HCP plan area while using development fees to implement the plan, purchase private property, and create a reserve system. The Stephens' kangaroo rat HCP and corresponding permits are in effect for areas covered by the Western Riverside County MSHCP.

The Stephens' kangaroo rat HCP and fee area overlaps with the eastern and southern portions of the City of Corona and its SOI. The HCP is administered by the Riverside County Habitat Conservation Agency (RCHCA) (RCHCA 2017). While the core reserves established by the SKR HCP are managed as part of the MSHCP Conservation Area, the Stephens' kangaroo rat HCP still provides Take Authorization for Stephens' kangaroo rat within its boundaries (County of Riverside 2003). The MSHCP provides Take Authorization for Stephens' kangaroo rat within its boundaries outside of the area already covered by the Stephens' kangaroo rat HCP, as described in Volume II of the final MSHCP.

3 STUDY APPROACH

This biological report is based on a desktop review of available literature, aerial photos and other publicly available maps, and searches of online databases containing information on natural resources. Data sources include background materials for the MSHCP, updated reports published online by the RCA, and standard biological reference sources, described below. Database searches encompassed the entire project area in order to provide regional context, and ensure thorough review of potential biological resources within the project area. When possible, results were presented separately for the City and the SOI. However, because the study did not include any field surveys, some information was not detailed enough to provide a meaningful analysis of the difference between conditions within the City versus conditions within the SOI. In those circumstances, results are presented within Section 4.1 for both the City and its SOI.

3.1 Database and Literature Reviews

The reported occurrence of special status flora, fauna and plant communities were discovered from the CDFW California Natural Diversity Database (CNDDB) RareFind 5 (CDFW 2017a) and the CNPS Online Inventory of Rare and Endangered Plants (CNPS 2017a). The study area included the eight U.S. Geological Survey (USGS) quadrangles encompassing the City of Corona and its SOI: *Prado Dam*, *Corona North*, *Riverside Wes*t, *Black Star Canyon*, *Corona South*, *Lake Mathews*, *Alberhill*, and *Santiago Peak*.

Additional reference sources included the following:

- State and Federally Listed Endangered, Threatened Animals and California Species of Special Concern (CDFW 2017b).
- State and Federally Listed Endangered, Threatened and Rare Plants of California (CDFW 2017c).
- USFWS web-based Critical Habitat Portal (USFWS 2017).
- California Native Plant Society (CNPS) *Inventory of Rare and Endangered Plants of California* (CNPS 2017a).

3.1.1 Definitions for Ranking Sensitive Natural Communities and Special Status Species

Sensitive natural communities and special status plants species were described using the CNPS ranking system, which includes the CNPS Global/State Rank and the California Rare Plant Rank (CRPR) (CNPS 2017b). Special status wildlife species were described using the CNDDB Global and State Ranking (CDFW 2017d). The rankings are defined as follows:

CNPS/CNDDB Global Rank:

- G1 = Critically Imperiled – At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.
- G2 = Imperiled – At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.
- G3 = Vulnerable – At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.
- G4 = Apparently Secure – Uncommon but not rare; some cause for long-term concern due to declines or other factors.
- G5 = Secure – Common; widespread and abundant.
- T = Subspecies ranking

- ? = Indicates more certainty than current rank, but less certainty than the next rank

CNPS/CNDDB State Rank:

- S1 = Critically Imperiled – Critically imperiled in the state because of extreme rarity (often 5 or fewer populations) or because of factor(s) such as very steep declines making it especially vulnerable to extirpation from the state.
- S2 = Imperiled – Imperiled in the state because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the state.
- S3 = Vulnerable – Vulnerable in the state due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation from the state.
- S4 = Apparently Secure – Uncommon but not rare in the state; some cause for long-term concern due to declines or other factors.
- S5 = Secure – Common, widespread, and abundant in the state.

California Rare Plant Ranking (CRPR):

- 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: More information needed (Review List)
- 4: Limited distribution (Watch List)
- 0.1: Seriously threatened in California.
- 0.2: Fairly threatened in California.
- 0.3: Not very threatened in California.

4 EXISTING CONDITIONS

The City of Corona and its SOI is located the western edge of Riverside County. It has a typical semi-arid Mediterranean climate with hot dry summers and mild winters. The yearly average temperature is 64.8 degrees Fahrenheit, a yearly average high of 93 degrees in August, and a yearly average low of 40 degrees in December; average annual precipitation is 12.01 inches per year, with February being the wettest month with an average precipitation of 2.98 inches (The Weather Channel, 2017).

Corona lies in a relatively level valley within the Santa Ana River watershed; the flow of the Santa Ana River begins in the San Bernardino Mountains, passes through the northwestern corner of the City of Corona, and discharges into the ocean at Huntington Beach. Mountain ranges are a dominant geographic features that influence the biotic conditions in the City and SOI. The Temescal Mountains are one of the northernmost mountains of the Peninsular Ranges in western Riverside County. They extend approximately 25 miles southeast of the Santa Ana River east of the Elsinore Fault Zone to the Temecula Basin and form the western edge of the Perris Block.

Several large areas of open space with biological conservation values surround the City and SOI including Chino Hills State Park, Cleveland National Forest, Lake Mathews Estelle Mountain Reserve, and Prado Basin; these large areas likely support a variety of plants and animals native to California (Figure 2). The spaces which are within the MSHCP plan area form parts of the Core Areas and Linkages as defined in the MSHCP, and function as valuable un-fragmented habitats. Lands within the City are primarily developed, whereas the SOI includes some areas of agriculture and natural vegetation (Figure 3). A large proportion of the City is highly urbanized and provides minimal habitat value for sensitive and special status species. Areas best characterized by their predominant vegetation, open space, water features or agricultural practices should be evaluated for sensitive biological resources; urbanized areas typically do not require the same level of scrutiny to assess potential impacts to biological resources. Most native species and natural communities are expected to occur in these less developed areas (Figure 4).

4.1 Sensitive Biological Resources

Literature and database resources were queried within the eight USGS 7.5-minute topographic quadrangle encompassing the City and SOI for records of sensitive natural communities and species: *Prado Dam*, *Corona North*, *Riverside Wes*t, *Black Star Canyon*, *Corona South*, *Lake Mathews*, *Alberhill*, and *Santiago Peak*.

While somewhat larger than the City and SOI, virtually all of the species with records in this vicinity have some potential to occur, due to the presence of local records. The only exceptions are species that are restricted to much higher elevations than the City and SOI, and species which depend on resources that are entirely absent, for example if there were records of marine species—this did not occur.

4.1.1 Sensitive Natural Communities

Sensitive or special status communities are vegetation types, associations, or sub-associations with a Global or State Rank of 3 or lower; additionally riparian communities are always considered sensitive. A CNDDB query identified 12 special status natural communities that occur within the study area (Table 1). Of the communities identified within the study area, six sensitive habitats have CNDDB records within the City and SOI. These habitats include Southern California Arroyo Chub/Santa Ana Sucker Stream, Southern Coast Live Oak Riparian Forest, Southern Cottonwood Willow Riparian Forest, Southern Riparian Forest, Southern Sycamore Alder Riparian Woodland, and Southern Willow Scrub. Most of these natural communities are described under the Holland classification (Holland 1986, Holland 1992).

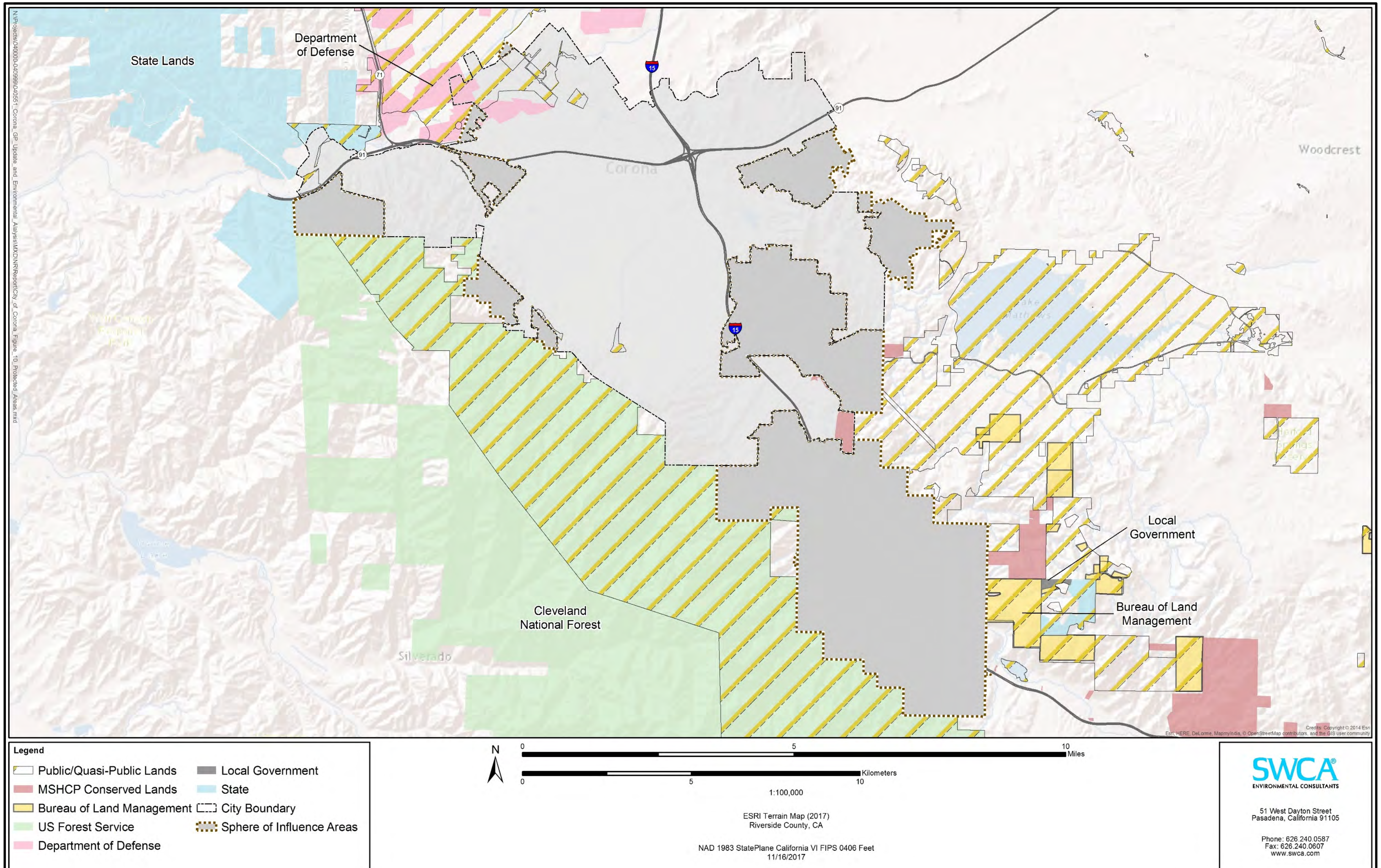

Figure 3: Open Spaces and Protected Lands

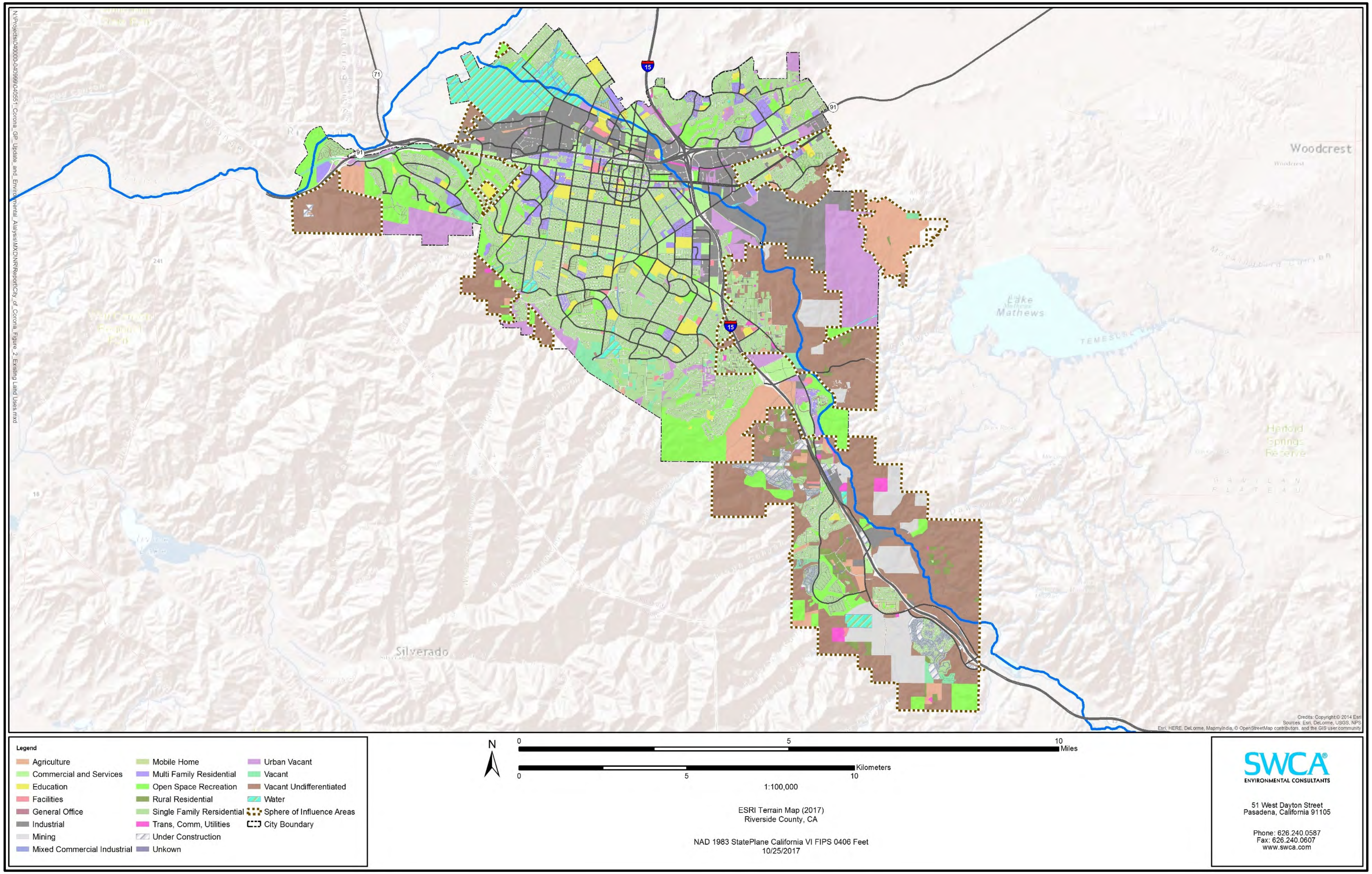

Figure 4: Land Uses within the City and SOI

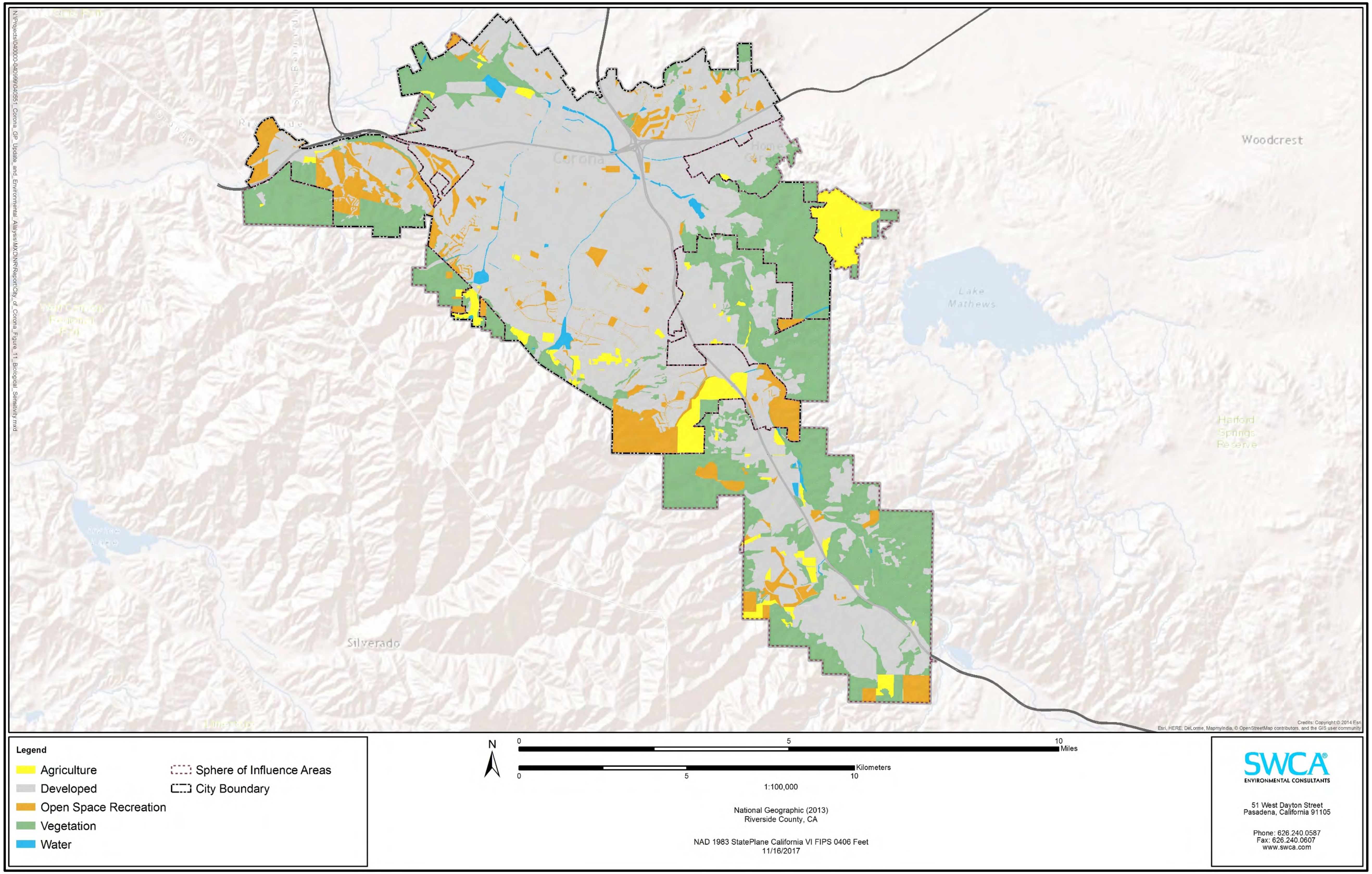

Figure 5: Less Developed Areas where Biological Resources are Likely to be Concentrated

Table 1. Sensitive Natural Communities in the Study Area

Natural Community	Global / State Rank
California Walnut Woodland	G2/S2.1
Canyon Live Oak Ravine Forest	G3/S3.3
Riversidian Alluvial Fan Sage Scrub	G1/S1.1
Southern California Arroyo Chub/Santa Ana Sucker Stream	GNR/SNR
Southern Coast Live Oak Riparian Forest	G4/S4
Southern Cottonwood Willow Riparian Forest	G3/S3.2
Southern Interior Cypress Forest	G2/S2.1
Southern Riparian Forest	G4/S4
Southern Riparian Scrub	G3/S3.2
Southern Sycamore Alder Riparian Woodland	G4/S4
Southern Willow Scrub	G3/S2.1
Valley Needlegrass Grassland	G3/S3.1
G1 = Critically Imperiled – At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors. G2 = Imperiled – At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors. G3 = Vulnerable – At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors. G4 = Apparently Secure – Uncommon but not rare; some cause for long-term concern due to declines or other factors. GNR = Global Rank not yet assessed.	S1 = Critically Imperiled – Critically imperiled in the state because of extreme rarity (often 5 or fewer populations) or because of factor(s) such as very steep declines making it especially vulnerable to extirpation from the state. S2 = Imperiled – Imperiled in the state because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the state. S3 = Vulnerable – Vulnerable in the state due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation from the state. S4 = Apparently Secure – Uncommon but not rare in the state; some cause for long-term concern due to declines or other factors. 0.1: Seriously threatened in California. 0.2: Fairly threatened in California. 0.3: Not very threatened in California. SNR = State Rank not yet assessed

4.1.1.1 CALIFORNIA WALNUT WOODLAND (HOLLAND CODE 71210)

California Walnut Woodland is an open woodland found in relatively moist, fine-textured soils of valley slopes and bottoms, and often surround rocky outcrops. This community is dominated by California walnut (*Juglans californica*) with an open canopy that allows for the growth of a grassy understory. The understory typically consists of non-native winter-active annuals that complete their growth cycle before the leafy canopy emerges in spring. Other species associated with this community include sugar bush (*Rhus ovata*), coast live oak (*Quercus agrifolia*), Engelmann oak (*Quercus engelmannii*), skunkbush (*Rhus trilobata*), red brome (*Bromus rubens*), horehound, (*Marrubium vulgare*).

4.1.1.2 CANYON LIVE OAK RAVINE FOREST (SIMILAR TO HOLLAND CODE 81320)

Canyon live oak ravine forest is a tall, dense canopied forest that grows on steep, rocky slopes with little soil development. This community is dominated by canyon live oak (*Quercus chrysolepis*) with little understory. Trees within this community often have multiple trunks, possibly from crown-sprouting that can occur after fires. This community can be found in a transitional zone adjacent to montane chaparral and low elevation coniferous and broadleaved forests. Other species typically associated with canyon live oak ravine forest include incense cedar (*Calocedrus decurrens*), tanoak (*Lithocarpus densiflorus*), Coulter pine (*Pinus coulteri*), Douglas fir (*Pseudotsuga menziesii*), and California laurel (*Umbellularia californica*).

4.1.1.3 RIVERSIDIAN ALLUVIAL FAN SAGE SCRUB (HOLLAND CODE 32720)

Riversidian alluvial fan sage scrub grows on well drained, sandy and rocky alluvial soils deposited by streams that experience periodic flooding along the base of the San Gabriel, San Bernardino, and San Jacinto mountains. This community is typically dominated by scale-broom (*Lepidospartum squamatum*), which is considered an indicator species. Species in this community consists of a mix of riparian species including drought deciduous subshrubs and large evergreen woody shrubs that adapted to intense, periodic flooding events. Due to the periodic flooding and erosion, pioneer, intermediate, and mature stages of alluvial fan sage scrub plant communities are often distinguished. These stages vary from sparse vegetation and low diversity to dense subshrubs and evergreen woody shrubs. Species associated with this community include California buckwheat (*Eriogonum fasciculatum*), coastal sagebrush (*Artemisia californica*), brittlebush (*Encelia farinose*), white sage (*Salvia apiana*), California sycamore (*Platanus racemosa*), deerweed (*Lotus scoparius*), and mule fat (*Baccharis salicifolia*).Southern California Arroyo Chub/Santa Ana Sucker Stream

Southern California Arroyo Chub/Santa Ana Sucker streams are primarily located in the rivers and streams of southern California including the Los Angeles, San Gabriel, San Luis Rey, Santa Ana, and Santa Margarita River drainages, and Malibu and San Juan creeks. These habitats fluctuate in water levels and temperature due to large winter storms and low summer flows. The Arroyo chub (*Gila orcutti*) has adapted to withstand these temperature fluctuations and prefer areas with sandy or muddy substrates in slow flowing waters. This species is omnivorous and primarily feeds on algae and water fern (*Azolla* spp.) and small invertebrates. The Santa Ana sucker (*Catostomus santaanae*) is typically found in cool water with sand or cobble substrates and boulders. This species requires shallow gravelly riffles for spawning. Santa Ana suckers are often associated with algae, their primary food source. Southern California Arroyo Chub/Santa Ana Sucker Stream is not listed as a vegetation community in the Holland Code, but is considered a sensitive habitat in CNDDB.

4.1.1.4 SOUTHERN COAST LIVE OAK RIPARIAN FOREST (HOLLAND CODE 61310)

Southern coast live oak riparian forest is found in the canyons and valleys of coastal southern California. This community is a dense evergreen woodland dominated by coast life oak. It occurs along large streams in outer floodplains and bottomlands on rich, fine-grained alluvium. Southern coast live oak riparian forest typically has a closed, or nearly closed, canopy with an understory that rich in herbs, but poor in understory shrubs. Species typically associated with this community include bigleaf maple (*Acer macrophyllum*), Douglas' sagewort (*Artemesia douglasiana*), milkmaids (*Cardamine californica*), spotted hideseed (*Eucrypta chrysanthemifolia*), toyon (*Heteromeles arbutifolia*), heartleaf keckiella (*Keckiella cordifolia*), pink honeysuckle (*Lonicera hispidula*), Cucamonga manroot (*Marah macrocarpus*), blue fiesta flower (*Pholistoma auritum*), skunkbush, California wildrose (*Rosa californica*), California blackberry (*Rubus ursinus*), blue elderberry (*Sambucus mexicana*), snowberry (*Symphoricarpos mollis*), poison oak (*Toxicodendron diversilobum*), and California laurel.

4.1.1.5 SOUTHERN COTTONWOOD-WILLOW RIPARIAN FOREST (HOLLAND CODE 61330)

Southern cottonwood-willow riparian forest is a tall, open, broad-leaved, winter-deciduous riparian forest found along perennial wet streams. This community is dominated by Fremont cottonwood (*Populus fremontii*), black cottonwood (*Populus trichocarpa*), several tree willow species (*Salix* spp.), and contains an understory of shrubby willows. This community is primarily found in sub-irrigated and frequently overflowed lands, which provide the moist, bare mineral soils required for the germination and establishment of the dominant species. Other plant species associated with this community include

California mugwort (*Artemisia douglasiana*), mule fat, wild cucumber, California sycamore, Goodding's black willow (*Salix gooddingii*), sandbar willow (*Salix exigua* var. *hindsiana*), Pacific willow (*Salix lasiandra*), arroyo willow (*Salix lasiolepis*), and stinging nettle (*Urtica dioica*).

4.1.1.6 SOUTHERN INTERIOR CYPRESS FOREST (HOLLAND CODE 83330)

Southern Interior Cypress forest is a fairly dense, fire-maintained, low forest that occurs in isolated groves within Chaparral or Pinyon Juniper Woodland. The dominant species in this community is dependent on elevation. The dominant species include either the Piute cypress (*Cupressus nevadensis*), Forbes' cypress (*Cupressus forbesii*), or Cuyamaca cypress (*Cupressus stephensonii*). Stands are often uniform in age and may vary in spacing due to fire history. Other species associated with this community include chamise (*Adenostoma faciculatum*), Eastwood's manzanita (*Arctostaphylos glandulosa*), mountain mahogany, (*Cercocarpus betuloides*), California buckwheat, toyon, California juniper (*Juniperus californica*), Coulter pine, and pinyon pine (*Pinus monophylla*).

4.1.1.7 SOUTHERN RIPARIAN FOREST (HOLLAND CODE 61300)

Southern Riparian Forest is a general vegetation description in the Holland Code that includes three elements: Southern Coast Live Oak Riparian Forest (61310), Southern Arroyo Willow Riparian forest (61320), and Southern Cottonwood-Willow Riparian Forest. Southern Arroyo Willow Riparian forest is listed in Holland, but does not have a description (Holland 1986). The other two vegetation communities are described in separate sections above. Southern Riparian Forests all occur along streams in canyons and valleys. Species that dominate each community varies based on vegetation type, but are typically coast live oak, willows, or a combination of cottonwood and willows.

4.1.1.8 SOUTHERN RIPARIAN SCRUB (HOLLAND CODE 63300)

Southern riparian scrub is a dense riparian community found along major river systems were flood scour occurs and can also be found in smaller drainages influenced by urban and agricultural runoff. Southern riparian scrub often adjacent to and encroaches on coastal marsh habitats. This community is characterized by small trees or shrubs, such as willows, but lacks taller riparian trees. Species typically associated with southern riparian scrub include arroyo willow and other willow species, and desert broom (*Baccharis sarothroides*).

4.1.1.9 SOUTHERN SYCAMORE-ALDER RIPARIAN WOODLAND (HOLLAND CODE 62400)

Southern sycamore-alder riparian woodland is a tall, open, broad-leaved, winter-deciduous woodland that is dominated by California sycamore and white alder (*Alnus rhombifolia*), which are often codominant or sub-codominant. White alder favors perennial stream systems, while western sycamore favors more intermittent flooding regime. These stands rarely form closed canopy forests, and often contain a dense understory of hard drought-resistant evergreens and deciduous species. Other species associated with southern sycamore-alder riparian woodland include bigleaf maple, Douglas' sagewort, California spikenard (*Aralia californica*), scouringrush horsetail (*Equisetum hyemale*), smilograss (*Oryzopsis miliacea*), coast live oak, California blackberry, blue elderberry, poison oak, California laurel, and stinging nettle.

4.1.1.10 SOUTHERN WILLOW SCRUB (HOLLAND CODE 63320)

Southern willow scrub is characterized by broad-leafed, winter deciduous riparian thickets that grow in loose, sandy, or fine gravelly alluvium deposited near stream channels during flood flows. This community is dominated by several willow species (*Salix* spp.), with scattered emergent Fremont cottonwood and

California sycamore. Stands of this community are typically dense, which limits the understory growth. This community requires repeated flooding events to prevent succession to the Southern Cottonwood-Sycamore Riparian Forest community. Species associated with this community include narrowleaf willow (*Salix exigua*), black willow, red willow (*Salix laevigata*), and arroyo willow.

4.1.1.11 VALLEY NEEDLEGRASS GRASSLAND (HOLLAND CODE 42110)

Valley Needlegrass Grassland is a mid-height grassland dominated by perennial, tussock forming purple needlegrass (*Stipa pulchra*). This community is usually found on fine-textured clay soils that are moist or waterlogged during winter and dry during summer. Native and non-native annuals often occur between the perennial species and may exceed the percent cover of the needlegrass. Other species associated with this plant community include boreal yarrow (*Achillea borealis*), blow wives (*Achyrachaena mollis*), mountain dandelion (*Agoseris heterophylla*), common wild oat (*Avena fatua*), goldenstar (*Bloomeria crocea*), golden brodiaea (*Brodiaea lutea*), ripgut brome (*Bromus diandrus*), softbrome (*Bromus hordeaceus*), red brome, California soaproot (*Chlorogalum pomeridianum*), winecup clarkia (*Clarkia purpurea*), Sierra shooting star (*Dodecatheon jeffreyi*), California melic (*Melica californica*), small flowered melic (*Melica imperfecta*), attenuate indian paintbrush (*Orthocarpus attenuates*), California plantain (*Plantago hookeriana*), pine-bluegrass (*Poa scabrella*), and nodding needlegrass (*Stipa cernua*).

4.1.2 Critical Habitat

The USFWS designates Critical Habitat for listed endangered or threatened species of flora and fauna. Critical Habitat is defined in the federal Endangered Species Act as habitat deemed essential to the survival of a federally listed species. (Refer to Section 2.1.1 of this report for more information regarding critical habitat). Seven animals and one plant that have been designated as federal endangered (FE), federal threatened (FT), and/or state endangered (SE) have designated Critical Habitat areas the vicinity of the study area (Figure 5). Critical Habitat for five species has been designated within or adjacent tot he City:

- least Bell's vireo (FE; SE)
- western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) (FT; SE)
- southwestern willow flycatcher (FE; SE)
- Santa Ana sucker (*Catostomas santaanae*) (FT)
- coastal California gnatcatcher (FT) – Northeast-facing foothills of the Cleveland National Forest, southwest of the City

The least Bell's vireo, western yellow-billed cuckoo, and southwestern willow flycatcher Critical Habitat areas occur at the northern end of the City on and around the Prado Reservoir. The Santa Ana River is listed as Santa Ana sucker Critical Habitat; the Santa Ana River flows north of Highway 91 and flows through the northwestern corner of the City boundary. Coastal California gnatcatcher Critical Habitat is widely distributed within the Chino Hills State Park the eastern foothills of the Cleveland National Forest. It is primarily adjacent to the City. Critical Habitat for Braunton's milk-vetch has been delineated within the study area, outside the City and SOI.

4.1.3 Special Status Species

The CDFW defines Special Animals, Plants and communities as those where at least one of the following conditions applies (CDFW 2017b):

- officially listed or proposed for listing under the state and/or federal ESAs;
- considered by the CDFW to be a Species of Special Concern (SSC);

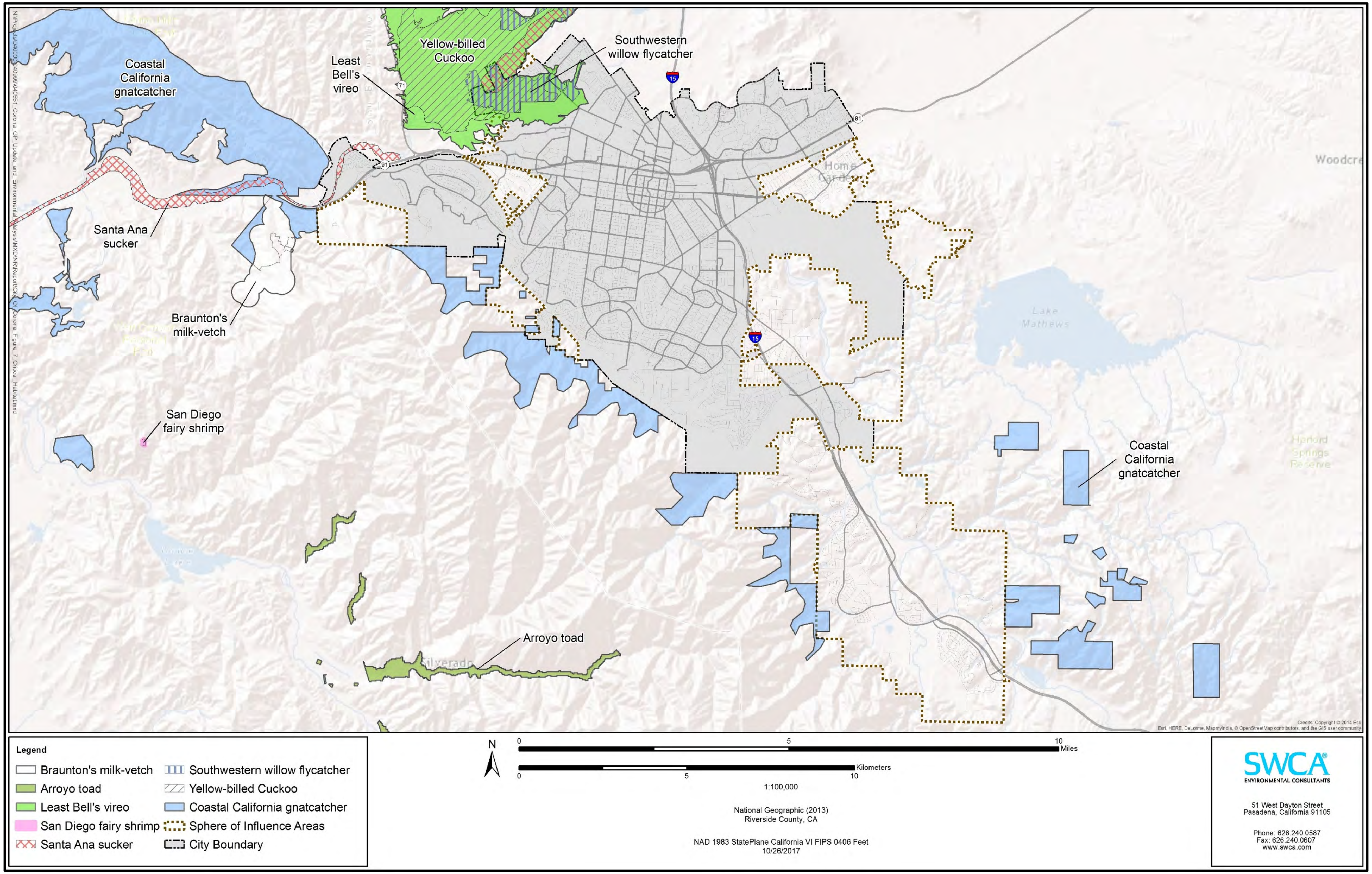

Figure 6. Designated Critical Habitat in and around the City and SOI

- listed by the CNPS with a Rare Plant Rank (RPR);
- included on other lists, such as Riverside County;
- taxa which meet the criteria for listing, even if not currently included on any list, as described in Section 15380 of the California Environmental Quality Act Guidelines;
- taxa that are biologically rare, very restricted in distribution, or declining throughout their range but not currently threatened with extirpation;
- population(s) in California that may be peripheral to the major portion of a taxon's range but are threatened with extirpation in California;
- taxa closely associated with a habitat that is declining in California at a significant rate (e.g. wetlands, riparian, vernal pools, old growth forests, desert aquatic systems, native grasslands, valley shrubland habitats, etc.); or
- taxa designated as a special status, sensitive, or declining species by other state or federal agencies, or a non-governmental organization and determined by the state to be rare, restricted, declining, or threatened across their range in California.

4.1.3.1 SPECIAL STATUS PLANTS

A review of CNDDB and the CNPS Rare Plant Inventory identified species that may occur in the City or SOI. Sixty-four (64) special status species have CNDDB or the CNPS Rare Plant Inventory records within the study area (Table 2, Figure 6). All projects within the jurisdiction of the updated general plan should comply with all MSHCP measures pertaining to biological resources, including surveys and species queries. Due to the size and diversity of the City and SOI, field surveys are recommended to determine potential for sensitive species within undeveloped areas; it should be assumed that these species have at least a low potential to occur prior to being reviewed by a qualified biologist.

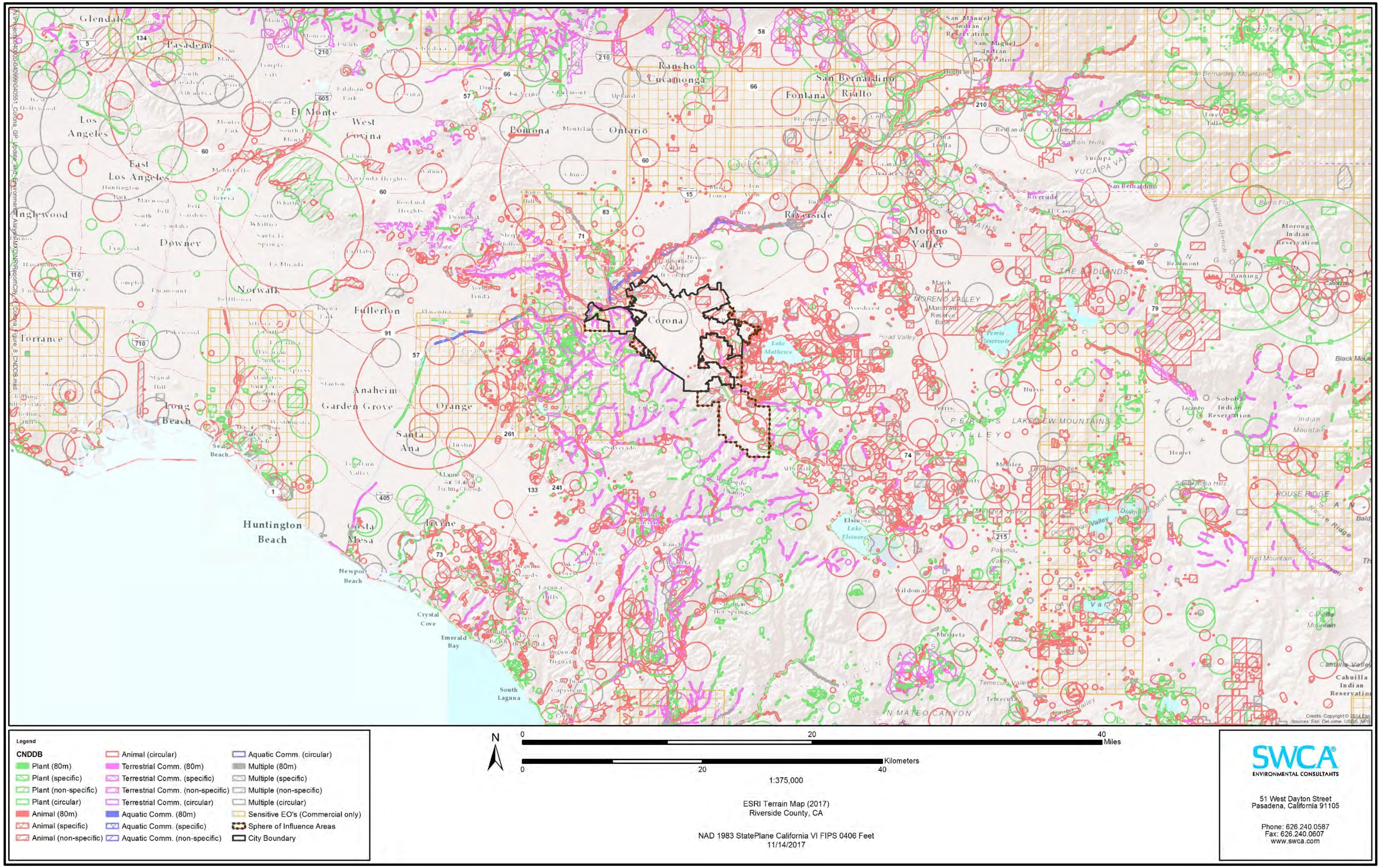

Figure 7: California Natural Diversity Database (CNDDB) Records in the Region (map scale based on the CNDDB terms of use)

Table 2. Special Status Plant Species with Records in the Study Area

Species Name	Habitat	Status	CRPR
Abronia villosa var. *aurita* chaparral sand-verbena	Chaparral, coastal scrub, desert dunes. Sandy areas. 60-1,570 m.[1]	-	1B.1
Allium munzii Munz's onion[3]	Chaparral, coastal scrub, cismontane woodland, pinyon and juniper woodland, valley and foothill grassland. Heavy clay soils; grows in grasslands & openings within shrublands or woodlands. 375-1,040 m.[1]	FE, ST	1B.1
Ambrosia pumila San Diego ambrosia[3]	Chaparral, coastal scrub, valley and foothill grassland. Sandy loam or clay soil; sometimes alkaline. In valleys; persists where disturbance has been superficial. Sometimes on margins or near vernal pools. 3-580 m.[1]	FE	1B.1
Asplenium vespertinum western spleenwort	Rocky areas in chaparral, cismontane woodland and coastal scrub. Sometimes the base of overhanging boulders. 180-1,000 m.[2]	-	4.2
Astragalus brauntonii Braunton's milk-vetch[4]	Chaparral, coastal scrub, valley and foothill grassland. Recent burns or disturbed areas; usually on sandstone with carbonate layers. Soil specialist; requires shallow soils to defeat pocket gophers and open areas, preferably on hilltops, saddles or bowls between hills. 3-640 m.[1]	FE	1B.1
Atriplex coronata var. *notatior* San Jacinto Valley crownscale[3]	Alkaline soils in playas, valleys and foothill grasslands (mesic), and vernal pools. 139-500 m.[2]	FE	1B.1
Atriplex coulteri Coulter's saltbush	Coastal bluff scrub, coastal dunes, coastal scrub, valley and foothill grassland. Ocean bluffs, ridgetops, as well as alkaline low places. Alkaline or clay soils. 2-460 m.	-	1B.2
Baccharis malibuensis Malibu baccharis	Coastal scrub, chaparral, cismontane woodland, riparian woodland. In Conejo volcanic substrates, often on exposed roadcuts. Sometimes occupies oak woodland habitat. 150-320 m.[1]	-	1B.1
Brodiaea filifolia thread-leaved brodiaea[3]	Cismontane woodland, coastal scrub, plays, valleys and foothill grassland, vernal pools, and openings in chaparral. 25-1,120m.[2]	FT, SE	1B.1
Calandrinia breweri Brewer's calandrinia	Sandy or loamy soils, disturbed sites and burns within chaparral and coastal scrub. 10-1,220 m.[2]	-	4.2
California macrophylla round-leaved filaree[3]	Cismontane woodland, valley and foothill grassland. Clay soils. 30-1,345 m.[1]	-	1B.2
Calochortus catalinae Catalina mariposa lily	Often occurring in heavy soil in opengrassland or scrub. Chaparral, cismontane woodland, coastal scrub, valley and foothill grassland. 15-700 m.[2]	-	4.2
Calochortus plummerae Plummer's mariposa-lily[3,6]	Coastal scrub, chaparral, valley and foothill grassland, cismontane woodland, lower montane coniferous forest. Occurs on rocky	-	4.2

Species Name	Habitat	Status	CRPR
	and sandy sites, usually of granitic or alluvial material. Can be very common after fire. 60-2,500 m.[1]		
Calochortus weedii var. *intermedius* intermediate mariposa-lily[3]	Coastal scrub, chaparral, valley and foothill grassland. Dry, rocky open slopes and rock outcrops. 60-1,575 m.[1]	-	1B.2
Calystegia felix lucky morning-glory	Meadows and seeps, riparian scrub. Sometimes alkaline, alluvial. 30-215 m.		3.1
Carex buxbaumii Buxbaum's sedge	Peatland and wet meadows. Bogs, fens, marshes, swamps, as well as mesic meadows and seeps. 3-3,300 m.[2]	-	4.2
Caulanthus simulans Payson's jewelflower[3]	Sandy and granitic soils in chaparral, coastal scrub, and pinyon/juniper woodland. 90-2,200 m.[2]	-	4.2
Centromadia pungens ssp. *laevis* smooth tarplant[3]	Valley and foothill grassland, chenopod scrub, meadows and seeps, playas, riparian woodland. Alkali meadow, alkali scrub; also in disturbed places. 5-1,170 m.[1]	-	1B.1
Chorizanthe leptotheca Peninsular spineflower[3,6]	Sandy or gravelly soils. Often in alluvial fans with granitic soils. 300-1,900 m.[2]	-	4.2
Chorizanthe parryi var. *fernandina* San Fernando Valley spineflower	Coastal scrub, valley and foothill grassland. Sandy soils. 15-1,015 m.[1]	PT, SE	1B.1
Chorizanthe parryi var. *parryi* Parry's spineflower[3,6]	Coastal scrub, chaparral, cismontane woodland, valley and foothill grassland. Dry slopes and flats; sometimes at interface of 2 vegetation types, such as chaparral and oak woodland. Dry, sandy soils. 90-1,220 m.[1]	-	1B.1
Chorizanthe polygonoides var. *longispina* long-spined spineflower[3]	Chaparral, coastal scrub, meadows and seeps, valley and foothill grassland, vernal pools. Gabbroic clay. 30-1,540 m.[1]	-	1B.2
Chorizanthe xanti var. *leucotheca* white-bracted spineflower	Sandy or gravelly soils in Mojavean desert scrub, pinyon/juniper woodland, and alluvial fans within coastal scrub. 300-1,200 m.[2]	-	1B.2
Clinopodium chandleri San Miguel savory[3]	Chaparral, cismontane woodland, coastal scrub, riparian woodland, valley and foothill grassland. Rocky, gabbroic or metavolcanic substrate. 120-1,075 m.[1]	-	1B.2
Comarostaphylis diversifolia ssp. *diversifolia* summer holly	Chaparral, cismontane woodland. Often in mixed chaparral in California, sometimes post-burn. 30-945 m.[1]	-	1B.2
Convolvulus simulans small-flowered morning-glory[3]	Clay substrates, occasionally serpentine soils. Coastal scrub, valley and foothill grassland, and openings in chaparral. 30-740 m.[2]	-	4.2
Deinandra paniculata paniculate tarplant	Usually in vernally mesic areas, often with sandy soils in coastal scrub, valley and foothill grassland, and vernal pools. Can also occur in open chaparral, woodland, and disturbed areas. 25-940 m.[2]	-	4.2
Diplacus clevelandii Cleveland's bush monkeyflower[3]	Often in disturbed, rocky, or open areas with gabbroic soils in chaparral, cismontane	-	4.2

Species Name	Habitat	Status	CRPR
	woodland, and lower montane coniferous forest. 450-2,000 m.[2]		
Dodecahema leptoceras slender-horned spineflower[3]	Chaparral, cismontane woodland, coastal scrub (alluvial fan sage scrub). Flood deposited terraces and washes; associates include *Encelia*, *Dalea*, *Lepidospartum*, etc. Sandy soils. 200-765 m.[1]	FE, SE	1B.1
Dudleya multicaulis many-stemmed dudleya[3]	Chaparral, coastal scrub, valley and foothill grassland. In heavy, often clayey soils or grassy slopes. 15-790 m.[1]	-	1B.2
Dudleya viscida sticky dudleya[3,6]	Coastal scrub, coastal bluff scrub, chaparral, cismontane woodland. On north and south-facing cliffs and banks. 20-870 m.[1]	-	1B.2
Eriastrum densifolium ssp. *sanctorum* Santa Ana River woollystar[3]	Coastal scrub, chaparral. In sandy soils on river floodplains or terraced fluvial deposits. 180-700 m.[1]	FE, SE	1B.1
Erythranthe diffusus[5] Palomar monkeyflower[3]	Sandy or gravelly soils in chaparral and lower montane coniferous forest. 1,220-1,830 m.[2]	-	4.3
Harpagonella palmeri Palmer's grapplinghook[3]	Chaparral, coastal scrub, valley and foothill grassland. Clay soils; open grassy areas within shrubland. 20-955 m.[1]	-	4.2
Hesperocyparis forbesii Tecate cypress	Closed-cone coniferous forest, chaparral. Primarily on north-facing slopes; groves often associated with chaparral. On clay or gabbro. 60-1,650 m.[1]	-	1B.1
Horkelia cuneata var. *puberula* mesa horkelia	Chaparral, cismontane woodland, coastal scrub. Sandy or gravelly sites. 15-1,645 m.[1]	-	1B.1
Juglans californica Southern California black walnut	Hillsides and canyons, usually with alluvial substrates in chaparral, cismontane woodland, coastal scrub, and riparian woodland. 50-900 m.[2]	-	4.2
Lasthenia glabrata ssp. *coulteri* Coulter's goldfields[3]	Coastal salt marshes, playas, vernal pools. Usually found on alkaline soils in playas, sinks, and grasslands. 1-1,375 m.[1]	-	1B.1
Lepechinia cardiophylla heart-leaved pitcher sage[3]	Closed-cone coniferous forest, chaparral, cismontane woodland. 520-1,370 m.[1]	-	1B.2
Lepidium virginicum var. *robinsonii* Robinson's pepper-grass	Chaparral, coastal scrub. Dry soils, shrubland. 4-1,435 m.[1]	-	4.3
Lilium humboldtii ssp. *ocellatum* ocellated Humboldt lily[3,6]	Openings within chaparral, cismontane woodland, coastal scrub, lower montane coniferous forest, and riparian woodland. 30-1,800 m.[2]	-	4.2
Microseris douglasii ssp. *platycarpa* small-flowered microseris[3,6]	Clay soils in cismontane woodland, coastal scrub, valley and foothill grassland, and vernal pools. May occur in serpentine outcrops. 15-1,070 m.[2]	-	4.2
Monardella australis ssp. *jokerstii* Jokerst's monardella	Lower montane coniferous forest, chaparral. Steep scree or talus slopes between breccia.	-	1B.1

Species Name	Habitat	Status	CRPR
	Secondary alluvial benches along drainages and washes. 1,350-1,750 m.[1]		
Monardella hypoleuca ssp. *intermedia* intermediate monardella	Chaparral, cismontane woodland, lower montane coniferous forest (sometimes). Often in steep, brushy areas. 195-16,750 m.[1]	-	1B.3
Monardella hypoleuca ssp. *lanata* felt-leaved monardella	Rocky, granitic slopes, or hilltops in chaparral and cismontane woodland. 300-1575 m.[2]	-	1B.2
Monardella macrantha ssp. *hallii* Hall's monardella[3]	Broadleafed upland forest, chaparral, lower montane coniferous forest, cismontane woodland, valley and foothill grassland. Dry slopes and ridges in openings. 700-,1770 m.[1]	-	1B.3
Nolina cismontana chaparral nolina	Chaparral, coastal scrub. Primarily on sandstone and shale substrates; also known from gabbro. 140-1,275 m.[1]	-	1B.2
Orcuttia californica California Orcutt grass[3]	Vernal pools. 15-660 m.[2]	FE, SE	1B.1
Penstemon californicus California beardtongue[3]	Chaparral, lower montane coniferous forest, pinyon and juniper woodland. Stony slopes and shrubby openings; sandy or granitic soils. 1,170-2,300 m.[1]	-	1B.2
Pentachaeta aurea ssp. *allenii* Allen's pentachaeta	Valley and foothill grasslands, coastal scrub. Openings in scrub or grassland. 75-520 m.[1]	-	1B.1
Phacelia keckii Santiago Peak phacelia	Closed-cone coniferous forest, chaparral. Open areas, sometimes along creeks. 545-1,525 m.[1]	-	1B.3
Phacelia stellaris Brand's star phacelia[3]	Coastal scrub, coastal dunes. Open areas. 3-370 m.[1]	-	1B.1
Pickeringia montana var. *tomentosa* woolly chaparral-pea	Gabbroic, granitic, and clay soils in chaparral. May occur in washes. 0-1700 m.[2]	-	4.3
Polygala cornuta var. *fishiae* Fish's milkwort[3,6]	Chaparral, cismontane woodland, and riparian woodland. 100-1000 m.[2]	-	4.3
Pseudognaphalium leucocephalum white rabbit-tobacco	Riparian woodland, cismontane woodland, coastal scrub, chaparral. Sandy, gravelly sites. 35-515 m.[1]	-	2B.2
Romneya coulteri Coulter's matilija poppy[3,6]	Canyons and washes in chaparral and coastal scrub. Often occurs in burn areas. 20-1,200m.[2]	-	4.2
Senecio aphanactis chaparral ragwort	Occurs in dry open rocky areas in chaparral, cismontane woodland, and coastal scrub. Sometimes occurs in alkaline flats. 15-800 m.[2]	-	2B.2
Sidalcea neomexicana salt spring checkerbloom	Playas, chaparral, coastal scrub, lower montane coniferous forest, Mojavean desert scrub. Alkali springs and marshes. 3-2,380 m.[1]	-	2B.2
Symphyotrichum defoliatum San Bernardino aster	Meadows and seeps, cismontane woodland, coastal scrub, lower montane coniferous forest, marshes and swamps, valley and foothill grassland. Vernally mesic grassland	-	1B.2

Species Name	Habitat	Status	CRPR
	or near ditches, streams and springs; disturbed areas. 2-2,040 m.[1]		
Tortula californica California screw-moss	Chenopod scrub, valley and foothill grassland. Moss growing on sandy soil. 10-1,460 m.[1]	-	1B.2

1: Habitat descriptions were taken from the CNDDB General and Microhabitat descriptions.
2: Species either not listed on CNDDB or has no observations recorded in CNDDB; habitat descriptions paraphrased from CNPS Rare Plant Inventory and the Jepson Manual.
3: Species is covered by in the MSHCP.
4: Braunton's milk-vetch critical habitat present outside the City and SOI.
5: Species known as *Mimulus diffusus* (CRPR 4.3) in MSHCP and Calflora, *Mimulus palmeri* (which is not a rare species) in TMJ2.
6: Species not included in the MSHCP "Adequately Conserved" list.

FE = Federally Endangered
FT = Federally Threatened
PT = Proposed Threatened under ESA.
SE = State Endangered
ST = State Threatened

CRPR = California Rare Plant Rank.
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: More information needed (Review List)
4: Limited distribution (Watch List)
0.1: Seriously threatened in California.
0.2: Fairly threatened in California.
0.3: Not very threatened in California.

4.1.3.2 SPECIAL STATUS WILDLIFE

A review of CNDDB identified species that may occur in the City or SOI. Fifty-nine special status wildlife species have CNDDB records within the study area (Table 3). Critical Habitat for the following species has been documented either in or adjacent to the City or SOI: Santa Ana sucker, western yellow-billed cuckoo, southwestern willow flycatcher, coastal California gnatcatcher, and Least Bell's vireo. A description of habitat requirements for these species has been included in the table below. Some of the special status species described below, such as the special status fish, western pond turtle, and two-striped garter snake, require permanent sources of water or specific vegetation community composition to be considered habitat. Due to the size and diversity of the City and SOI, field surveys are recommended to determine if any of these species have no potential to occur; it should be assumed that these species have at least a low potential to occur within some areas of the City or SOI.

Table 3. Special Status Wildlife Species in the Study Area

Species Name	Habitat[1]	Status
Invertebrates		
Bombus crotchii Crotch bumble bee	Coastal California east to the Sierra-Cascade crest and south into Mexico. Food plant genera include *Antirrhinum*, *Phacelia*, *Clarkia*, *Dendromecon*, *Eschscholzia*, and *Eriogonum*.	SA
Branchinecta sandiegonensis San Diego fairy shrimp	Endemic to San Diego and Orange County mesas. Vernal pools.	FE
Carolella busckana[3] Busck's gallmoth	Coastal scrub and coastal dunes.	SA
Ceratochrysis longimala Desert cuckoo wasp	Hosts are unknown. Other members of this genus known as nest parasites of "a variety of genera in the Crabronidae and Vespidae."[4]	SA
Streptocephalus woottoni Riverside fairy shrimp[2]	Endemic to Western Riverside, Orange, and San Diego counties in areas of tectonic swales/earth slump basins in grassland and coastal sage scrub. Inhabit seasonally astatic pools filled by winter/spring rains. Hatch in warm water later in the season.	FE

Species Name	Habitat[1]	Status
Fish		
Catostomus santaanae Santa Ana sucker[2,7]	Endemic to Los Angeles Basin south coastal streams. Habitat generalists, but prefer sand-rubble-boulder bottoms, cool, clear water, and algae.	FT
Gila orcuttii arroyo chub[2]	Native to streams from Malibu Creek to San Luis Rey River basin. Introduced into streams in Santa Clara, Ventura, Santa Ynez, Mojave & San Diego river basins. Slow water stream sections with mud or sand bottoms. Feeds heavily on aquatic vegetation and associated invertebrates.	SSC
Rhinichthys osculus ssp. 3 Santa Ana speckled dace	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 C. Usually inhabits shallow cobble and gravel riffles.	SSC
Amphibians		
Anaxyrus californicus arroyo toad[2]	Semi-arid regions near washes or intermittent streams, including valley-foothill and desert riparian, desert wash, etc. Rivers with sandy banks, willows, cottonwoods, and sycamores; loose, gravelly areas of streams in drier parts of range.	FE, SSC
Lithobates pipiens northern leopard frog	Native range is east of Sierra Nevada-Cascade Crest. Near permanent or semi-permanent water in a variety of habitats. Highly aquatic species. Shoreline cover, submerged and emergent aquatic vegetation are important habitat characteristics.	SSC
Spea hammondii[5] western spadefoot[2]	Occurs primarily in grassland habitats, but can be found in valley-foothill hardwood woodlands. Vernal pools are essential for breeding and egg-laying.	SSC
Taricha torosa Coast Range newt[2]	Coastal drainages from Mendocino County to San Diego County. Lives in terrestrial habitats & will migrate over 1 km to breed in ponds, reservoirs & slow moving streams.	SSC
Reptiles		
Anniella stebbinsi southern California legless lizard	Generally south of the Transverse Range, extending to northwestern Baja California. Occurs in sandy or loose loamy soils under sparse vegetation. Disjunct populations in the Tehachapi and Piute Mountains in Kern County. Variety of habitats; generally in moist, loose soil. They prefer soils with a high moisture content.	SSC
Arizona elegans occidentalis California glossy snake	Patchily distributed from the eastern portion of San Francisco Bay, southern San Joaquin Valley, and the Coast, Transverse, and Peninsular ranges, south to Baja California. Generalist reported from a range of scrub and grassland habitats, often with loose or sandy soils.	SSC
Aspidoscelis hyperythra orange-throated whiptail[2]	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: termites.	WL

Species Name	Habitat[1]	Status
Aspidoscelis tigris stejnegeri coastal whiptail[2]	Found in deserts and semi-arid areas with sparse vegetation and open areas. Also found in woodland & riparian areas. Ground may be firm soil, sandy, or rocky.	SSC
Coleonyx variegatus abbotti San Diego banded gecko[2]	Coastal & cismontane Southern California. Found in granite or rocky outcrops in coastal scrub and chaparral habitats.	SSC
Crotalus ruber red-diamond rattlesnake[2]	Chaparral, woodland, grassland, & desert areas 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.	SSC
Emys marmorata western pond turtle[2]	A thoroughly aquatic turtle of ponds, marshes, rivers, streams and irrigation ditches, usually with aquatic vegetation, below 6,000 ft elevation. Needs basking sites and suitable (sandy banks or grassy open fields) upland habitat up to 0.5 km from water for egg-laying.	SSC
Phrynosoma blainvillii[6] coast horned lizard[2]	Frequents a wide variety of habitats, most common in lowlands along sandy washes with scattered low bushes. Open areas for sunning, bushes for cover, patches of loose soil for burial, and abundant supply of ants and other insects.	SSC
Salvadora hexalepis virgultea coast patch-nosed snake	Brushy or shrubby vegetation in coastal Southern California. Require small mammal burrows for refuge and overwintering sites.	SSC
Thamnophis hammondii two-striped gartersnake	Coastal California from vicinity of Salinas to northwest Baja California. From sea to about 7,000 ft elevation. Highly aquatic, found in or near permanent fresh water. Often along streams with rocky beds and riparian growth.	SSC
Birds		
Accipiter cooperii Cooper's hawk[2]	Woodland, chiefly of open, interrupted or marginal type. Nest sites mainly in riparian growths of deciduous trees, as in canyon bottoms on river flood-plains; also, live oaks.	WL
Agelaius tricolor tricolored blackbird[2]	Highly colonial species, most numerous in Central Valley & vicinity. Largely endemic to California. Requires open water, protected nesting substrate, and foraging area with insect prey within a few km of the colony.	CE, SSC
Aimophila ruficeps canescens southern California rufous-crowned sparrow[2]	Resident in Southern California coastal sage scrub and sparse mixed chaparral. Frequents relatively steep, often rocky hillsides with grass and forb patches.	WL
Ammodramus savannarum grasshopper sparrow[2,12]	Dense grasslands on rolling hills, lowland plains, in valleys and on hillsides on lower mountain slopes. Favors native grasslands with a mix of grasses, forbs and scattered shrubs. Loosely colonial when nesting.	SSC
Artemisiospiza belli Bell's sage sparrow[2]	Nests in chaparral dominated by fairly dense stands of chamise. Found in coastal sage scrub in south of range. Nest located on the ground beneath a shrub or in a shrub 6-18 inches above ground. Territories about 50 yds apart.	WL

Species Name	Habitat[1]	Status
Aquila chrysaetos golden eagle[2]	Rolling foothills, mountain areas, sage-juniper flats, and desert. Cliff-walled canyons provide nesting habitat in most parts of range; also, large trees in open areas.	FP
Asio otus long-eared owl	Riparian bottomlands grown to tall willows and cottonwoods; also, belts of live oak paralleling stream courses. Require adjacent open land, productive of mice and the presence of old nests of crows, hawks, or magpies for breeding.	SSC
Athene cunicularia burrowing owl[2]	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.	SSC
Buteo swainsoni Swainson's hawk[2]	Breeds in grasslands with scattered trees, juniper-sage flats, riparian areas, savannahs, & 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.	ST
Campylorhynchus brunneicapillus sandiegensis coastal cactus wren[2]	Southern California coastal sage scrub. Wrens require tall opuntia cactus for nesting and roosting.	SSC
Charadrius alexandrinus nivosus western snowy plover	Sandy beaches, salt pond levees & shores of large alkali lakes. Needs sandy, gravelly or friable soils for nesting.	FT, SSC
Circus cyaneus northern harrier[2]	Coastal salt & freshwater marsh. Nest and forage in grasslands, from salt grass in desert sink to mountain cienagas. Nests on ground in shrubby vegetation, usually at marsh edge; nest built of a large mound of sticks in wet areas.	SSC
Coccyzus americanus occidentalis western yellow-billed cuckoo[2,8]	Riparian forest nester, along the broad, lower flood-bottoms of larger river systems. Nests in riparian jungles of willow, often mixed with cottonwoods, with lower story of blackberry, nettles, or wild grape.	FT, SE
Coturnicops noveboracensis yellow rail	Summer resident in eastern Sierra Nevada in Mono County. Freshwater marshlands.	SSC
Elanus leucurus white-tailed kite[2]	Rolling foothills and valley margins with scattered oaks & river bottomlands or marshes next to deciduous woodland. Open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching.	FP
Empidonax traillii extimus southwestern willow flycatcher[2,9]	Riparian woodlands in Southern California.	FE, SE
Eremophila alpestris actia California horned lark[2]	Coastal regions, chiefly from Sonoma County to San Diego County. Also main part of San Joaquin Valley and east to foothills. Short-grass prairie, "bald" hills, mountain meadows, open coastal plains, fallow grain fields, alkali flats.	WL
Haliaeetus leucocephalus bald eagle[2]	Ocean shore, lake margins, and rivers for both nesting and wintering. Most nests within 1 mile of water. Nests in large, old-growth, or dominant live tree with open	SE, FP

Species Name	Habitat[1]	Status
	branches, especially ponderosa pine. Roosts communally in winter.	
Icteria virens yellow-breasted chat[2]	Summer resident; inhabits riparian thickets of willow and other brushy tangles near watercourses. Nests in low, dense riparian, consisting of willow, blackberry, wild grape; forages and nests within 10 ft of ground.	SSC
Laterallus jamaicensis coturniculus California black rail	Inhabits freshwater marshes, wet meadows and shallow margins of saltwater marshes bordering larger bays. Needs water depths of about 1 inch that do not fluctuate during the year and dense vegetation for nesting habitat.	ST, FP
Plegadis chihi white-faced ibis[2]	Shallow freshwater marsh. Dense tule thickets for nesting, interspersed with areas of shallow water for foraging.	WL
Polioptila californica coastal California gnatcatcher[2,10]	Obligate, permanent resident of coastal sage scrub below 2500 ft in Southern California. Low, coastal sage scrub in arid washes, on mesas and slopes. Not all areas classified as coastal sage scrub are occupied.	FT, SSC
Setophaga petechia yellow warbler[2]	Riparian plant associations in close proximity to water. Also nests in montane shrubbery in open conifer forests in Cascades and Sierra Nevada. Frequently found nesting and foraging in willow shrubs and thickets, and in other riparian plants including cottonwoods, sycamores, ash, and alders.	SSC
Vireo bellii pusillus least Bell's vireo[2,11]	Summer resident of Southern California in low riparian in vicinity of water or in dry river bottoms; below 2000 ft. Nests placed along margins of bushes or on twigs projecting into pathways, usually willow, Baccharis, mesquite.	FE, SE
Mammals		
Antrozous pallidus pallid bat	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.	SSC
Chaetodipus fallax fallax northwestern San Diego pocket mouse	Coastal scrub, chaparral, grasslands, sagebrush, etc. in western San Diego County. Sandy, herbaceous areas, usually in association with rocks or coarse gravel.	SSC
Dipodomys merriami parvus San Bernardino kangaroo rat[2]	Alluvial scrub vegetation on sandy loam substrates characteristic of alluvial fans and flood plains. Needs early to intermediate seral stages.	FE, SSC
Dipodomys stephensi Stephens' kangaroo rat[2]	Primarily annual & perennial grasslands, but also occurs in coastal scrub & sagebrush with sparse canopy cover. Prefers buckwheat, chamise, brome grass and filaree. Will burrow into firm soil.	FE, ST
Eumops perotis californicus western mastiff bat	Many open, semi-arid to arid habitats, including conifer & deciduous woodlands, coastal scrub, grasslands, chaparral, etc. Roosts in crevices in cliff faces, high buildings, trees and tunnels.	SSC
Lasiurus xanthinus western yellow bat	Found in valley foothill riparian, desert riparian, desert wash, and palm oasis habitats. Roosts in trees, particularly palms. Forages over water and among trees.	SSC

Species Name	Habitat[1]	Status
Lepus californicus bennettii San Diego black-tailed jackrabbit[2]	Intermediate canopy stages of shrub habitats & open shrub / herbaceous & tree / herbaceous edges. Coastal sage scrub habitats in Southern California.	SSC
Neotoma lepida intermedia San Diego desert woodrat[2]	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, rocky cliffs, and slopes.	SSC
Nyctinomops femorosaccus pocketed free-tailed bat	Variety of arid areas in Southern California; pine-juniper woodlands, desert scrub, palm oasis, desert wash, desert riparian, etc. Rocky areas with high cliffs.	SSC

1: Habitat descriptions sourced from the general and microhabitat descriptions listed in CNDDB.
2: Species included in the MSHCP.
3: Also known as *Eugnosta busckana*.
4: Kimsey, L. 2014. *California Cuckoo Wasps in the Family Chrysididae (Hymenoptera)*. University of California Press. Berkeley, CA.
5: Species known as *Scaphiopus hammondii* in the MSHCP.
6: Species known as *Phrynosoma coronata blainvillii* in the MSHCP.
7: Sana Ana sucker critical habitat is within the study area.
8: Western yellow-billed cuckoo critical habitat is within the study area.
9: Southwestern willow flycatcher critical habitat is within the study area.
10: Coastal California gnatcatcher critical habitat is within the study area. Large amounts of critical habitat are adjacent to the study area.
11: Least Bell's vireo critical habitat is within the study area.
12: Species not included in the MSHCP "Adequately Conserved Species" list.

FE = Federally Endangered
FT = Federally Threatened
SE = State Endangered
ST = State Threatened
CE = State Candidate for Endangered Listing
FP = CDFW Fully Protected
SA = CDFW Special Animals
SSC = CDFW Species of Special Concern

4.2 Existing Conditions – City of Corona

The City of Corona is located approximately 45 miles southeast of Los Angeles in western Riverside County. The City limits encompass about 39.2 square miles (excluding the SOI). Land use within the City was historically agricultural, with citrus orchards, dairy farms and ranches. Current land use within the City is primarily residential (approximately 38 percent of the total area), with noteworthy areas of industrial use (approximately 15 percent), open space and recreational areas (approximately 12 percent) and urban vacant land (approximately 12 percent) (see Figure 4). Agricultural uses only comprise approximately 3 percent of the total area with the City. Present-day Corona is a fully developed city which supports relatively few biological resources within the city limits.

4.2.1 Sensitive Natural Communities

Of the communities identified within the study area, four sensitive natural communities (three vegetation communities and one sensitive habitat) have CNDDB records within the City and SOI (Table 4). These habitats include Southern California Arroyo Chub/Santa Ana Sucker Stream, Southern Cottonwood Willow Riparian Forest, Southern Riparian Forest, and Southern Sycamore Alder Riparian Woodland. The presence of these communities within the City is confirmed; however, a lack of CNDDB records for these communities does not imply the absence of these communities within the City. The records for these sensitive communities are located along the edges of the City and SOI; however, it is possible that the communities extend further into the City than is documented, and records that lie outside of the City may extend into the boundary. All of the sensitive communities documented within the study area are associated with ephemeral or perennial water features, such as streams and washes. These communities often provide valuable habitat for wildlife, and in some cases may contribute to wildlife movement.

Table 4. Sensitive Natural Communities in the City of Corona

Natural Community	Global / State Rank
Southern California Arroyo Chub/Santa Ana Sucker Stream	GNR/SNR
Southern Cottonwood Willow Riparian Forest	G3/S3.2
Southern Riparian Forest	G4/S4
Southern Sycamore Alder Riparian Woodland	G4/S4

G3 = Vulnerable – At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.
G4 = Apparently Secure – Uncommon but not rare; some cause for long-term concern due to declines or other factors.
GNR = Global Rank not yet assessed.
S3 = Vulnerable – Vulnerable in the state due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation from the state.
S4 = Apparently Secure – Uncommon but not rare in the state; some cause for long-term concern due to declines or other factors.
0.2: Fairly threatened in California.
SNR = State Rank not yet assessed

4.2.1 Aquatic Resources

The City is located within the Santa Ana River Watershed. There are several ephemeral washes that traverse the City, generally originating in the mountainous areas of the Cleveland National Forest to the southwest of the City and flowing northerly toward the Santa Ana River basin. Artificial ponds and lakes are present, with variable amounts of natural habitat associated with them.

4.2.1.1 DRAINAGES

The City's 2004 General Plan Hydrological Resources section describes several washes than run through the City from the southwest: Temescal Wash; Bedford Canyon Wash; Joseph Canyon Wash; Main Street Wash; and Mabey Canyon Wash (Figure 8). Most of these are confined within concrete channels, although small amounts of vegetation may be present seasonally. The exception to the otherwise channelized drainages is Temescal Wash, which comprises a natural channel with riparian vegetation over two sections of its length through the City. Temescal Wash flows northerly through the City up to the quarry vicinity, where it continues via a concrete channel to the airport. North-northwest of the airport, a natural channel continues into the Prado Basin at N. Lincoln Avenue. In the un-channelized segments of Temescal Wash, substantial amounts of riparian vegetation provide habitat for a range of wildlife, including small mammals, amphibians, and birds. A goal of the MSHCP is to create a connection between Lake Mathews/Estelle Mountain Reserve and the Santa Ana River via Temescal Wash to facilitate wildlife movement.

4.2.1.2 ARTIFICIAL LAKES

Artificial (created) lakes and ponds are present at Lake Temescal (southeast of the interchange of Highway 91 and Interstate 15), Border Lake (near Brentwood Park), and at the City's golf courses. Lake Temescal is ringed with riparian vegetation and open water areas, providing cover and foraging habitat for birds, amphibians and western pond turtle. Although Border Lake is surrounded by residential development and lacks riparian plants, open water habitat is present and could be used by birds such as ducks and American coots (*Fulica americana*).

4.2.1 Vegetation

Vegetation described in this section is based on the generalized and un-collapsed vegetation community classifications included in the MSHCP vegetation map, which incorporates updates made in 2012 by CNPS. Natural vegetation communities within the City are primarily coastal sage scrub, grassland, and chaparral, however the majority of the land is classified as developed/disturbed (Figure 9). There is an area of riparian scrub, woodland, forest with interspersed meadows and marshes and grassland along the northern border

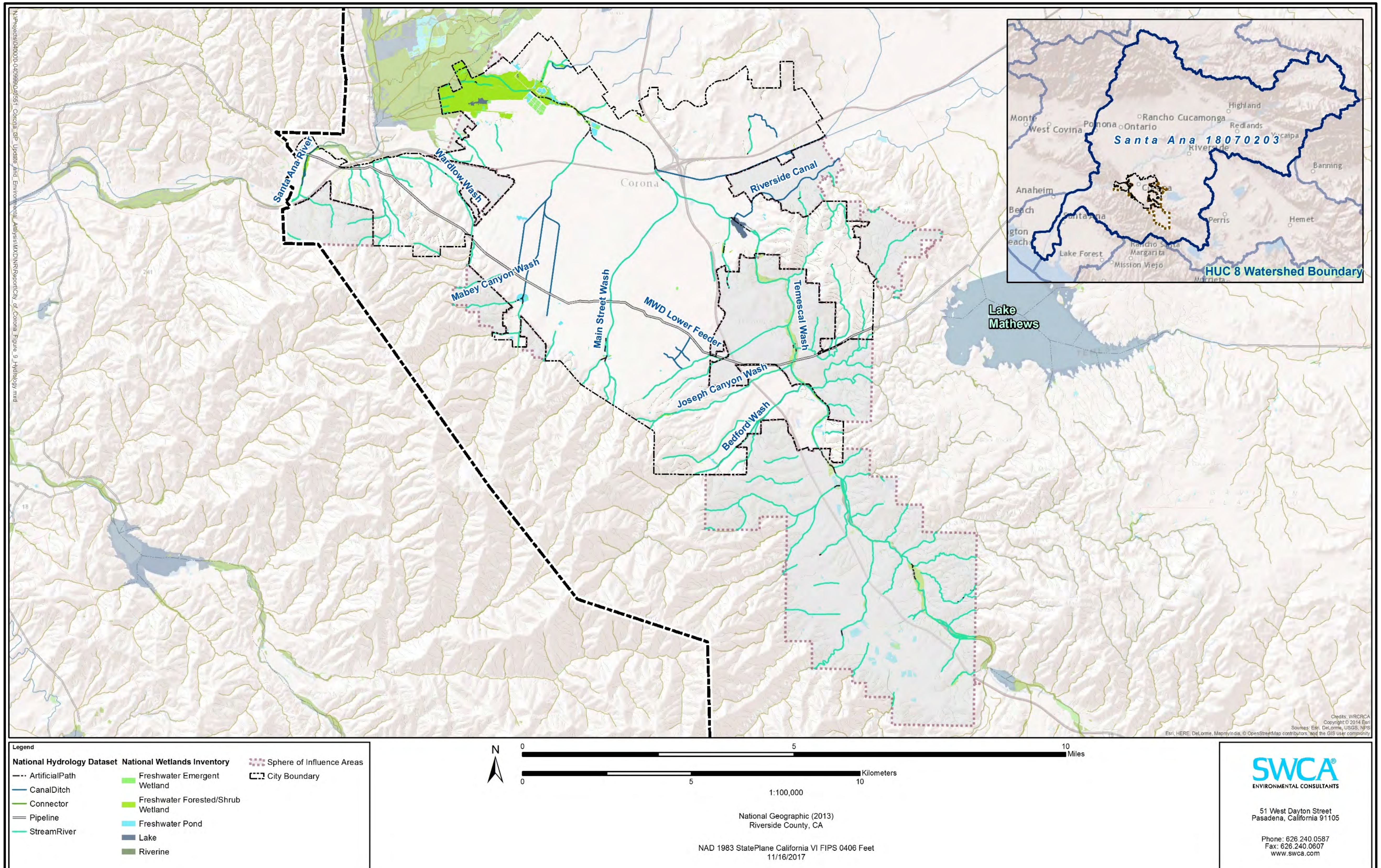

Figure 8. Drainages within the City and SOI

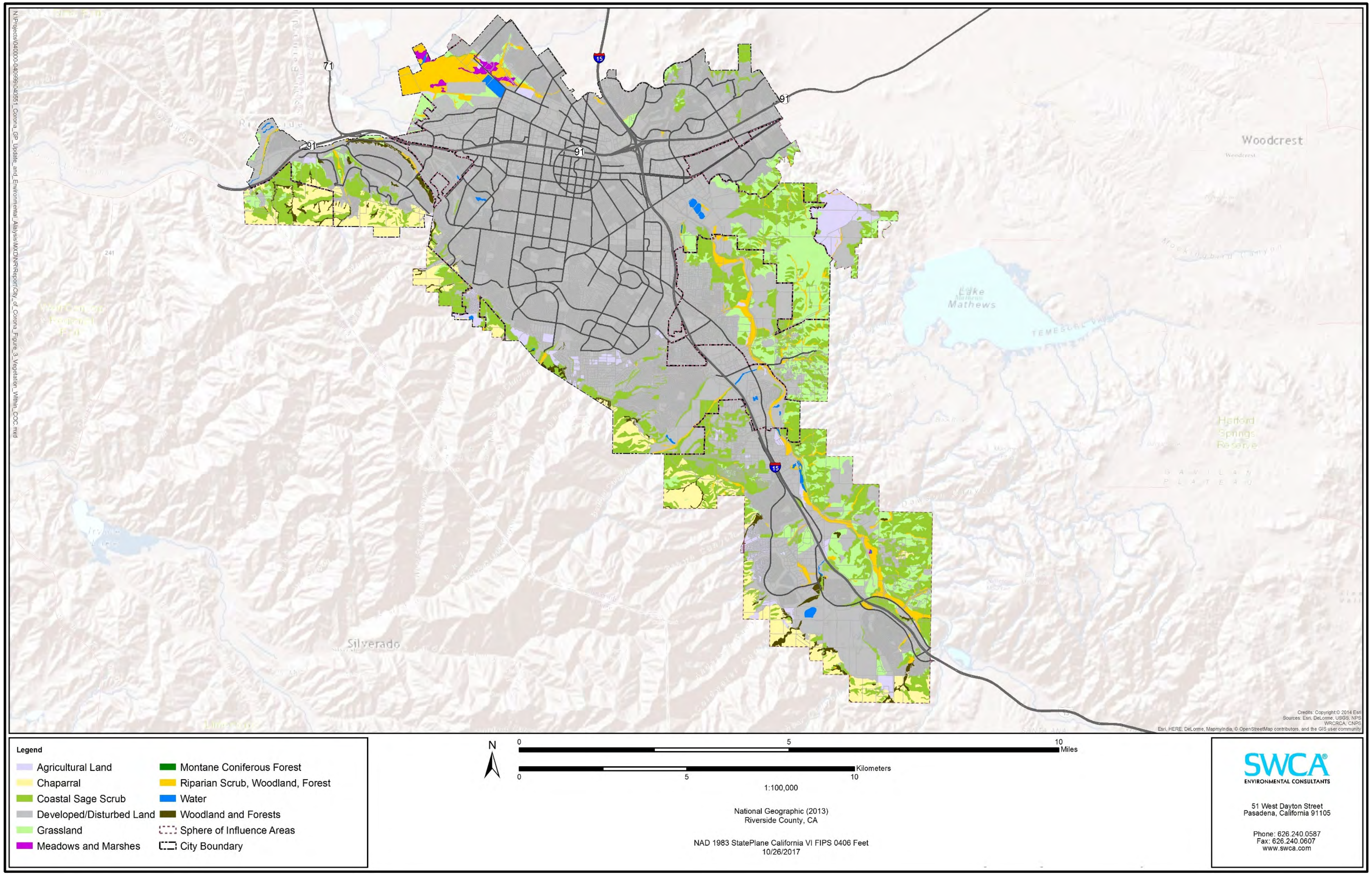

Figure 9. Vegetation within the City of Corona

of the City. Along part of the western border, just south of Highway 91, is an area of chaparral with patches of coastal sage scrub, grassland, woodland and forest, and riparian scrub, woodland, forest. East of Temescal Lake there is an area of coastal sage scrub with patches of grassland and several small riparian corridors. The southern portion of the City has a relatively intact corridor of riparian scrub, woodland, forest associated with Temescal Wash. Native plant communities identified within the project area include coastal sage scrub (CSS), and southern willow scrub. Landscaped areas comprised of primarily non-native plant species occur throughout the city. Coast live oak is a protected tree species in the Conservation Element of the Riverside County General Plan; this species exists in scattered locations within the study area and should be given consideration regardless the species' relative abundance.

4.2.1.1 COASTAL SAGE SCRUB ALLIANCES

Areas in the City containing coastal sage scrub are characterized by the dominance of California sagebrush (*Artemisia californica*) and/or California buckwheat (*Eriogonum fasciculatum*), with variable amounts of laurel sumac (*Malosma laurina*), California encelia (*Encelia californica*), and sage species (e.g., *Salvia mellifera, S. apiana*). This plant community was previously identified as Riversidean sage scrub, a term which is no longer applied.

4.2.1.2 SOUTHERN WILLOW SCRUB

The southern willow scrub plant community is present within the City in areas along Temescal Wash and Bedford Wash, although channelization and clearing have reduced and limited the spread of this habitat type.

4.2.1.3 NON-NATIVE VEGETATION

Nonnative vegetation recorded within the City includes grassland dominated by nonnative species and other ruderal plant communities. Tamarisk (*Tamarix* ssp.) and giant reed (*Arundo donax*) infestations have affected local waterways and places where water collects. These two species have a rating of "High" on the California Invasive Plant Council (Cal-IPC) list and are defined as species that "have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment." Tamarisk and giant reed are heavy water users with high evapotranspiration rates, provide little nest or foraging habitat, are difficult to control, and can grow into dense monocultures that block access to water for larger wildlife. Infestations can take over large areas, outcompeting native plant species and thereby reducing overall habitat quality.

4.2.1 Wildlife

Open spaces areas within the built environment of the City provide refugia for some wildlife species, particularly birds and small animals such as lizards and butterflies. Golf courses, parks, and cemeteries typically have mature trees and may have water features, both important elements providing food and cover for wildlife. Orchards and some other types of agricultural land uses may also offer some habitat value. The City contains three golf courses, one cemetery, and at least 40 parks totaling more than 394 acres, as well as remnant patches of orchards and agricultural lands (City of Corona 2017).

Wildlife species that inhabit the areas that support native vegetation and open space, especially in wet areas such as around Temescal Wash, include common amphibians such as Baja California tree frog (*Pseudacris hypochondriaca*) and the nonnative American bullfrog (*Rana catesbeiana*). Nonnative fish observed include carp (*Cyprinus carpio*) and mosquitofish (*Gambusia* sp.). Reptiles observed within the City limits include several lizards and snakes. Many typical California resident and migratory birds have been observed in association with the remnant riparian, wetland, oak woodland, sage scrub, and grassland habitats. Urban-adapted common birds such as American crow (*Corvus brachyrhynchos*), blackbirds, white-crowned sparrow (*Zonotrichia leucophrys*), California towhee (*Melozone crissalis*), juncos, house finch (*Haemorhous mexicanus*), house sparrow (*Passer domesticus*), and hummingbirds, depending upon plant species present to provide cover and food resources, likely inhabit golf courses and cemeteries where disturbance and perceived threats (e.g., dogs) are fewer. Mammal species known to occur include California ground squirrel (*Spermophilus beecheyi*), desert cottontail (*Sylvilagus audubonii*), Virginia opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), Botta's pocket gopher (*Thomomys bottae*), mice and voles, coyote (*Canis latrans*), and bobcat. Mountain lions are known to occur in the Cleveland National Forest and along the Santa Ana River corridor, and have been documented in the Temescal Valley, near Trilogy Golf Club.

4.2.1 Special Status Species Documented within the City of Corona

Twenty species of plants and wildlife have confirmed CNDDB observations that intersect with the City of Corona (Table 5). The year of the most recent observation for these species is included.

Table 5. Special Status Plant and Animal Species with Records in the City of Corona

Species Name	Common Name	Most Recent CNDDB Observation
Plants		
Abronia villosa var. *aurita*	chaparral sand-verbena	1934
California macrophylla	round-leaved filaree	2009
Calochortus weedii var. *intermedius*	intermediate mariposa-lily	2008
Dudleya multicaulis	many-stemmed dudleya	1996
Lepidium virginicum var. *robinsonii*	Robinson's pepper-grass	2010
Invertebrates		
Bombus crotchii	Crotch bumble bee	1933
Fish		
Catostomus santaanae[1]	Santa Ana sucker	1991
Gila orcuttii	Southern California arroyo chub	1997
Amphibians		
Taricha torosa	Coast Range newt	1999
Reptiles		
Crotalus ruber	red-diamond rattlesnake	2010
Emys marmorata	western pond turtle	1992
Phrynosoma blainvillii	coast horned lizard	1951
Birds		
Aquila chrysaetos	golden eagle	2007
Athene cunicularia	burrowing owl	2007
Buteo swainsoni	Swainson's hawk	1919
Coccyzus americanus occidentalis	western yellow-billed cuckoo	2011
Polioptila californica	coastal California gnatcatcher	2003

Species Name	Common Name	Most Recent CNDDB Observation
Vireo bellii pusillus	least Bell's vireo	2011
Mammals		
Chaetodipus fallax fallax	northwestern San Diego pocket mouse	2001
Dipodomys stephensi	Stephens' kangaroo rat	1993

1: Observation for Santa Ana sucker is not a direct species observation; rather, the Santa Ana River was classified as a Southern California Arroyo Chub/Santa Ana Sucker Stream in 1991.

4.2.2 Wildlife Movement and Migratory Corridors

There are large areas of open space around the City including the Chino Hills State Park (to the northwest), Cleveland National Forest (to the southwest), Prado Basin (to the north), and the Lake Matthews Area (to the east). Generally the City is developed, with minimal opportunities for wildlife movement through the city. The few areas with natural characteristics that could be used by wildlife as movement or migratory corridors occur in orchards and along drainages that course through the City. The most prominent features that may provide valuable habitat linkage are the Bedford Wash and Temescal Wash; together these two ephemeral drainages connect the Cleveland National Forest and the Lake Mathews Estelle Mountain Reserve. This potential corridor is labeled as the Bedford Wash to Lake Mathews Estelle Mountain Reserve Corridor (Figure 10). Some smaller, mobile species may be able to use the channelized washes that bisect the city, particularly during the dry season. Within the City of Corona, there are no other notable wildlife movement and migratory corridors that link large areas of open space; however, there is potential value in establishing a corridor between the Chino Hills State Park and the Cleveland National Forest by circumventing California State Route 91. This highway poses a substantial barrier for wildlife movement between these two large open spaces.

4.3 Existing Conditions – Sphere of Influence

The West Sphere contains the Prado Basin area, the Coronita area, and the Foothill area, however the Prado Basin area has been largely eliminated from the SOI since the last General Plan update in 2004. The Coronita area occurs within a donut hole in the City boundary, and the Foothill area is along the western border of the City at the base of the foothills of the Santa Ana Mountains. The East Sphere contains the El Cerrito area, the largest area within this sphere, as well as the Home Gardens area to the north and the Eagle Valley area to the north east. The South Sphere is the largest of the three spheres, and contains Temescal Canyon. The SOI encompasses a total of approximately 26.5 square miles. Similar to the City, land use within the SOI was historically agricultural, with citrus orchards, dairy farms and ranches. Current land uses within the SOI is primarily vacant undifferentiated land, which includes much of the open space and park land within the SOI (approximately 54 percent) (see Figure 4). Other notable land uses include residential uses (approximately 15 percent), non-oil and gas mineral extraction (approximately 10 percent), and agricultural uses (approximately 6 percent).

As described above in Section 3, the information available does not always allow for discussion of existing conditions with the City and its SOI separately. Native plant communities, special status species, and general species composition of both plants and wildlife in the vicinity were established for the entire project area through desktop research, and did not include any field surveys or on-the-ground verification of the research results. Therefore, it is not possible to make assertions regarding how these conditions may differ between the area within the City and the areas within the City's SOI.

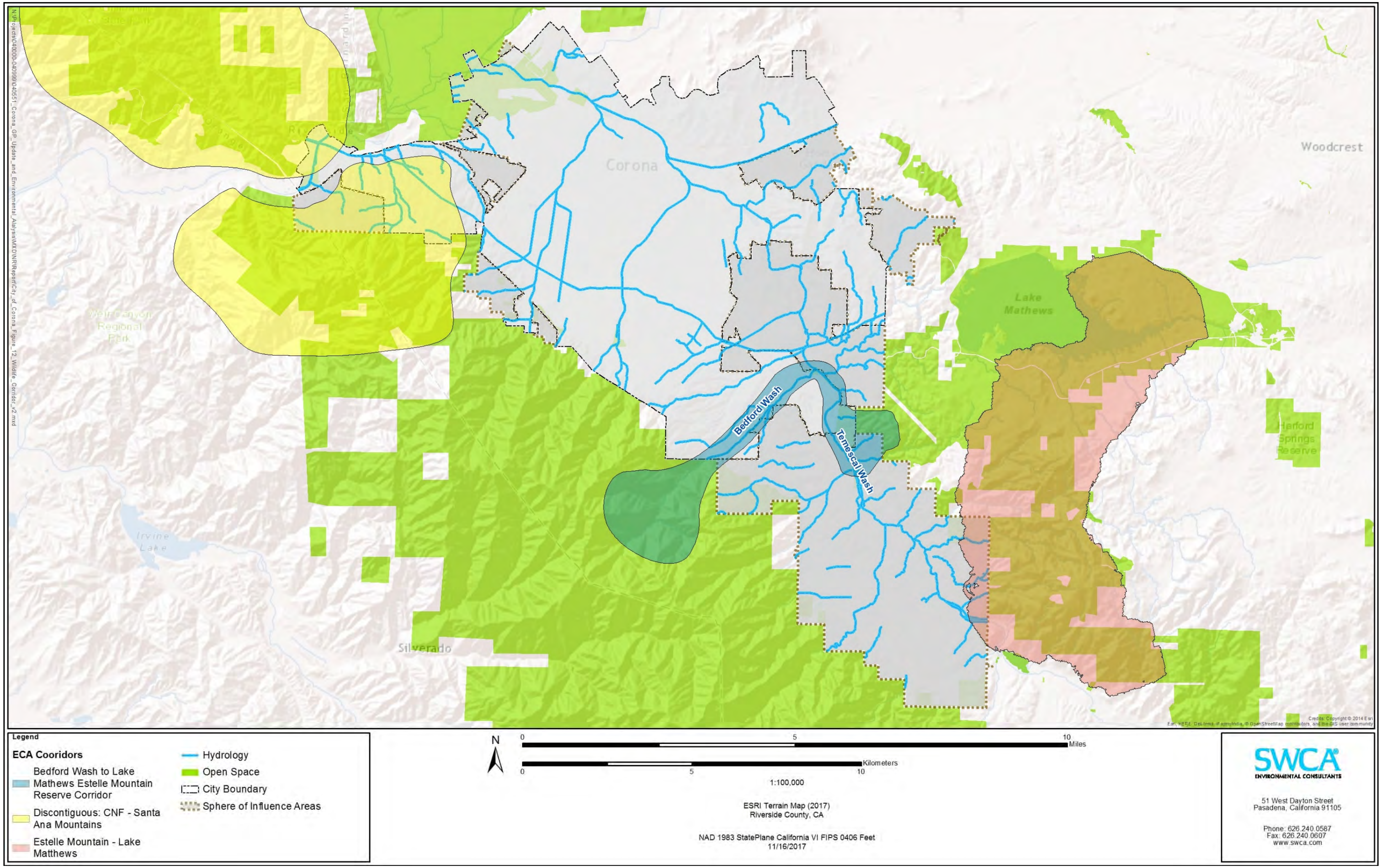

Figure 10: Potential Wildlife Movement Corridors within the City and SOI

4.3.1 Critical Habitat

As noted above in Section 4.1.5.1, seven animals and one plant that have been designated as federal endangered (FE), federal threatened (FT), and/or state endangered (SE) have designated Critical Habitat areas the vicinity of the study area (see Figure 6). Critical Habitat for four species overlap with the SOI:

- coastal California gnatcatcher (FT) – Northeast-facing foothills of the Cleveland National Forest, southwest of the City
- least Bell's vireo (FE; SE) – Santa Ana River corridor, north and northwest of the City
- Santa Ana sucker (*Catostomas santaanae*) (FT) – Santa Ana River corridor
- western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) (FT, SE) – Santa Ana River corridor

4.3.2 Sensitive Natural Communities

The table below summarizes which sensitive natural communities have confirmed CNDDB observations that intersect the SOI.

Natural Community	Global / State Rank
Southern California Arroyo Chub/Santa Ana Sucker Stream	GNR/SNR
Southern Coast Live Oak Riparian Forest	G4/S4
Southern Cottonwood Willow Riparian Forest	G3/S3.2
Southern Riparian Forest	G4/S4
Southern Sycamore Alder Riparian Woodland	G4/S4
Southern Willow Scrub	G3/S2.1

G3 = Vulnerable – At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.
G4 = Apparently Secure – Uncommon but not rare; some cause for long-term concern due to declines or other factors.
GNR = Global Rank not yet assessed.

S2 = Imperiled – Imperiled in the state because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the state.
S3 = Vulnerable – Vulnerable in the state due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation from the state.
S4 = Apparently Secure – Uncommon but not rare in the state; some cause for long-term concern due to declines or other factors.
0.1: Seriously threatened in California.
0.2: Fairly threatened in California.
SNR = State Rank not yet assessed

4.3.3 Aquatic Resources

The SOI is located within the Santa Ana River Watershed. The Santa Ana River lies just north of the West Sphere, flowing westerly from the San Bernardino Mountains. The Temescal Canyon Wash runs north from Lake Elsinore through both the South Sphere and the El Cerrito area in the East Sphere, before flowing through the City and ultimately draining to the Santa Ana River. The Riverside Canal runs along the northern border of the Home Gardens area. The West Sphere and the Eagle Valley area within the East Sphere do not contain any major water courses.

4.3.4 Vegetation

Vegetation described in this section is based on the generalized and un-collapsed vegetation community classifications included in the MSHCP vegetation map, which incorporates updates made in 2012 by CNPS (Figures 11, 12, and 13). Natural vegetation communities within the West Sphere are primarily chaparral and coastal sage scrub, with patches of grassland. The El Cerrito area within the East Sphere is dominated

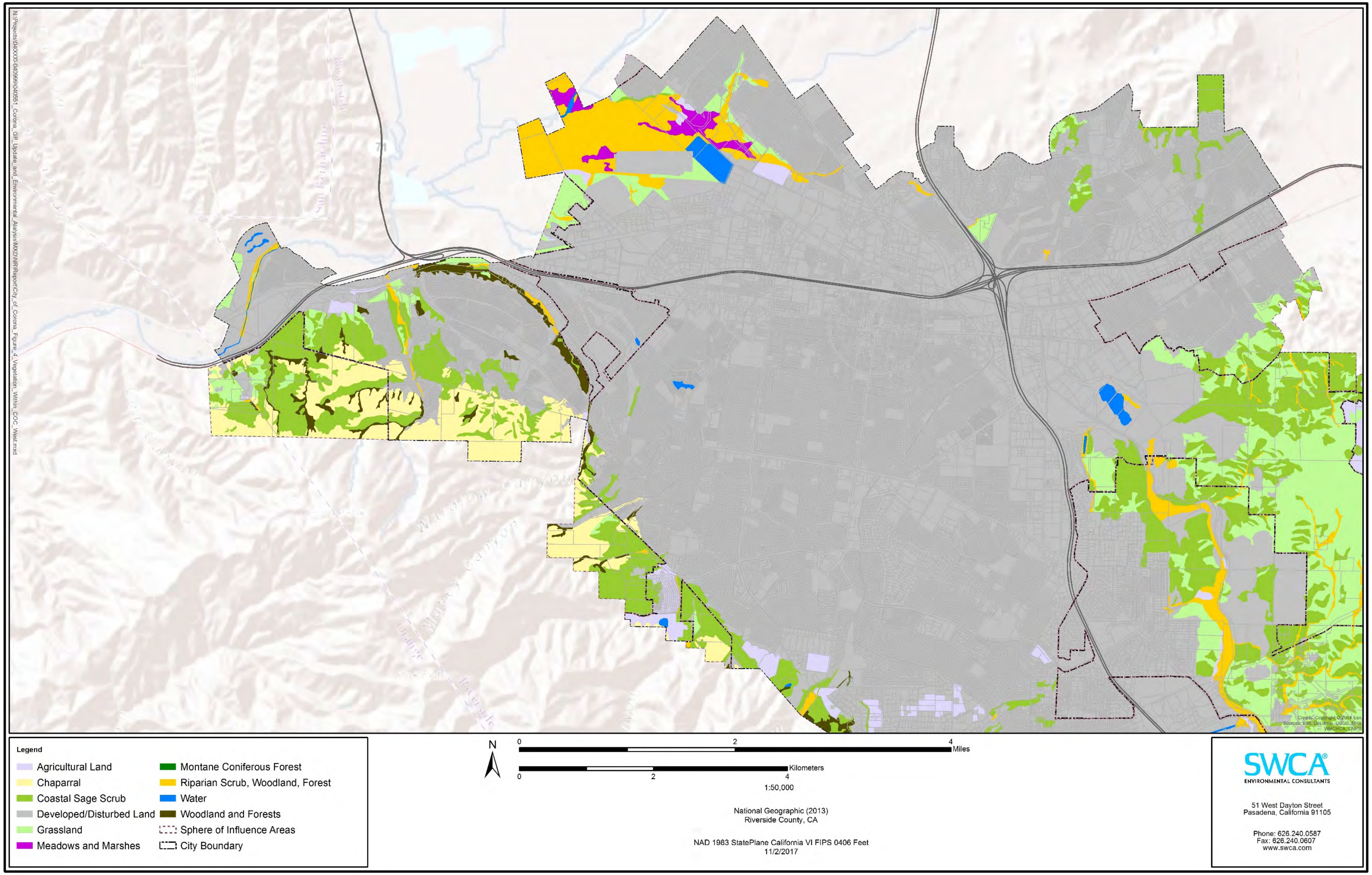

Figure 11. Vegetation within the West Sphere of Influence

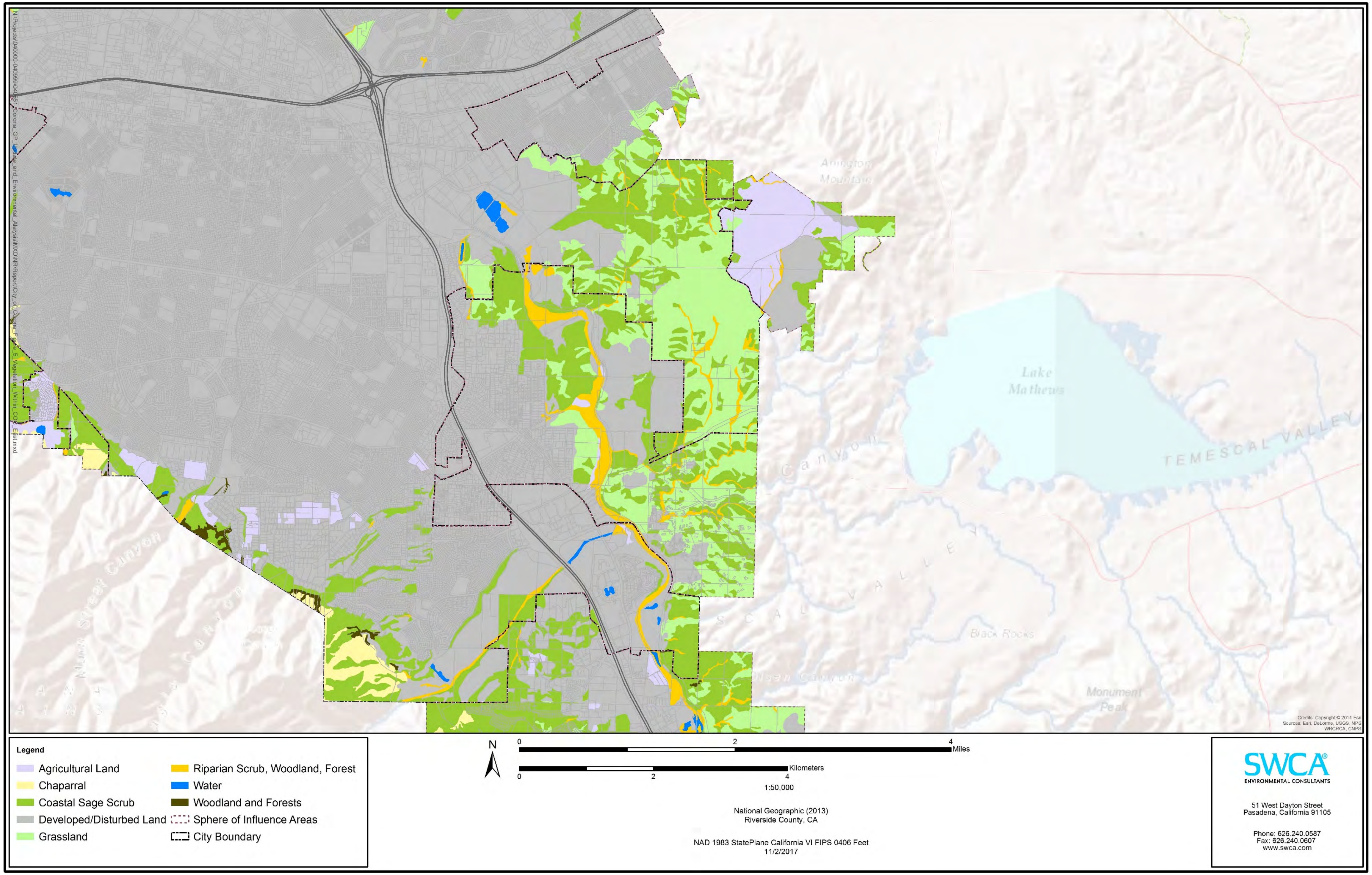

Figure 12. Vegetation within the East Sphere of Influence

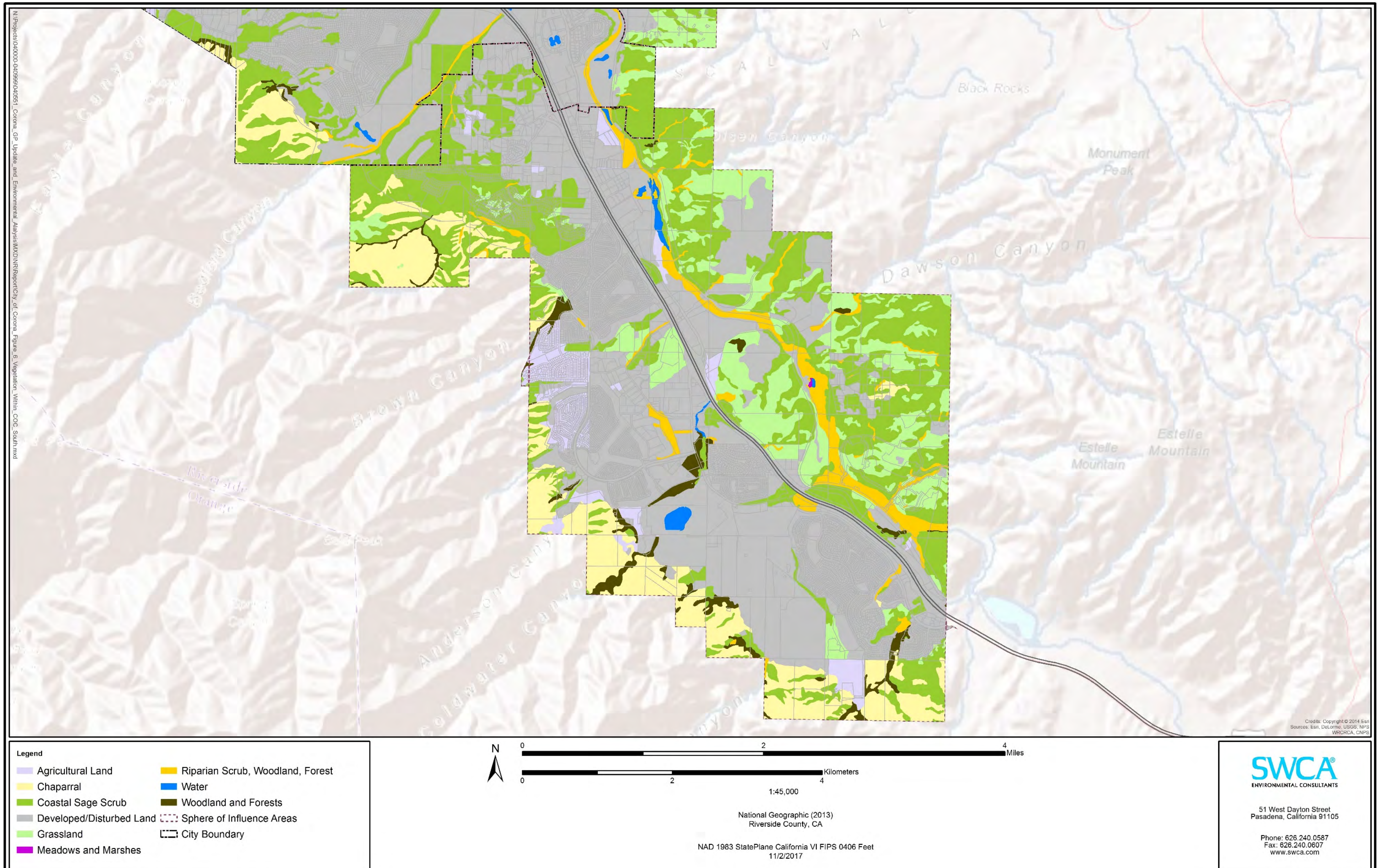

Figure 13. Vegetation within the South Sphere of Influence

by grassland and some coastal sage scrub, with riparian scrub, woodland, forest along the Temescal Wash and other riparian corridors. The Eagle Valley area is dominated by agricultural land, and Home Gardens is largely developed. The South Sphere is characterized by riparian scrub, woodland, and forest along the Temescal Wash riparian corridor, with adjacent uplands dominated by coastal sage scrub and grassland. The southwestern border of the South Sphere is dominated by chaparral with some coastal sage scrub and montane coniferous forest. Special consideration should be given to coast live oak; it is a regionally common species that is a protected tree species in the Conservation Element of the Riverside County General Plan; this species exists in scattered locations within the study area and should be given consideration regardless the species' relative abundance.

4.3.1 Wildlife

Common species of wildlife likely or known to occur within the SOI are presented above in Section 4.2.1. In general, it is anticipated that wildlife in the area would be more concentrated within the SOI than within the more fully developed City. Parks and open space areas within the SOI provide refugia for wildlife species, and numerous ephemeral tributaries to Temescal Wash and the Santa Ana River can be found within canyons and valleys of the Santa Ana Mountains.

4.3.1 Special Status Species Documented within the SOI

Twenty-six species of plants and wildlife have confirmed CNDDB observations that intersect with the SOI (Table 6). The year of the most recent observation for these species is included. Of the species included in this list, Southern California rufous-crowned sparrow is the only MSHCP covered species that is not considered Adequately Conserved by the MSHCP. There is an opportunity to conserve Southern California rufous-crowned sparrow habitat through the preservation of coastal sage scrub and sparse mixed chaparral, which is a relatively common habitat type in the SOI; due to the recent records, habitat preservation is expected to have a positive effect for this species.

Table 6. Special Status Plant and Animal Species with Records in the SOI

Species Name	Common Name	Most Recent CNDDB Observation
Plants		
Abronia villosa var. *aurita*	chaparral sand-verbena	2015
Allium munzii	Munz's onion	2011
Calochortus weedii var. *intermedius*	intermediate mariposa-lily	2008
Centromadia pungens ssp. *laevis*	smooth tarplant	1988
Dudleya multicaulis	many-stemmed dudleya	1996
Harpagonella palmeri	Palmer's grapplinghook	1986
Lepidium virginicum var. *robinsonii*	Robinson's pepper-grass	2010
Nolina cismontana	chaparral nolina	1990
Pseudognaphalium leucocephalum	white rabbit-tobacco	2004
Symphyotrichum defoliatum	San Bernardino aster	1986
Fish		
Catostomus santaanae[1]	Santa Ana sucker	1991
Gila orcuttii[1`]	Southern California arroyo chub	1991

Species Name	Common Name	Most Recent CNDDB Observation
Amphibians		
Spea hammondii	western spadefoot	2008
Taricha torosa	Coast Range newt	1999
Reptiles		
Aspidoscelis tigris stejnegeri	coastal whiptail	2016
Crotalus ruber	red-diamond rattlesnake	1992
Phrynosoma blainvillii	coast horned lizard	2016
Birds		
Aimophila ruficeps canescens	southern California rufous-crowned sparrow	2016
Aquila chrysaetos	golden eagle	2007
Athene cunicularia	burrowing owl	1986
Buteo swainsoni	Swainson's hawk	1919
Coccyzus americanus occidentalis	western yellow-billed cuckoo	2011
Polioptila californica californica	coastal California gnatcatcher	2002
Vireo bellii pusillus	least Bell's vireo	2014
Mammals		
Dipodomys stephensi	Stephens' kangaroo rat	2000
Lepus californicus bennettii	San Diego black-tailed jackrabbit	2000

1: Observation for Southern California arroyo chub and Santa Ana sucker is not a direct species observation; rather, the Santa Ana River was classified as a Southern California Arroyo Chub/Santa Ana Sucker Stream in 1991.

4.3.2 Wildlife Movement and Migratory Corridors

The SOI boasts significantly more open space area suitable for wildlife habitat than the City. Excluding the Coronita area, most of the land within the West Sphere is within the Cleveland National Forest. The entire southwestern border of the South Sphere is adjacent to the Cleveland National Forest, and large parts of the southeastern border is adjacent to the Lake Mathews Estelle Mountain Reserve. The Eastern Sphere is adjacent to the Lake Mathews Estelle Mountain Reserve which extends south to the Lake Elsinore State Recreation Park. Aside from the Bedford Wash to Lake Mathews Estelle Mountain Reserve Corridor (which goes through the City and parts of the SOI), the primary contribution of the SOI's towards wildlife movement and migratory corridors is due to their proximity to large areas of open space; however development of these areas is unlikely to result in the removal of any wildlife corridors because wildlife would have other alternatives for moving between open spaces.

5 ENVIRONMENTAL CONSTRAINTS ANALYSIS

The City's opportunities to protect the natural environment within the City General Plan Update Area as well as the potential development constraints for future projects associated with the natural resources that could potentially occur are discussed in this section. The goal of this section is to identify potentially inadequate or conflicting mitigation measures with other plans and regulations that will guide the Corona General Plan update.

5.1 Constraints

The preservation of natural resources within the City and SOI is primarily constrained by the fact that most of the City has been developed and has limited value as habitat for sensitive native species, wildlife movement corridors, and other conservation uses. Conservation of biological resources and open species is also constrained by the private ownership of most natural areas within the City and SOI; preservation of these areas depends on the participation of willing landowners. Development in some of the open areas has been approved, or is awaiting approval by the City, the environmental impacts of which were analyzed pursuant to the requirements of CEQA, the MSHCP, and other regulatory requirements. These include the Arantine Hills Specific Plan, which covers 301 acres in the TCAP, and the Skyline Heights Specific Plan, which covers 271 acres in the western part of the City. Fees from projects like these fund the MSHCP reserve assembly and conservation of MSHCP covered species.

The MSHCP poses one of the primary constraints on conservation within the City and SOI. The MSHCP targets conservation efforts in predetermined areas, specifically the Criteria Area Cells, and prioritizes conservation of species that are of regional importance, which may differ from priorities at the local level.

The City's participation in the MSHCP requires the adoption of an ordinance imposing the Local Development Mitigation Fee; this requirement has been fulfilled through Chapter 16.33 of the City Municipal Code, the *Multiple Species Habitat Conservation Plan (MSHCP) Mitigation Fee*.

5.2 Opportunities

The General Plan is an instrument which the City can use to manage biological resources and open space, along with other codes, ordinances, and guidelines. The update of the General Plan provides opportunities for the City to protect natural resources and open space. Amending development policies, codes, and ordinances when needed to comply with updated regulatory requirements will allow planning for future projects to proceed smoothly and predictably. This will favor development in areas with lower natural resource values, and favor conservation of areas with more natural resources. Collaboration with the County of Riverside, the Riverside County Resource Conservation District, and other entities can provide logistical support in project review to ensure consistency with the MSHCP and other regulations, and in implementing mitigation requirements. Focus on acquiring areas in the Criteria Area cells will promote species conservation, enhance wildlife corridors and habitats, and preserve MSHCP linkages.

There are opportunities throughout undeveloped areas of the City of Corona and the SOI to preserve open spaces, conserve native species, and contribute to assembly of the reserve system for the MSHCP. Key aspects of the City's location provide good opportunities to support these goals, such as the City's unique siting at the eastern edge of the Santa Ana Mountains along the Santa Ana River.

Sensitive biological resources that may occur within the City and SOI are not all covered by the MSHCP. Because the City and SOI are located at the northwestern corner of the MSHCP plan area, species that primarily occur outside the MSHCP could occur in the City or SOI. In addition, the MSHCP covers species that are not considered Adequately Conserved, meaning that the implementation of the MSHCP may not suffice to achieve conservation goals for these species. Through the General Plan, the City can provide means to conserve these resources, though careful assessment of biological resources that may be impacted by development, and through conservation of open space. Many of the non-covered species that have been recorded in the City, the SOI or in the vicinity were discussed earlier, but others may occur.

5.3 Issues and Recommendations

Based on a review of the available documents and resources, SWCA did not identify any conflicts between the existing General Plan and other applicable policies or ordinances protecting biological resources. Likewise, the General Plan does not conflict with any adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

Implementation of the General Plan will allow the City to evaluate and encourage development projects that are consistent with City priorities, including the preservation of open space and biological resources. The impacts of development projects will be offset in part, and the goals of the MSHCP furthered, by the imposition of the MSHCP fee and any other fee or mitigation requirements by the City.

Policies in the existing General Plan that reduce impacts to biological resources provide a robust framework for the evaluation of potential development projects and identify priority resources for conservation in the City and SOI, including sensitive resources addressed in the MSCHP. Further, the implementation programs identify ordinances and regulatory provisions through which these policies can be applied. However, additional development within the City and SOI would inevitably impact biological resources incrementally, although the impacts would be offset through mitigation requirements and fees imposed by the City.

Through its participation in the MSHCP, those species which are adequately conserved by the MSHCP will be addressed on a regional basis through implementation of the MSHCP. To supplement this, the City may identify MSHCP covered species of interest to conserve on a local basis outside the auspices of the MSHCP. It is recommended that the goals and policies in the General Plan identify species and resources and that are not covered by MSHCP, and those which are covered by the MSHCP but are not adequately conserved, and ensure that the conservation of these resources are prioritized.

Goals 10.1 through 10.11 of the existing General Plan identify resources to be protected that cover the key biological resources: water quality, wetlands, recharge areas, and floodplains; sensitive species of plants and animals; areas of priority habitat for sensitive species such as Temescal Canyon; wildlife corridors and linkages; sensitive natural communities; and soils known to support sensitive plants and native species. Moreover, the policies in Goal 10.7—*Ensure that biological resources are not impacted during or as a result of construction and development activity*—outline a series of steps to assess potential impacts from development projects and to ensure that impacts to ESA-listed and CESA-listed species are appropriately mitigated.

Expansion of the policies outlined in Goal 10.7 would allow ensure that impacts to biological resources that are not listed species are also property identified, analyzed, and mitigated. The series of recommended measures outline a series of assessments and actions which, if followed by proponents of development projects, provide guidance for evaluating potential project impacts and incorporating appropriate means to avoid, minimize, and/or mitigate project impacts in compliance with CEQA and conformance with the General Plan.

5.3.1 General Measures for Impact Assessments

As part of the project approval process, each future proposed development project should include an initial site assessment to determine if sensitive biological resources could be present within and/or adjacent to the proposed development project. Sensitive biological resources include special status species, sensitive natural communities, wetlands and jurisdictional waters, wildlife movement corridors and nursery sites, and the items identified in Appendix G of the CEQA Guidelines.

If no sensitive biological resources have a potential to occur within and/or adjacent to the proposed development project, the City may approve the proposed development project to proceed without further biological resource analyses.

If sensitive biological resources could be present within and/or adjacent to the proposed development project, the proposed development project must include an analysis to determine if sensitive biological resources would be impacted during implementation of the proposed development project. The following general biological mitigation measures would apply to future proposed development projects that have a potential to impact sensitive biological resources.

To comply with applicable regulations, these assessments should occur prior to the City's approval of any project, and before the implementation of development projects. In order to ensure avoidance and minimization of impacts to biological resources, evaluation of the potential for adverse impacts to biological resources should be conducted on a project-by-project basis. Each project proponent should be responsible for conducting an assessment of the potential for occurrence of, and impacts to, sensitive vegetation communities and special status species, as well as wildlife movement corridors and nursery sites.

5.3.2 Specific Measures

1. Applicants for future development projects shall include a biological resources survey. The biological resources survey shall be conducted by a qualified biologist. The biological resources survey shall include, but not be limited to:
    - An analysis of available literature and biological databases, such as the California Natural Diversity Database, to determine sensitive biological resources that have been reported historically from the proposed development project vicinity,
    - A review of current land use and land ownership within the proposed development project vicinity,
    - An assessment and mapping of vegetation communities present within the proposed development project vicinity,
    - An evaluation of potential local and regional wildlife movement corridors,
    - A general assessment of potential jurisdictional areas, including wetlands and riparian habitats
2. If the proposed development project site supports vegetation communities that may provide habitat for plant or wildlife species, a focused habitat assessment shall be conducted by a qualified biologist to determine the potential for special status plant and/or animal species to occur within or adjacent to the proposed development project area.
3. If one or more special status species has the potential to occur within the proposed development project area, focused species surveys shall be conducted to determine the presence/absence of these species to adequately evaluate potential direct and/or indirect impacts to these species.
4. If construction activities are not initiated immediately after focused surveys have been completed, additional pre-construction special status species surveys may be required to assure impacts are

avoided or minimized to the extent feasible. If pre-construction activities are required, a qualified biologist would perform these surveys as required for each special status species that is known to occur or has a potential to occur within or adjacent to the proposed development project area.

5. The results of the biological survey for proposed development projects with no significant impacts may be presented in a biological survey letter report. For proposed development projects with significant impacts that require mitigation to reduce the impacts to below a level of significance, the results of the biological survey shall be presented in a biological technical report.
6. If sensitive biological resources are identified within or adjacent to the proposed development project area, the construction limits shall be clearly flagged to assure impacts to sensitive biological resources are avoided or minimized to the extent feasible. Prior to implementing construction activities, a qualified biologist shall verify that the flagging clearly delineates the construction limits and sensitive resources to be avoided.
7. If sensitive biological resources are known to occur within or adjacent to the proposed development project area, a project-specific contractor training program shall be developed and implemented to educate project contractors on the sensitive biological resources within and adjacent to the proposed development project area and measures being implemented to avoid and/or minimize impacts to these species. A qualified biologist shall develop and implement the contractor training program.
8. If sensitive biological resources are present within or adjacent to the proposed development project area and impacts may occur from implementation of construction activities, a qualified biological monitor may be required during a portion or all of the construction activities to assure impacts to the sensitive biological resources are avoided or minimized to the extent feasible. The specific biological monitoring requirements shall be evaluated on a project-by-project basis. The qualified biological monitor shall be approved by the City on a project-by-project basis based on applicable experience with the sensitive biological resources that may be impacted by the proposed development project activities.
9. If birds that are covered under the MBTA are identified within or adjacent to the proposed development project area, the proposed development project may result in direct or indirect impacts to these species, especially during breeding season. If impacts cannot be avoided, potential impacts during the breeding season may be considered significant depending on the species and the extent of the impact. To ensure that active nests are not impacted, preconstruction general nesting bird surveys shall be conducted within all suitable nesting habitat that may be impacted by active construction during the general avian breeding season (February 1 through August 31). The pre-construction surveys shall be conducted no more than 7 days prior to initiation of construction. If no active avian nests are identified within the proposed development project area or within a 300-foot buffer of the proposed development project area, no further mitigation is necessary. If active nests of avian species covered by the MBTA are detected within the proposed development project area or within a 300-foot buffer of the proposed development project area, construction shall be halted until the young have fledged, until a qualified biologist has determined the nest is inactive, or until appropriate mitigation measures that respond to the specific situation have been developed and implemented in consultation with the regulatory agencies.

5.3.2.1 MEASURES FOR IMPACTS TO JURISDICTIONAL AREAS

Impacts to jurisdictional areas could be considered significant under CEQA depending on the extent of the proposed impact. Survey requirements and mitigation measures for unavoidable impacts to jurisdictional areas resulting from future proposed development projects are discussed below.

10. If the proposed development project has the potential to affect jurisdictional resources, a qualified biologist shall conduct a jurisdictional delineation following the methods outlined in the 1987 USACE Wetland Delineation Manual (USACE 1987) and the Regional Supplement to the USACE Wetland Delineation Manual: Arid West Region (USACE 2008) to map the extent of wetlands and non-wetland waters, determine jurisdiction, and assess potential impacts. The results of the delineation shall be presented in a wetland delineation report and shall be incorporated into the CEQA document(s) required for approval and permitting of the proposed development project.
11. If a proposed project would impact jurisdictional features, permits and authorizations shall be obtained from the USACE, CDFW, and/or RWQCB. The regulatory agency authorization(s) would include impact avoidance and minimization measures as well as mitigation measures for unavoidable impacts. Specific avoidance, minimization, and mitigation measures for impacts to jurisdictional resources shall be determined through discussions with the regulatory agencies during the proposed development project permitting process and may include monetary contributions to a mitigation bank or habitat creation, restoration, or enhancement.

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Appendix F Cultural Resources Report

Appendices

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CITY OF CORONA GENERAL PLAN UPDATE: CULTURAL RESOURCES TECHNICAL REPORT

December 2018

SUBMITTED TO

PlaceWorks

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Santa Ana, California 92707

SUBMITTED BY

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CITY OF CORONA GENERAL PLAN UPDATE: CULTURAL RESOURCES TECHNICAL REPORT

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1 INTRODUCTION

SWCA Environmental Consultants (SWCA) was retained by PlaceWorks, Inc. (PlaceWorks) to provide cultural resources services in support of the City of Corona General Plan Interim Technical Update and Environmental Analysis (project) for the City of Corona, Riverside County, California (City). SWCA performed a desktop analysis to assess cultural resources conditions throughout the City of Corona and its Sphere of Influence (SOI), and reviewed relevant technical documents and databases on cultural resources. This desktop research is summarized in this cultural resources technical report (CRTR), which documents the existing known cultural resources within the City and its SOI, herein referred to as the General Plan area. The interim technical update to the General Plan, which was last updated in 2004, will ensure that all technical data and policies remain current, and will guide decisions carried out by the City. The General Plan addresses an area encompassing the 39.2 square miles within the City boundaries and an additional 26.5 square miles within the SOI.

The City of Corona is located in Riverside County within the greater Inland Empire area (Figure 1). The City is bordered by Norco and Riverside to the north, the Santa Ana Mountains to the south and west, and El Cerrito to the east. The City has designated several sparsely inhabited spaces on the borders of the city as its "Sphere of Influence" (SOI). The City and its SOI are plotted in Township 3 South, Ranges 7 and 8 West; Township 4 South, Ranges 5, 6, 7, and 8 West; and Township 5 South, Ranges 5 and 6 West, as depicted on the U.S. Geological Survey (USGS) Prado Dam, Corona North, Riverside West, Black Star Canyon, Corona South, Lake Mathews, El Toro, Santiago Peak, and Alberhill California 7.5 minute quadrangles (Figure 2).

2 SETTING

2.1 Environmental Setting

The General Plan area is located in the southwestern California region, and more specifically, within the south coast subregion, at the western edge of Riverside County. This subregion was previously dominated by coastal scrub and chaparral communities but has recently been urbanized, resulting in a great loss of undisturbed habitat (Hickman 1993). Today, the General Plan area has generally hot, dry summers, with maximum temperatures ranging from 29 to 33 degrees Celsius (84 to 92 degrees Fahrenheit), and winter lows ranging from 0 to 7 degrees Celsius (32 to 44 degrees Fahrenheit) (Munz and Keck 1968:17). The average annual precipitation is 28 centimeters (11 inches), with most occurring between November and March. The uplands generally have a warm Mediterranean-type climate with occasional summer thundershowers. Due to the low quantity of precipitation, there is little natural perennial surface water in the watershed; the rivers do not typically convey large volumes of water. River flow today includes highly treated discharges from wastewater treatment plants, as well as urban and irrigation runoff.

The General Plan area is located within the Santa Ana River watershed, The Santa Ana River trends roughly northeast-southwest and runs through the northwest corner of Corona. One of the river's tributaries, the Temescal River trends northwest-southeast through the City. The Santa Ana River watershed covers an area that measures 2,840 square miles and encompasses 58 cities. The watershed receives water from the southern flanks of the San Gabriel and San Bernardino Mountains and the flanks of the several smaller hill ranges surrounding the Santa Ana River. Lake Elsinore is the only natural freshwater lake of any size within the watershed, and is located approximately 32 km (20 miles) south of the General Plan area.

Figure 1. General Plan vicinity.

In map

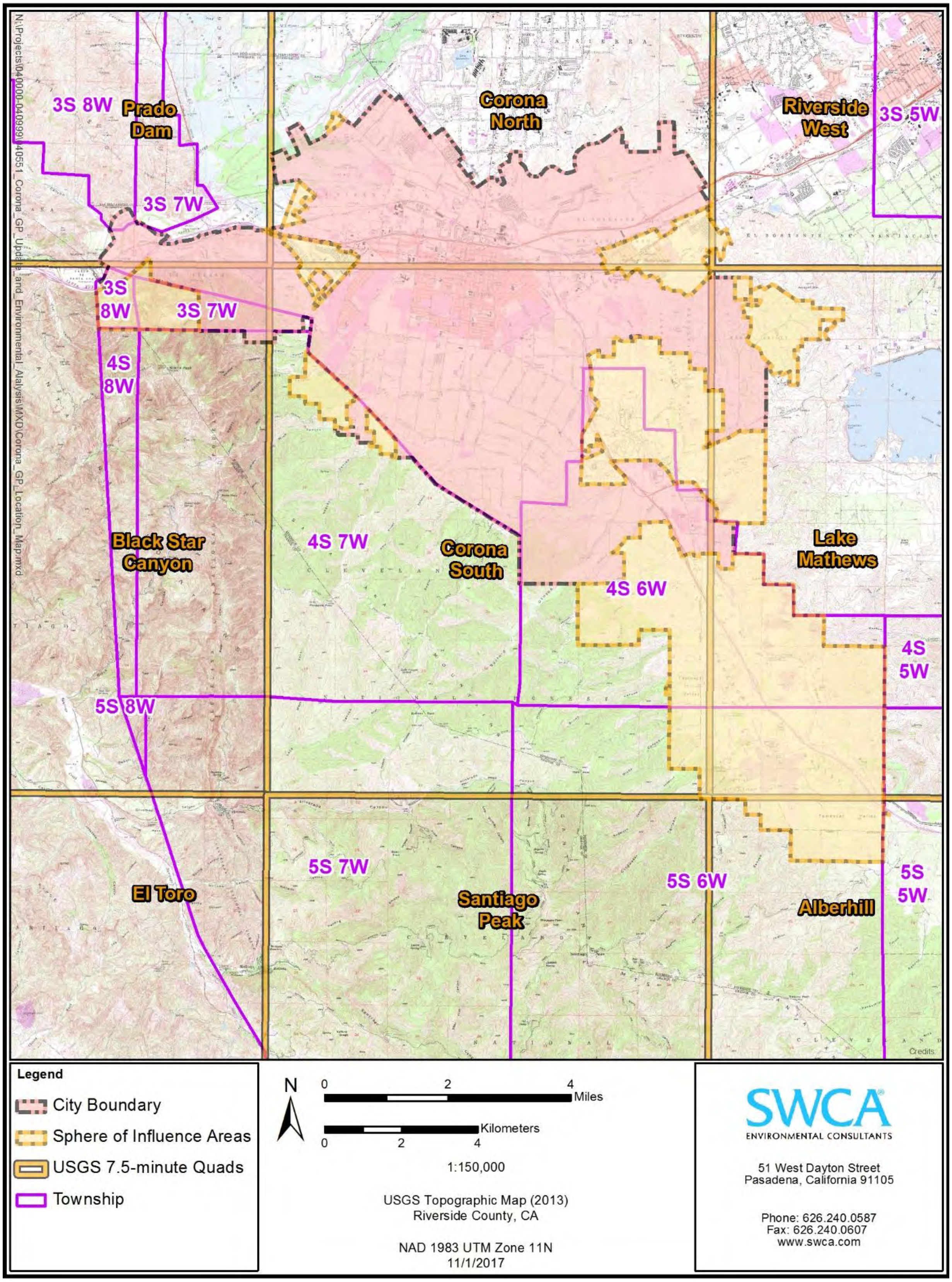

Figure 2. Corona and its Sphere of Influence shown on USGS Topographic maps.

Riverside County is positioned near the northern end of the Perris Block, which lies within the geomorphic province known as the Peninsular Ranges Province. Rivers in this province, including the Santa Ana River, drain westward into the Pacific Ocean.

The ecological setting within and adjacent to the General Plan area contains a mosaic of disturbed/developed areas and native vegetation communities. Though most of the uplands adjacent to the Santa Ana River have been developed and/or disturbed, there are remnant patches of upland habitat that indicate the range of habitats, and resources therein, that were likely available to the prehistoric inhabitants of the General Plan area vicinity.

Vegetation in the general vicinity of the General Plan area consists of the following communities: Coastal Sage Scrub, Coast Live Oak Woodland, Freshwater Marshland, Riparian Scrub/Woodland, Valley and Foothill Grassland, and Chaparral communities. More specifically these communities include those that likely existed near the General Plan area in the past. Several communities, particularly those located along the Santa Ana River channel, still exist today.

Wildlife species common to the vegetation communities in the vicinity of the General Plan area and available for exploitation by the local prehistoric peoples would have included mule deer (*Odocoileus hemionus*), cottontail (*Sylvilagus auduboni*), jackrabbit (*Lepus californicus*), and wood rats (*Neotoma* spp.); California quail (*Callipepla californica*), dove (*Zenaidura macroura*), and other birds including waterfowl, associated with the marshes; and various types of reptiles, amphibians, fish, and insects. Although pronghorn antelope (*Antilocapra americana*) were barely noted by Euro-American settlers (Sleeper 1982), they were quite common in 1769 throughout the plains and valleys when the Portolá expedition traveled through the region, whereas deer were less common (Brown 2001:308, 325). Predators included mountain lion (*Puma concolor*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), and gray fox (*Urocyon cinereoargenteus*).

2.2 Cultural Setting

2.2.1 Prehistoric Overview

Numerous chronological sequences have been devised to understand cultural changes for various areas within southern California over the past century. Building on early studies and focusing on data synthesis, Wallace (1955, 1978) developed a prehistoric chronology for the southern California coastal region applicable to near-coastal and many inland areas, including western Riverside County. Four periods are presented in Wallace's prehistoric sequence: Early Man, Milling Stone, Intermediate, and Late Prehistoric. Some revisions have been made to Wallace's 1955 synthesis using radiocarbon dates and projectile point assemblages (e.g., Koerper and Drover 1983; Koerper et al. 2002; Mason and Peterson 1994).

In addition to Wallace's classic summary, a regional synthesis developed by Warren (1968) will be referred to in the following discussion. This synthesis is supported by a larger archaeological database for southern California, which includes the advent and increased use of radiocarbon dating after the 1950s. Using the concepts of cultural ecology and cultural tradition, Warren (1968) proposed a series of six prehistoric traditions. Three of these traditions, the San Dieguito Tradition, Encinitas Tradition, and Campbell Tradition, correlate with Wallace's Early Man, Milling Stone, and Intermediate periods. The Chumash Tradition, Takic Tradition (formerly "Shoshonean"), and Yuman Tradition are represented within Wallace's Late Prehistoric period. As noted further, these ecologically based traditions are applicable to specific regions within southern California.

The summary of prehistoric chronological sequences for southern California presented below is a composite of information in Wallace (1955) and Warren (1968), as well as more recent studies, including Koerper and Drover (1983). The chronology formulated by Koerper and Drover (1983) is based on the results of their excavations at a multi-component village site (CA-ORA-119-A) near the University of California, Irvine, in Orange County.

2.2.1.1 EARLY MAN PERIOD/SAN DIEGUITO/PALEO-COASTAL (CA. 10,000–6000 B.C.)

Traditional models of California's prehistory hypothesize that the coastline was populated by Native Americans from the interior of North America during the end of the last Ice Age (Moratto 1984; Wallace 1978). The impact of post-Pleistocene climate change is thought to have caused Pleistocene lakes within the desert interior to dwindle, and cultures dependent on these lakes began exploiting a wider range of plant and animal species, eventually inhabiting the coast. When Wallace (1955) defined the Early Man period in the mid-1950s, there was little evidence of human presence on the southern California coast prior to 6000 B.C. Archaeological work over the past twenty years has challenged this traditional model and suggests that the settlement of southern California was more complex than previously thought and points to the development of sea travel technologies and a reliance on maritime resources in the early Holocene (Byrd and Raab 2007). Recent research has identified numerous older sites dating prior to 10,000 years ago, including sites on the coast and Channel Islands (e.g., Erlandson 1991; Johnson et al. 2002; Moratto 1984; Rick et al. 2001:609. The earliest accepted dates for occupation are from two of the northern Channel Islands, located off the coast of Santa Barbara. On San Miguel Island, Daisy Cave clearly establishes the presence of people in this area about 10,000 years ago (Erlandson 1991:105). On Santa Rosa Island, human remains have been dated from the Arlington Springs site to approximately 13,000 years ago (Johnson et al. 2002).

In what is now Orange County, there are sites dating from 9,000 to 10,000 years ago (Macko 1998a:41; Mason and Peterson 1994:55–57). Known sites dating to the Early Man period are rare in western Riverside County. One exception is the Elsinore site (CA-RIV-2798-B), which has deposits dating as early as 6630 cal B.C. (Grenda 1997:260).

Recent data from coastal and inland sites during this period indicate that the economy was a diverse mixture of hunting and gathering, with a major emphasis on aquatic resources in many coastal areas (e.g., Jones et al. 2002) and on Pleistocene lakeshores in eastern San Diego County (see Moratto 1984:90–92).

A Paleo-Coastal Tradition was proposed and recently referenced to highlight the distinctive marine and littoral focus identified within the southern California coastal archaeological record prior to the emergence of the Encinitas Tradition during the succeeding Milling Stone period (Mason and Peterson 1994:57–58; Moratto 1984:104). At coastal sites, there is abundant evidence that marine resources such as fish, sea mammals, and shellfish were exploited by Paleo-Coastal Tradition peoples.

At near-coastal and inland sites, it is generally considered that an emphasis on hunting may have been greater during the Early Man period than in later periods, although few Clovis-like or Folsom-like fluted points have been found in southern California (e.g., Dillon 2002; Erlandson et al. 1987). In Riverside County, only one isolated fluted point has been identified on the surface of a site in the Pinto Basin in the central part of the county (Campbell and Campbell 1935; Dillon 2002:113). Common elements in many San Dieguito Tradition sites include leaf-shaped bifacial projectile points and knives, stemmed or shouldered projectile points (e.g., Silver Lake and Lake Mojave series), scrapers, engraving tools, and crescents (Warren 1967:174–177; Warren and True 1961:251–254). Use of the atlatl (spear-throwing stick) during this period facilitated launching spears with greater power and distance. Subsistence patterns shifted around 6000 B.C. coincident with the gradual desiccation associated with the onset of the Altithermal, a warm and dry period that lasted for about 3,000 years. After 6000 B.C., a greater emphasis was placed on plant foods and small animals.

2.2.1.2 MILLING STONE PERIOD (CA. 6000–3000/1000 B.C.)

The Milling Stone period of Wallace (1955, 1978) and the Encinitas Tradition of Warren (1968) are characterized by an ecological adaptation to collecting, and by the dominance of the principal ground stone implements generally associated with the horizontal motion of grinding small seeds—namely, milling stones (metates, slabs) and hand stones (manos), which are typically shaped. Milling stones occur in large numbers for the first time, and are even more numerous near the end of this period. As testified by their toolkits and shell middens in coastal sites, people during this period practiced a mixed food-procurement strategy. Subsistence patterns varied somewhat as groups became better adapted to their regional or local environments.

Milling Stone period sites are common in the southern California coastal region between Santa Barbara and San Diego, and at many inland locations, including the Prado Basin in western Riverside County and the Pauma Valley in northeastern San Diego County (e.g., Herring 1968; Langenwalter and Brock 1985; Sawyer and Brock 1999; Sutton 1993). Wallace (1955, 1978) and Warren (1968) relied on several key coastal sites to characterize the Milling Stone period and Encinitas Tradition, respectively. These include the Oak Grove Complex in the Santa Barbara region, Little Sycamore in southwestern Ventura County, Topanga Canyon in the Santa Monica Mountains, and La Jolla in San Diego County. The Encinitas Tradition was proposed to extend into San Diego County, where it apparently continued alongside the following Campbell Tradition, which occurred primarily in the Santa Barbara–Ventura County region beginning around 3000 B.C.

Of the numerous Milling Stone period sites identified in the region, the most well-known is the Irvine site (CA-ORA-64), which has occupation levels dating between ca. 6000 and 4000 B.C. (Drover et al. 1983; Macko 1998b). Along coastal Orange County, Koerper and Drover (1983:11) mark the transition at the end of the Milling Stone around 1000 B.C., whereas Wallace's mid-1950s scheme has the period ending at 3000 B.C. Based on radiocarbon dates from the Newport Coast Archaeological Project (NCAP), Mason and Peterson (1994) propose a timeline for the Milling Stone similar to that advanced by Koerper and Drover (1983). The chronological schemes advanced for coastal Orange County also apply to many southern California near-coastal and inland areas, including much of western Riverside County.

During the Milling Stone period and Encinitas Tradition, stone chopping, scraping, and cutting tools are abundant, and generally made from locally available raw material. Projectile points, rather large and generally leaf-shaped, and bone tools, including awls, are generally rare. The large points are associated with the spear, and probably with an atlatl. Items made from shell, including beads, pendants, and abalone dishes, are generally rare. Evidence of weaving or basketry is present at a few sites. Cogged stones and discoidals are often purposefully buried or "cached," and are found mainly in sites along the coastal drainages from southern Ventura County southward, with a few specimens inland at Cajon Pass, and in abundance at some Orange County sites (Dixon 1968:63; Moratto 1984:149). Kowta (1969) attributes the presence of numerous scraper-planes in Milling Stone sites to the preparation of agave or yucca for food or fiber. The mortar and pestle, associated with the vertical motion of pounding foods, such as acorns, were introduced during the Milling Stone, but are not common.

Two types of artifacts that are considered diagnostic of the Milling Stone period are the cogged stone and discoidal, most of which have been found within sites dating between 4000 and 1000 B.C. (Moratto 1984:149). The cogged stone is best described as a ground stone object that has variant forms of gear-like teeth on the perimeter, which is produced from a variety of materials. The function of cogged stones is unknown, but has been interpreted as ritualistic or ceremonial in nature (Dixon 1968:64-65; Eberhart 1961:367). Similar to cogged stones, discoidals are found in the archaeological record subsequent to the introduction of the cogged stone. Both discoidals and cogged stones have been found together at some Orange County sites, such as CA-ORA-83/86/144 (Van Bueren et al. 1989:772), CA-ORA-950 (Ron Bissell, personal communication 1999), and Los Cerritos Ranch (Dixon 1975 in Moratto 1984:150).

Koerper and Drover (1983) suggest that Milling Stone period sites represent migratory settlement patterns of hunters and gatherers who used marine resources during the winter and inland resources the remainder of the year. More recent research indicates that residential bases or camps were moved to resources seasonally (de Barros 1996; Koerper et al. 2002; Mason et al. 1997; Tuma 2004), or that some sites were occupied year-round with portions of the village population leaving at certain times of the year to exploit available resources (Cottrell and Del Chario 1981). Regardless of settlement system, it is clear that subsistence strategies during the Milling Stone period included the following: hunting of small and large terrestrial mammals, sea mammals, and birds; collecting shellfish and other shore species; extensive use of seed and plant products; the processing of yucca and agave; and nearshore fishing with barbs or gorges (Kowta 1969; Reinman 1964; Tuma 2004). As evidenced by the abundant milling equipment found at these sites throughout the region, the processing of small seeds was an important component of their subsistence practices.

Characteristic mortuary practices during the Milling Stone period or Encinitas Tradition include extended and loosely flexed burials, some with red ochre, and few grave goods such as shell beads and milling stones interred beneath cobble or milling stone cairns. "Killed" milling stones, exhibiting holes, may occur in the cairns. Reburials are common in the Los Angeles County area, with flexed burials oriented to the north common in Orange and San Diego Counties. Evidence of wattle-and-daub structures and walls have been identified at some sites in the San Joaquin Hills and Newport Coast area spanning all cultural periods (Koerper 1995; Mason et al. 1991, 1992, 1993; Strudwick 2004).

2.2.1.3 INTERMEDIATE PERIOD (CA. 3000/1000 B.C.–A.D. 500/650)

Following the Milling Stone, Wallace's Intermediate period and Warren's Campbell Tradition in Santa Barbara, Ventura, and parts of Los Angeles Counties, date from approximately 3000 B.C. to A.D. 500 and are characterized by a shift toward a hunting and maritime subsistence strategy, along with a wider use of plant foods. The Campbell Tradition (Warren 1968) incorporates David B. Rogers' (1929) Hunting Culture and related expressions along the Santa Barbara coast. In the San Diego region, the Encinitas Tradition (Warren 1968) and the La Jolla Culture (Moriarty 1966; M. Rogers 1939, 1945) persist with little change during this time.

Temporal placement of the Intermediate is generally recognized as ranging between 3000 B.C. and A.D. 500 (Wallace 1955; Warren 1968). In Orange County, researchers have estimated the Intermediate period began around 1000 B.C. and lasted until ca. A.D. 650 (3000–1300 B.P.) (Koerper and Drover 1983:11; Mason and Peterson 1994). A more recent evaluation, based on some 1,300 calibrated radiocarbon dates from sites in Orange County, suggests a date of 1400 B.C. for the start of the Intermediate, marked by single-piece circular fishhooks and coinciding with the transition from the Middle to Late Holocene (Koerper et al. 2002:67–68). Another researcher sees the Intermediate not as a cultural period, but as a transition between the Milling Stone and the later Late Prehistoric period based on his investigations at sites in the Bonita Mesa area near upper Newport Bay (Peterson 2000). This idea may simply reflect sub-regional or area-specific trends at sites in and around Newport Bay rather than an accurate depiction of the cultural period dynamics in Orange County and the greater southern California region.

Although sites in the Prado Basin and Perris Reservoir area have cultural components that date to this period (Bettinger 1974:160; Grenda 1995:25), the Intermediate period in western Riverside County is still not as well understood as it is in coastal areas (e.g., Van Bueren et al. 1986:11). The following discussion is thus based mainly on information gathered from coastal and near-coastal sites in southern California.

During the Intermediate period, there is a pronounced trend toward greater adaptation to regional or local resources. For example, the remains of fish, land mammals, and sea mammals are increasingly abundant and diverse in sites along the California coast in the referenced region. Related chipped stone tools suitable for hunting are more abundant and diversified, and shell fishhooks become part of the toolkit during this period. Larger knives, a variety of flake scrapers, and drill-like implements are common during this period. Projectile points include large side-notched, stemmed, and lanceolate or leaf-shaped forms. Koerper and Drover (1983) consider Gypsum Cave and Elko series points, which have a wide distribution in the Great Basin and Mojave deserts between ca. 2000 B.C. and A.D. 500, to be diagnostic of this period. Bone tools, including awls, are more numerous than in the preceding period, and the use of asphaltum adhesive is now common.

Mortars and pestles become more common during this period, gradually replacing manos and metates as milling stone implements. In addition, hopper mortars and stone bowls, including steatite vessels, appear to enter the toolkit at this time. This shift appears to correlate with a diversification in subsistence resources. Many archaeologists believe this change in milling stones signals a shift away from the processing and consumption of hard seed resources to the increasing importance of the acorn (e.g., Glassow et al. 1988; True 1993). It has been argued that mortars and pestles may have been used initially to process roots (e.g., tubers, bulbs, and corms associated with marshland plants), with acorn processing beginning at a later point in prehistory (Glassow 1997:86) and continuing to European contact.

Characteristic mortuary practices during the Intermediate period include fully flexed burials, placed face down or face up, and oriented toward the north or west (Warren 1968:2–3). Red ochre is common, and abalone shell dishes are infrequent. Interments sometimes occurred beneath cairns or broken artifacts. Shell, bone, and stone ornaments, including charmstones, are more common than in the preceding Encinitas Tradition. Some later sites include Olivella shell and steatite beads, mortars with flat bases and flaring sides, and a few small points. The broad distribution of steatite from the Channel Islands and obsidian from distant inland regions, among other items, attest to the growth of trade, particularly during the later part of this period.

2.2.1.4 LATE PREHISTORIC PERIOD (CA. A.D. 500/650–1769)

Wallace (1955, 1978) places the beginning of the Late Prehistoric around A.D. 500. In Orange County, the start of this period is recognized at a slightly later date, ca. A.D. 650 (Koerper and Drover 1983; Mason and Peterson 1994). In all chronological schemes for southern California, the Late Prehistoric period lasts until significant European settlements were initiated in A.D. 1769.

During the Late Prehistoric period, there was an increase in the use of plant food resources in addition to an increase in land and sea mammal hunting. There was a concomitant increase in the diversity and complexity of material culture during this period, demonstrated by more classes of artifacts. The recovery of a greater number of small, finely chipped projectile points, usually stemless with convex or concave bases, suggests an increased utilization of the bow and arrow rather than the atlatl and dart for hunting. In Orange County, Cottonwood series triangular projectile points in particular are diagnostic of this period (Koerper and Drover 1983). Other items include steatite cooking vessels and containers, the increased presence of smaller bone and shell circular fishhooks, perforated stones, arrow shaft straighteners made of steatite, a variety of bone tools, and personal ornaments made from shell, bone, and stone. There is also an increased use of asphalt for waterproofing and as an adhesive.

During the Late Prehistoric, sites contain beautiful and complex objects of utility, art, and decoration. Ornaments include drilled whole chione (venus clam) and drilled abalone. Steatite effigies become more common, with pecten shell rattles common in middens. In Orange County, for example, pecten shell rattles are concentrated in the Late Prehistoric midden at CA-ORA-119A, and other time-sensitive artifacts, including abalone ornaments and drilled Chione shells, are also present (Koerper and Drover 1983:19–20). Most of the rock art found today in the Chumash sphere is thought to date to this period. Mortuary customs are elaborate, including cremation and interment, with abundant grave goods.

By A.D. 1000, fired clay smoking pipes and ceramic vessels begin to appear at some sites (Meighan 1954; Warren and True 1984). The scarcity of pottery in coastal and near-coastal sites implies ceramic technology was not well developed in that area, or that ceramics were obtained by trade with neighboring groups to the south and east. The lack of widespread pottery manufacture is usually attributed to the high quality of tightly woven and watertight basketry that functioned in the same capacity as ceramic vessels.

Another feature typical of Late Prehistoric period occupation is an increase in the frequency of obsidian imported from the Obsidian Butte source in Imperial County, California. Obsidian Butte was exploited after ca. A.D. 1000 after its exposure by the receding waters of Holocene Lake Cahuilla (Wilke 1978). A Late Prehistoric period component of the Elsinore site (CA-RIV-2798-A) produced two flakes that originated from Obsidian Butte (Grenda 1997:255; Towner et al. 1997:224-225). Although about 16 percent of the debitage at the Peppertree site (CA-RIV-463) at Perris Reservoir is obsidian, no sourcing study was done (Wilke 1974:61). The site contains a late Intermediate to Late Prehistoric period component and it is assumed that most of the obsidian originated from Obsidian Butte. In the earlier Milling Stone and Intermediate periods, most of the obsidian found at sites within Orange County and many inland areas came from northern sources, mostly the Coso volcanic field. This also appears to be the case within Prado Basin and other interior sites that have yielded obsidian (e.g., Grenda 1995:59; Taşkiran 1997:46). The presence of Grimes Canyon (Ventura County) fused shale at southern California archaeological sites is also thought to be typical of the Late Prehistoric period (Demcak 1981; Hall 1988).

During this period, there is an increase in population size accompanied by the advent of larger, more permanent villages (Wallace 1955:223). Large populations and, in places, high population densities are characteristic, with some coastal and near-coastal settlements containing as many as 1,500 people. Many of the larger settlements were permanent villages, where people resided year-round. The populations of these villages may have also increased seasonally.

In Warren’s (1968) cultural ecological scheme, the period between A.D. 500 and European contact is divided into three regional patterns. The Chumash Tradition is present mainly in the region of Santa Barbara and Ventura Counties; the Takic or Numic Tradition in the Los Angeles, Orange, and western Riverside Counties region; and the Yuman Tradition in the San Diego region. The seemingly abrupt changes in material culture, burial practices, and subsistence focus at the beginning of the Late Prehistoric period are considered the result of a migration to the coast of peoples from inland desert regions to the east. In addition to the small triangular and triangular side-notched points similar to those found in the desert regions in the Great Basin and Lower Colorado River, Colorado River pottery and the introduction of cremation in the archaeological record are diagnostic of the Yuman Tradition in the San Diego region. This combination certainly suggests a strong influence from the Colorado Desert region.

In Los Angeles, Orange, and western Riverside Counties, similar changes (introduction of cremation, pottery, and small triangular arrow points) are considered the result of a Takic migration to the coast from inland desert regions. This Takic or Numic Tradition was formerly referred to as the “Shoshonean wedge” or “Shoshonean intrusion” (Warren 1968). This terminology, used originally to describe a Uto-Aztecan language group, is generally no longer used in order to avoid confusion with ethnohistoric and modern Shoshonean groups who spoke Numic languages (Heizer 1978:5; Shipley 1978:88, 90). Modern Gabrielino, Juaneño, and Luiseño in this region are considered the descendants of the prehistoric Uto-Aztecan, Takic-speaking populations that settled along the California coast during this period, or perhaps somewhat earlier.

2.2.2 Ethnographic Overview

The General Plan area is located within an ethnographic transition zone between three Native American groups: the Juaneño, the Gabrielino, and the Cahuilla. All three groups are speakers of Takic languages, which are part of the Uto-Aztecan linguistic stock. Since the City of Corona and the SOI occupy a transitional zone among these groups, it is necessary to consider all three groups to fully understand the occupation history of the area.

2.2.2.1 GABRIELINO

The City of Corona is located within the Gabrielino territory, (Bean and Smith 1978:538; Kroeber 1925:Plate 57). Surrounding native groups include the Chumash and Tatataviam/Alliklik to the north, the Serrano to the East, and the Luiseño/Juaneño to the south. There is well-documented interaction between the Gabrielino and many of their neighbors in the form of intermarriage and trade.

The name Gabrielino (sometimes spelled Gabrieleno or Gabrieleño) denotes those people who were administered by the Spanish from Mission San Gabriel. By the same token, Native Americans in the sphere of influence of Mission San Fernando were historically referred to as Fernandeño (Kroeber 1925). This group is now considered to be a regional dialect of the Gabrielino language, along with the Santa Catalina Island and San Nicolas Island dialects (Bean and Smith 1978). In the post-Contact period, Mission San Gabriel included natives of the greater Los Angeles area, as well as members of surrounding groups such as Kitanemuk, Serrano, and Cahuilla. There is little evidence that the people we call Gabrielino had a broad term for their group; rather, they identified themselves as an inhabitant of a specific community through the use of locational suffixes (e.g., a resident of Yaanga was called a Yabit, much the same way that a resident of New York is called a New Yorker) (Dakin 1978:222).

Native words that have been suggested as labels for the broader group of Native Americans in the Los Angeles region include Tongva (or Tong-v) and Kizh (Kij or Kichereno); although there is evidence that these terms originally referred to local places or smaller groups of people within the larger group that we now call Gabrielino (Heizer 1968). The term Gabrielino, which combines the most commonly used group names, is used in the remainder of this study to designate native people of the Los Angeles Basin and their descendants.

Gabrielino lands encompassed the greater Los Angeles Basin and three Channel Islands: San Clemente, San Nicolas, and Santa Catalina. Their mainland territory was bounded on the north by the Chumash at Topanga Creek, the Serrano at the San Gabriel Mountains in the east, and the Juaneño on the south at Aliso Creek (Bean and Smith 1978:538; Kroeber 1925:636).

The Gabrielino language, as well as that of the neighboring Juaneño/Luiseño, Tatataviam/Alliklik, and Serrano, belongs to Takic branch of the Uto-Aztecan language family, which can be traced to the Great Basin area (Mithun 2004). This language family's origin differs substantially from that of the Chumash to the north and the Ipai, Tipai, and Kumeyaay farther south. The language of the Ipai, Tipai, and Kumeyaay is derived from the California-Delta branch of the Yuman-Cochimi language family, which originated in the American Southwest (Mithun 2004:577). The Chumash language is unlike both the Yuman-Cochimi and Uto-Aztecan families, and may represent a separate lineage (Mithun 2004:390). Linguistic analysis suggests that Takic-speaking immigrants from the Great Basin area began moving into southern California around 500 B.C. (Kroeber 1925:579). This migration may have displaced both Chumashan- and Yuman-speaking peoples, but the timing and extent of the migrations and their impact on indigenous peoples is not well understood. The Gabrielino language consisted of two main dialects, Eastern and Western; the Western included much of the coast and the Channel Island population (King 2004). Lands of the Western group encompassed much of the western Los Angeles Basin and San Fernando Valley, northward along the coast to the Palos Verdes Peninsula (McCawley 1996:47).

Gabrielino society was organized along patrilineal non-localized clans, a characteristic Takic pattern. Clans consisted of several lineages, each with their own ceremonial leader. The chief, or tómyaar, always came from the primary lineage of the clan/village. One or two clans generally made up the population of a village. Even though the Gabrielino did not have a distinctly stratified society, there were two general classes of individuals: elites and commoners. The elites consisted of primary lineage members, other lineage leaders (who maintained a separate ceremonial language), the wealthy, and the elite families of the various villages who commonly married among themselves. The commoner class contained those from "fairly well-to-do and long-established lineages" (Bean and Smith 1978:543). A third, lower class consisted of slaves taken in war and individuals, unrelated to the inhabitants, who drifted into the village.

The Gabrielino established large, permanent villages in the fertile lowlands along rivers and streams, and in sheltered areas along the coast, stretching from the foothills of the San Gabriel Mountains to the Pacific Ocean. A total tribal population has been estimated of at least 5,000 (Bean and Smith 1978:540), but recent ethnohistoric work suggests that a number approaching 10,000 seems more likely (O'Neil 2002). Several Gabrielino villages appear to have served as trade centers, due in large part to their centralized geographic position in relation to the southern Channel Islands and to other tribes. These villages maintained particularly large populations and hosted annual trade fairs that would bring their population to 1,000 or more for the duration of the event (McCawley 1996:113–114).

Houses constructed by the Gabrielino could hold up to 50 people and were large, circular, domed structures made of willow poles thatched with tule (Bean and Smith 1978). Other structures served as sweathouses, menstrual huts, ceremonial enclosures, and probably communal granaries. Cleared fields for races and games such as lacrosse and pole throwing were created adjacent to Gabrielino villages (McCawley 1996:27).

The Gabrielino subsistence economy was centered on gathering and hunting. The surrounding environment was rich and varied, and the tribe exploited mountains, foothills, valleys, and deserts as well as riparian, estuarine, and open and rocky coastal eco-niches. As with most native Californians, acorns were the staple food (an established industry by the time of the early Intermediate period). Acorns were supplemented by the roots, leaves, seeds, and fruits of a wide variety of flora (e.g., islay, cactus, yucca, sages, and agave). Fresh and saltwater fish, shellfish, birds, reptiles, and insects as well as large and small mammals were also consumed (Bean and Smith 1978:546; Kroeber 1925:631–632; McCawley 1996:119–123, 128–131).

A wide variety of tools and implements was employed by the Gabrielino to gather and collect food resources. These included the bow and arrow, traps, nets, blinds, throwing sticks and slings, spears, harpoons, and hooks. Many plant foods were collected with woven seed beaters, several forms of burden baskets, carrying nets, and sharpened digging sticks, sometimes with stone weights fitted onto them. Groups residing near the ocean used ocean-going plank canoes (known as a ti'at) and tule balsa canoes for fishing, travel, and trade between the mainland and the Channel Islands. The ocean-going canoes were capable of holding six to 14 people and were also used for travel and trade between the mainland and the Channel Islands. The tule balsa canoes were used for near-shore fishing (Blackburn 1963; McCawley 1996:117-127).

Gabrielino people processed food with a variety of tools, including portable and bedrock mortars, pestles, basket hopper mortars, manos and metates, hammerstones and anvils, woven strainers and winnowers, leaching baskets and bowls, woven parching trays, knives, bone saws, and wooden drying racks. Food was consumed from a number of woven and carved wood vessels. The ground meal and unprocessed hard seeds were stored in large, finely woven baskets, and the unprocessed acorns were stored in large granaries woven of willow branches and raised off the ground on platforms. Santa Catalina Island steatite was used to make comals, ollas, and cooking vessels that would not crack after repeated firings. In addition to cooking vessels, steatite was used to make effigies, ornaments, and arrow straighteners (Blackburn 1963; Kroeber 1925:631-639; McCawley 1996:129-138).

The Gabrielino participated in an extensive exchange network, trading coastal goods for inland resources. They exported Santa Catalina Island steatite products, roots, seal and otter skins, fish and shellfish, red ochre, and lead ore to neighboring tribes, as well as people as far away as the Colorado River. In exchange they received ceramic goods, deer skin shirts, obsidian, acorns, and other items. This burgeoning trade was facilitated by the use of craft specialists, a standard medium of exchange (Olivella bead currency), and the regular destruction of valuables in ceremonies that maintained a high demand for these goods (McCawley 1996:112-115).

At the time of Spanish contact, the basis of Gabrielino religious life was the Chinigchinich cult, which centered on the last of a series of heroic mythological figures. Chinigchinich gave instruction on laws and institutions, and also taught the people how to dance, the primary religious act for this society. He later withdrew into heaven, where he rewarded the faithful and punished those who disobeyed his laws (Kroeber 1925:637–638). The Chinigchinich religion seems to have been relatively new when the Spanish arrived. It was spreading south into the Southern Takic groups even as Christian missions were being built, and may represent a mixture of native and Christian belief and practices (McCawley 1996:143–144).

Deceased Gabrielino were either buried or cremated, with inhumation reportedly being more common on the Channel Islands and the neighboring mainland coast, and cremation predominating on the remainder of the coast and in the interior (Harrington 1942; McCawley 1996:157). Remains were buried in distinct burial areas, either associated with villages (Altschul et al. 2007:34-42) or without apparent village association (Applied Earthworks 1999; Frazier 2000:169-176). Cremation ashes have been found in archaeological contexts buried within stone bowls and in shell dishes (Ashby and Winterbourne 1966), as well as scattered among broken ground stone implements (Altschul et al. 2007; Cleland et al. 2007). Archaeological data such as these correspond with ethnographic descriptions of an elaborate mourning ceremony that included a wide variety of offerings, including seeds, stone grinding tools, otter skins, baskets, wood tools, shell beads, bone and shell ornaments, and projectile points and knives (Boscana 1846:314). Offerings varied with the sex and status of the deceased (Dakin 1978:234-235; Johnston 1962:52-54; McCawley 1996:155-165). At the behest of the Spanish missionaries, cremation essentially ceased during the post-Contact period (McCawley 1996:157). For inhumations, the deceased was wrapped in a covering, bound head to foot, with hands crooked upon their breast (Dakin 1978:234). Archaeological examples of human remains in the Gabrielino region dating to the Late Prehistoric and protohistoric periods are dominated by flexed or extended inhumations, with a smaller number of cremations. Gravegoods associated with burials/cremations varied in quantity and content and included projectile points, beads, steatite objects, and asphaltum (Fraizer 2000:175). Well-preserved burial features have evidence of wrappings of net, hide blanket or cape, or a mat of tule reeds or sea grass (McCawley 1996:157). At least one formal grave marker, an elaborately etched sandstone slab, was reported in 1885 at a site between Los Angeles and the coast, near San Pedro (Blackburn 1963:35).

2.2.2.2 JUANEÑO/ACJACHEMEN

The City of Corona is located northwest of the border of the traditional Juaneño territory which was surrounded by the Luiseño to the south, the Gabrielino to the north, and the Cahuilla to the west. Juaneño denotes people who were administered during Spanish Colonial times by Mission San Juan Capistrano (Bean and Shipek 1978; Kroeber 1925). Many contemporary Juaneño and coastal Luiseño identify themselves as descendants of the indigenous people living in the local area, termed the Acjachemen Nation.

The Juaneño and Luiseño languages, like the Gabrieleno/Tongva languages, are dialects of one another. These languages were derived from the Takic family, part of the Uto-Aztecan linguistic stock. By contrast, the Chumash language, from north of the Gabrielino, is not related to any other known Native American language family or stock, representing an origin quite different from that of the Juaneño (Mithun 2004). North of the Chumash and south of the Luiseño are languages considered part of the Hokan linguistic stock, namely the Salinan language to the north, and the Yuman family of languages to the south.

The Yuman family of languages is derived from the American Southwest, while the Takic family can be traced to the Great Basin area (Driver 1969). Linguistic analysis has established that the Hokan speakers of San Diego County and those found north of the Chumash were separated sometime after 500 B.C. The implication is that most of the southern California coastal region (excepting Chumash) was once filled with Hokan speakers, who were separated and displaced by Takic-speaking immigrants from the Great Basin area. The timing, extent, and impact on local societies of this putative migration are not well understood, and any data related to it represent a contribution to the understanding of local prehistory and history.

The Juaneño, or *Acjachemen*, population prior to European contact is thought to have numbered upwards of 3,500 (O'Neil 2002). It is known that 1,138 local Native Americans, consisting primarily of Acjachemen but including Gabrielino, coastal and interior Luiseño, Serrano, and Cahuilla, resided at Mission San Juan Capistrano in the year 1810 (Engelhardt 1922:175). The mission's death register shows as many as 1,665 Native American burials in its cemetery by this time, a number in addition to those who were dying at the villages from natural causes and introduced infectious diseases.

The Juaneño resided in permanent, well-defined villages and associated seasonal camps. Each village contained from 35 to 400 persons, who typically belonged to a single lineage in the smaller villages, and a dominant clan joined with other families of multiple lineage background in the larger towns. As Boscana said of the Acjachemen, "all the rancherias were composed of a single relationship" (Harrington 1934:32). Each clan/village had its own resource territory and was politically independent, yet maintained ties to others through economic, religious, and social networks in the immediate region.

Nuclear families resided in dome-shaped dwellings (*kish*) made of willow poles covered with interlaced tule reeds. The chief's residence was generally larger in order to accommodate his large family, ceremonial regalia, and ceremonial food processing. Other village structures included a ceremonial enclosure (*wamkech*), a semi-subterranean sweat lodge, and menstrual huts. Simple lean-tos were constructed in the upper foothills during acorn harvest season. The ceremonial enclosure and the chief's home were generally located in the center of the village.

There were three hierarchical social classes: an elite class consisting of chiefly families, lineage heads, and other ceremonial specialists; a "middle class" of established and successful families; and, finally, people of disconnected or wandering families and war captives (Bean 1976:109–111). Native leadership focused in the *Nota*, or clan chief, who conducted community rites and regulated ceremonial life in conjunction with a council of elders (*puuplem*) composed of lineage heads and ceremonial specialists. The council discussed and decided matters of community import; those decisions were then implemented by the Nota and his staff.

The hereditary village chief held an administrative position that combined and controlled religious, economic, and warfare powers. While the placement of residential huts in a village was not regulated, a contemporary census study would likely have shown family groupings. The ceremonial enclosure (*vanquesh*) and the chief's home could generally be found in the center of the village. As Boscana states:

> The temples … were invariably erected in the center of their towns, and contiguous to the dwelling-place of the captain, or chief; … they managed to have the location of his house as near the middle as possible. (Boscana 1978:37)

The village chief had a formal assistant, who acted as messenger and had important religious duties. Ritual specialists and shamans, each with his own special area of knowledge about the environment or ritual magic, had hereditary membership on the council and the responsibility for training some successor from his own lineage or family who showed the proper innate abilities. Hence, intra- and inter-lineage affairs dominated the political landscape, both within and between villages.

Father Boscana, a priest at Mission San Juan Capistrano, recorded his observations of the local Native Americans. Kroeber (1925) describes Boscana's *Chinigchinich* as "the most intensive and best written account of the customs and religion of any group of California Indians in the mission days." Kroeber, drawing on Boscana (1978) and other sources, describes the Juaneño as having well-developed religious, ritual, and social customs.

Like the Gabrielino to the north, center of the Juaneño religion was Chinigchinich, the last of a series of heroic mythological figures. The heroes were originally from the stars and the sagas told of them formed the Juaneño religious beliefs. The most obvious expression of the religion at the time of arrival of the Spanish was the *wankech,* a brush-enclosed area where religious observances were performed. The wankech apparently contained an inner enclosure housing a representation of Chinigchinich, a coyote skin stuffed with feathers, horns, claws, beaks, and arrows.

Both boys and girls were subjected to rites of initiation around the age of puberty. The rites for males included use of datura extract, a hallucinogen, in the search for a spirit helper. Trials of endurance may also have been part of the ritual. Females had to endure being placed in a branch-lined pit containing heated stones. The girl being initiated fasted in the pit for several days. Females also were introduced to tattooing during the initiation period.

The Juaneño practiced both cremation and burial of the dead. Specific individuals who received compensation for their services managed the cremation. The death of at least those of higher rank was commemorated on the first anniversary. The Juaneño possessed a very accurate calendar. Complete knowledge of its exact working has been lost, but we do know that it combined both lunar and solar elements in a fashion similar to certain Southwestern practices.

As a strongly patrilineal society, residence was normatively patrilocal. However, use of the Family Reconstruction methodology with Mission San Juan Capistrano sacramental registers has revealed several births at the mother's village or third villages, notwithstanding a dominance of patrilocality (O'Neil 2002). Polygamy was practiced, but probably only by chiefs and puuplem with ceremonial positions who had larger economic roles within the community (Boscana 1978:44). Sororal polygamy is also seen in the Mission San Juan Capistrano records. Divorce was not easy, but possible; divorcees and widows could re-marry, the latter preferably to a classificatory "brother" of her deceased husband. Marriage was used as a mechanism of politics, ecology, and economics. Important lineages were allied through marriage. Reciprocally useful alliances were arranged between groups of differing ecological niches.

Plant foods were by far the largest part of the traditional diet. The following description is from the summary by Bean and Shipek (1978:552). Acorns were the most important single food source, and two species were used locally. Villages were situated near reliable sources of abundant water, as was necessary in part for the daily leaching of milled acorn products. As a dietary staple, acorn mush (*weewish*) was prepared in various ways and served as gruel, cakes, or fried; it might be sweetened with honey or sugar-laden berries; and it could be made into a stew with added greens and meat. Grass seeds were the next most abundant plant food used, and other plant foods included manzanita, sunflower, sage, chia, lemonade berry, wild rose, holly-leaf cherry, prickly pear, lamb's-quarter, and pine nuts. Seeds were parched, ground, and cooked as mush in various combinations (according to taste and availability) much like weewish. Such greens as thistle, lamb's-quarters, miner's lettuce, white sage, and clover were eaten raw or cooked, and were sometimes dried for storage. Cactus pods and fruits were also used. Thimbleberries, elderberries, and wild grapes were eaten raw or dried for later cooking. Cooked yucca buds, blossoms, and pods provided a sizable addition to the community's food resources. Bulbs, roots, and tubers were dug in the spring and summer and usually eaten fresh. Mushrooms and tree fungus provided significant food supplements and were prized as delicacies. Various teas were made from flowers, fruits, stems, and roots for medicinal cures and beverages.

Principal game animals included deer, rabbit, jackrabbit, wood rat, mice, ground squirrel, antelope, quail, dove, duck, and other birds. Most predators were avoided as food, as were tree squirrels and most reptiles. Trout and other fish were caught in the streams, while salmon were available as they ran in the larger creeks. Being predominantly a coastal people, the Juaneño and Luiseño made extensive use of marine foods in their diet. Sea mammals, fish, and crustaceans were obtained from the shoreline and open sea with the use of reed and dugout canoes. Shellfish were the most heavily used resource and included abalone, turban, mussel, and other species from the rocky shores; clams, scallops, and univalves from the sandy beaches; and chione and bubble shells, in addition to other species from the estuaries.

Raymond White (1962) proposed that for the coastal Juaneño and Luiseño, fish and marine animals accounted for variably 50–60 percent of the diet, and terrestrial game another 5–10 percent. Plant foods accounted for the remaining 30–60 percent, broken down by acorns 10–25 percent; seeds 5–10 percent; greens 5–10 percent; and bulbs, roots, and fruits 10–15 percent. These percentages would have varied as a reflection of village placement and size, the characteristics of its near surroundings, and annual variations in weather, sea temperature, and oceanic currents.

2.2.2.3 CAHUILLA

The City of Corona is located southwest of traditional Cahuilla territory which encompassed a large area and was bordered by eleven other Native American groups. the Evidence suggests the Cahuilla migrated to southern California about 2,000 to 3,000 years ago, most likely from the southern Sierra Nevada ranges of east-central California with other related socio-linguistic (Takic speaking) groups (Moratto 1984:559). The Cahuilla settled in a territory that extended west to east from the present-day city of Riverside to the central portion of the Salton Sea in the Colorado Desert, and south to north from the San Jacinto Valley to the San Bernardino Mountains. Though 60 percent of Cahuilla territory was in the Lower Sonoran Desert environment, 75 percent of their diet came from plant resources acquired in Upper Sonoran and Transition environmental zones (Bean 1978:576).

Cahuilla socio-political organization included three primary levels (Bean 1978:580). The highest level was the cultural nationality, encompassing everyone speaking a common language. Next were two patrimoieties called the Wildcats (*tuktum*) and the Coyotes (*'istam*); every clan of the Cahuilla belonged to one or the other. The third basic level of socio-political organization was the many political-ritual-corporate units called *sibs*, or patrilineal clans (Bean 1978:580). Lineages within a clan cooperated in many ways, including defense, communal subsistence activities, and religious ceremonies. Each lineage maintained ownership rights to various resource collecting locations, including food collecting, hunting, and other areas. The Cahuilla lived in a productive environment well suited to a sophisticated hunting and gathering economy. Studies suggest that aboriginal people in southern California improved the structure and productivity of the environment through controlled burning, selective harvesting and pruning, replanting, seed re-broadcast, and possibly limited irrigation (Bean and Lawton 1993). Limited agricultural practices for growing beans, squash, and corn had been adopted by the Cahuilla prior to Euro-American contact. Bean (1978:578) suggests that their "proto-agricultural techniques and a marginal agriculture" were adopted from the Colorado River groups to the east.

Spanish mission *asistencias* were established near Cahuilla territory at San Bernardino and San Jacinto by 1819. Interaction with Europeans was less intense in the Cahuilla region than for coastal groups because the topography and paucity of water rendered the inland area inhabited by the Cahuilla unattractive to colonists. By the 1820s, however, the Pass Cahuilla experienced consistent contact with the ranchos of Mission San Gabriel, whereas the Mountain Cahuilla frequently received employment from private rancheros and were recruited to Mission San Luis Rey.

Mexican ranchos were located near Cahuilla territory along the upper Santa Ana and San Jacinto rivers by the 1830s, providing the opportunity for the Cahuilla to earn money ranching and to learn new agricultural techniques. The expansion of immigrants into the region introduced the Cahuilla to European diseases. The single worst recorded event was a smallpox epidemic in 1862–1863. By 1891, only 1,160 Cahuilla remained within what was left of their territory, down from an aboriginal population estimated at 6,000 to 10,000 (Bean 1978:583–584). By 1974, approximately 900 people claimed Cahuilla descent; most resided on reservations.

Between 1875 and 1891, the United States established 10 reservations for the Cahuilla within their territory: Agua Caliente, Augustine, Cabazon, Cahuilla, Los Coyotes, Morongo, Ramona, Santa Rosa, Soboba, and Torres-Martinez (Bean 1978:585). Four of these reservations are shared with other Native American groups, including the Chemehuevi, Cupeño, and Serrano. The Cahuilla on the Morongo Reservation established the Malki Museum in 1965, which today is a respected repository for artifacts and ethnographic knowledge. The museum publishes books on Native American lifeways as well as the *Journal of California and Great Basin Anthropology.*

2.2.2.4 NATIVE AMERICAN VILLAGES NEAR THE PROJECT AREA

In general, it has proven very difficult or impossible to establish definitively the precise location of Native American villages occupied in the Ethnohistoric period (McCawley 1996:31–32). Native American placenames referred to at the time of Spanish contact did not necessarily represent a continually occupied settlement within a discrete location. Instead, in at least some cases, the communities were represented by several smaller camps scattered throughout an approximate geography, shaped by natural features subject to change over generations (see Johnston 1962:122). Many of the villages had long since been abandoned by the time ethnographers, anthropologists, and historians attempted to document any of their locations, at which point the former village sites were affected by urban and agricultural development, and Native American lifeways had been irrevocably changed. Alternative names and spellings for communities, and conflicting reports on their meaning or locational reference, further confound efforts at relocation. McCawley quotes Kroeber (1925:616) in his remarks on the subject, writing that "the opportunity to prepare a true map of village locations 'passed away 50 years ago'" (McCawley 1996:32). Thus, even with archaeological evidence, it can be difficult to conclusively establish whether any given assemblage represents the remains of the former village site.

Although the precise location of any given village is subject to much speculation, it is clear that the banks of the major stream courses were home to many Native American settlements and placenames. Similarly, foraging and seasonal camps surrounding springs would have almost certainly been a regular occurrence and correlate more regularly with archaeological assemblages (Dillon 1994:24–25). Other clues about the approximate locations of the communities have also been taken where associations were described between the village areas with specific ranchos or land grants, as well as prominent natural features within those approximate boundaries. McCawley (1996:32) cites Kroeber's (1925:616) description as seminal in his summary of the circumstance:

> The Indians of this region, Serrano, Gabrielino, and Luiseño, have long had relations to the old ranchos or land grants, by which chiefly the country was known and designated until the Americans began to dot it with towns. The Indians kept in use…native names for these grants. Some were the designations of the principal village on the grant, others of the particular spot on which the ranch headquarters were erected, still others of camp sites, or hills, or various natural features.

The closest ethnographically documented village to the General Plan area is known as Paxangna (alternative spellings and names include Paxauxa and Paxavxanga). Kroeber (1925) refers to the village being located along Temescal Creek; O'Neil and Evans (1980:229–230, 277) suggest the village was located further south. Harrington's informant Jesus Jauro described the area around Corona as having been known as Shiishonga, which McCawley notes is similar to Shiisho'vet, a placename Jose Zalvidea (another of Harrington's informants) located near Azusa (McCawley 1996:49).

2.2.3 Historic Overview

Post-Contact history for the state of California is generally divided into three specific periods: the Spanish period (1769–1822), the Mexican period (1822–1848), and the American period (1848–present). Although Spanish, Russian, and British explorers visited the area for brief periods between 1529 and 1769, the Spanish period in California begins with the establishment in 1769 of a settlement at San Diego and the founding of Mission San Diego de Alcalá, the first of 21 missions constructed between 1769 and 1823. Independence from Spain in 1821 marks the beginning of the Mexican period, and the signing of the Treaty of Guadalupe Hidalgo in 1848, ending the Mexican–American War, signals the beginning of the American period when California became a territory of the United States.

The first part of the following overview provides a brief history of post-contact California up to the American period. After this general overview, a more detailed consideration of the history of Corona is presented.

2.2.3.1 SPANISH PERIOD (1769–1822)

Spanish explorers made sailing expeditions along the coast of southern California between the mid-1500s and mid-1700s. In search of the legendary Northwest Passage, Juan Rodríguez Cabrillo stopped in 1542 at present-day San Diego Bay. With his crew, Cabrillo explored the shorelines of present Catalina Island as well as San Pedro and Santa Monica bays. Much of the present California and Oregon coastline was mapped and recorded in the next half-century by Spanish naval officer Sebastián Vizcaíno. Vizcaíno's crew also landed on Santa Catalina Island and at San Pedro and Santa Monica Bays, giving each location its long-standing name. The Spanish crown laid claim to California based on the surveys conducted by Cabríllo and Vizcaíno (Bancroft 1886:96–99; Gumprecht 1999:35).

More than 200 years passed before Spain began the colonization and inland exploration of Alta California. The 1769 overland expedition by Captain Gaspar de Portolá marks the beginning of California's Historic period, occurring just after the King of Spain installed the Franciscan Order to direct religious and colonization matters in assigned territories of the Americas. With a band of 64 soldiers, missionaries, Baja (lower) California Native Americans, and Mexican civilians, Portolá established the Presidio of San Diego, a fortified military outpost, as the first Spanish settlement in Alta California. In July of 1769, while Portolá was exploring southern California, Franciscan Fr. Junípero Serra founded Mission San Diego de Alcalá at Presidio Hill, the first of the 21 missions that would be established in Alta California by the Spanish and the Franciscan Order between 1769 and 1823.

A Spanish expedition led by Pedro Fages in 1772 was the first European group to travel in the vicinity of Lake Elsinore. Looking for deserters from the military post in San Diego, Fages crossed into the San Bernardino Valley from the southeast, crossing the Santa Ana River at what is now called the Pedley or Riverside Narrows, then heading north through the Cajon Pass and into the Mojave Desert (Hampson et al. 1988). In 1774, the expedition of Juan Bautista de Anza also traveled this route. His expedition opened an overland travel route from Sonora in the Mexican interior to Monterey in California. Following his first expedition, Anza returned to the region in 1775 leading a group of settlers recruited mainly from Sinaloa to found a mission and presidio in San Francisco (Brown and Boyd 1922; Rawls and Bean 2003).

The string of 21 California missions paralleled the coastline between San Diego and Sonoma. Near-coastal locations were preferred by the Spaniards for colonization because they were easier to defend and supply from ships, and were also bordered by populous Native American villages with potential converts. All of the missions contained churches, workshops, storehouses, soldiers' barracks, and quarters for Native

American neophytes. These new converts were used as labor, establishing and nurturing the mission orchards, gardens, vineyards, and pastures. At the missions, the padres exercised strict control over the Native American neophytes, and oversaw all economic activities of Spanish California, particularly directing agricultural activities, including slaughter of cattle, pigs, and sheep, and nearly all related commercial activity (Dallas 1955:3–4).

Mission San Juan Capistrano was established 1776 to fill the gap between Mission San Diego and Mission San Gabriel (Engelhardt 1922). The location the padres chose for Mission San Juan Capistrano was a coastal valley where the Elsinore Mountains meet the Pacific Ocean, within the territory of the Juaneño, the same Native American group that held Lake Elsinore at the time of European contact. The name Juaneño denotes the Mission San Juan Capistrano community of missionized Native Americans and their descendants (Bean and Shipek 1978; Kroeber 1925).

Spanish efforts to colonize and evangelize were continued by Mission San Luis Rey, which was established in 1798. The Luiseño—a Native American group closely related to and geographically adjacent to the Juaneño—derive their name from Mission San Luis Rey.

2.2.3.2 MEXICAN PERIOD (1822–1848)

A major emphasis during the Spanish period in California was the construction of missions and associated presidios to integrate the Native American population into Christianity and communal enterprise. Incentives were also provided to bring settlers to pueblos or towns, but just three pueblos were established during the Spanish period, only two of which were successful and remain as California cities (San José and Los Angeles). Several factors kept growth within Alta California to a minimum, including the threat of foreign invasion, political dissatisfaction, and unrest among the indigenous population. After more than a decade of intermittent rebellion and warfare, New Spain (Mexico and the California territory) won independence from Spain in 1821. In 1822, the Mexican legislative body in California ended isolationist policies designed to protect the Spanish monopoly on trade, and decreed California ports open to foreign merchants (Dallas 1955:14).

Extensive land grants were established in the interior during the Mexican period, in part to increase the population inland from the more settled coastal areas where the Spanish had first concentrated their colonization efforts. At the same time, the influence of the California missions waned in the late 1820s through the early 1830s. This decline resulted from a combination of outside events and pressures, including increasing hostility between missionaries and local civilians who demanded mission lands, decimation of the Native American population by introduced diseases, and the influence of private traders in the hide and tallow industry.

Chief among these circumstances was the adoption of the Secularization Act of 1833, by which the Mexican government privatized most of the Catholic Church's landholdings, including their California missions. By 1836, this sweeping process effectively reduced the California missions to parish churches and released their vast properties. Although earlier secularization schemes had called for redistribution of lands to Native American neophytes, who were responsible for the construction of the mission empire, the mission lands and livestock holdings were instead redistributed by the Mexican government through several hundred land grants to non–Native American ranchers (Langum 1987:15–18). The Mexican citizens who received the ranchos subsequently released their neophyte "workers" to fend for themselves.

During the supremacy of the ranchos (1834–1848), landowners largely focused on the cattle industry and devoted large tracts to grazing. Cattle hides became a primary southern California export, providing a commodity to trade for goods from the east and other areas in the United States and Mexico. The number of nonnative inhabitants increased during this period because of the influx of explorers, trappers, and ranchers associated with the land grants. The rising California population contributed to the introduction and rise of diseases foreign to the Native American population, who had no associated immunities. Large numbers of Native Americans in the Central Valley, for example, died from disease between 1830 and 1833, and disease exterminated whole tribes along the American, Merced, Tuolumne, and Yuba Rivers. The Central Valley was hit by a second epidemic in 1837, which further decimated indigenous Californians (Cook 1955).

2.2.3.3 AMERICAN PERIOD (1848–PRESENT)

War in 1846 between Mexico and the United States precipitated the Battle of Chino, a clash between resident Californios and Americans in the San Bernardino area. The Mexican-American War ended with the Treaty of Guadalupe Hidalgo in 1848, ushering California into its American period.

California officially became a state with the Compromise of 1850, which also designated Utah and New Mexico (with present-day Arizona) as U.S. Territories (Waugh 2003). Horticulture and livestock, based primarily on cattle as the currency and staple of the rancho system, continued to dominate the southern California economy through 1850s. The Gold Rush commenced in 1848, and with the influx of people seeking gold, cattle were no longer desired mainly for their hides, but also as a source of meat and other goods. During the 1850s cattle boom, rancho vaqueros drove large herds from southern to northern California to feed that region's burgeoning mining and commercial boom. Cattle were at first driven along major trails or roads such as the Gila Trail or Southern Overland Trail, then were transported by trains where available. The cattle boom ended for southern California as neighbor states and territories drove herds to northern California at reduced prices. Operation of the huge ranchos became increasingly difficult, and droughts severely reduced their productivity (Cleland 2005:102–103).

One year after discovering gold, nearly 90,000 people journeyed to the California gold fields. A portion of Captain John Sutter's Mexican land grant, known as *New Helvetia,* became the bustling Gold Rush boomtown of Sacramento. California became the 31st state in 1850 largely as a result of the Gold Rush. By 1853, the population of the state exceeded 300,000; Sacramento became the state capital in 1854.

Riverside County formed 40 years later in 1893, created from portions of nearby San Bernardino and San Diego Counties. The City of Riverside, located on the Santa Ana River channel, is the county seat and was founded in 1870. Part of California's "Inland Empire," many Riverside County residents work in and commute to the greater Los Angeles metropolitan area.

2.2.3.4 LOCAL HISTORY OF CORONA

In the early 1800s, lands within the City of Corona and its SOI were part of several Mexican land grants: Rancho La Sierra, Rancho Jurupa, Rancho El Rincon, and Rancho El Sobrante de San Jacinto. After Secularization, in 1838, Juan Bandini was appointed administrator of Mission San Gabriel and became overseer of the Mission and its holdings. He petitioned that same year to Governor Alvarado for ownership of Rancho Jurupa, an approximately 30,000 acre area of land. His request was granted on September 28, 1838 and became the first recognized Mexican land grant in Riverside County (Lech 2004:35). In 1839, Bandini petitioned for additional lands to the west, and was granted Rancho El Rincon, an approximate 4,500-acre holding. Long before Bernardo Yorba (1800-1858) acquired lands in the Corona area, he and his brothers were already pasturing herds to the east of their family's Rancho Santiago de Santa Ana. Yorba subsequently acquired that grazing land, but continued pasturing herds even farther east, in the Corona area. Yorba petitioned for this pasturage, as well, and was granted Rancho La Sierra (also called Rancho La Sierra de Santa Ana) by Pío Pico, the Mexican governor of Alta California, on June 15, 1846 (Lech 2004:47). The 17,769-acre land grant encompassed the site of the present-day City of Corona. To the southeast, Rancho El Sobrante de San Jacinto was granted on May 9, 1846 to Maria del Rosario Estudillo de Aguirre, who is said to have held more than 900 head of cattle on the rancho (Lech 2004:45).

Throughout the nineteenth century, the area that would become Riverside County was an important travel corridor from the interior of the continent to the California coast. During the Gold Rush, thousands of people traveled the Gila (or Southern Overland) Trail from Yuma to Temecula and on to Los Angeles. Thousands more traveled the Old Spanish Trail from Santa Fe across the Mojave Desert to Mission San Gabriel Arcángel and the Pueblo de Los Ángeles. The Butterfield Overland Mail Trail, a stagecoach service which delivered mail and passengers from St. Louis to San Francisco from 1858 to 1861, traversed the Temescal Valley along the same route as the Southern Emigrant Trail, with a station at Rancho Temescal south of Corona (Riverside County Regional Parks 2015). Wagon roads and railroads constructed across the Colorado and Mojave Deserts from the 1850s to the 1870s connected coastal California with the rest of the country. These modes of transport served to carry mail, prospectors, miners, entrepreneurs, merchants, immigrants, laborers, muleteers, settlers, and military personnel, as well as civilian and military supplies, livestock, produce, timber, and minerals produced by desert mines, among other necessities.

The origins of the City of Corona are closely linked to the advent of the railroad and the phenomenal Southern California real estate boom of the 1880s. The success of Los Angeles as a notable commercial center provided capital and local markets for agricultural products. For Southern California, the citrus industry would form the basis of a significant new sector of California's economy. Corona was originally founded in 1886 when Robert B. Taylor, Adolph Rimpau, George L. Joy, A.S. Garretson, and Samuel Merrill purchased 12,000 acres of agricultural land in what was then the southwestern San Bernardino County. The land was developed by the newly formed South Riverside Land and Water Company who established a railroad depot and irrigation systems (Holmes 1912:254). With the addition of an irrigation infrastructure the building blocks of the citrus industry were laid. The town was named South Riverside, a name which it kept until 1896.

During this period the city's iconic circular boulevard was laid out by a civil engineer known as H.C. Kellogg and R.B. Taylor. In 1896 the citizens of South Riverside voted to incorporate into newly developed Riverside County. In July of that year, residents voted to change the name from South Riverside to Corona, which means crown in Spanish or Latin (Bright 1998:43). According to Gudde (1959:20), Corona was so named because of the circular drive surrounding the city (at that time) which was the site of spectacular auto races between 1913 and 1916. This circular concrete thoroughfare was 60 feet wide and three miles in length, thus giving Corona the title "Circle City" (McGroarty 1914:139).

In 1888 the San Jacinto Land Company gained control of a tin mine in the San Jacinto Hills, which had been discovered in 1857. South Riverside was the nearest point to all the mines, giving its residents high expectations of the vast industry that would be emerging from the tin mines. The tin mines opened during the early part of 1891, and South Riverside became well-known for having the only operating tin mine in the United States (Holmes 1912:265). The mines did not yield as much tin as originally expected; shipment of tin and work gradually decreased and stopped completely by 1893.

During this era the citrus industry became the driving industry of Corona and was known as the lemon capital of the world. By 1913, Corona was shipping more fruit than any other town in southern California.

In addition to growing the lemons there was a large processing plant that took those lemons deemed lower quality or that did not sell and produced commercial products such as citric acid, sodium citrate, lemon juice, pectin, and lemon oil. During and after World War II the city of Corona experienced many changes, including increased racial integration and a growth in population. As time went on traditionally segregated areas such as schools, and municipal pools, became desegregated and Asian families, who were once not even allowed to rent in the town started moving in (City of Corona 2018).

Many of the citrus and farming communities have disappeared with to the increase in industrialization. Significant changes occurred during the military buildup during World War II; military bases established across Riverside County brought thousands of men and their families into the area (Brown 1990:156-159).

Riverside Freeway (State Highway 91) was constructed through Corona in 1962. In 1989, Interstate 15 was built through Norco and east of Corona, replacing many segments of Temescal Canyon Road. This new, straighter and faster road encouraged expansion, resulting in new housing developments and related infrastructure.

3 REGULATORY SETTING

A complex network of federal, state, and local regulations governs the cultural resources of California. This section is intended as an overview of these regulations rather than an in-depth review. This section reviews the federal, state, and local regulations and policies that may be pertinent to the update of the City's General Plan.

3.1 Federal Regulations

3.1.1 National Historic Preservation Act of 1966

The National Historic Preservation Act (NHPA) of 1966, as amended (16 United States Code [USC] 470f) protects cultural resources. Cultural resources are considered during federal undertakings chiefly under Section 106 of NHPA through one of its implementing regulations, 36 Code of Federal Regulations (CFR) 800 (Protection of Historic Properties), as well as the National Environmental Policy Act (NEPA). Properties of traditional religious and cultural importance to Native Americans are considered under Section 101(d)(6)(A) of the NHPA. Other relevant federal laws include the Archaeological Data Preservation Act of 1974, the American Indian Religious Freedom Act of 1978, the Archaeological Resources Protection Act of 1979, and the Native American Graves Protection and Repatriation Act of 1989.

Section 106 requires federal agencies to take into account the effects of their undertakings on any district, site, building, structure, or object that is included in or eligible for the National Register of Historic Places (NRHP) and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on such undertakings (36 CFR 800.1). Under Section 106, cultural resources must be identified and evaluated; effects to historic properties are reduced to acceptable levels through mitigation measures or agreements among consulting and interested parties. Historic properties are those resources that are listed in or are eligible for the NRHP per the criteria listed below (36 CFR 60.4).

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 installation, 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.

Impacts of an undertaking that affect contributing elements of a historic property are considered a significant effect on the environment. Under 36 CFR 800.5(a)(2), adverse effects on historic properties include, but are not limited to

(i) physical destruction of or damage to all or part of the property;

(ii) alteration of a property;

(iii) removal of the property from its historic location;

(iv) change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance;

(v) introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features;

(vi) neglect of a property which causes its deterioration;

(vii) transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

3.1.2 National Register of Historic Places

The NRHP was established by the NHPA of 1966 as "an authoritative guide to be used by federal, state, and local governments, private groups and citizens to identify the nation's cultural resources and to indicate what properties should be considered for protection from destruction or impairment" (36 CFR 60.2. The NRHP recognizes properties that are significant at the national, state, and local levels. In general, a resource must be 50 years of age to be considered for the NRHP, unless it satisfies a standard of exceptional importance. To be eligible for listing in the NRHP, a resource must be significant in American history, architecture, archaeology, engineering, or culture. Districts, sites, buildings, structures, and objects of potential significance must also possess integrity of location, design, setting, materials, workmanship, feeling, and association. A property is eligible for the NRHP if it is significant under one or more of the following criteria:

- Criterion A: It is associated with events that have made a significant contribution to the broad patterns of our history;
- Criterion B: It is associated with the lives of persons who are significant in our past;
- Criterion C: It embodies the distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual distinction; and/or
- Criterion D: It has yielded, or may be likely to yield, information important in prehistory or history.

In addition to meeting these criteria, a property must retain historic integrity, which is defined in National Register Bulletin 15 as the "ability of a property to convey its significance" (National Park Service 2002). In order to assess integrity, the National Park Service recognizes seven aspects or qualities that, considered together, define historic integrity. To retain integrity, a property must possess several, if not all, of these seven qualities:

1. Location: the place where the historic property was constructed or the place where the historic event occurred;
2. Design: the combination of elements that create the form, plan, space, structure, and style of a property;
3. Setting: the physical environment of a historic property;
4. Materials: the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property;
5. Workmanship: the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory;
6. Feeling: a property's expression of the aesthetic or historic sense of a particular period of time; and
7. Association: the direct link between an important historic event or person and a historic property.

3.1.2.1 NATIONAL REGISTER OF HISTORIC PLACES ELIGIBILITY CRITERIA

As set forth in 36 CFR 60.4, in order for a cultural resource to be considered a "historic property" under NRHP criteria (i.e., eligible for the NRHP), it must be demonstrated that the resource possesses integrity of location, design, setting, materials, workmanship, feeling, and association, and meet at least one of the following four criteria delineated by Section 106 (Advisory Council on Historic Preservation 2010). Historic properties include resources:

1. that are associated with events that have made a significant contribution to the broad patterns of our history; or
2. that are associated with the lives of persons significant in our past; or
3. 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
4. that have yielded, or may be likely to yield, information important in prehistory or history.

3.1.3 Native American Graves Protection and Repatriation Act

The Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 (25 USC 3001 et seq.) protects human remains, funerary objects, sacred objects, and items of cultural patrimony of indigenous peoples on federal lands. NAGPRA stipulates priorities for assigning ownership or control of such cultural items excavated or discovered on federal or tribal lands, or in the possession and control of an agency that has received federal funding. Thus NAGPRA may apply to the City of Corona if it receives federal funding and takes possession and control of the items described above.

NAGPRA also provides for the repatriation of human remains and associated items previously collected from federal lands and in the possession or control of a federal agency or federally funded repository.

Implementing regulations are codified in 43 CFR Part 10. In addition to defining procedures for dealing with previously collected human remains and associated items, these regulations outline procedures for negotiating plans of action or comprehensive agreements for treatment of human remains and associated items encountered in intentional excavations, or inadvertent discoveries on federal or tribal lands.

3.1.4 National Historic Landmarks Program

The National Historic Landmarks Program (NHLP) was established to preserve, protect, and maintain U.S. National Historic Landmarks (NHLs). The NHLP is "a list of nationally significant historic places designated by the Secretary of the Interior because they possess exceptional value or quality in illustrating or interpreting the heritage" (National Park Service [NPS] 2018) of the U.S. The difference between the NHLP and the NRHP is that the NHLP contains properties that are important to the entire nation, rather than properties that can be important to local, state, or federal levels.

3.1.5 American Antiquities Act

The Antiquities Act of 1906 (PL 59-209; 34 Statute 225; 16 USC 431-433) was the first federal law to provide protection of historic and prehistoric resources located on federal land. This act prohibits any excavation on public land without permission of the appropriate department secretary. The Antiquities Act authorizes the Secretaries of the Interior, Agriculture, and Army to grant permission to reputable institutions to conduct research (including excavation) to increase knowledge and the permanent preservation of antiquities in public museums. This act authorizes the President to declare areas of federal lands as national monuments. Preservation of American Antiquities (43 CFR Part 3) implements the Antiquities Act, defining jurisdiction over cultural resources on federal land and the permit process for excavations.

3.2 State Regulations

3.2.1 California Environmental Quality Act

The California Environmental Quality Act (CEQA) (Section 21084.1) requires that a lead agency determine whether a project could have a significant effect on historical resources. If it can be demonstrated that a project will cause damage to a unique archaeological resource, the lead agency can require that reasonable efforts be made to permit any or all of these resources to be preserved in place or left in an undisturbed state. To the extent that they cannot be left undisturbed, CEQA (Section 21083.2[a], [b], and [c]) requires mitigation measures.

3.2.1.1 HISTORICAL RESOURCES

According to State CEQA Guidelines Section 15064.5, for the purposes of CEQA, historical resources are:

A resource listed in, or formally determined eligible…for listing in the California Register of Historical Resources (PRC 5024.1, Title 14 CCR, Section 4850 et seq.).

A resource included in a local register of historical resources, as defined in Section 5020.1(k) of the PRC or identified as significanct in a historic resources survey meeting the requirements of Section 5024.1(g) of the PRC.

Any object, building, structure, site, area, place, record, or manuscript that the lead agency determines to be eligible for national, state, or local landmark listing; generally, a resource shall be considered by the lead agency to be historically significant (and therefore a historic resource under CEQA) if the resource meets the criteria for listing on the California Register (as defined in PRC Section 5024.1, Title 14 CCR, Section 4852).

Resources nominated to the CRHR must retain enough of their historic character or appearance to convey the reasons for their significance. Resources with historic integrity (as defined above) that does not meet NRHP criteria may still be eligible for listing in the CRHR.

According to CEQA, the fact that a resource is not listed in or determined eligible for listing in the CRHR or is not included in a local register or survey shall not preclude the lead agency from determining that the resource may be a historical resource (PRC Section 5024.1). Pursuant to CEQA, a project with an effect that may cause a substantial adverse change in the significance of a historical resource may have a significant effect on the environment (State CEQA Guidelines, Section 15064.5[b]).

Substantial Adverse Change and Indirect Impacts to Historical Resources

State CEQA Guidelines specify that a "substantial adverse change in the significance of an historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired" (State CEQA Guidelines, Section 15064.5). Material impairment occurs when a project alters in an adverse manner or demolishes "those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion" or eligibility for inclusion in the NRHP, CRHR, or local register. In addition, pursuant to State CEQA Guidelines Section 15126.2, the "direct and indirect significant effects of the project on the environment shall be clearly identified and described, giving due consideration to both the short-term and long-term effects."

The following guides and requirements are of particular relevance to this study's analysis of indirect impacts to historic resources. Pursuant to State CEQA Guidelines (Section 15378), study of a project under CEQA requires consideration of "the whole of an action, which has the potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment." State CEQA Guidelines (Section 15064(d)) further define direct and indirect impacts:

(1) A direct physical change in the environment is a physical change in the environment which is caused by and immediately related to the project.

(2) An indirect physical change in the environment is a physical change in the environment which is not immediately related to the project, but which is caused indirectly by the project. If a direct physical change in the environment in turn causes another change in the environment, then the other change is an indirect physical change in the environment.

(3) An indirect physical change is to be considered only if that change is a reasonably foreseeable impact which may be caused by the project.

3.2.1.2 ARCHAEOLOGICAL RESOURCES

In terms of archaeological resources, PRC Section 21083.2(g) defines a unique archaeological resource as an archaeological artifact, object, or site about which it can be clearly demonstrated that without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

(1) Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.

(2) Has a special and particular quality such as being the oldest of its type or the best available example of its type.

(3) Is directly associated with a scientifically recognized important prehistoric or historic event or person.

If it can be demonstrated that a proposed project will cause damage to a unique archaeological resource, the lead agency may require reasonable efforts be made to permit any or all of these resources to be preserved in place or left in an undisturbed state. To the extent that they cannot be left undisturbed, mitigation measures are required (PRC Sections 21083.2[a], [b], and [c]). CEQA notes that, if an archaeological resource is neither a unique archaeological resource nor a historical resource, the effects of the project on those resources shall not be considered to be a significant effect on the environment (State CEQA Guidelines Section 15064.5[c][4]).

3.2.2 California State Senate Bill 18

Signed into law in 2004, Senate Bill (SB) 18 requires that cities and counties notify and consult with California Native American Tribes about proposed local land use planning decisions for the purpose of protecting traditional tribal cultural sites. Cities and counties must provide general and specific plan amendment proposals to California Native American Tribes that have been identified by the NAHC as having traditional lands located within the city's boundaries. If requested by the Native American Tribes, the city must also conduct consultations with the tribes prior to adopting or amending their general and specific plans.

3.2.3 California State Assembly Bill 52

Assembly Bill 52 of 2014 (AB 52) amended PRC Section 5097.94 and added PRC Sections 21073, 21074, 21080.3.1, 21080.3.2, 21082.3, 21083.09, 21084.2, and 21084.3.

3.2.4 Consultation with Native Americans

AB 52 formalizes the lead agency-tribal consultation process, requiring the lead agency to initiate consultation with California Native American groups that are traditionally and culturally affiliated with the project, including tribes that may not be federally recognized. Lead agencies are required to begin consultation prior to the release of a negative declaration, mitigated negative declaration, or environmental impact report.

3.2.5 Tribal Cultural Resources

Section 4 of AB 52 adds Sections 21074 (a) and (b) to the PRC, which address tribal cultural resources and cultural landscapes. Section 21074 (a) defines tribal cultural resources as one of the following:

(1) Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following:

(A) Included or determined to be eligible for inclusion in the California Register of Historical Resources.

(B) Included in a local register of historical resources as defined in subdivision (k) of Section 5020.1.

(2) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Section 5024.1. In applying the criteria set forth in subdivision (c) of Section 5024.1 for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American tribe.

Section 1 (a)(9) of AB 52 establishes that "a substantial adverse change to a tribal cultural resource has a significant effect on the environment." Effects on tribal cultural resources should be considered under CEQA. Section 6 of AB 52 adds Section 21080.3.2 to the PRC, which states that parties may propose mitigation measures "capable of avoiding or substantially lessening potential significant impacts to a tribal cultural resource or alternatives that would avoid significant impacts to a tribal cultural resource." Further, if a California Native American tribe requests consultation regarding project alternatives, mitigation measures, or significant effects to tribal cultural resources, the consultation shall include those topics (PRC Section 21080.3.2[a]). The environmental document and the mitigation monitoring and reporting program (where applicable) shall include any mitigation measures that are adopted (PRC Section 21082.3[a]).

3.2.6 California Register of Historic Resources

Created in 1992 and implemented in 1998, the CRHR is "an authoritative guide in California to be used by state and local agencies, private groups, and citizens to identify the state's historical resources and to indicate what properties are to be protected, to the extent prudent and feasible, from substantial adverse change" (PRC Sections 21083.2 and 21084.1). Certain properties, including those listed in or formally determined eligible for listing in the NRHP and California Historical Landmarks numbered 770 and higher, are automatically included in the CRHR. Other properties recognized under the California Points of Historical Interest program, identified as significant in historical resources surveys, or designated by local landmarks programs, may be nominated for inclusion in the CRHR. According to PRC Section 5024.1(c), a resource, either an individual property or a contributor to a historic district, may be listed in the CRHR if the State Historical Resources Commission determines that it meets one or more of the following criteria, which are modeled on NRHP criteria:

Criterion 1: It is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.

Criterion 2: It is associated with the lives of persons important in our past.

Criterion 3: It 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.

Criterion 4: It has yielded, or may be likely to yield, information important in history or prehistory.

Resources nominated to the CRHR must retain enough of their historic character or appearance to convey the reasons for their significance. Resources whose historic integrity does not meet NRHP criteria may still be eligible for listing in the CRHR.

3.2.7 Treatment of Human Remains

The disposition of burials falls first under the general prohibition on disturbing or removing human remains under California Health and Safety Code (CHSC) Section 7050.5. More specifically, remains suspected to be Native American are treated under CEQA at CCR Section 15064.5; PRC Section 5097.98 illustrates the process to be followed in the event that remains are discovered. If human remains are discovered during construction, no further disturbance to the site shall occur, and the County Coroner must be notified (CCR 15064.5 and PRC 5097.98).

3.2.7.1 CALIFORNIA PUBLIC RESOURCE CODE SECTION 5097.98

The General Plan is subject to California PRC Section 5097.98, which states that if a county coroner notifies the NAHC that human remains are Native American and outside the coroner's jurisdiction per Health and Safety Code (HSC) Section 7050.5, the NAHC must determine and notify an MLD. The MLD shall complete the inspection of the site within 48 hours of notification and may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials.

3.2.7.2 CALIFORNIA HEALTH AND SAFETY CODE SECTION 7050.5

This code section requires that further excavation or disturbance of land, upon discovery of human remains outside of a dedicated cemetery, cease until a county coroner makes a report. It requires a county coroner to contact the NAHC within 24 hours if the coroner determines that the remains are not subject to his or her authority and if the coroner recognizes the remains to be those of a Native American.

3.3 County Regulations

3.3.1 Riverside County Historical Commission

The Riverside County Historical Commission (RCHC) is responsible for advising the County of Riverside Board of Supervisors on historic matters within the County. The RCHC discovers and identifies persons, events, and places related to the County's historical importance, makes recommendations related to preservation of historic sites and structures, makes recommendations related to the County's historical parks, sites, and museums and encourages their development, and obtains assistance from related agencies. The RCHC is overseen by the Riverside County Historic Preservation Officer and administers the Riverside County Historic Landmarks (RCHL) program.

3.3.1.1 RIVERSIDE COUNTY HISTORIC PRESERVATION OFFICER

The Riverside County Historic Preservation Office is responsible for oversight of the RCHC, and the Riverside County Historic Landmarks Program.

3.3.2 Riverside County Historic Landmarks

The RCHC administers the RCHL program. The goal of the RCHL program is to recognize places as part of the County's history, community, and lives (Riverside County Parks 2018). The RCHL program has an application and approval process. The RCHL provides types of resources and criteria for listing to the RCHL, which is loosely based on the CRHR criteria. Types of historical resources eligible for nomination include:

- **Building:** A resource, such as a house, barn, church, factory, hotel, or similar structure created principally to shelter or assist in carrying out any form of human activity.

- **Site:** A site is the location of a significant event, a prehistoric or historic occupation or activity, or a building or structure, whether standing, ruined, or vanished, where the location itself possessed historical, cultural, or archaeological value. A site need not be marked by physical remains if it is the location of a prehistoric or historic event. Nor is it required that a building, structure, or object marked the site at the time of it is historic significance, occupation, or activity. Examples: trails, landscapes features, battlefields, habitation sites, Native American ceremonial areas, and rock art.

- **Structure:** The term "structure" is used to describe a construction made for a functional purpose rather than creating human shelter. Examples: mines, flumes, roads, bridges, and tunnels.

- **Object:** The term "object" is used to describe those constructions that are primarily artistic or commemorative in nature, relatively small in scale, and associated with a specific setting or environment. Objects that are located in museums are not eligible for landmark listing. Examples: fountains, monuments, maritime resources, sculptures, and boundary markers.

- **Historic Districts:** A geographic area designated as containing multiple historic resources that collectively have a special character or value—historical, cultural, architectural, archaeological, community, or aesthetic. A district must meet at least one of the criteria discussed below.

To be considered a historic resource eligible for landmark listing, the resource must be at least 45 years of age at the time of nomination. A historic resource must be significant under one or more of the following criteria in order to qualify for listing as a Riverside County Historic Landmark:

- Is associated with events that have made a significant contribution to the broad patterns of Riverside County's history and cultural heritage.

- Is associated with the lives of persons important to the history of Riverside County or its communities.

- Embodies the distinctive characteristics of a type, period, Riverside County region, or method of construction, or represents the work of an important creative individual or possesses high artistic values.

- Has yielded or may be likely to yield, information important in Riverside County, state of California, or national prehistory or history.

3.3.3 Riverside County General Plan

Cultural resources are addressed in the Multipurpose Open Space Element of the Riverside County General Plan (RCGP; updated 2015). This document defines cultural resources, explains their significance and nonrenewable status, and explicates the County's policies on cultural resources. According to these policies, the County values cultural resources (Open Space Policy [OS]19.1). The RCGP established a Cultural Resources Program in consultation with Native American Tribes and professional cultural resources consultants (OS 19.2), to address projects subject to environmental review, engage in government-to-government consultation, process applications, manage databases, assist with maintaining confidentiality of site locations, provide review of technical studies, establish professional qualifications and requirements, monitor sites, provide examples of mitigation and preservation methods, and provide for curation. Other policies include reviewing proposed developments for the possibility of cultural resources and for compliance with the Cultural Resources Program (OS 19.3), allocating resources for open space to preserve cultural resources in situ (OS 19.4), and exercising sensitivity and respect for human remains in compliance with all applicable laws concerning such remains (OS 19.5).

The RCGP also addresses historic resources under its Land Use Element, with the following policies:

- LU 4.3: Create programs to ensure historic preservation.
- LU 4.4: Encourage the appropriate interpretive use of historic or pre-historic resources for such things as educational kiosks, specially designed play equipment, or historical landscaping.
- LU 4.5: Permit historically significant buildings to vary from building and zoning codes in order to maintain the historical character of Riverside County; providing that the variations do not endanger human life and buildings comply with the State Historic Building Code.

It assigns the Riverside County Regional Park and Open-Space District's History Division to review proposals for large development projects for the purpose of evaluating the potential destruction or preservation of historical sites. The RCGP also promotes built environment preservation, the application of the Historic Building Code, and authorization of tax credits for retrofitting (Riverside County Planning Department 2018).

3.4 Local Regulations

3.4.1 Corona Municipal Code Chapter 17.63 Historic Resources

The purpose of the Corona Municipal Code Chapter 17.63 Historic Resources "is to promote the recognition, preservation, and viability of historic resources" in the City. The code uses a seven-pronged approach: encouraging knowledge and pride in Corona's heritage; providing a process and register for identification of resources; establishing process for review of future developments; encouraging and assisting private property owners with management and preservation of their historic resources and properties; promoting the management and preservation of Corona's historic resources that reflect the city's diverse cultural, social, artistic, economic, engineering, political, and architectural heritage; enhancing the City's cultural tourism; and promoting use of historic resources for education, enjoyment, and welfare of the people of the City. This code authorized the property preservation/tax reduction program, historic markers program, and historic design guidelines. This code set the standards by which historic buildings are evaluated for the Corona Register of Historic Resources and the City's Heritage Inventory.

3.4.1.1 CORONA REGISTER OF HISTORIC RESOURCES

Established in 2001, a Certified Local Government (CLG) in the Federal Historic Preservation Program, the City of Corona has pledged its commitment to historic preservation. This commitment is key to the United States' ability to preserve, protect, and increase awareness of our unique cultural heritage found in the built environment across the country. Jointly administered by the National Park Service (NPS) and the State Historic Preservation Office (SHPO), the Federal Historic Preservation Program provides access to benefits of the program. In return, each CLG agrees to follow Federal and State requirements concerning historic resources.

The Corona Register of Historic Resources and the Corona Heritage Inventory comprise listings of buildings, structures, sites, and features of local significance, civic identity, and character. These include landmarks and historic districts.

Landmark

Landmarks are those physical elements of Corona's historical development that provide the community with its own unique civic identity and character. A site, improvement or natural feature shall be eligible for listing on the Corona Register as a landmark if the City Council finds that all the following criteria are satisfied:

1) It has been in existence for a period of at least 50 years, or if less than 50 years old, is of exceptional importance to the community;
2) It has significant historic, cultural or architectural value and its designation as a landmark is reasonable, appropriate and necessary to promote, preserve and further the purposes and intent of this chapter;
3) It exhibits one or more of the following characteristics: and
    a) It is associated with events that have made a significant contribution to the history of Corona, the region, the state or the nation;
    b) It is associated with the lives of persons significant in Corona's past;
    c) It embodies distinctive characteristics of a style, type, period or method of construction or a valuable example of the use of materials or craftsmanship;
    d) It exemplifies or reflects special elements of the city's cultural, social, economic, political, aesthetic, engineering, architectural or natural history;
    e) It is representative of the work of a notable builder, designer or architect;
    f) It exemplifies one of the best remaining architectural styles or types in a neighborhood or contains outstanding elements of architectural design, detail, materials or craftsmanship of a particular historic period;
    g) It is in a unique location or contains physical characteristics representing an established and familiar visual feature of a neighborhood;
    h) It is a potential source of archeological or paleontological interest;
    i) It is or contains a natural setting or feature that strongly contributes to the well being of the people of the city;
4) It has integrity of location, design, setting, materials, workmanship, feeling and association;
    a) Integrity is the authenticity of an historic resource's physical identity, as evidenced by the survival of characteristics that existed during the historic resource's period of significance, to be recognizable and to convey the reasons for its significance;
    b) A site, improvement or natural feature that has diminished historic character or appearance may still have sufficient integrity for the Corona Register if it retains the potential to yield significant scientific or historical information or specific data or retains sufficient character to convey the reasons for its significance. Thus, it is possible that a site, improvement or natural feature may not retain sufficient integrity to meet the criteria for listing on the California Register or National Register, but it may still be eligible for listing on the Corona Register;
    c) Integrity shall be judged with reference to the particular criterion or criteria which provide its eligibility. An improvement removed from its original location shall be eligible if it is

significant primarily for its architectural value or it is the surviving structure most importantly associated with an historic person or event.

A reconstructed improvement shall be eligible if the reconstruction is historically accurate, the improvement is presented in a dignified manner as part of a restoration master plan and no other original improvement survives that has the same association. A site, improvement or natural feature that is intended to be primarily commemorative shall be eligible if its design, age, tradition or symbolic value creates its own historic significance. Examples include, but are not limited to, public statuary, murals, monuments, sculptures, graves and birthplaces. These sites or improvements may be identified by the placement of an historic marker.

Historic District

An historic district is a geographically defined area possessing a concentration of contributing historic resources that relate to each other and are unified by physical development or historical context. A defined area shall be eligible for listing on the Corona Register as an historic district if the City Council finds that all the following criteria are satisfied:

(1) The defined area is a unified geographical area with precisely defined boundaries;

(2) The defined area contains a significant concentration of individually recognized contributing historic resources united in character by an historic plan, physical development, cultural heritage, past events, an historic period or prehistory era, aesthetics design or architectural traditions;

(3) At least 75% of the contributing historic resources in the defined area are 50 years of age or older and retain their original architectural character;

(4) The civic and historic value of the contributing historic resources is greater as a collective whole than as individual historic resources; and

(5) The defined area has significant historic, cultural or architectural value and its designation as an historic district promotes, preserves and furthers the purposes and intent of this chapter.

Upon the listing of an historic district on the Corona Register, all identified contributing historic resources in the historic district shall be individually listed on the Corona Register, along with notation of the historic district's noncontributing resources.

3.4.1.2 CORONA HERITAGE INVENTORY

Adopted by the City Planning Commission in 2003, the Corona Heritage Inventory contains 482 properties recommended for preservation because of age or historic significance. Listing here was initiated by the City of Corona and not by individual property owners. A site, improvement or natural feature shall be eligible for listing on the Corona Heritage Inventory as a heritage property if the Planning Commission finds that all the following criteria are satisfied:

(A) An official survey, describing the features, merits and quality of the site, improvement or natural feature, has been prepared; and

(B) The site, improvement or natural feature is identified as a potential resource to be conserved because of its age, and either its context in the neighborhood, its association with an historic event or period, or its significance to the architectural, engineering, scientific, economic, agricultural, educational, cultural, social, artistic, political or military history of Corona.

3.4.1.3 HISTORIC PROPERTY PRESERVATION (MILLS ACT) PROGRAM

The City adopted the Historic Property Preservation (Mills Act) Program in 2002. The Mills Act is a California State Law that allows cities to enter into agreements with the owners of historic structures. The owner continues to preserve the property and the State reduces property taxes. The Corona Community Development Department uses the Mills Act as an incentive for local property owners to preserve local historic buildings (Corona Historic Preservation Society [CHPS] 2018).

3.4.1.4 PUBLIC LIBRARY HERITAGE ROOM

The Corona Public Library Heritage Room is a facility housed in the historic W.D. Addison Heritage Room, established in 1980. This location is open to the public for research, exhibits, websites, and prints. This library maintains records concerning all historic resources as listed on the Corona Register or Corona Heritage Inventory. The files also contain land records, clipping files, books, manuscripts, photographs, slides, Sanborn Fire Insurance Maps, databases, newspapers, and more (City of Corona 2018).

3.4.2 Corona Historical Resources Ordinance 2270

The Corona Historical Resources Ordinance 2270 encourages the preservation of the Corona Register of Historic Resources, which allows for the designation of “landmark trees” that meet certain criteria. It includes provisions for archaeological resources, architectural character/historic resources, and historic sites. This ordinance has several goals and initiatives to protect the City’s rich resources and community heritage.

3.4.3 City of Corona General Plan Historic Resources Element

The City adopted a Historic Resources Element and implementing ordinance in 2001. The goal of the Historic Resources Element is to identify key preservation issues and provide policies for planning and management of historic resources in the City. The following are the key components of Corona’s Historic Resources element:

- Architectural character of urban and agricultural buildings, structures, and features
- Urban landscapes, streetscapes, and landforms
- Prehistoric and historic archaeological sites and resources
- Historic properties of National and Statewide significance
- Historic districts
- Historical markers (monuments and plaques)

3.4.4 Private Sector, Local Organizations

3.4.4.1 CORONA HERITAGE FOUNDATION/CORONA HERITAGE PARK AND MUSEUM

The Corona Heritage Foundation doing business as the Corona Heritage Park and Museum seeks to promote and enhance the origins and development of the City itself. The Foundation uses education, recreation, and outreach across the community to reach these goals (Corona Heritage Foundation 2018).

3.4.4.2 CORONA HISTORIC PRESERVATION SOCIETY

The CHPS was established in 1972 and recognized as a non-profit organization in 1974. The CHPS’s mission is to preserve the “architecturally beautiful, Classical Revival style, [and the] 1906 Carnegie Public

Library Structure." Their goal is to educate, act, and preserve Corona's history. They have placed 25 historic markers throughout the city to recognize historically significant sites (CHPS 2018).

4 STUDY APPROACH

This CRTR is based on a desktop review of available literature, historic topographic maps, historic aerial photographs, and records and database searches containing information on cultural resources. Data sources include the California Historical Resources Information System (CHRIS), California State databases, County of Riverside databases, and City of Corona databases. Database and map searches encompassed the entire General Plan area in order to provide regional context, and ensure thorough review of potential cultural resources within the General Plan area. When possible, results are presented separately for the City and the SOI. However, because the study did not include any field surveys, some information was not detailed enough to provide a meaningful analysis of the difference between conditions within the City versus conditions within the SOI. In those circumstances, the results are presented in the list and marked with an asterisk for ease of identification.

4.1 CHRIS Records Search

On September 8, 2017, SWCA Cultural Resource Specialists performed a records search of the CHRIS at the Eastern Information Center (EIC) to identify previous cultural resources studies and previously recorded cultural resources within the City of Corona and the SOI. The CHRIS search also included a review of the NRHP, the CRHR, the California Points of Historical Interest list, the California Historical Landmarks list, the Archaeological Determinations of Eligibility list, the City of Los Angeles Historic-Cultural Monuments (HCM) list, and the California State Historic Resources Inventory.

4.2 Local Database Searches

As part of the background research for the current CRTR, SWCA reviewed the lists of the Historic Properties Database (HPD), the NRHP, the CRHR, Riverside County Points of Historical Interest, and the Historic Districts and Landmarks on the Corona Register of Historic Resources, as they pertain to the City of Corona.

4.3 Sacred Lands File Search

SWCA requested an SLF from the NAHC on February 23, 2018. On February 26, 2018, the NAHC provided the results of this SLF search, as well as a consultation list of tribal governments with traditional lands or cultural places located within the General Plan area. To assist with formal government-to-government consultation with NAHC-listed bands or tribes pursuant to SB 18 and AB 52, this list will be provided to the City.

5 EXISTING CONDITIONS

5.1 Cultural Resource Studies

Results of the cultural resources records search at the EIC indicate that there have been 212 cultural resource studies conducted within the City of Corona and its SOI. Details of these studies are included in Appendix A.

5.2 Sacred Lands File Search

SWCA requested an SLF from the NAHC on February 23, 2018. On February 26, 2018, the NAHC provided the results of the SLF search, along with a consultation list of tribal governments with traditional lands or cultural places located within the General Plan area, who should be contacted for additional information. The SLF search returned positive results, indicating that known Tribal resources are located within the General Plan area. So that a meaningful consultation with interested Native American groups can be completed, this list will be forwarded to the City of Corona, where all records of this consultation should be kept on file. Confidential Appendix B contains the list of tribal governments and SLF results.

5.3 Existing Conditions – City of Corona

5.3.1 Archaeological Resources

Results of the cultural resources records search at the EIC indicate that 70 previously recorded cultural resources have been identified within the City of Corona (Table 1). Of these resources, 30 are prehistoric archaeological sites, 38 are historic archaeological sites, and two are multicomponent resources. Six of these resources are located on the border between the City of Corona and its SOI and are indicated by an asterisk in Table 1.

Table 1. Previously Recorded Cultural Resources Within the City of Corona

Primary	Trinomial	Resource Type	USGS Topographic Quadrangle	Recorded By and Year
P-33-000675	CA-RIV-000675	Prehistoric	Corona North	1952 (Smith, N/A); 1980 (Steven Schwartz, N/A)
P-33-000808	CA-RIV-000808	Prehistoric, Historic	Corona North	1974 (Reiss, Clough & Banwer, n/a); 1980 (Cottrell, Archaeological Resource Management Corp.)
P-33-001040	CA-RIV-001040	Prehistoric	Corona North	(G. Smith, n/a); 1975 (Matthew C. Hall, ARU, UCR); 1980 (Steven Schwartz, n/a)
P-33-001044	CA-RIV-001044	Historic	Corona North	1975 (M. Hall, n/a); 1980 (Steven Schwartz, Department of the Army, Army Corps of Engineers, Environmental Quality Section); 1995 (Mark D. Selverson, Greenwood and Associates)
P-33-001259	CA-RIV-001259	Prehistoric	Corona North	1974 (J. P. Barker); 1988 (Roderick S. Brown and Jeanette A. McKenna)
P-33-001438	CA-RIV-001438	Prehistoric	Corona North	1977 (S. Hammond, Caltrans); 1980 (Cottrell, Archaeological Resource Management Corp., Garden Grove, CA.)
P-33-001439	CA-RIV-001439	Prehistoric	Corona North	1977 (S. Hammond, Caltrans); 1980 (Cottrell, Archaeological Resource Management Corp., Garden Grove, CA.)

Primary	Trinomial	Resource Type	USGS Topographic Quadrangle	Recorded By and Year
P-33-001440	CA-RIV-001440	Prehistoric	Corona North	1977 (S. Hammond, Caltrans); 1980 (Cottrell, Archaeological Resource Management Corp., Garden Grove, CA.); 1993 (Paul Chace and Bill McManis, The Keith Companies, Costa Mesa, CA.)
P-33-001441	CA-RIV-001441	Prehistoric	Corona North	1977 (S. Hammond, Caltrans)
P-33-001443	CA-RIV-001443	Prehistoric	Corona North	1977 (S. Hammond, Caltrans); 1979 (J. Swenson); 1979 (C.E. Drover); 1988 (Roderick S. Brown and Jeanette A. McKenna, Archaeological Research Unit, UC Riverside, Riverside, CA.); 1992 (L. Franklin and J. Schmidt, McKenna et al., Whittier, CA.); 1999 (Patrick O. Maxon, RMW Paleo Associates, Incorporated., Mission Viejo, CA.)
P-33-001445	CA-RIV-001445	Prehistoric	Corona North	1977 (S. Hammond, Caltrans); 1988 (J. McKenna and R. Brown, Hatheway & McKenna, Mission Viejo, CA.); 1988 (Roderick S. Brown and Jeanette A. McKenna, Archaeological Research Unit, UCR Riverside, Riverside, CA.)
P-33-001511		Historic	Corona South	1978 (M. Brown); 1983 (Carol Rector)
P-33-001653	CA-RIV-001653	Prehistoric	Corona North	1979 (Pink and Singer); 1980 (Cottrell, Archaeological Resource Management Corp., Garden Grove, CA.)
P-33-001654	CA-RIV-001654	Prehistoric	Corona North	1979 (Ping, Singer, Brown and Giansanti); 1980 (Cottrell, Archaeological Resource Management Corp., Garden Grove, CA.)
P-33-001801	CA-RIV-001801	Prehistoric	Prado Dam	1979 (Mark Desautels and Jon Cizek)
P-33-001837	-	Prehistoric	Corona South	1980 (Schupp/ Wessel); 2004 (Richard S. Shepard, Bon Terra Consulting, Costa Mesa, CA.)
P-33-002679*	CA-RIV-002679	Prehistoric	Lake Mathews	1983 (Del Chario and Demcak, Archaeological Resource Management Corp., Garden Grove, CA.)
P-33-003055	-	Historic	Corona South	1987 (Karen K. Swope, Archaeological Research Unit, UC Riverside, CA.)
P-33-003175*	CA-RIV-004112H	Prehistoric	Anza	1987 (S.J. Bouscaren, J. Pjerrou, and E. Plummer, Archaeological Research Unit, UC Riverside, CA.)

Primary	Trinomial	Resource Type	USGS Topographic Quadrangle	Recorded By and Year
P-33-003424	CA-RIV-003424	Historic	Black Star Canyon	1988 (Andrew Pigniolo, WESTEC Services, Inc., San Diego, CA.)
P-33-003559	CA-RIV-003559	Prehistoric	Corona South	1989 (Daniel F. McCarthy, Archaeological Research Unit, UC Riverside, CA.)
P-33-003685	CA-RIV-003685	Historic	Lake Mathews	1989 (Joan C. Brown, RMW Paleo Associates, Mission Viejo, CA.)
P-33-003693	CA-RIV-003693	Historic	Prado Dam	1989 (J. Brock and J. Elliot, Archaeological Advisory Group, Newport Beach, CA.)
P-33-003832	CA-RIV-003832	Historic	Alberhill, Corona North, Corona South, Lake Elsinore, Lake Mathews	1990 (K. Swope and D. Peirce, Archaeological Research Unit, UC Riverside, CA.); 1990 (Daniel F. McCarthy, Archaeological Research Unit, UC Riverside, CA.); 1996 (CRM TECH, CRM TECH, Riverside, CA.); 2001 (Bruce Love and Tom Tang, Riordan Goodwin, Riverside, CA.); 2005 (Kristie R, Blevins and Anna M. Hoover); 2006 (J.D. Goodman, SRI); 2006 (John Goodman, Nick Reseburg and Windy Jones, Statistical Research, Inc., Redlands, CA.); 2011 (Robin D. Hoffman, ICF)
P-33-004112*	CA-RIV-004112H	Historic	Corona South, Lake Mathews	1991 (K. Swope and K. Hallaran, Archaeological Research Unit, UC Riverside); 1997 (Bruce Love, CRM Tech); 2005 (Strudwick, Ivan / Baumann, Joseph / Jones, Brett, LSA Associates, Inc.); 2007 (Joshua Patterson, Jones and Stokes)
P-33-004118	CA-RIV-004118	Prehistoric	Lake Mathews	1988 (Dibble, Carr, Jones, Archaeological Resource Management Corporation, 1945 W. Commonwealth, Suite C, Fullerton, CA 92633); 2002 (A. Wesson)
P-33-004119	CA-RIV-004119	Prehistoric	Lake Mathews	1988 (Dibble, Carr, Jones, Archaeological Resource Management Corporation, 1945 W. Commonwealth, Suite C, Fullerton, CA 92633)
P-33-004120	CA-RIV-004120	Prehistoric	Lake Mathews	1988 (Dibble, Carr, Jones, Archaeological Resource Management Corporation, 1945 W. Commonwealth, Suite C, Fullerton, CA 92633)
P-33-004121	CA-RIV-004121	Prehistoric	Lake Mathews	1988 (Dibble, Carr, Jones, Archaeological Resource Management Corporation, 1945 W. Commonwealth, Suite C, Fullerton, CA 92633)

Primary	Trinomial	Resource Type	USGS Topographic Quadrangle	Recorded By and Year
P-33-004791*	CA-RIV-004791	Historic	Corona North, Corona South, Riverside East, Riverside West, San Bernardino South	1992 (Robert Wlodarski, Historical Environmental Research Team); 2001 (Angie Gustafson, Mike McGrath, EDAW, Inc); 2005 (Jeanette A. McKenna, et. al, McKenna et. al.)
P-33-004808	CA-RIV-004808	Prehistoric, Historic	Myoma	1992 (Radek Cecil and Frank Dittmer, Archaeological Consulting Services)
P-33-005310	CA-RIV-005310	Historic	Corona North	
P-33-005781	CA-RIV-005521H	Historic	Corona North	1995 (A.G. Toren, Greenwood and Associates)
P-33-005782	CA-RIV-005522H	Historic	Prado Dam	1995 (A.G. Toren, Greenwood and Associates); 2012 (Riordan Goodwin, LSA Associates)
P-33-007423	-	Historic	Fontana	1984 (S. Saunders, Riverside County Historical Comm.)
P-33-007586	-	Historic	Corona North	1996 (James Brock & Brenda Smith, Archeological Advisory Group)
P-33-007719	CA-RIV-006197H	Historic	Corona South	1999 (L. White, L&L Environmental)
P-33-008406	CA-RIV-006133H	Historic	Corona South	1998 (Bruce Love, CRM TECH, Riverside, CA)
P-33-009653	CA-RIV-006453H	Historic	Corona South	
P-33-010819*	CA-RIV-006532H	Historic	Black Star Canyon	2000 (Matthew Sterner, Statistical Research, Inc.)
P-33-011805	-	Prehistoric	Lake Mathews	
P-33-012556	-	Prehistoric	Corona South	
P-33-012622	-	Prehistoric	Corona North	
P-33-013056	CA-RIV-007574	Prehistoric	Toro Peak	
P-33-013148	-	Prehistoric	Corona South	1990 (K. Swope and D. Peirce, Archaeological Research Unit, UC Riverside); 2007 (Joshua Patterson, Jones and Stokes)
P-33-013275	-	Historic	Corona South	2004 (Goodwin, Riordan, LSA); 2007 (Shepard, Richard S., Shepard Consulting Services)
P-33-013276	-	Historic	Corona South	2004 (Goodwin, Riordan, LSA); 2007 (Shepard, Richard S., Shepard Consulting Services)
P-33-013277	-	Historic	Corona South	2004 (Goodwin, Riordan, LSA); 2007 (Shepard, Richard S., Shepard Consulting Services)

Primary	Trinomial	Resource Type	USGS Topographic Quadrangle	Recorded By and Year
P-33-013409	-	Prehistoric	Corona North	1980 (C.E Drover)
P-33-013857	-	Prehistoric	Corona South	2004 (White, Laura S., Archaeological Associates)
P-33-013858	-	Historic	Corona South	2004 (White, Laura S., Archaeological Associates)
P-33-013859	-	Historic	Corona South	2004 (White, Laura S., Archaeological Associates)
P-33-016051	-	Historic	Lake Mathews	2005 (Roberts, Chris, Maria Garrity, and Trish Drennan, LSA Associates, Inc.)
P-33-017132	-	Historic	Corona South	2008 (Demcak, Carol, ARMC)
P-33-017133	-	Historic	Corona South	2008 (Demcak, Carol, ARMC)
P-33-019802	-	Historic	Prado Dam	2011 (Andrew Belcourt, LSA Associates)
P-33-023618	-	Historic	Corona South	2005 (Carrie D. Wills, Michael Brandman Associates)
P-33-024188	-	Historic	Corona South	2012 (Peter Moruzzi, ICF International)
P-33-024189	-	Historic	Corona South	2012 (Peter Moruzzi, ICF International)
P-33-024190	-	Historic	Corona South	2012 (Peter Moruzzi, ICF International)
P-33-024191	-	Historic	Corona South	2012 (Peter Moruzzi, ICF International)
P-33-024192	-	Historic	Corona South	2012 (Peter Moruzzi, ICF International)
P-33-024552	-	Historic	Prado Dam	2000 (R.E. Reynolds, LSA Associates Inc.)
P-33-024553	CA-RIV-012173	Historic	Corona South	2004 (Richard S. Shepard, BonTerra Consulting)
P-33-024723	CA-RIV-012241	Historic	Corona South	2015 (William Burns, Nicolas F. Hearth, and Benjamin, Scherzer, Duke CRM)
P-33-024724	-	Prehistoric	Corona South	2015 (Nicholas F. Hearth and William Burns, Duke CRM)
P-33-024725	-	Prehistoric	Corona South	2015 (Nicholas F. Hearth and William Burns, Duke CRM)
P-33-024726	-	Prehistoric	Corona South	2015 (Nicholas F, Hearth and Mathew Stever, Duke CRM)
P-33-024855	-	Historic	Corona South	2015 (Lynn Furnis, Cogstone Resources Management Inc.)
P-33-024866*	CA-RIV-012327	Historic	Corona North	2016 (Hubert Switalski and Victoria Harvey, Stantec Consulting Services, Inc.)

* Indicates that this resource is found near the border of the City of Corona and the SOI.

5.3.2 Built Environment Resources

Results of the cultural resources records search at the EIC indicate that 31 previously recorded built environment resources have been identified within the City of Corona (Table 2). All of these resources are historic in age. One of these resources occurs near the border between the City of Corona and its SOI and is indicated by an asterisk in Table 2. The vast majority of these built environment resources (n=25) were recorded in 2011 as part of a citywide effort by ICF International.

Table 2. Previously Recorded Built Environment Resources Within the City of Corona

Primary	Trinomial	Resource Description	USGS Topographic Quadrangle	Recorded by and Year
P-33-014754	-		Corona North	2005 (Winn, Richard and Mary Winn, Corona Historic Preservation Society)
P-33-017926	-	Other - Corona City Park	Corona North, Corona South	2009 (Michael H. Dice, Michael Brandman Associates, San Bernardino, CA.)
P-33-020200	-	Other - Riverside County Assessor Parcel Number (APN) 107-020-012	Corona South	2011 (Tim Yates, ICF International)
P-33-020201	-	Other - AE-2418-1H; Other - Riverside County APN 107-030-003; Other - 14282 E. 6th Street	Corona South	2011 (Tim Yates, ICF International); 2012 (Josh Smallwood, Applied Earthworks, Inc.)
P-33-020202	-	Other - Riverside County APN 107-030-022	Corona South	2011 (Tim Yates, ICF International)
P-33-020204	-	Other - Riverside County APN 107-040-006	Corona South	2011 (Tim Yates, ICF International)
P-33-020203*	-	Other - Riverside County APN 107-040-005	Corona South	2011 (Tim Yates, ICF International)
P-33-020205	-	Other - Riverside County APN 107-060-003	Corona South	2011 (Tim Yates, ICF International)
P-33-020206	-	Other - Riverside County APNs 107-060-008 & 107-060-009	Corona South	2011 (Tim Yates, ICF International)
P-33-020207	CA-RIV-020207	Other - Riverside County APN 115-090-003	Corona South	2011 (Tim Yates, ICF International)
P-33-020208	-	Other - Riverside County APN 117-031-001	Corona North	2011 (Tim Yates, ICF International)
P-33-020209	-	Other - Riverside County APN 117-031-002	Corona North	2011 (Tim Yates, ICF International)
P-33-020210	-	Other - Riverside County APN 117-031-036	Corona North	2011 (Tim Yates, ICF International)
P-33-020211	-	Other - Riverside County APN 119-041-013	Corona North	2011 (Tim Yates, ICF International)

Primary	Trinomial	Resource Description	USGS Topographic Quadrangle	Recorded by and Year
P-33-020212	-	Other - Riverside County APN 119-041-014	Corona North	2011 (Tim Yates, ICF International)
P-33-020213	-	Other - Riverside County APN 119-041-015	Corona North	2011 (Tim Yates, ICF International)
P-33-020225	-	Other - Riverside County APN 119-041-016	Corona North	2011 (Tim Yates, ICF International)
P-33-020226	-	Other - Riverside County APN 119-041-017	Corona North	2011 (Tim Yates, ICF International)
P-33-020227	-	Other - Riverside County APN 119-041-018	Corona North	2011 (Tim Yates, ICF International)
P-33-020229	-	Other - Riverside County APN 119-041-020	Corona North	2011 (Tim Yates, ICF International)
P-33-020231	-	Other - Riverside County APN 119-041-022; Other - 1108 Serene Drive	Corona North	2011 (Tim Yates, ICF International)
P-33-020232	-	Other - 1002 Peaceful Drive; Other - Riverside County APN 119-041-024	Corona North	2011 (Tim Yates, ICF International)
P-33-020233	-	Other - 1090 Serene Drive; Other - Riverside County APN 119-043-001	Corona North	2011 (Tim Yates, ICF International)
P-33-020234	-	Other - 1082 Serene Drive; Other - Riverside County APN 119-043-002	Corona North	2011 (Tim Yates, ICF International)
P-33-020235	-	Other - Riverside County APN 119-043-003; Other - 1070 Serene Drive	Corona North	2011 (Tim Yates, ICF International)
P-33-020236	-	Other - Riverside County APN 119-043-004; Other - 1058 Serene Drive	Corona North	2011 (Tim Yates, ICF International)

Primary	Trinomial	Resource Description	USGS Topographic Quadrangle	Recorded by and Year
P-33-020237	-	Other - 1050 Serene Drive; Other - Riverside County APN 119-043-005	Corona North	2011 (Tim Yates, ICF International)
P-33-024119	CA-RIV-011860	Other - Sidebotham (Phillips) Quarry (north); Other - LSA-MGI1401-S-1	Corona South	2014 (Riordan Goodwin, LSA Associates, Inc.)
P-33-024207	-		Corona North	2012 (Tim Yates, ICF International)
P-33-024551	CA-RIV-012171		Prado Dam	2015 (Riordan Goodwin, LSA Associates, Inc.)

* Indicates that this resource is found near the border of the City of Corona and the SOI

5.3.3 Properties Listed on Federal, State, and Local Registers

5.3.3.1 NATIONAL REGISTER OF HISTORIC PLACES

In the City of Corona, there are seven historic properties defined as listed or eligible for listing on the NRHP.

Carnegie Library (1906): This neo-classical building was designed by Los Angeles architect Franklin Pierce Burnham with construction completed on July 2, 1906. The exterior was cream and red colored pressed brick, with stone and concrete trim. It was symmetrically designed with a central staircase flanked by sloping banisters, which held decorative iron lights. The entrance was topped by an overhanging triangular pediment with ornate plaster designs and supported by fluted Ionic columns on either side. This building served as the City's public library until July 3, 1971, when a much larger public library facility was constructed several blocks away. The building remained empty for the next six years. Despite efforts to have it restored, it fell into disrepair and was damaged by fires and vandalism; the building was demolished April 18, 1978.

Corona Heritage Park (1900): This 5-acre complex was the headquarters for the Corona Foothill Lemon Company, the largest citrus ranch in the area in the early 1900s. The various buildings within the complex were primarily constructed between 1913 and 1937, and are largely intact today. The Corona Heritage Foundation is restoring the complex as a historic park and museum facility.

Corona High School/Civic Center (1923): Originally constructed as Corona's second high school, it became the Civic Center in 1961. The classic Spanish Revival architecture and expansive front lawns make it a recognizable feature in Corona's downtown area.

Grand Boulevard Historic District (1886): This unique circular roadway was a prominent design element in the original layout for the townsite. Corona derives its longstanding moniker "The Circle City" from the boulevard. Internationally acclaimed road races were held on this street in 1913, 1914, and 1916, drawing more than 100,000 spectators, as well as racing legends. The boulevard displays wide parkways, large mature trees, and historic streetlights fronting grand homes and more modest bungalows along its route.

Women's Improvement Club Clubhouse (1913): Southern California architect Thomas Preston designed this one-story, multi-gabled, Craftsman-style bungalow clubhouse that was built in 1913. The club was formed in 1899 as a civic organization called the Town Improvement Association; it changed its name to the Women's Improvement Club of Corona in 1902. The building's architectural features include painted wood shingles on the exterior walls, a steep-gabled main roof with clipped gables over the side wings, an original oak front door with beveled glass, and wooden porch piers on a prominent brick base. It was added to the National Register on November 3, 1988, and is the only remaining structure within Corona city limits with that status.

Corona Theater Landmark Building (1929): The Spanish Revival-style Corona Theater, also known as the Landmark Building, was designed by Southern California architect Carl Boller and dedicated on August 29, 1929. Various celebrities including Al Jolson, Laurel and Hardy, and Irving Berlin attended its grand opening ceremonies. Its L-shaped design features a two-story elevation in front and three stories in the rear, with separate segments of varying heights topped by individual gable roofs and interspersed with hipped roof towers. The building was constructed of brick, with stucco on its front elevation. Some remodeling has been done to the exterior, but significant details remain. Over the years, the building has had various uses, including commercial office space, a Masonic Lodge meeting hall, and a large theater. The building is the only pre-Depression Era theater remaining in Corona, has been determined eligible for the National Register.

5.3.3.2 STATE HISTORIC LANDMARKS

Within the City of Corona, there are no State Historic Landmarks.

5.3.3.3 STATE HISTORICAL POINTS OF INTEREST

The City of Corona contains two State Historical Points of Interest:

- Bandini-Cota Adobe Site
- Temescal Tin Mines California Register of Historical Resources

The seven properties listed on the NRHP are also automatically eligible for listing to the CRHR. In addition, there are nine other properties that are eligible for the CRHR:

- Jefferson Elementary School (1927)
- Barber Home (1893) – Eastlake
- 1101 S Ramona Ave (1915) – Vernacular Wood Frame with Classical revival Elements
- Terpening House (1899) – Queen Anne
- Corona First Methodist Church (1914) – Tudor Revival
- 401 East 8th Street (1908) – Vernacular Wood Frame
- Camp Haan Barracks (1942) – Vernacular Wood Frame
- 517 E 8th Street (1896)

- El Gordo Caballo Ranch (1939)

5.3.3.4 CORONA REGISTER OF HISTORIC RESOURCES

There are 367 individual built environment resources listed on the Corona Register of Historic Resources. Most of these (308 resources) are eligible as contributors to districts. Appendix C includes a list of all resources listed on the Corona Register of Historical Resources.

5.3.3.5 CORONA HISTORIC LANDMARKS

There are 57 properties listed on the Corona Historic Landmarks (Table 3).

Table 3. Historic Landmarks Within the City of Corona

Historic District (HD)/Landmark (HL) Number	Address	APN	District or Style	Date Built	Date approved by City Council
HD-001	510 W Foothill Ave	114-350-046	Heritage Park District	1913 1927 1937	May 16, 2001
HD-002	2750 S Rimpau Av	120-121-028	Lemonia Grove District	1895	May 16, 2001
HD-003	2837 S Kellogg Av	120-072-008	Kammeyer Ranch District	1892 1895	May 16, 2001
HD-004	1125 S Rimpau Av	111-290-024	Sunny Slope Cemetery District	1892	May 16, 2001
HD-005	930 E Sixth St	117-310-001	City Park District	1913	May 16, 2001
HD-006	Grand Blvd Circle	Not Available	Grand Blvd. Streetscape District	Not Available	May 16, 2001
HD-007	Chase Dr (Garretson To Foothill)	Not Available	Chase Drive Palm Trees District	Pre-1930	May 16, 2001
HD-008	Rimpau Av (Old Temescal Rd To Chase)	Not Available	Rimpau Ave. Palm Trees District	Pre-1930	May 16, 2001
HD-009	Main St (Olive To Chase)	Not Available	South Main Street Palm Trees District	Pre-1930	May 16, 2001
HD-010	Palisades Dr (1 Mile From Green River/Wardlow Wash Bridge)	Not Available	Palisades Drive Roadway District	Not Available	June 3, 2015
HL-001	1101 S Main St	117-266-006	Woman's Improvement Club	1913	May 16, 2001

Historic District (HD)/Landmark (HL) Number	Address	APN	District or Style	Date Built	Date approved by City Council
HL-002	815 W Sixth St	118-270-049	Historic City Hall	1923	May 16, 2001
HL-003	900 S Victoria Av	117-236-001	Victoria Park/Old Lincoln Cemetery	N/A	May 16, 2001
HL-004	722/423 S Joy St/Eighth	117-206-009	Joy Street Market and Residence	N/A	Revoked On Nov 18, 2009
HL-005	1169 E Grand Blvd	Not Available	Not Available	N/A	May 16, 2001
HL-006	1156 E Grand Blvd	Not Available	Not Available	N/A	May 16, 2001
HL-007	1148 E Grand Blvd	Not Available	Not Available	N/A	May 16, 2001
HL-008	1136 E Grand Blvd	Not Available	Not Available	N/A	May 16, 2001
HL-009	1036 E Grand Blvd	Not Available	Not Available	N/A	May 16, 2001
HL-010	822 S Joy St	117-241-001	Not Available	N/A	September 17, 2001
HL-011	1314 S Victoria Av	109-041-014	Not Available	N/A	July 17, 2001
HL-012	1147 E Grand Blvd	Not Available	Not Available	N/A	September 18, 2002
HL-013	123 W Eleventh St	117-254-012	Vernacular Wood Frame	1915	July 16, 2003
HL-014	1214 S Belle Av	110-192-018	Vernacular Wood Frame	1920	July 16, 2003

Historic District (HD)/Landmark (HL) Number	Address	APN	District or Style	Date Built	Date approved by City Council
HL-015	616 W Eleventh St	110-172-009	Provincial Revival	1928	January 7, 2004
HL-016	1315 S Main St	109-041-002	Mediterranean/Spanish Revival	1935	October 20, 2004
HL-017	818 S Howard St	117-233-022	Queen Anne	1890	October 20, 2004
HL-018	1128 E Grand Blvd	117-263-016	Vernacular Wood Frame	1929	October 19, 2005
HL-019	1052 E Grand Blvd	117-264-005	Victorian (mixed style)	1888	May 3, 2006, Dec. 19, 2007
HL-020	809 E Grand Blvd	111-022-011	Not Available	1924-27	May 3, 2006
HL-021	1052 E Grand Blvd	Not Available	Not Available		July 5, 2006
HL-022	1170 E Grand Blvd	117-265-010	Mediterranean/Spanish Revival	1924	August 16, 2006
HL-023	1301 S Main St	109-041-004	Vernacular Wood Frame w/Craftsman Bungalow Elements	1910	October 4, 2006
HL-024	1124 Palm Av	109-033-005	Vernacular Wood Frame	1920	October 18, 2006
HL-025	920 S Victoria Av	117-237-002	Bungalow	1930	October 18, 2006
HL-026	1107 W Grand Blvd	117-252-022	Vernacular Wood Frame	1908	May 16, 2007
HL-027	1120 Palm Av	109-033-004	Vernacular Wood Frame	1912	June 20, 2007
HL-028	824 S Sheridan St	117-221-001	Vernacular Wood Frame	1907	June 20, 2007
HL-029	623 S Merrill St	117-173-016	Victorian (mixed style)/Queen Anne	1893	July 18, 2007
HL-030	1047 E Grand Blvd	109-031-002	Not Available		September 5, 2007
HL-031	1101/1103 S Victoria Av	117-263-014	Transitional Bungalow	1917	October 17, 2007
HL-032	1133 E Grand Blvd	109-022-002	Not Available	1913	August 6, 2007

Historic District (HD)/Landmark (HL) Number	Address	APN	District or Style	Date Built	Date approved by City Council
HL-033	914 S Victoria Av	117-237-012	Vernacular Wood Frame w/Bungalow Elements	Not Available	October 17, 2007
HL-034	1164 E Grand Blvd	117-265-009	Not Available	Not Available	July 16, 2008
HL-035	1208 Palm Av	109-033-007	Bungalow	1914	September 17, 2008
HL-036	122 E Olive St	109-041-006	Bungalow	1916	September 17, 2008
HL-037	1222 S Victoria Av	109-021-011	Vernacular Wood Frame	1916	September 17, 2008
HL-038	934 E Grand Blvd	117-243-009	Not Available	Not Available	September 17, 2008
HL-039	802 W Grand Blvd	110-112-007	Not Available	Not Available	October 21, 2009
HL-040	805/809 S Ramona Av	117-232-007	Gothic Revival	1910-11	August 5, 2009
HL-041	1127 E Grand Blvd	109-022-003	Not Available	Not Available	September 1, 2010
HL-041	1127 E Grand Blvd	109-022-003	Not Available	Not Available	September 1, 2010
HL-042	353 E Olive St	109-033-012	Not Available	Not Available	July 17, 2013
HL-043	1031 E Grand Blvd	109-031-004	Not Available	Not Available	September 17, 2014
HL-044	1518 S Main St	109-072-008	Not Available	1938	September 16, 2015
HL-045	119 E Kendall St	109-041-021	Vernacular Wood Frame	1910	September 17, 2016
HL-046	502 W Eleventh St	110-172-020	Mission Revival	1926	October 18, 2017

5.3.3.6 CORONA HISTORIC MARKERS

In the City of Corona there are 10 Historic Markers (Table 4).

Table 4. Historic Markers Within the City of Corona

Historic Marker Number	Description	Location	Date Built	Date Dedicated
HM-00	Corona Road Races	W. Grand Blvd and Main St	1913	1986
HM-01	Corona High School and Civic Center	W. Sixth St & Buena Vista Ave	1923	Not Available

Historic Marker Number	Description	Location	Date Built	Date Dedicated
HM-02	First Congregational Church	Ramona & Eighth St	1887 1911	Not Available
HM-03	First Corona Police Officer was killed in the line of duty	Sixth & Howard	1913	Not Available
HM-04	Jefferson Elementary	Tenth & Vicentia Streets	1927	Not Available
HM-05	Site of Corona's First Fire Station	S. Main & Eighth St.	1898	1998
HM-06	Site of Lincoln Elementary School	Howard & Ninth Streets	1889 1914	1998
HM-07	Original Site of Victoria Hotel	E. Sixth Street & Victoria Ave	1904	1999
HM-08	Site of First Corona Hospital	Eighth & Belle Streets	1933	1999
HM-09	Corona's First High & Middle School	Main St and Grand Blvd	1937	2000

5.3.4 Additional Historic-in-Age Resources

The City of Corona has a long history of development dating back to the late 1800s. As of 2018, there are 5,390 parcels within the City of Corona that contain properties which are at least 50 years old (i.e., constructed prior to 1968). Of these, 106 are on the border of the City and the SOI. Details of these parcels are provided in Appendix D.

Assuming the next General Plan Update will not be completed for another decade, SWCA has also compiled a list of parcels containing properties that will become 50 years old or older within the next decade (i.e., those constructed between 1969 and 1978). That list is also provided in Appendix D. There are 3,217 such parcels within the City, 94 of which are on the border of the City and the SOI.

Additionally, Appendix D contains a series of maps which depict the history of Corona's development by decade.

5.4 Existing Conditions – Sphere of Influence

5.4.1 Archaeological Resources

Results of the cultural resources records search at the EIC indicate that 86 previously recorded archaeological resources have been identified within the City of Corona's SOI (Table 5). Of these resources, 74 are prehistoric archaeological resources, 10 are historic archaeological resources, and two are multicomponent resources. Six resources border the boundary between the City of Corona and SOI, however, these were already indicated by an asterisk in Table 1, above.

Table 5. Archaeological Resources Identified Within Corona's SOI

Primary	Trinomial	Resource Type	USGS Topographic Quadrangle	Recorded By and Year
P-33-000034	CA-RIV-000034	Prehistoric	Lake Mathews	1935 (James Gomes, City of Corona); 1959 (W. A. Savage, Lake Elsinore State Park); 1975 (Janet Williams Gould, n/a); 1975 (A. Gonzalez, n/a); 1978 (D.F McCarthy, n/a); 1980 (J. Arbuckle, n/a); 1989 (R. McLean, Chambers Group, Inc.); 2004 (Anna M. Hoover, Brad Garrett, L&L Environmental, Inc.)
P-33-000078	CA-RIV-000078	Prehistoric	Lake Mathews	1935 (Janet W. Gould, Historical Landmark approval committee); 1955 (A. Elsasser from A. Haenszel, n/a); 1959 (W.S. Savage, Lake Elsonore State Park); 1968 (Gene Shepard, Dorothy Cowper, Arda Haenszel, n/a); 1979 (Jim Arbuckle, n/a); 1988 (Daniel McCarthy, UCRARU)
P-33-000108	CA-RIV-000108	Prehistoric	Lake Mathews	1951 (Eberhardt, n/a); 1981 (Phil Porretta, Interstate Electronics Corporation); 1982 (A. Schroth & V. Chapel, Archaeological Resource Management Corp.); 1987 (L. Carbone, Scientific Resource Surveys, Inc.)
P-33-000630	CA-RIV-000630	Prehistoric	Lake Mathews	1973 (Humbert, J. and S. Hammond, CEFU); 1990 (Swope, K. and D. Peirce, Archaeological Research Units, UC Riverside)
P-33-001089	CA-RIV-001089	Prehistoric	Lake Mathews	1976 (A. Gonzales, n/a); 1980 (R. Brown, n/a); 1990 (C.E. Drover and D.M. Smith, Christopher Drover)
P-33-001090	CA-RIV-001090	Prehistoric	Lake Mathews	1978 (Daniel McCarthy, n/a)

Primary	Trinomial	Resource Type	USGS Topographic Quadrangle	Recorded By and Year
P-33-001099	CA-RIV-001099	Prehistoric	Lake Mathews	1974 (Hammond, S. R., and Ann Martz, n/a); 1985 (Hammond, S.R, Caltrans); 1987 (Carbone, L., Scientific Resource Surveys, Inc); 1990 (Swope, K., and D. Pierce, Archaeological Research Unit, UC Riverside); 2001 (Moreno, Adrian Sanchez, n/a); 2007 (Sanka, J, PBS&J); 2007 (Patterson, Joshua); 2011 (J. Sanka, PBS&J)
P-33-001169		Prehistoric	Palm Springs	1972 (Kirkish, n/a); 1992 (Drew Pallette, Brain F. Mooney Associates)
P-33-001572	CA-RIV-001572	Prehistoric	Lake Mathews	1981 (Lee A. DiGregorio, USDA Forest Service California Region)
P-33-001649	CA-RIV-001649	Prehistoric	Lake Mathews	1979 (Wm Pink); 1980 (M. Desautels, Scientific Resources Surveys, Inc., Santa Ana, CA.)
P-33-001650	CA-RIV-001650	Prehistoric	Lake Mathews	1979 (Wm Pink); 1980 (M. Desautels, Scientific Resource Surveys, Inc., Santa Ana, CA.)
P-33-002516	-	Prehistoric	Riverside East	1982 (Daniel F. McCarthy)
P-33-002680	-	Prehistoric	Corona South	1983 (Del Chario and Schroth, Archaeological Resource Management Corp., Garden Grove, CA.)
P-33-002728	CA-RIV-002728	Prehistoric	Corona North	1983 (N. Evans and W.J. Pink)
P-33-002729	CA-RIV-002729	Prehistoric	Corona North	1983 (N. Evans and W.J. Pink)
P-33-002730	CA-RIV-002730	Prehistoric	Corona North	1983 (N. Evans and W.J. Pink)
P-33-002731	CA-RIV-002731	Prehistoric	Corona North	1983 (N. Evans and W.J. Pink)
P-33-002732	CA-RIV-002732	Prehistoric	Corona North	1983 (N. Evans and W.J. Pink)
P-33-003531	CA-RIV-003531	Prehistoric	Lake Mathews	1989 (Kathleen Bergin and Randall Preston, Harmsworth Associates, Laguna Hills, CA.)
P-33-003532	CA-RIV-003532	Prehistoric	Lake Mathews	1989 (Kathleen Bergin and Randall Preston, Harmsworth Associates, Laguna Hills, CA.)
P-33-003818	CA-RIV-003818	Prehistoric	Lake Mathews	1990 (Daniel F. McCarthy, Archaeological Research Unit, UC Riverside, CA.)

Primary	Trinomial	Resource Type	USGS Topographic Quadrangle	Recorded By and Year
P-33-003819	CA-RIV-003819	Prehistoric	Lake Mathews	1990 (Daniel F. McCarthy, Archaeological Research Unit, UC Riverside, CA.)
P-33-003820	CA-RIV-003820	Prehistoric	Lake Mathews	1990 (Daniel McCarthy, Archaeological Research Unit, UC Riverside, CA.)
P-33-003821	CA-RIV-003821	Prehistoric	Lake Mathews	1990 (Daniel F. McCarthy, Archaeological Research Unit, UC Riverside, CA.)
P-33-003822	CA-RIV-003822	Prehistoric	Lake Mathews	1989 (R. McLean, J. Lanier and D. McIntosh, Chambers Group, Inc., Santa Ana, CA.); 1989 (Daniel F. McCarthy and John D. Goodman, Archaeological Research Unit, UC Riverside, CA.)
P-33-003823	CA-RIV-003823	Prehistoric	Lake Mathews	1990 (Daniel F. McCarthy and Jon Goodman, Archaeological Research Unit, UC Riverside, CA.)
P-33-003824	CA-RIV-003824	Prehistoric	Lake Mathews	1989 (R. McLean and J. Lanier and D. McIntosh, Chambers Group, Inc., Santa Ana, CA.); 1990 (Daniel McCarthy and John D. Goodman, Archaeological Research Unit, UC Riverside, CA.)
P-33-003825	CA-RIV-003825	Prehistoric	Lake Mathews	1989 (R. McLean and J. Lanier and McIntosh, Chambers Group, Inc., Santa Ana, CA.); 1990 (Daniel F. McCarthy, Archaeological Research Unit, UC Riverside, CA.)
P-33-003826	CA-RIV-003826	Prehistoric	Lake Mathews	1990 (Diane Hamann and Ken Hedges); 1990 (Daniel F. McCarthy, Archaeological Research Unit, UC Riverside, CA.)
P-33-003827	CA-RIV-003827	Prehistoric	Lake Mathews	1989 (R. McLean, J. Lanier and D. McIntosh, Chambers Group, Inc., Santa Ana, CA.); 1989 (Daniel F. McCarthy and John D. Goodman, Archaeological Research Unit, UC Riverside, CA.); 1990 (Jeanette A. McKenna, McKenna et.al., Whittier, CA.); 1990 (Diane Hamann and Ken Hedges)
P-33-003828	CA-RIV-003828	Prehistoric	Lake Mathews	1989 (Daniel F. McCarthy and John D. Goodman, Archaeological Research Unit, UC Riverside, CA.); 1990 (Ken Hedges and Diane Hamann); 1990 (Jeanette A. McKenna, McKenna et, al., Whittier, CA.)

Primary	Trinomial	Resource Type	USGS Topographic Quadrangle	Recorded By and Year
P-33-003829	CA-RIV-003829	Prehistoric	Lake Mathews	1989 (Daniel F. McCarthy and John Goodman, Archaeological Research Unit, UC Riverside, CA.); 1990 (Jeanette A. McKenna, McKenna et.al., Whittier, CA.)
P-33-003830	CA-RIV-003830	Prehistoric	Lake Mathews	1990 (Daniel F. McCarthy, Archaeological Research Unit, UC Riverside, CA.)
P-33-003831	CA-RIV-003831	Prehistoric	Lake Mathews	1990 (Daniel F. McCarthy and John D. Goodman, Archaeological Research Unit, UC Riverside, CA.)
P-33-005051	CA-RIV-005051	Prehistoric	Lake Mathews	1993 (Dave Stevens, J. Brown, J. Shinn, RMW Paleo Associates, Inc)
P-33-005052	CA-RIV-005052	Prehistoric	Lake Mathews	1993 (D. Stevens, J. Shinn, J. Brown, RMW Paleo Associates, Inc)
P-33-005821	-	Historic	Lake Mathews	1995 (J. Newland, Cleveland National Forest); 2011 (S. Williams)
P-33-008267	CA-RIV-006152/H	Prehistoric, Historic	Lake Mathews	1998 (I. Strudwick, G. King, LSA Associates, Irvine, CA)
P-33-008433	CA-RIV-006153	Prehistoric	Lake Mathews	1998 (I. Strudwick and G. King, LSA Associates, Inc., Irvine, CA)
P-33-009701	CA-RIV-0006467	Prehistoric	Corona South	2000 (Richard S. Shepard, Chambers Group, Inc.)
P-33-009702	CA-RIV-0006468H	Historic	Corona South	2000 (Richard S. Shepard, Shannon Davis, Chambers Group, Inc.)
P-33-009729	CA-RIV-0006485	Prehistoric	Corona South	1999 (Barbara Hall, Julia Kasprzak, L&L Environmental, Inc.)
P-33-009731	CA-RIV-0006487	Prehistoric	Corona South	
P-33-009732	CA-RIV-006488H	Historic	Corona South	2000 (Michael Dice, L & L Environmental, Inc.)
P-33-011041	CA-RIV-006652/H	Prehistoric, Protohistoric, Historic	Lake Mathews	
P-33-011089	-	Prehistoric	Lake Mathews	2001 (Daniel Ballester, CRM Tech); 2007 (Joshua Patterson, Jones and Stokes)
P-33-011090	-	Prehistoric	Lake Mathews	2001 (Daniel Ballester, CRM Tech); 2007 (Joshua Patterson, Jones and Stokes)
P-33-011091	-	Prehistoric	Lake Mathews	2001 (Daniel Ballester, CRM Tech); 2007 (Joshua Patterson, Jones and Stokes)
P-33-011185	-	Prehistoric	Lake Mathews	
P-33-011186	-	Prehistoric	Lake Mathews	

Primary	Trinomial	Resource Type	USGS Topographic Quadrangle	Recorded By and Year
P-33-011187	-	Prehistoric	Corona South	2000 (Daniel Ballester, CRM TECH)
P-33-011188	-	Prehistoric	Corona South	
P-33-012557	-	Prehistoric	Corona South	1986 (J. Mack, Pomona College; Dept. Anthro.)
P-33-012559	-	Prehistoric	Corona South	1987 (L.A. Carbone, Scientific Resource Surveys, Inc.); 2007 (Joshua Patterson, Jones and Stokes)
P-33-012560	-	Prehistoric	Corona South	1987 (L.A. Carbone, Scientific Resource Surveys, Inc.)
P-33-013146	-	Prehistoric	Corona South	
P-33-013147	-	Prehistoric	Corona South	1990 (K. Swope and D. Peirce, Archaeological Research Unit, UC Riverside); 2007 (Joshua Patterson, Jones and Stokes)
P-33-013490	-	Prehistoric	Lake Mathews	
P-33-013533	-	Prehistoric	Lake Mathews	2004 (Paige, Peter, SWCA Environmental Consultants); 2005 (Lawson, Nat and Daniel Ewers, LSA Associates, Inc.)
P-33-013534	CA-RIV-007483	Prehistoric	Lake Mathews	
P-33-013622	CA-RIV-007494	Prehistoric	Lake Mathews	2004 (Anna. M. Hoover and Brad Garrett, L&L Environmental, Inc.)
P-33-013623	CA-RIV-007495	Prehistoric	Lake Mathews	2004 (Anna M. Hoover and Brad Garrett, L&L Environmental, Inc.)
P-33-013624	CA-RIV-007496	Prehistoric	Lake Mathews	
P-33-013625	CA-RIV-007497	Prehistoric	Lake Mathews	2004 (Hoover, Anna M.; Kristie R. Bleins); 2004 (Hoover, Anna M.; Brad Garrett, L&L Environmental, Inc.)
P-33-013690	CA-RIV-007515	Prehistoric	Lake Mathews	2004 (Hoover, Anna M. and Kristie R. Blevins, L&L Environmental, Inc.)
P-33-013691	-	Prehistoric	Lake Mathews	2004 (Hoover, Anna M. and Kristie R. Blevins, L&L Environmental, Inc.)
P-33-013692	-	Prehistoric	Lake Mathews	2004 (Hoover, Anna M. and Kristie R. Blevins, L&L Environmental, Inc.)
P-33-013693	-	Prehistoric	Lake Mathews	2004 (Hoover, Anna M. and Kristie R. Blevins, L&L Environmental, Inc.)
P-33-015322	CA-RIV-008090	Historic	Lake Mathews	2006 (Garcia, Kyle and J.D. Stewart, PCR Services Corporation)

Primary	Trinomial	Resource Type	USGS Topographic Quadrangle	Recorded By and Year
P-33-015362	CA-RIV-008118	Historic	Lake Mathews	2006 (John Goodman, Deborah Cogan, Windy Jones, Statistical Research, Inc.); 2015 (Nicholas F. Hearth, Matthew Stever, Duke CRM)
P-33-015427	CA-RIV-008137	Historic	Lake Mathews	2006 (Goodman, John, Sara Bholat, and Deborah Cogan, Statistical Research, Inc.)
P-33-015706	CA-RIV-008186	Prehistoric	Lake Mathews	2006 (William A. Sawyer, SWCA Environmental Consultants, Inc.)
P-33-015707	CA-RIV-008187	Prehistoric	Lake Mathews	2006 (William A. Sawyer, SWCA Environmental Consultants, Inc.)
P-33-016035	-	Historic	Lake Mathews	2001 (Wallack, Nicole and Shannon Younger, LSA Associates, Inc.)
P-33-016231	CA-RIV-008380	Prehistoric	Lake Mathews	2005 (Fulton, Phil, Chris Roberts, Joe Baumann, and Andy Jackson, LSA Associates, Inc.)
P-33-016687	CA-RIV-008739	Prehistoric	Lake Mathews	2005 (Phil Fulton, Chris Roberts, Andy Jackson, and Joe Baumann, LSA Associates, Inc.)
P-33-016688	CA-RIV-008740	Prehistoric	Lake Mathews	2005 (Nat Lawson and Dan Ewers, LSA Associates, Inc.)
P-33-016700	-	Prehistoric	Lake Mathews	2007 (Sara Clowery-Moreno, Brian F. Smith and Associates)
P-33-016701	-	Prehistoric	Lake Mathews	2007 (Sara Clowery-Moreno, Brian F. Smith and Associates)
P-33-016702	-	Prehistoric	Lake Mathews	2007 (Sara Clowery-Moreno, Brian F. Smith and Associates)
P-33-016807	-	Prehistoric	Lake Mathews	2007 (Dice, M., Michael Brandman Associates)
P-33-016808	-	Prehistoric	Lake Mathews	2007 (Dice, M., Michael Brandman Associates)
P-33-016809	-	Prehistoric	Lake Mathews	2007 (Dice, M., Michael Brandman Associates)
P-33-016947	-	Historic	Lake Mathews	2007 (Sanka, Jennifer M. and Marnie Aislin-Kay, Michael Brandman Associates)
P-33-016999	-	Historic	Hemet	2007 (Souza, Anthony and Jon Kaniewski, Tierra Environmental Consultants)
P-33-017025	CA-RIV-008864	Historic	Lake Mathews	2007 (Craft, Andrea M. and Michael M. DeGiovine, Jones and Stokes)

5.4.2 Built Environment Resources

There is only one previously recorded built environment resource outside City boundaries but within the SOI. It is the historic-era Sky Ranch (P-33-016976/CA-RIV-008842) resource recorded in 2008 by SWCA.

It can be found on the Corona South USGS topographic quadrangle. Since some parcels in the SOI are located outside the City boundaries, City efforts to record historic-era built environment resources did not include them in previous surveys.

5.4.3 Properties Listed on Federal, State, and Local Registers

There are no resources outside City boundaries but within the SOI that are listed on the NRHP. The following summarizes resources in this category that are listed on state and local registers.

5.4.3.1 STATE HISTORIC LANDMARKS

Within the SOI, but outside City boundaries, there are eight State Historic Landmarks:

- Serrano Boulder (No. 185): As early as 1818, Don Leandro Serrano had cattle, sheep, cultivated land, and orchards in Temescal Valley. The boulder placed by residents of Temescal Valley marks the site of the first house in Riverside County, erected by Leandro Serrano about May 1824.

- Serrano Tanning Vats (No. 186): Nearby, two vats were built in 1819 by the Luiseño Indians under the direction of Leandro Serrano, the first non-Indian settler in what is now Riverside County. The vats were used in making leather from cow hides. In 1981 the vats were restored and placed here by the Billy Holcomb Chapter of E. Clampus Vitus.

- Carved Rock (No. 187): The petroglyphs were carved by the Luiseño Indians, their meaning is said to be: ”A chief died here. These are his plumes, his portrait, his sign, and the animals sacred to him.” The Luiseño Indians who lived in Temescal Valley belonged to the Shoshonean linguistic group. The rock has been damaged by vandals.

- Butterfield Stage Station (No. 188): Site of Butterfield Stage Station where mail was delivered and horses changed. The first stage carrying overland mail left Tipton, Missouri on September 15, 1858 and, passing through Temescal, arrived in Los Angeles October 7, 1858.

- Painted Rock (No. 190): In tribute to the earliest record of any people in this region, the Santa Fe Railway has preserved this rock with its ancient pictograph, and the Committee of the Corona Women's Improvement Club has placed a tablet.

- Ruins of the Third Serrano Adobe (No. 224): Don Leandro Serrano set out orchards and vineyards and cultivated some of the fertile lands of the Temescal Valley. In the 1840s he built his third adobe, which the Serrano family occupied until 1898, on the well-traveled road between San Diego and Los Angeles.

- Old Temescal Road (No. 638): This route was used by Luiseño and Gabrielino Indians, whose villages were nearby. Leandro Serrano established a home here in 1820. Jackson and Warner traveled the road in 1831, and Frémont in 1848. It was the southern emigrant road for gold seekers from 1849 to 1851, the Overland Mail route from 1858 to 1861, and a military road between Los Angeles and San Diego from 1861 to 1865.

- Corona Founders Monument (No. 738): R.B. Taylor, George L. Joy, Samuel Merrill, A.S. Garretson, and Adolph Rimpau, after purchasing lands of La Sierra Rancho and El Temescal grant, founded the citrus colony and town of Corona on May 4, 1886.

5.4.4 Additional Historic-in-Age Resources

The General Plan area has a long history of development dating back to the late 1800s. As of 2018, there are 1,892 parcels outside City boundaries, but within the SOI that contain properties which are at least 50 years old (i.e., built prior to 1968) but have not been evaluated for listing to the NRHP, CRHR or the Corona Register of Historic Places. These parcels are listed by their Assessor Parcel Number (APN) in Appendix D.

Assuming the next General Plan Update will not be completed for another decade, SWCA has also compiled a list of parcels containing properties that will become 50 years old or older within the next decade (i.e., those constructed between 1969 and 1978). That list, which includes 586 properties outside City boundaries but within the SOI, is also provided in Appendix D.

6 ENVIRONMENTAL CONSTRAINTS ANALYSIS

This section discusses the City's opportunities to protect cultural resources within the General Plan area as well as the potential developer constraints for future projects associated with known cultural resources and those that could potentially occur. The goal of this section is to identify potentially inadequate or conflicting mitigation measures with other plans and regulations that will guide the Corona General Plan update.

6.1 Constraints

The preservation of cultural resources within the City and its SOI is primarily constrained by the fact that much of the City and its SOI has not been systematically surveyed to identify cultural resources. In addition, some cultural resources may have been paved over during development. Further, the conservation of cultural resources is also constrained by private ownership of some built environment resources and land owners; preservation of these resources depends on the participation of willing owners.

6.2 Opportunities

The General Plan is an instrument the city can use to manage cultural resources, along with other codes, ordinances, and guidelines. The update of the General Plan provides opportunities for the City to protect cultural resources. Amending development policies, codes, and ordinances when needed to comply with updated regulatory requirements will allow planning for future projects to proceed smoothly and predictably. This will favor development in areas with fewer cultural resources, and favor conservation of areas with more cultural resources. Collaboration with Riverside County and other entities can provide logistical support during project review to ensure consistency.

There are opportunities throughout undeveloped areas of the City of Corona and its SOI to survey, identify, record, and preserve cultural resources. Key aspects of the City's location provide good opportunities to support these goals, such as the City's unique siting at the eastern edge of the Santa Ana Mountains along the Santa Ana River, where prehistoric cultural resources are abundant. The City of Corona also contains several historic-era built environment resources where the opportunity exists to identify, preserve, and rehabilitate historic built environment resources.

Through the General Plan, the City can provide means to conserve cultural resources through careful assessment of cultural resources that may be impacted by development.

6.3 Issues and Recommendations

Based on a review of the available documents and resources, SWCA did not identify any conflicts between the existing General Plan and other applicable policies or ordinances protecting cultural resources. Likewise, the General Plan does not conflict with any federal, state, or county regulations, laws, or ordinances.

Implementation of the General Plan will allow the City to evaluate and encourage development projects that are consistent with the City's priorities, including the preservation of existing built environment or archaeological resources. Further, through its participation in CEQA, the impacts of development projects to cultural resources can be avoided or reduced through implementation of appropriate mitigation measures in accordance with the CEQA process. To supplement this, the City may identify cultural resources of interest to conserve on a local basis outside the auspices of CEQA.

Goals 4.1 through 4.6 of the existing General Plan identify key methods for protecting cultural resources, including: continued implementation of a historic resources management program (4.1); promotion of use, restoration, reuse, and maintenance of historic properties (4.2); recognized importance of archaeological resources and ensured identification and protection of those resources (4.3); recognized and identified natural resources as they contribute to their historic and cultural value in the city (4.4); fostered community awareness for Corona's heritage (4.5); and strengthened preservation partnership between the City and property owners, businesses, community organizations, educational institutions, and state and federal agencies (4.6).

Expansion of the policies outlined in the aforementioned goals would ensure that impacts to cultural resources that are not known are also identified, analyzed, and mitigated. The series of recommended measures outline a series of assessments and actions, which, if allowed by proponents of development projects, provide guidance for evaluating potential project impacts and incorporating appropriate means to avoid, minimize, and/or mitigate project impacts in compliance with CEQA and conformance with the General Plan.

6.3.1 Archaeological Resources

6.3.1.1 SIGNIFICANCE THRESHOLD

Under CEQA, archaeological resources may meet the definition of a historical resource or unique archaeological resource. Any project that may cause a substantial adverse change in the significance of a historical resource would also have a significant effect on the environment. Substantial adverse change to the significance of a historical resource is defined as physical demolition, destruction, alteration, or relocation of the resource or immediate surroundings such that its significance would be materially impaired. CEQA states that when a project would cause damage to a unique archaeological resource, reasonable efforts must be made to preserve the resource in place or leave it in an undisturbed state. General or specific measures are required to the extent that the resources could be damaged or destroyed by a proposed project. Implementation of the following general measures would mitigate to the greatest extent feasible the potential for future projects to impact archaeological resources.

6.3.1.2 IMPACTS TO ARCHAEOLOGICAL RESOURCES

The records search and SLF search results indicate that the General Plan area contains archaeological resources. While some portions of lands located within the city boundaries and the SOI have been previously studied, future development or improvements related to changes in land use could potentially impact and cause significant adverse impacts to archaeological resources. The following measures are recommended to assist in the avoidance and mitigation of potential impacts from future projects in the General Plan area to archaeological resources.

6.3.1.3 MITIGATION MEASURES

Archaeological Resources Mitigation Measure 1

To determine the archaeological sensitivity of a proposed General Plan area, archaeological resources assessments shall be performed under the supervision of an archaeologist that meets the Secretary of the Interior's Professionally Qualified Standards (PQS) in either prehistoric or historic archaeology. Assessments shall include a CHRIS records search at the EIC and a search of the SLF maintained by the NAHC. The records searches will determine if the proposed General Plan area has been previously surveyed for archaeological resources, identify and characterize the results of previous cultural resource surveys, and disclose any cultural resources that have been recorded and/or evaluated. A Phase I pedestrian survey shall be undertaken in proposed General Plan areas that are undeveloped to locate any surface cultural materials. By performing a records search, consultation with the NAHC, and a Phase I survey, a qualified archaeologist will be able to classify the General Plan area as having high, medium, or low sensitivity for archaeological resources.

Archaeological Resources Mitigation Measure 2

If potentially significant archaeological resources are identified through an archaeological resources assessment, and impacts to these resources cannot be avoided, a Phase II Testing and Evaluation investigation shall be performed by an archaeologist who meets the PQS prior to any construction-related ground-disturbing activities to determine significance. If resources determined significant or unique through Phase II testing, and site avoidance is not possible, appropriate site-specific mitigation measures shall be established and undertaken. These might include a Phase III data recovery program that would be implemented by a qualified archaeologist and shall be performed in accordance with the Office of Historic Preservation's *Archaeological Resource Management Reports (ARMR): Recommended Contents and Format* (1990) and *Guidelines for Archaeological Research Designs* (1991).

Archaeological Resources Mitigation Measure 3

If the archaeological assessment did not identify potentially significant archaeological resources within the proposed General Plan area but indicated the area to be highly sensitive for archaeological resources, a qualified archaeologist shall monitor all ground-disturbing construction and pre-construction activities in areas with previously undisturbed soil. The archaeologist shall inform all construction personnel prior to construction activities of the proper procedures in the event of an archaeological discovery. The training shall be held in conjunction with the project's initial on-site safety meeting, and shall explain the importance and legal basis for the protection of significant archaeological resources. In the event that archaeological resources (artifacts or features) are exposed during ground-disturbing activities, construction activities in the immediate vicinity of the discovery shall be halted while the resources are evaluated for significance by an archaeologist who meets the PQS. If the discovery proves to be significant, it shall be curated with a recognized scientific or educational repository.

Archaeological Resources Mitigation Measure 4

If the archaeological assessment did not identify potentially significant archaeological resources within the proposed General Plan area, but indicates the area to be of medium sensitivity for archaeological resources, an archaeologist who meets the PQS shall be retained on an on-call basis. The archaeologist shall inform all construction personnel prior to construction activities about the proper procedures in the event of an archaeological discovery. The training shall be held in conjunction with the project's initial on-site safety meeting, and shall explain the importance and legal basis for the protection of significant archaeological resources. In the event that archaeological resources (artifacts or features) are exposed during ground-disturbing activities, construction activities in the immediate vicinity of the discovery shall be halted while the on-call archaeologist is contacted. If the discovery proves to be significant, it shall be curated with a recognized scientific or educational repository.

6.3.2 Historical Resources

6.3.2.1 SIGNIFICANCE THRESHOLD

Under CEQA, any project that may cause a substantial adverse change in the significance of a historical resource would also have a significant effect on the environment. Substantial adverse change to the significance of a historical resource is defined as physical demolition, destruction, alteration, or relocation of the resource or immediate surroundings such that its significance would be materially impaired. CEQA states that when a project will cause damage to a historical resource, reasonable efforts must be made to preserve the resource in place or leave it in an undisturbed state. Mitigation measures are required to the extent that the resource could be damaged or destroyed by a project. Projects that follow the Secretary of the Interior's Standards for the Treatments of Historic Properties (Standards) are typically mitigated below the level of significance.

6.3.2.2 IMPACTS TO HISTORICAL RESOURCES

The records search indicates that the General Plan area contains a large quantity of buildings and structures that are older than 50 years of age; therefore it is probable that future development in the General Plan area will result in the identification of historical resources. Within the city boundaries, it appears there is a particularly high potential to encounter historic buildings and structures. Future development or improvements related to changes in land use could potentially impact historic buildings and structures and cause significant adverse impacts to historical resources. The following measures are recommended to assist in the avoidance and mitigation of potential impacts from future projects in the General Plan area to historical resources.

6.3.2.3 MITIGATION MEASURES

Historical Resources Mitigation Measure 1

Prior to any construction activities that may affect historical resources, a historical resources assessment shall be performed by an architectural historian or historian who meets the PQS in architectural history or history. This shall include a records search at the EIC to determine if any resources that may be potentially affected by the project have been previously recorded, evaluated, and/or designated in the NRHP, CRHR, or Corona Register of Historic Resources. Following the records search, the qualified architectural historian or historian shall conduct a reconnaissance-level and/or intensive-level survey in accordance with the California Office of Historic Preservation (OHP) guidelines to identify any previously unrecorded potential historical resources that may be potentially affected by the proposed project. Pursuant to the definition of a historical resource under CEQA, potential historical resources shall be evaluated under a developed historic context.

Historical Resources Mitigation Measure 2

To ensure that projects requiring the relocation, rehabilitation, or alteration of a historical resource not impair its significance, the *Secretary of the Interior's Standards for the Treatments of Historic Properties* shall be used to the maximum extent possible. The application of the standards shall be overseen by a qualified architectural historian or historic architect meeting the PQS. Prior to any construction activities that may affect the historical resource, a report identifying and specifying the treatment of character-defining features and construction activities shall be provided to the City of Corona.

Historical Resources Mitigation Measure 3

If a proposed project would result in the demolition or significant alteration of a historical resource, it cannot be mitigated to a less than significant level. However, recordation of the resource prior to construction activities will assist in reducing adverse impacts to the resource to the greatest extent possible. Recordation shall take the form of Historic American Buildings Survey (HABS), Historic American Engineering Record (HAER), or Historic American Landscape Survey (HALS) documentation, and shall be performed by an architectural historian or historian who meets the PQS. Documentation shall include an architectural and historical narrative; medium- or large-format black and white photographs, negatives, and prints; and supplementary information such as building plans and elevations, and/or historic photographs. Documentation shall be reproduced on archival paper and placed in appropriate local, state, or federal institutions. The specific scope and details of documentation would be developed at the project level.

6.3.3 Measures for All Cultural Resources (Built Environment and Archaeological Resources)

Cultural Resources Mitigation Measure 1

The results of the cultural resources survey for a proposed development with no significant impacts may be presented in a cultural resources survey letter report. For proposed development projects with significant impacts that require mitigation to reduce the impacts to below a level of significance, the results of the survey shall be presented in a CRTR.

Cultural Resources Mitigation Measure 2

If cultural resources that are eligible for listing to the NRHP, CRHR, or Corona Register of Historic Resources are identified within or adjacent to the proposed development, the construction limits shall be clearly flagged to assure impacts to eligible cultural resources are avoided or minimized to the extent feasible. Prior to implementing construction activities, a qualified archaeologist shall verify that the flagging clearly delineates the construction limits and eligible resources to be avoided. Since the location of some eligible cultural resources is confidential, these resources will be flagged as environmentally sensitive areas (ESA).

Cultural Resources Mitigation Measure 3

If eligible cultural resources are present within or adjacent to the proposed development and impacts may occur from implementation of construction activities, a qualified cultural resources monitor may be required during a portion or all of the construction activities to assure impacts are avoided or minimized to the extent feasible. The specific cultural resources requirement shall be evaluated on a project-by-project basis.

Cultural Resources Mitigation Measure 4

In the event of any artifact discovery, construction work will halt within a 30-m radius of the find until its eligibility can be determined by a qualified archaeologist. Any artifact or feature shall be recovered, prepared to the point of curation, identified by qualified experts, listed in a database to facilitate analysis, and deposited in a designated archaeological curation facility.

Cultural Resources Mitigation Measure 5

In the event of a human burial recovery, all construction work will halt within a 30-m radius of the find. The Riverside County Coroner will be contacted immediately at (951) 443-2300. If the Coroner and qualified archaeologist agree that the human remains are prehistoric, the NAHC shall be contacted to determine the MLD. The MLD will make recommendations for the treatment and potential repatriation. The recommendations will be followed to the extent feasible, as deemed appropriate by a qualified archaeologist.

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Appendix A.
Previous Cultural Resources Studies within the City of Corona and the SOI

Report No.	Authors	City/Year	Citation Title	Report Type	Resources	Resource Count	Maps
RI-00062	Ronalad C. Tobey, Terry D. Suss, And Larry Burgess	1977	Historical Resource Survey Of The Prado Flood Control Basin	Architectural/historical	33-000653, 33-001039, 33-001044, 33-003694, 33-005783	5	Corona North, Prado Dam
RI-00064	Jean Tadlock	1977	Archaeological Element Of An Environmental Impact Report Western Village Project, Riverside County, California, Leighton Project 77201-1	Archaeological, Field study		0	Black Star Canyon, Prado Dam
RI-00078	Michael C. Gardner	1973	Main Street Wash Flood Control Project: Expected Impact To Archaeological Resources.	Archaeological, Field study		0	Corona North, Corona South

RI-00080	Michael C. Garnder	1973	Lincoln Street Channel Stage Ii Flood Control Project: Expected Impact To Archaeological Resources.	Archaeological, Field study	33-001639	1	Corona North, Riverside West
RI-00164	Timothy M. Kearns	1978	Archaeological Survey Report: On A Thirty-Two Acre Parcel In The Twilliger Valley Area, Anza, California	Archaeological, Field study		0	Beauty Mountain
RI-00166	Thomas J. King, Jr.	1975	The Ceramic Assemblage From Wadi Breadnaker.	Archaeological, Excavation, Field study	33-000881	1	Orocopia Canyon

RI-00169	Patricia Martz And Richard A. Weaver	1975	Environmental Evaluation: Archaeology Of The Proposed Alignments Of The Santa Ana Regional Interceptor, Riverside, San Bernardino, And Orange Counties, California	Archaeological, Field study		0	Prado Dam
RI-00188	Mary A. Brown	1976	Letter Report: Cultural Resources Evaluation For Proposed Water Supply Facilities For The City Of Corona And Surrounding Communities (Phase Ii).	Archaeological, Field study	33-000101	1	Corona South, Lake Mathews

RI-00188	Mary A. Brown	1976	Letter Report: Cultural Resources Evaluation For Proposed Water Supply Facilities For The City Of Corona And Surrounding Communities (Phase Ii).	Archaeological, Field study	33-000101	1	Corona South, Lake Mathews
RI-00261	Donald Lipp	1977	Environmental Impact Assessment :Archaeological Survey Of Sharer Ranch, Riverside County, California	Archaeological, Field study		0	Black Star Canyon, Prado Dam

RI-00264	Jean A. Salpas	1981	Mitigation Of The Archaeological Site Ca-Riv 150, Locus I Cultural Resources Located On 9.5 Acres Of Land At The Southeast Corner Of Washington Avenue And Highway 111 In La Quinta, Riverside County	Archaeological, Excavation, Field study	33-000150	1	La Quinta
RI-00270	Donald Lipp	1977	Environmental Impact Evaluation: Archaeological Survey Of The Proposed Interceptor Facility To City Of Riverside Water Quality Control Plant, Riverside County, California	Archaeological, Field study	33-000494	1	Riverside West

RI-00315	Stephen Bouscaren	1978	Environmental Impact Evaluation: Archaeological Assessment Of Tentative Parcel Map 11547, Riverside County, California	Archaeological, Field study	33-001317, 33-002249	2	Temecula
RI-00336	Christina Brewer	1978	An Archaeological Survey Of Parcel Nos. 1, 2, And 3 On Parcel Map 11561, County Of Riverside, California	Archaeological, Field study		0	Lake Mathews
RI-00337	Jane Rosenthal	1996	Archaeological Assessment For Corona Clay Parcels 1, 2, And 3 Temescal Canyon Vicinity, Riverside County, California	Archaeological, Field study		0	Lake Mathews

RI-00375	Victor Demunck	1978	Environmental Impact Evaluation: Archaeological Assessment Of Parcel Map 10826, Gavilan Hills Area, Riverside County, California	Archaeological, Field study		0	Steele Peak
RI-00384	Christopher E. Dover	1978	Environmental Impact Evaluation: Archaeological Assessment Of Tentative Parcel Map 11899, Near Lake Mathews, Riverside County, California	Archaeological, Field study		0	Lake Mathews
RI-00410	Jack Zahnisec	1980	Archaeological Assessment Form: Riverside County Planning Department, Smp No. 133	Archaeological, Field study		0	Alberhill, Lake Mathews

RI-00446	Christopher E. Dover	1992	Environmental Impact Evaluation: A Cultural Resources Assessment Of The 291 Acre Golden City Project Murrieta Usgs Quadrangle, Riverside County, California	Archaeological, Field study	33-001074, 33-001364, 33-001365, 33-001375, 33-001376, 33-001377, 33-001802, 33-002210, 33-002220	9	Murrieta
RI-00448	Jean A. Keller	1995	Report Of Research Finding For Golden City Specific Plan And Eir	Archaeological, Field study	33-001074	1	Murrieta
RI-00449	Ruth A. Musser	1978	Environmental Impact Evaluation: Archaeological Assessment Of Tentative Tract 13338, South Paloma Valley, Riverside County, California	Archaeological, Field study	33-001558, 33-001559	2	Romoland

RI-00465	Bruce Love And Bai "Tom" Tang	1999	Historic Building Evaluation, Former B&R Service Building, 1390 East Chase Drive, City Of Corona, Riverside County, California	Evaluation	33-008903	1	Corona South
RI-00468	Terry Malone And Willian Fowler	1978	Archaeological Survey Report On Tentative Tract 11920 Located In The Rancho Santa Rosa Portion Of Rancho California In The County Of Riverside, California	Archaeological, Field study		0	Temecula
RI-00608	Beth Padon	1982	Archaeological Assessment Of Woodlake Villages General Plan Amendment	Archaeological, Field study	33-000106, 33-001258, 33-001259, 33-001443, 33-001445, 33-001626	6	Corona North

RI-00609	Thomas Holcomb, James D. Swenson, And Philip J. Wilke	1979	Results Of Test Excavations At Ca-Riv-1443, Norco Hills, Riverside County, California	Excavation	33-001443	1	Corona North
RI-00610	Christopher E. Drover	1979	An Archaeological Assessment Of The Norco Hills Proposed Subdivision Near Norco, California	Archaeological, Field study	33-001259, 33-001443, 33-001445, 33-001626	4	Corona North
RI-00661	L. Kyle Napton And Elizabeth Anne Greathouse	1979	Archaeological Reconnaissance On The Torres-Martinez Indian Reservation, Riverside County, California	Archaeological, Field study	33-001292	1	Mecca, Oasis, Valerie
RI-00748	M.D Chambers	1979	Letter Report: Archaeological Survey Of Tentative Parcel No. 13062	Archaeological, Field study		0	Alberhill, Lake Mathews

RI-00755	Marie Cottrel	1980	Archaeological Resources Conducted For The Corona Assessment District Environmental Impact Report	Archaeological, Field study	33-000808, 33-001437, 33-001438, 33-001439, 33-001440, 33-001653, 33-001654	7	Corona North
RI-00757	James E. Baldwin	1980	Cultural Resource Impact Evaluation: Archaeological Inspection Of Tentative Parcel Map No. 15490, Portion Of Dawson Canyon, Corona, Riverside County	Archaeological, Field study		0	Lake Mathews
RI-00817	Philip De Barros And Paul Farnsworth	1990	Archaeological Investigations Of The St. Boniface Indian School And Cemetery Site, Banning, California	Archaeological, Field study	33-000099, 33-004213	2	Beaumont

RI-00848	Christopher E. Drover	1980	Environmental Impact Evaluation: Archaeological Assessment Of A Proposed Subdivision On The Northwest Corner Of Temescal Canyon And Glen Ivy Roads Near Corona, California	Archaeological, Field study		0	Lake Mathews
RI-00974	Joan Oxendine	1980	Archaeological Assessment Of Pm 16663	Archaeological, Field study		0	Myoma
RI-01003	James D. Swenson	1979	Letter Report: Archaeological Assessment Of A 15 Acre Parcel	Archaeological, Field study		0	Palm Springs

RI-01035	George R. Momyer	1937	Indian Picture Writing In Southern California (Copy)	Other research	14-000208, 26-000007, 33-000010, 33-000014, 33-000016, 33-000020, 33-000036, 33-000061, 33-000078, 33-000114	10	
RI-01076	Jean A. Salpas	1980	An Archaeological Assessment Of 10 Acres In The Temescal Valley (Lot In The Temescal Valley)	Archaeological, Field study		0	Lake Mathews
RI-01077	Jean A. Salpas	1980	An Archaeological Assessment Of 7.92 Acres In The Temescal Valley (Portion Of Parcel 2, Parcel Map 7239)	Archaeological, Field study		0	Lake Mathews

RI-01112	Steven Schwartz	1981	Cultural Resources Survey, Prado Fix	Archaeological, Field study	33-002203, 33-012900	2	Corona North, Prado Dam
RI-01169	Roger J. Desautels	1979	Archaeological Survey Report On A 1700 + Acre Parcel Of Land Designated The "Campeau Project" Located In The Lake Matthews Area Of Riverside County	Archaeological, Field study	33-002097, 33-002226, 33-002227	3	Corona North, Corona South, Lake Mathews, Riverside West
RI-01237	Robert J. Wlodarski And John M. Foster	1980	Cultural Resource Overview For The Devers Substation To Serrano Substation Transmission Route Alternatives Corridor Right-Of-Way	Archaeological, Field study	33-001836, 33-001837	2	Alberhill, Beaumont, Black Star Canyon, Cabazon, Corona South, El Casco, Lake Elsinore, Lake Mathews, Lakeview, Perris, Romoland

RI-01237	Robert J. Wlodarski And John M. Foster	1980	Cultural Resource Overview For The Devers Substation To Serrano Substation Transmission Route Alternatives Corridor Right-Of-Way	Archaeological, Field study	33-001836, 33-001837	2	Alberhill, Beaumont, Black Star Canyon, Cabazon, Corona South, El Casco, Lake Elsinore, Lake Mathews, Lakeview, Perris, Romoland
RI-01238	Daniel F. Mccarthy	1986	Environmental Evaluation: A Archaeological Assessment Of A 9.9 Acre Parcel Of Land In Temescal Canyon, Riverside County, California.	Archaeological, Field study		0	Lake Mathews

RI-01242	Stephen R. Hammond	1980	First Addendum To Archaeological Survey Report For The Proposed Route 15 Transportation Facility Between Magnolia Avenue In The City Of Corona And The Route 60 Freeway, Riverside And San Bernardino Counties	Archaeological, Field study	33-001439, 33-001441	2	Corona North
RI-01268	Stephen R. Hammond	1981	Archaeological Survey Report For The Proposed Glen Ivy Safety Roadside Rest Facilities (P.M. 31.3/31.9)	Archaeological, Field study		0	Lake Mathews

RI-01307	Ann S. Peak	1975	Cultural Resource Assessment Of Sewage Treatment Facilities Expansion Project, City Of Corona, Riverside County, California	Archaeological, Field study		0	Corona North
RI-01338	Christina Brewer	1979	An Archaeological Survey Of Track 14684, County Of Riverside, California	Archaeological, Field study		0	Alberhill, Lake Mathews
RI-01354	William Breece And Beth Padon	1982	Archaeological Testing At Ca-Riv-1801, Green River Meadow Project, Riverside County, California	Excavation	33-001801	1	Prado Dam

RI-01355	Roger J. Desautels	1979	Archaeological Survey Report On: An 85 Acre Segment Of The Cadillac Fairview'S " Green River" Project. Located In Santa Ana Canyon, Riverside County, California	Archaeological, Field study	33-001801	1	Prado Dam
RI-01388	Larry L. Bowles	1982	An Archaeological Assessment Of Tentative Tract 18411 Located Near Vail Lake	Archaeological, Field study		0	Vail Lake

RI-01420	Lsa, Inc.	1982	Archaeological Records Search And Reconnaissance Western Municipal Water District Proposed Water Treatment Plant, Riverside County, California	Archaeological, Field study		0	Prado Dam
RI-01479	Schroth, Adella	1982	Archaeological Assessment Of The Temescal Valley Project, County Of Riverside, California	Archaeological, Field study	33-000108, 33-000642, 33-001423, 33-001446, 33-001461	5	Alberhill, Corona South, Lake Mathews

RI-01479	Schroth, Adella	1982	Archaeological Assessment Of The Temescal Valley Project, County Of Riverside, California	Archaeological, Field study	33-000108, 33-000642, 33-001423, 33-001446, 33-001461	5	Alberhill, Corona South, Lake Mathews
RI-01494	Rosenthal, Jane And Patricia R. Jertberg	1993	Archaeological Assessment Of The Twenty-Nine Palms Band Of Mission Indians Casino Development, Indio, Riverside County, California	Archaeological, Field study	33-000149	1	Indio
RI-01517	Bowles, Larry L.	1982	Archaeological Assessment For Tpm 18721	Archaeological, Field study		0	Black Star Canyon, Corona North, Corona South

RI-01517	Bowles, Larry L.	1982	Archaeological Assessment For Tpm 18721	Archaeological, Field study		0	Black Star Canyon, Corona North, Corona South
RI-01572	Bowles, Larry L. And Jean Salpas	1979	An Archaeological Assessment Of Parcel 14613	Archaeological, Field study		0	Romoland

RI-01665	Wirth Associates	1983	Devers-Serrano-Villa Park Transmission System Supplement To The Cultural Resources Technical Report - Public Review Document And Confidential Appendices	Archaeological, Field study	33-002529, 33-002530, 33-002531, 33-002591, 33-002592, 33-013336, 33-013366, 33-013545	8	Alberhill, Beaumont, Cabazon, Corona North, Corona South, El Casco, Lake Fulmor, Lake Mathews, Lakeview, Perris, Redlands, San Bernardino South, San Jacinto, Santiago Peak, Sunnymead
RI-01724	Rector, Carol	1983	An Archaeological Assessment Of Tract 17634, City Of Corona, Riverside County, California	Archaeological, Field study, Literature search		0	Corona South

RI-01735	Mccarthy, Daniel F.	1983	An Archaeological Assessment Of Sky Island Estates, Santa Ana Canyon Area Of Orange And Riverside Counties, California	Archaeological, Field study		0	Black Star Canyon, Prado Dam
RI-01736	Pink, W.J., M.A. Brown And Nancy Evans	1983	Cultural And Paleontological Resources Assessment Of The Greenway Farms, A Proposed Subdivision, Riverside County, California	Archaeological, Field study	33-002728, 33-002729, 33-002730, 33-002731, 33-002732	5	Corona North, Corona South, Lake Mathews, Riverside West

RI-01873	Cottrell, Marie	1984	A Cultural Resources Assessment Conducted For Tt 20060, City Of Corona, Riverside County, California	Archaeological, Field study	33-002201	1	Corona North
RI-01913	Mccarthy, Daniel F.	1985	An Archaeological Assessment Of A Portion Of A Proposed Interceptor Sewer Pipeline Right-Of-Way In The Norco- Corona Area, Riverside County, California	Archaeological, Field study	33-003002	1	Corona North

RI-01914	Gallegos, Dennis And Richard Carrico	1985	Cultural Resources Survey For The Proposed Siera Del Oro Project, Corona, California	Archaeological, Field study		0	Black Star Canyon, Corona North, Corona South, Prado Dam
RI-01914	Gallegos, Dennis And Richard Carrico	1985	Cultural Resources Survey For The Proposed Siera Del Oro Project, Corona, California	Archaeological, Field study		0	Black Star Canyon, Corona North, Corona South, Prado Dam

RI-01949	Bouscaren, Stephen	1985	Final Report: An Archaeological Assessment Of The Proposed Valley-Serrano 500 Kv Transmission Line Corridor, Orange And Riverside Counties	Archaeological, Field study	33-000714, 33-001078, 33-001655, 33-001725	4	Alberhill, Corona South, Lake Elsinore, Lake Mathews, Romoland
RI-01954	E. Jane Rosenthal And Steven J. Schwarz	1981	A Cultural Resource Surveyof The Proposed Santa Ana River Hiking/Biking Trail Iin The Prado Flood Control Basin	Archaeological, Field study	33-000653, 33-003508	2	Black Star Canyon, Corona North, Prado Dam

RI-01976	Hammond, Stephen R.	1985	Archaeological Survey Report For The Proposed Widening Of Interstate Route 15 Between Glen Ivy Undercrossing And 0.4 Mile South Of Ontario Avenue 08-Riv-15, P.M.33.3/38.3	Archaeological, Field study	33-001099	1	Corona South, Lake Mathews
RI-02072	Swope, Karen K.	1987	An Archaeological Assessment Of Tt 21268, Corona Area Of Riverside County, California	Archaeological, Field study	33-003055	1	Corona South

RI-02267	Schneider, Joan S.	1988	An Archaeological Assessment Of Tt 21355 Located In The City Of Corona, Western Riverside County, California	Archaeological, Field study		0	Corona North
RI-02270	Drover, C.E.	1988	An Archaeological Assessment Of The Proposed Temscal Wash Sand And Gravel Mining Operation, Temscal Canyon, Riverside County, California	Archaeological, Field study	33-000078	1	Lake Mathews

RI-02303	Keller, Jean Salpas	1988	An Archaeological Assessment Of Tpm # 23456, Riverside County, California	Archaeological, Field study		0	Bachelor Mtn
RI-02308	Parr, Robert E.	1988	An Archaeological Assessment Of Tp 22782, Located In The Corona Area Of Riverside County, California	Archaeological, Field study		0	Corona South
RI-02379	Lsa, Inc.	1989	Chase Ranch Specific Plan - Archaeological Assessment	Archaeological, Field study		0	Corona South
RI-02381	Scientific Resource Surveys, Inc.	1988	Archaeological Assessment - Tp 23959	Archaeological, Field study		0	Lake Mathews

RI-02386	Keller, Jean S.	1988	An Archaeological Assessment Of Tpm 24011, Riverside County California	Archaeological, Field study		0	Temecula
RI-02396	Drover, C.E.	1989	An Archaoelogical Assessment Of The Indian Trails Project, Temescal Valley, East Of Corona, California.	Archaeological, Field study		0	Alberhill, Lake Mathews

RI-02396	Drover, C.E.	1989	An Archaoelogical Assessment Of The Indian Trails Project, Temescal Valley, East Of Corona, California.	Archaeological, Field study		0	Alberhill, Lake Mathews
RI-02429	Stickel, E. Gary And Terence D'Altroy	1980	Santa Ana River And Santiago Creek: A Cultural Resource Survey	Archaeological, Field study	33-011620, 33-011621	2	Corona North, El Casco, Prado Dam
RI-02515	Brown, Joan C.	1989	Cultural Resources Reconnaissance Of The 1,100 Acre Eagle Valley Project, Riverside, California.	Archaeological, Field study	33-003685, 33-011805	2	Corona South, Lake Mathews

RI-02516	Morgan, Marilyn	1989	Addendum To Cultural Resources Reconnaissance Of Eagle Valley Project, Dated 17 And 20 July 1989, Riverside County, California			0	Corona South, Lake Mathews
RI-02521	Dibble, Stephen D.	1987	An Archaeological Assessment Of The Warm Springs Green Development, Riverside County, California.	Archaeological, Field study		0	Lake Mathews

RI-02535	Keller, Jean S.	1989	An Archaeological Assessment Of Change Of Zone 5328/Plot Plan 10,893 Riverside County, California.	Archaeological, Field study		0	Wildomar
RI-02650	Bergin, Kathleen A. And Randal P. Preston	1989	Technical Report 3: Archaeological Research Report For The Temescal Canyon Composing Facility Eir Riverside County, California. Sch 88100318	Archaeological, Field study	33-003531, 33-003532	2	Lake Mathews

RI-02651	Love, Bruce	1991	Letter Report: Cultural Resources Monitoring: Temescal Canyon Composting Project		33-003531	1	Lake Mathews
RI-02660	Scientific Resource Surveys	1989	Cultural And Paleontological Resources Investigation Of Lee Lake Water District Reach F Extension Riverside County, California.	Archaeological, Field study		0	Lake Mathews

RI-02743	Mccarthy, Daniel	1990	Archaeological Assessment Of The Morger Property Located In Olsen Canyon In Temescal Valley, Riverside County, California	Archaeological, Field study	33-003819, 33-003820, 33-003821, 33-003822, 33-003823, 33-003824, 33-003825, 33-003826, 33-003827, 33-003828, 33-003829, 33-003830, 33-003831, 33-003832	14	Lake Mathews
RI-02744	Mckenna, Jeanette A., Ken Hedges, And Diane Hamann	1990	Archaeological Test Excavations In The Temescal Quarry Site, Olsen Canyon, Riverside County, California		33-003826, 33-003827, 33-003828, 33-003829	4	Lake Mathews

RI-02871	Reed, Judyth E.	1984	Cultural Resources Inventory And Evaluation Of Several Parcels Near Oasis, California	Archaeological, Field study	33-001523, 33-002947, 33-002948, 33-002949	4	Oasis, Rabbit Peak
RI-02881	Greenwood, Roberta And J. Foster	1990	Context Evaluation Of Historical Sites In The Prado Basin.	Evaluation	33-000653, 33-001039, 33-001044, 33-002203, 33-002778, 33-002802, 33-003372, 33-003508, 33-003693, 33-003694	10	Corona North, Prado Dam
RI-02890	Mckenna, J. Et Al.	1990	Historic And Archaeological Investigations Of The Sandberg Project Site, Glen Ivy, Riverside County, California	Archaeological, Field study		0	Alberhill, Lake Mathews

RI-02897	Mitchell, M.	1990	Cultural Resource Assessment Of 219 Acres Of Public Lands Probosed For Exchange To The Newport Habor Development Corp. Letter Report	Archaeological, Field study		0	Hopkins Well
RI-02905	Mckenna, Jeanette	1988	An Intensive Survey Of The Corona Ranch Project Area, City Of Corona, Riverside County, California.	Archaeological, Field study	33-001259, 33-001443, 33-001445, 33-001446, 33-001626	5	Corona North

RI-02980	Digregorio, Lee A.	1990	An Archaeological Reconnaissance Report (Trabuco Land Exchange)	Archaeological, Field study	33-001238, 33-002988, 33-003884, 33-003885, 33-004024, 33-004025, 33-013358	7	Alberhill, Corona South, Wildomar
RI-02984	Drover, Christopher	1990	An Archaeological Assessment Of The Temescal Valley Project, Temescal Valley, East Of Corona, California.	Archaeological, Field study	33-001089	1	Alberhill, Lake Mathews

RI-02985	Yohe, Robert M. Ii	1989	An Archaeological Assessment Of Tentative Tract 24030 Located In The Bermuda Dunes Area Of Riverside County, California.	Archaeological, Field study		0	La Quinta
RI-03138	Scientific Resource Surveys, Inc.	1990	Cultural And Paleontological Survey Report On The Nastonero Property, Riverside County, California	Archaeological, Field study		0	Black Star Canyon, Corona South

RI-03153	Cottrell, Marie G., D., Stephen Dibble, And Vada Drummy-Chapel	1988	A Cultural Resource Assessment Of A Proposed Development In The Temescal Valley, Riverside County, California; Part I: Archaeology; Part Ii: Historic Assessment	Archaeological, Field study	33-004118, 33-004119, 33-004120, 33-004121, 33-004122	5	Corona South, Lake Mathews
RI-03175	Swope, Karen	1991	Cultural Resources Assessment: Temescal Valley Project, Riverside County, California	Archaeological, Field study	33-000101, 33-000630, 33-000642, 33-001099, 33-003832, 33-004111, 33-004112, 33-013146, 33-013147, 33-013148	10	Alberhill, Corona South, Lake Mathews

RI-03306	Freeman, Trevor A. And David M. Van Horn	1989	Archaeological Survey Report: Cultural Resource Assessment Of The Seigal Farms Property Lake Mathews, Riverside County, California	Archaeological, Field study	33-001144, 33-001146, 33-001147, 33-001536, 33-002529, 33-004307, 33-004308, 33-004309	8	Lake Mathews
RI-03320	Drover, Christopher	1990	Environmental Impact Evaluation: An Archaeological Assessment Of The Werner Surface Mine, Temescal Valley, East Of Corona, California	Archaeological, Field study		0	Alberhill, Lake Mathews

RI-03322	The Keith Companies	1988	State Route 91 Improvements Project: Historic Property Survey Report	Literature search, Other research		0	Black Star Canyon, Corona North, Prado Dam, Riverside West
RI-03322	The Keith Companies	1988	State Route 91 Improvements Project: Historic Property Survey Report	Literature search, Other research		0	Black Star Canyon, Corona North, Prado Dam, Riverside West
RI-03514	Macko, Michael E. And Keith D. Rhodes	1992	Phase I Archaeological Resource Assessment: Glen Ivy Hot Springs Flood Control Project, Linked To Plot Plan 9026, Riverside County, California			0	Lake Mathews

RI-03532	York, Andrew	1992	San Bernardino National Forest Archaeological Reconnaissance Report (Gte Route 74 Fiber Optics Cable Project)	Archaeological, Field study		0	Butterfly Peak
RI-03564	Mckenna, Jeannette A.	1992	A Cultural Resources Investigation And Site Evaluations For The Proposed 200 Acre Windward Development Project Area, Norco, Riverside County, Ca.	Archaeological, Evaluation, Field study	33-000106, 33-001258, 33-001443, 33-001446, 33-001626, 33-004947, 33-004948, 33-009024, 33-009025, 33-009026, 33-012561	11	Corona North

RI-03598	Seymour, Gregory And David Doak	1992	An Archaeological Survey For The Western Riverside Regional Wastewater Treatment Facility Conveyanco System In Corona And Norco, Riverside County, California.	Archaeological, Field study		0	Corona North

RI-03599	Seymour, Gregory R.	1993	An Archaeological Survey For The Home Gardens Sanitary District Initial Study In Corona, Riverside County, California.	Archaeological, Field study		0	Corona North, Corona South
RI-03602	Brown, Joan C.	1993	Cultural Resource Reconnaissance And Assessment For The Eagle Valley East Project.	Archaeological, Field study	33-005049, 33-005050, 33-005051, 33-005052	4	Lake Mathews
RI-03609	Keller, Jean A.	1993	A Phase I Archaeological Assessment Of Tentative Tract Map 27617.	Archaeological, Field study		0	Lake Elsinore

RI-03629	Gregory Seymour And David Doak	1992	An Archaeological Survey For The Western Riverside Regional Waste Water Treatment System In Corona And Norco, Riverside County.	Archaeological, Field study	33-000652	1	Corona North
RI-03722	Desautels, Nancy And Robert Beer	1993	Geophysical Investigations And Subsurface Recovery On Tom'S Farms Property, Riverside County, California; Parcel Map 4927	Evaluation		0	Lake Mathews

RI-03768	Alexandrowicz, J. S., Arthur Kuhner, Edward Knell, And Susan Alexandrowicz	1994	Historic Preservation Investigations For The South Norco Channel Line Sb, Stage 1, City Of Corona, City Of Norco, County Of Riverside, California	Archaeological, Field study	33-005310, 33-005311	2	Corona North
RI-03810	Duffield, Anne Q.	1989	Archaeological & Historical Survey Report For The Cajalco Canyon Rock Quarry	Archaeological, Field study		0	Lake Mathews

RI-03811	Hatheway, Roger	1990	Letter Report: Supplement To Archaeological & Historical Survey Report For The Cajalco Canyon Rock Quarry	Archaeological, Field study		0	Lake Mathews
RI-03890	Lsa Associates, Inc.	1990	An Archaeological Assessment Of The Empire Homes Specific Plan And Tentative Tract 25466, Riverside County, California	Archaeological, Field study		0	Corona South

RI-04120	Mason, Roger, Philippe Lapin, And Wayne H. Bonner	1998	Cultural Resources Records Search And Survey Report For A Pacific Bell Mobile Services Telecommunications Facility: Cm 150-03, City Of Corona, California	Archaeological, Field study		0	Corona North
RI-04144	Love, Bruce And Bai "Tom" Tang	1998	Cultural Resources Report: Temescal Valley Regional Interceptor, Santa Ana Watershed Project Authority, Riverside County, California	Archaeological, Field study	33-000100, 33-000630, 33-001099, 33-003832, 33-004112	5	Alberhill, Corona North, Corona South, Lake Elsinore, Lake Mathews

RI-04144	Love, Bruce And Bai "Tom" Tang	1998	Cultural Resources Report: Temescal Valley Regional Interceptor, Santa Ana Watershed Project Authority, Riverside County, California	Archaeological, Field study	33-000100, 33-000630, 33-001099, 33-003832, 33-004112	5	Alberhill, Corona North, Corona South, Lake Elsinore, Lake Mathews
RI-04144	Love, Bruce And Bai "Tom" Tang	1998	Cultural Resources Report: Temescal Valley Regional Interceptor, Santa Ana Watershed Project Authority, Riverside County, California	Archaeological, Field study	33-000100, 33-000630, 33-001099, 33-003832, 33-004112	5	Alberhill, Corona North, Corona South, Lake Elsinore, Lake Mathews

RI-04170	Love, Bruce And Bai "Tom" Tang	1999	Identification And Evaluation Of Historic Properties: Temescal Valley Pipeline Phase Iii (Extension), City Of Corona, Riverside County, California	Archaeological, Field study		0	Corona South
RI-04171	Mckenna, Jeanette And Karen C. Bennett	1998	Historc Resources Investigation And Evaluation Of The Residence Located At 2542 Gilbert Avenue, Corona, Riverside County, California			0	Corona South

RI-04203	Chambers Group, Inc.	1993	Cultural Resources Survey For The Central Pool Augmentation And Water Quality Project.	Archaeological, Field study	33-000883, 33-003818, 33-003934, 33-003935, 33-003936, 33-004118, 33-004119, 33-004120, 33-004410, 33-004411, 33-004720, 33-004721	12	Black Star Canyon, Canada Gobernadora, Corona North, Corona South, Lake Mathews, Prado Dam
RI-04357	Lapin, Philippe	2000	Letter Report: Cultural Resource Assessment For Modifications To Pacific Bell Wireless Facility Cm 109-06, County Of Riverside, California.			0	Corona North

RI-04360	Duke, Curt	2000	Letter Report: Cultural Resources Assessment For The At&T Wireless Services Facility Number C581, County Of Riverside, California.			0	Corona North
RI-04416	Robinson, Mark C.	2000	Cultural Resources Survey And Assessment Of Approximately 150 Acres: Sfu Investments Menifee 150 Project Garboni Road And Pitman Lane, Menifee, Riverside County, California	Archaeological, Field study	33-009745, 33-009746	2	Romoland

RI-04496	Brock, James	2001	Phase I Cultural Resources Assessment For Tentative Tract Map 30259, Thousand Palms Area Of Unincorporated Riverside County, California (Apns 651-162-038 And 651-162-039)	Archaeological, Field study		0	Myoma

RI-04659	White, Robert S. And Laura S. White	2004	A Cultural Resources Assessment Of A Proposed Regional Drainage Facility, Temescal Canyon Road At Leroy Road, South Corona, Riverside County	Archaeological, Field study		0	Corona South, Lake Mathews
RI-04665	Love, Bruce And Bai "Tom" Tang	1997	Identification And Evaluation Of Historic Properties Temescal Valley Project Elsinore Valley Municipal Water District Riverside County, California	Archaeological, Field study	33-000101, 33-000630, 33-001099, 33-003832, 33-004122, 33-007918	6	Alberhill, Corona South, Lake Mathews

RI-04665	Love, Bruce And Bai "Tom" Tang	1997	Identification And Evaluation Of Historic Properties Temescal Valley Project Elsinore Valley Municipal Water District Riverside County, California	Archaeological, Field study	33-000101, 33-000630, 33-001099, 33-003832, 33-004122, 33-007918	6	Alberhill, Corona South, Lake Mathews
RI-04713	Smith, Brooks And Deborah Mclean	2004	Cultural Resource Assessment, Far West Housing, Llc, Sierra Bella Project, Riverside County, California	Archaeological, Field study, Literature search		0	Black Star Canyon, Corona South

RI-04737	Strudwick, Ivan H. And Kathleen Ann Bergin	1999	Archaeological Survey, Testing And Evaluation Of Sites Ca-Riv-101/H, Ca-Riv-2992/H, Ca-Riv-6152/H And Ca-Riv-6153 For The Temescal Summit Project, Riverside County, California	Archaeological, Evaluation, Field study	33-000101, 33-002992, 33-008267, 33-008433	4	Lake Mathews

RI-04765	Hoover, Anna M., Kristie R. Blevins, Hugh M. Wagner, And Stephen Van Wormer	2004	An Archaeological And Paleontological Phase I Survey, A Phase Ii Significance Testing Program, And A Historic Properties Evaluation Report, The Serrano Specific Plan (Ssp), Case #441, Riverside County, California	Archaeological, Evaluation, Field study	33-000034, 33-000108, 33-001090, 33-003832, 33-004111, 33-006438, 33-006441, 33-006820, 33-013622, 33-013623, 33-013624, 33-013625, 33-013690, 33-013691, 33-013692, 33-013693	16	Lake Mathews

RI-04871	Love, Bruce, Michael Hogan, And Harry Quinn	2001	Archaeological Monitoring Report: Trilogy At Glen Ivy: Near The Community Of Glen Ivy Hot Springs, Riverside County, California	Monitoring	33-011041, 33-011183, 33-011184, 33-011185, 33-011186, 33-011187, 33-011188	7	Corona South, Lake Mathews
RI-04877	Peak & Associates, Inc.	2003	Cultural Resources Assessment Of The Proposed Temecula Valley Regional Water Reclamation Facility Effluent Pipeline, Riverside County, California	Archaeological, Evaluation, Field study	33-010986	1	Lake Elsinore, Murrieta, Wildomar

RI-04879	Dice, Michael	2000	A Cultural Resources Record Search And Archived Aerial Photography Search Of 1,219.51 Acre Southeast Annexation Project For The City Of Hemet, County Of Riverside, California	Literature search		0	Hemet

RI-04891	Wlodarski, Robert J.	2002	A Phase 1 Archaeological Study For The Proposed Corona Senior Housing Project Located At 701, 733, 735, And 777 Sherman Avenue (Apn# 110-040-013, -014,-015, And -016), City Of Corona, County Of Riverside, California	Archaeological, Field study		0	Corona North

RI-04895	Fox, Julia K., Anna M. Hoover, Kristie R. Blevins, Hugh M. Wagner, And Mark A Roeder	2005	A Biological, Archaeological, And Paleontological Phase Iv Mitigation Report, Monte Verde, Tract 29000, +457-Acre Property, City Of Corona, County Of Riverside, California			0	Corona South
RI-04913	Irish, Leslie Nay, Anna M. Hoover, Hugh M. Wagner, And Kristie R. Blevins	2003	A Phase I Archaeological And Paleontological Surey Report For Tract 30786, Apns 945-090-011-5 And 945-090-012-6, Temecula, County Of Riverside, California	Archaeological, Field study		0	Pechanga

RI-04946	Hoover, Anna M., Hugh Wagner, And Lilia Aleman Ramos	2005	An Archaeological And Paleontological Mitigation Mnitoring Report, Tract 30725, Apn 136-050-003; 10.3-Acre Property, County Of Riverside, California.	Archaeological, Field study		0	Riverside West
RI-04969	Hoover, Anna M., William R. Gillean, And Hugh M. Wagner	2005	A Phase I Archaeological And Paleontological Survey Report For Apns 290-060-007, -017 And -019 And 290-080-012, -014 And -015, A +32-Acre Property, County Of Riverside, California.	Archaeological, Field study		0	Lake Mathews

RI-05153	Holmes, Amy And J.D. Stewart	2005	Results Of A Cultural And Paleontological Assessment Of The Approximately 4 Acre Smith Avenue	Archaeological, Field study		0	Corona North
RI-05409	Love, Bruce, Bai "Tom" Tang, Michael Hogan, And Mariam Dahdul	2001	Historical/Archaeological Resources Survey Report, Arlington Desalter And Pipeline, Cities Of Riverside, Corona, And Norco, Riverside County, California	Archaeological, Evaluation, Field study	33-011195	1	Corona North, Riverside West

RI-05433	Jackson, Adrianna	2000	Letter Report: Records Search Results For Spring Pcs Facility Rv54Xc472A (Green River Water Tank Site), Corona, Riverside County, California	Literature search		0	Prado Dam
RI-05435	Jackson, Adrianna	2000	Letter Report: Records Search Results For Spring Pcs Facility Rv34Zc472B (Green River Fire Station Site), Corona, Riverside County, California	Literature search		0	Prado Dam

RI-05578	White, Robert S. And Laura S. White	2004	A Cultural Resources Assessment Of A 39.5 Acre Parcel As Shown On Ttm 32024, Located Adjacent To Monte Vista Drive, Wildomar, Riverside County	Archaeological, Field study		0	Wildomar

RI-05764	Wlodarski, Robert J.	2005	Letter Report: Records Search And Field Reconnaissance Results For The Proposed Nextel Wireless Communications Site (Ca5379-A: Moore Electric) Located At 463 North Smith Avenue, City Of Corona, Riverside County, California 92880	Archaeological, Field study		0	Corona North

RI-05827	White, Robert S., Laurie S. White, And David M. Van Horn	2003	Cultural Resources Investigation For The Elsinore Advanced Pumped Storage Project, Lake Elsinore, Riverside County	Archaeological, Field study	33-001082, 33-002205, 33-003836, 33-007723, 33-007925, 33-007926	6	Alberhill, Lake Elsinore
RI-06085	Sterner, Mathew., Et Al.	2004	Ranching, Rails, And Clay: The Development And Demise Of The Town Of Rincon/Prado, Archaeological Data Recovery At Ca-Riv-1039H And Ca-Riv-1044H, Riverside County, California	Other research	33-001039, 33-001044	2	Corona North

RI-06103	Aislin-Kay, Marnie	2004	Cultural Resource Records Search And Site Visit Results For Sprint Telecommunications Facility Candidate Rv60Xc809A (255 Airport Circle), Located At 255 Airport Circle, Corona, Riverside County, Ca	Archaeological, Field study		0	Corona North
RI-06214	Earth Touch, Inc.	2006	New Tower ("Nt") Submission Packet, Fcc Form 620: Corona Fire Station	Archaeological, Field study		0	Corona North

RI-06620	Hogan, Michael, Bai "Tom" Tang, Ayse Taskiran-Johnson, Harry M. Quinn, And Adrian Sanchez Moreno	2005	Archaeological Monitoring Report: Tentative Tract No. 30956 In The City Of Indio, Riverside, County, California	Archaeological, Field study, Monitoring	33-012283, 33-012284, 33-013461	3	Indio, La Quinta

RI-06626	Hogan, Michael	2006	Letter Report: Archaeological/Paleontological Monitoring Of Earth-Moving Activities, The Sycamore Creek Project, Phase 2B, Tracts 30440 (Pa 2B), 30440-2 (Pa 12B), And 30440-3 (Pa 10), Near The Community Of Glen Ivy Hot Springs, Riverside County, California	Monitoring		0	Alberhill, Lake Mathews

RI-06888	Lerch, Michael K. And Gray, Marlesa A.	2006	Cultural Resources Assessment Of The Valley-Ivyglen Transmission Line Project, Riverside County, California	Archaeological, Field study	33-015346, 33-015347, 33-015348, 33-015349, 33-015350, 33-015351, 33-015352, 33-015353, 33-015354, 33-015355, 33-015356, 33-015357, 33-015358, 33-015359, 33-015360, 33-015361, 33-015362, 33-015363, 33-015364, 33-015365, 33-015375, 33-015376, 33-015377, 33-015378, 33-015379, 33-015380, 33-015416, 33-015417, 33-015418, 33-015419, 33-015420, 33-015422, 33-015423, 33-015424, 33-015425, 33-015427	36	Alberhill, Lake Elsinore, Lake Mathews, Perris, Romoland, Steele Peak

RI-06911	King, Gary	2000	Negative History Property Survey Report For State Route 91 At Main Street Interchange Corona, California	Archaeological, Field study		0	Corona North
RI-06926	Mckenna, Jeanette A.	2006	A Phase I Cultural Resources Investigation Of Proposed Access Road Alternatives Leading To The Mesa View Middle School In The City Of Calimesa, Riverside County, California.	Archaeological, Field study		0	El Casco

RI-07166	Caprice D. Harper	2004	Cultural Resource Assessment For Cingular Wireless Facility No. Sb 286-01 Near Corona, Riverside County, California	Archaeological, Field study, Literature search		0	Prado Dam
RI-07219	Cooley, Thedore G.	2007	Archaeological Survey Report For Southern California Edison Company Underground Cable Conduit Installations For The East And West Taps To The Chase Substation, City Of Corona, Riverside County, California	Archaeological, Field study		0	Corona South

RI-07424	Mouriquand, Leslie J. And Goodman, John D.	2004	Phase I Cultural Resources Investigation Of 27.7 Acres Located North Of Avenue 48 And West Of Dune Palms Road Within Section 29, Township 5 South, Range 7 East, Sbbm, City Of La Quinta, Riverside County, California	Archaeological, Field study	33-004747, 33-004751, 33-004757, 33-013837	4	La Quinta

RI-07425	Mclean, Deborah	2007	Historic Property Survey Report (First Supplemental Historic Property Survey Report: 08/12-Riv/Ora-91-Pm 15.9-19.9/0.0-2.9 Kp25.6-32.0/0.0/4.7 Eastbound Lane Addition Ea: 0E800/0G040)	Literature search		0	Black Star Canyon, Prado Dam

RI-07433	Bonner, H. Wayne And Aislin-Kay, Marnie	2007	Cultural Resource Records Search And Site Visit Results For T-Mobile Candidate Ie05297 (Sycamore Creek Water Tank), Unaddressed Parcel, Corona, Riverside County, California	Archaeological, Field study, Literature search		0	Alberhill
RI-07494	Underbrink, Susan	2006	Historic Property Survey Report (Archaeological Survey Report For The Eastbound Sr-91 Lane Addition Project From Sr-241 To Sr-71, County Of Orange, And County Of Riverside California)	Archaeological, Field study	33-010819	1	Black Star Canyon, Prado Dam

RI-07666	Cooley, Theodore G. And Andrea M. Craft	2008	Addendum: Cultural Resources Assessment Of The Valley-Ivyglen Transmission Line Project, Riverside County, California		33-000630, 33-000643, 33-004110, 33-007175, 33-008021, 33-015794, 33-016641, 33-016642, 33-016643, 33-017016, 33-017017, 33-017018, 33-017019, 33-017020, 33-017021, 33-017022, 33-017023, 33-017024, 33-017025, 33-017026, 33-017027, 33-017028	22	Alberhill, Lake Elsinore, Lake Mathews

RI-07666	Cooley, Theodore G. And Andrea M. Craft	2008	Addendum: Cultural Resources Assessment Of The Valley-Ivyglen Transmission Line Project, Riverside County, California		33-000630, 33-000643, 33-004110, 33-007175, 33-008021, 33-015794, 33-016641, 33-016642, 33-016643, 33-017016, 33-017017, 33-017018, 33-017019, 33-017020, 33-017021, 33-017022, 33-017023, 33-017024, 33-017025, 33-017026, 33-017027, 33-017028	22	Alberhill, Lake Elsinore, Lake Mathews
RI-07734	Greene, Richard And Brian F. Smith	2006	A Phase I Archaeological Assessment Of The Sitework Development Project, Apn 279-230-034	Archaeological, Field study		0	Corona South

RI-07766	Brown, Joan C.	2007	Cultural Resources Survey Of The New Proposed Cajalco Road, Eagle Canyon Road And The Scenario 2 Road Alignments, City Of Corona, Riverside County, California. (Including Results From Previous Eagle Valley Access Road Studies)	Archaeological, Field study	33-004759, 33-013224	2	Corona North, Corona South, Lake Mathews, Riverside West

RI-08043	Sherri Gust And Amy Glover	2008	Phase I Cultural Resources Assessment Report For The Centennial High School Project In Corona, California	Archaeological, Field study		0	Corona South
RI-08044	Sherri Gust And Amy Glover	2008	Phase I Cultural Resources Assessment Report For The Santiago High School Project In Corona, California.	Archaeological, Field study		0	Corona South
RI-08045	Sherri Gust, Amy Glover, And Veronica Harper	2008	Phase I Cultural Resources Assessment Report For The Lincoln Alternative Elementary School Project In Corona, California	Archaeological, Field study		0	Corona South

RI-08215	Bai "Tom" Tang	2009	Letter Report: Historical/Archaeological Resources Survey Of A Portion Of Apn 290-660-004, Glen Ivy Hot Springs Area, Riverside County, California	Archaeological, Field study		0	Alberhill
RI-08238	Pamela Maxwell	1993	Los Angeles District Project To Clear Vegetation To Regain Efficient Use Of Water Gauging Station, And Repair Existing Concrete Channel Bottom, On The Santa Ana River, Riverside County, California-Cultural Resources.	Management/planning		0	Prado Dam

RI-08519	James J. Schmidt	2010	Letter Report: Mira Loma-Cleargen-Delgen 66Kv Transmission Line Deteriorated Pole Replacement Project (Wo 4305-4114; 80028383), Corona, Riverside County, California	Literature search		0	Corona North
RI-08533	James J. Schmidt	2010	Letter Report: Buckboard And Hitch 12Kv (P#2263076E) And Unidentified Circuit (P#2245653E) Deteriorated Pole Replacement Project (Wo 6088-4800; 0-4878, & 0-4880), Riverside County, California	Archaeological, Field study, Literature search		0	Lake Mathews, Pechanga

RI-08534	James J. Schmidt	2010	Letter Report: Deteriorated Pole Replacements Projects (Wo 6088-4800; 0-4876, 0-4877, 0-4881, 0-4883.2010), Riverside County, California	Archaeological, Field study, Literature search		0	Alberhill, Bachelor Mtn, Lake Mathews, Sage
RI-08555	Bai "Tom" Tang, Michael Hogan, Terri Jacquemain, And Daniel Ballester	2010	Letter Report: Rancho Jurupa Sports Park Project	Archaeological, Field study	33-003320, 33-003353, 33-003354, 33-003358, 33-007411, 33-007412, 33-007413, 33-007423, 33-007725, 33-007729, 33-007730, 33-010967, 33-010968, 33-010969, 33-010970, 33-013436, 33-013970, 33-013972, 33-013973, 33-013974, 33-016437, 33-016849, 33-017411	23	Riverside West

RI-08605	Susan Goldberg	2010	Archaeological Survey Report For State Route 91/71 Interchange Project, Riverside County, California (08-Riv-91- P.M. R0.6/ R2.6; 08-Riv-71. 1.6/3.0) Ea 0F541	Archaeological, Field study		0	Black Star Canyon, Prado Dam
RI-08623	Cary D. Cotterman And Evelyn N. Chandler	2011	Cultural Resources Inventory Of Two Proposed Pole Replacements In Corona And Temescal Canyon, Riverside County, California (W.O. 6034-4800, K 4892, Td 495676)	CF MOU		0	Corona South, Lake Mathews

RI-08660	Wayne H. Bonner, Sarah A. Williams, And Kathleen A. Crawford	2011	Cultural Resources Records Search And Site Visit Results For T-Mobile Usa Candidate Ie24189-A	Literature search		0	Corona North
RI-08694	Wayne H. Bonner, Sarah A. Williams, And Kathleen A. Crawford	2011	Cultural Resources Record Search And Site Visit Results For T-Mobile Usa Candidate Ie25763-A	Archaeological, Field study		0	Corona South
RI-08707	Wayne H. Bonner, Marnie Aislin-Kay, And Kathleen A. Crawford	2010	Cultural Resources Record Search And Site Visit Results For T-Mobile Usa Candidate Ie24154-D	Archaeological, Field study		0	Corona North
RI-08761	Bai "Tom" Tang, Michael Hogan, Daniel Ballester, Harry M. Quinn, And Laura H. Shaker	2012	Identification And Evaluation Of Historic Properties: Butterfield Park Reclaimed Waterline	Evaluation		0	Corona North

RI-08763	Robin Hoffman, Timothy Yates, And Karen Crawford	2012	Cultural Resources Inventory Report For The Proposed Circle City Substation And Mira Loma-Jefferson Subtransmission Line Project	Archaeological, Field study		0	Corona North, Corona South, Guasti
RI-08768	Joan C. Brown And Nancy E. Sikes	2008	Cultural Resources Monitoring For The Edom Hills Wind Repower Project	Monitoring		0	Seven Palms Valley
RI-08817	Bai "Tom" Tang, Michael Hogan, Daniel Ballester, Laura H. Shaker, And Harry M. Quinn	2012	Identification And Evaluation Of Historic Properties Butterfield Park Recycled Waterline Project	Archaeological, Field study		0	Corona North

RI-08826	Bai "Tom" Tang, Michael Hogan, And Terri Jacquemain	2012	Phase I Cultural Resources Assessment: Assessor'S Parcel Nos. 172-110-007 And -008	Archaeological, Field study		0	Corona North
RI-08838	Wayne H. Bonner And Sarah A. Williams	2012	Letter Report: Cultural Resources Records Search And Site Visits Results For At&T Mobility, Llc Candidate La6044 (Cattle Run & Green River), 1400 Nicholas Place, Corona, Riverside County, California	Archaeological, Field study		0	Prado Dam

RI-08870	Cary D. Cotterman And Evelyn N. Chandler	2011	Cultural Resources Inventory Of Two Proposed Pole Replacements In Corona And Temescal Canyon, Riverside County, California (W.O. 6034-4800, K 4872, Td 495676)	Archaeological, Field study		0	Corona South, Lake Mathews
RI-08897	Riordan Goodwen	2012	Cultural Resource Assessment: Santa Ana River Trail Improvements Project	Archaeological, Field study		0	Black Star Canyon, Prado Dam

RI-08902	Josh Smallwood	2012	Cultural Resources Report For The Proposed Magnolia Point Project, Sw Corner 6Th Street And Magnolia Avenue In Corona, Riverside County, California. Assessor'S Parcel Nos. 107-030-003, -014, -015, -018, -019, -020, -024, And -027	Archaeological, Architectural/historical, Evaluation, Field study, Literature search	33-020201	1	Corona South

RI-08988	Susan L. Bupp	2013	Supplemental Archaeological Survey Report For Sr-91Corridor Improvement Project, City Of Corona, Riverside County, California, California Department Of Transportation, District 8	Archaeological, Evaluation, Field study, Literature search		0	Black Star Canyon, Corona North, Corona South, Prado Dam, Riverside West
RI-08989	Carrie Chasteen	2013	Supplemental Finding Of No Adverse Effect Report For Sr-91 Corridor Improvement Project, City Of Corona, Riverside County, California, California Department Of Transportation, District 8	Other research		0	Black Star Canyon, Corona North, Corona South, Prado Dam, Riverside West

RI-09088	Michael Dice	2009	Cultural Resource Survey And Historic Resource Assessment Of The Corona City Park, 930 E. Sixth Street, Corona, California	Architectural/Historical	33-017926, 33-017929	2	Corona North, Corona South
RI-09106	Tracy A. Stropes And Brian F. Smith	2013	A Class Iii Cultural Resources Study For The Sierra Bella Project For Section 106 Compliance Riverside County, California	Architectural/Historical		0	Black Star Canyon, Corona South

RI-09144	J. Claire Dean	2009	Joshua Tree National Park: Final Report, Rock Image Condition Assessment And Conservation Project	Evaluation	33-000023, 33-000025, 33-000026, 33-000027, 33-000028, 33-000029, 33-000030, 33-000092, 33-000094, 33-000170, 33-000347, 33-000349, 33-000900, 33-000901, 33-000902, 33-000903, 33-000930, 33-000931, 33-000932, 33-000933	20	Indian Cove, Keys View, Malapai Hill
RI-09216	Don C. Prez	2013	Cultural Resources Survey Rs0310	Archaeological		0	Corona South

RI-09221	Heather R. Puckett	2013	Cultural Resources Summary For The Proposed Verizon Wireless. Inc. Property At The Treehouse Site 615 Richey Street, Corona Riverside County, California 92879			0	Corona North
RI-09304	Sara Williams	2014	Cultural Resource Records Search And Site Visit Results For Verizon Wireless Candidate 'Klug', 2395 Railroad Street, Corona, Riverside County, California	Archaeological, Architectural/Historical, Field study, Management/planning		0	Corona North

RI-09337	Shelly Long	2013	Corona Regional Medical Center Expansion Project Archaeological And Paleontological Resources Report	Archaeological, Architectural/Historical, Field study, Management/planning		0	Corona North, Corona South
RI-09384	Susan L. Bupp	2013	Supplemental Archaeological Survey Report For Sr-91 Corridor Improvement Project, City Of Corona, Riverside County, California	Archaeological		0	Black Star Canyon, Corona North, Corona South, Prado Dam, Riverside West
RI-09384	Susan L. Bupp	2013	Supplemental Archaeological Survey Report For Sr-91 Corridor Improvement Project, City Of Corona, Riverside County, California	Archaeological		0	Black Star Canyon, Corona North, Corona South, Prado Dam, Riverside West

RI-09384	Susan L. Bupp	2013	Supplemental Archaeological Survey Report For Sr-91 Corridor Improvement Project, City Of Corona, Riverside County, California	Archaeological		0	Black Star Canyon, Corona North, Corona South, Prado Dam, Riverside West

RI-09410	Jacqueline Hall And Chis Morgan	2014	Archaeological Survey Report For The Southern California Edison Company Replacement Of Twelve Deteriorated Power Poles On Multiple Circuits, Td838569, Td846652, Td849109, Td849083, Td849999, Td850010, Td850012, Td831483, A,D Td846972 San Bernardino National Forest, Riverside And San Bernardino Counties, California	Archaeological, Field study, Literature search		0	Blackburn Canyon, San Jacinto Peak

RI-09419	Brian F. Smith, David K. Grabski, And Tracy A. Stopes	2014	A Section 106 (Nhpa) Cultural Resources Study For The Toscana Project, Riverside County, California	Archaeological, Excavation, Field study, Literature search		0	Lake Mathews
RI-09420	Lsa Associates Inc.	2000	Cultural Resources Assessment Green River Ranch Specific Plan Corona, Riverside County, California, Lsa Project No. Ccr932	Archaeological, Field study, Literature search		0	Black Star Canyon, Prado Dam
RI-09584	Justin Lev-Tov, Megan Wilson, Lynn Furnis, And Sherri Gust	2016	Shoppes At Corona Vista Cultural Resources Assessment City Of Corona, Riverside County, California	Field study		0	Corona South

RI-09593	Michael Hogan	2016	Final Report On Archaeological And Paleontological Resources Monitoring Santa Ana Canyon - Below Prado: Inland Empire Brine Line Protection Project Near The City Of Corona, Riverside County, California Crm Tech Contract #2903	Archaeological, Field study, Monitoring		0	Prado Dam
RI-09603	Andre Simmons And Sherri Gust	2016	Cultural Resources Assessment For The Corona Affordable Housing Project, City Of Corona, Riverside County, California	Archaeological, Field study, Literature search		0	Corona South

RI-09678	Carrie D. Wills And Kathleen A. Crawford	2015	Direct Ape Historic Architectural Assessment For T-Mobile West, Llc Candidate Ie04109A (Cm109 Lb124 [Corona Downtown]) 511 South Joy Street, Corona , Riverside County	Archaeological, Management/planning		0	Corona North
RI-09714	Heather R. Puckett	2014	Cultural Resources Summery For The Proposed Verizon Wireless, Inc., Property At The Railroad Site, 665 West Rincon Street, Corona, Riverside County, Californian 92880	Field study, Literature search		0	Corona North, Corona South

RI-09741	Riordan Goodwin	2016	Cultural Resources Assessment Corona 720 Project Lsa Project No. Gry1501	Field study, Literature search, Monitoring, Other research	33-001801, 33-003424, 33-003693, 33-004730, 33-005782, 33-010819, 33-019802, 33-024551, 33-024552	9	Black Star Canyon, Prado Dam
RI-09746	Jason Andrew Miller	2013	Cultural Resources Survey Report Addendum Valley-Ivy Glenn 115Kv Transmission Line Project Southern California Edison Riverside County, California	Archaeological, Field study	33-001652, 33-001655, 33-017890, 33-023612, 33-023613, 33-023614	6	Alberhill, Lake Elsinore, Romoland
RI-09770	Brian F. Smith And David K. Grabski	2014	A Phase Ii Cultural Resource Evaluation Report For Riv-8118 At The Toscana Project	Archaeological		0	Lake Mathews

RI-09771	Brian F. Smith And Jennifer R. Kraft	2014	Historic Structure Assessment 11950 El Hermando Road	Architectural/Historical		0	Lake Mathews

Confidential Appendix B.
NAHC List of Tribes and Individuals

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Appendix C.
Properties Eligible for the Corona Register of Historic Resources Lists

Table D1. Corona Register of Historic Resources by Property Number.

Property Number	Primary #	Street Address	Year Constructed
090575		1002 S Belle Ave	1918
059203		1005 S Washburn Ave	1910
059204		1006 S Belle Ave	1910
059205		1009 S Washburn Ave	1922
059206		1010 S Belle Ave	1918
059207		1011 S Ramona Ave	1927
059208		1014 S Ramona Ave	1906
059209		1015 S Ramona Ave	1928
059203		1015 S Victoria Ave	1926
059204		1016 S Belle Ave	1926
059205		1016 S Washburn Ave	1912
059206		1021 S Victoria Ave	1915
059208		1025 S Victoria Ave	1903
059209		1028 S Belle Ave	1905
059212		1106 S Belle Ave	1925
059214		1111 S Belle Ave	1924
059217		1116 S Vicentia Ave	1930
059107		1119 Palm Ave	1910
059108		1120 Palm Ave	1912
059109		1121 Palm Ave	1920
059110		1124 Palm Ave	1920
059112		1124 S Vicentia Ave	1930
059113		1136 S Vicentia Ave	1910
058945		1140 Garretson Ave	1910
059179		115 Victoria Ave	1895
059180		1202 S Vicentia Ave	1930
059111		1208 S Palm Ave	1914
059112		1214 S Belle Ave	1920
059113		1214 S Vicentia Ave	1936
059114		1220 S Belle Ave	1924
058946		1220 S Garretson Ave	1910
058947		1222 S Belle Ave	1923
058948		1222 S Victoria Ave	1916
058949		1224 S Victoria Ave	1916
058950		1228 S Belle Ave	1930
058951		1228 S Garretson Ave	1910
058952		1232 S Victoria Ave	1916
059035		1284 Kelley Ave	1927

Table D1. Corona Register of Historic Resources by Property Number.

Property Number	Primary #	Street Address	Year Constructed
059036		1312 S Belle Ave	1925
059180		1314 Victoria Ave	1920
059181		1942 S Garretson Ave	1945
058908		220 S Belle Ave	1915
058949		2412 Garretson Ave	1913
059036		2768 Kellog Ave	1881
059037		302 S Belle Ave	1920
059038		307 S Belle Ave	1918
059181		308 S Victoria Ave	1920
059182		311 S Belle Ave	1905
059183		312 S Belle Ave	1908
059184		312 S Washburn Ave	1910
059185		320 S Belle Ave	1920
059123		323 S Ramona Ave	1903
059124		400 S Ramona Ave	1920
059125		407 S Belle Ave	1918
059126		409 S Victoria Ave	1900
059127		410 S Victoria Ave	1908
059128		411 S Ramona Ave	1910
059129		412 S Belle Ave	1905
058916		413 Belle Ave	1912
058917		413 S Victoria Ave	1904
058918		415 S Ramona Ave	1912
058917		416 S Belle Ave	1915
058918		419 S Victoria Ave	1910
058919		420 S Belle Ave	1920
058920		424 S Belle Ave	1907
058921		424 S Victoria Ave	1908
058922		502 S Belle Ave	1910
058923		505 S Victoria Ave	1920
059168		507 S Vicentia Ave	1910
059169		511 S Vicentia Ave	1923
059170		619 S Victoria Ave	1926
059171		620 S Victoria Ave	1910
059173		624 S Vicentia Ave	1926
059166		6505 Sumner Ave	1910
059167		701 S Victoria Ave	1918
059168		706 S Belle Ave	1902

Table D1. Corona Register of Historic Resources by Property Number.

Property Number	Primary #	Street Address	Year Constructed
059169		709 S Belle Ave	1895
059171		711 S Ramona Ave	1910
059172		715 S Ramona Ave	1912
059173		801 S Victoria Ave	1900
059176		806 S Belle Ave	1908
059178		807 S Ramona Ave	1933
059179		807 S Victoria Ave	1895
059180		810 S Belle Ave	1908
146619		811 S Victoria Ave	1915
146620		812 S Victoria Ave	1920
146621		817 S Victoria Ave	1905
146622		821 S Victoria Ave	1913
146624		904 S Ramona Ave	1900
146625		906 S Vicentia Ave	1909
058943		907 Fullerton Ave	1924
058944		912 S Ramona Ave	1900
058945		914 S Victoria Ave	1910
058947		919 S Washburn Ave	1912
058944		920 Fullerton Ave	1927
058945		922 S Victoria Ave	1902
058947		924 S Ramona Ave	1900
058948		926 S Vicentia Ave	1910
059215		928 Wellwood Ave	1915
059303		Lincoln Ave	1887
058965		1031 E Grand Blvd	1913
058966		1036 E Grand Blvd	1893
058967		1047 E Grand Blvd	1905
058968		1052 E Grand Blvd	1888
059000		1103 W Grand Blvd	1910
059001		1107 W Grand Blvd	1908
058970		1114 E Grand Blvd	1935
058969		1114 E Grand Blvd	1935
058971		1122 E Grand Blvd	1924
059002		1122 W Grand Blvd	1924
058972		1127 E Grand Blvd	1890
058973		1128 E Grand Blvd	1923
058974		1136 E Grnd Blvd	1905
058975		1147 E Grand Blvd	1920

Table D1. Corona Register of Historic Resources by Property Number.

Property Number	Primary #	Street Address	Year Constructed
058976		1148 E Grand Blvd	1935
058977		1153 E Grand Blvd	1910
058978		1156 E Grand Blvd	1911
058979		1159 E Grand Blvd	1910
058980		1164 E Grand Blvd	1900
058981		1165 E Grand Blvd	1912
058982		1169 E Grand Blvd	1892
058983		1170 E Grand Blvd	1920
058984		1209 E Grand Blvd	1905
058985		1215 E Grand Blvd	1902
058986		229 W Grand Blvd	1908
058951		402 E Grand Blvd	1910
058952		408 E Grand Blvd	1925
058953		412 E Grand Blvd	1928
058954		416 E Grand Blvd	1920
058987		428 W Grand Blvd	1905
058950		44 E Grand Blvd	1907
058988		514 W Grand Blvd	1928
058989		616 W Grand Blvd	1922
058990		702 W Grand Blvd	1924
058955		712 E Grand Blvd	1925
058956		714 E Grand Blvd	1910
058991		714 W Grand Blvd	1933
058957		715 E Grand Blvd	1937
131059		720 W Grand Blvd	1924
058958		722 E Grand Blvd	1900
058992		724 W Grand Blvd	1928
058993		802 W Grand Blvd	1912
058994		806 W Grand Blvd	1926
058995		810 W Grand Blvd	1920
058959		813 E Grand Blvd	1913
058996		814 W Grand Blvd	1912
058997		817 W Grand Blvd	1940
058960		820 E Grand Blvd	1902
058961		827 E Grand Blvd	1926
058962		903 E Grand Blvd	1927
058998		908 W Grand Blvd	1928
058999		912 W Grand Blvd	1932

Table D1. Corona Register of Historic Resources by Property Number.

Property Number	Primary #	Street Address	Year Constructed
058963		916 E Grand Blvd	1892
058964		934 E Grand Blvd	1890
059048		812 Kress Ct	1926
059037		2837 Kellogg Dr	1900
059112		702 Park Lane	1895
059116		712 Park Lane	1923
059113		713 Park Lane	1912
059114		715 Park Lane	1924
059115		718 Park Lane	1915
059117		728 Park Lane	1911
131061		732 Park Lane	1913
059118		802 Park Lane	1926
059119		803 Park Lane	1925
059167		20730 Temescal Canyon Rd	1934
059305		Dawson Canyon Rd	1819
059301		Tin Mine Rd	1868
059302		1002 S Main St	1911
059303		1006 S Main St	1910
059304		1008 S Sheridan St	1914
059305		1021 S Main St	1931
059306		1024 S Main St	1928
059307		1026 S Sheridan St	1913
059005		108 S Howard St	1900
059303		1104 S Sheridan St	1930
059088		116 E Olive St	1914
059042		116 W Kendall St	1915
059038		119 E Kendall St	1910
059089		119 E Olive St	1909
059090		122 E Olive St	1916
059091		123 E Olive St	1924
059287		123 W 11Th St	1915
059043		128 W Kendall St	1920
059057		1301 S Main St	1910
059058		1307 S Main St	1930
059059		1315 S Main St	1935
059060		1321 S Main St	1905
059061		1322 S Main St	1908
059062		1326 S Main St	1928

Table D1. Corona Register of Historic Resources by Property Number.

Property Number	Primary #	Street Address	Year Constructed
059063		1402 S Main St	1925
059064		1410 S Main St	1925
059065		1420 S Main St	1910
059066		1839 S Main St	1889
059067		1902 S Main St	1912
059068		1910 S Main St	1920
059069		1926 S Main St	1931
059070		1934 S Main St	1907
059071		1939 S Main St	1892
059221		202 E 5Th St	1920
059092		202 E Olive St	1912
059093		2038 S Main St	1920
059120		205 N Pearl St	1941
059039		207 E Kendall St	1915
059093		207 E Olive St	1918
059094		211 E Olive St	1914
059121		211 N Pearl St	1910
059095		212 E Olive St	1916
059284		212 W 10Th St	1908
059285		2134 S Main St	1894
059040		215 E Kendall St	1910
059225		216 E 6Th St	1900
059096		216 E Olive St	1910
059285		216 W 10Th St	1915
059286		219 S Merrill St	1910
059041		223 E Kendall St	1910
059024		224 S Joy St	1910
059217		224 W 3Rd St	1930
059097		232 E Olive St	1930
059098		2804 S Main St	1915
059023		301 N Joy St	1915
059044		301 W Kendall St	1905
160517		303 S Joy St	1910
059236		303 W 7Th St	1888
059237		303 W 7Th St	1900
059098		306 E Olive St	1910
059238		307 W 7Th St	1922
059239		309 W 7Th St	1910

Table D1. Corona Register of Historic Resources by Property Number.

Property Number	Primary #	Street Address	Year Constructed
058941		311 W Francis St	1937
059254		312 E 8Th St	1910
059045		312 W Kendall St	1927
059046		313 S Howard St	1908
059101		313 W Olive St	1925
059255		314 E 8Th St	1910
059240		315 W 7Th St	1935
059241		316 W 7Th St	1926
059102		316 W Olive St	1910
059103		321 S Howard St	1908
059242		322 W 7Th St	1890
059243		323 W 7Th St	1896
059256		324 E 8Th St	1922
059099		326 E Olive St	1917
058939		403 Crawford St	1912
059100		405 E Olive St	1916
059076		405 S Merrill St	1920
059149		405 S Sheridan St	1895
059148		405 S Sheridan St	1890
059149		406 S Joy St	1910
059223		410 W 5Th St	1900
163598		413 S Howard St	1910
059244		414 W 7Th St	1912
059218		415 E 4Th St	1914
059259		415 E 8Th St	1912
059245		418 W 7Th St	1912
059046		418 W Kendall St	1909
059103		418 W Olive St	1918
059260		419 E 8Th St	1900
059261		419 S Howard St	1908
059233		420 E 7Th St	1905
059011		420 S Howard St	1910
059047		422 W Kendall St	1911
059286		423 E 10Th St	1902
059261		423 E 8Th St	1902
059262		423 S Howard St	1900
059246		424 W 7Th St	1920
058938		460 E Citrom St	1927

Table D1. Corona Register of Historic Resources by Property Number.

Property Number	Primary #	Street Address	Year Constructed
059247		500 W 7Th St	1907
059077		501 Merrill St	1916
059078		502 S Joy St	1916
059079		502 W 11Th St	1926
059223		504 S Howard St	1895
059078		505 S Merrill St	1934
059262		506 E 8Th St	1926
059263		506 S Joy St	1910
059264		506 W 11Th St	1926
059263		507 E 8Th St	1897
059010		508 S Howard St	1908
059011		510 W 11Th St	1926
059012		514 W 11Th St	1926
059234		515 E 7Th St	1920
059264		516 E 8Th St	1900
059276		516 W 8Th St	1907
059266		518 W 11Th St	1923
059266		520 E 8Th St	1909
059267		522 W 11Th St	1929
059219		523 E 4Th St	1907
059224		523 W 5Th St	1901
059267		524 E 8Th St	1907
059248		524 W 7Th St	1892
059268		528 E 8Th St	1912
059249		601 W 7Th St	1918
059269		602 E 8Th St	1905
059274		602 W 8Th St	1982
059270		603 E 8Th St	1902
059271		603 W 11Th St	1927
059271		605 E 8Th St	1902
059272		606 E 8Th St	1920
059275		609 W 8Th St	1916
059220		611 E 4Th St	1926
059250		612 W 7Th St	1928
059295		616 W 11Th St	1928
059282		616 W 9Th St	1936
059104		621 W Olive St	1903
059105		623 S Joy St	1905

Table D1. Corona Register of Historic Resources by Property Number.

Property Number	Primary #	Street Address	Year Constructed
059106		623 S Merrill St	1893
059299		63 W 20Th St	1925
059296		632 W 11Th St	1929
059150		702 S Sheridan St	1924
059151		704 S Howard St	1888
059152		704 S Joy St	1900
059153		705 S Sheridan St	1902
059015		709 S Howard St	1914
059016		710 S Joy St	1925
058940		711 Crawford St	1887
058941		711 S Joy St	1918
058942		711 S Sheridan St	1912
059228		711 W 6Th St	1936
059297		712 W 11Th St	1936
058942		715 S Fuller St	1910
058943		715 S Joy St	1920
058944		715 S Sheridan St	1907
059229		715 W 6Th St	1926
059106		716 S Sheridan St	1902
059277		716 W 8Th St	1914
059278		717 W 8Th St	1928
059016		718 S Howard St	1920
059251		718 W 7Th St	1926
059252		720 S Sheridan St	1910
059253		722 S Joy St	1902
059279		722 W 8Th St	1924
058907		723 Barth St	1905
059298		724 W 11Th St	1927
059230		724 W 6Th St	1922
059280		729 W 8Th St	1922
059147		7725 Selby St	1915
059106		801 W Olive St	1915
059107		802 S Sheridan St	1924
059108		805 S Merrill St	1917
059021		806 Joy St	1900
059022		806 S Sheridan St	1909
059081		810 S Merrill St	1912
059082		811 S Sheridan St	1917

Table D1. Corona Register of Historic Resources by Property Number.

Property Number	Primary #	Street Address	Year Constructed
059003	33-006524	8120 Grapewin St	1928
154719		816 S Merrill St	1900
154720		818 S Howard St	1890
154721		819 S Merrill St	1920
154722		820 S Merrill St	1907
059022		822 Joy St	1900
059281		822 W 8Th St	1905
059018		823 Howard St	1907
059019		823 S Sheridan St	1918
059020		824 S Sheridan St	1907
059252		827 W 7Th St	1920
059253		830 W 7Th St	1920
059232		832 W 6Th St	1922
059004		8382 Hellman St	1935
058907		910 S Sheridan St	1908
059019		911 Howard St	1912
059050		911 S Main St	1910
059051		911 S Merrill St	1918
059052		914 S Main St	1933
059053		915 S Main St	1907
059054		915 S Merrill St	1926
059020		919 Howard St	1917
059021		924 S Sheridan St	1910
058937		Blaine St	1938
059049		N Main St	1937

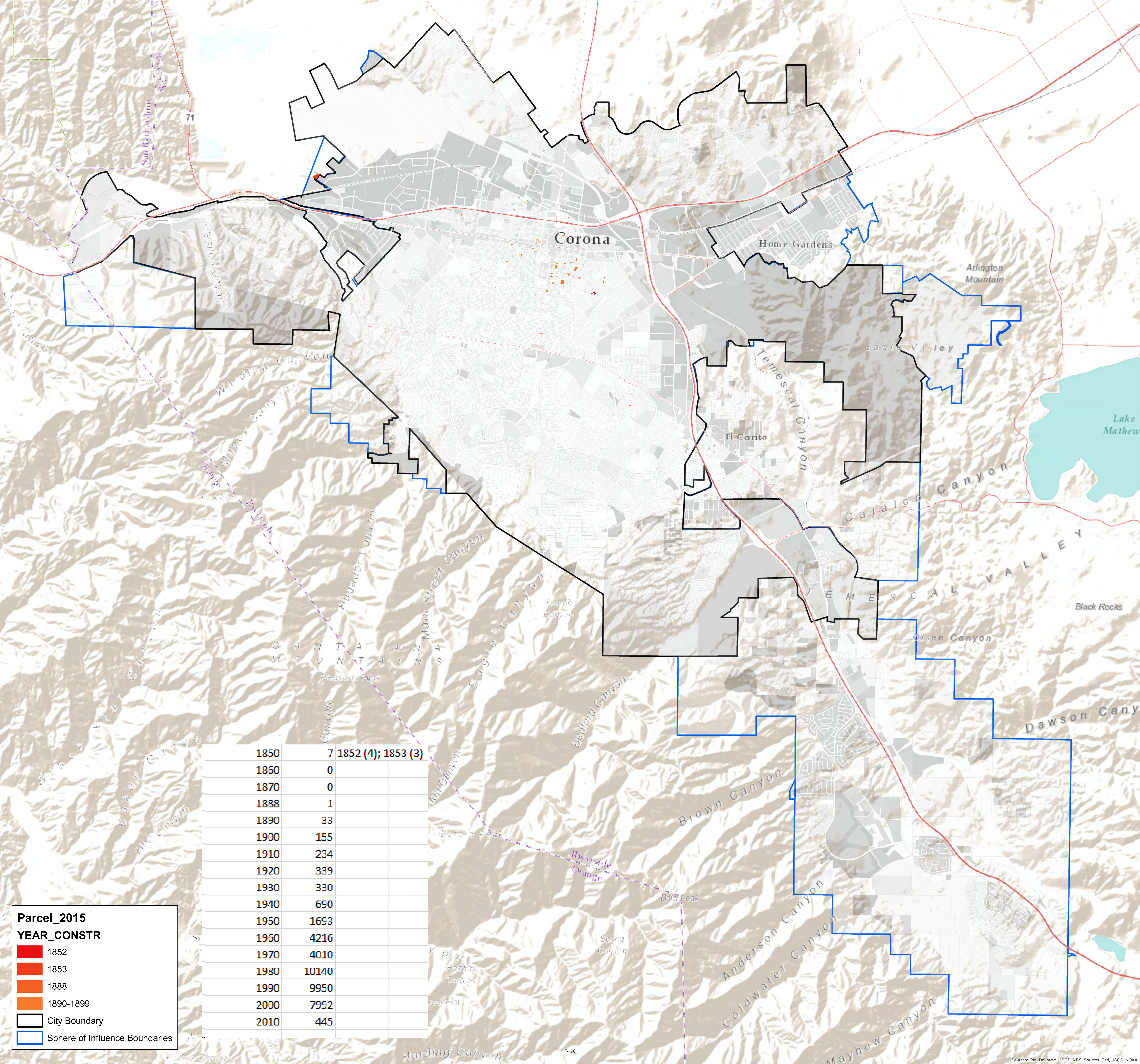
Appendix D.
Built Environment Resources 40 Years and Older

<= 1968, No Mills Act

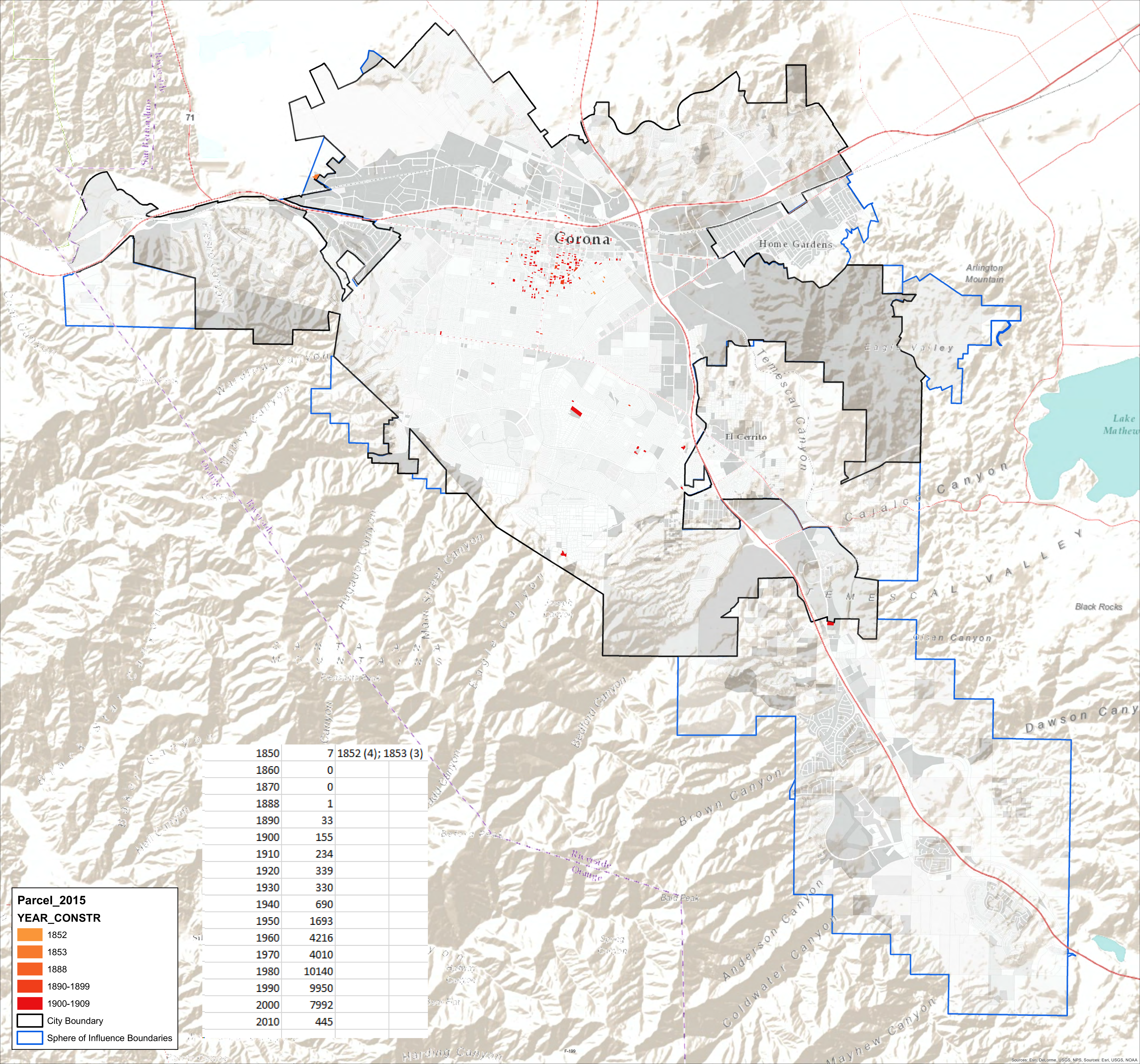
Row Labels	Count of APN
COC	5284
SOI	1892
SOI/COC	106
Grand Total	7282

1969-78, No Mills Act

Row Labels	Count of APN
COC	3123
SOI	586
SOI/COC	94
Grand Total	3803



1850	7	1852 (4); 1853 (3)
1860	0	
1870	0	
1888	1	
1890	33	
1900	155	
1910	234	
1920	339	
1930	330	
1940	690	
1950	1693	
1960	4216	
1970	4010	
1980	10140	
1990	9950	
2000	7992	
2010	445	



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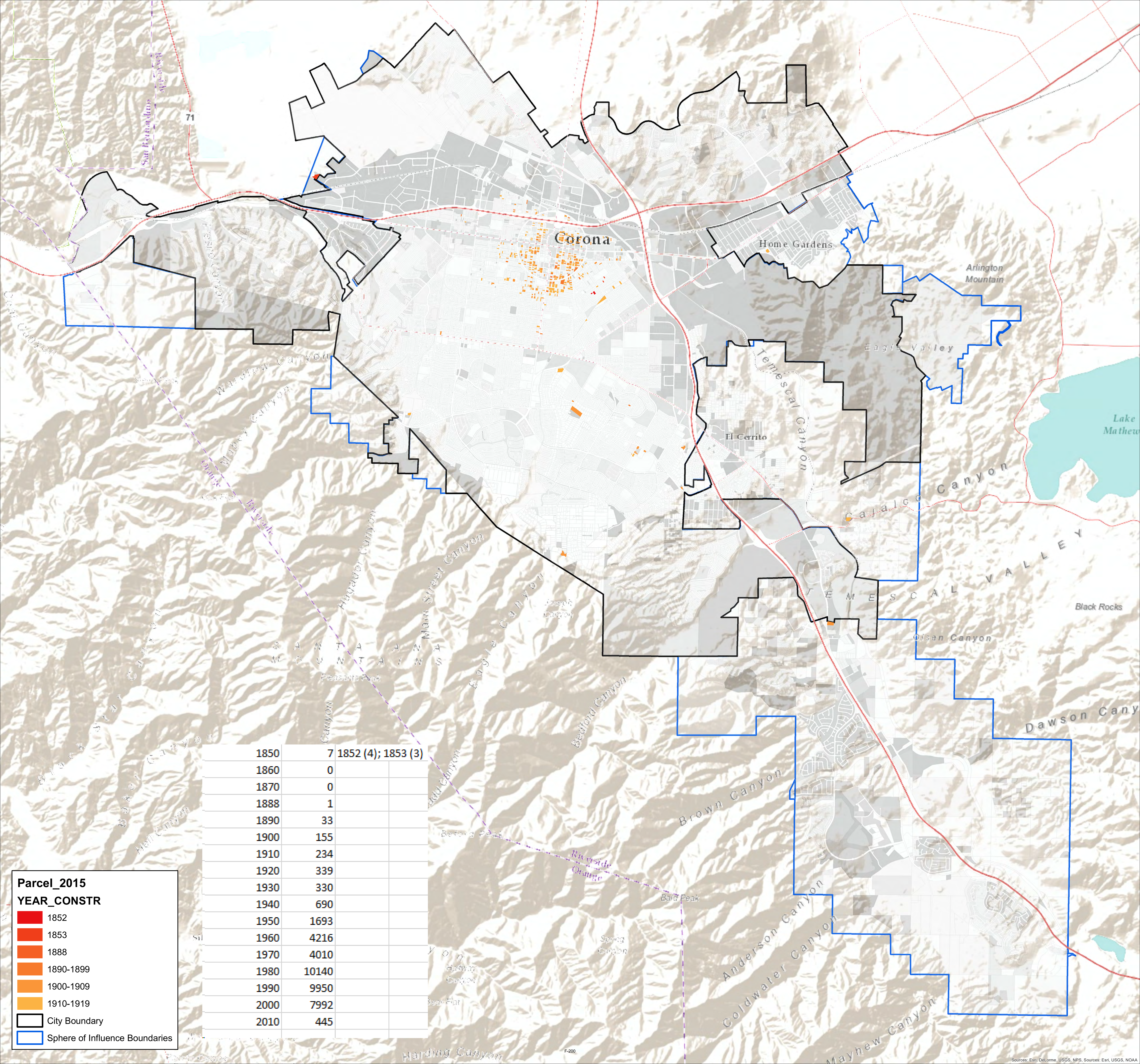
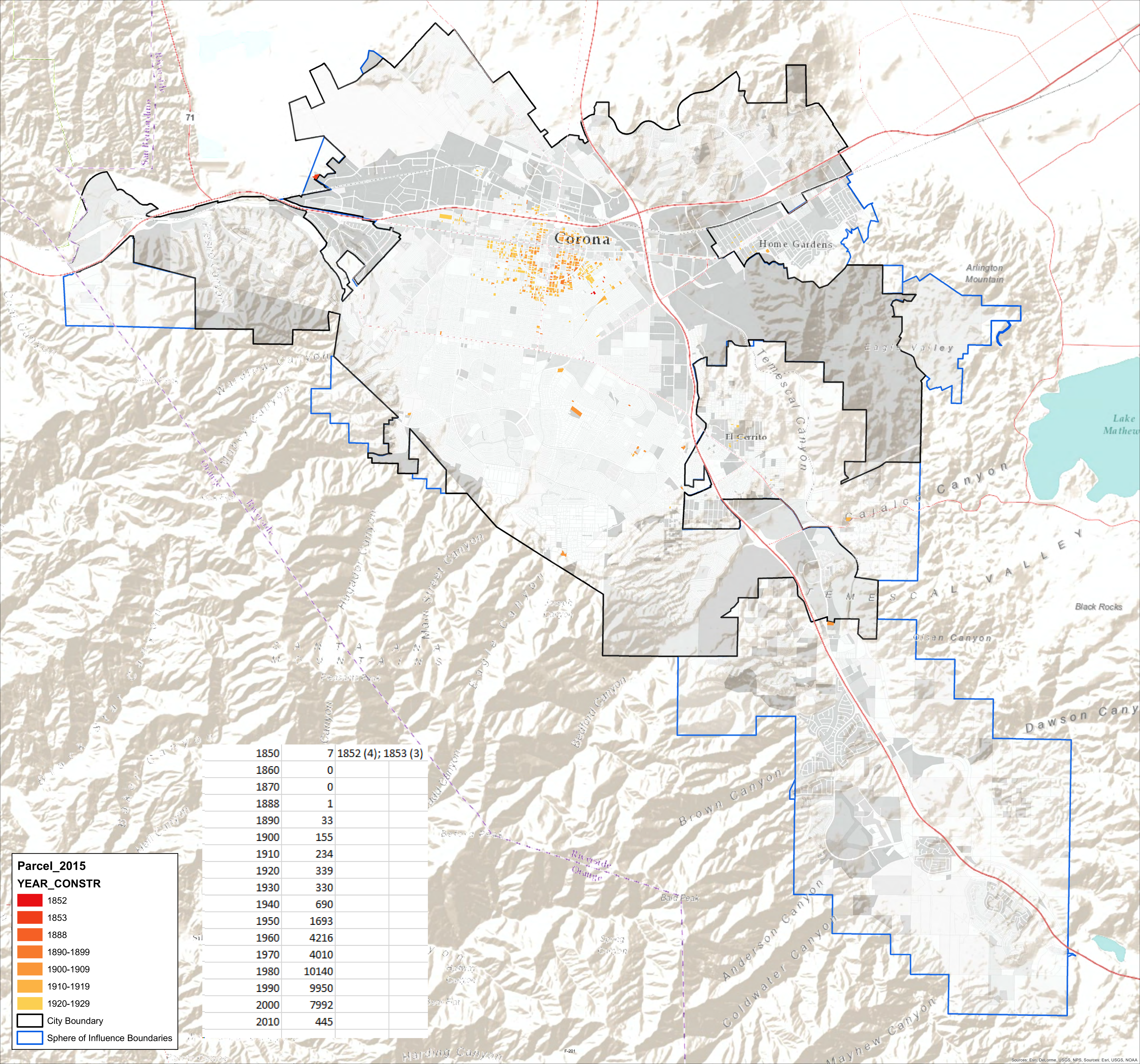
1860	0	
1870	0	
1888	1	
1890	33	
1900	155	
1910	234	
1920	339	
1930	330	
1940	690	
1950	1693	
1960	4216	
1970	4010	
1980	10140	
1990	9950	
2000	7992	
2010	445	



1850	7	1852 (4); 1853 (3)	
1860	0		
1870	0		
1888	1		
1890	33		
1900	155		
1910	234		
1920	339		
1930	330		
1940	690		
1950	1693		
1960	4216		
1970	4010		
1980	10140		
1990	9950		
2000	7992		
2010	445		



1850	7	1852 (4); 1853 (3)
1860	0	
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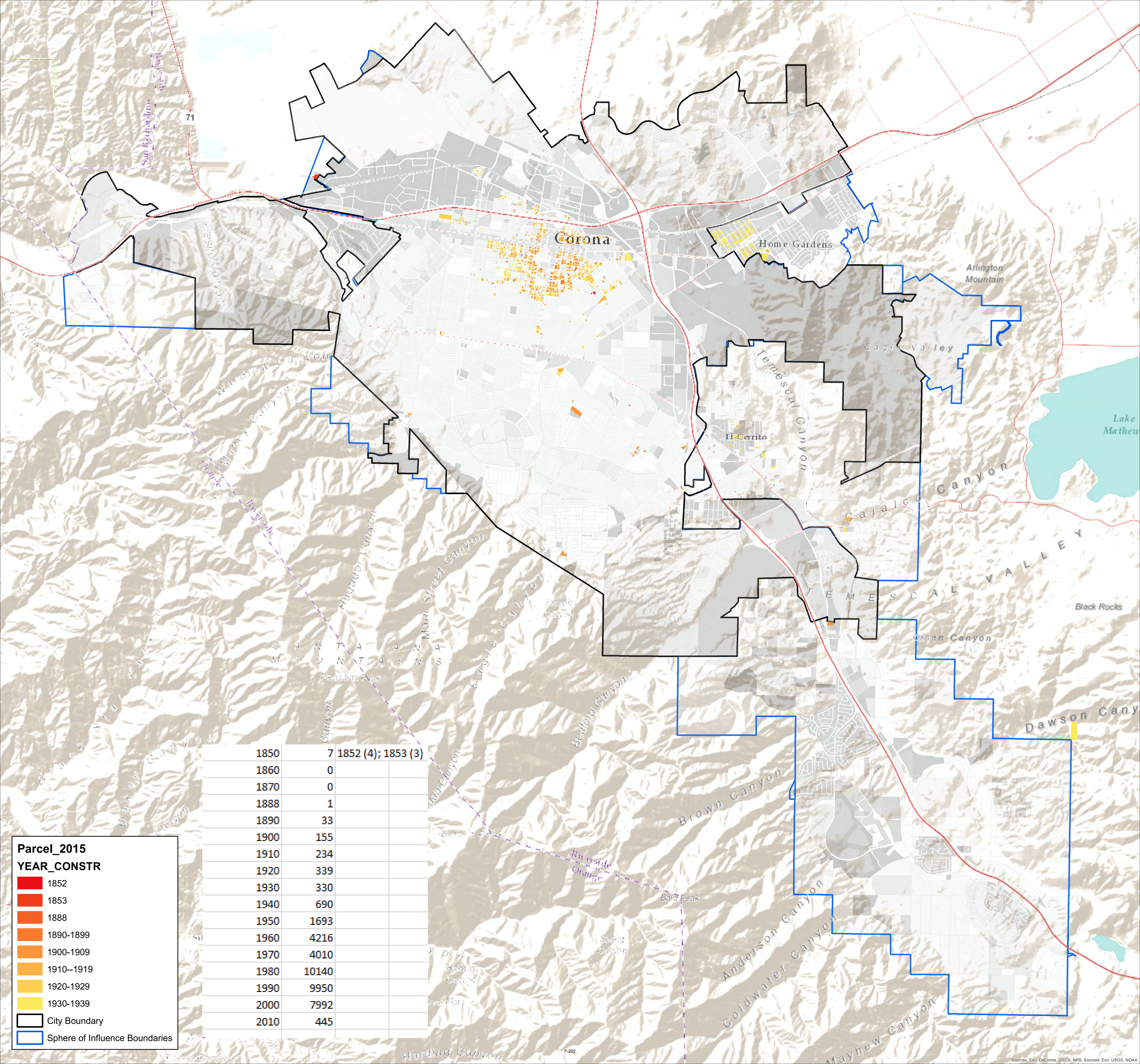
1888	1	
1890	33	
1900	155	
1910	234	
1920	339	
1930	330	
1940	690	
1950	1693	
1960	4216	
1970	4010	
1980	10140	
1990	9950	
2000	7992	
2010	445	



1850	7	1852 (4); 1853 (3)
1860	0	
1870	0	
1888	1	
1890	33	
1900	155	
1910	234	
1920	339	
1930	330	
1940	690	
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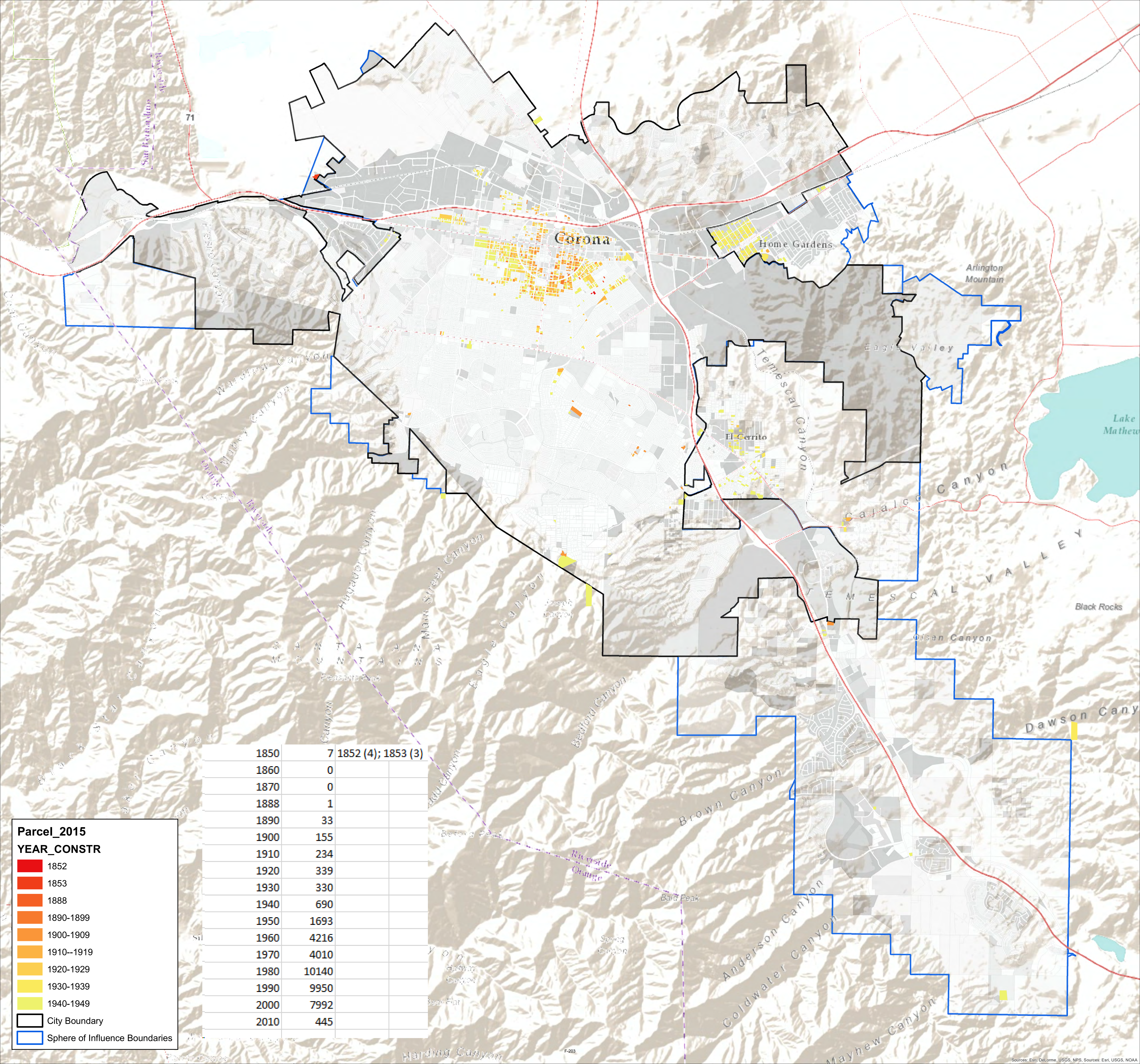
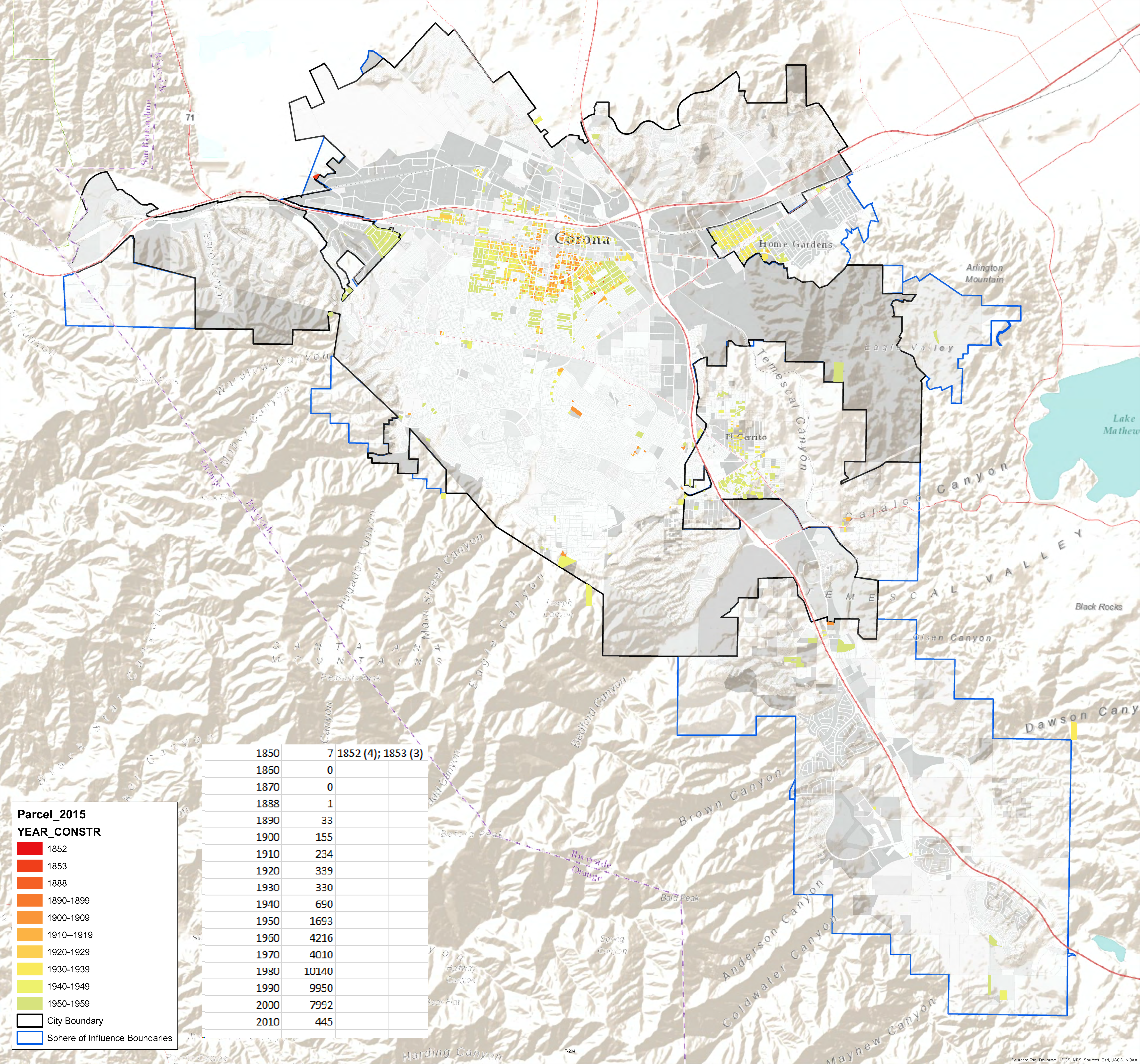
1990	9950	
2000	7992	
2010	445	

F-202



1850	7	1852 (4); 1853 (3)	
1860	0		
1870	0		
1888	1		
1890	33		
1900	155		
1910	234		
1920	339		
1930	330		
1940	690		
1950	1693		
1960	4216		
1970	4010		
1980	10140		
1990	9950		
2000	7992		
2010	445		



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1860	0	
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1888	1	
1890	33	
1900	155	
1910	234	
1920	339	
1930	330	
1940	690	
1950	1693	
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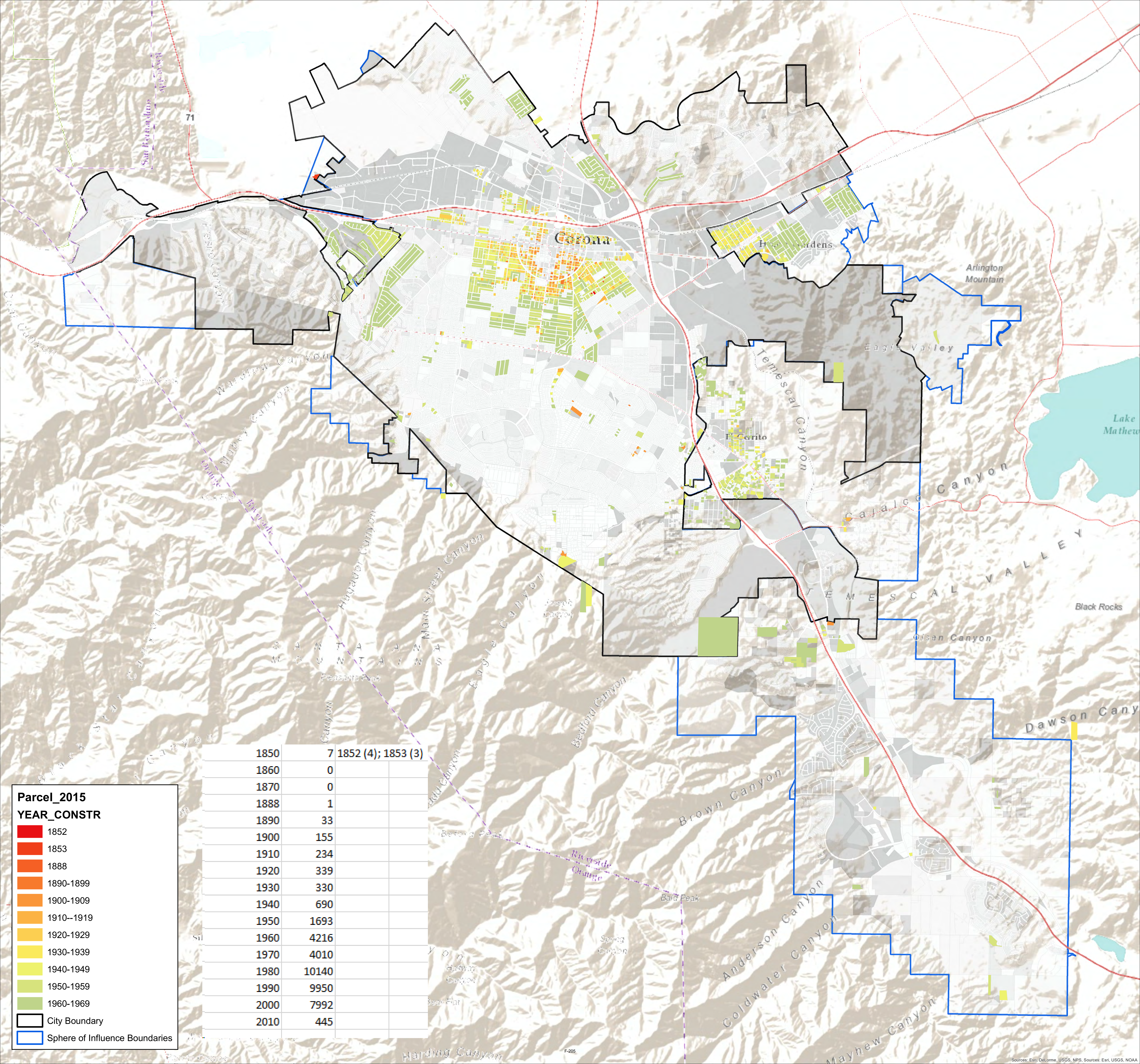
F-204



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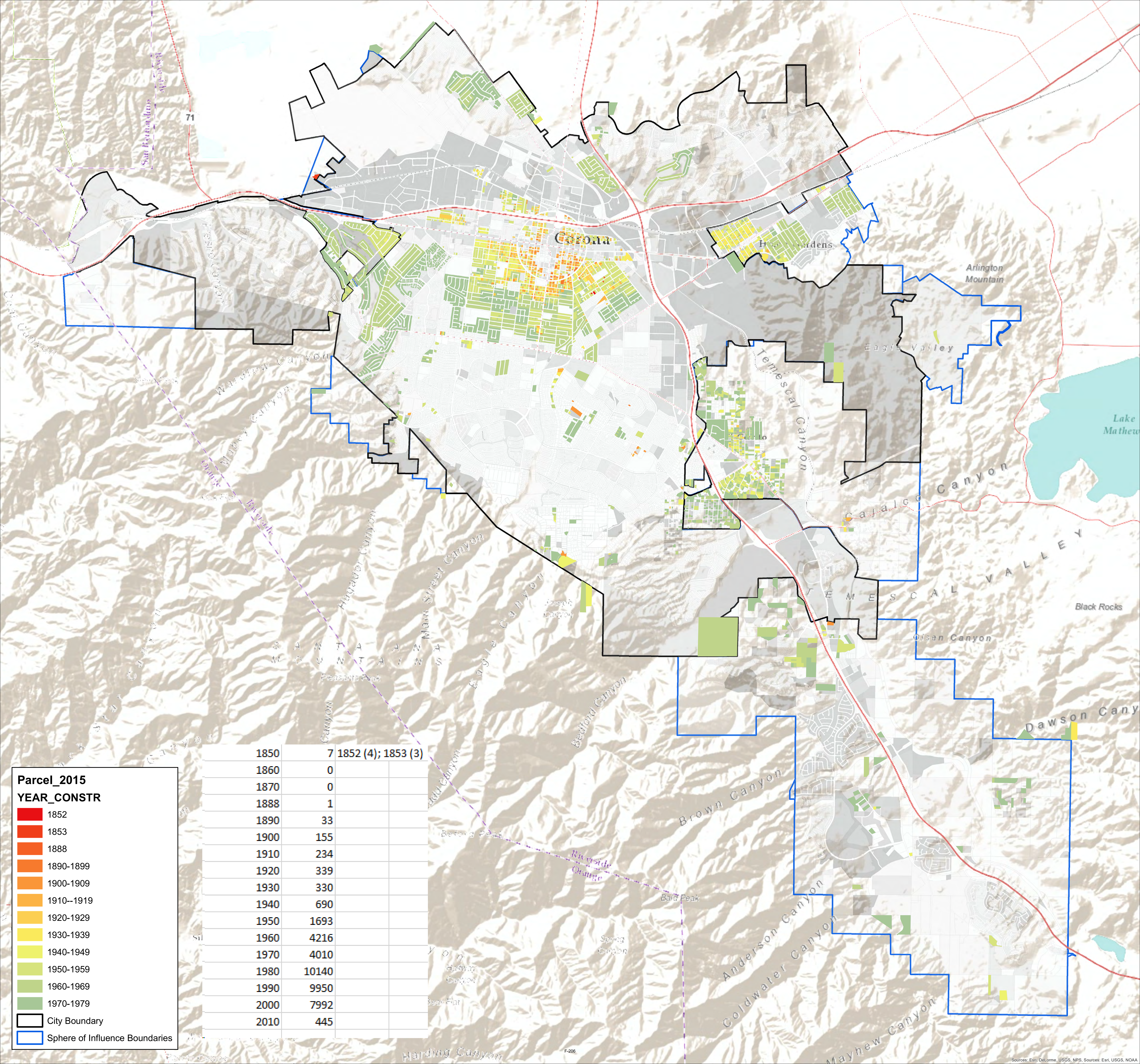
1860	0	
1870	0	
1888	1	
1890	33	
1900	155	
1910	234	
1920	339	
1930	330	
1940	690	
1950	1693	
1960	4216	
1970	4010	
1980	10140	
1990	9950	
2000	7992	
2010	445	

F-205



1850	7	1852 (4); 1853 (3)
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1870	0	
1888	1	
1890	33	
1900	155	
1910	234	
1920	339	
1930	330	
1940	690	
1950	1693	
1960	4216	
1970	4010	
1980	10140	
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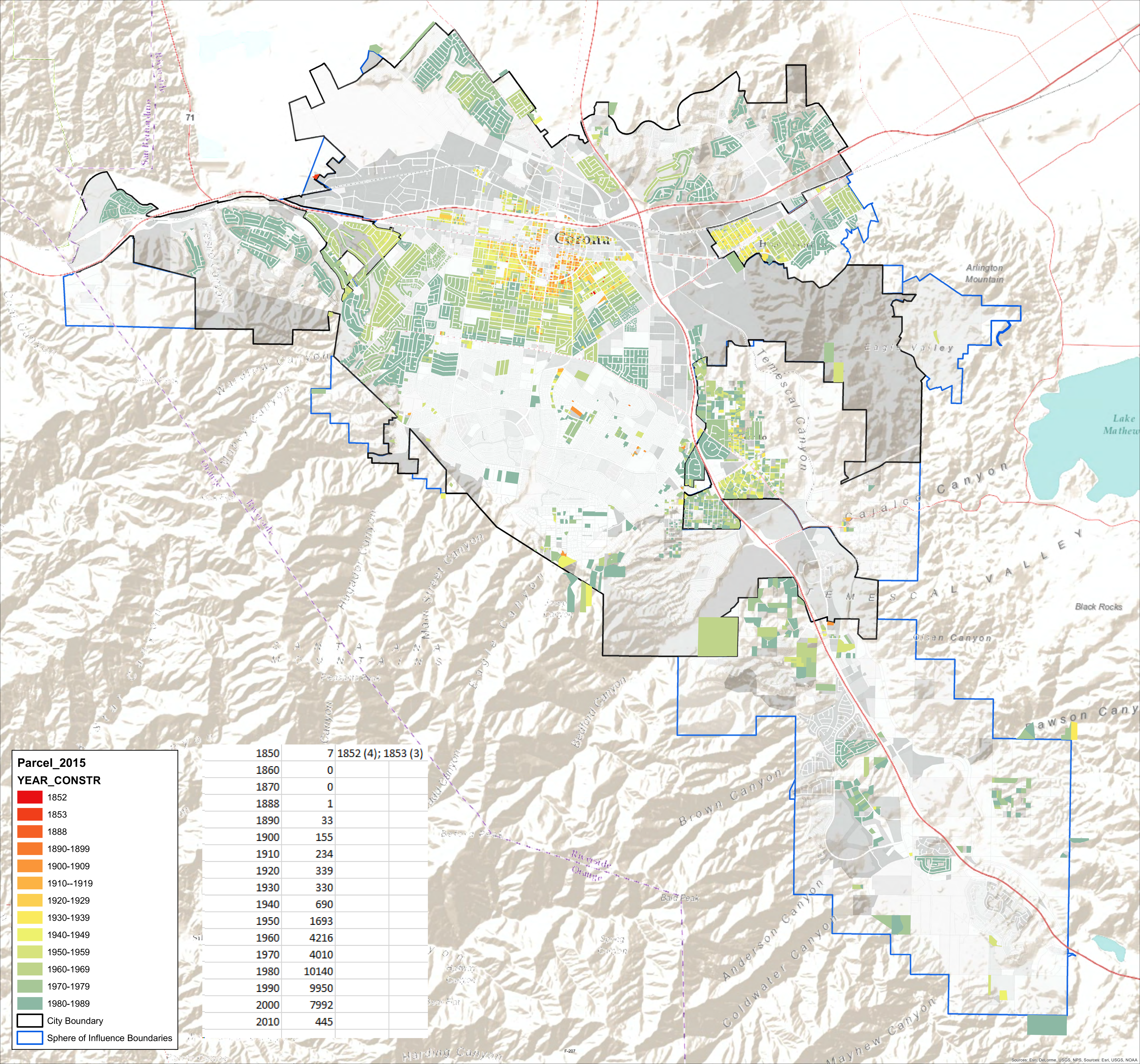
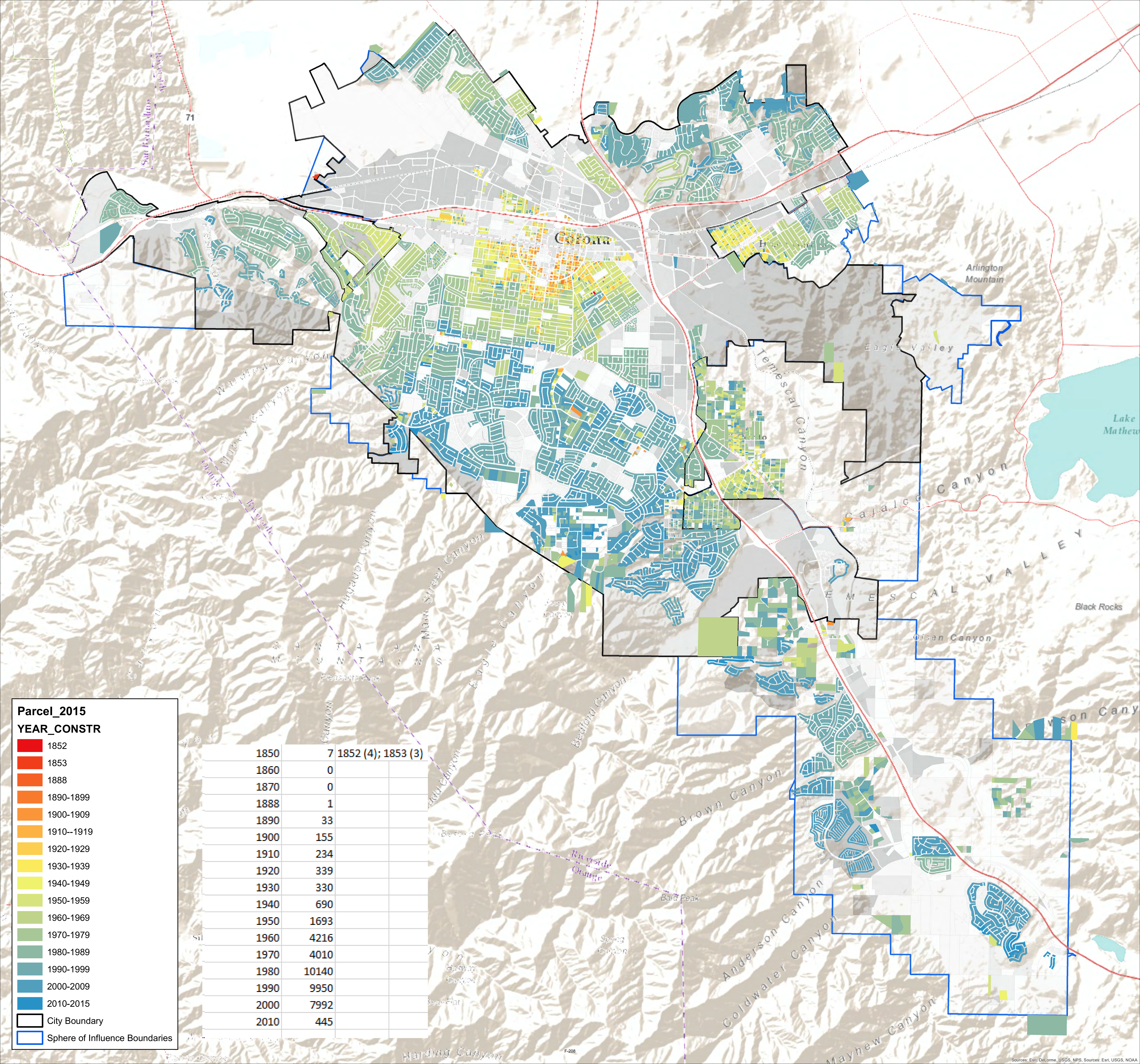


1850	7	1852 (4); 1853 (3)
1860	0	
1870	0	
1888	1	
1890	33	
1900	155	
1910	234	
1920	339	
1930	330	
1940	690	
1950	1693	
1960	4216	
1970	4010	
1980	10140	
1990	9950	
2000	7992	
2010	445	



1850	7	1852 (4); 1853 (3)
1860	0	
1870	0	
1888	1	
1890	33	
1900	155	
1910	234	
1920	339	
1930	330	
1940	690	
1950	1693	
1960	4216	
1970	4010	
1980	10140	
1990	9950	
2000	7992	
2010	445	

Appendix G Paleontological Resources Report

Appendices

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City of Corona General Plan Update: Paleontological Resources Technical Report

[DRAFT]

February 2018

SUBMITTED TO

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Santa Ana, California 92707

SUBMITTED BY

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City of Corona General Plan Update: Paleontological Resources Technical Report

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SWCA Project No. 40551

February 2018

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1 INTRODUCTION

SWCA Environmental Consultants (SWCA) was retained on behalf of PlaceWorks to provide paleontological resources services in support of the City of Corona General Plan Interim Technical Update and Environmental Analysis (project) for the City of Corona, Riverside County, California (City). SWCA performed a desktop analysis to assess paleontological conditions throughout the project area and reviewed relevant technical documents and agency-maintained databases on paleontological resources. The desktop research is summarized in this paleontological resources technical report (PRTR), which documents the existing paleontological resources within the project area, including the City and other acreage within its Sphere of Influence (SOI). This interim technical update to the General Plan, which was last updated in 2004, will ensure that all technical data and policies remain current, and will guide decisions carried out by the City. The General Plan addresses an area encompassing the 101.5 square km (39.2 square miles) within the city boundaries and an additional 68.6 square km (26.5 square miles) within the SOI.

2 REGULATORY SETTING

Paleontological resources are limited, nonrenewable resources of scientific, cultural, and educational value and are afforded protection under federal and state laws and regulations. This study satisfies project requirements in accordance with both federal and state regulations. This analysis also complies with guidelines and significance criteria specified by the Society of Vertebrate Paleontology (SVP 1995, 2010).

2.1 Federal Regulations

2.1.1 Paleontological Resources Preservation, Omnibus Public Lands Act, Public Law 111-011, Title VI, Subtitle D (PRPA), 2009

This legislation directs the Secretaries of the U.S. Department of the Interior (USDI) and U.S. Department of Agriculture (USDA) to manage and protect paleontological resources on federal land using “scientific principles and expertise.” To formulate a consistent paleontological resources management framework, the PRPA incorporates most of the recommendations from the report of the Secretary of the Interior titled “Assessment of Fossil Management on Federal and Indian Lands” (USDI 2000). In passing the PRPA, Congress officially recognized the scientific importance of paleontological resources on some federal lands by declaring that fossils from these lands are federal property that must be preserved and protected. The PRPA codifies existing policies of the Bureau of Land Management (BLM), National Park Service (NPS), U.S. Forest Service (USFS), Bureau of Reclamation, and U.S. Fish and Wildlife Service, and provides the following:

- uniform criminal and civil penalties for illegal sale and transport, and theft and vandalism of fossils from federal lands;
- uniform minimum requirements for paleontological resource-use permit issuance (terms, conditions, and qualifications of applicants);
- uniform definitions for “paleontological resources” and “casual collecting”; and
- uniform requirements for curation of federal fossils in approved repositories.

2.1.2 Federal Land Policy and Management Act (FLPMA) of 1976

The Federal Land Policy and Management Act (FLPMA) of 1976 (43 United States Code [USC] 1712[c], 1732[b]); sec. 2, Federal Land Management and Policy Act of 1962 [30 USC 611]; Subpart 3631.0 et seq.), Federal Register Vol. 47, No. 159, 1982, does not refer specifically to fossils. However, “significant fossils” are understood and recognized in policy as scientific resources. Permits, which authorize the collection of significant fossils for scientific purposes, are issued under the authority of FLPMA. Under FLPMA, federal agencies are charged to:

- manage public lands in a manner that protects the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, archaeological, and water resources, and, where appropriate, preserve and protect certain public lands in their natural condition (Section 102 (a)(8) (11));
- periodically inventory public lands so that the data can be used to make informed land-use decisions (Section 102(a)(2)); and
- regulate the use and development of public lands and resources through easements, licenses, and permits (Section 302(b)).

2.1.3 The National Environmental Policy Act (NEPA) of 1969

The National Environmental Policy Act of 1969 (NEPA), as amended (Pub. L. 91-190, 42 USC 4321-4347, January 1, 1970, as amended by Pub. L. 94-52, July 3, 1975, Pub. L. 94-83, August 9, 1975, and Pub. L. 97-258 Sec. 4(b), Sept. 13, 1982) recognizes the continuing responsibility of the federal government to "preserve important historic, cultural, and natural aspects of our national heritage…" (Sec. 101 [42 USC Sec. 4321]) (#382). With the passage of the PRPA, paleontological resources are considered a significant resource and it is therefore now standard practice to include paleontological resources in NEPA studies in all instances where there is a possible impact.

2.1.4 Antiquities Act of 1906

The Antiquities Act of 1906 (16 USC 431-433) states, in part:

> That any person who shall appropriate, excavate, injure or destroy any historic or prehistoric ruin or monument, or any object of antiquity, situated on lands owned or controlled by the Government of the United States, without the permission of the Secretary of the Department of the Government having jurisdiction over the lands on which said antiquities are situated, shall upon conviction, be fined in a sum of not more than five hundred dollars or be imprisoned for a period of not more than ninety days, or shall suffer both fine and imprisonment, in the discretion of the court.

Although there is no specific mention of natural or paleontological resources in the Act itself, or in the Act's uniform rules and regulations (Title 43 Part 3, Code of Federal Regulations [43 CFR 3]), the term "objects of antiquity" has been interpreted to include fossils by the NPS, BLM, the USFS, and other federal agencies. Permits to collect fossils on lands administered by federal agencies are authorized under this Act. However, due to the large gray areas left open to interpretation due to the imprecision of the wording, agencies are hesitant to interpret this act as governing paleontological resources.

2.2 State Regulations

2.2.1 California Environmental Quality Act (CEQA)

CEQA is the principal statute governing environmental review of projects occurring in the state and is codified at Public Resources Code (PRC) Section 21000 et seq. CEQA requires lead agencies to determine if a proposed project would have a significant effect on the environment, including significant effects on paleontological resources. Guidelines for the Implementation of CEQA, as amended March 29, 1999 (Title 14, Chapter 3, California Code of Regulations 15000 et seq.), define procedures, types of activities, persons, and public agencies required to comply with CEQA, and include as one of the questions to be answered in the Environmental Checklist (Section 15023, Appendix G, Section XIV, Part a) the following: "Will the proposed project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?"

2.2.2 Public Resources Code (PRC) Section 5097.5

Requirements for paleontological resource management are included in the PRC Division 5, Chapter 1.7, Section 5097.5, and Division 20, Chapter 3, Section 30244, which states:

> No person shall knowingly and willfully excavate upon, or remove, destroy, injure or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands. Violation of this section is a misdemeanor.

These statutes prohibit the removal, without permission, of any paleontological site or feature from lands under the jurisdiction of the state or any city, county, district, authority, or public corporation, or any agency thereof. As a result, local agencies are required to comply with PRC 5097.5 for their own activities, including construction and maintenance, as well as for permit actions (e.g., encroachment permits) undertaken by others. PRC Section 5097.5 also establishes the removal of paleontological resources as a misdemeanor, and requires reasonable mitigation of adverse impacts to paleontological resources from developments on public (state, county, city, and district) lands.

2.3 Local Regulations

2.3.1 Riverside County

The Riverside County General Plan 2025 (2012) includes paleontological resources as targets of conservation in its Historic Preservation Element under Objective HP-1, "To use historic preservation principles as an equal component in the planning and development process" (p. HP-25). The following policy under this objective is directed toward paleontological resources:

> **Policy HP-1:3—**The City shall protect sites of archaeological and paleontological significance and ensure compliance with all applicable State and Federal cultural resources protection and management laws in its planning and project review process.

The General Plan also lines out policies intended to appropriately consider paleontological resources in the Chapter 5: Multipurpose Open Space Element (Riverside County General Plan 2025 [2012:55]):

> **OS 19.6 –** Whenever existing information indicates that a site proposed for development has high paleontological sensitivity, a paleontological resource impact mitigation program (PRIMP) shall be filed with the County Geologist prior to site grading. The PRIMP shall specify the steps to be taken to mitigate impacts to paleontological resources.
>
> **OS 19.7 –** Whenever existing information indicates that a site proposed for development has low paleontological sensitivity, no direct mitigation is required unless a fossil is encountered during site development. Should a fossil be encountered, the County Geologist shall be notified and a paleontologist shall be retained by the project proponent. The paleontologist shall document the extent and potential significance of the paleontological resources on the site and establish appropriate mitigation measures for further site development.

> **OS 19.8 –** Whenever existing information indicates that a site proposed for development has undetermined paleontological sensitivity, a report shall be filed with the County Geologist documenting the extent and potential significance of the paleontological resources on site and identifying the extent and potential significance of the paleontological resources on site and identifying mitigation measures for the fossil and for impacts to significant paleontological resources prior to approval of that department.
>
> **OS 19.9 –** Whenever paleontological resources are found, the County Geologist shall direct them to a facility within Riverside County for their curation, including the Western Science Center in the City of Hemet.

2.3.2 City of Corona

The City of Corona's General Plan from 2004 includes paleontological resources in the Historic Resources section. This chapter identifies Goal 4.3, "Recognize the importance of archeological and paleontological resources and ensure the identification and protection of those resources within the City of Corona" (p. 115). The General Plan identifies eight policies in support of this goal, three of which address paleontological resources:

- **4.3.1—**Compile and maintain an inventory of all known archeological and paleontological resources within the City and the Sphere of Influence, and identify areas of cultural and resource sensitivity for future study in conjunction with development proposals.
- **4.3.6—**Any project that involves earth-disturbing activities in soil or rock units known or reasonably suspected to be fossil-bearing shall require monitoring by a qualified paleontologist retained by the project applicant for the duration of excavation or trenching.
- **4.3.7—**Paleontological resources found prior to or during construction shall be evaluated by a qualified paleontologist, and appropriate mitigation measures applied, pursuant to Section 21083.2 of CEQA, before the resumption of development activities. Any measures applied shall include the preparation of a report meeting professional standards, which shall be submitted to the Riverside County Museum of Natural History.

3 STUDY APPROACH

This PRTR is based on a desktop review of available scientific literature, geologic maps, a records search at the Natural History Museum of Los Angeles County (NHMLA), and a review of the online collections database of the University of California Museum of Paleontology (UCMP). When possible, results are presented separately for the city of Corona, the vicinity of Corona, and Riverside County.

3.1 Database and Literature Reviews

SWCA conducted a thorough background research and analysis of the project area, including geologic map and literature reviews. The purpose of the review was to evaluate the paleontological sensitivity of the project area by identifying known fossil resources within the project area and nearby in the same geologic formations. SWCA also requested a paleontological records search from the NHMLA and reviewed UCMP's online collections database (UCMP 2017). The purpose of the museum records search was to 1) determine whether any previously recorded fossil localities occur in the project area, 2) assess the potential for disturbance of these localities during construction, and 3) evaluate the paleontological sensitivity of the project area. The study area included the eight U.S. Geological Survey (USGS) 7.5-minute quadrangles encompassing the City of Corona and its SOI: Prado Dam, Corona North, Riverside West, Black Star Canyon, Corona South, Lake Mathews, Alberhill, and Santiago Peak.

3.2 Project Personnel

SWCA project managers Chris Millington, M.A., provided oversight on this project. SWCA Lead Paleontologist Alyssa Bell, Ph.D., conducted the paleontological analysis and authored this report. Geographic information systems (GIS) Specialists Peter Von der Porten and Jeremy Huey produced the figures. SWCA Paleontological Resources Principal Investigator Paleontologist Russell Shapiro, Ph.D., reviewed this report.

3.3 Definition and Significance of Paleontological Resources

Paleontology is a multidisciplinary science combining elements of geology, biology, chemistry, and physics to understand the history of life on earth. Paleontological resources, or fossils, are the remains, imprints, or traces of once-living organisms preserved in rocks and sediments. These include mineralized, partially mineralized, or un-mineralized bones and teeth, soft tissues, shells, wood, leaf impressions, footprints, burrows, and microscopic remains. Paleontological resources include not only the fossils themselves, but also the physical characteristics of the fossils' associated sedimentary matrix.

The fossil record is the only evidence that indicates life on earth has existed for more than 3.6 billion years. Fossils are considered nonrenewable resources because the organisms they represent no longer exist. Thus, once destroyed, a fossil can never be replaced (Murphey and Daitch 2007). Fossils are important scientific and educational resources and can be used to:

- study the phylogenetic relationships among extinct organisms, as well as their relationships to modern groups;
- elucidate the taphonomic, behavioral, temporal, and diagenetic pathways responsible for fossil preservation, including the biases inherent in the fossil record;
- reconstruct ancient environments, climate change, and paleoecological relationships;
- provide a measure of relative geologic dating, which forms the basis for biochronology and biostratigraphy, and is an independent and corroborating line of evidence for isotopic dating;
- study the geographic distribution of organisms and tectonic movements of land masses and ocean basins through time;
- study patterns and processes of evolution, extinction, and speciation; and
- identify past and potential future human-caused effects to global environments and climates (Murphey and Daitch 2007).

3.4 Resource Assessment Guidelines

The loss of any identifiable fossil that could yield information important to prehistory, or that embodies the distinctive characteristics of a type of organism, environment, period of time, or geographic region, would be a significant environmental impact. Direct impacts on paleontological resources primarily concern the potential destruction of nonrenewable paleontological resources and the loss of information associated with these resources. This includes the unauthorized collection of fossil remains. If potentially fossiliferous bedrock or surficial sediments are disturbed, the disturbance could result in the destruction of paleontological resources and subsequent loss of information (a significant impact). At the project-specific level, direct impacts can be reduced to a less-than-significant level through the implementation of paleontological mitigation.

The CEQA threshold of significance for an impact to paleontological resources is reached when a project is determined to "directly or indirectly destroy a significant paleontological resource or unique geologic feature" (Appendix G, State CEQA Guidelines). In general, for project areas underlain by paleontologically sensitive geologic units, the greater the amount of ground disturbance, the higher the potential for significant impacts to paleontological resources. For project areas that are directly underlain by geologic units with no paleontological sensitivity, there is no potential for impacts on paleontological resources unless sensitive geologic units that underlie the non-sensitive unit are also affected.

3.4.1 Professional Standards

The SVP has established standard guidelines that outline professional protocols and practices for conducting paleontological resource assessments and surveys, monitoring and mitigation, data and fossil recovery, sampling procedures, and specimen preparation, identification, analysis, and curation (1995, 2010). Most practicing professional vertebrate paleontologists adhere closely to the SVP's assessment, mitigation, and monitoring requirements as specifically provided in its standard guidelines. Most state regulatory agencies with paleontological laws, ordinances, regulations, and standards accept and use the professional standards set forth by the SVP.

As defined by the SVP (2010:11), significant paleontological resources are:

> fossils and fossiliferous deposits, here defined as consisting of identifiable vertebrate fossils, large or small, uncommon invertebrate, plant, and trace fossils, and other data that provide taphonomic, taxonomic, phylogenetic, paleoecologic, stratigraphic, and/or biochronologic information. Paleontological resources are considered to be older than recorded human history and/or older than middle Holocene (i.e., older than about 5,000 radiocarbon years).

Based on the significance definitions of the SVP (2010), all identifiable vertebrate fossils are considered to have significant scientific value because vertebrate fossils are relatively uncommon, and only rarely will a fossil locality yield a statistically significant number of specimens of the same genus. Therefore, every vertebrate fossil found has the potential to provide significant new information about the taxon it represents, its paleoenvironment, and/or its distribution. Furthermore, all geologic units in which vertebrate fossils have been found previously are considered to have high sensitivity. Identifiable plant and invertebrate fossils are considered significant if found in association with vertebrate fossils or if defined as significant by project paleontologists, specialists, or local government agencies.

A geologic unit known to contain significant fossils is considered sensitive to adverse impacts if there is a high probability that earth-moving or ground-disturbing activities in that rock unit will either disturb or destroy fossil remains directly or indirectly. This definition of sensitivity differs fundamentally from the definition for archaeological resources as follows:

> It is extremely important to distinguish between archaeological and paleontological resources when discussing the paleontological potential of rock units. The boundaries of an archaeological resource site define the areal/geographic extent of an archaeological resource, which is generally independent from the rock unit on which it sits. However, paleontological sites indicate that the containing rock unit or formation is fossiliferous. Therefore, the limits of the entire rock unit, both areal and stratigraphic, define the extent of paleontological potential (SVP 2010).

Many archaeological sites contain features that are visually detectable on the surface. In contrast, fossils are often contained within surficial sediments or bedrock, and are therefore not observable or detectable unless exposed by erosion or human activity.

In summary, paleontologists cannot know either the quality or quantity of fossils prior to natural erosion or human-caused exposure. As a result, even in the absence of fossils on the surface, it is necessary to assess the sensitivity of rock units based on their known potential to produce significant fossils elsewhere within the same geologic unit (both within and outside the study area) or a similar geologic unit, or based on whether the unit in question was deposited in a type of environment considered favorable for fossil preservation. Monitoring by experienced paleontologists greatly increases the probability that fossils will be discovered during ground-disturbing activities and that, if these remains are significant, successful mitigation and salvage efforts may be undertaken to prevent adverse impacts to these resources.

3.4.2 Paleontological Sensitivity

Paleontological sensitivity is defined as the potential for a geologic unit to produce scientifically significant fossils. This is determined by rock type, past history of the geologic unit in producing significant fossils, and fossil localities recorded from that unit. Paleontological sensitivity is derived from the known fossil data collected from the entire geologic unit, not just from a specific survey. In its “Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources,” the SVP (2010:1–2) defines four categories of paleontological sensitivity (potential) for rock units: high, low, undetermined, and no potential:

High Potential. “Rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered are considered to have a high potential for containing additional significant paleontological resources. Rock units classified as having high potential for producing paleontological resources include, but are not limited to, sedimentary formations and some volcaniclastic formations (e.g., ashes or tephras), and some low-grade metamorphic rocks which contain significant paleontological resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils (e.g., middle Holocene and older, fine-grained fluvial sandstones, argillaceous and carbonate-rich paleosols, cross-bedded point bar sandstones, fine-grained marine sandstones, etc.). Paleontological potential consists of both a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, plant, or trace fossils and b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, paleoecologic, taphonomic, biochronologic, or stratigraphic data. Rock units which contain potentially datable organic remains older than late Holocene, including deposits associated with animal nests or middens, and rock units which may contain new vertebrate deposits, traces, or trackways are also classified as having high potential.”

Low Potential. “Reports in the paleontological literature or field surveys by a qualified professional paleontologist may allow determination that some rock units have low potential for yielding significant fossils. Such rock units will be poorly represented by fossil specimens in institutional collections, or based on general scientific consensus, only preserve fossils in rare circumstances and the presence of fossils is the exception not the rule, e.g. basalt flows or Recent colluvium. Rock units with low potential typically will not require impact mitigation measures to protect fossils.”

Undetermined Potential. “Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment are considered to have undetermined potential. Further study is necessary to determine if these rock units have high or low potential to contain significant paleontological resources. A field survey by a qualified professional paleontologist to specifically determine the paleontological resource potential of these rock units is required before a paleontological resource impact mitigation program can be developed. In cases where no subsurface data are available, paleontological potential can sometimes be determined by strategically located excavations into subsurface stratigraphy."

No Potential. "Some rock units have no potential to contain significant paleontological resources, for instance high-grade metamorphic rocks (such as gneisses and schists) and plutonic igneous rocks (such as granites and diorites). Rock units with no potential require no protection or impact mitigation measures relative to paleontological resources" (SVP 2010:1–2).

4 EXISTING CONDITIONS

4.1 Existing Conditions: City of Corona

The city of Corona is located approximately 72 km (45 miles) southeast of Los Angeles in western Riverside County. The city limits encompass about 101.5 square km (39.2 square miles; Figure 1). Land use within the city and its SOI was historically agricultural, with citrus orchards, dairy farms and ranches. Current land uses within the city and its SOI are primarily residential (approximately 38 percent of the total area), with noteworthy areas of industrial use (approximately 15 percent), open space and recreational areas (approximately 12 percent), and urban vacant land (approximately 12 percent). Agricultural uses only comprise approximately 3 percent of the total area with the city.

The city of Corona is located in the Peninsular Ranges Geomorphic Province, one of 11 major provinces in the state (Norris and Webb 1990). The Peninsular Ranges province runs parallel to the southern California Pacific coast and extends from the Los Angeles coastline to the San Bernardino Fault and from the San Diego coastline to the Colorado Desert. It is characterized by northwest-trending mountains and valleys (Norris and Webb 1990). Within the Peninsular Ranges, the city lies at the northeastern-most edge of the Santa Ana Mountains, in the southern Chino Basin. The Santa Ana Mountains are fault controlled, with uplift of the mountains resulting in the deposition of up to 305 m (1,000 ft.) of sediments into the adjoining Chino Basin (Durham and Yerkes 1965). Basement rocks in and around the city are a complex of Mesozoic-aged plutonic rocks overlain by mixed marine sediments and volcanic rocks deposited from the Late Cretaceous onward (Schoellhamer et al. 1981). Tertiary sediments begin to show terrestrial input between marine units, such as the Paleocene Silverado Formation, through the Pleistocene, when alluvial deposits dominate (Schoellhamer et al. 1981). A geologic timescale is shown in Table 1.

Table 1. Geologic Timescale (International Commission on Stratigraphy 2017)

Eon	Era	Period	Epoch	Age, mya
Phanerozoic	Cenozoic	Quaternary	Holocene	0.0117
			Pleistocene	2.58
		Tertiary	Pliocene	5.33
			Miocene	23.03
			Oligocene	33.90
			Eocene	56.00
			Paleocene	66.00
	Mesozoic	Cretaceous	Late	100.50
			Early	145.00
		Jurassic	Late	163.50
			Middle	174.10
			Early	201.30
		Triassic	Late	237.00
			Middle	247.20
			Early	251.90

4.2 Existing Conditions: Sphere of Influence

The SOI for the City of Corona General Plan includes 42.6 square km (26.5 square miles) in western Riverside County. The SOI land use, much like that of the city, was historically agricultural, with citrus orchards, dairy farms, and ranches. Current land uses within the SOI are primarily residential (approximately 38 percent of the total area), with noteworthy areas of industrial use (approximately 15 percent), open space and recreational areas (approximately 12 percent) and urban vacant land (approximately 12 percent).

The SOI is also located in the Peninsular Ranges Geomorphic Province (Norris and Webb 1990). Within the Peninsular Ranges, the SOI lies at the northeastern-most edge of the Santa Ana Mountains, in the southern Chino Basin. For a more in-depth discussion, see above and the geologic timescale shown in Table 1.

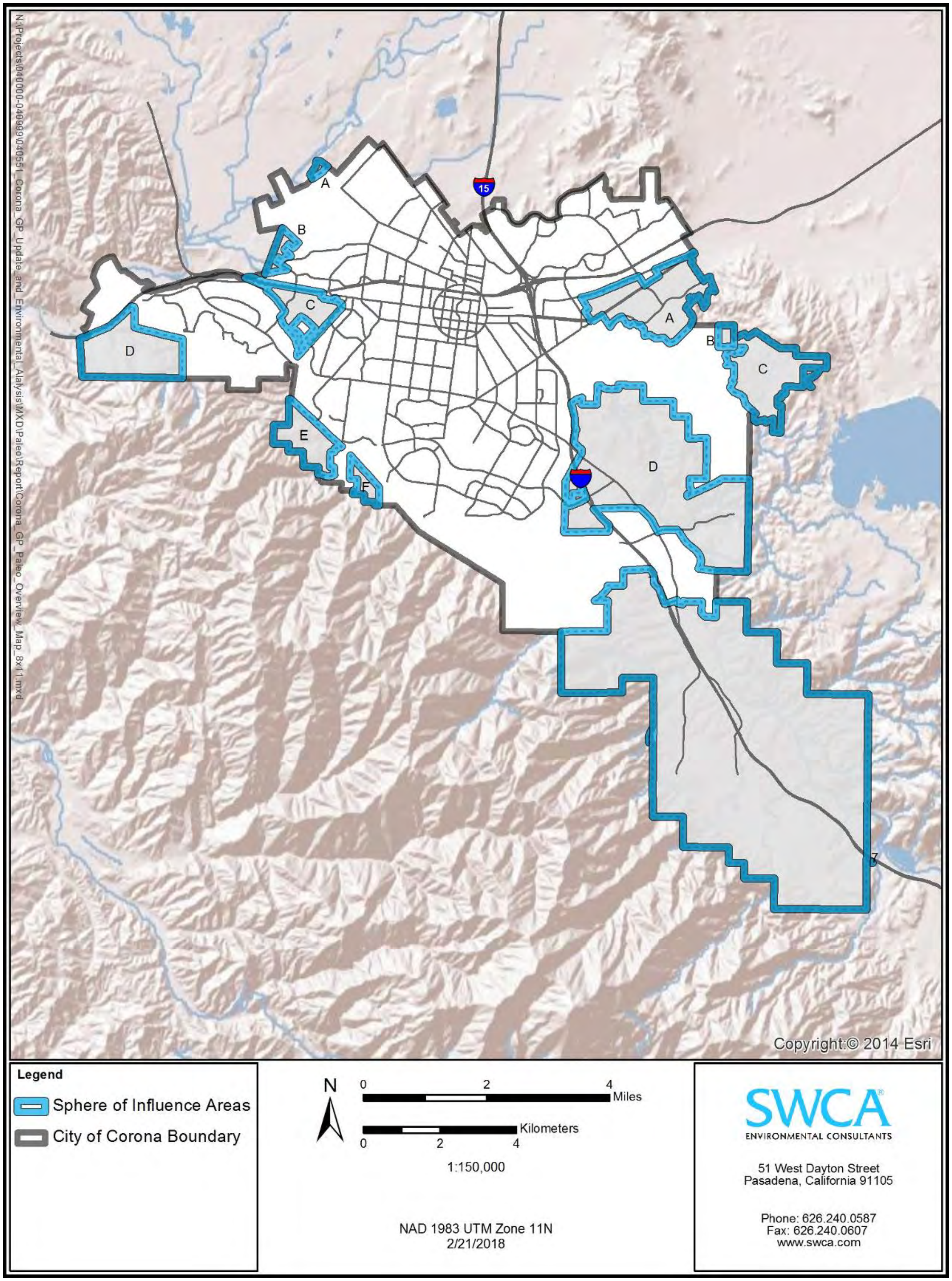

Figure 1. City of Corona and additional areas within the Sphere of Influence.

5 ANALYSIS

5.1 City of Corona: Geology and Paleontology

5.1.1 Geologic Units within the City

Morton and Miller (2006) mapped the geology in the vicinity of the city of Corona at a scale of 1:100,000. A variety of different geologic units (Figure 2) are found within the city of Corona, including igneous, metamorphic, and sedimentary rocks that date from the Triassic to the Miocene and alluvial deposits that date from the Pleistocene to the Recent. A map of the surficial geology in and around the City is shown in Figure 3 and Figure 4. These units are discussed in more detail below.

Artificial Fill (Qaf). These sediments were artificially constructed from sand, gravel, and bedrock fragments derived from construction and mining activities. Artificial fill is mapped as isolated outcrops in the City. These sediments have no potential to preserve fossils.

Very young surficial sediments. These sediments all date to the late Holocene (Morton and Miller 2006), deposited in the last few thousand years. As such, they are too young to preserve fossil resources. However, they may overlie older, paleontologically sensitive sediments. They differ primarily in grain size and depositional setting, as described below:

- Very young wash deposits (Qw). These sediments consist of sand and gravel of active washes mapped along the Santa Ana River at the northernmost edge of the city (Morton and Miller 2006).
- Very young landslide deposits (Qls). These sediments consist of slope-failure deposits with disorganized soil and rubble or large displaced blocks of bedrock that are found just south of the Santa Ana River in the northeastern portion of the city where they overlie sediments belonging to the Cretaceous Ladd Formation and the Santiago Peak Volcanics (Morton and Miller 2006).

Young surficial sediments. These sediments are similar to the above-described very young surficial sediments, but are older, ranging from the Holocene to late Pleistocene (around 11,000 years ago). As defined by the SVP (2010), fossils may be preserved in sediments older than 5,000 years. Based on this definition, fossil resources would not be found in the upper layers of these units, but deeper layers may preserve fossil resources.

- Young alluvial fan deposits (Qyf). Unconsolidated to moderately consolidated silt, sand, and pebbly cobbly sand deposits with slightly to moderately dissected surfaces, mapped as occurring widely throughout the city (Morton and Miller 2006). These sediments mostly overlie a wide range of older sedimentary rocks, most of which may preserve fossil resources. In rare occurrences, primarily in the southern portions of the city, these sediments may overlie Cretaceous igneous rocks, which will not preserve fossil resources.
    - Young alluvial fan deposits, Unit 1 (Qyf1). These sediments are much like the general young alluvial fan deposits (Qyf) in lithology, but are better constrained in age, dating from the early Holocene to late Pleistocene (Morton and Miller 2006). As such, these sediments are of an age to preserve fossil resources throughout their depth. Unit 1 is mapped throughout the city, with large areas present at the surface in the northern and central parts of the city.
- Young axial-channel deposits (Qya). These sediments consist of slightly consolidated to moderately consolidated silt, sand, and gravel, sometimes with boulders when present near steep valleys or slopes (Morton and Miller 2006). These deposits are mapped over large surface areas in the northern and northeastern parts of the city and extend along narrow drainages to the south.

- Young landslide deposits (Qyls). These are similar to the very young landslide deposits (Qls), but have surfaces that may be slightly dissected or otherwise modified by erosion (Morton and Miller 2006). These sediments are very rarely found in the project area, present only in small outcrops between West Ontario and Foothill Avenues.

Old surficial sediments. These sediments are similar in lithology to the very young and young surficial sediments discussed above, and may be found underlying those sediments throughout the project area (Morton and Miller 2006). These sediments date from the late to middle Pleistocene, and therefore are old enough to preserve fossils at any depth in areas mapped as these units. Throughout Southern California, alluvial sediments of this age have preserved a rich fossil history of Ice Age terrestrial fossils, such as mammoth, bison, horse, lion, cheetah, wolf, camel, antelope, peccary, mastodon, capybara, and giant ground sloth, as well as small animals such as birds, rodents, and lizards (Graham and Lundelius 1994; Jefferson 1991a, 1991b; Miller 1971; Scott and Cox 2008; Springer et al. 2009).

- Old alluvial fan deposits (Qof). These sediments are moderately to well-consolidated silt, sand, and gravel (Morton and Miller 2006), and cover large land areas throughout the city.
  - Old alluvial fan deposits, Unit 3 (Qof3). This unit of the old alluvial fan deposits is capped by soil with B_t horizons on the scale of tens of centimeters thick (Morton and Miller 2006), and are found in the northeastern part of the city.
  - Old alluvial fan deposits, Unit 1 (Qof1). This unit of the old alluvial fan deposits dates to the middle Pleistocene and has a thicker soil B_t horizon than Unit 3, up to 150 cm thick (Morton and Miller 2006). This unit occurs in the northern part of the city.
- Old alluvial-valley deposits (Qov). These sediments consist of moderately indurated, commonly slightly dissected sand, silt, and clay-bearing alluvium and are found primarily in the northeastern portion of the city (Morton and Miller 2006).
- Old landslide deposits (Qols). These sediments consist of slope-failure deposits that are moderately dissected, and probably inactive under current climatic and tectonic conditions (Morton and Miller 2006). These sediments are present only in very small outcrops in the southwestern portion of the city around Vandagriff Way and just north of Bedford Canyon.

Very old surficial sediments. These sediments are similar in lithology to the surficial sediments discussed above, and may be found underlying those sediments throughout the city. These sediments date from the middle to early Pleistocene (Morton and Miller 2006), and therefore are old enough to preserve fossils at any depth. As discussed above for the old surficial sediments, these very old surficial sediments have a rich fossil record throughout Southern California preserving Ice Age fossils.

- Very old alluvial-fan deposits (Qvof). These sediments consist of moderately to well- consolidated silt, sand, gravel, and conglomerate, and occur extensively throughout the western and southern portions of the city (Morton and Miller 2006).
- Very old axial-channel deposits (Qvoa). These sediments consist of well-consolidated alluvial deposits predominantly composed of sand but with scattered gravel and pebble layers as well as silt and clay-bearing alluvium (Morton and Miller 2006). These sediments occur in the northernmost portion of the city.

Sedimentary Rocks of the Norco Area (QTn). This unit is a conglomerate that dates from the early Pleistocene to perhaps the late Pliocene (Morton and Miller 2006), and crops out in the northernmost city around Corydon Street and Auburndale Street, where it also likely underlies the nearby young and very old axial channel deposits. Little additional information is available about this unit in the scientific literature.

Fernando Formation (Tf). The Fernando Formation dates to the Pliocene and consists of marine siltstone, sandstone, pebbly sandstone, and conglomerate (Morton and Miller 2006). The unit has limited surface exposure in the southern part of the city, near the intersection of Masters Drive and Dune Drive and the intersection of Signature Drive and Fairway Drive. However, the Fernando Formation may also be present underlying the adjoining old and very old alluvial fan deposits (Qof, Qvof). The lower part of the Fernando Formation consists of a pebble-cobble conglomerate in a sandstone matrix that fines upwards into a coarse sandstone and then a silty sandstone (Schoellhamer et al. 1981). The upper Fernando Formation consists of coarse-grained sandstone with conglomerate lenses (Schoellhamer et al. 1981). The Fernando Formation has an extensive record of preserving scientifically significant fossils, including invertebrates such as mollusks, echinoids, and bryozoans (Groves 1992; Morris 1976; Woodring 1938), fish (Huddleston and Takeuchi 2006), squid (Clarke et al. 1980), and a number of unidentified megafossils (Schoellhamer et al. 1981).

Sandstone of Norco Area (Tns). This marine unit consists of an unnamed, unconsolidated, greenish-yellow sandstone with sparse conglomerate lenses (Morton and Miller 2006). This unit is limited to scattered outcrops in the north-central and northeastern portions of the city, but is likely also present in the subsurface underlying the nearby young and very old axial channel deposits (Qya, Qvoa). There are abundant but poorly preserved shallow water fossils, primarily mollusks, known from this unit (Morton and Miller 2006).

Puente Formation (Tp). The Puente Formation consists of marine sandstone, siltstone, and shale that dates from the early Pliocene to the Miocene (Critelli et al. 1995; Morton and Miller 2006). The Puente Formation has a history of preserving both invertebrate and vertebrate marine fossils, such as cephalopods (Saul and Stadum 2005), crustaceans (Feldman 2003), fish (Carnevale et al. 2008; David 1943; Hilton and Grande 2006; Huddleston and Takeuchi 2006), and other marine and terrestrial vertebrates (Barboza et al. 2017; Leatham and North 2017). Scattered outcrops of the Puente Formation that have not been assigned to a specific member may be present in the subsurface of the central part of the city, underlying old and very old alluvial fan deposits (Qof, Qvof).

- **Sycamore Canyon Member (Tpsc).** The Sycamore Canyon Member dates to the late Miocene and consists of moderately indurated marine clastic sediments, predominately sandstone and pebble conglomerate (Morton and Miller 2006). This member has limited exposure in the project area, occurring at the surface only in the northwestern-most part of the city around Green River Road; however, it is likely present in the subsurface of the adjacent young axial channel (Qya) and very old alluvial fan deposits (Qvof).
- **Yorba Member (Tpy).** The Yorba Member dates to the Miocene and consists of primarily siltstone with some sandstone (Morton and Miller 2006). This member has very limited exposure in the city, occurring at the surface only in the northwestern-most area, south of the Sycamore Canyon Member outcrops. However, it is likely also present in the subsurface of the adjacent very old alluvial fan deposit (Qvof).
- **Soquel Member (Tpsq).** The Soquel Member dates to the Miocene and consists primarily of sandstone with some siltstone (Morton and Miller 2006). This unit does not crop out in the city, but may be present in the subsurface of the northwestern city, near the other members of the Puente Formation.

Topanga Group (Tt). The Topanga Group is predominantly composed of sandstone but also has siltstone and some breccia and shale (Morton and Miller 2006; Vedder 1972). This unit does not crop out in the city, but may be present in the subsurface underlying old alluvial fan deposits (Qof) in the southern part of the city. The Topanga is interpreted to represent wave-dominated coastal deposits grading into river-dominated deltaic deposits and fluvial deposits in the upper parts of the formation (Critelli and Ingersoll 1995). The

Topanga Formation dates to the middle Miocene, around 20 to 16 million years ago (Morton and Miller 2006). Fossils from the Topanga Formation include numerous invertebrate and vertebrate remains from both marine and terrestrial settings, including sharks, bony fishes, birds, whales, dolphins, and land mammals (Boessenecker and Churchill 2015; Campbell and Yerkes 1980; Morton and Miller 2006; Whistler and Lander 2003).

Vaqueros and Sespe Formations, undivided (Tvs). The Sespe and Vaqueros formations are often undifferentiated in the greater Los Angeles region (Morton and Miller 2006). The Sespe Formation records transitional marine environments (Liddicoat 1990), with sediments that consist of interbedded gray siltstone and red claystone with sandstone layers and fluvial conglomerate (Howard 2000). The Sespe Formation ranges in age from the early Miocene to the late Eocene (Morton and Miller 2006). Fossils from the Sespe Formation include highly weathered marine mollusks (Liddicoat 1990) and a wide variety of terrestrial vertebrates such as turtle, opossum, rabbit, pocket mouse, and badger (Lander 1983; Whistler and Lander 2003).

The Vaqueros Formation consists of predominately limey sandstone interbedded with siltstone and shale deposited in an offshore basin (Bartow 1974; Morton and Miller 2006). The Vaqueros Formation ranges in age from the early Miocene to the late Eocene (Morton and Miller 2006). Common fossils in the Vaqueros include marine invertebrates such as barnacles, ostreids, and pectinids and marine ichnofossils (Bartow 1974) as well as terrestrial vertebrates (Whistler and Lander 2003) and marine megafauna (Morton and Miller 2006).

Outcrops of undivided Vaqueros and Sespe formations occur in the northwestern portion of the city to the southwest of Green River Road.

Santiago Formation (Tsa). The Santiago Formation (not to be confused with the older Santiago Peak Volcanics) consists of terrestrial and marine sandstone and conglomerate (Morton and Miller 2006). Conglomerate occurs primarily in the lower portion of the unit and contains clasts of quartzite, volcanic rocks, sandstone, and metaconglomerate with an unknown, distant source. The lower conglomerate is overlain by gray feldspathic sandstone with small amounts of interbedded siltstone. This unit occurs as an isolated outcrop in the northwestern-most part of the city south of Green River Road and may also be present underlying the very old alluvial fan deposits (Qvof) immediately to the north of this outcrop. The Santiago Formation dates to the middle Eocene (Morton and Miller 2006). Although fossils are not known from the lower conglomerate, the sandstone contains marine mollusks, mammals, and nonmarine silicified wood (Morton and Miller 2006; Navarro-Santillan et al. 2002; Westgate 1988).

Silverado Formation (Tsi). The Silverado Formation consists of a basal conglomerate unit overlain by a sequence of sandstone and siltstone and a thick clay bed (Morton and Miller 2006). Studies of fossilized pollen found in the Silverado Formation indicate deposition in a swamp or lowland bog during the late Paleocene (Gaponoff 1984). The Silverado records the transition from fluvially deposited terrestrial sediments to marine shelf sediments during a major transgressive event (Ramirez and Maine 1995). This formation occurs as thin outcrops just south of the Santiago Formation and Vaqueros/Sespe Formation outcrops south of Green River Road, paralleling the southwestern border of the city to the southernmost extent of the city, where the formation is likely present in the subsurface underlying old and very old alluvial fan deposits (Qof, Qvof; Morton and Miller 2006). Fossils recovered from the Silverado Formation include mollusks and foraminifera (Lopez 1999) as well as terrestrial animals and wood fragments (Ramirez and Maine 1995).

Vaqueros, Sespe, Santiago, & Silverado Formations, undivided (Tvss). This unit consists of sandstone and conglomerate that cannot be further subdivided, but show lithological characteristics common to all of these units (see individual descriptions above; Morton and Miller 2006). This unit occurs as an isolated outcrop in the eastern part of the city around Sherborn Street.

Ladd Formation (Kl). The Ladd Formation consists of conglomerate, sandstone, siltstone, and shale that date to the Late Cretaceous (Morton and Miller 2006). Undifferentiated outcrops of this unit occur in the northwestern project area, south of Highway 91. Undifferentiated Cretaceous-aged sediments have been identified as preserving an abundant and well-preserved macrofauna of invertebrate fossils such as ammonites and mollusks in the nearby Santa Ana Mountains (Link and Bottjer 1982; Morton and Miller 2006; Popenoe 1937; Sundberg 1980, 1982), with certain areas described as "highly fossiliferous" (Popenoe 1941:742).

Williams and Ladd Formation, undifferentiated (Kwl). These sediments consist of sandstone, siltstone, and conglomerate, with the upper parts generally coarse grained and thick to massively bedded, whereas the lower parts include a relatively thick shale zone (Morton and Miller 2006). This unit occurs in the northwestern portion of the project area from south of Wilderness Drive to Wardlow Canyon. In addition to the fossils of the Ladd Formation discussed above that might also occur in this unit, undifferentiated Cretaceous-aged sediments have been identified as preserving an abundant and well-preserved macrofauna consisting of invertebrate fossils such as ammonites and mollusks in the nearby Santa Ana Mountains (Sundberg 1980, 1982). Furthermore, a hadrosaur, more commonly known as a duck-billed dinosaur, is known from this unit (Morris 1973). Dinosaur fossils are incredibly rare in California, limited to only a few known (Hilton 2003).

Cretaceous Plutonic Rocks. Intrusive igneous rocks belonging to the Peninsular Ranges Batholith are found across the eastern parts of the city (Morton and Miller 2006). These rocks include La Sierra Tonalite (Klst), Mount Hole Granodiorite (Kmhg), micropegmatite granite (kmp), diorite (kd), granite (kgu) and heterogeneous granite (khg), monzogranite (kcg), and granodiorite and quartz latite (Kcgq). Within the city these rocks are found primarily as scattered outcrops in the northeastern area, where they likely underlie the surrounding older alluvial sediments (Qvoa, Qof_3). These rocks form from magma deep in the Earth's crust and therefore will not preserve fossil resources.

Estelle Mountain Volcanics (Kvem). These rocks comprise a heterogeneous mixture of rhyolite flows, shallow intrusive rocks, and volcaniclastic rocks that occur along the eastern side of the city. These rocks form from the cooling of erupted lava and shallow cooling magma and therefore are not likely to preserve fossil resources. However, the volcaniclastic rocks in this unit consist of sediments interbedded with volcanic material. Those sediments are of an age to preserve fossil resources; however, little information is available regarding fossil preservation in the sediments.

Santiago Peak Volcanics (Kvsp, Kvspi). The Santiago Peak Volcanics consist of metavolcanic rocks composed of andesite, dacite, and latite interbedded with argillite, greywacke, and slate (Balch et al. 1984). These rocks were initially formed through volcanic activity and erosional redeposition during the Early Cretaceous (Morton and Miller 2006), and later metamorphosed by emplacement of the Peninsular Ranges batholith (Fife et al. 1967). Much of the unit has been hydrothermally altered (Morton and Miller 2006). The Santiago Peak Volcanics (Kvsp) crop out in large areas just outside of the western part of the city, and therefore may be present in the subsurface in this area, with small outcrops present in the southernmost city. Outcrops of Santiago Peak Volcanics (Kvspi) are also in the eastern portion of the city. Although fossils are not preserved in pure volcanic rocks (Kvspi), the interbedded metasedimentary rocks of the Santiago Peak Volcanics (Kvsp) have produced marine fossils such as clams, belemnoids, and others (Fife et al. 1967).

Bedford Canyon Formation, undifferentiated (Jbc). The Bedford Canyon Formation consists of slightly metamorphosed argillite, slate, phyllite, greywacke, and quartzite, with small quantities of limestone and conglomerate (Morton and Miller 2006). Bedding and primary sedimentary structures are commonly preserved, with some beds exhibiting tight folding. This unit is found in the southernmost corner of the city. Infrequent fossils recovered from this formation include invertebrates such as bivalves (Fairbanks 1893, Silberling et al. 1961), brachiopods (Imlay 1964, Larsen 1948), and ammonites (Imlay 1964).

Metamorphic rocks (Trmu). These rocks date to the Triassic and consist of schist, greywacke, quartzite, and phyllite and occur in the southern portion of the city along the eastern boundary (Morton and Miller 2006). Because these rocks formed from the high temperature and pressure alteration of sedimentary rocks, they are unlikely to preserve significant fossils.

Qaf - Artificial Fill
Qw - Very young wash deposits
Qf - Very young alluvial fan deposits
Qls - Very young landslide deposits
Qls?- Possible very young landslide deposits
Ql - Very young lacustrine deposits
Qyw - Young wash deposits
Qyf - Young alluvial fan deposits
Qyf1 - Young alluvial fan deposits, Unit 1
Qya - Young axial-channel deposits
Qyv - Young alluvial-valley deposits
Qyls - Young landslide deposits
Qyls? - Possible young landslide deposits
Qof - Old alluvial-fan deposits
Qof3 - Old alluvial-fan deposits, unit 3
Qof1 - Old alluvial-fan deposits, unit 1
Qoa - Old axial-channel deposits
Qov - Old alluvial-valley deposits
Qols - Old landslide deposits
Qvof - Very old alluvial-fan deposits
Qvof1 - Very old alluvial-fan deposits, unit 1
Qvoa - Very old axial-channel deposits
QTs - Unnamed sedimentary rocks in Riverside and Corona areas
QTn - Sedimentary Rocks of the Norco Area
QTt - Conglomerate of Temescal Area
QTc - Conglomeratic sedimentary rocks of Riverside West 7.5' quadrangle
Tf - Fernando Formation
Tns - Sandstone of Norco Area
Tch - Sandstone and conglomerate in southeastern Chino Hills
Tlm - Lake Matthews Formation
Tlm? - Possible Lake Matthews Formation
Tp - Puente Formation
Tpsc - Puente Formation, Sycamore Canyon Member
Tpy - Puente Formation, Yorba Member
Tpsq - Puente Formation, Soquel Member
Tplv - Puente Formation, La Vida Member
Tt - Topanga Group

Tsa - Santiago Formation
Tsi - Silverado Formation
Tvs - Vaqueros & Sespe Formations, undivided
Tvss - Vaqueros, Sespe, Santiago, & Silverado Formations, undivided
Tcga - Conglomerate of Arlington Mountain
Kcg - Monzogranite
Kcgb - Granodiorite and gabbro
Kcgq - Granodiorite and quartz latite
Kcto - Tourmalinized monzogranite
Kd - Diorite
Kgb - Gabbro
Kgu - Granite
Khg - Heterogeneous granite
Krg - Granite of Riverside area
Kt - Tonalite and mafic rocks
Kl - Ladd Formation
Klbc - Ladd Formation
Klhs - Ladd Formation, Holz Shale Member
Kwl - Williams & Ladd Formation, undifferentiated
Kwsr - Williams Formation; Schultz Ranch Member
Klst - La Sierra Tonalite
Kmhg - Mount Hole Granodiorite
Kmp - Micropegmatite granite
Kmpc - Cajalco Pluton
Kvem - Estelle Mountain Volcanics
Kvs - Intermixed Estelle Mountain Volcanics & Mesozoic Sedimentary Rocks
Kvsp - Santiago Peak Volcanics
Kvspi - Santiago Peak Volcanics, intrusive rocks
Jbc - Bedford Canyon Formation
Jbcm - Bedford Canyon Formation, marble & limestone facies
Trms - Schist
Trmu - Rocks of Menifee Valley
water body
Sphere of Influence Areas
City of Corona Boundary

Figure 2. Geologic map legend.

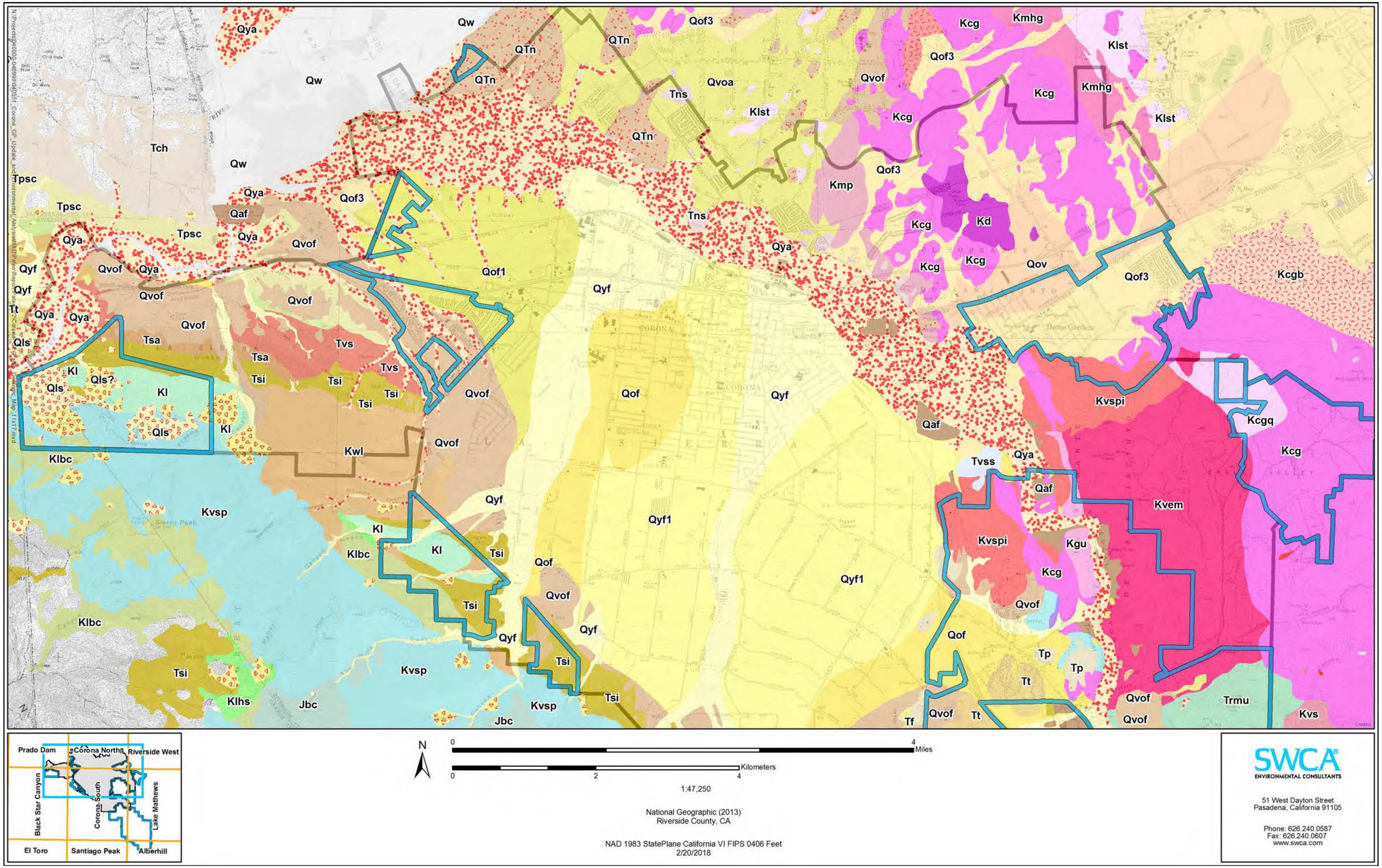

Figure 3. City of Corona Geologic Map (1 of 2).

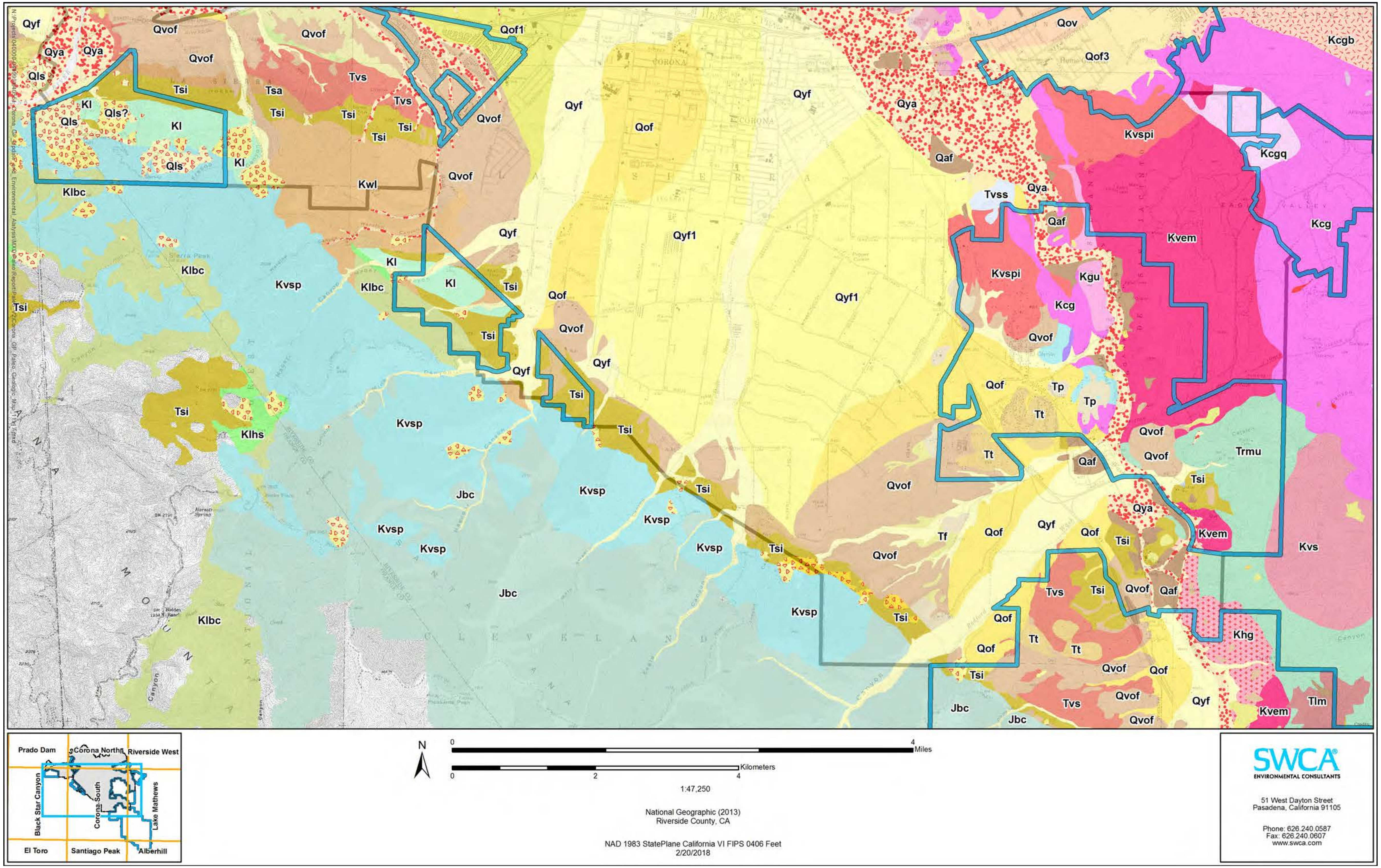

Figure 4. City of Corona Geologic Map (2 of 2).

5.1.2 City of Corona: Records Search Results

The data provided by the LACM indicates there are multiple known fossil localities (Table 2) within the city limits, as well as other fossil localities known from similar geologic formations in the vicinity (Table 3; MacLeod 2017).

Table 2. NHMLA Fossil Localities from Within the City of Corona

Geologic Unit	Locality No.	Taxa	Location
Pleistocene Alluvium (Qof, Qoa, Qov, Qvof, Qvoa)	LACM 1207	Deer	Highway 91, north of downtown Corona on the west side of Cota Street
Fernando Formation (Tf)	LACM 6962, 6963, 7319, 7321-7323, 7325, 7479-7481, 7486-7488	Multiple marine and terrestrial organisms, including ray and sharks (eagle ray, guitarfish, whitetip shark, hammerhead, leopard shark), bony fish (herring, carp, killifish, stickleback), amphibians and reptiles (alligator lizard, snake, pond turtle, tortoise, frog), and mammals (rodent, dugong, mastodon, whale, antelope, camel)	West of Corona Freeway and north of Bedford Wash
Puente Formation (Tp)	LACM 7320, 7482-7485	Multiple fish (silverside, herring, mora, mackerel, croaker, and salmon)	West of Corona Freeway and north of Bedford Wash

Table 3. NHMLA Fossil Localities from the Vicinity of the City of Corona

Geologic Unit	Locality No.	Taxa	Location (Locality No.)
Pleistocene Alluvium (Qof, Qoa, Qov, Qvof, Qvoa)	LACM 7811, 7268, 7271, 7508	Whipsnakes, horses, ground sloths	Summer Avenue in Mira Loma, north of Corona (7811), Chino Hills, northwest of Corona (7268, 7271), Soquel Canyon, west of Corona (7508)
Topanga Formation	LACM 6292, 3891, 4008-4009	Sharks, the marine mammal *Desmostylus*, dugongs, and whales	Santiago Canyon Road, southwest of Corona (6292), El Modena foothills (3891, 4008-4009)
Sespe Formation (Tsv)	LACM 4553-4554	Turtles, opossums, rabbits, mice, and badgers	Upper Oso Reservoir, southwest of Corona
Vaqueros Formation (Tvs)	LACM 1905, 4315, 6624	Multiple sharks and the marine mammal *Desmostylus*	Limestone Canyon (1905), west of Corona on Highway 91 (4315), southwest of Corona (6624)

Table 3. NHMLA Fossil Localities from the Vicinity of the City of Corona

Geologic Unit	Locality No.	Taxa	Location (Locality No.)
Santiago Formation	LACM 3881, 3883-3884, 3979, 5022, 5346-5347, 6926, 68102	Turtles, crocodiles, birds, rodents, insectivores, brontothere, camels, and rhinoceroses	Northwestern San Diego County, south of Corona
Silverado Formation (Tsi)	LACM 4634	Turtles	Irvine Ranch, west of city limits in Santa Ana Mountains
Ladd Formation (Kl)	LACM 1895, 4221	Multiple sharks	Silverado Canyon

In addition to the records search requested from the NHMLA, a search of the online collections of the UCMP was conducted on October 30, 2017. Although the information on localities provided by this search is only available by county, the search reveals that the UCMP has recorded localities from geologic formations that occur in the city throughout Riverside County (Table 4).

Table 4. UCMP Fossil Localities from Riverside County

Geologic Unit	Locality No.	Taxa	Location (Locality No.)
Pleistocene Alluvium (Qof, Qoa, Qov, Qvof, Qvoa)	RV8601, V65248, V7006	Multiple rodents, mammoths, snakes	Corona East (RV8601), Riverside (V65248), Carr Ranch (V7006)
Lake Matthews Formation (Tlm)	RV7201	Multiple mammals	Lake Matthews
Ladd Formation (Kl)	A810	Multiple gastropods	Santa Ana Mountains

5.2 City of Corona: Paleontological Sensitivity Analysis

The results of the literature review and museum records searches presented above were used to assign each geologic unit present in the city of Corona an SVP paleontological sensitivity ranking (SVP 2010) (Figure 5 and Figure 6). Table 5 contains the paleontological sensitivities of geologic formations in the city and recommended mitigation measures.

No Sensitivity. Igneous and metamorphic rocks generally have no paleontological sensitivity because the ways these rocks form are not conducive to fossil preservation (SVP 2010). Therefore, the following units have no paleontological sensitivity: La Sierra Tonalite (Klst), Mount Hole Granodiorite (Kmhg), micropegmatite granite (kmp), diorite (kd), granite (kgu), heterogeneous granite (khg), monzogranite (kcg), granodiorite and quartz latite (Kcgq), Estelle Mountain Volcanics (Kvem), the Santiago Peak Volcanics (Kvsp, Kvspi), and metamorphic rocks (Trmu). In addition, artificial fill (Qaf) has no sensitivity because it has been deposited by human activities in recent times.

However, the Santiago Peak Volcanics (Kvsp) include some sedimentary units interbedded with extrusive volcanics, and these sediments are known to preserve fossils (see discussion above). Therefore, although the volcanics that dominate the unit (Kvsp, Kvspi) have no sensitivity, sedimentary layers may exist within the unit that have high paleontological sensitivity. Such layers, if encountered, may require paleontological mitigation measures such as those discussed below for high sensitivity sediments. Likewise, the sedimentary units of the Estelle Mountain Volcanics (Kvem) could possibly preserve fossil resources; however, little information is currently available in the scientific literature. Therefore, the sedimentary rocks in the Estelle Mountain Volcanics (Kvem) should be considered as having undetermined paleontological sensitivity.

Low Sensitivity. Some rock units are of an age to preserve fossil resources, but specimens are poorly represented in the literature and in museums, and the presence of fossils is the exception and not the rule (SVP 2010). The Bedford Canyon Formation (Jbc) is assigned low paleontological sensitivity because much of the unit has been metamorphosed, and those fossils that are present are rare and consist entirely of common invertebrate fossils.

Low-to-High Sensitivity, increasing with depth. A number of sedimentary deposits in the project area are too young to preserve fossil resources at the surface or in the shallow subsurface (i.e., younger than 5,000 years before present), but may preserve fossils at depth or overlie older units that have high paleontological sensitivity. These units are very young surficial sediments (Qw, Qls) and young surficial sediments (Qyf, Qyf1, Qya, Qyls).

High Sensitivity. Many of the geologic formations in the project area are known to preserve abundant or scientifically significant fossils, thus giving them high paleontological sensitivity (SVP 2010). These units are old surficial sediments (Qof, Qof3, Qof1, Qov, Qols); very old surficial sediments (Qvof, Qvoa); Fernando Formation (Tf); sandstone of Norco Area (Tns); Puente Formation (Tp), including Sycamore Canyon Member (Tpsc), Yorba Member (Tpy), and Soquel Member (Tpsq); Topanga Group (Tt); Vaqueros and Sespe Formations, undivided (Tvs); Santiago Formation (Tsa); Silverado Formation (Tsi); Vaqueros, Sespe, Santiago, and Silverado Formations, undivided (Tvss); Ladd Formation (Kl); and the Williams and Ladd Formation, undifferentiated (Kwl).

Undetermined Sensitivity. For some geologic units in the project area, paleontological sensitivities cannot be determined at this time because they have little to no record in the scientific literature (SVP 2010). Within the city the sedimentary rocks of the Norco area (QTn) have undetermined sensitivity.

The analysis presented here indicates that the paleontological sensitivity of the geologic units mapped at the surface and likely to be present in the subsurface in the city of Corona is primarily high. This is particularly true in the central area of the city, where middle to late Holocene (Qyf1)– and Pleistocene (Qof, Qof_1, Qvof)–aged sediments are found covering large areas of the surface and are likely present in the subsurface beneath younger deposits (Qya, Qyf). As discussed above, older alluvial sediments like these have a rich fossil history in this region of Southern California, where they preserve fossils of iconic Ice Age animals such as mammoths, camel, bison, and ground sloths, as well as smaller fauna such as rodents and lizards (Graham and Lundelius, 1994; Jefferson, 1991a, 1991b). An exceptional example of one of these sites is located about 48 km (30 miles) southeast of the city, where nearly 100,000 identifiable fossil specimens representing 105 vertebrate, invertebrate, and plant species were collected from more than 2,000 individual localities during the construction of the dam at Diamond Valley Lake (Springer et al. 2009), and are now housed at the Western Science Center in Hemet, California. This site represents the second largest late Pleistocene fossil assemblage, after the La Brea Tar Pits in Los Angeles, known from the American Southwest (Springer et al. 2009). Other Ice Age fossils have been found throughout the inland valleys (Miller 1971; Reynolds and Reynolds 1991; Reynolds et al. 2012) and further east in the Mojave Desert (Jefferson 1987, 1988; Scott et al. 2004, 2006; Scott and Cox 2008). In addition to illuminating the striking differences between Southern California in the Pleistocene and today, this abundant fossil record has been vital in studies of extinction (e.g., Sandom et al. 2014; Scott 2010), ecology (e.g., Connin et al. 1998), and climate change (e.g., Roy et al. 1996).

In the northwestern part of city, south of Highway 91 and around Green River Road, ancient sediments belonging to the Puente (Tp, Tpsc, Tpy, Tpsq), undivided Sespe and Vaqueros (Tvs), Santiago (Tsa), and Silverado (Tsi) formations are present at the surface and likely in the subsurface underlying the nearby alluvial sediments (Qya, Qyf, Qvof). These sediments date from the Eocene, which began 56 million years ago, to the early Pliocene, around 5 million years ago, and record the history of sea level rise and fall within the Los Angeles Basin and vicinity (Yerkes et al. 1965). These sediments range from primarily marine (Puente Formation) to a mix of terrestrial and marine environments (Santiago and Silverado Formations). As discussed above, these formations all preserve fossil resources, with the Puente Formation particularly rich in both invertebrate and vertebrate marine fossils (e.g., Feldman 2003; Hilton and Grande 2006; Saul and Stadum 2005; etc.) as well as terrestrial vertebrates that washed out to sea and were preserved as fossils (Barboza et al. 2017; Leatham and North 2017). The Silverado Formation (Tsi) and undivided Sespe and Vaqueros formations (Tvs) are mapped at the surface just to the south of the city, and are therefore also likely present in the subsurface in the southernmost area of the city.

The northeastern and easternmost parts of the city have a very different geologic makeup, consisting of Cretaceous granitic (Kcg, Kmhg, Kmp, etc.) and volcanic (Kvem, Kvspi) highlands with the adjoining valleys filled with older alluvial sediments (Qof_3, Qov, Qvoa). In this area only the older alluvial sediments have high paleontological sensitivity, but as these likely overlie granitic or volcanic sediments, the sensitivity of the subsurface may be low or none.

Table 5. Paleontological Sensitivities of Geologic Formations in the City of Corona and Recommended Mitigation Measures

Geologic Formation	Sensitivity*	Recommended Mitigation Measures
Artificial Fill (Qaf)	None	MM-6
Very young wash deposits (Qw)	Low-to-High	MM-1, MM-3, MM-6
Very young landslide deposits (Qls)	Low-to-High	MM-1, MM-3, MM-6
Young alluvial fan deposits (Qyf)	Low-to-High	MM-1, MM-3, MM-6
Unit 1 (Qyf_1)	High	MM-1, MM-2, MM-6
Young axial-channel deposits (Qya)	Low-to-High	MM-1, MM-3, MM-6
Young landslide deposits (Qyls)	Low-to-High	MM-1, MM-3, MM-6
Old alluvial-fan deposits (Qof)	High	MM-1, MM-2, MM-6
Old alluvial-fan deposits, unit 3 (Qof_3)	High	MM-1, MM-2, MM-6
Old alluvial-fan deposits, unit 1 (Qof_1)	High	MM-1, MM-2, MM-6
Old alluvial-valley deposits (Qov)	High	MM-1, MM-2, MM-6
Old landslide deposits (Qols)	High	MM-1, MM-2, MM-6
Very old alluvial-fan deposits (Qvof)	High	MM-1, MM-2, MM-6
Very old axial-channel deposits (Qvoa)	High	MM-1, MM-2, MM-6
Sedimentary Rocks of the Norco Area (QTn)	Unknown	MM-1, MM-5, MM-6
Fernando Formation (Tf)	High	MM-1, MM-2, MM-6
Sandstone of Norco Area (Tns)	High	MM-1, MM-2, MM-6
Puente Formation (Tp)	High	MM-1, MM-2, MM-6
Sycamore Canyon Member (Tpsc)	High	MM-1, MM-2, MM-6
Yorba Member (Tpy)	High	MM-1, MM-2, MM-6
Soquel Member (Tpsq)	High	MM-1, MM-2, MM-6

Table 5. Paleontological Sensitivities of Geologic Formations in the City of Corona and Recommended Mitigation Measures

Geologic Formation	Sensitivity*	Recommended Mitigation Measures
Topanga Group (Tt)	High	MM-1, MM-2, MM-6
Vaqueros & Sespe formations, undivided (Tvs)	High	MM-1, MM-2, MM-6
Santiago Formation (Tsa)	High	MM-1, MM-2, MM-6
Silverado Formation (Tsi)	High	MM-1, MM-2, MM-6
Vaqueros, Sespe, Santiago, and Silverado formations, undivided (Tvss)	High	MM-1, MM-2, MM-6
Ladd Formation (Kl)	High	MM-1, MM-2, MM-6
Williams and Ladd formations, undifferentiated (Kwl)	High	MM-1, MM-2, MM-6
Monzogranite (Kcg)	None	MM-6
Granodiorite and quartz latite (Kcgq)	None	MM-6
Diorite (Kd)	None	MM-6
Granite (Kgu)	None	MM-6
Heterogeneous granite (Khg)	None	MM-6
La Sierra Tonalite (Klst)	None	MM-6
Mount Hole Granodiorite (Kmhg)	None	MM-6
Micropegmatite granite (Kmp)	None	MM-6
Estelle Mountain Volcanics (Kvem)	None[1]	MM-6
Santiago Peak Volcanics (Kvsp)	None[2]	MM-6
Santiago Peak Volcanics, intrusive rocks (Kvspi)	None	MM-6
Bedford Canyon Formation (Jbc)	Low	MM-1, MM-4, MM-6
Metamorphic Rocks (Trmu)	None	MM-6

*Following SVP (2010).
[1] Sedimentary layers, if present, have unknown sensitivity (see discussion in Section 7.2).
[2] Sedimentary layers, if present, have high sensitivity (see discussion in Section 7.2).

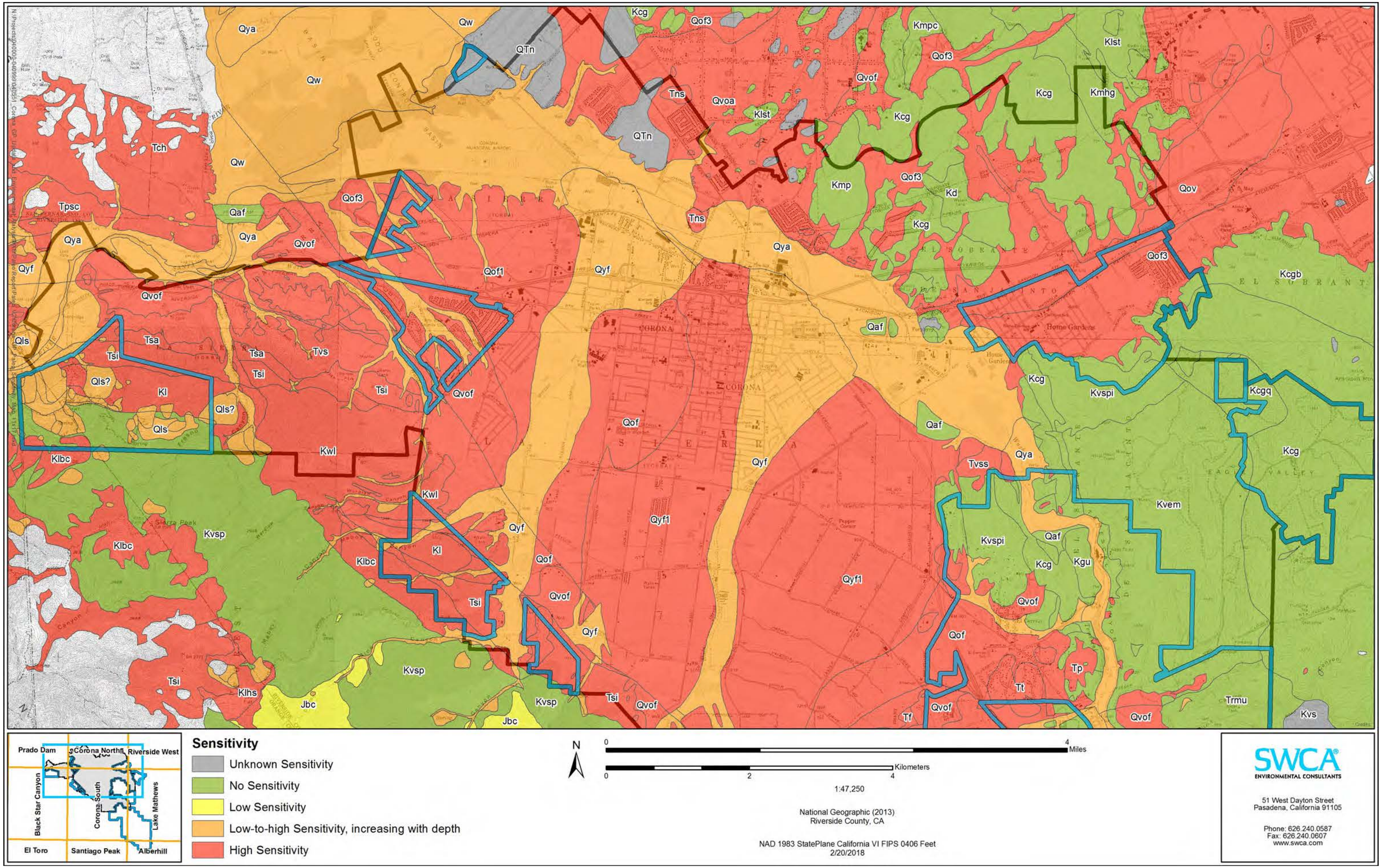

Figure 5. City of Corona Paleontological Sensitivity Map (1 of 2).

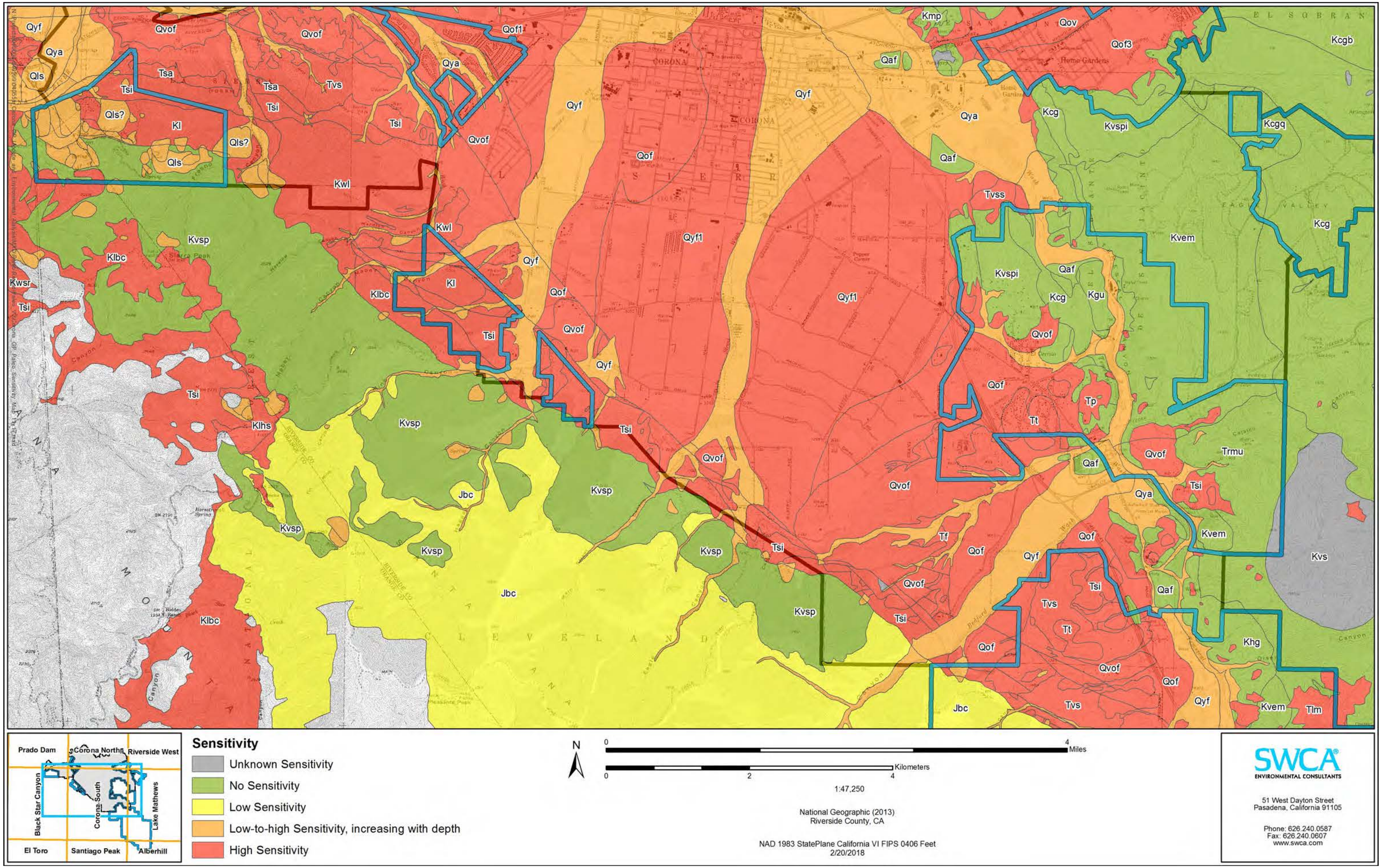

Figure 6. City of Corona Paleontological Sensitivity Map (2 of 2).

5.3 Sphere of Influence: Geology and Paleontology

5.3.1 Geologic Units within the Sphere of Influence

Morton and Miller (2006) mapped the geology in the SOI at a scale of 1:100,000. A variety of different geologic units are found within the SOI, including igneous, metamorphic, and sedimentary rocks that date from the Triassic to the Miocene and alluvial deposits that date from the Pleistocene to the Recent. The West SOI consists of six subunits, which are referred to as Areas A through F in this analysis. The East Sphere is divided into four subunits, referred to as Areas A through D in this analysis. The South Sphere can generally be divided along Temescal Valley. A map of the surficial geology in and around the SOI is shown in Figure 7 through Figure 9. These units are discussed in more detail below.

Artificial Fill (Qaf). These sediments were artificially constructed from sand, gravel, and bedrock fragments derived from construction and mining activities. Large areas of artificial fill occur in the South Sphere, just west of Interstate 15 and south of Cajalco Road. These sediments have no potential to preserve fossils.

Very young landslide deposits (Qls). These sediments date to the late Holocene (Morton and Miller 2006), deposited in the last few thousand years. As such, they are too young to preserve fossil resources. However, they may overlie older, paleontologically sensitive sediments. Landslide deposits consist of slope-failure deposits with disorganized soil and rubble or large displaced blocks of bedrock that are found just south of the Santa Ana River in Areas D and E of the West Sphere, where they overlie sediments belonging to the Norco-area sandstone, Silverado Formation, and the Cretaceous Ladd Formation, as well as the Santiago Peak Volcanics (Morton and Miller 2006).

Young surficial sediments. These sediments are very similar to the above-described very young surficial sediments, but are older, ranging from the Holocene to late Pleistocene (around 11,000 years ago). As defined by the SVP (2010), fossils may be preserved in sediments older than 5,000 years. Based on this definition, fossil resources would not be found in the upper layers, but deeper layers may preserve fossil resources.

- Young alluvial fan deposits (Qyf). Unconsolidated to moderately consolidated silt, sand, and pebbly cobbly sand deposits with slightly to moderately dissected surfaces, mapped as occurring widely throughout the project area (Morton and Miller 2006). In Area E of the West Sphere and Area D of the East Sphere, thin deposits of these sediments overlie a wide range of older sedimentary rocks, most of which may preserve fossil resources. This unit is more widespread in the South Sphere, where it likely overlies units mapped adjacent to it, primarily older alluvial sediments but also Cretaceous igneous rocks or Jurassic metamorphic rocks, which will not preserve fossil resources.
- Young axial-channel deposits (Qya). These sediments consist of slightly consolidated to moderately consolidated silt, sand, and gravel, sometimes with boulders when present near steep valleys or slopes (Morton and Miller 2006). These deposits occur along narrow drainages in the SOI, such as drainage from the Santa Ana River in Areas B and C of the West Sphere, to the east of Temescal Canyon Road in Area D of the East Sphere, and to the east of Interstate 15 in the South Sphere.
- Young alluvial-valley deposits (Qyv). These sediments consist of unconsolidated sand, silt, and clay-bearing alluvium deposited along valley floors, and are found in the central part of the South Sphere in Temescal Valley (Morton and Miller 2006).
- Young landslide deposits (Qyls). These are similar to the very young landslide deposits, but have surfaces that may be slightly dissected or otherwise modified by erosion (Morton and Miller 2006).

These sediments are very rarely found in the SOI, present only in Bedford Canyon and south of Glen Ivy Road in the South Sphere.

Old surficial sediments. These sediments are similar in lithology to the very young and young surficial sediments discussed above, and may be found underlying those sediments throughout the project area (Morton and Miller 2006). These sediments date from the late to middle Pleistocene, and therefore are old enough to preserve fossils at any depth in areas mapped as these units. Throughout Southern California, alluvial sediments of this age have preserved a rich fossil history of Ice Age terrestrial fossils, such as mammoth, bison, horse, lion, cheetah, wolf, camel, antelope, peccary, mastodon, capybara, and giant ground sloth, as well as small animals such as birds, rodents and lizards (Graham and Lundelius 1994; Jefferson 1991a, 1991b; Miller 1971; Scott 2010; Scott and Cox 2008; Springer et al. 2009).

- Old alluvial fan deposits (Qof). These sediments are moderately to well-consolidated silt, sand, and gravel, and cover large land areas throughout the SOI, primarily in the southeastern portion of Area D of the East Sphere and throughout the South Sphere (Morton and Miller 2006).
    - Old alluvial fan deposits, Unit 3 (Qof3). This unit of the old alluvial fan deposits is capped by soil with B_t horizons on the scale of tens of centimeters thick (Morton and Miller 2006), and are found throughout Area A of the East Sphere.
    - Old alluvial fan deposits, Unit 1 (Qof1). This unit of the old alluvial fan deposits dates to the middle Pleistocene and has a thicker soil B_t horizon than Unit 3, up to 150 cm thick (Morton and Miller 2006). This unit occurs in Areas B and C of the West Sphere.
- Old alluvial-valley deposits (Qov). These sediments consist of moderately indurated, commonly slightly dissected sand, silt, and clay-bearing alluvium and are found in the northern part of Area A of the East Sphere (Morton and Miller 2006).

Very old surficial sediments. These sediments are similar in lithology to the surficial sediments discussed above, and may be found underlying those sediments throughout the SOI. These sediments date from the middle to early Pleistocene (Morton and Miller 2006), and therefore are old enough to preserve fossils at any depth in sediments mapped as belonging to these units. As discussed above for the old surficial sediments, these very old surficial sediments have a rich fossil record throughout southern California preserving Ice Age fossils.

- Very old alluvial-fan deposits (Qvof). These sediments consist of moderately to well- consolidated silt, sand, gravel, and conglomerate, and occur throughout the southwestern half of Area C of the West Sphere and as scattered outcrops throughout Area D of the East Sphere and the South Sphere (Morton and Miller 2006).
- Very old axial-channel deposits (Qvoa). These sediments consist of well-consolidated alluvial deposits predominantly composed of sand but with scattered gravel and pebble layers as well as silt and clay-bearing alluvium (Morton and Miller 2006). These sediments occur in the South Sphere as isolated outcrops on the east side of Interstate 15 near Cabot Drive and near Santiago Canyon Road.

Sedimentary Rocks of the Norco Area (QTn). This unit is a conglomerate that dates from the early Pleistocene to perhaps the late Pliocene, and crops out across the entirety of Area A of the West Sphere (Morton and Miller 2006). Little additional information is available about this unit in the scientific literature.

Conglomerate of Temescal Area (QTt). This unit is a cobble conglomerate deposited on a deeply weathered surface that dates from early Pleistocene to perhaps the late Pliocene (Morton and Miller 2006). This unit is restricted to a single outcrop in the South Sphere near Olsen Canyon, east of Interstate 15, where it likely overlies Jurassic metamorphic rocks. Little additional information is available about this unit in the scientific literature.

Fernando Formation (Tf). The Fernando Formation dates to the Pliocene and consists of marine siltstone, sandstone, pebbly sandstone, and conglomerate (Morton and Miller 2006). The unit has limited surface exposure along the western margin of Area D of the East Sphere. The lower part of the Fernando Formation consists of a pebble-cobble conglomerate in a sandstone matrix that fines upwards into a coarse sandstone and then a silty sandstone (Schoellhamer et al. 1981). The upper Fernando Formation consists of coarse-grained sandstone with conglomerate lenses (Schoellhamer et al. 1981). The Fernando Formation has an extensive record of preserving scientifically significant fossils, including invertebrates such as mollusks, echinoids, and bryozoans (Groves 1992; Morris 1976; Woodring 1938), fish (Huddleston and Takeuchi 2006), squid (Clarke et al. 1980), and a number of unidentified megafossils (Schoellhamer et al. 1981).

Puente Formation (Tp). The Puente Formation consists of marine sandstone, siltstone, and shale that date from the early Pliocene to the Miocene (Critelli et al. 1995; Morton and Miller 2006). The Puente Formation has a history of preserving both invertebrate and vertebrate marine fossils, such as cephalopods (Saul and Stadum 2005), crustaceans (Feldman 2003), fish (Carnevale et al. 2008; David 1943; Hilton and Grande 2006; Huddleston and Takeuchi 2006), and other marine and terrestrial vertebrates (Barboza et al. 2017; Leatham and North 2017). Scattered outcrops of the Puente Formation that have not been assigned to a specific member occur in the southern part of Area D of the East Sphere, and may be present in the subsurface in the adjacent old alluvial fan deposits (Qof).

Lake Matthews Formation (Tlm). The Lake Matthews Formation dates to the Miocene and consists of a sequence of massive, greenish-gray mudstone and minor conglomerate with poorly bedded white to gray sandstone, pebbly sandstone, and conglomerate (Morton and Miller 2006). This formation is limited to a few exposures along the northeastern edge of the South Sphere, just north of Dawson Canyon Road. Fossils of *Merychyus*, a small herbivore somewhat like a tapir, are known from the Lake Matthews Formation (Proctor and Downs 1963), as well as an abundant microvertebrate fauna including mice, squirrels, and rabbits (Lander 2008).

Topanga Group (Tt). The Topanga Group is predominantly composed of sandstone but also with siltstone and some breccia and shale (Morton and Miller 2006; Vedder 1972). This unit occurs as scattered outcrops in the southern part of Area D of the East Sphere, where it may also be present in the subsurface underlying the adjacent old alluvial fan deposits (Qof). The Topanga is interpreted to represent wave-dominated coastal deposits grading into river-dominated deltaic deposits and fluvial deposits in the upper parts of the formation (Critelli and Ingersoll 1995). The Topanga Formation dates to the middle Miocene, around 20 to 16 million years ago (Morton and Miller 2006). Fossils from the Topanga Formation include numerous invertebrate and vertebrate remains from both marine and terrestrial settings, including sharks, bony fishes, birds, whales, dolphins, and land mammals (Boessenecker and Churchill 2015; Campbell and Yerkes 1980; Morton and Miller 2006; Whistler and Lander 2003).

Vaqueros and Sespe Formations, undivided (Tvs). The Sespe and Vaqueros formations are often undifferentiated in the greater Los Angeles region (Morton and Miller 2006). The Sespe Formation records transitional marine environments (Liddicoat 1990), with sediments that consist of interbedded gray siltstone and red claystone with sandstone layers and fluvial conglomerate (Howard 2000). The Sespe Formation ranges in age from the early Miocene to the late Eocene (Morton and Miller 2006). Fossils from the Sespe Formation include highly weathered marine mollusks (Liddicoat 1990) and a wide variety of terrestrial vertebrates such as turtle, opossum, rabbit, pocket mouse, and badger (Lander 1983; Whistler and Lander 2003).

The Vaqueros Formation consists of predominately limey sandstone interbedded with siltstone and shale deposited in an offshore basin (Bartow 1974; Morton and Miller 2006). The Vaqueros Formation ranges in age from the early Miocene to the late Eocene (Morton and Miller 2006). Common fossils in the Vaqueros include marine invertebrates such as barnacles, ostreids, and pectinids and marine ichnofossils (Bartow 1974) as well as terrestrial vertebrates (Whistler and Lander 2003) and marine megafauna (Morton and Miller 2006).

Outcrops of undivided Vaqueros and Sespe formations occur in the South Sphere around North Weirick Road and Bedford Motor Way.

Santiago Formation (Tsa). The Santiago Formation (not to be confused with the older Santiago Peak Volcanics) consists of terrestrial and marine sandstone and conglomerate (Morton and Miller 2006). Conglomerate occurs primarily in the lower portion of the unit and contains clasts of quartzite, volcanic rocks, sandstone, and metaconglomerate with an unknown, distant source. The lower conglomerate is overlain by gray feldspathic sandstone with small amounts of interbedded siltstone. This unit occurs as an isolated outcrop in the northern part of Area D of the West Sphere, south of Green River Road. The Santiago Formation dates to the middle Eocene (Morton and Miller 2006). Although fossils are not known from the lower conglomerate, the sandstone contains marine mollusks, mammals, and non-marine silicified wood (Morton and Miller 2006; Navarro-Santillan et al. 2002; Westgate 1988).

Silverado Formation (Tsi). The Silverado Formation consists of a basal conglomerate unit overlain by a sequence of sandstone and siltstone and a thick clay bed (Morton and Miller 2006). Studies of fossilized pollen found in the Silverado Formation indicate deposition in a swamp or lowland bog during the late Paleocene (Gaponoff 1984). The Silverado records the transition from fluvially deposited terrestrial sediments to marine shelf sediments during a major transgressive event (Ramirez and Maine 1995). This formation occurs as thin outcrops just south of the Santiago Formation outcrops south of Green River Road in Area D of the West Sphere, throughout Areas E and F of the West Sphere, in the southeastern corner of Area D of the East Sphere, and scattered outcrops throughout the South Sphere, where the formation is likely present in the subsurface underlying old and very old alluvial fan deposits (Qof, Qvof) (Morton and Miller 2006). Fossils recovered from the Silverado Formation include mollusks and foraminifera (Lopez 1999) as well as terrestrial animals and wood fragments (Ramirez and Maine 1995).

Ladd Formation (Kl). The Ladd Formation consists of conglomerate, sandstone, siltstone, and shale that date to the Late Cretaceous (Morton and Miller 2006). Undifferentiated outcrops of this unit occur throughout Areas D and E of the West Sphere. Undifferentiated Cretaceous-aged sediments have been identified as preserving an abundant and well-preserved macrofauna of invertebrate fossils such as ammonites and mollusks in the nearby Santa Ana Mountains (Sundberg 1980, 1982)

- **Baker Canyon Member (Klbc).** The Baker Canyon Conglomerate of the Ladd Formation consists of a lower greenish-grey, partially non-marine conglomerate with granitic, siliceous volcanic, and hypabyssal clasts, overlain by an upper conglomeratic sandstone with smaller clasts (Morton and Miller 2006). The base of this unit intertongues with the underlying Trabuco Formation, and can appear quite similar to those older rocks. The Baker Canyon ranges up to 425 meters in thickness and has been dated to the Turonian Stage of the Cretaceous Period (Morton and Miller 2006). This member occurs as a small outcrop in the southernmost part of Area D of the West Sphere and across the southwestern boundary of Area E of the West Sphere, but may be present in the subsurface throughout this area (Morton and Miller 2006). Fossils recovered from this member include invertebrates such as ammonites and other mollusks (Popenoe 1937), with the upper portion of this member having been described as "highly fossiliferous" (Popenoe 1941:742).

Williams and Ladd Formation, undifferentiated (Kwl). These sediments consist of sandstone, siltstone, and conglomerate, with the upper parts generally coarse-grained and thick to massively bedded, while the lower parts include a relatively thick shale zone (Morton and Miller 2006). This unit occurs in the northernmost part of Aera E of the West Sphere, from south of Wilderness Drive to Wardlow Canyon. In addition to the fossils of the Ladd Formation discussed above that might also occur in this unit, a hadrosaur, more commonly known as a duck-billed dinosaur, is known from this unit (Morris 1973). Dinosaur fossils are incredibly rare in California, limited to only a few known (Hilton 2003). In addition, undifferentiated Cretaceous-aged sediments have been identified as preserving an abundant and well-preserved macrofauna consisting of invertebrate fossils such as ammonites and mollusks in the nearby Santa Ana Mountains (Sundberg 1980, 1982).

Cretaceous Plutonic Rocks. Intrusive igneous rocks belonging to the Peninsular Ranges Batholith are found across the East and South Spheres (Morton and Miller 2006). These rocks include granite (kgu), heterogeneous granite (khg), monzogranite (kcg), granodiorite and quartz latite (Kcgq), granodiorite and gabbro (Kcgb), and gabbro (kgb). These rocks form from cooling magma deep in the Earth’s crust and therefore will not preserve fossil resources.

Estelle Mountain Volcanics (Kvem). These rocks comprise a heterogeneous mixture of rhyolite flows, shallow intrusive rocks, and volcaniclastic rocks that occur along the northeastern side of Area D of the East Sphere and the South Sphere. These rocks form from the cooling of erupted lava and shallow cooling magma and therefore are not likely to preserve fossil resources. However, the volcaniclastic rocks in this unit consist of sediments interbedded with volcanic material. Those sediments are of an age to preserve fossil resources; however, little information is available regarding fossil preservation in the sediments.

Santiago Peak Volcanics (Kvsp, Kvspi). The Santiago Peak Volcanics consist of metavolcanic rocks composed of andesite, dacite, and latite interbedded with argillite, greywacke, and slate (Balch et al. 1984). These rocks were initially formed through volcanic activity and erosional redeposition during the Early Cretaceous (Morton and Miller 2006), and later metamorphosed by emplacement of the Peninsular Ranges batholith (Fife et al. 1967). Much of the unit has been hydrothermally altered (Morton and Miller 2006). The Santiago Peak Volcanics occur in the southern part of Area D of the West Sphere (Kvsp), and in Areas A and D of the East Sphere (Kvspi). Although fossils are not preserved in pure volcanic rocks (Kvspi), the interbedded metasedimentary rocks of the Santiago Peak Volcanics (Kvsp) have produced marine fossils such as clams, belemnoids, and others (Fife et al. 1967).

Bedford Canyon Formation, undifferentiated (Jbc). The Bedford Canyon Formation consists of slightly metamorphosed argillite, slate, phyllite, greywacke, and quartzite, with small quantities of limestone and conglomerate (Morton and Miller 2006). Bedding and primary sedimentary structures are commonly preserved, with some beds exhibiting tight folding. This unit is found along the southwestern boundary of the South Sphere. Infrequent fossils recovered from this formation include invertebrates such as bivalves (Fairbanks 1893; Silberling et al. 1961), brachiopods (Imlay 1964; Larsen 1948), and ammonites (Imlay 1964).

Metamorphic rocks (Trmu). These rocks date to the Triassic and consist of schist, greywacke, quartzite, and phyllite and occur in the eastern portion of the South Sphere (Morton and Miller 2006). Because these rocks formed from the high temperature and pressure alteration of sedimentary rocks, they are unlikely to preserve significant fossils.

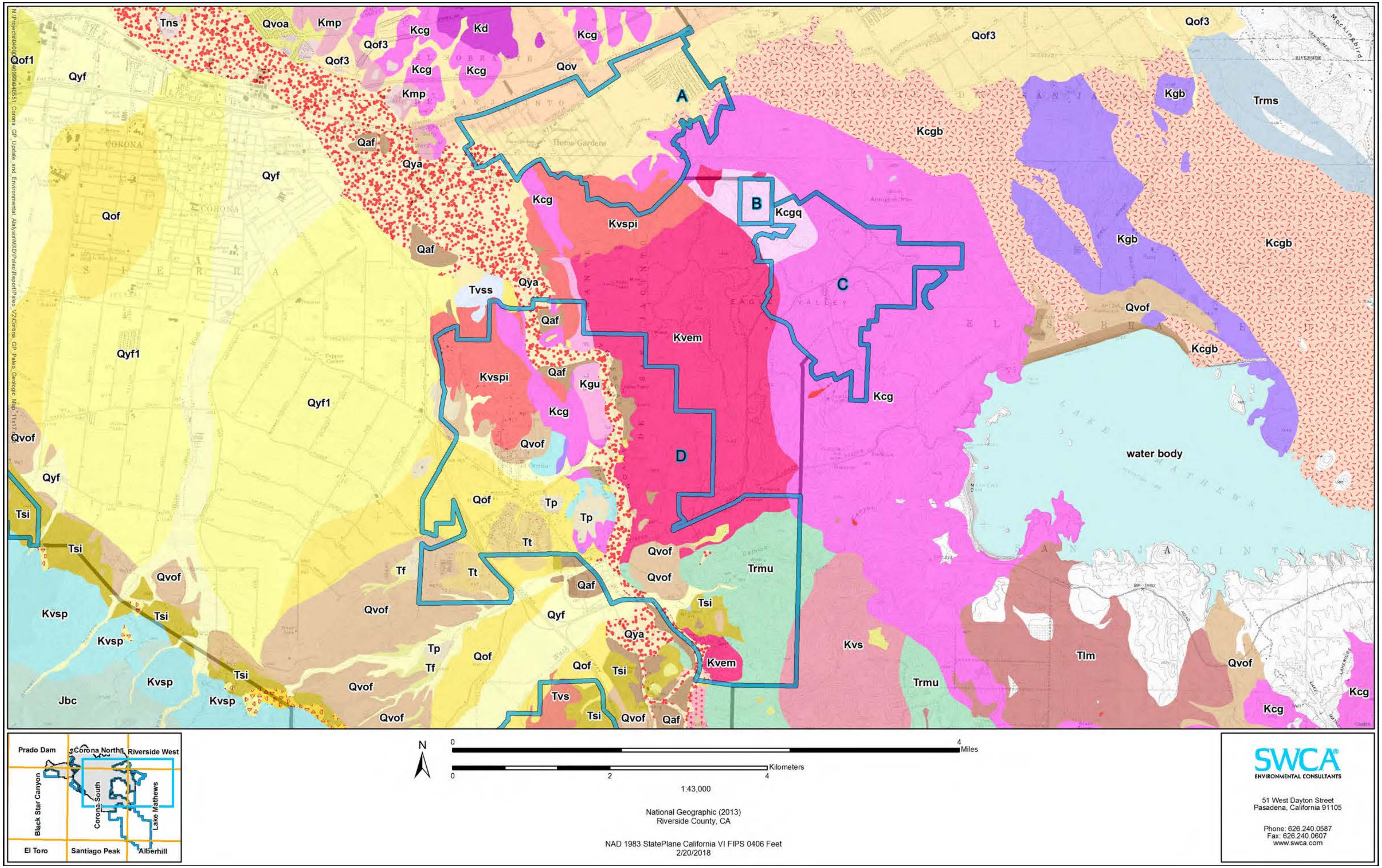

Figure 7. Eastern Sphere of Influence Geology Map (1 of 3).

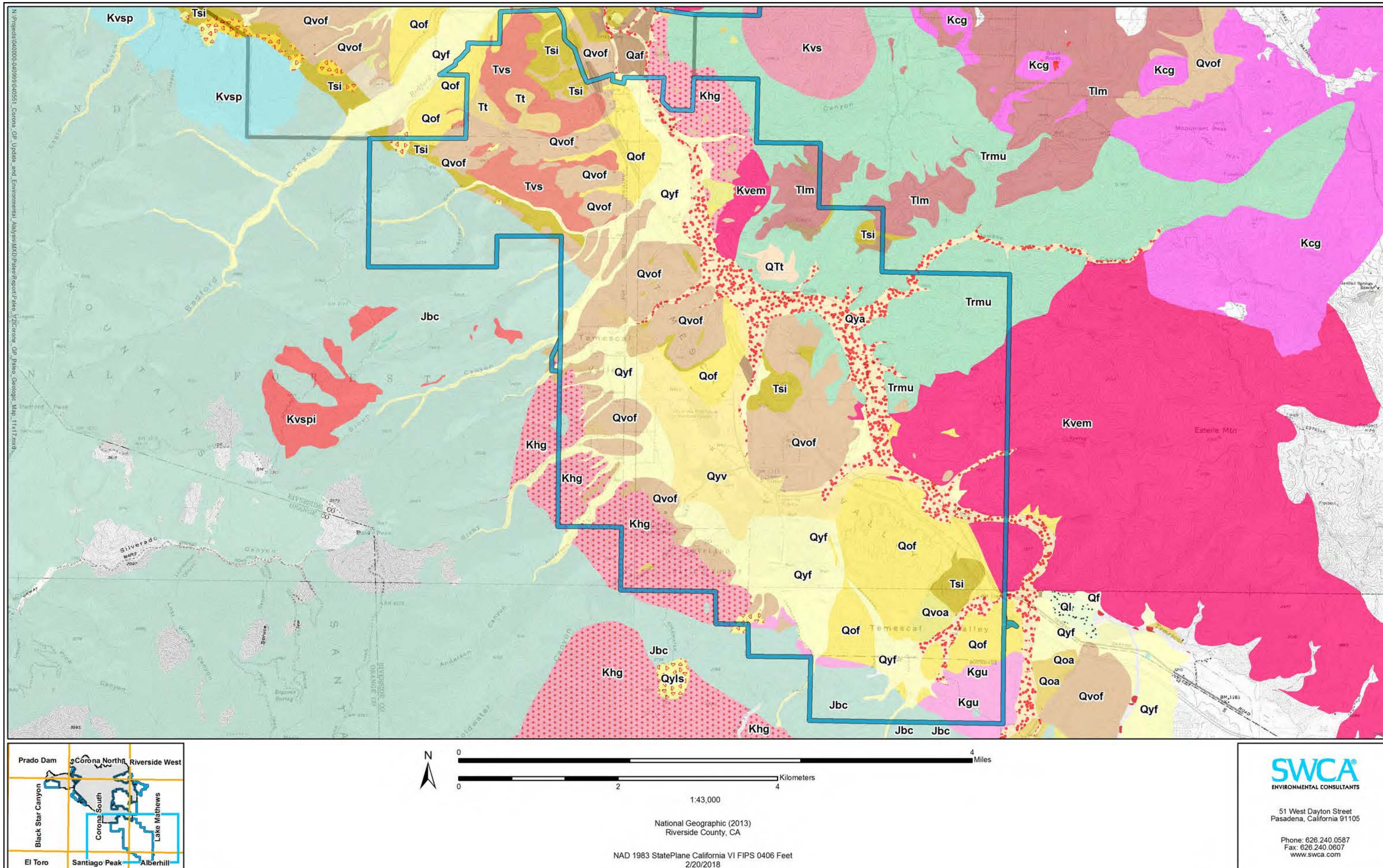

Figure 8. Southern Sphere of Influence Geology Map (2 of 3).

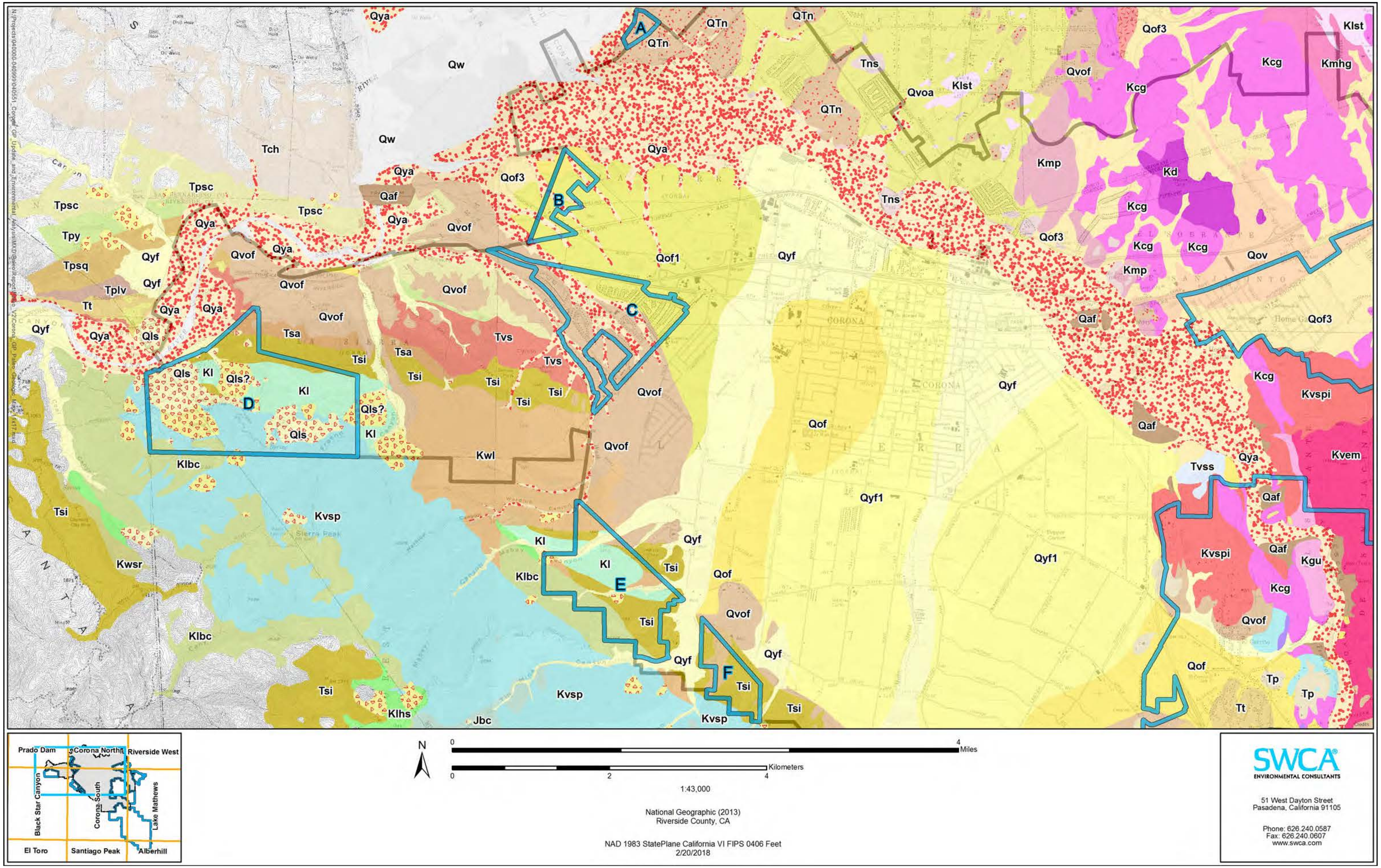

Figure 9. Western Sphere of Influence Geology Map (3 of 3).

5.3.2 Sphere of Influence: Records Search Results

The data provided by the NHMLA indicates there are no known fossil localities known from within the SOI (McLeod 2017). However, the numerous fossil localities reported above from the city of Corona and the surrounding area by both the NHMLA (Table 2 and Table 3) and the UCMP (Table 4) are relevant to the paleontological sensitivity of the SOI, as all of the geologic units that have yielded fossil resources shown in those data are also present in the SOI.

5.4 Sphere of Influence: Paleontological Sensitivity Analysis

The results of the literature review and museum records searches presented above were used to assign each geologic unit present in the project area an SVP paleontological sensitivity ranking (SVP 2010) (Figure 10 through Figure 12). Table 6 contains the paleontological sensitivities of geologic formations in the SOI and recommended mitigation measures.

No Sensitivity. Igneous and metamorphic rocks generally have no paleontological sensitivity because the ways in which these rocks form are not conducive to fossil preservation (SVP 2010). Therefore, the following units have no paleontological sensitivity: granite (kgu), heterogeneous granite (khg), monzogranite (kcg), quartz latite (Kcgq), Estelle Mountain Volcanics (Kvem), Santiago Peak Volcanics (Kvspi), and metamorphic rocks (Trms, Trmu). In addition, artificial fill (Qaf) has no sensitivity because it has been deposited by human activities in recent times.

Moreover, the Santiago Peak Volcanics (Kvsp) include some sedimentary units interbedded with extrusive volcanics, which are known to preserve fossils (see discussion above). Therefore, though the volcanics that dominate the unit (Kvsp, Kvspi) have no sensitivity, sedimentary layers may exist within the unit that have high paleontological sensitivity. Such layers, if encountered, may require paleontological mitigation measures such as those discussed below for high sensitivity sediments. Likewise, the sedimentary units of the Estelle Mountain Volcanics (Kvem) could possibly preserve fossil resources; however, little information is currently available in the scientific literature. Therefore, the sedimentary rocks in the Estelle Mountain Volcanics (Kvem) should be considered to have undetermined paleontological sensitivity.

Low Sensitivity. Some rock units are of an age to preserve fossil resources, but specimens are poorly represented in the literature and in museums, and the presence of fossils is the exception and not the rule (SVP 2010). The Bedford Canyon Formation (Jbc) is assigned low paleontological sensitivity because much of the unit has been metamorphosed, and those fossils present are rare and consist entirely of common invertebrate fossils.

Low-to-High Sensitivity, increasing with depth. A number of sedimentary deposits in the project area are too young to preserve fossil resources at the surface or in the shallow subsurface (i.e., 5,000 years before present), but may preserve fossils at depth or overlie older units that have high paleontological sensitivity. These units are very young landslide deposits (Qls) and young surficial sediments (Qyf, Qya, Qyv, Qyls).

High Sensitivity. Many of the geologic formations in the project area are known to preserve abundant or scientifically significant fossils, thus giving them high paleontological sensitivity (SVP 2010). These units are old surficial sediments (Qof, Qof3, Qof1, Qov); very old surficial sediments (Qvof, Qvoa); Fernando Formation (Tf); Puente Formation (Tp); Lake Matthews Formation (Tlm); Topanga Group (Tt); Vaqueros and Sespe Formations, undivided (Tvs); Santiago Formation (Tsa); Silverado Formation (Tsi); Ladd Formation (Kl), including Holz Shale Member (Klhs) and Baker Canyon Member (Klbc); and the Williams and Ladd Formation, undifferentiated (Kwl).

Undetermined Sensitivity. For some geologic units in the project area, paleontological sensitivities cannot be determined at this time because they have little to no record in the scientific literature (SVP 2010). These units are sedimentary rocks of the Norco area (QTn), conglomerate of Temescal area (QTt), and the intermixed Estelle Mountain Volcanics and Mesozoic sedimentary rocks (Kvs).

As mentioned above, the West Sphere consists of six subunits, which are referred to as Areas A-F in this analysis. Area A, the northernmost of the subunits, is mapped as consisting entirely of sedimentary rocks of the Norco Area (QTn) at the surface (Morton and Miller 2006). There is little reported about this unit in the literature, and therefore this Area has undetermined sensitivity. Areas B and C, to the southeast of Area A, consist of older alluvium (Qof_3, Qof_1, Qvof) overlain by young alluvium (Qya) in drainages. As discussed above, older alluvium has high paleontological sensitivity, and so the sensitivity of Areas B and C is high. Area D, to the west of Area C, has highly varied surficial geology, with the Santiago and Silverado Formations present in the north, the Ladd Formation (Kl) in the central area, and the Santiago Peak Volcanics (Kvsp) in the south, all of which are covered by scattered modern landslide deposits (Qls). The landslide deposits are recent and have low sensitivity, but all of the other units except the volcanics (Kvsp) are known for preserving fossil resources, as discussed above, and so have high sensitivity. Furthermore, layers of clastic sediments within the Santiago Peak Volcanics (Kvsp) are known to preserve fossil resources, while the volcanic rocks of the unit will not. Areas E and F are similar in terms of sensitivity to Area D, but have fewer (Area E) or no (Area F) landslide deposits and the volcanics (Kvsp) are not present.

The East Sphere, as noted, is divided into four subunits, referred to as Areas A-D in this analysis. Area A, the northernmost area, consists of older alluvium (Qov, Qof_3) present over most of the surface of the area, with volcanics (Kvspi) and plutonic igneous rocks (Kcg, Kcgb) present along the southern boundary and likely present in the subsurface throughout the Area. The older alluvial sediments have high paleontological sensitivity, as discussed above, however in general the igneous rocks have no sensitivity. Therefore, the portions of Area A mapped as older alluvium will only have high sensitivity at the surface and in the shallow subsurface, once igneous rocks are encountered at depth the sensitivity drops to none. Areas B and C both consist of igneous plutonic (Kcgq, Kcg) and volcanic (Kvem) rocks. The plutonic rocks have no sensitivity, and so Area B and almost all of Area C have no paleontological sensitivity. The exception would be the small portion of Area C mapped as Estelle Mountain Volcanics (Kvem). As discussed above, this unit may contain layers of clastic sediments, which could potentially preserve fossil resources, however little information is available about this unit, giving the sedimentary layers within it unknown potential. Area D has much more complicated geology. The northern and northeastern portions of this area are similar to Areas B and C discussed above, with primarily plutonic (Kgu, Kcg) and volcanic (Kvspi, Kvem) igneous rocks with no sensitivity, except for low or unknown potential in sedimentary units that may be present within the volcanics (Kvspi, Kvem). The southwestern portion of this Area consists of older alluvium (Qof, Qvof) overlying volcanics and the Puente Formation (Tp) and the Topanga Group (Tt). These sediments all have high paleontological sensitivity. In the southeastern corner of Area D metamorphosed Triassic rocks (Trmu) are present, with low paleontological sensitivity, as well as isolated outcrops of plutonis (Kvs) and volcanic (Kvem) rocks, the Silverado Formation (Tsi), and older alluvium (Qvof). Of these, only the older alluvium and Silverado Formation have high paleontological sensitivity. Cutting across Area D is the Temescal Valley, the floor of which consists of young alluvium (Qya, Qyf). These sediments have low sensitivity, but with depth that will either increase or decrease, depending on the underlying formations. In the northern part of Area D it will decrease, as igneous rocks dominate this area, while in the far south of Area D older alluvium or the Silverado Formation may be present beneath the young alluvial sediments.

The South Sphere can generally be divided along Temescal Valley, with the rocks in the northeastern and eastern portion consisting of low sensitivity metamorphic rocks (Trmu) and none to unknown sensitivity Estelle Mountain Volcanics (Kvem). To the south and southwest of Temescal Valley the rocks consist primarily of younger (Qyv, Qyf) and older (Qof, Qvof, Qvoa) sediments overlying igneous (Khg, Kvem), metamorphic (Jbc), and ancient sedimentary (Tvs, Tsi) rocks. At the surface areas mapped as older surficial sediments or ancient sediments will have high sensitivity, while areas mapped as younger sediments will have low sensitivity that increases to high sensitivity when overlying older sediments, which is likely the case in most of the South Sphere. The exception would be the southwest boundary, where young fan deposits cut across igneous rocks (Khg), or along Temescal Valley, where young stream deposits cut across metamorphic (Trmu) and igneous (Kvem) with low, unknown, or no sensitivity.

Table 6. Paleontological Sensitivities of Geologic Formations in the Sphere of Influence and Recommended Mitigation Measures

Geologic Formation	SOI Location	Sensitivity*	Recommended Mitigation Measures
Artificial Fill (Qaf)	East Sphere (Area D)	None	MM-6
Very young landslide deposits (Qls)	West Sphere (Area D), South Sphere	Low-to-High	MM-1, MM-3, MM-6
Young alluvial fan deposits (Qyf)	West Sphere (Area E), East Sphere (Area D), South Sphere	Low-to-High	MM-1, MM-3, MM-6
Young axial-channel deposits (Qya)	West Sphere (Area B,C), East Sphere (Area A, D), South Sphere	Low-to-High	MM-1, MM-3, MM-6
Young alluvial-valley deposits (Qyv)	South Sphere	Low-to-High	MM-1, MM-3, MM-6
Young landslide deposits (Qyls)	South Sphere	Low-to-High	MM-1, MM-3, MM-6
Old alluvial-fan deposits (Qof)	East Sphere (Area D), South Sphere	High	MM-1, MM-2, MM-6
Old alluvial-fan deposits, unit 3 (Qof_3)	East Sphere (Area A)	High	MM-1, MM-2, MM-6
Old alluvial-fan deposits, unit 1 (Qof_1)	West Sphere (Area B, C)	High	MM-1, MM-2, MM-6
Old alluvial-valley deposits (Qov)	East Sphere (Area A)	High	MM-1, MM-2, MM-6
Very old alluvial-fan deposits (Qvof)	West Sphere (Area C, E, F), East Sphere (Area D), South Sphere	High	MM-1, MM-2, MM-6
Very old axial-channel deposits (Qvoa)	South Sphere	High	MM-1, MM-2, MM-6
Sedimentary Rocks of the Norco Area (QTn)	West Sphere (Area A)	Unknown	MM-1, MM-5, MM-6
Conglomerate of Temescal Area (QTt)	South Sphere	Unknown	MM-1, MM-5, MM-6
Fernando Formation (Tf)	West Sphere (Area D)	High	MM-1, MM-2, MM-6
Puente Formation (Tp)	East Sphere (Area D)	High	MM-1, MM-2, MM-6
Lake Matthews Formation (Tlm)	South Sphere	High	MM-1, MM-2, MM-6
Topanga Group (Tt)	East Sphere (Area D), South Sphere	High	MM-1, MM-2, MM-6

Table 6. Paleontological Sensitivities of Geologic Formations in the Sphere of Influence and Recommended Mitigation Measures

Geologic Formation	SOI Location	Sensitivity*	Recommended Mitigation Measures
Vaqueros and Sespe Formations, undivided (Tvs)	South Sphere	High	MM-1, MM-2, MM-6
Santiago Formation (Tsa)	West Sphere (Area D)	High	MM-1, MM-2, MM-6
Silverado Formation (Tsi)	West Sphere (Area D, E, F), East Sphere (Area D), South Sphere	High	MM-1, MM-2, MM-6
Ladd Formation (Kl)	West Sphere (Area D, E), East Sphere (Area D)	High	MM-1, MM-2, MM-6
Baker Canyon Member (Klbc)	West Sphere (Area D, E)	High	MM-1, MM-2, MM-6
Williams and Ladd Formation, undifferentiated (Kwl)	West Sphere (Area E)	High	MM-1, MM-2, MM-6
Monzogranite (Kcg)	East Sphere (Area A, C, D)	None	MM-6
Granodiorite and quartz latite (Kcgq)	East Sphere (Area B, C)	None	MM-6
Gabbro (Kgb)	East Sphere (Area A, D)	None	MM-6
Granite (Kgu)	East Sphere (Area D), South Sphere	None	MM-6
Heterogeneous granite (Khg)	South Sphere	None	MM-6
Estelle Mountain Volcanics (Kvem)	East Sphere (Area C, D), South Sphere	None[1]	MM-6
Santiago Peak Volcanics (Kvsp)	West Sphere (Area D, F)	None[2]	MM-6
Santiago Peak Volcanics, intrusive rocks (Kvspi)	East Sphere (Area A, D)	None	MM-6
Bedford Canyon Formation (Jbc)	South Sphere	Low	MM-1, MM-4, MM-6
Metamorphic Rocks (Trmu)	East Sphere (Area D), South Sphere	None	MM-6

*Following SVP (2010).
[1] Sedimentary layers, if present, have unknown sensitivity (See discussion in Section 7.2).
[2] Sedimentary layers, if present, have high sensitivity (See discussion in Section 7.2).

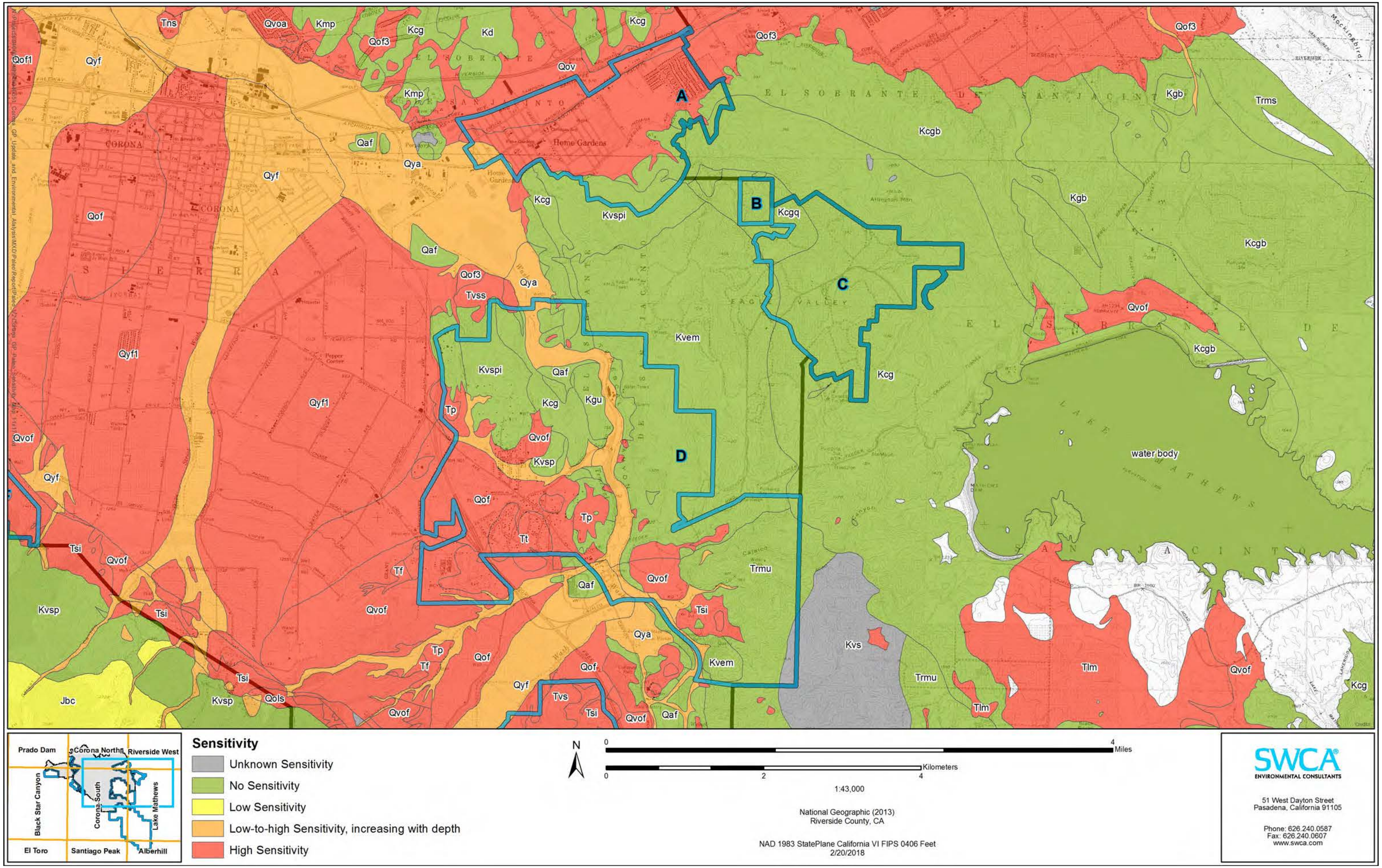

Figure 10. Eastern Sphere of Influence Paleontological Sensitivity Map (1 of 3).

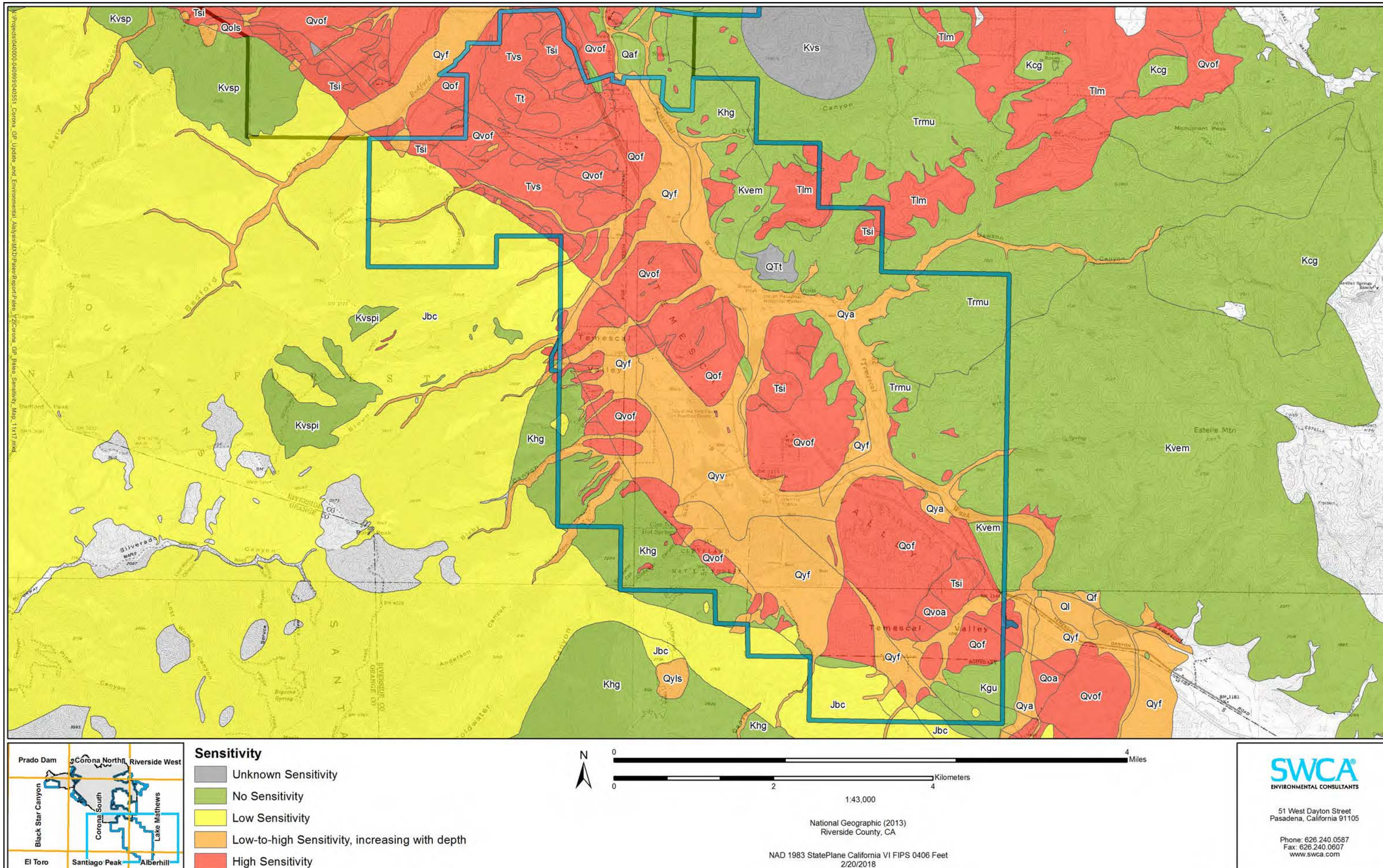

Figure 11. Southern Sphere of Influence Paleontological Sensitivity Map (2 of 3).

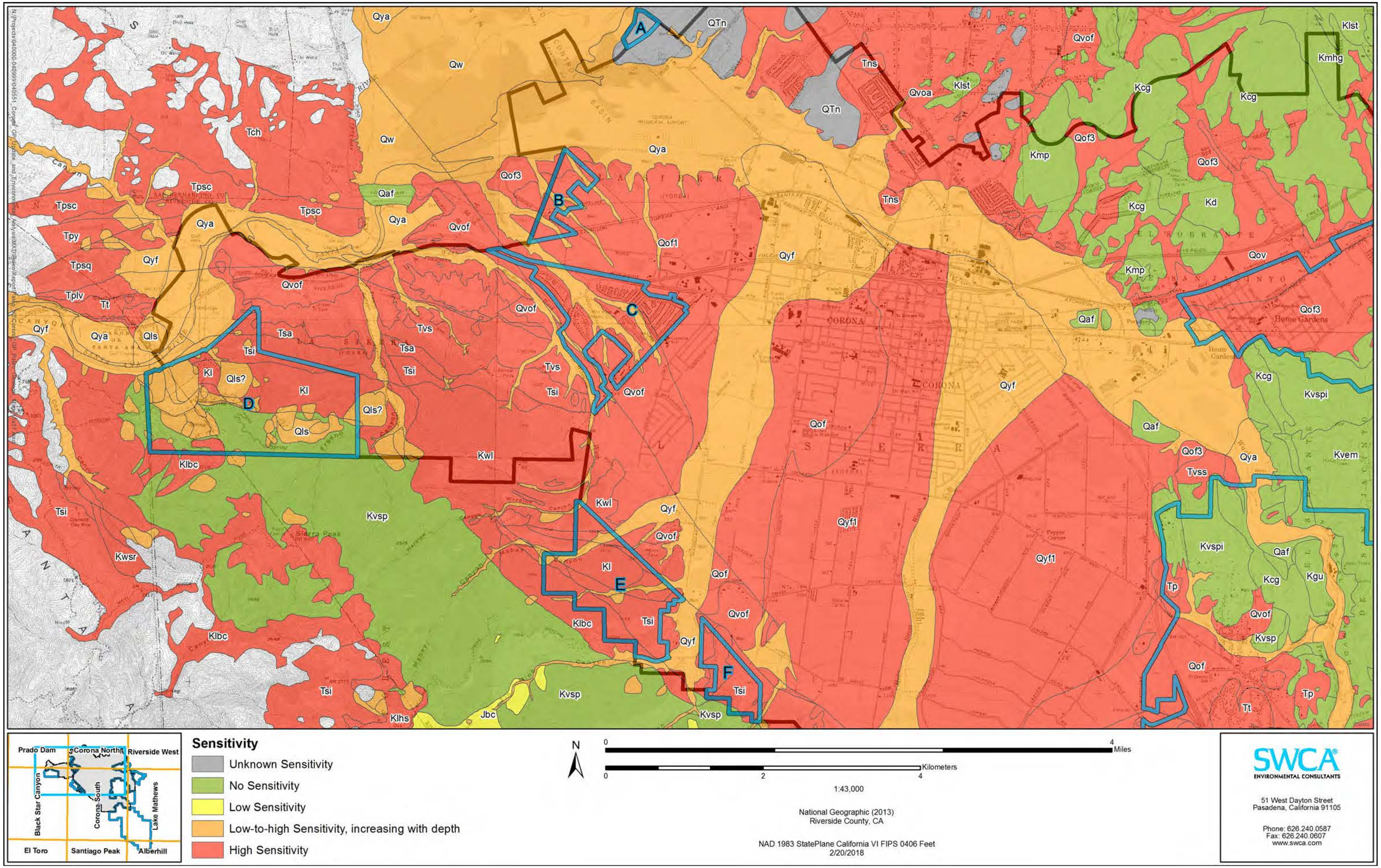

Figure 12. Western Sphere of Influence Paleontological Sensitivity Map (3 of 3).

6 PALEONTOLOGICAL CONSTRAINTS ANALYSIS

To demonstrate CEQA compliance, a response is required to the following question in the Environmental Checklist, based on the results of the paleontological analysis: "Will the proposed project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?" With the implementation of the following general recommendations, construction projects in the city of Corona and other areas within the SOI will be mitigated against directly or indirectly destroying unique paleontological resources or sites or unique geologic features. The intent of these recommendations is to ensure that potential adverse impacts to paleontological resources as a result of project implementation are reduced to a less-than-significant level.

6.1 Constraints

The preservation of fossil resources within the city and SOI is primarily constrained by the occurrence of these resources. Fossils are part of the sedimentary rock unit in which they are preserved, and as such are only encountered when exposed through erosion or human activity. Although the paleontological sensitivities assessed here can provide a general sense of the likelihood of encountering fossils in a given area or the types of fossils to expect in that area, it is impossible to predict where exactly in the subsurface a fossil will be preserved. Thus, avoiding fossil resources is not possible when planning or conducting ground-disturbing activities.

Instead, the requirements of laws and regulations such as CEQA and the PRPA, as well as guidance provided by the SVP, allow construction activities in high-sensitivity areas to proceed while following mitigation measures designed to recognize and salvage fossil resources, should they be encountered.

6.2 Opportunities

The General Plan is an instrument the City can use to protect fossil resources, along with other codes, ordinances, and guidelines. The update of the General Plan provides opportunities for the City to protect fossil resources. Amending development policies, codes, and ordinances when needed to comply with updated regulatory requirements will allow planning for future projects to proceed smoothly and predictably.

As discussed above, paleontological resources remain buried in native sediment until erosion or human activity exposes them. Although exposure by human activity may pose a risk of destruction to the fossil specimen, it is also often the only opportunity for that fossil to be discovered and accessible to scientists. The excavation of fossils is a necessary and common part of paleontology, and therefore construction activities in areas with high sensitivity pose a unique opportunity for furthering this science.

Through the General Plan, the City can provide guidelines for better assessing specific projects that may occur in high-sensitivity areas, ensuring that proper mitigation techniques are used to protect and salvage any fossil resources discovered so they may be studied by scientists and preserved in museums for generations to come.

6.3 Recommendations

The following general mitigation measures (MMs) have been developed in accordance with the SVP (2010) standards that meet the paleontological requirements of CEQA. These mitigation measures have been used throughout California and have been demonstrated successful in protecting paleontological resources while allowing timely completion of construction. These mitigation measures are only general guidelines, and all projects proposing ground-disturbing activities should develop a project-specific paleontological mitigation and monitoring plan. Paleontological sensitivities for each of the identified geologic formations and their respective mitigation measures have been determined (see Table 5 and Table 6).

- **MM-1:** A Qualified Paleontologist meeting the standards of SVP (2010) will be designated to conduct all paleontological mitigation measures associated with construction activities, including the preparation of a paleontological resources monitoring and mitigation plan (PRMMP), tailored to each specific development project. This plan will address specifics of monitoring and mitigation to that project area and construction plan, and will take into account updated geologic mapping, geotechnical data, updated paleontological records searches, and any changes to the regulatory framework.
- **MM-2:** All projects involving ground disturbances in previously undisturbed areas mapped as having high paleontological sensitivity will be monitored by a qualified paleontological monitor (SVP 2010) on a full-time basis, under the supervision of the Qualified Paleontologist. This monitoring will include inspection of exposed sedimentary units during active excavations within sensitive geologic sediments. The monitor will have authority to temporarily divert activity away from exposed fossils to evaluate the significance of the find and, should the fossils be determined to be significant, professionally and efficiently recover the fossil specimens and collect associated data. Paleontological monitors will use field data forms to record pertinent location and geologic data, will measure stratigraphic sections (if applicable), and collect appropriate sediment samples from any fossil localities.
- **MM-3:** All projects involving ground disturbance in previously undisturbed areas mapped with low-to-high paleontological sensitivity will only require monitoring if construction activity will exceed the depth of the low-sensitivity surficial sediments. The underlying sediments may have high paleontological sensitivity, and therefore work in those units might require paleontological monitoring, as designated by the Qualified Paleontologist in the PRMMP.
- **MM-4:** All projects involving ground disturbance in previously undisturbed areas mapped as having low paleontological sensitivity should incorporate worker training to make construction workers aware that although paleontological sensitivity is low, fossils might still be encountered. The Qualified Paleontologist should oversee this training as well as remain on-call in the event fossils are found.
- **MM-5:** All projects involving ground disturbance in previously undisturbed areas mapped as having unknown paleontological sensitivity should retain a Qualified Paleontologist to conduct a field survey of the proposed project area to determine the sensitivity of the geologic units, after which the relevant mitigation measures can be applied.
- **MM-6:** In the event of any fossil discovery, regardless of depth or geologic formation, construction work will halt within a 50-ft. radius of the find until its significance can be determined by a Qualified Paleontologist. Significant fossils will be recovered, prepared to the point of curation, identified by qualified experts, listed in a database to facilitate analysis, and deposited in a designated paleontological curation facility, in accordance with the standards of the SVP (2010). The most likely repository is the NHMLA. A repository will be identified and a curatorial arrangement will be signed prior to collection of the fossils.

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Appendix H Hazardous Materials Site List

Appendices

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Hazardous Materials Sites

The following lists of hazardous materials sites were searched between July 13 and July 19 2017:

- **US Environmental Protection Agency (USEPA)**
  - Superfund Enterprise Management System
  - RCRAInfo
  - EJScreen
  - EnviroFacts
- **State Water Resources Control Board**
  - GeoTracker
- **Department of Toxic Substances Control**
  - EnviroStor
- **Department of Resources Recovery and Recycling**
  - Solid Waste Information System
- **California Air Resources Board**
  - Pollution Mapping Tool (searched July 27, 2017)

1. US Environmental Protection Agency Databases

Superfund Enterprise Management System

Superfund is a program administered by the EPA to locate, investigate, and clean up the worst hazardous waste sites throughout the United States. Sites include abandoned warehouses, manufacturing facilities, processing plants, and landfills (USEPA 2017a). Superfund sites in Corona are listed in Table 1.

Table 1 Superfund Sites in Corona: US Environmental Protection Agency

Site Name Address	Reason for Listing and Regulatory Status
Superfund Enterprise Management System (SEMS), US Environmental Protection Agency	
6th and Corona Near the intersection of Cardiff St/6th St	Removal only site (no site assessment work needed)
Advanced Fuel Filtration, Inc	Removal only site (no site assessment work needed)

1451 Magnolia	
Liston Brick Co. 3710 Temescal Canyon Rd	Removal only site (no site assessment work needed) Listed as case closed 2016 on DTSC *Envirostor* database.
Sherborn Magnolia Drum Site Near Sherborn St/Magnolia St	Also listed as USEPA City of Corona Brownfields site. Removal only site (no site assessment work needed) Site assessment completed 2007
Thomas Ranch	Also listed as State Voluntary Cleanup Site, case closed 2014, on DTSC *Envirostor* database.
Source: US Environmental Protection Agency. 2017, July 19. EJScreen. https://ejscreen.epa.gov/mapper/.	

Brownfield Sites

A brownfield is a property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant (USEPA 2017b). Brownfield sites in Corona are listed in Table 2.

Table 2 Brownfield Sites in Corona: US Environmental Protection Agency

Site Name Address	Reason for Listing and Regulatory Status
Harrington 1096 Harrington Street	Site assessment completed 2010
Corona Redevelopment Agency 1040 E 6th St	Site assessment underway
Corona Redevelopment Agency Main at Ramona	Site assessment completed 2010
City of Corona 1601 Sherborn Rd	Site assessment completed 2007
Source: US Environmental Protection Agency. 2017, July 19. EJScreen. https://ejscreen.epa.gov/mapper/.	

Toxics Release Inventory

The Toxics Release Inventory (TRI) tracks the management of over 650 toxic chemicals that pose a threat to human health and the environment. U.S. facilities in certain industry sectors that manufacture, process, or otherwise use these chemicals in amounts above established levels must report how each chemical is managed through recycling, energy recovery, treatment, and releases to the environment. A “release” of a chemical means that it is emitted to the air or water, or placed in some type of land disposal (USEPA 2017c). TRI sites in Corona are listed below in Table 3.

Table 3 Toxic Release Inventory (TRI) Sites
US Environmental Protection Agency TRI Search

Facility	Address
3M Co - Corona	18750 Minnesota Rd
Alcoa Premium Castings Div	1450 Rincon St
All American Asphalt	1776 All American Way
Anaco & Clow Valve	1001 El Camino Ave
Anchor Lithkemko	280 N Ott St
Aqua Mix Inc.	250 Benjamin Dr
Arvin Industries Inc Arvinyl Div	233 N Sherman Ave
Austin Plastics Inc	182 Business Center Dr
Boral Roofing LLC	909 Railroad St
Cemex Corona Plant	24980 Maitri Rd
Champion Home Builders Inc	299 N Smith Ave
Clow Valve Co	1375 Magnolia Ave
Connor Formed Metal Products	1451 Railroad St
Corona Plant 30	1540 Sherborn St.
Corona Products	215 N Smith Ave
Creative Ideas	545 Alcoa Circle
Dairy Farmers Of America Inc.	1138 W Rincon St
Dart Container Corp Of CA	150 S Maple St
Electrasem LLC	372 Elizabeth Ln
Fiberglass Reinforced Products	235 N Sherman Ave
Frontier Aluminum Corp	2480 Railroad St
G S Creations Sierra Furniture	1346 Railroad St
Hayden Industrial Products	1531 Pomona Rd
Hi-Country Corona Inc	355 N Joy St
Hot Sports Inc	2151 Sampson Ave
Imco Recycling Of California, Inc	1462 Quarry Rd
Johns Manville	1251 Magnolia Ave
Kolmar Labs Inc	450 N Sheridan St
Lucas Oil Products Inc	302 N Sheridan St
National Ready Mix Concrete Co	25050 Maitri Rd
Noranco Corona Div	345 Cessna Cir # 102
Oce Imaging Supplies	2388 Railroad St
Pacific Clay Prods Inc	20325 Temescal Canyon Rd
Parker Hannifin Corp - Cylinder Div	221 Helicopter Cir
Production Partners Chemical Co Inc	1223 Sherborn St., Unit 101
RW Lyall & Co Inc	2665 Research Dr
Tolco Inc	1375 Sampson Ave
Unlimited Performance Products Inc	560 W Rincon
Us Battery Mfg Co	1675 Sampson Ave
Vulcan Materials Co Corona	1709 Sherborn St
Westile Inc.	1745 Sampson Ave

Source: US Environmental Protection Agency. 2017, July 18. TRI Search. https://www.epa.gov/enviro/tri-search.

Stationary Sources of Air Pollution

Integrated Compliance Information System (ICIS)-AIR contains compliance and permit data for stationary sources of air pollution (such as electric power plants, steel mills, factories, and universities) regulated by EPA, state and local air pollution agencies (USEPA 2017d). Stationary sources permitted to emit air pollutants and listed in the ICIS database are listed below in Table 4.

Table 4 Facilities in Corona Listed on US Environmental Protection Agency's Integrated Compliance Information System (ICIS) Database for Air Pollutant Emissions

Facility	Address
3M Co - Corona	18750 Minnesota Rd
All American Asphalt	1776 All American Way
Caliber 1 Custom Boats	1884 Pomona Road
Corona City, Dept Of Water & Power	2205 Railroad St
Corona Energy Partners Ltd	1130 West Rincon Street
Dart Container Corporation Of California	150 South Maple Street
Fender Musical Instruments Corp	311 Cessna Cir
Integrated Protein Technology	1138 West Rincon Street
Preproduction Plastics Inc.	210 Teller Street
RGF Enterprises Inc	220 Citation Circle
Silvercrest Western Homes Corp	299 N Smith Ave
Thoro Packaging	1467 Davril Circle
UBS Printing Group	2577 Research Drr
United States Tile Co Corona	909 Railroad Street
US Battery Mfg Co	1675 Sampson Ave

Source: US Environmental Protection Agency (USEPA). 2017, July 19. EnviroFacts. ICIS-Air. https://iaspub.epa.gov/enviro/find.airs_afs?pLocation=corona%2C+CA&x=10&y=6.

Facilities Permitted to Discharge Wastewater to Waters of the United States

The facilities listed below in Table 5 have been issued National Pollution Discharge Elimination System (NPDES) permits for discharges of wastewater to Waters of the United States. The facilities discharge several categories of waste water including treated municipal wastewater, industrial wastewater, and agricultural wastewater.

Table 5 Facilities in Corona with National Pollution Discharge Elimination System (NPDES) Permits for Discharges of Waste Water to Waters of the United States

Facility Name	Address
Darigold Juice Products	355 North Joy Street
Arivinyl Metal Laminators	233 North Sherman Avenue
City Of Corona, STP 2	815 West Sixth Street
Corona WRF No. 1	2205 Railroad Street
Corona WWTP #3	3997 Temescal Canyon Road
Dallape Dairy	2877 River Road
Integrated Protein Technology	1138 West Rincon Street
Quality Dairy	8342 Chino-Corona Road
STP	1904 Clearwater Drive
Syann Dairy	14950 River Road
Syann Dairy #2	14901 River Road

Vander Meer	Vander Meer
Western Riverside Co Reg WWTP	14634 River Road
Source: US Environmental Protection Agency (USEPA). 2017, July 19. EnviroFacts. Topic Searches: Water. https://www.epa.gov/enviro/topic-searches#water	

Hazardous Waste Generators

Two categories of facilities generating hazardous wastes listed on the RCRAInfo database are included below in Table 6.

Large Quantity Generators generate 1,000 kilograms per month or more of hazardous waste or more than one kilogram per month of acutely hazardous waste.

Small Quantity Generators generate more than 100 kilograms, but less than 1,000 kilograms of hazardous waste per month (USEPA 2017e).

Table 6 Hazardous Wastes Generators in Corona
US Environmental Protection Agency RCRAInfo [Resource Conservation and Recovery Act]

Name	Address
Large Quantity Generators	
1451 Magnolia Llc	1436 E 6th St
Actron Mfg Inc	1841 Railroad St
Acuity Specialty Products Dba Zep Inc	1000 Railroad Street
Alexis Oil Co	219 Glider Cir
All American Asphalt	1776 All American Way
Chevron 207494	1140 E Ontario Ave.
Chevron 303835	1315 Magnolia Ave
Circor Aerospace	2301 Wardlow Circle
Corona Regional Medical Center	800 South Main
Costco Wholesale # 432	480 N Mckinley St
Cvs Pharmacy #5958	14220 Schleisman Rd
Cvs Pharmacy #8816	11950 De Palma Rd
Cvs Pharmacy #9190	1299 E. Ontario Ave
Cvs Pharmacy #9604	1183 Magnolia Ave
Cvs Pharmacy #9728	1322 West Sixth Street
Dart Container Corporation Of California	150 S. Maple Street
Exxonmobil Oil Corp 12358	1580 W Sixth Street
Fender Musical Instruments Corporation	311 Cessna Circle
Frontier Aluminum Corp	2480 Railroad St
Frontier Aluminum Corporation	1990 Railroad St
Hayden Industrial Products	1531 Pomona Road
Hayden Industries	1531 Pomona Road
Kobelco Compressors America Inc.	1450 Rincon Street
Monitor And Crt Recyclers Of Ca	1691 N Delilah St
Palos Verdes Bldg. Corp Dba Us Battery Mfg. Co	1675 Sampson Ave
Park Avenue Cleaners	129 N Mckinley St
Ralphs #136	2661 Green River Rd
Ralphs Grocery Company #136	2661 Green River Rd
Sears Essentials #2518	705 N. Main Street
State Rte 91 Corridor Improvement Proj Sr 91 Cip	905 E 3rd St
Stater Bros Markets #170	2243 Eagle Glen Pkwy
Thoro Packaging Inc.	1467 Davril Circle
Vons Store #2818	11800 De Palma Rd
Walgreen No 7591	120 W Park Ridge Ave
Watson Laboratories	132 Business Center Drive
Watson Laboratories	100 Business Center Drive

Table 6 Hazardous Wastes Generators in Corona

US Environmental Protection Agency RCRAInfo [Resource Conservation and Recovery Act]

Name	Address
Watson Laboratories	311 Bonnie Circle
West Coast Procelain Industries, Inc.	133 North Sherman Avenue
Small Quantity Generators	
3 V Fasteners Co Inc	1821 W Railroad St
6th St Chevron Service	1107 W 6th St
A 1 Precision Screw Product	1441 Pomona Rd
A M A Plastics	350 W Rincon St
Aarons Camera Inc	170 N Maple St Unit 101
Accent Plastics	1925 Elise Cir
Accurate Motor Products And Service	22079 Forest Boundary Rd Ste B
Acker Stone Ind Inc	13296 Temescal Canyon Rd
Advanced Technology	2175 Sampson St
Advanced Tool Tech	1550 Consumer Cir
Airmark International	1771 Railroad St
Alta Graphics Inc	179 Business Center Dr
Anaco	1001 El Camino Ave
Aqua Performance	425 N Smith Ave
Aquamix	250 Benjamin Drive
Arco Facility No 09705	1735 W 6th St
Arco Facility No 09706	624 W 6th St
Arco Facility No 09707	1205 S Main St
Arco Facility No 09709	611 N Main St
Arvin Laminates Lp	233 N Sherman Ave
At&T	3950 S Main St
Atk Space Systems	250 Klug Circle
Automotive Inspectors	1443 6th St Ste 108
Avid Ink	1163 Pomona Rd
B B K Performance Prod	1871 Delilah
B L Bealer	1100 Olympic Ave No 105
Baker Equipment Leasing Co	1955 Sampson Ave Ste A
Boral Resources Corona	14270 Magnolia Ave
Boral Resources Eagle Valley	19494 River Rock Rd
Borden Ind Foods	137 N Joy St
Bosch Auto Group	2683 Wardlow Rd
Bouman Forklift Sales Inc	299 E Harrison St
C & H Transportation Company	1001 E Third St
C L Pharris Group	24980 Maitri Road
Cabo Marine Co	144 N Sherman

Table 6 Hazardous Wastes Generators in Corona

US Environmental Protection Agency RCRAInfo [Resource Conservation and Recovery Act]

Name	Address
Cal Draulics Inc	220 N Delilah
Calif Institute For Women	16756 Chino Corona Rd
Calmat Co	1709 Sherborn
Caltrans Corona Maint Station	842 El Sobrante Rd
Center Manufacturing Inc	1160 Olympic Dr
Chemstar Urethanes Inc	1148 California Ave
Chevron 99010	309 S Main St.
Chevron Station 91582	2270 Frontage Rd
Chevron Station No 207496	130 W Foothill Pkwy
Chevron Station No 90236	4710 Green River Rd
Cimmarron Materials	155 E Rincon
Circle K Store #470	13595 Magnolia Ave
Circle K Store #522	19570 Temescal Canyon Rd
Circle Seal Controls	2301 Wardlow Cir
Citrus And Allied Essences Ltd.	240 Deininger Circle
City Of Corona	2205 Railroad
City Of Corona Dept Of Public Works	730 Corporation Yard Way
Classic One Hour Photo Inc	469 Magnolia Ave No 105
Clow Valve, Inc.	1375 Magnolia Avenue
Club Car	2220 Railroad
Compounding Technology Inc	1966 Compton Ave
Conner Chrysler Dodge Inc	934 W 6th St
Connor Formed Metal Products	1451 Railroad St
Construction Machinery Inc	22099 Knabe Rd
Container Corp Of Amer	185 N Smith St
Cornona Tank And Pump Refurb	1142 Quarry St
Corona 1 Hour Photo	736 Cn Main St
Corona City Of	815 W 6th St
Corona Clay Co	22079 Forest Boundary Rd
Corona Cleaners	782 N Main St
Corona Community Hospital	800 S Main St
Corona Cylinder And Engine Overhaul	1965 Aviation Dr
Corona Energy Partners Ltd	1130 W Rincon St
Corona Honda Motorcycle	1631 Pomona Rd Ste A
Corona Industrial Sand Projects	20125 Temescal Canyon Rd
Corona Intermediate School	1230 S Main St
Corona Magetics Inc	1474 Pomona Rd
Corona Mall Chevron	117 E 4th St Unit B

Table 6 Hazardous Wastes Generators in Corona

US Environmental Protection Agency RCRAInfo [Resource Conservation and Recovery Act]

Name	Address
Corona Medical Ctr	1157 W Grand Blvd
Corona Nissan	375 N Main St
Corona Norco Independent	823 S Main St
Corona Norco Usd	300 Buena Vista Ave
Corona Products	215 N Smith Ave
Corona Pump Station	275 N Maple St
Corona Sunrise Physician Med Grp	1820 Fullerton Rd Ste 120
Counrtyside Cleaner	2276 Griffin Wy Ste B102
Cox Hobbies Inc	350 W Rincon St
Creative Machining Technology	400 E Parkridge
Cwr Manufacturing Inc	230 N Sherman Ave
D C Sports	1451 E 6th St
Dairy Farmers Of America	1138 W Rincon St
Daves Muffler	1888 W 6th Street
David Engineering	1800 Capital St
Deforrest Jones Inc	1787 Pomona Rd Ste C
Dentin Manufacturing Company	165 Business Center Drive
Design Gifts International Inc	234 N Sherman Ave
Diagraph Corp	291 Bonnie Lane Unit 102
Diamond Cleaners	430 N Main St
Diler Chevrolet	1720 W 6th St
Discount Tire Center No 44	836 W 6th St
Do+Able Products	395 Smitty Way Suite #101
Drivetrain Direct	1477 Davrill Cir
Dryclean Express	341 H S Lincoln Ave
Dutton Threading Co	410 E Princeland Ct No 1
Economy Cleaners	623 N Main St Unit D1
Eds Auto Wrecking	14264 Magnolia Ave
Egyptian Inc Dba Trucare Pharmacy	1875 California Ave
Electro Formed Nickel Inc	283 Winfield Circle
Empire Olds	1111 W 6th St
Environmental Invest And Action	1171 Railroad St
F And L Tools Corp	245 Jason Ct
F Rodgers Corporation	341 Bonnie Circle
First Class Cleaners	821 N Main St Ste B
Fmc Corp Agri Chem Group	1027 E Third St
Foothill Engineering	905 E Third St
Gail Trucking	1256 Magnolia Ave

Table 6 Hazardous Wastes Generators in Corona

US Environmental Protection Agency RCRAInfo [Resource Conservation and Recovery Act]

Name	Address
Gamboa Truck Lines	20305 Temescal Cyn
Gateway Buick Gmc	1150 W 6th St
Glistens	1441 Pomona Rd No 21
Golden State Axle	451 Railroad St
Grady Garrison Paint & Auto Body	212 N Smith Ave
Greensteel	2621a Research Drive
H E I	2401 Pomona Rincon Rd
H L Blachford Inc	463 N Smith Ave
Hamner Towing	2125 Railroad St
Harbor Freight Tools Usa Inc	1750 W 6th St
Home Depot Usa Inc Hd 0601	490 Mckinley St
Home Depot Usa Inc Hd 6665	1355 E Ontario Ave
Homexx International	2652 Research Dr
Hydro Conduit Corp	23200 Temescal Cyn Rd
Hydroseal Polymers Inc	1550 Melissa Court
I B A	344 Bonnie Circle
Inland Empire Driveline Service	1540 Commerce St
Inland Mailing Service	1611 Pomona Rd Bldg A
Inter Conn Electronics Inc	341 S Maple St
J & L Discount Car Care	420 River Rd #B
J C B Pacific Coast Machinery Inc	1701 Delilah St
J C Mc Clinton Trucking Co Inc	18430 Compton Ave
Jad Metal Engineering Inc	1275 W Railroad St
Janda Company Inc	1275 Railroad St
Jerrys Brake And Wheel	1011 West 6th Street
Johns Manville	1251 Magnolia
Kandy Kreations	250 E Harrison St
Karls Auto Machine	410 E Princeland #5
Keco Industries Inc	159 Vander St
Kimmel Body Works	302 E Harrison St
Kt Specialties Inc	232 N Sherman Unit E
Kt Specialties Inc	1535 Consumers Cir
L H Research	720 S Temescal St
Laminated Shim	1691 California Ave
Larrys Transmission	1443 W 6th St Ste 110
Laticrete International Inc	22520 Temescal Canyon Rd
Le Myers Co The	21840 N 19th Ave Suite B
Lemans Plating Co Inc	1520 Commerce St Unit C

Table 6 Hazardous Wastes Generators in Corona

US Environmental Protection Agency RCRAInfo [Resource Conservation and Recovery Act]

Name	Address
Linville Kellogg Ranch Ltd	2807 Kellogg St
Maaco Auto Painting	110 So Washburn #5
Mac Arthurs Rv	129 E Grand Blvd
Meggit Airdynamics Inc	2616 Research Dr
Mercury Aerospace Fasteners	385 N Sherman Ave
Metroline Surfaces Inc	1690 Delilah
Microfilming Services Inc	180 Vander St
Mighty Mover	224 N Sherman Ave
Mikes Tire & Alignment	225 W Grand Blvd
Mobile Sand Co	22300 Temescal Cyn Rd
More Truck Lines	14272 Magnolia Ave
Morgan Services Inc	531 W Rincon St
Morgan Services Inc	531 W Rincon St
Morgan Svc Inc	531 Rincon St
Motivational Systems	1240 Railroad St
Motra Transmission	1453 W 6th St Ste 103
Mr Best Cleaners	685 E Grand Blvd 110
Mr Dryclean	2621 Green River Rd Ste 102
National Aircraft & Engineering	200 N Smith
Newlight Technologies Llc	1475 Sampson Ave
Nibco Inc	1375 Sampson Ave
Nord Gear Corp	1121 Railroad St
P C R Procircuit	2388 Railroad St
Pacific Bell	511 Joy St
Pacific Bell	1102 E Sixth St
Pacific Clay Products Inc	20325 Temescal Canyon Rd
Pacific Reach Inc	1055 East 3rd
Pacific Screw Products	595 B N Smith
Palm Springs Oil #6	401 W Sixth St
Parcel 3	1785 Sampson Ave
Park And Eat	131 Industrial Wy
Pemco Engineers	2398 Railroad St
Pep Boys #778	581 N Main St
Photo Ctr	488 N Main St No C18
Plascor	500 E Rincon Ste 150
Polystyrene Recycling Co Of America	720 S Temescal St
Precision Tune	2187 Sampson Ave Ste 111
Premier Gear & Machine	2360 Pomona Rincon Rd

Table 6 Hazardous Wastes Generators in Corona
US Environmental Protection Agency RCRAInfo [Resource Conservation and Recovery Act]

Name	Address
Preproduction Plastics Inc	210 N Teller St
Pro Circuit	130 N Sherman Ave
Pro Tune	1453 W Sixth St Unit 101
Production Industries	240 Teller St
Proformance Mfg	1922 Elise Cr
Proposed Development	1346 Railroad St
Pti Sand & Gravel	14925 River Rd
Quality Toyota	1685 W 6th St
Quality Toyota	1700 W 6th St
R K L Technologies Inc	245 Citation Cr
Race Tech	1501 Pomona Rd
Reliance Manufacturing	1441 Pomona Rd Unit 31
Republic Bag	580 E Harrison St
Rgf Enterprises, Inc	220 Citation Cir
Ride Mfg	150 Klug Circle
Rish Equipment Co	1731 Pomono Rd
Robsons Custom Cabinets	1683 Commerce St
Romar Fleet Svc	1248 Magnolia Ave
Ross Swiss	1990 Pomona Rd
Royal Cleaners	4300 Green River Dr
S C Modifications Inc	400 Princeland No 4
Salco Circuits	1825 Sampson Ave
Sams Club #4709	1375 E Ontario Ave
San Valle Tile Kilns Inc	1620 East Magnolia Ave
Saturn Cleaners	1390 6th St Ste 132 134
Saturn Cleaners	514 S Smith Ave Ste B101
Scher Tire No 25	2189 Sampson Ave
Servpro	1793 Kelog St
Shell Service Station	1205 Magnolia Ave
Shell Service Station	794 N Main
Shell Service Station	175 N Mckinley
Shell Service Station	1825 W 6th St
Shell Service Station - 135194	111 N. Lincoln/Hwy 91
Shell Service Station - 135196	4721 W Green River/91 Fwy
Six Pac Recycling Corp	1430 E Sixth St
Smith Furniture Makers	1346 Railroad St Front Bldgs
Smittybilt	395 Smitty Way
Smittybilt Inc	2090 California St

Table 6 Hazardous Wastes Generators in Corona

US Environmental Protection Agency RCRAInfo [Resource Conservation and Recovery Act]

Name	Address
Soff Cut	1112 Olympic Dr
Sons Auto Repair	421 W 6th St
Sparkling Cleaners	420 N Mckinley St Ste 114
Sparkling Cleaners	420 Mckinley Ave No 114
Special Operations Group	526 Railroad St
Spirol West Inc	645 E Harrison St Ste 100
Sport Carriers, Inc.	2380 Railroad Street
Standard Logic Inc	132 Business Center Dr
Standard Ready Mix Concrete	2300 Temescal Canyon Rd
Standard Ready Mix Concrete	22300 Temescal Canyon Rd #A
Standard Ready Mix Concrete	25050 Maitri Rd
Star Coach America	1655 W 6th St
Stewart And Stevenson Sierra Inc	215 Jason Ct
Sumitomo Machine	2375 Railroad St
Sunshine Cleaners	529 W Mckinley St Unit 105
Suss Microtec Photonic Systems Inc	220 Klug Cir
Suzuki Cars And Trucks Of Corona	231 S Lincoln Avenue
Talco Plastics Inc	1000 Rincon Rd
Target Store T1548	2615 Tuscanny St
Tasman Roofing Inc	1230 Railroad St
Team Car Care	481 Railroad St
Technicote	1141 California
Temecula Valley Shutters	1541 Commerce St
Tepla America Inc	251 Corporate Terrace
Texaco Service Station	1610 W 6th St
Texaco Service Station	2197 Sampson
Texaco Service Station	230 Lincoln
Thakar Aluminum Corp	Parkridge And Sampson
The Glidden Co Dba Ici Paints	2410 Wardlow Rd
Thomas Ranch Prp Group	Palisades Dr And Serfas Club
Tiffany Coachworks	13445 Estelle St
Town 1hr Photo	401 S Lincoln Ave Unit B
Town And Country Cleaner Out Of Business	156 W Ontario Ave
Traditional Furniture Designs Inc	13455 Estelle St
Tristan Engineering Contractors Inc Hq	1151 Pomona Rd
Tube Technologies	1555 Consumer Circle
U S A Industries	1620 Leeson
Ubs Printing Group	2577 Research Dr

Table 6 Hazardous Wastes Generators in Corona
US Environmental Protection Agency RCRAInfo [Resource Conservation and Recovery Act]

Name	Address
Uhaul Center Of Corona	314 E 6th St
Ultra Custom Coach Inc	1911 Sampson St
United Business Systems	2420 Railroad St
United States Tile Co	909 W Railroad St
Unlimited Products	560 W Rincon St
Unlimited R P Ms	2871 Ragel Way No 104
Victor Buick Gmc Truck Inc	2525 Wardlow Rd
Waco Intl	137 Vander St
Walmart Neighborhood Market No 2487	1560 W Sixth St
Walmart Supercenter No 1912	479 N Mckinley St
Warner Elec Inc	1955 Sampson Ave
Watson Laboratories Inc	2455 Wardlow Rd
Wd Schock Corp	23125 Temescal Canyon Rd
Webber Automotive	2855 Sampson Ave
Werner Corp	S Of Scale House
Westech Cabinet	143 Business Center Dr
Western Homes Corp	299 N Smith Ave
Western Turf Jacobsen Textron	281 Corporate Terrace
Western Waste Ind	10910 Dawson Canyon Rd
Westile Inc	1745 Sampson Ave
Winston Tire	185 N Mc Kinley

Source: US Environmental Protection Agency (USEPA). 2017, July 17. RCRAInfo: Search. https://www3.epa.gov/enviro/facts/rcrainfo/search.html

Hazardous Waste Transporters

Hazardous waste transporters in Corona listed on the RCRAInfo database are shown below in Table 7.

Table 7 Hazardous Waste Transporters in Corona

US Environmental Protection Agency RCRAInfo [Resource Conservation and Recovery Act]

Company Name	Address
Advanced Fuel Filtration Inc	1275 Graphite Dr
Alexis Environmental Company	219 Glider Cr
Alfredo Jaime Dba Loovy Trucking	2160 Turnberry Ln
All Counties Environmental Svcs	21657 Temescal Canyon Rd
Alpha Petroleum Transport Inc	2621 Cottage Dr
Alpha Petroleum Transport, Inc Ii Dba Alpha Petroleum Enviro Engineering & Const	22740 Temescal Canyon Rd
ASE Contracting Inc	1631 Market Ste A
California Express	995 Pomona Rd
California Maintenance Svc	149 N Maple Unit E
Cook Trucking & Equipment Rental	526 Railroad St
Cross Country Management Inc	1141 Pomona Unit D
Dambach Trucking	1945 Bern Dr
Dwd Development Corporation	3180 Sonrisa Dr
Environmental Investigation and Action	359 Sheridan Suite 108
Esqueda Trucking	9040 Blue Flag St
Hunter Consulting Inc DBA HCI Env and Eng Svc	114 Business Center Dr
Mediwaste Disposal, LLC	235 Deininger Cr
Phoenix Environmental Inc Dba Phoenix Environmental Engineering and Construction	21657 Temescal Canyon Rd
Ron E Varela Co Inc	109 North Maple Suite K
Tristan Engineering Contractors Inc HQ	1151 Pomona Rd
U S Services Inc	526 Railroad St
Unique Solutions	1781 Capital St
Valcro	1342 E Sixth St Ste 106
Wild Rose Transportation	22505 Forest Boundary Rd

Source: US Environmental Protection Agency (USEPA). 2017, July 18. RCRAInfo: Search. https://www3.epa.gov/enviro/facts/rcrainfo/search.html

2. State Water Resources Control Board

GeoTracker is the Water Boards' data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater. GeoTracker contains records for sites that require cleanup, such as Leaking Underground Storage Tank (LUST) Sites, Department of Defense Sites, and Cleanup Program Sites. GeoTracker also contains records for various unregulated projects as well as permitted facilities including: Irrigated Lands, Oil and Gas production, operating Permitted USTs, and Land Disposal Sites (SWRCB 2017).

GeoTracker Cleanup Sites

GeoTracker cleanup and land disposal sites, including leaking underground storage tank (LUST) sites, are listed below in Table 8.

Table 8 GeoTracker Cleanup and Land Disposal Sites in Corona
State Water Resources Control Board: GeoTracker

Site	Address	Status
Leaking Underground Storage Tank (LUST) Sites		
Open Cases		
Downs Energy	1296 Magnolia Ave	Open - Assessment & Interim Remedial Action
Private Residence	Not Available	Open - Remediation
Arco #1924	785 N Main Street	Open - Eligible for Closure
Closed Cases		
Certified Grocers	1990 Pomona Rd	Closed
Dart Container Corporation	150 S Maple St.	
Private Residence	Private Residence	
Corona Products	215 N N Smith Ave	
Chevron #9-9398	610 N Main St	
River Road Car Wash	199 W River Rd	
Mobil #18-Ht6	819 N Main St	
Terrible Herbst Gas Station	701 W 6th St	
Humble Transport Company	22300 Temescal Canyon Rd	
Ed's Auto Wrecking	1480 Magnolia Ave	
Core-Mark International Inc	353 Meyer Cir	
Owl Rock Products	11901 Highway 71	
Wayside Dairy	19630 Temescal Canyon Rd	
Corona Fire Station #5	1200 Canyon Crest Dr	
Arco #5676	1402 E Ontario Ave	
Villa Park Trucking	21880 Temescal Canyon Rd	
Song's Arco Station	800 Serfas Club Drive	
Unocal #2865	1358 W W Sixth St	
Harold King Property	706 S Vicentia	
Brazil Market	14449 Chandler St	
San Clemente Business Park	215 N N Joy St	
Texaco Sampson (Former)	2197 Sampson Ave	
Corona Municipal Airport	1973 Aviation Dr	
Downs Fueling Corona	1950 Railroad St.	
Foothill Property	510 Foothill Pkwy	
Arco #9707/Toc#337	1205 S Main St	
John Livacich Produce	13485 Magnolia Ave	
Mission Clay Products	23835 Temescal Canyon Rd	
Exxon #7-1776	1610 W W Sixth St	
Palm Springs Oil #6	401 W 6th St	
Wild Rose Development	Highway 15 (Near Clay Canyon)	
Shell Mckinley St	175 Mckinley Street	
Texaco Lincoln	230 S S Lincoln Ave	
Robertson's Ready Mix	2275 Sampson Ave	
Chevron #9-3563 (Norms)	100 W W Ontario Ave	
Mobil Raj	401 E E Sixth St	
Allevato Property	2875 Taylor Ave	
Brass Craft	215 N Smith Ave	
Shell 6th St Corona	1825 W. 6TH Street	

Table 8 GeoTracker Cleanup and Land Disposal Sites in Corona

State Water Resources Control Board: GeoTracker

Site	Address	Status
Hunco Development	Temescal Canyon Rd	
El Cerrito Arco	19501 Ontario Ave	
Econo Lube N Tune	135 Washburn Cir	
Chevron #9-9010	309 S Main Street	
Horsethief Canyon Ranch	Horsethief Canyon Rd	
Camco Construction	1776 All American Way	
Mobil #18-Flm	616 Paseo Grande	
Shell Magnolia Corona	1205 Magnolia Ave	
R & S Service	703 E Sixth St	
Nfs Repeater Station	Santiago Peak	
Dick Vander Meer Sons Dairy	6851 Harrison Ave	
3m Corona	18750 Minnesota Rd	
Excelsior Farms	7401 Hamner Ave	
Corona Air Service	1929 Aviation Dr	
Liston Aluminum	20401 Temescal Canyon Rd	
Circle K	13595 Magnolia Ave	
Mobil Beck	13653 Magnolia Ave	
Texaco Stanfield	625 W 6th St	
Six-Pac Industries	1428 E Sixth St	
Sunwest Materials	24980 Maitri Rd	
Mwd Corona (Metropolitan Water District)	1980 Adobe Rd	
MTA Truck School	325 N Cota St	
Green River Golf Course	5215 Green River Dr	
Mobil #18-Fmt	1580 W Sixth St	
Shell Lincoln	230 S Lincoln Avenue	
K E C Engineering	200 N Sherman Ave	
Hillcrest Trees	3560 S Lincoln Ave	
Shell #1825	1825 W Sixth St	
Downs Oil	1296 Magnolia Ave	
A Toufigh/ Golshani	2600 3000 S Buena Vista	
Riverside Cement Co.	10250 Dawson Canyon Rd	
Arco #1259	702 E Sixth St	
Jay's Market	1267 W Sixth St	
Echeverria Dairy	7481 Cleveland Ave	
Sunkist Growers, Inc., Corona	355 Joy Street N	
American Lath And Plaster	132 N Sherman Ave	
Circle City Hospital	730 Magnolia Ave	
Corona-Norco Unified School District	300 Buena Vista Ave	
Chevron #9-3563	100 W Ontario Ave.	
Us Rentals	525 S Maple St	
Thrifty Oil #339/ Arco #9709	611 N Main St	
Thrifty Oil #337	1205 S S Main St	
Corona Trucking	19885 Temescal Canyon Rd	
Standard Concrete	22300 Temescal Canyon Rd	
HONDA CARS OF CORONA (Former)	231 S Lincoln Ave	

Table 8 GeoTracker Cleanup and Land Disposal Sites in Corona

State Water Resources Control Board: GeoTracker

Site	Address	Status
SVS Development	1903 Aviation Dr	
Corona Nissan	375 N Main St	
Thrifty Oil #336/ Arco #9706	624 W Sixth St	
Arco # 5536	3830 Mckinley Street	
Arco Temescal Cyn	23760 Temescal Canyon Road	
B and S Pump and Supply Co.	179 N Maple St	
Unocal #6216	304 S S Main St	
Shell Lincoln Pomona	111 North Lincoln Avenue	
Corona Police Facility	849 W Sixth St	
Thrifty Oil #335/ Arco #9705	1735 W W Sixth St	
Arco #9705	1735 W. Sixth St.	
CSR Hydro Conduit	23200 Temescal Canyon Rd	
Circle K #1922	13120 Magnolia Ave	
Chevron #9-0236	4710 Green River Rd	
Corona National Golf Course	Smith St & Rincon St	
Eagle Valley Estates/Debone Ranch (Ag Farm Tank)	17495 Eagle Valley Road	
Thakar Aluminum	1462 Quarry St	
Shell #794	794 N N Main St	
Mountain View Country Club	2121 Mountain View Dr	
R.T. Lee Construction	7200 Hellman Ave	
Dart Container Corporation	150 S Maple St	
Ez Stop	401 W Sixth St	
Arco #1259	702 E. Sixth Street	
Shell Green River	4721 Green River Rd	
Smog Check Of Corona	13537 Magnolia Ave	
Orange Heights Orange Association	105 Pearl Ave	
76 Station 0522	19570 Temescal Canyon Road	
Flamingo Dairy	14970 Chandler Rd	
Aamco Transmissions	612 W 6th St	
Cleanup Program Site		
Open Cases		
Dry Clean Express	341 S. Lincoln Ave	Open - Site Assessment
Thomas Ranch (Schofield)	N/A Serfas Club Drive	Open - Site Assessment
Planet Home Living	13485 Magnolia Avenue	Open - Assessment & Interim Remedial Action
Corona Mfg Company	N/A	Open - Inactive
Park Avenue Cleaners	129 N. McKinley Street	Open - Verification Monitoring
Closed Cases		
Lyon/Copley Asso.	102 Main Street	Closed
Anchor	280 North Ott Street	
SCE Chase Substation	1390 East Ontario Avenue	
Sycamore Creek	15931 Indian Truck Trail	
Southern California Edison	2000 Compton Avenue	
Gateway Business Park	20325 Temescal Canyon Road	
Horsethief Canyon Ranch	N/A Horsethief Canyon Road	

Table 8 GeoTracker Cleanup and Land Disposal Sites in Corona
State Water Resources Control Board: GeoTracker

Site	Address	Status
Alcoa - Corona, Ca	1450 Rincon Street	
Town & Country Cleaners	156 Ontario Avenue	
Southpointe Plaza	N/A Ontario Avenue	
Liston Aluminum Brick Company	20401 Temescal Canyon Rd	
Murdock Development Property	20325 Temescal Canyon Rd	
131 Industrial Way	131 Industrial Way	
NWC Of Ontario And State	Ontario Avenue And State Street	
Royal Cleaners	4300 Green River Road	
NW Corner Ontario Ave & State St	1535 E Ontario Ave	
Hayden Industrial Products	1531 Pomona Road	
Sycamore Creek / Wildrose Ranch	15931 Indian Truck Trail	
Aluminum Company Of America	1450 Rincon St	
Corona Cross Roads	N/A Sherborn Street	
CT Corona	1451 Magnolia Ave X E 6th St	
Military Cleanup Site		
Corona Annex	Not Available	Open - Inactive
Land Disposal Sites		
Open Cases		
Landfill, Corona-Inert	1776 All American	Open - Operating
Glen Ivy Mine Landfill	25050 Maitri Road	Open - Operating
All-American Asphalt	1776 All American Way	Open - Operating
El Sobrante Landfill	10910 Dawson Canyon	Open - Operating
Mayhew Aggregates Landfill	24890 Maitri Road	Open - Operating
3M Brine Ponds	18750 Minnesota	Open - Operating
Corona Landfill	1462 Quarry St	Open - Closed/with Monitoring
Corona Brine Ponds	2205 Railroad	Open - Closed/with Monitoring
Closed Cases		
Brine Fac, Johns Manville - Corona	1251 Magnolia	Closed
Greenwaste, River Ranch-Corona (Closed)	14545 River Road	
Greenwaste, Bp John Recycling-Corona	1501 Sherborn Road	
Landfill, Corona	Radio & Quarry Road	
Brine Fac, Mahala Oil Field	0000 Hwy #71	
Landfill, Corona	1462 Quarry	
Composting Plant, Synagro - Temescal Cyn	22500 Temescal Canyon	
Landfill, Inert Bruce Hahn	1601 Sherborn	

Source: State Water Resources Control Board (SWRCB). 2017, July 18. GeoTracker. http://geotracker.waterboards.ca.gov/.

Permitted Underground Storage Tank (UST) Sites

Permitted underground storage tank sites listed on GeoTracker are shown below in Table 9.

Table 9 Permitted Underground Storage Tank Sites in Corona

State Water Resources Control Board: GeoTracker

Business_Name	Address
Amir's Mobile Service #304983	616 Paseo Grande
River Road X-press Car Wash Inc	199 River Rd
Corona Fleet Services	760 Public Safety Way
HCI Corona	1204 Magnolia Ave
Tesoro (Usa) 63339	611 N Main St
Tesoro (Usa) 63336	624 W 6th St
RS Service Inc.	703 E 6th St
Arco Am/Pm	800 Serfas Club Dr
Arco AM/PM	3830 McKinley St
ARCO 42660	111 N Lincoln Avenue
Ralphs Fuel Center #45	12618 Limonite Avenue
Costco Wholesale #432 (Gas Station)	482 N McKinley St
Vons Fuel Center #2596	433 Magnolia Ave
Tesoro (Shell) 68524	1205 Magnolia Ave
Corona Gas Mart ARCO AM/PM	785 N Main St
Vons Fuel Center #2818	11810 De Palma Rd
AAAA Fuel Inc.	401 W Sixth St
Corona Norco Unified School District Maintenance and Operations	300 S Buena Vista Ave
City of Corona Fleet Svcs Fueling	740 Public Safety Wy
Raj Service Station	401 E 6th St
ARCO 42015	702 E Sixth St
Chevron Station # 303835/2006	1315 Magnolia Ave
AT&T California - LB124	511 S Joy St
Chevron Station# 90236/1921	4710 Green River Rd
Kaiser 1850	1850 California Ave
Sam's Club #4709 - Fuel Station Only	1395 E Ontario Ave
Dos Lagos Arco	8765 Dos Lagos Dr
Downs Energy Magnolia Diesel (Site 29)	1226 Magnolia Ave
Tesoro (Shell) 68804	4721 Green River Rd
Circle K Store #2701922	13120 Magnolia Ave
Shell Service Station	23255 Temescal Canyon Rd
Dart Container Corp	150 S Maple St
TESORO (ARCO) 63335	1735 W 6th St
Green River 76	4350 Green River Rd
7-Eleven Inc #33560	7014 Archibald Ave.
Shell Food Mart	230 S Lincoln Ave
Downs Energy-Railroad	1950 Railroad St
Corona Regional Medical Center	800 S Main St
Chevron SS #1433/91582	2270 Frontage Rd
Circle K Store #2705705	304 S Main St
US Foods	1283 Sherborn St 102
Wholesale Distribution Inc. dba :Quality Services	340 N Grant Ave
TESORO (ARCO) 63337	1205 S Main St
Lucky Oil Company, Inc. DBA McKinley Shell	175 N McKinley St
Arco Am/Pm	23760 Temescal Canyon Rd
Claim Jumper Restaurant	380 N McKinley St

Table 9 Permitted Underground Storage Tank Sites in Corona
State Water Resources Control Board: GeoTracker

Business_Name	Address
Moylers LLC DBA Circle K # 0522	19570 Temescal Canyon Rd
Krishna Dham Corporation, Arco Am Pm	1402 E Ontario Ave
Corona Mall Oil Company Inc. - Chevron# 99010	309 S Main St
All Star Car Wash	465 N McKinley St
Core-Mark Int	353 Meyer Cir
Downs Energy Magnolia Gasoline (Site 68)	1296 Magnolia Ave
Corona Oil Co.	1550 E Ontario Ave
South Corona Petroleum	2240 Compton Ave
Rehab Medical Center	730 Magnolia St
Southern California Gas Company: Corona Base	1775 Sampson Ave
Shargo, Inc.-Sam's Mobil	1580 W 6th St
Chevron Station# 207496/1913	130 W Foothill Pkwy
Corona Gas	625 W 6th St
AT&T Corp – LB1E3	3950 S Main St
Taco Bell	4718 Green River Rd B
Corona 76	1610 W 6th St
All American Asphalt	1776 All American Way
Chevron Station# 207494/1876	1140 E Ontario Ave
Eagle Glen Mobil	2261 Eagle Glen Pkwy
Circle K Stores Inc. Site #2709431	431 N McKinley St
Ganahl Lumber Co	150 W Blaine St
Quikrete Of So California LLC	3940 Temescal Canyon Rd
Alexis Oil Company	219 Glider Cir
Waste Management Inland Empire	800 S Temescal St
Sixth Street Shell	1825 W Sixth St

Source: State Water Resources Control Board (SWRCB). 2017, July 18. GeoTracker. http://geotracker.waterboards.ca.gov/.

3. Department of Toxic Substances Control

EnviroStor is the Department of Toxic Substances Control's data management system for tracking cleanup, permitting, enforcement and investigation efforts at hazardous waste facilities and sites with known contamination or sites where there may be reasons to investigate further (DTSC 2017).

EnviroStor Cleanup Sites

EnviroStor cleanup sites are listed below in Table 10.

Table 10 EnviroStor Cleanup Sites in Corona

Department of Toxic Substances Control: EnviroStor

Site	Address	Case Status
State Response (Cleanup) Sites		
Liston Aluminum Company Site	9107 Cajalco Rd	Certified (case closed)
Thomas Ranch	S of Palisades Dr, W of Serfas Club Dr	Certified/Operations & Maintenance Plan
Voluntary Cleanup Sites		
Edison/Corona #1 MGP	633 Railroad St	Active
Liston Aluminum Brick Company	20401 Highway 71 (Temescal Canyon Rd.)	Certified
Imco Waste Disposal Area (Former)	1462 Quarry Street	Certified O&M - Land Use Restrictions Only
Pietersma Dairy (Former)	14955 Schleisman Road	Certified
Corona Palisades Business Park	South of Palisades Drive and West of Serfas Club Drive	No Further Action
Evaluation		
Aluminum & Magnesium Inc. Division of Vulcan Materials	1300 W. Sampson	Inactive - Needs Evaluation
Aluminum Company of America (ALCOA)	1450 W. Rincon	Inactive - Needs Evaluation
Spacex, Inc.	202 E. 5th St.	Inactive - Needs Evaluation
Wu Property, Fieldstone Communties	Se Coner of Montoya Dr. and Taylor Ave.	Referred to Local Agency
Great Western Chemical	180 Sherman Dr.	Referred to Local Agency
City of Corona Redevelopment Agency	East 6th Street: Vacant Parcels,1040 E. 6th Street: The Chuck Wagon Restaurant, 1049 Circle City Drive: Single Family Residence	No Further Action
Corona Chemical Company	S. Taylor Ave. & W Foothill Pky	No Action Required
FMC Corporation	1027 E. 3rd St	No Action Required
Alponco Company	120 E. Harrison	No Action Required
Military Evaluation		
CA Rehab Center	Not Available	Inactive - Needs Evaluation
Naval Ordnance Lab	Not Available	Inactive - Needs Evaluation
School Cleanup		
Vicentia Elementary School	2005 Vicentia Avenue	Certified
Home Gardens Elementary School	13550 Tolton Avenue	Certified
Rosa Parks Elementary School	6701 Harrison Avenue	Certified
River Heights Inter/Roosevelt Hi Schools	Cleveland Avenue/Orange Street	Certified
Augustine Ramirez Intermediate School	6851 Harrison Avenue	No Further Action
School Investigation		
Rancho Serrano High School	9001 Cajalco Road	Inactive - Needs Evaluation
Parkridge School For The Arts	750 Corona Avenue	No Action Required or No Further Action
El Cerrito Elementary School	7581 Rudell Road	
Corona High School	1150 West Tenth Street	
Centennial High School Expansion	1820 Rimpau Avenue	
New Buena Vista High School	Magnolia Avenue/Main Street	
Lincoln Alternative Elementary School	1041 Fullerton Road	
Santiago High School	1395 East Foothill Parkway	
Centennial High School	1820 Rimpau Avenue	
Corona High School	1150 West Tenth Street	
Temescal Canyon Elementary	Claystone Avenue/Nickellaus Court	

Table 10 EnviroStor Cleanup Sites in Corona
Department of Toxic Substances Control: EnviroStor

Site	Address	Case Status
Eastvale Elementary	13031 Orange Street	
Eisenhower Elementary	3355 Mountain Gate Drive	
Orange Elementary	1350 Valencia Road	
Orange Grove High School	300 Buena Vista Avenue	
Santiago High School Improvements	1395 E. Foothill Parkway	
Harada Elementary School	Cleveland Avenue/Cloverdale Road	
Sycamore Creek Elementary	Temescal Canyon/Maitri Road	
Luiseno Elementary School	13500 Mountain Road	
Coronita Elementary School Campus	1757 Via Del Rio	
Cesar Chavez Elementary School Expansion	1150 Paseo Grande	
Rancho Serrano High School	Lawson Drive/Temescal Canyon Road	
Garretson Elementary School Modernization Area	1650 Garretson Avenue	
John Adams Elementary School Modernization Project	2350 Border Avenue	
Tiered Permit (onsite treatment of hazardous wastes)		
Clow Valve Company	1375 Magnolia Avenue	Active
Tamarack Scientific Co., Inc.	220 Klug Circle	Inactive - Needs Evaluation
Frontier Aluminum, Inc.	2480 Railroad Street	Inactive - Needs Evaluation
U.S. Battery Mfg. Co.	1675 Sampson Avenue	Inactive - Needs Evaluation
Glenn A. Singer, Inc.	1865 Sampson Ave	Refer: Other Agency
Circle Seal Controls	2301 Wardlow Circle	No Action Required
Historical		
H & E Engineering	958 El Sobrante Rd.	Refer: Other Agency
Dump - Hall Avenue	7675 Hall Avenue	Refer: Other Agency
Sunkist Growers/Lemon Products Divisions	310 North Joy Street	Refer: Other Agency
All American Asphalt	14224 Magnolia	Refer: Other Agency
Prado Petroleum Company	2471 Pomona-Rincon Road	Refer: RWQCB
Pacific Clay Products Inc	20325 Temescal Canyon Road	Refer: Other Agency
Rich Manufacturing Company Of Calif #3	1375 Magnolia Avenue	Refer: Other Agency
Cresta Verde Golf Course	1295 Cresta Road	No Further Action
Orange Heights Orange Association	215 Pearl Street	No Further Action

Source: Department of Toxic Substances Control (DTSC). 2017, July 18. EnviroStor. http://www.envirostor.dtsc.ca.gov/public/

4. Department of Resources Recycling and Recovery

The **Solid Waste Information System (SWIS)** facility database contains information on solid waste facilities, operations, and disposal sites throughout the State of California; facility types include landfills, transfer stations, material recovery facilities, composting sites, transformation facilities, waste tire sites, and closed disposal sites (CalRecycle 2017).

Solid waste facilities in Corona listed on the SWIS database are shown below in Table 11.

Table 11 Solid Waste Facilities in Corona Listed on California Department of Resources Recovery and Recycling *Solid Waste Information System* database

Facility	Location	Type of Site	Operational Status
Disposal Sites			
El Sobrante Landfill	10910 Dawson Canyon Road	Disposal	Active
All American Asphalt Inert Fill Operatio	1776 All American Way	Disposal	Active
Mayhew Aggregates and Mine Reclamation	24890 Maitri Rd.	Disposal	Active
Werner Corporation IDEFO	25050 Maitri Rd.	Disposal	Active
Corona Disposal Site	Near Magnolia & Compton Avenues	Disposal	Closed
Spanish Hills DS	11240 Spanish Hills Dr.	Disposal	Closed
Transfer/Processing Sites			
Caltrans Corona Maintenance Station	842 El Sobrante Rd.	Transfer/Processing	Active
El Cerritos Maintenance Yard	19-355 Ontario Ave.	Transfer/Processing	Active
City of Corona Maintenance Station	2205 Railroad St.	Transfer/Processing	Active

Source: California Department of Resources Recovery and Recycling. 2017, July 19. SWIS Facility/Site Search. http://www.calrecycle.ca.gov/SWFacilities/Directory/Search.aspx.

5. California Air Resources Board

The Pollution Mapping Tool maps and tabulates emissions of selected criteria pollutants from large facilities. Large facilities emitting volatile organic compounds, oxides of nitrogen (NO_X), sulfur oxides (SO_X), particulate matter below 10 micometers diameter (PM_{10}), and particulate matter below 2.5 micrometers diameter ($PM_{2.5}$) are listed below in Table 12.

Table 12 Emissions of Criteria Air Pollutants from Large Facilities in Corona
California Air Resources Board: Pollution Mapping Tool

Site	Address	Pollutants				
		VOC	NO_X	SO_X	PM_{10}	$PM_{2.5}$
3M Corona	18750 Minnesota Road	X	X	X	X	X
All American Asphalt - Corona	1776 All American Way	X	X	X	X	X
Corona Energy Partners, Ltd.	1130 West Rincon Street	X	X		X	X
Dart Container Corporation of California	150 South Maple Street	X	X	X	X	X
Riverside Public Utilities - Clearwater Facility	2201 Railroad St	X	X		X	X
Waste Management - El Sobrante Landfill	10910 Dawson Canyon Road	X	X	X	X	X

Source: California Air Resources Board. 2017, July 27. Pollution Mapping Tool. https://www.arb.ca.gov/ei/tools/pollution_map/.

REFERENCES

California Air Resources Board. 2017, July 27. Pollution Mapping Tool. https://www.arb.ca.gov/ei/tools/pollution_map/.

California Department of Resources Recycling and Recovery (CalRecycle). 2017, July 19. Solid Waste Information System (SWIS). http://www.calrecycle.ca.gov/swfacilities/directory/.

Department of Toxic Substances Control (DTSC). 2017, July 19. EnviroStor. https://www.envirostor.dtsc.ca.gov/public/.

State Water Resources Control Board (SWRCB). 2017, July 19. GeoTracker. https://geotracker.waterboards.ca.gov/.

US Environmental Protection Agency (USEPA). 2017a, July 19. SEMS Overview. https://www.epa.gov/enviro/sems-overview.

US Environmental Protection Agency (USEPA). 2017b, July 19. Overview of the Brownfields Program. https://www.epa.gov/brownfields/overview-brownfields-program.

US Environmental Protection Agency (USEPA). 2017c, July 19. TRI Overview. https://www.epa.gov/enviro/tri-overview.

US Environmental Protection Agency (USEPA). 2017d, July 19. ICIS-AIR Overview. https://www.epa.gov/enviro/icis-air-overview.

US Environmental Protection Agency (USEPA). 2017e, July 19. Categories of Hazardous Waste Generators. https://www.epa.gov/hwgenerators/categories-hazardous-waste-generators.

Appendix I Infrastructure Report

Appendices

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CITY OF CORONA
GENERAL PLAN UPDATE

INFRASTRUCTURE REPORT FOR
HYDROLOGY, SEWER, WATER, AND WATER QUALITY

CITY OF CORONA
RIVERSIDE COUNTY, CALIFORNIA

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DATE PREPARED: August 24, 2018

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Appendix A Corona GPU Area Drainage System

Appendix B Corona GPU Area Sewer System

Appendix C Corona GPU Area Water System

Appendix D Sewer Flow Calculations

Appendix E Water Demand Calculations

1. INTRODUCTION & BACKGROUND

The City of Corona ("City") encompasses 38.5 square miles in the northwestern corner of Riverside County that is adjacent to Orange County. The City is currently undergoing a General Plan Update (GPU) which is intended to shape development in the City and its sphere of influence (SOI) over the next 30-plus years. A General Plan is the principal long-range policy and planning document for guiding the physical development, conservation, and enhancement of California cities and counties. As part of this GPU process, infrastructure such as drainage, sewer and water systems that support the existing and proposed land uses will be analyzed at a level consistent with the program level planning of a General Plan. This report will focus on the existing conditions of these infrastructure systems that serve the City and its SOI ("Corona GPU").

The City is situated in an urbanized region within the northwestern corner of Riverside County. The City borders the Santa Ana Mountains to the west that separates it from Orange County, and is adjacent to the cities of Norco and Riverside to the north. To the west and south, the City is surrounded by the Lake Matthews reservoir and associated mountain reserve lands. Regional access to the City is provided by State Route 91 (Riverside Freeway) that runs in an east-to-west direction through the upper half of the City, and by Interstate 15 that runs in a north-to-south direction through the eastern half of the City.

The City's SOI area extends along the boundaries of the City and includes unincorporated areas such as Wild Rose, El Cerrito, Trilogy and Home Gardens. Some regions of the SOI are likely to be annexed into the City over time. For example, the Skyline Heights development is a proposed subdivision of several hundred homes that will be located at the western border of the City bordering the Cleveland National Forest. Additionally, in the City's SOI area, there are two areas designated as Disadvantaged Unincorporated Communities (DUC) located on the eastern portion of the SOI. These DUC areas are within Home Gardens and El Cerrito. SB 244 (Wolk, 2011) requires cities and counties to address the infrastructure needs of unincorporated DUCs in city and county general plans, LAFCO Municipal Service Reviews (MSRs) and annexation decisions. SB 244 requires that the General Plan land use element must include an analysis for the water, wastewater and stormwater drainage systems serving DUC areas and any deficiencies to these systems. Throughout this report, implications of DUC areas will be addressed and the existing conditions of the infrastructure system serving these areas will be identified.

The City of Corona is undergoing a General Plan Update that will guide future development within the City and its SOI for years to come. As part of the California Environmental Quality Act (CEQA) process associated with General Plan Updates, infrastructure such as drainage, sewer, water systems and water quality that support the existing and proposed land uses will be analyzed at a level consistent with the city-wide program-level planning of an EIR. This report analyzes the existing infrastructure systems that serve the Corona GPU area. The analysis includes a review and summary of the Master Plans of Drainage, Water and Wastewater systems, and existing water quality regulations currently in place. The analysis also includes the utilization of GIS tools and data and ongoing communication with City staff. This report will evaluate baseline conditions and future buildout scenarios associated with the GPU.

2. ENVIRONMENTAL SETTING

2.1 HYDROLOGY

2.1.1 Watershed Setting and Existing Drainage Facilities

The City of Corona resides within the regional Santa Ana River Watershed, a flood control zone monitored by the Santa Ana Regional Water Quality Board (RWQCB) and covers portions of the Counties of Riverside, Orange, and San Bernardino. Within Riverside County, this regional Watershed is subdivided into the Santa Ana Sub-watershed (of which the City lies within) and the San Jacinto River Sub-watershed. The Santa Ana Sub-watershed consists of the Santa Ana River and its tributaries and the San Jacinto River Sub-watershed includes the Santa Jacinto River and its tributaries that overflow into the Santa Ana River only in high volume storm events[1]. The Santa Ana Sub-watershed is also further subdivided into smaller sub-watersheds based on major tributary channels that feed into the Santa Ana River. The City lies within two of these smaller sub-watersheds: The Middle Santa Ana River sub-watershed and the Temescal sub-watershed described in more detail below.

- Middle Santa Ana River sub-watershed: Located in the northwest corner of Riverside County and covers a total tributary area of 170 square miles that generally drains westwards towards the Santa Ana River. Tributaries to this sub-watershed include: Temescal Creek, Tequesquite Arroyo (Sycamore Creek), Day Creek, and San Sevaine Creek.

- Temescal Wash sub-watershed: Covers 250 square miles and is defined as the tributary area draining into the Temescal Wash, also known as the Temescal Creek, that connects Lake Elsinore with the Santa Ana River. Tributaries to the Temescal Wash include Wasson Canyon Wash, Arroyo Del Toro, Stovepipe Canyon Wash, Rice Canyon Wash, and Lee Lake. A majority of Corona lies within this sub-watershed, and the drainage channels that run through the City that tie into the Temescal Wash include Arlington Channel, Main Street Channel, Oak Street Drain, Joseph Canyon Wash, and Bedford Wash.

Ultimately, all channels converge with the Santa Ana River where downstream ends of the channel travel through Orange County prior to emptying into the Pacific Ocean. All the channel reaches within the City in the two sub-watersheds are improved (lined) for flood control and are not subject to hydromodification impacts.

City of Corona/SOI Existing Storm Drain Facilities

The storm drain system within the City is comprised of six (6) main storm drain facilities summarized below:

- Temescal Canyon Wash: Temescal Canyon Wash is the major watercourse and flows northwesterly through the northern half of the City. Temescal Wash joins the Santa Ana River at the site of Prado Dam, a U.S. Army Corps of Engineers flood-control reservoir. This reservoir is located at the northwestern City limits.

[1] Watershed Action Plan Santa Ana Region, Riverside County. January 18, 2017. http://rcflood.org/downloads/NPDES/Documents/SA_WAP/WatershedActionPlan.pdf.

- Oak Street Channel: This channel traverses generally from the Oak Street Debris Basin northerly across SR-91, and terminates at the Temescal Wash. The channel is generally open rectangular concrete-lined section with various culvert crossings at the major streets.

- Main Street Channel: This channel traverses through the southeasterly corner of the City and consists of a concrete lined rectangular channel at the upstream end of the channel. It joins the Temescal Wash at Sixth Street.

- Arlington Channel: This channel consists of vertical wall concrete-lined section that flows westerly through the Home Gardens area and joins Temescal Wash near the AT&SF Railroad, north of SR-91.

- South Norco Storm Drain: This drain runs from southwest of Norco through Parkridge Avenue at City limit and terminates at Temescal Wash.

- North Norco Storm Drain: This drain enters City limits at River Road and terminates at Temescal Wash.

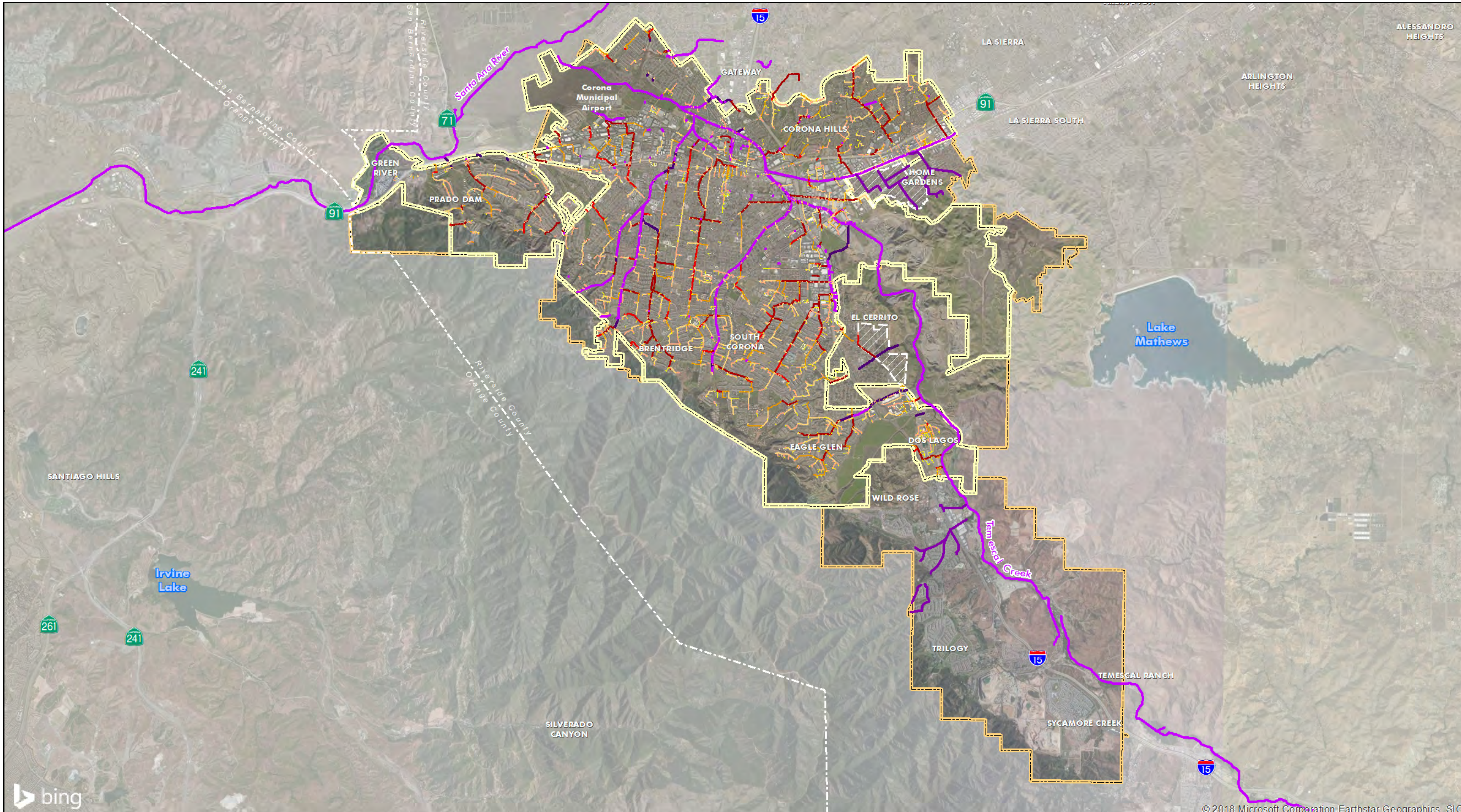
Other facilities include the Main, Oak, Mabey basins, the Line 36 storm drain, the Line 7-A storm drain, and the Compton Avenue storm drain. Storm drain pipe diameters ranging from 12"-102" within the City. The DUC areas are primarily covered by Riverside County storm drain facilities as described in more detail below.

Disadvantaged Communities Existing Storm Drain Facilities

El Cerrito and Home Gardens

The Riverside County Flood Control and Water Conservation District (RCFCD) maintain the primary storm drain infrastructure within the El Cerrito and Home Gardens DUC areas. The goal of RCFCD is to protect people, property and watersheds from damage or destruction from flood and stormwaters and to conserve, reclaim and save such waters for beneficial use. The Project Maintenance section is charged with the daily maintenance and emergency repair of the District drainage system. Functions range from vegetation and rodent management, to fencing repairs and graffiti removal.

See Figure 1 below that shows the existing storm drain system throughout the City and the SOI areas. See Appendix A for more details on the storm drain system within various areas of the City and SOI.



Aerial Date: 2010

Corona GPU Area Storm Drain System

Figure 1

City of Corona General Plan Update

08/24/2018

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City of Corona
City of Corona Sphere of Influence
Disadvantaged Unincorporated Communities

Storm Drain Lines
8" to 12"
13" to 18"
20" to 29"
30" to 39"
42" to 48"
51" to 58"
60" to 124"
Storm Drain Channels
District Facilities (Riverside County)

0 8,000 16,000 Feet

X:\Projects\511\27\MXD\GPU_Exhibits\Fig1_STORMDRAIN_180824.mxd

2.1.2 Storm Drain Master Plan Summary

City of Corona/SOI Storm Drain Master Plan

Corona's Drainage Master Plan was first prepared in 1998 and updated in April 2003. The purpose of the Drainage Master Plan is to analyze the capacity of the storm drain facilities within the City and identify any deficiencies or capital improvements needed. The City used the 10-year and 100-year design storms to determine peak runoff quantified in analyzing existing storm drain facilities and sizing potential improvements. Additionally, to determine the most deficient facilities, or those with the highest priority, a 2-year design storm was used to analyze the existing system. Analysis of the 2-, 10- and 100-year storm events helped determine the necessary facilities needed to achieve flood protection. Streets and surface conditions were considered in computing flood runoff carrying capacity. Street flow capacity was defined by three street types: 1) major arterial highways; 2) secondary arterial highways; and 3) collector streets.

The City's objective is for existing and proposed storm drain systems to meet the minimum 10-year frequency storm event. For arterial streets, the City has adopted criteria to keep one lane open for the 10-year frequency storm event. For the 100-year storm event, the maximum street flow depth shall not exceed the street right-of-way. Ponding is not allowed at major arterial intersections for 10-year flooding events. For collector streets, depth of flow for 2- and 10-year storm runoff shall be maintained below the top of curb. The adopted criterion for collector streets is the 100-year storm runoff will be maintained in the street right-of-way.

The RATSC Computer Model was utilized in the analysis and integrates the Rational Method and the Unit Hydrograph Method. GIS technology was implemented for data handling due to the large volume of data required to accurately model and analyze the system. A deficiency analysis of the existing drainage system was prepared for all City mainline systems elements. Because the City desires to maintain storm drain system elements within the street rights-of-way, and maintain current direction of storm flows, three deficiency remedies were prepared:

- New system (install new system on one side of the street)
- Replacement system (replace the existing storm drain system with a new, optimized system element typically larger than existing size)
- Parallel system (install another system element parallel with the existing system element, while optimizing all elements of flow capacities)

According to the 2003 Drainage Master Plan, there are approximately 289 deficient segments that require new, replaced or parallel systems to be constructed. A total of 137 areas have insufficient street capacity and 152 storm drain segments are deficient. Since the 2003 Drainage Master Plan, improvements have been made to the storm drain system and ongoing monitoring occurs through the City Public Works Department.

Disadvantaged Communities Storm Drain Analysis

El Cerrito

The County of Riverside conducts ongoing monitoring of the storm drain system for the El Cerrito DUC. Currently, ongoing projects have been planned to be completed by Fall 2018 as part of the El Cerrito Channel Restoration project. The restoration project seeks to replace an undersized concrete trapezoidal channel with a concrete rectangular channel running through the existing location between Ontario Avenue and Minnesota Road and ultimately empties out into the Temescal Creek. The project expansion seeks to provide capacity for a 100-year storm event as well as provide up to two additional feet of freeboard to alleviate potential flooding and to ultimately remap the FEMA floodplain[2].

Home Gardens

As mentioned above, the County of Riverside has ongoing maintenance and monitoring of the storm drain infrastructure within the Home Gardens DUC. Currently there are no deficiencies within the infrastructure servicing the Home Gardens area.

2.1.3 Existing Floodplain Mapping

The National Flood Insurance Act (1968) established the National Flood Insurance Program, which is based on the minimal requirements for flood plain management and is designed to minimize flood damage within Special Flood Hazard Areas. The Federal Emergency Management Agency (FEMA) is the agency that administrates the National Flood Insurance Program. Special Flood Hazard Areas (SFHA) are defined as areas that have a 1 percent chance of flooding within a given year, also referred to as the 100-year flood. Flood Insurance Rate Maps (FIRMs) were developed to identify areas of flood hazards within a community.

City of Corona/SOI Floodplain Mapping

According to the Flood Zone determination covering the Corona GPU area, the majority of the City and SOI area lies within Zone X. Zone X encompasses approximately 39,500 acres out of 42,113 total City/SOI acreage and is designated as the area determined to be outside the 500-year flood, protected by levee from 100-year flood, and with a minimal or 0.2% chance of flooding. In addition, a northwestern portion of the City and other intermittent parts of the City, approximately 336 acres, are designated as Zone A which represent areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. A large portion of the northwestern area of the City, totaling approximately 2,109 acres, is designated as Zone AE which is subject to inundation by the 1% annual chance flood event where mandatory flood insurance purchase requirements and floodplain management standards apply. A small portion in the north central portion of the City near the SR-91 Freeway is designated at Zone AO (approximately 4 acres) which is designated as a river or stream flood hazard area, and an area with a 1% or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 feet.

Disadvantaged Communities Floodplain Mapping

El Cerrito

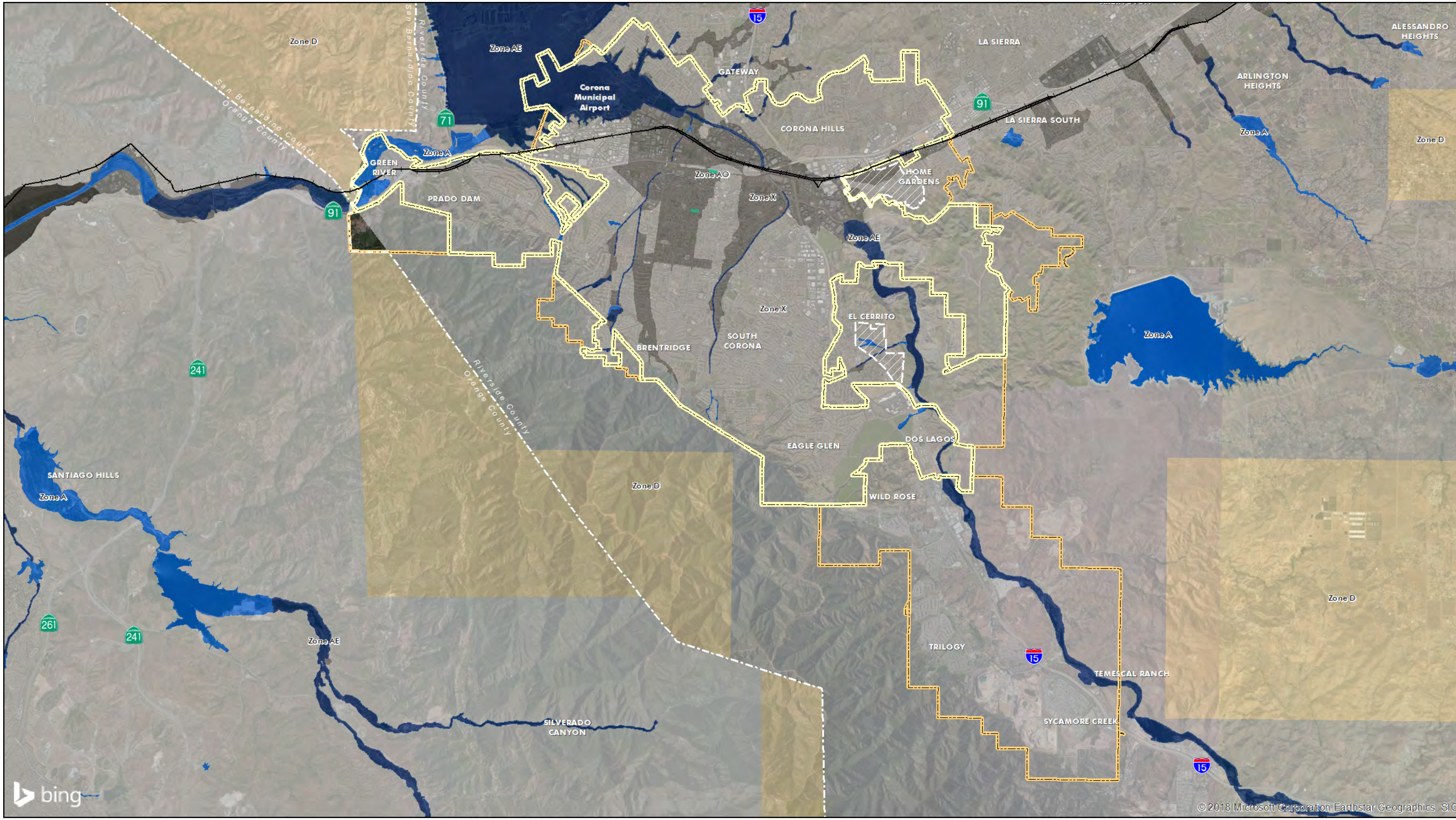
Most of El Cerrito, approximately 227 acres, lies within Zone X. Approximately 14 acres are in Zone A while the remaining 2 acres are in Zone AE.

[2] Riverside County Flood Control & Water Conservation District. El Cerrito Channel Restoration (Updated September 19, 2017). Retrieved October 2017 from http://rcflood.org/downloads/CIP/ElCerritoCH_Restoration.pdf

Home Gardens

The Home Gardens DUC is primarily designated as Zone X (396 acres) with a minimal flood hazard and a small portion with a 0.2% annual chance flood hazard. The remaining area within the El Cerrito DUC (0.19 acres) is Zone AE.

See Figure 2 below for a map of the FEMA flood zones within the Corona GPU.



Aerial Date: 2010

Corona GPU Area Flood Zones

City of Corona General Plan Update

Figure 2

08/24/2018

Incorporated City of Corona
City of Corona Sphere of Influence
Disadvantaged Unincorporated Communities

FEMA SFHA
Zone A
Zone AE
Zone AO
Zone D
Zone X - 0.2% Annual Chance Flood Hazard
Zone X - Area of Minimal Flood Hazard
Zone X - Area with Reduced Flood Risk Due to Levee

0 1.5 3 Miles

FUSCOE ENGINEERING

Flood Data Source: FEMA National Flood Hazard Layer.

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2.2 SEWER & WASTEWATER INFRASTRUCTURE

2.2.1 Existing Sewer System and Facilities

City of Corona/SOI Existing Sewer System

The majority of the sewer system within the City is maintained by the City's Department of Water and Power (City DWP), Wastewater Division. The Department services a population of approximately 168,000 people over 38.5 square miles. The Temescal Valley Water District (TVWD) provides sewer services to the Temescal Canyon area in the City's southern SOI. Within the Home Gardens DUC, the Home Gardens Sanitary District (HGSD) serves the unincorporated areas of Home Gardens in the eastern portions of Corona's SOI. The El Cerrito DUC area currently relies on septic systems; however, there are plans to extend the City's sewer service to the El Cerrito area.

The City sewer system is comprised of 13 sewer lift stations and associated force mains, three (3) wastewater treatment plants and a network of gravity sewer pipes of approximately 368 miles with sizes ranging from 6"-42" in diameter. Roughly 83% of City pipes are 8" in diameter[3]. Within the Home Gardens SOI area, the Home Gardens Sanitary District sewer system is comprised of approximately 16 miles of sewer lines ranging in size from 8"-15" in diameter with 320 manholes. TVWD provides sewer services to the City's southern SOI with sewer lines ranging in size from 6"-21" in diameter. See Figure 3 below for the existing sewer system infrastructure. See Appendix B for more details on the sewer system within various areas of the City and SOI.

As mentioned, the City owns and operates three wastewater treatment plants. The effluent produced meets criteria for discharge to percolation ponds, Temescal Creek and California Title 22 reuse. The wastewater treatment plants are described in more detail below.

- Wastewater Treatment Plant 1 (WWTP 1): WWTP 1 consists of preliminary treatment, two secondary treatment facilities (Plant 1A and 1B), and a tertiary treatment facility. Up to 5.5 million gallons per day (MGD) of the flow from the headworks is directed to Plant 1A, which provides a biological nitrogen removal activated sludge process and secondary clarification. Up to 6.0 MGD is conveyed through Plant 1B, which has two oxidation ditches with biological nitrogen removal and secondary clarification. The secondary effluent is either sent to the tertiary treatment facility or to the Lincoln Avenue and Cota Street percolation ponds. The tertiary process produces Title 22 recycled water that can be used for irrigation and/or is discharged to Butterfield Drain, a tributary of Temescal Creek. The maximum flow to the tertiary facility is 9.0 MGD.

- Wastewater Treatment Plant 2 (WWTP 2) WWTP 2 was formerly called Sunkist Treatment Plant, which was used to treat industrial process wastewater. In 1986, the City purchased the plant and had it renovated to provide primary and secondary treatment. WWTP 2 became operational in 1988. WWTP 2 is a conventional activated sludge facility with the ability to bypass flows to WWTP1. It discharges secondary effluent to the Lincoln and Cota Street percolation ponds.

[3] City of Corona. 2005 Sewer Master Plan (Updated 2005). Retrieved July 2017.

- Wastewater Treatment Plant 3 (WWTP 3) WWTP 3 was constructed in 2001 and serves the southeastern portion of the City. WWTP 3 is a water reclamation plant that provides Title 22 reclaimed water for reuse.

Table 1 below provides the flows and capacities of the three treatment plants within the City of Corona.

Table 1 Existing Wastewater Treatment Facility Flows and Capacity

Wastewater Treatment Plant	2003 Influent Wastewater Flows (MGD)	Current Treatment Capacity (MGD)	Future Treatment Capacity (MGD)
WWTP 1A	3.84	5.50	6.50
WWTP 1B	4.44	6.00	8.00
WWTP 2	3.06	3.00	3.50
WWTP 3	0.30	1.00	0.00[1]
Total	11.63	15.50	18.00

Notes:
[1]Per communication with City DWP staff, WWTP 3 will be decommission in the future.
Source: City of Corona. 2005 Sewer Master Plan (Updated 2005). Retrieved July 2017.

As shown above, the current treatment capacity of the existing wastewater treatment plants is 15.5 MGD and there are plans to expand the wastewater treatment capacity to 18 MGD in the future. Since the 2005 Sewer Master Plan, it has been decided that the WWTP 3 will be decommissioned at some point in the future.

The City also maintains significant reclaimed water infrastructure that ties in to the wastewater treatment system. The reclaimed water system treats an average of 13.5 MGD per day and the system consists of three reclaimed water storage tanks, five reclaimed booster stations, and 44 miles of reclaimed water lines. This reclaimed water system produces roughly 5.5 MGD in the summer seasons and 3 MGD during the winter season[4] that is used for landscape irrigation, including golf courses, parks, landscape maintenance districts, schools, and freeway landscaping. See Appendix C for a map of the reclaimed water purple pipe system throughout the City.

Additionally, the City is participating in the proposed Stagecoach Reclaimed Waterline that will connect the City of Corona, City of Norco, and the Western Riverside County Regional Wastewater Authority facility in Eastvale. The proposed Waterline will provide the City with access to additional reclaimed water for irrigation and industrial use to reduce the City's potable water demand.[5]

In the City's southern SOI, Temescal Valley Water District (TVWD) owns and operates regional wastewater treatment facilities adjacent to its Administration and Operation complex within the Wild Rose Business Park. The Reclamation Facility is capable of treating 1.57 MGD of raw sewage and producing tertiary reclaimed water usable for landscape irrigation and other non-consumptive purposes. This reclaimed water is distributed to multiple sites within the District's

[4] City of Corona Department of Water and Power. Quick Facts (Updated August 19, 2014). Retrieved October 2017 from http://www.discovercoronadwp.com/about/quick-facts.shtml
[5] City of Corona Department of Water and Power. Construction Projects (Updated October 28, 2014). Retrieve October 2017 from http://www.discovercoronadwp.com/about/projects.shtml

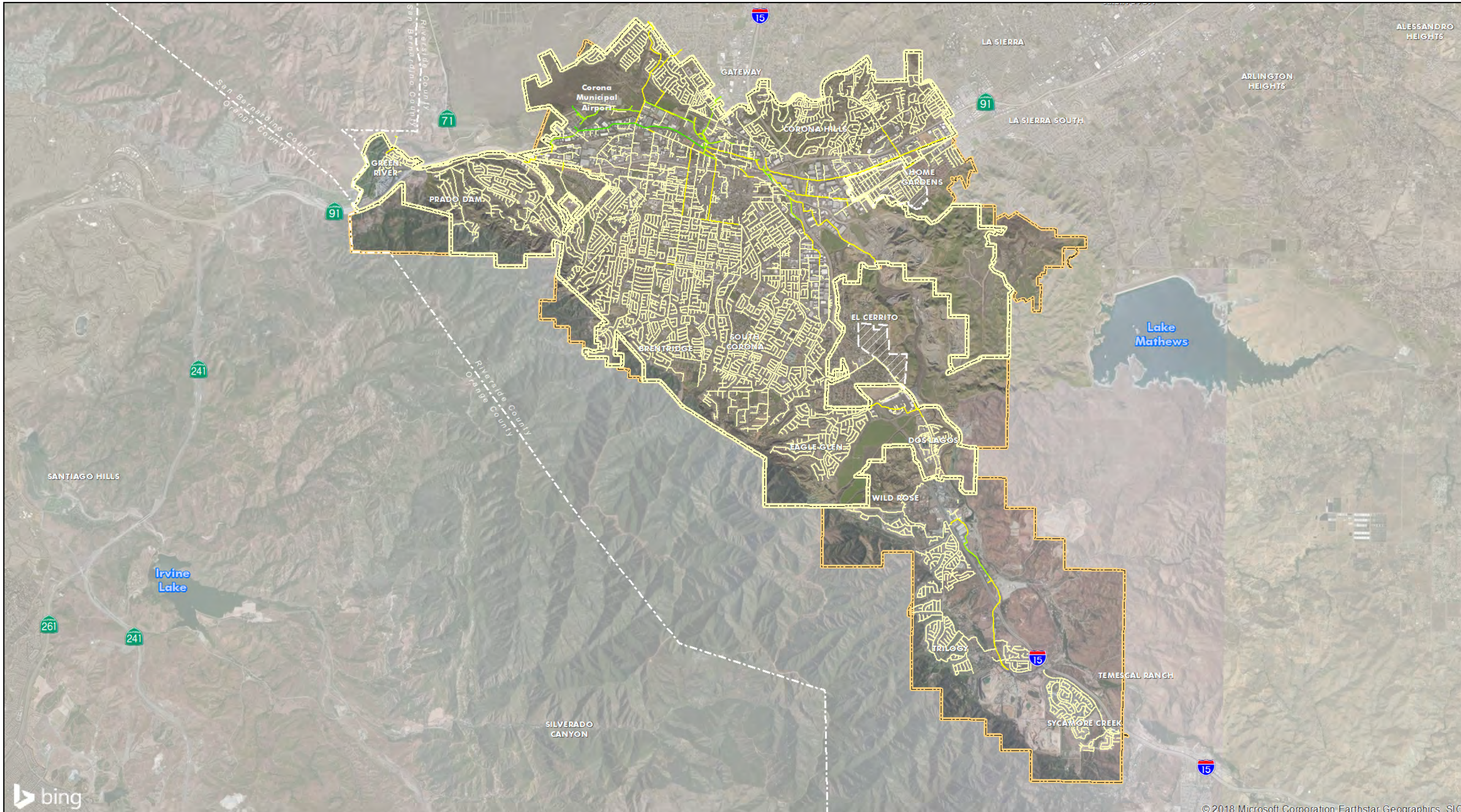
service area, including the Retreat Golf Course on the north end and the Deleo Sports Park within Sycamore Creek on the south end[6].

Disadvantaged Communities Existing Sewer System

El Cerrito
As mentioned above, the El Cerrito DUC area is currently on septic systems. The City plans to extend its sewer system to the El Cerrito DUC in the future, creating a combination of septic systems and traditional sewer connections in the area. Per language in the 2011 El Cerrito Specific Plan Update, the City of Corona will assist in the formation of a voluntary sewer assessment district to construct sewer connections. Commercial and industrial development constructed after annexation by the City will be required to connect to the City's sewer system, and property owners will have the opportunity to connect to the sewer line[7].

Home Gardens
The Home Gardens Sanitation District (HGSD) currently provides sewer services to the Home Gardens DUC. The sewer system pipes range in diameter from 8 inches to 12 inches. The sewer lines connect into the Western Riverside County Wastewater Treatment Plant (WRCWTP) located in the City of Corona. The WRCWTP is under joint management between the WMWD and the Western Riverside County Wastewater Authority (WRCRWA) and treat wastewater from the City of Norco, Jurupa Community Services District and Home Gardens Sanitary District. The plant currently has a capacity of 14 MGD and treats wastewater at a tertiary level prior to discharging into the Santa Ana River[8].

[6] TVWD FAQ website. Found here: https://www.temescalvwd.com/FAQ.cfm
[7] City of Corona. 2011. El Cerrito Specific Plan, SP-91-02.
[8] Western Municipal Water District. 2018. *WRCRWA*. https://www.wmwd.com/186/WRCRWA



Aerial Date: 2010

Corona GPU Area Sewer System

City of Corona General Plan Update

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City of Corona
City of Corona Sphere of Influence
Disadvantaged Unincorporated Communities

Sewer Lines

8" - 12"
13" - 18"
19" - 27"
28" - 48"
49" - 75"

Figure 3

08/24/2018

0 8,000 16,000 Feet

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2.2.2 Existing Sewer Flows

For each land use in the City of Corona and the City's SOI, a total sewer generation was estimated to provide a baseline condition and to allow for comparison against proposed land use changes. Acreages of the existing development (i.e. residential & non-residential) were utilized along with their corresponding flow/generation factors to develop existing condition flow rates. Sewer generation factors were provided from Table 1-2 of the City of Corona 2005 Sewer Master Plan. Table 2 provides a summary of the existing wastewater flows for the City and SOI.

Table 2 Existing Condition Average Daily Sewer Flows

Area	Number of Dwelling Units	Non-Residential SF[1]	Average Sewer Flows (GPD)
City of Corona	48,532	49,905,176	15,270,981
Corona SOI	10,896	3,436,459	3,331,095
Total	59,428	53,341,635	18,602,076

Notes:
GPD – Gallons per day SF – Square Feet
[1]Non Residential includes commercial, retail, open space, agricultural, and mixed land uses
Land use data supplied by Placeworks, 2018

Under the existing conditions, average daily sewer flows are estimated at 18.6 million gallons per day (MGD) throughout the City of Corona and the SOI. The City has an existing sewer flow of approximately 15.3 MGD, while the SOI has an existing sewer flow of approximately 3.3 MGD. These conservative flow estimates are for land planning purposes only and generally over-estimate flows.

2.2.3 Existing Sewer Capacity Assessment

City of Corona 2005 Sewer Master Plan

The 2005 Sewer Master Plan was prepared by AKM Consulting Engineers to describe the infrastructure of the City's sewer system and determine any existing or future deficiencies to the system based on land use. To perform a detailed capacity analysis of the wastewater collection system, the GIS-based H2OMap Sewer software program was utilized by implementing Manning's Equation for depth of flow calculations in gravity sewer pipes. Average flows were calculated using the unit flow factors that were developed based upon the land use data obtained from the City's existing GIS and results of a temporary flow monitoring study. As the adequacy of a sewage collection system is based upon its ability to convey the peak flows, peak dry weather flow was estimated by converting the total average flow upstream of the point in question to peak dry weather flow by an empirical peak-to-average relationship.

The analysis of the City's existing gravity sewer system was based upon existing land uses, the unit flow factors and the dry weather peaking formula described above and in the Sewer Master Plan. The design and analysis of gravity sewer systems are typically based upon the depth to diameter ratio (d/D). Pipes should meet the City's established criteria as follows:

- Existing pipes ≤ 12-inches in diameter: d/D = 0.64 at peak dry weather flow.
- Existing pipes ≥ 15-inches in diameter: d/D = 0.67 at peak dry weather flow.

The total length of sewer found to be exceeding the City's established d/D ratio per the established criteria is 16,502 feet. This is less than 1% of the length of gravity sewer system, which totals about 1.94 million feet (368 miles). In addition, about 16% (2,626 ft) of these pipes have a peak dry weather flow depth to diameter ratio between 0.64 and 0.67. These pipes are considered a low priority and would not be recommended for immediate replacement or upgrades. The City intends to expand its sewer system to provide service to 5,030 acres of vacant land within city limits to be built out for commercial, industrial, and residential uses. The sewer system will also expand to cover an additional 6,560 acres within the City's SOI.

In addition to the 2005 Sewer Master Plan effort, ongoing hydraulic analyses occur as needed throughout each year utilizing both hydraulic modeling and closed-circuit televising (CCTV) equipment to ensure the sewer system is functioning. These analyses tend to occur when a new development or redevelopment is implemented in an area with a potential deficiency, or as the City determines additional analysis is required. Since the 2005 Sewer Master Plan, approximately 3,100 feet of the deficient 16,502 feet of sewer segments have been rehabilitated or replaced[9] based on existing capacity deficiencies as summarized in Table 3 below. Approximately 4,500 feet of improvements required to handle flows in the "ultimate" condition mentioned in the 2005 Sewer Master Plan have also been deemed to be unnecessary after additional hydraulic analyses.

Table 3 2005 Existing Sewer Capacity Deficiency Improvements

CIP Project Number	Street Location	Length (ft)	Existing Pipe Size	Replacement Pipe Size
P-3	W. Parkridge Ave	241	8"	12"
P-7	Maple St	2,385	8"	10-12"
P-9	Harrison St	173	18"	21"
P-10	Sixth St	354	12"	15"
Notes: Source: Table 8-5: Pipeline Capital Improvement Projects. Received via personal communication with City DWP staff on 08/14/2017				

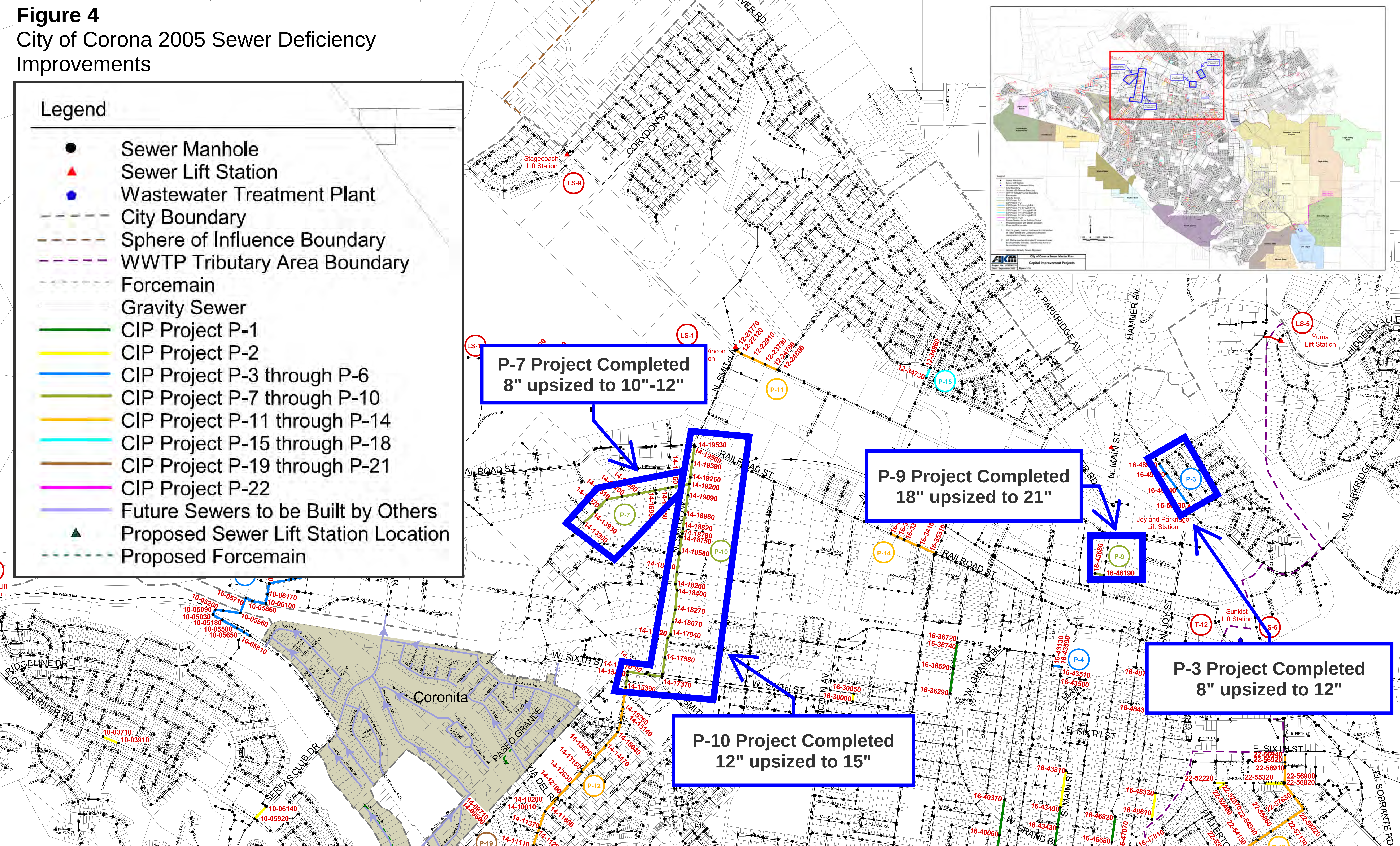
Sewer improvements totaling approximately 4,500 feet have also been implemented since 2005 to address deficiencies to the condition of the sewer infrastructure (i.e. pipeline breaks) that were discovered by separate analyses. The City has a formal process in place to ensure that the sewer system is functioning and is currently planning on updating the Sewer Master Plan for the entire City within the next 2-3 years. Sewer system improvements since the 2005 Sewer Master Plan are shown below in Figure 4.

<u>TVWD Sewer System Assessment</u>

After personal communication with TVWD staff, it has been confirmed that the sewer system is functioning adequately; there are no major deficiencies and there are currently no projects planned in the near future. TVWD has systems and procedures in place to monitor the system and perform maintenance on a regular basis.

[9] Table 8-5: Pipeline Capital Improvement Projects. Received via personal communication with City DWP staff on 08/14/2017.

Figure 4
City of Corona 2005 Sewer Deficiency Improvements



Disadvantaged Communities Sewer Assessments

El Cerrito

No existing assessment of treatment capacity has been conducted as the area is served by septic system. Once the area has been incorporated into the City's sewer system, assessment will be performed for the El Cerrito DUC.

Home Gardens Sanitation District 2010 Sewer Evaluation and Capacity Assurance Plan

In February 2010, the HGSD performed the System Evaluation and Capacity Assurance Plan Report as part of a Sewer System Management Plan. The evaluation presents the results of a comprehensive sewer system capacity study of the existing sewer system and provides information for the planning and implementation of the proposed preliminary Capital Improvement Program (CIP) of the HGSD sewer system. To evaluate the sewer system capacity and determine the peak wastewater flows in the system, measured flow data from flow monitoring performed in November of 2004 via a CCTV inspection at four locations for a period of one week was utilized in the analysis. The design criteria standards of the City of Corona and the Riverside County Eastern Municipal Water District were also used to establish the unit sewer flow factors for various land uses within the District. A computer model was then used to evaluate available capacity in the existing sewer system under the existing and ultimate conditions.

Computer model results indicated that the existing sewer system has adequate capacity under the existing condition. However, in the ultimate condition the existing sewer system may be under capacity in the 15" trunk sewer in Sixth Street. The determination of the hydraulic deficiencies in the sewer system was based on applying the 0.67 d/D for pipes 8" to 12" in diameter and 0.75 d/D for pipes 15" in diameter and larger. As the existing sewer system had no hydraulic capacity deficiencies and it was determined that the capacity deficiencies under the ultimate condition may be alleviated by diverting upstream flows via the diversion structure at Mckinley/Magnolia, capital improvements to correct hydraulic capacity deficiencies were not recommended. However, based on the CCTV pipe condition evaluation, deficiencies were found based on the condition of the sewer pipes (i.e. cracked/broken pipes, offset joints, blockages). As of Spring 2017, all high priority improvements to the sewer system mentioned in the 2010 HGSD sewer evaluation have been made totaling 2,316 feet[10]. Improvements to the system are shown in Figure 5 below.

The HGSD has policies in place to ensure the sewer system is functioning properly. At this time, no improvement projects are scheduled in the near future but service to existing laterals happen on an as-needed basis typically based off of new connections (i.e. new development or significant redevelopment). Any new proposed land uses associated with the Corona GPU will be shared with HGSD and any additional analyses of the sewer system will occur at that time if needed.

[10] Home Gardens Sanitations District – Sewer Collection System Evaluation and Capacity Assurance Plan. February 2010.

HOME GARDENS SANITARY DISTRICT

SERVICE AREA AND HIGH PRIORITY SEWER REPAIRS

FIGURE 5

2.3 WATER DISTRIBUTION SYSTEM

2.3.1 Existing Water System

City of Corona/SOI Existing Water System

The City of Corona is the water service provider and distributes water to the City's residents, businesses, and park facilities. While the City provides water within City and its SOI (Coronita and portions of Temescal Canyon) and the El Cerrito DUC, some areas within the SOI are served by other agencies. The Home Gardens County Water District (HGCWD) provides water to the Home Gardens area including the DUC; the Eagle Valley Mutual Water Company serves the Eagle Valley area which is not yet developed; and the Temescal Canyon in the City's southern SOI is served by the Temescal Valley Water District (TVWD).

The City receives water from two main sources: groundwater sources from three basins managed by the City DWP, and imported water from WMWD. The groundwater basins including the Coldwater Basin, Temescal Basin, and Bedford Basin provide approximately 40% of the City's water supply from 22 wells with a total capacity of 39,200 AF/year (35.0 MGD). The City currently maintains 16 booster pump stations equipped with a total of 45 booster pumps to deliver groundwater from the wells to the City supply system. The remaining 60% of the City's water supply is imported from WMWD through the Lower Feeder Pipeline (raw Colorado River water) and Mills Pipeline Connection (treated State Project water).

All raw water is treated at the Lester and Sierra del Oro Treatment Plants prior to entering the City's system. The Lester Treatment Plant receives raw water from the Colorado River via 108-inch diameter pipes, which then flows through six filters that treat for Total Suspended Solids in a five-step process. The Sierra del Oro Treatment Plant treats an average of 5 million gallons of water per day in a five-step treatment process that consists of filtration and sediment settling via sediment basin before distributing water directly to homes and businesses. The total capacity of the imported water supply is 39,840 AF/year (35.6 MGD)[11].

Additionally, two projects, the Riverside-Corona Feeder and Inland Empire Brine Line, are proposed to serve the City and the surrounding Inland Empire to provide additional treatment and water supply from percolated waters for future use. The Riverside-Corona Feeder is proposed by the WMWD to serve the western portion of Riverside County and provide an additional water source for the City of Corona. The Riverside-Corona Feeder will consist of 20 wells and 28 miles of pipeline to capture, store, and distribute water from wet years for future use and reduce dependency on the Colorado River. Water will be treated to remediate perchlorate and other groundwater contaminants. The Riverside-Corona Feeder is estimated to provide an additional 40,000 AF of water to benefit the various cities and water districts served by the project.[12] The Inland Empire Brine Line is a treatment facility that receives industrial wastewater and removes excess salt before redirecting it to the Pacific Ocean, bypassing the Santa Ana River. This project seeks to reduce the impact of salt on plants and wildlife in the Santa Ana River, as well as provide cleaner percolated waters that enter the groundwater

[11] City of Corona. 2005 Water Master Plan (Updated 2005). Retrieved July 2017.

[12] Western Municipal Water District. Riverside-Corona Feeder (Updated August 2017). Retrieved October 2017, from http://wmwd.com/DocumentCenter/Home/View/227

basins[13]. A portion of water from both projects will be available to the City and SOI service area.

The City operates eight (8) blending stations that blend the groundwater and imported sources to meet regulatory standards of the Environmental Protection Agency (EPA) and California Department of Health Services. Prior to distribution throughout the City, the blended water is stored in 15 reservoirs throughout the City's six (6) service zones, with one concrete reservoir with a 2.5 million-gallon (MG) capacity proposed for construction under the 2005 Water Master Plan. The total storage capacity of the 16 reservoirs is approximately 43.3 MG.

The City's service zones are interconnected between reservoirs and supply sources by major transmission pipelines ranging from 12" to 36" in diameter. Distribution pipelines ranging from 6" to 12" in diameter connect the transmission line to various residential developments, industrial, and commercial sections. The HGCWD water system lines range in diameter between 6"-12" and the TVWD lines range in diameter from 6"-48". See Figure 6 below for additional details on the distribution pipelines within the City. See Appendix C for more details on the water system within various areas of the City and SOI.

Ensuring adequate fire flow is an important aspect of the City's water system management. As described in the 2005 Water Master Plan, each component of the water system (i.e. storage, booster pump stations, pressure regulating stations, transmission/distribution pipelines, fire suppression systems etc.) must be designed and maintained to ensure sufficient flows for normal daily demands and water demands for fire flows. All new pipes associated with the GPU will be sized to provide adequate fire flows and a minimum of 20 psi residual pressure at the hydrant outlet during fire flow. To achieve this, when a single, unlooped pipe provides fire service to an area, a minimum diameter of 8-inch should be maintained to the last hydrant. All mains should be constructed with a minimum diameter of 8-inch, except on short cul-de-sac dead-end mains where 4-inch lines may be allowed. See below for fire flow requirements in Table 4.

Table 4 Fire Flow Requirements per Land Use

Land Use	Flow (gpm)	Duration (hr)	Residual Pressure at Hydrant Outlet (psi)	Average Spacing between Hydrants (ft)
Residential Single Family	1,500	2	20	300
Residential Multi-Family	2,500	2	20	250
Schools	3,000	4	20	250
Commercial/Industrial	3,500	4	20	250
Source: City of Corona. 2005 Water Master Plan (Updated 2005). Retrieved July 2017.				

The majority of the service area consists of residential land uses. Other demands within the City include industrial, commercial, agricultural, and open space. The 2015 Urban Water Management Plan (2015 UWMP) reported the City's daily per capita water demand as 163 gallons per capita per day (GPCD) in 2015. This water demand is well below the minimum water use reduction target of 213 GPCD as required by the Water Conservation Bill of 2009

[13] Santa Ana Water Protection Agency. Brine Line. Retrieved October 2017, from http://www.sawpa.org/brineline/

(SBx 7-7)[14]. Therefore, the City's plan to maintain the current level per capita water use is in compliance with SBx 7-7.

In the City's southern SOI, TVWD receives all of its water supply from the Metropolitan Water District via the Mills Pipeline. The Mills Pipeline serves other communities besides those served by Temescal Valley Water District including part of the City of Corona, Eagle Valley Area and other areas within the unincorporated Riverside County. All water delivered to TVWD is imported from Northern California via the State Water Project system. Once transferred to Southern California, the imported water is provided full water treatment at the Mills Water Filtration Plant located on Alessandro Boulevard. Water produced from this filtration plant and subsequently delivered to Temescal Valley Water District meets all local state and federal requirements for water quality. Water supply from TVWD is distributed to the Temescal Canyon area via 6-28" water pipes.

Disadvantaged Communities Existing Water System

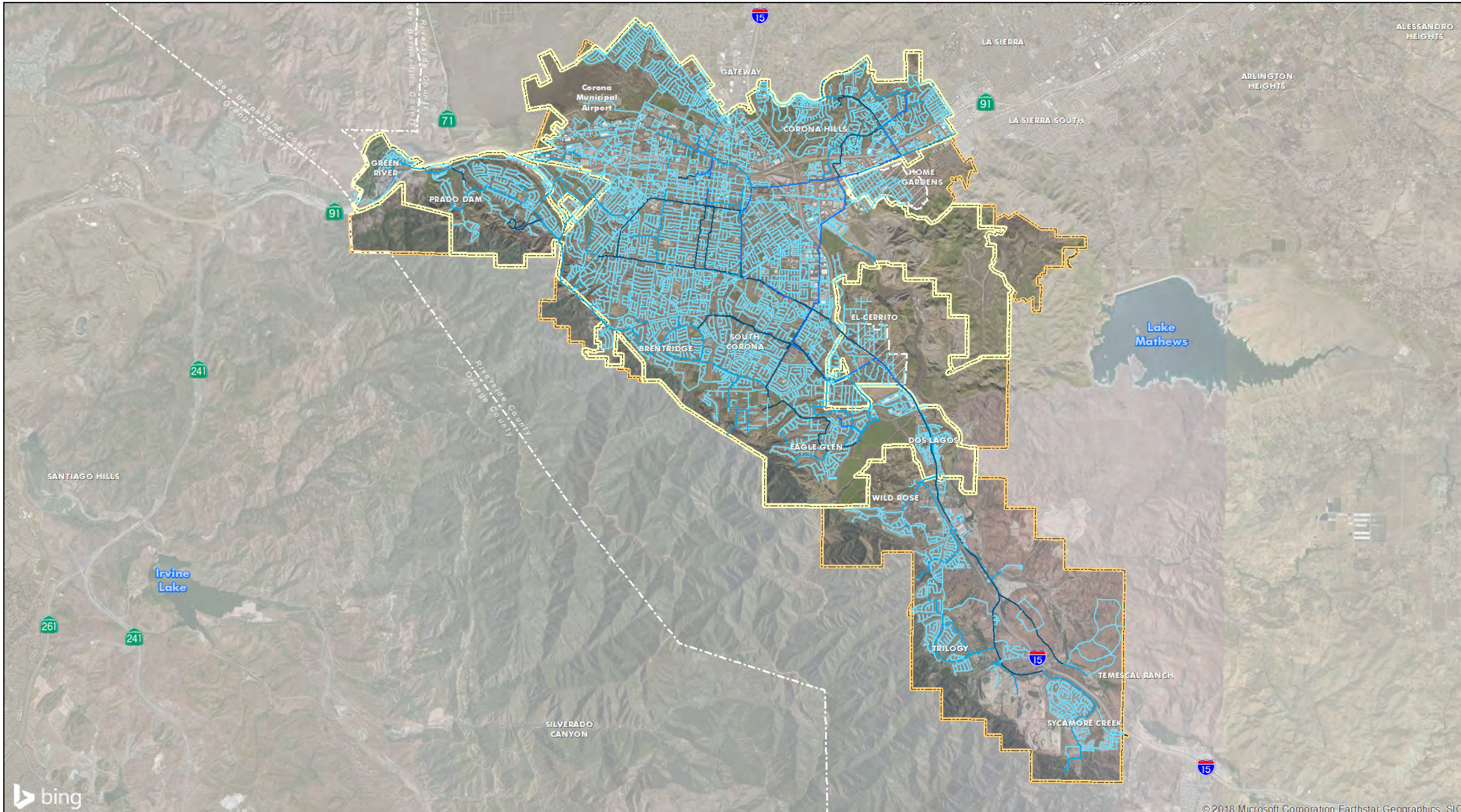
El Cerrito

The City of Corona DWP provides water services to the El Cerrito DUC. Water system line ranges from 4 inches to 30 inches. As the City is a member agency of WMWD, treatment capacity to deliver water to the El Cerrito DUC is adequate as described above in Section 2.3.1. As described above, the City's water system requires certain fire flow standards to be maintained that also apply to the El Cerrito DUC.

Home Gardens

As mentioned, HGCWD provides water services to the Home Gardens DUC. Water lines within the Home Gardens DUC range in size between 6"-12" in diameter. As HGCWD is a member agency of WMWD, treatment capacity to deliver water to the Home Gardens DUC is adequate as described above in Section 2.3.1. After personal communication with HGCWD staff, it has been determined that the majority of the water system was constructed in 1987 and is in good condition. There are no identified existing deficiencies to the system.

[14] KWC Engineers. City of Corona 2015 Urban Water Management Plan Volume 1 – Report (Updated July 2016). Retrieved July 2017.



Aerial Date: 2010

Corona GPU Area Water System

City of Corona General Plan Update

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City of Corona
City of Corona Sphere of Influence
Disadvantaged Unincorporated Communities

Water Lines
6" - 12"
14" - 18"
20" - 28"
30" - 48"
> 48"

Figure 6

08/24/2018

0 8,000 16,000 Feet

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2.3.2 Existing Water Demand

For each land use in the City of Corona and the City's SOI, water demand estimates were developed to provide a baseline condition and to allow for comparisons against any proposed land use changes. Similar to the sewer/wastewater analysis, acreages of development (i.e. residential & non-residential) were utilized along with their corresponding flow factors to identify changes in water demand. Water demand factors specific to the City of Corona were not provided or available; therefore, regional water demand estimates derived from the 2005 City of Corona Water Master Plan were employed to calculate water demands. Table 5 provides a summary of the existing condition water demand for the City and SOI. Detailed calculations are provided in Appendix C.

Table 5 Existing Condition Average Daily Water Demand

Area	Number of Dwelling Units	Non-Residential SF	Average Water Demand (GPD)
Corona	48,532	49,905,176	22,147,437
Corona SOI	10,896	3,436,459	5,557,468
Total	59,428	53,341,605	27,704,906

Notes:
GPD – Gallons per day SF – Square Feet
[1]Non Residential includes commercial, retail, open space, agricultural, and mixed land uses
Land use data supplied by Placeworks, 2018

Under the existing conditions, average daily water demands are estimated at 27.7 MGD for both the City of Corona and the SOI. The City of Corona has an existing water demand of approximately 22.1 MGD while the SOI has an existing water demand of approximately 5.6 MGD. These conservative flow estimates are for land planning purposes only and generally over-estimate flows.

2.3.3 Existing Water Capacity Assessment and Water Planning

City of Corona 2005 Water Master Plan

The 2005 Water Master Plan was prepared by AKM Consulting Engineers to describe the water distribution system in the City of Corona, identify system deficiencies, and recommend improvements. The methodology included an initial survey on the City's existing water supply, storage, and pumping facilities. Unit flow factors were then developed to determine required existing and ultimate water system supply based on land use and water demands. Finally, five scenarios using H_2O Map Water modeling software to simulate various operation conditions were employed to determine whether the water distribution system required any changes to meet the future City conditions. The five scenarios analyzed include: Calibration Day, Existing Average Day, Existing Maximum Day, Future Average Day, and Future Maximum Day.

Based on the results of the analysis, improvements were recommended to address water system deficiencies and added to the Capital Improvement Program (CIP) list for funding and construction. The CIP prioritizes projects based on system needs and phasing, and acts as a long-term planning tool to facilitate construction of recommended projects to keep pace with City growth and demands. Since the 2005 Water Master Plan, nine (9) projects have been fully completed or executed out of the 28 total improvement projects identified in the 2005 Water Master Plan as shown in Table 6 below.

Table 6 2005 Water Distribution System Constructed Improvement Projects

ID	Project Name	Description	Status
R. Reservoirs			
R-1	Zone 6 Reservoir / Jameson (under construction)	This reservoir will provide needed storage capacity and eliminate the need for hydro-pneumatic pump systems in Zone 6. The control settings for the Payette and Eagle Glen Zone 6 Pump Stations will be based on the Zone 6 Reservoir water levels.	Constructed
R-3	Zone 2 Reservoir / R-3	This new reservoir will provide emergency storage capacity for Zone 2, north of Ontario Avenue.	Constructed
V. Pressure Reducing Valves			
V-2	Miguel Pressure Reducing Station	This new pressure reducing station provides a route for water to flow from Zone 6 to Zone 5 if needed.	Constructed
V-3	Summerhill Pressure Reducing Station	This new PRV, allowing water to flow from Zone 4 to Zone 3, will help achieve adequate fire protection on Weirick Road.	Constructed
P. Pipes			
P-1	Re-Zone Paseo Grande Hydrants	At Paseo Grande and Hummingbird Lane, the Zone 2 pressure is sufficient to meet normal demand. However, it is insufficient to reliability meet fire-flow conditions. Thus, it is recommended that two fire hydrants on Paseo Grande be converted to Zone 3.	Constructed
P-2	Re-Zone Sonrisa Hydrants	At Sonrisa Drive and Pacific Avenue, the Zone 4 pressure is sufficient to feed the normal demand. However, it is insufficient to reliability meet fire-flow conditions. Thus, it is recommended that four fire hydrants on Sonrisa Drive be converted to Zone 5.	Constructed
P-3	Re-Zone Garretson Hydrants	At Garretson Circle and Pacific Avenue, the Zone 4 pressure is sufficient to feed the normal demand. However, it is insufficient to reliability meet fire-flow conditions. Thus, it is recommended that three fire hydrants on Garretson Circle be converted to Zone 5.	Constructed
P-5	Harlan Hills - Mabey Cyn - Zone 5 Transmission Main	This 16-inch pipe connects the Harlan Hills and Mabey Canyon hydro-pneumatic sub- zones to Zone 5. This conversion reduces the wear on the Harlan Hills and Mabey Canyon booster pumps because they will not be turning on and off with as high of frequency. It also makes the system more robust by enabling water to move where it is most needed.	Constructed
P-6	Fair Isle Transmission Pipeline	This pipe connects Fair Isle Court to Alamitos Circle across a valley in Zone 6. In order to reduce the velocity through this pipe, it should be upsized to 16-inches.	Constructed

ID	Project Name	Description	Status
Source: Table 1-2: Recommended Improvement Projects, from the 2005 Water Master Plan. Updates on Project status received via personal communication with DWP staff on 08/14/2017.			

The remaining 19 projects mentioned in the Water Master Plan are either in design, in construction, or not yet executed. The City has a formal process in place to ensure that the water system, including fire flow requirements, is functioning and is currently planning on updating the Water Master Plan for the entire City within the next 2-3 years. Water system improvements since the 2005 Water Master Plan are also shown below in Figure 4.

City of Corona 2018 Reclaimed Water Master Plan

In July 2018 the City completed its Reclaimed Water Master Plan (RWMP). The goal of this plan is to aid the City in meeting current and future goals for reclaimed water usage. Additionally, this Plan aims to adequately prepare the City for the decommissioning of WWTP 3 and for the addition of the new Western Riverside County Regional Wastewater Authority (WRCRWA) treatment plant as a new source of reclaimed water in the City's portfolio. Its goals are consistent with targets and plans set forth in the 2005 Water Master Plan. The RWMP suggests a number of projects, programs, and studies to further aid the City in reaching its reclaimed water usage goals.

The RWMP estimates existing recycled water production as 11.34 MGD. Existing reclaimed water demand is 2.0 MGD, primarily used for irrigation across the City's service area[15].

TVWD Water System Assessment

In addition to the City's Water Master Plan, the Temescal Canyon area has additional monitoring of its water infrastructure. After personal communication with TVWD staff, it has been confirmed that, similar to the sewer system, the water system is also in good condition and there are currently no projects planned in the near future. Ongoing monitoring and maintenance occur on an as needed basis. Any proposed land use changes and potential increases in densities associated with the Corona GPU will be shared with TVWD to ensure that their existing system is adequate to handle changes in water demands.

[15] City of Corona. 2018. 2018 Reclaimed Water Master Plan

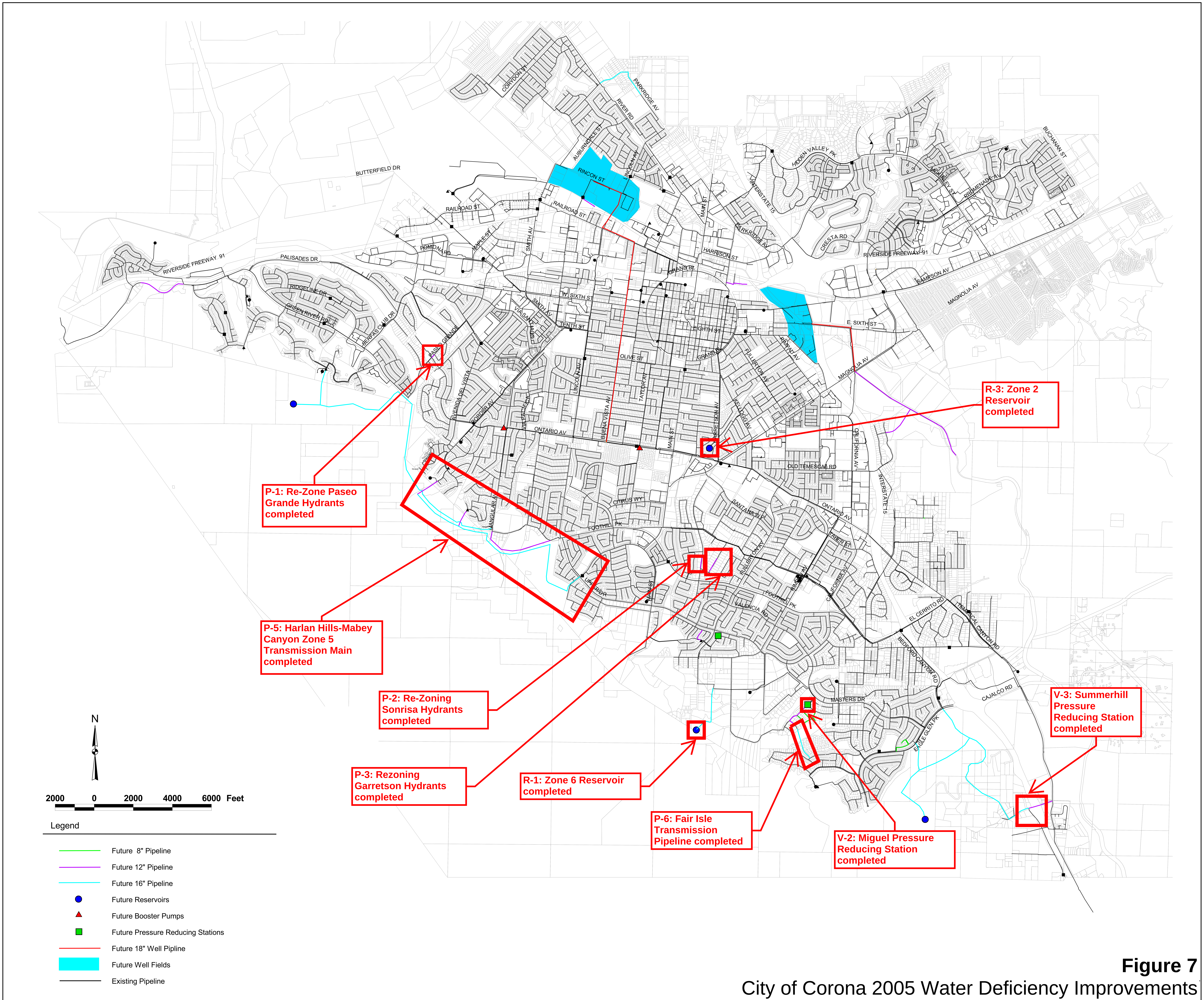


Figure 7
City of Corona 2005 Water Deficiency Improvements

Disadvantaged Communities Water System Condition

El Cerrito
The El Cerrito DUC was included in the City's assessment. As shown in Figure 7, there are no existing deficiencies in the El Cerrito DUC. All fire flow requirements associated with booster stations, pressure regulating stations, and other features of the water system are functioning within the El Cerrito DUC.

Home Gardens
The HGCWD provides water service to the Home Gardens DUC area. After personal communication with HGCWD staff, it has been determined that the majority of the water system was constructed in 1987 and is in good condition including fire flow requirements. There are no existing deficiencies to the system.

Any proposed land use changes and potential increases in densities associated with the Corona GPU will be shared with HGCWD to ensure that their existing system is adequate to handle changes in water demands. If deficiencies are identified at that stage of the GPU planning process, recommended improvements will be suggested to ensure functionality and efficiency within each respective water agency.

2.4 WATER QUALITY

The City falls under the Santa Ana Regional Water Quality Control Board (RWQCB) and its Basin Plan, which specifically (i) designates beneficial uses for surface waters and ground waters, (ii) sets narrative and numerical objectives that must be met in order to protect the beneficial uses and conform to the state's antidegradation policy, and (iii) describes implementation programs to protect all waters in the Region. In other words, the Santa Ana RWQCB Basin Plan provides all relevant information necessary to carry out federal mandates for the antidegradation policy, 303(d) listing of impaired waters, and related Total Maximum Daily Loads (TMDLs), and provides information relative to National Pollutant Discharge Elimination System (NPDES) and Waste Discharge Requirement (WDR) permit limits. See more details below for specifics on these items.

Total Maximum Daily Loads (TMDLs)

Once a water body has been listed as impaired on the 303(d) list, a TMDL for the constituent of concern (pollutant) must be developed for that water body. A TMDL is an estimate of the daily load of pollutants that a water body may receive from point sources, non-point sources, and natural background conditions (including an appropriate margin of safety), without exceeding its water quality standard. Those facilities and activities that are discharging into the water body, collectively, must not exceed the TMDL. In general terms, Municipal Separate Storm Sewer System (MS4) and other dischargers within each watershed are collectively responsible for meeting the required reductions and other TMDL requirements by the assigned deadline.

TMDLs have been established for pathogens for the Santa Ana River, Reach 3. The remaining 303(d) listed impairments shown in Table 7 have not yet been established and are pending approval for TMDL establishments for 2021.

Table 7 List of 303(d) Impairments and TMDLs

Water Body/Channel	List of 303(d) Impairments[1]	TMDL
Temescal Creek, Reach 1	pH	Pending 2021 TMDL Establishment for all Impairments
Santa Ana River, Reach 3	Copper, Lead, Pathogens	Approved TMDL for Pathogens. Pending 2021 TMDL Establishment for copper and lead.
Santa Ana River, Reach 2	Indicator Bacteria	Pending 2021 TMDL Establishment for indicator bacteria

Notes:
Source:
2010 California 303(d) List of Water Quality Limited Segments. Retrieved July 2017:
http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml

In addition, the California State Water Resources Control Board (State Board) has adopted the statewide Trash Provisions that requires implementation of Best Management Practices (BMPs) that mitigate or abate trash within Priority Land Use Areas (PLUs). PLUs are defined as, "high density residential, industrial, commercial, mixed urban, and public transportation stations." The purpose of the Trash Provisions is to establish a statewide water quality objective that ensures the quality of surface waters that enter storm drains and eventually lead out to major water ways are free of trash. The City is currently undergoing the process to comply with these new Trash Provisions and has chosen to pursue a Track 1 compliance route. This will require the City to implement full capture system BMPs within catch basins that receive runoff from PLU areas over the next 10 years.

County of Riverside MS4 Permit, Drainage Area Management Plan (DAMP) & Local Implementation Plans (LIP)

In January 2010, the Santa Ana RWQCB re-issued the Riverside County MS4 Storm Water Permit as WDR Order R8-2010-0033 (NPDES Permit No. CAS618033) to the County of Riverside, the incorporated cities of Riverside County, and the Riverside County Flood Control and Water Conservation District within the Santa Ana Region. Pursuant to the 2010 MS4 Permit, the Co-permittees were required to update and implement a Drainage Area Management Plan (DAMP) for its jurisdiction, as well as Local Implementation Plans (LIPs), which describe the Co-permittees' urban runoff management programs for their local jurisdictions.

Under the City's LIP, land development policies pertaining to hydromodification and low impact development (LID) are regulated for new developments and significant redevelopment projects. The use of LID Best Management Practices (BMPs) in project planning and design is to preserve a site's predevelopment hydrology by minimizing the loss of natural hydrologic processes such as infiltration, evapotranspiration, and runoff detention. These land development requirements are detailed in the County-wide Model Water Quality Management Plan (WQMP) and Technical Guidance Document (TGD), approved in May 2011, which cities have incorporated into their discretionary approval processes for new development and redevelopment projects. Within the City's built out system, all runoff ultimately discharges into fully engineered concrete flood control channels. Based on this drainage collection system, projects within the City of Corona are not subject to the hydromodification requirements. Projects are required to comply with the LID requirements in accordance with the LID hierarchy.

The LID hierarchy requires new developments and re-developments to implement BMPs under the LID hierarchy as described in the TGD. The LID hierarchy requires new projects to first infiltrate, then harvest and reuse, then biofilter stormwater runoff from their project site. In the City of Corona, infiltration will likely be incorporated for new projects within the central and southern portions of the City as it is comprised of mostly Type A and B soils which typically have high infiltration rates. Groundwater levels throughout the City ranges from 45 feet to 80 feet below ground level which is also beneficial for infiltration BMP implementation. The eastern and western portions of the City are comprised of mostly Type C & D soils and will likely need infiltration testing to confirm infiltration feasibility. In areas where infiltration is determined to be infeasible, harvest and reuse BMPs may prove feasible for projects that incorporate ample landscaping and/or have high indoor toilet flushing demands (i.e. hotels). For areas that cannot infiltrate or utilize harvest and reuse systems, projects will be able to biofilter stormwater through biofiltration BMPs such as vegetated swales and bioretention basins.

2.4.1 Existing Surface Water Conditions

According to the Santa Ana Region Water Action Plan (WAP), the channels with existing beneficial uses include the Santa Ana River, Reach 3; Temescal Creek, Reaches 1 & 2; Bedford Canyon Creek; and the Coldwater Canyon Creek.

Table 8 List of Receiving Waters and Beneficial Uses

Middle Santa Ana River Subwatershed – Santa Ana Reach 2	
AGR – Agricultural Supply GWR – Groundwater Recharge REC 1 – Water Contact Recreation REC 2 – Non-Contact Water Recreation	WILD – Wildlife Habitat RARE – Rare, Threatened, or Endangered Species WARM – Warm Freshwater Habitat
Middle Santa Ana River Subwatershed – Santa Ana Reach 3	
AGR – Agricultural Supply	WILD – Wildlife Habitat
GWR – Groundwater Recharge	RARE – Rare, Threatened, or Endangered Species
REC 1 – Water Contact Recreation	SPWN – Spawning, Reproduction, and/or Early Development
REC 2 – Non-Contact Water Recreation	WARM – Warm Freshwater Habitat
Temescal Canyon Subwatershed – Temescal Creek, Reach 1	
REC 1 – Water Contact Recreation	WARM – Warm Freshwater Habitat
REC 2 – Non-Contact Water Recreation	WILD – Wildlife Habitat
Temescal Canyon Subwatershed – Temescal Creek, Reach 2	
I-AGR – Intermittent Agricultural Supply IND – Industrial Service Supply GWR – Groundwater Recharge REC 1 – Water Contact Recreation	REC 2 – Non-Contact Water Recreation LWARM – Limited Warm Freshwater Habitat WILD – Wildlife Habitat
Temescal Canyon Subwatershed – Bedford Canyon Creek	
I-GWR – Groundwater Recharge REC 1 – Water Contact Recreation REC 2 – Non-Contact Water Recreation	WARM –Warm Freshwater Habitat WILD – Wildlife Habitat
Temescal Canyon Subwatershed – Coldwater Creek Canyon	
MUN – Municipal AGR – Agricultural Supply GWR – Groundwater Recharge REC 1 – Water Contact Recreation	REC 2 – Non-Contact Water Recreation WARM – Warm Freshwater Habitat WILD – Wildlife Habitat

Notes:
Sources:
-Watershed Action Plan Santa Ana Region, Riverside County. January 18, 2017. http://rcflood.org/downloads/NPDES/Documents/SA_WAP/WatershedActionPlan.pdf.
-California Regional Water Quality Control Board, Santa Ana Region. 1995 Water Quality Control Plan for the Santa Ana River Basin (Updated 2016). Retrieved July 2017, from https://www.waterboards.ca.gov/santaana/water_issues/programs/basin_plan/docs/2016/Chapter_3_Feb_2016.pdf

General water quality objectives have been prescribed in the Basin Plan for all surface waters within the Santa Ana River Region. In order to maintain the beneficial uses listed in the previous section, inland surface waters must achieve these water quality objectives. The following numeric objectives have been established by the Basin Plan for the following surface streams within the City of Corona, specifically the Santa Ana River:

Table 9 Numeric Water Quality Objectives

Water Quality Objective	Numeric Objective (mg/L)
Boron	0.75
Total Dissolved Solids	700
Hardness	350
Sodium	110
Chloride	140
Total Inorganic Nitrogen	10^2
Sulfate	150
Chemical Oxygen Demand	30

In addition to specific numeric water quality objectives, narrative objectives for all surface waters in the Upper Santa Ana River Basin also apply to the Middle Santa Ana River subwatershed and Temescal Wash subwatershed within Riverside County. Narrative objectives have been established for the following constituents[16]:

Inland Surface Waters

- Algae
- Ammonia, un-ionized
- Boron
- Chemical Oxygen Demand (COD)
- Chloride
- Chlorine, residual
- Color
- Dissolved Solids, total
- Filtrable Reside, total
- Floatables
- Fluoride
- Hardness (as $CaCO_3$)
- Inorganic Nitrogen, total
- Metals
- Methylene Blue-Activated Substances (MBAS)
- Nitrate
- Nitrogen, total inorganic
- Oil and Grease
- Oxygen, dissolved
- Oxygen, dissolved
- Pathogen Indicator Bacteria
- pH
- Radioactivity
- Sodium
- Sulfate
- Sulfides
- Surfactants (surface-active agents)
- Taste and Odor
- Temperature
- Total Dissolved Solids
- Total Filtrable Residue
- Total Inorganic Nitrogen
- Toxic Substances
- Turbidity

[16] California Regional Water Quality Control Board, Santa Ana Region. 1995 Water Quality Control Plan for the Santa Ana River Basin (Updated 2016). Retrieved July 2017, from http://www.swrcb.ca.gov/santaana/water_issues/programs/basin_plan/index.shtml

2.4.2 Existing Groundwater Conditions

Regional Groundwater Conditions

The Middle Santa Ana River Basin contains twelve management zones: Arlington, Bedford, Coldwater, Elsinore, Lee Lake, Riverside A through F, and Temescal. The City of Corona resides within the Bedford, Coldwater, and Temescal management zones. The Middle Santa Ana River Basin is noted for elevated concentrations of salt and nitrate in the groundwater and is likely a partial attribution to historical agriculture and dairy activities in the area. As the population continues to grow with increasing residential, commercial, and industrial land uses to replace agricultural uses, future concentrations of salt and nitrate will likely decrease over time. As part of the Basin Plan, a Total Dissolved Solids (TDS) Management Plan was developed to address salt loadings from residential, commercial, industrial, and agricultural sources into the groundwater basins[17].

A study of 107 drywells was conducted November 2006—March 2007 by the USGS and summarized in a 2012 publication to assess groundwater quality in the Upper Santa Ana Watershed, which includes the Middle Santa Ana River Basin[18]. The study concluded that a majority of organic constituent concentrations were largely low or undetected, while inorganic constituent concentrations were roughly split between low concentrations and high concentrations. The table below summarizes the report's findings:

Table 10 Upper Santa Ana Watershed Groundwater Quality

	Concentration (as a percentage of the watershed study area with concentration in the three specified categories		
Inorganic Constituent	Low	Medium	High
Trace and minor elements	77%	7%	16%
Uranium and radioactive constituents	82%	14%	8%
Nutrients (nitrate plus nitrite)	49%	25%	25%
Total dissolved solids (TDS)	70%	25%	5%
Iron or manganese	90%	6%	4%
Perchlorate	36%	53%	11%
Overall inorganic constituents	38%	29%	33%
	Concentration (as a percentage of the watershed study area with concentration in the three specified categories		
Organic Constituent	Low	Medium	High
Solvents	88%	9%	3%
Organic synthesis reagents	96%	3%	1%
Trihalomethanes and other VOCs	100%	0%	0%
Fumigants	96%	0%	4%
Herbicides	99%	1%	0%
Overall organic constituents	82%	11%	7%
Source:			

[17] Watershed Action Plan Santa Ana Region, Riverside County. January 18, 2017. http://rcflood.org/downloads/NPDES/Documents/SA_WAP/WatershedActionPlan.pdf.

[18] USGS. Status of Groundwater Quality in the Upper Santa Ana Watershed, November 2006-March 2007: California GAMA Priority Basin Project (Updated 2012). Retrieved in October 2017 from https://pubs.usgs.gov/sir/2012/5052/pdf/sir20125052.pdf

USGS. Groundwater in the Upper Santa Ana Watershed Study Unit, California (Updated 2012). Retrieved October 2017 from https://pubs.usgs.gov/fs/2012/3037/pdf/fs20123037.pdf

As shown in Table 10, inorganic constituents had higher concentration levels present, with the TDS, nutrients, and perchlorate appearing as more prevalent for the area of study. The study also notes that perchlorate and nitrates were more prevalent in the region compared to the statewide average. A more recent study was conducted specifically for the groundwater quality and constituent concentration in June 2008 for the City and is summarized in the section below.

In addition to the Watershed Action Plan summary from January 2017, Santa Ana Watershed Project Authority (SAWPA) recently published a technical memorandum with detailed ambient water quality conditions within various groundwater basins throughout the Santa Ana Watershed area. This detailed data is described in more detail below for the local groundwater basins directly underlying the City.

Local Groundwater Conditions

<u>Corona Groundwater Management Plan</u>
A Groundwater Management Plan (GWMP) was prepared for the City of Corona in June 2008. The City of Corona is the water service provider for its constituents, and the GWMP adopted in accordance with Assembly Bill 3030 to address management for groundwater supply and quality to sustain beneficial uses. The GWMP covers the three groundwater basins that cover the City, including Temescal, Coldwater, and Bedford Basins.

The two latter basins (Coldwater and Bedford Basins) make up a portion of the larger Elsinore Basin. Currently, coordinated efforts are required to manage the Coldwater and Bedford Basins between the various agencies with jurisdiction over the area. These agencies that manage the Coldwater and Bedford Basins include the City of Corona, the Temescal Valley Water District (TVWD), while Elsinore Valley Municipal Water District (EVWMD) manages the remainder of the Elsinore Basin outside of the Coldwater and Bedford Basins.

Successful implementation of the Groundwater Management Plan also requires coordinated efforts between local jurisdictions and statewide monitoring of California's groundwater basins. The California Department of Water Resources (DWR) manages the California Statewide Groundwater Elevation Monitoring (CASGEM) program which tracks the health and groundwater-level elevations of California's 515 different basins and how to best manage these basins. It also publishes a list of basin prioritization to determine how resources should be allocated to manage various groundwater basins, with the majority of resources directed towards basins with medium and high priority.

Priority is determined by eight criteria, including:

1. Overlying population served by the basin
2. Projected overlying population growth
3. Total number of wells
4. Total number of public supply wells
5. Overlying irrigated acreage
6. Overlying population reliance on basin as a source of water
7. Water quality impacts on groundwater

8. Miscellaneous information determined to be relevant by DWR.

Within the City of Corona, the Temescal Basin is designated as a medium priority by CASGEM based on the above criteria. The Elsinore Basin, which includes the Coldwater and Bedford Basins that are overlain by the City, is designated as a high priority. In an effort to provide more coordinated management of the groundwater basins, the City, TVWD, and EVWMD are proposing a new basin boundary based on CASGEM's boundary modification process that would designate the Coldwater-Bedford Basin as a combined groundwater basin to be separate from the existing larger Elsinore Basin. The intent of the boundary change is to align the basin boundaries with the alluvial deposits as mapped out by the USGS and provide more efficient management of basin activities between the various agencies and cities that directly oversee or benefit from the Coldwater-Bedford Basin area[19].

Local Groundwater Quality Studies

Groundwater quality data for the three current basins underlying the City was compiled in the 2008 Groundwater Management Plan to determine the overall health and concentration of pollutants of concern (specifically total dissolved solids and nitrate) within the City's managed basins. In addition, the Santa Ana Watershed Project Authority (SAWPA) Basin Monitoring Program Task Force in conjunction with DBS&A consultants recently published a technical memorandum titled the "Re-computation of Ambient Water Quality in the Santa Ana River Watershed for the Period 1996 to 2015" in September 2017 that also analyzed total dissolved solids and nitrate within the underlying groundwater basins within the City.

Between the two reports, overall data shows that groundwater quality from the three basins have similar inorganic chemistry indicating primarily a sodium and calcium-bicarbonate water type. Variability of water type is observed between the three basins and is likely attributed to variations in geology surrounding each of the three basins.

Table 11 Groundwater Basin Existing Water Quality

Basin	Total Dissolved Solids, mg/L	Total Dissolved Solids, mg/L	Nitrate (as NO_3), mg/L	Nitrate (as NO_3), mg/L
	1997-2015 Range[1,2]	2015 Concentration[2]	1997-2015 Range[1,2]	2015 Concentration[2]
Temescal	307-1,950	*810*	0.3-124	*10.9*
Bedford	630 -*740*	*N/A*	0.4-6.5	*N/A*
Coldwater	300-650	*460*	*1.5-2.8*	*2.2*

Source:
[1]AKM Consulting Engineers and Todd Engineers. Groundwater Basin Management Plan (Updated June 2008). Retrieved July 2017.
[2]SAWPA and DBS&A. Re-computation of Ambient Water Quality in the Santa Ana River Watershed for the Period 1996 to 2015 (September 2017). Retried October 2017.
Notes:
Italicized numbers come from SAWPA and DBS&A report
N/A represents not enough data

[19] City of Corona Department of Water & Power. SGMA Basin Boundary Modification Plan (Updated May 2, 2016). Retrieved October 2017 from http://discovercoronadwp.com/02-2016-BasinModificationInfo.shtml

As shown above in Table 11, numeric levels of total dissolved solids in the Temescal Basin exceed the recommended 500 mg/L TDS for potable water, the recommended 700 mg/L TDS for irrigation use and the water quality objective of 770 mg/L (described in more detail below). Temescal Basin nitrate concentrations have a wide range in values over the study period and have exceeded the 45 mg/L Nitrate (as NO_3) level for potable water and the water quality objective of 10 mg/L (described in more detail below) as shown in the 2008 Groundwater Management Plan. However, as shown in the SAWPA report, recent levels of nitrate within the Temescal Basin have ranged from 10.9-12 from 2009-2015. Therefore, it is possible that groundwater quality within the Temescal Basin has been improving since 2008 as concentrations becomes closer to the prescribed water quality objective.

For Bedford Basin, the 2008 Groundwater Master Plan showed levels that were generally above the drinking water/irrigation recommended levels for total dissolved solids. Bedford Basin has nitrate levels that were below the recommended nitrate concentrations. Note that for Bedford Basin, adequate data for total dissolved solids and nitrate concentrations was not available in the SAWPA report. In addition, there are no existing prescribed water quality objectives for the Bedford Basin at this time.

The Coldwater Basin shows the highest quality groundwater data within the City. Both the 2008 Groundwater Master Plan and the SAWPA report showed total dissolved solids and nitrate concentrations were generally below recommended levels for the two constituents. This is likely because groundwater pumped via City operated wells is blended with imported water to reduce concentration levels to within recommended EPA and California Department of Health Care Service levels.

Beneficial Uses

The Basin Plan identifies the Riverside County groundwater management zone in the Middle Santa Ana River Basin as having four beneficial uses for the Bedford Basin, Coldwater Basin, and Temescal Basin as shown below[20]:

- MUN – Municipal and Domestic Supply;
- AGR – Agricultural Supply;
- IND – Industrial Service Supply; and
- PROC – Industrial Process Supply.

Water Quality Objectives

Specific water quality numeric objectives have been established for the Riverside County groundwater management zones within the City of Corona, specifically the Coldwater Basin and the Temescal Basin to maintain its beneficial uses and are summarized below.

[20] California Regional Water Quality Control Board, Santa Ana Region. 1995 Water Quality Control Plan for the Santa Ana River Basin (Updated 2016). Retrieved July 2017, from http://www.swrcb.ca.gov/santaana/water_issues/programs/basin_plan/index.shtml

Table 12 Groundwater Basin Water Quality Objectives

Groundwater Management Zone	Total Dissolved Solids Objective (mg/L)	Nitrate (as N) Objective (mg/L)
Coldwater	380	1.5
Temescal	770	10

Source:
SAWPA and DBS&A. Re-computation of Ambient Water Quality in the Santa Ana River Watershed for the Period 1996 to 2015 (September 2017). Retried October 2017.

In addition to specific numeric water quality objectives, narrative objectives for all groundwater basins in the Middle Santa Ana River Basin also apply to the Riverside County groundwater basin management zone. Narrative objectives have been established for the following constituents:

- Arsenic
- Bacteria, Coliform
- Barium
- Boron
- Chloride
- Color
- Total Dissolved Solids
- Total Filtrable Residue
- Fluoride
- Hardness as $CaCO_3$
- Metals
- Nitrate
- Oil and Grease
- pH
- Radioactivity
- Sodium
- Sulfate
- Taste and Odor
- Total Inorganic Nitrogen
- Toxic Substances

3. THRESHOLDS OF SIGNIFICANCE

California Environmental Quality Act (CEQA) significance criteria are used to evaluate the degree of impact caused by a development project on environmental resources such as hydrology and water quality. According to Appendix G of the CEQA Guidelines, a project would normally have a significant effect on the environment if the project would impact any of the items listed below.

3.1 HYDROLOGY & WATER QUALITY THRESHOLDS (CEQA CHECKLIST SECTION IX)

Would the Project:

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? (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, or in a manner which would result in a 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 that would result in flooding on- or off-site?

E. Create or contribute runoff water which would exceed the capacity of existing or planned storm water 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?

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. Be subject to inundation by seiche, tsunami, or mudflow?

Should the answers to these environmental factors prove to be a potentially significant impact, mitigation measures would be required to reduce those impacts to a less-than-significant threshold.

3.2 UTILITIES AND SERVICE SYSTEMS THRESHOLDS (CEQA CHECKLIST SECTION XVII)

Would the Project:

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?

Should the answers to these environmental factors prove to be a potentially significant impact, mitigation measures would be required to reduce those impacts to a less-than-significant threshold.

4. ENVIRONMENTAL IMPACTS

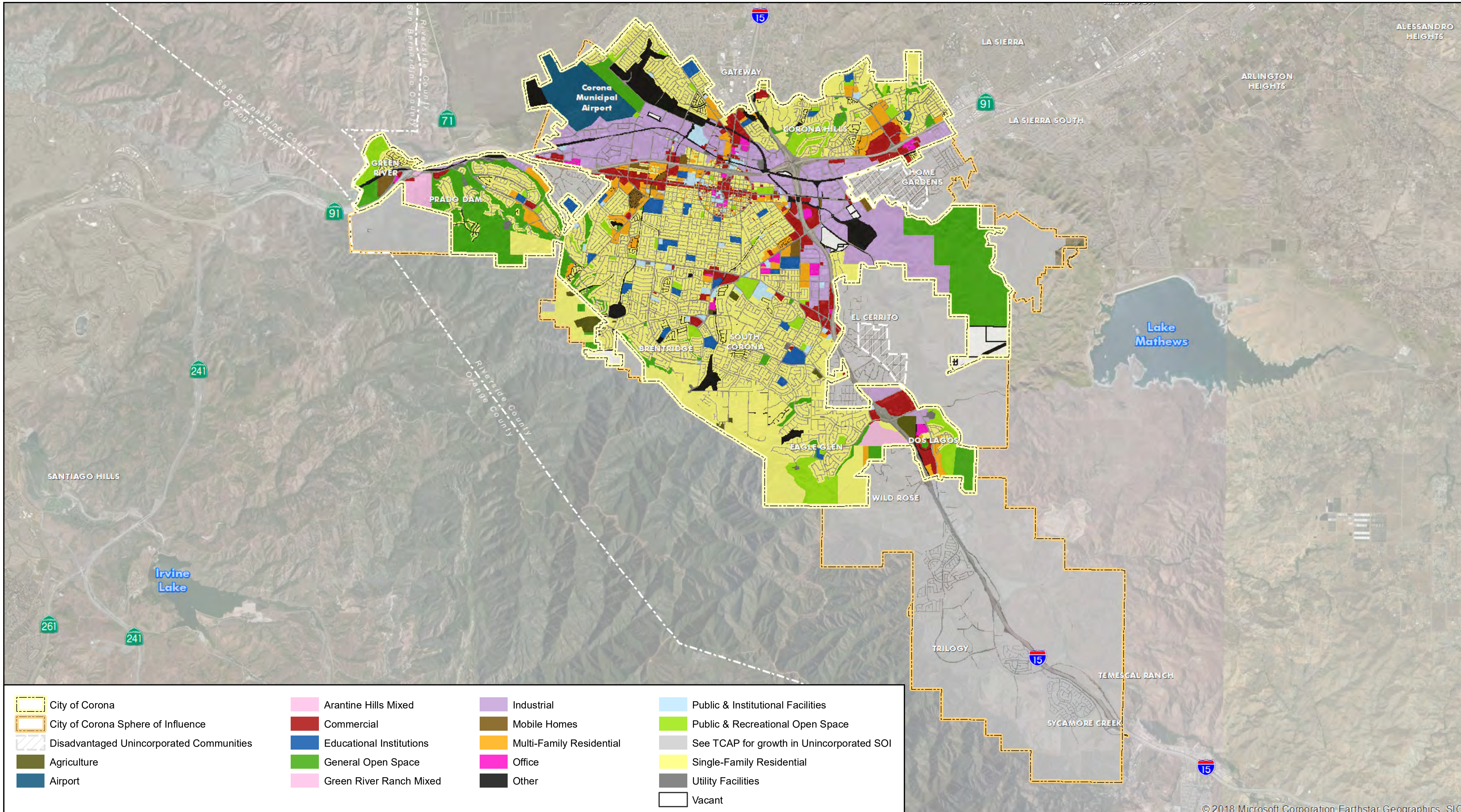
The purpose of the proposed conditions evaluation is to determine potential impacts related to the proposed land use zoning associated with the Corona GPU and hydrology, sewer and water infrastructure systems.

4.1 PROPOSED LAND USE CHANGES

The proposed land use changes that will largely increase mixed use land uses including single and multi-family homes, commercial, industrial, and retail of varying density. An estimated 1,586 acres of single-family residential growth is anticipated in the City, concentrated mainly along the southern boundary of the City, corresponding to an increase of 3,296 dwelling units. Approximately 372 acres of industrial land uses are anticipated in the northwestern and southeastern sections of the City boundary, primarily within developed areas. Approximately 77 acres of commercial and office land uses are anticipated in the downtown area of the City (currently developed), while an additional 41 acres of open space is proposed in the southeastern corner of the City boundary. Figure 8 illustrates the proposed buildout of land uses under full implementation of the GPU.

Exact locations and acreages of growth have not been determined for the City's SOI. There is an estimated increase of 5,096 single family dwelling units and 846 multi-family dwelling units throughout the SOI, and an estimated increase of approximately 16.5 million square feet of new commercial, office, and industrial land use proposed. Figure 9 features proposed land uses within the City of Corona SOI. This land use data was created by the County of Riverside and is featured in the 2016 Temescal Canyon Area Plan. All land use designations and symbology is that of the County of Riverside.

Based on the proposed land use changes, sewer and water demands are anticipated to increase while runoff within existing built out areas is anticipated to decrease due to increased landscaping and storm water requirements as compared to existing conditions. Runoff increases will occur within areas of new development. Additional details are provided below for hydrology, sewer and water.



Aerial Date: 2010

City of Corona GPU Proposed Buildout

Figure 8

City of Corona General Plan Update

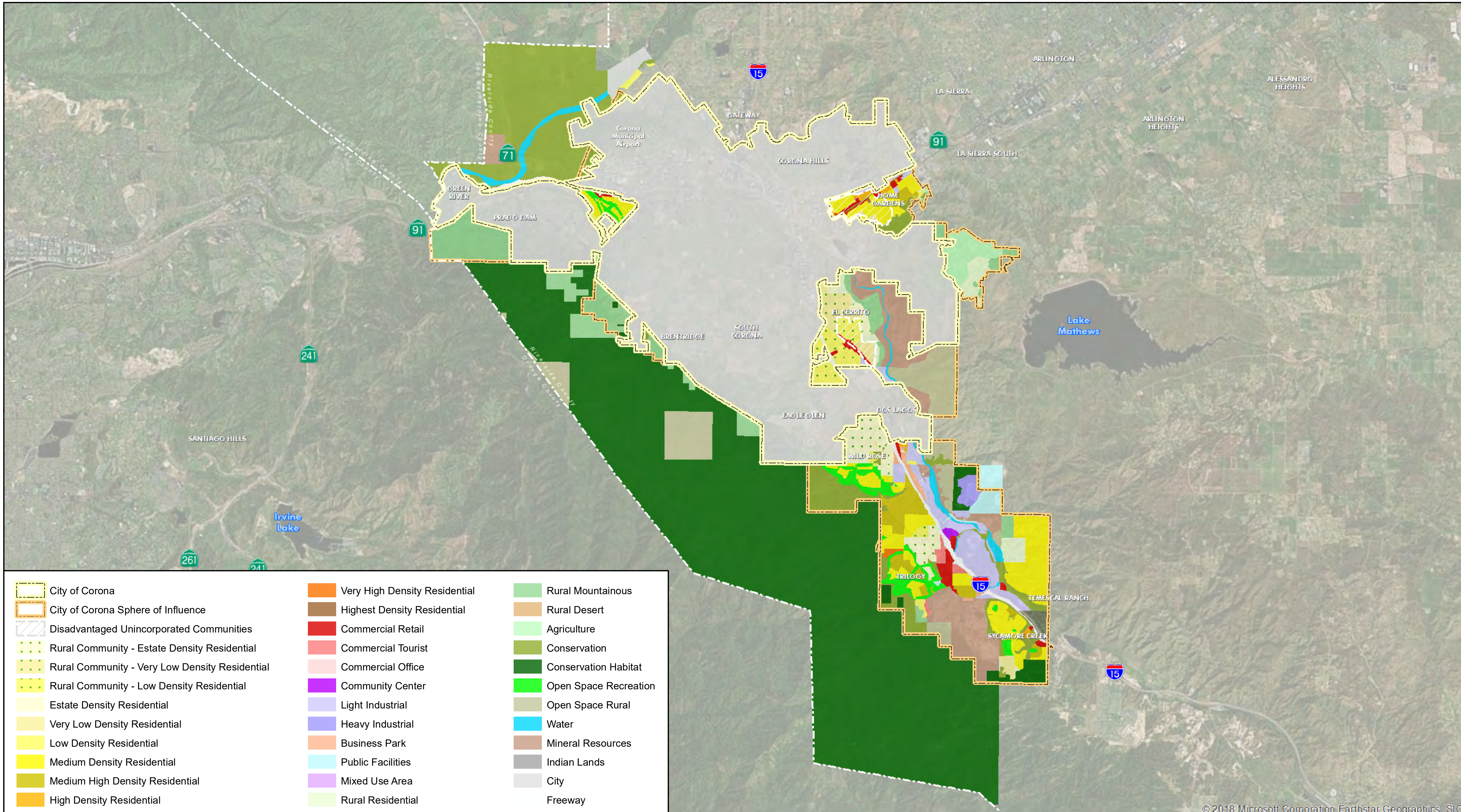
08/24/2018

FUSCOE ENGINEERING

Source: Data provided by Placeworks.

Feet
0 8,000 16,000

X:\Projects\511\27\MXD\GPU_Exhibits\Fig8_PROPOSED_LU_180824.mxd



Aerial Date: 2010

Uncapitalized Land Use

Figure 9

City of Corona General Plan Update

08/24/2018

FUSCOE ENGINEERING

Proposed Land Use data and designations from County of Riverside's 2016 Temescal Canyon Area Plan.

0 10,000 20,000 Feet

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4.2 HYDROLOGY

The purpose of the proposed conditions evaluation is to evaluate impacts associated with the proposed land use changes at a program-level EIR, characterize changes as compared to the existing runoff conditions and identify where either additional storm drain facilities are required to improve runoff conditions or where conformance to master plans of drainage are required for long-term planning and protection of downstream receiving waters.

4.2.1 Hydrology Impacts

The following impact assessments are based on the significance criteria established in Section 3.1 for hydrology.

Impact B: Would the Project 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)?

Impact Analysis: The Corona GPU area relies on local groundwater resources for approximately 40% of its water supply. Therefore, increases in population could generate a higher demand for groundwater resources. However, the City of Corona updates its UWMP every five years, quantifying existing and projected water supplies and demands to ensure there will not be any water supply shortages or significant groundwater depletion. The 2015 UWMP highlighted sufficient surface and underground water supplied through 2040 concluding no risk of a net deficit in aquifer volume or lowering of the groundwater table. The City of Corona has mechanisms to avoid overdraft of the groundwater basin even during dry periods. Impacts related to the depletion of groundwater are considered less than significant.

Impact D: Would the Project substantially alter the existing drainage pattern of the site, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site?

Impact Analysis: Under the existing conditions and proposed conditions, drainage patterns will largely be maintained and will utilize the existing drainage facilities within the public right of way. Current runoff is captured and conveyed by existing storm drain infrastructure in the City and SOI and is eventually discharged into the Santa Ana River.

The 2003 update of the City of Corona Drainage Master Plan identified a number of deficient segments throughout the City's service area that were marked for improvement. The City is monitoring its storm drain system for any segments that need immediate improvements and will be updating its Drainage Master Plan to adequately plan for future drainage needs, especially within the remaining undeveloped areas. As the City addresses more of the noted improvement projects, flooding risks will be alleviated. Redevelopment projects that will occur under implementation of the GPU will provide additional opportunities for capital improvements to occur.

The County of Riverside oversees maintenance and improvements for storm drain infrastructure in the DUCs of El Cerrito and Home Gardens. The El Cerrito Channel Restoration project, covered in Section 2.1.2 will reduce flooding risks in the El Cerrito area. Home Gardens has no noted storm drain or flood conveyance deficiencies.

Under the proposed condition, overall drainage patterns, flow rates and flow volumes will be maintained based on the high level of impervious condition under the existing condition and will not increase the opportunity to erosion or scour downstream. Hydromodification requirements and standards flood control requirements for new development will minimize impacts of increased flows and volumes on downstream receiving waters. On-site storm drain systems will likely change with the individual project components but will still utilize the existing city and county facilities within the public right of way. Implementation of the proposed land uses within future redevelopment areas will not result in increases in surface water peak flows or volumes over the existing conditions and will likely result in reduced discharges due to on-site water quality and LID features. Implementation of the proposed land use changes within undeveloped areas will likely result in increased runoff but discharges will be required to remain within the parameters defined by the most current Master Plan of Drainage or site-specific watershed study. Based on these provisions, impacts related to surface water are considered less than significant.

Impact E: Would the Project create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?

Impact Analysis: The 2003 City of Corona Drainage Master Plan update identified 289 deficient storm drain segments. Based on the 2003 Plan, none of the twelve storm drain lines have been implemented or constructed to improve capacity and reduce localized flooding. As part of the General Plan Update, implementation of these proposed upgrades will occur based on priorities defined within the Capital Improvement Program. Those improvements that are located in or adjacent to the proposed land use changes will be prioritized for implementation.

The project is not anticipated to produce substantial additional sources of polluted runoff based on the proposed water quality management strategy of infiltration and/or biotreatment. A full discussion of water quality impacts is provided in Impact Assessment A under Section 4.4.3 of this report.

Impact G: Would the Project 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?

Impact Analysis:

It is the City's policy to avoid placing new housing within 100-year flood hazard areas based on FEMA's floodplain maps. All existing housing within Flood Zone A's and AE's require flood insurance. Impacts related to new housing within the 100-year flood hazard areas are considered less than significant.

Impact H: Would the Project place within a 100-year flood hazard area structures which would impede or redirect flood flows?

Impact Analysis: It is the City's policy to avoid placing new structures within 100-year flood hazard areas that have the potential to impede or redirect flows. Therefore, potential impacts related to structures within 100-year flood hazard areas are considered less than significant.

4.3 SEWER & WASTEWATER INFRASTRUCTURE

4.3.1 Proposed Wastewater Flows

Under the proposed land use changes, sewer flows will increase in both the City of Corona and its SOI. A total increase of 11,511 dwelling units and increase of approximately 26,476,352 sf of non-residential uses are proposed. Table 13 provides a summary of the proposed increases in sewer flows under implementation of the General Plan land use changes.

Table 13 Proposed Condition Average Sewer Flows

Area	Number of Dwelling Units	Non-Residential SF[1]	Proposed Sewer Flows (GPD)	Existing Sewer Flows (GPD)	Change in Sewer Flows (GPD)	% Increase
City of Corona	5,494	9,515,804	17,101,221	15,270,981	1,830,240	12
Corona SOI	6,017	16,960,548	5,559,401	3,331,095	2,228,306	67
Total	11,511	26,476,352	22,660,622	18,602,076	4,058,546	22

Notes:
GPD – Gallons per day SF – Square Feet
[1]Non Residential includes commercial, retail, open space, agricultural, and mixed land uses
Land use data supplied by Placeworks, 2018

Full implementation of the proposed land use changes has the potential to increase sewer flows by 4.06 MGD within the City and SOI. These flow estimates are for land planning purposes only and are considered very conservative and tend to overestimate actual flows.

4.3.2 Proposed Sewer/Wastewater System

The City of Corona will be updating its Sewer Master Plan within the next 2-3 years. This updated draft will note any new deficiencies as well as update the status of deficient segments noted in the 2005 Sewer Master Plan. Updating the Sewer Master Plan will allow the City to prepare and plan for any proposed land use changes and increases in flows under implementation of the GPU. Additionally, the City has confirmed that it will be decommissioning WWTP 3, which may occur before the update of the Sewer Master Plan. The City has confirmed that, based on current capacities and projections, it will have adequate capacity for the estimated increase in sewer flows under the proposed land use changes. Any long-term sewer infrastructure improvements to accommodate the ultimate build out condition of the GPU will be refined upon completion of the updated Sewer Master Plan.

TVWD confirmed they have no major projects planned in the near future, but also noted that the sewer system is in good condition and has no major deficiencies under existing conditions or anticipated in the future.

Disadvantaged Communities Proposed Sewer System

El Cerrito

The City intends to incorporate the community of El Cerrito, which is currently served by septic systems, into its sewer system service area in the future. Single lot residential projects will be allowed to utilize septic systems that meet the requirements of Riverside County Department of Health Services and existing septic systems are allowed as long as they continue to function properly and do not pose a health risk. Any commercial or industrial development within 200 feet of an existing sewer will be required to connect to the City system. Development projects greater than 200 feet away from an existing City sewer may either connect to the City system or utilize a septic system upon approval by the Santa Ana Regional Water Quality Control Board.

As sewer connections are requested, the City will assist in the formation of a voluntary assessment district to construct the sewer connections and add required capacity to City facilities if required. The assessment district will create the funding mechanism to evaluate and construct the necessary sewage collection, conveyance and treatment facilities.

Home Gardens

HGSD has noted that it currently owns 1.0 MGD of treatment capacity as a member agency of the Western Riverside County Regional Wastewater Authority (WRCRWA). Any new flows that will be served by HGSD will be subject to individual connection fees in addition to the rates, rules, and regulations of the District.

4.3.3 Sewer/Wastewater Impacts

The following impact assessments are based on the significance criteria established in Section 3.2 for wastewater.

Impact A. Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?

Impact Analysis: The proposed increase in sewer flows will in the City of Corona and its service area will be routed through City infrastructure to one of two WWTPs which are already permitted under the Santa Ana RWQCB. Flows from the southern portion of the SOI and from Home Gardens Sanitary District flow to the TVWD Reclamation Facility and the Western Riverside County Wastewater Treatment Plant (WRCWTP), respectively, both permitted under the Santa Ana RWQCB. The City intends to ultimately expand its sewer service to the community of El Cerrito and these wastewater flows will no longer utilize septic systems but will instead will discharge to one of the RWQCB permitted WWTP facilities that the City operates. No new RWQCB permits will be necessary regarding wastewater treatment. As described below in Impact Analysis B, there is sufficient regional capacity available to treat the additional sewer flows from implementation of the proposed General Plan Update. Therefore, no impacts to treatment requirements are anticipated.

Impact 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?

Impact Analysis: The 2005 Sewer Master Plan estimated a total future capacity of the City's wastewater treatment plants of 18.00 MGD[21]. The estimated increase of 1.8 MGD over the 15.2 MGD of existing flows will not exceed the projected future capacity of the City of Corona's WWTPs. The City's WWTPs will also have capacity to receive portions of the proposed increases in sewer flows across the City's SOI. Within the City of Corona SOI, portions of flows travel to both the TVWD and the WRCWTP, with respective planned capacities of 1.57 MGD and 14 MGD. Both WWTPs will be able to receive portions of the proposed 2.2 MGD increase in flows spread across the SOI. HGSD has noted that substantial flows beyond 0.2 MGD anticipated in its service area will require consultation with HGSD staff to evaluate potential impacts, but that HGSD can accept a portion of the flow increases proposed for the SOI.

The anticipated increases under implementation of the GPU are not anticipated to create any major deficiencies in sewer lines across the City and its SOI. The improvement of deficient lines is funded through developer fees for new development/ redevelopment projects and capital reserves. Developer fees and individual required permits and applications will vary between sewer service providers. No impacts are anticipated from the construction or expansion of sewer facilities related to implementation of the GPU.

Impact 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?*

Impact Analysis: See Impact Analysis B regarding wastewater treatment capacity. The City of Corona has confirmed capacity within its sewage treatment facilities to handle the proposed increases in flows from the GPU. HGSD has noted that it can receive a portion of the proposed increases in flows for the SOI, but that over 0.2 MGD of flow increases will require consultation with Staff. Through updating appropriate master plans, long-term capital improvement budgets, and assessment districts, TVWD will be able to receive increases in flows consistent with the buildout proposed under implementation of the GPU. No impacts are anticipated to service provider capacities.

4.4 WATER INFRASTRUCTURE

4.4.1 Proposed Water Demands

Under the proposed land use changes, water demands will increase in both the City of Corona and its SOI due to increases in dwelling units and commercial land uses. A total increase of 11,511 dwelling units and 26,476,352 sf of non-residential uses and proposed. Table 14 shows the proposed water demands associated with each land use change, using the same methodology as for the existing conditions. Detailed calculations and associated exhibits are included in Appendix C.

[21] City of Corona. 2005 Sewer Master Plan (Updated 2005).

Table 14 Proposed Condition Water Demands

Area	Number of Dwelling Units	Non-Residential SF	Proposed Water Demand (GPD)	Existing Water Demand (GPD)	Change in Demand (GPD)	% Increase
Corona	5,494	9,515,804	24,619,203	22,147,437	2,471,856	11
Corona SOI	6,017	16,960,548	9,052,794	5,557,468	3,495,326	63
Total	**11,511**	**26,476,352**	**33,671,997**	**27,704,906**	**5,967,182**	**22**

Notes:
GPD – Gallons per day SF – Square Feet
[1]Non Residential includes commercial, retail, open space, agricultural, and mixed land uses
Land use data supplied by Placeworks, 2018

Full implementation of the proposed increases has the potential to increase water demand by 5.97 MGD (6684 AFY) within the City and SOI. Water demands will primarily come from additional dwelling units in both the City and SOI. These flow estimates are for land planning purposes only and are considered very conservative and overestimate actual flows.

4.4.2 Proposed Water System

The City currently has 19 identified water system improvement projects throughout the City as part of its CIP, as identified in the 2005 Water Master Plan. These projects are intended to increase the City water system's capacity and functionality to keep up with population and non-residential growth throughout the service area. The status of these projects, as well as the list of constructed or completed projects, will be updated upon the release of the updated Water Master Plan, anticipated in the next 2-3 years.

Per the City of Corona 2018 Reclaimed Water Master Plan, the City is planning on increasing its use of recycled water throughout its service area into the future, improving the City's water security and efficiency and further expanding its portfolio of water sources. Recycled water production is estimated to increase 7.8%, an increase of 0.88 MGD, by 2040[22].The City will also be incorporating the new WRCRWA wastewater reclamation facility in Eastvale into its supply portfolio as an additional source of reclaimed water.

The City of Corona has confirmed that it has adequate capacity for the proposed increases in water demands across the City under implementation of the GPU, and that it will be able to serve the additional dwelling units and commercial and industrial square footage proposed.

The TVWD has noted that it has no current deficiencies or planned improvement projects for its water system.

[22] City of Corona. 2018. 2018 Reclaimed Water Master Plan.

Disadvantaged Communities Proposed Water System

El Cerrito

The City of Corona DWP has an on-going program of upgrading water distribution facilities, as funds become available; this includes facilities in the El Cerrito area. However, new developments subject to Development Plan Review will be required to meet City standards for water service and fire flow as identified in the most current Water Master Plan. All construction costs and necessary fees will be the responsibility of the site developer. Deficiencies will be corrected as needed and monitoring will occur to ensure that water standards and fire flow standards are maintained.

Home Gardens

HGWCD provides service to the Home Gardens DUC and has noted that there are no existing deficiencies and that the water system is in good condition. HGCWD will remain a member of WMWD and continue to receive treated water to meet its needs and relies on the City for its water supply. HGCWD staff noted that the area is substantially built-out and does not anticipate any significant increases in demands, and that all new users will be subject to buy-ins or capacity fees.

4.4.3 Water Impacts

The following impact assessments are based on the significance criteria established in Section 3.2 for water systems.

Impact 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?

Impact Analysis: Specific impacts on the regional water system will be determined when the Corona Water Master Plan and respective planning documents for the SOI are updated to include the proposed land uses associated with the GPU. However, major deficiencies are not anticipated as the City has confirmed that it will have adequate capacity to accommodate the proposed increases in water demands under implementation of the GPU. Individual projects will be subject to City permits, fees, and applications in order to ensure that they will not place an undue burden on existing infrastructure. TVWD and EVWC will both be able to serve the increased demands under implementation of the GPU through updating appropriate master plans and developer fees to accommodate for any expansions that may be necessary. No significant impacts from the construction or expansion of water facilities are anticipated.

Impact D Have sufficient water supplies available to serve the project from existing and resources, or are new or expanded entitlements needed?

Impact Analysis: Under full buildout of the proposed land use changes in the GPU, water demands would increase by 5.97 GPD across the City and its SOI, an overall increase of 22%. The City has a total groundwater capacity of 35.0 MGD and a total imported water supply capacity of 35.6 MGD[23]. The proposed increase of 2.4 MGD for the City and portions of the

[23] City of Corona. 2005 Water Master Plan (Updated 2005). Retrieved July 2017.

proposed increase of 3.5 MGD for the City's SOI can be served by the City's current water resources without the need for new or expanded entitlements. As TVWD and HGWCD receive imported water from the WMWD, this supply will be adequate to meet proposed increases in demands under buildout of the GPU. No impacts to water supplies are anticipated.

4.5 WATER QUALITY

4.5.1 Construction Activities

Clearing, grading, excavation and construction activities associated with the proposed project may impact water quality due to sheet erosion of exposed soils and subsequent deposition of particulates in local drainages. Grading activities, in particular, lead to exposed areas of loose soil, as well as sediment stockpiles, that are susceptible to uncontrolled sheet flow. Although erosion occurs naturally in the environment, primarily from weathering by water and wind action, improperly managed construction activities can lead to substantially accelerated rates of erosion that are considered detrimental to the environment.

General Construction Permit

Prior to the issuance of grading permits, the project applicants shall provide evidence that the development of the projects one acre or greater of soil disturbance shall comply with the most current Construction General Permit (CGP) and associated local National Pollutant Discharge Elimination System (NPDES) regulations to ensure that the potential for soil erosion is minimized on a project by project basis. In accordance with the most recent CGP (Order No. 2009-0009-DWQ), the following Permit Registration Documents are required to be submitted to the SWRCB prior to commencement of construction activities:

- Notice of Intent (NOI)
- Risk Assessment (Standard or Site-Specific)
- Particle Size Analysis (if site-specific risk assessment is performed)
- Site Map
- SWPPP
- Post-Construction Water Balance Calculator
- Active Treatment System (ATS) Design Documentation (if ATS is determined necessary)
- Annual Fee & Certification

Construction Best Management Practices (BMPs)

In accordance with the existing and updated GCP, a construction SWPPP must be prepared and implemented at all construction projects with 1 acre or greater of soil disturbance, and revised as necessary, as administrative or physical conditions change. The SWPPP must be made available for review upon request, shall describe construction BMPs that address pollutant source reduction, and provide measures/controls necessary to mitigate potential pollutant sources. These include, but are not limited to: erosion controls, sediment controls, tracking controls, non-storm water management, materials & waste management, and good housekeeping practices[24]. The above-mentioned BMPs for construction activities are briefly discussed below.

Prior to commencement of construction activities within the Corona GPU area, the project-specific SWPPP(s) will be prepared in accordance with the site-specific sediment risk analyses based on the grading plans, with erosion and sediment controls proposed for each phase of construction for the individual project. The phases of construction will define the maximum amount of soil disturbed, the appropriate sized sediment basins and other control measures to accommodate all active soil disturbance areas and the appropriate monitoring and sampling plans.

4.5.2 Post-Construction Activities

With the proposed land use changes, development resulting from the Corona GPU may result in long-term impacts to the quality of storm water and urban runoff, subsequently impacting downstream water quality. Developments similar to the proposed project can potentially create new sources for runoff contamination through changing land uses. As a consequence, implementation of the GPU may have the potential to increase the post-construction pollutant loadings of certain constituent pollutants associated with the proposed land uses and their associated features, such as landscaping and plaza areas.

To help prevent long-term impacts associated with land use changes and in accordance with the requirements of the City of Corona LIP and consistency with Riverside County Fourth-Term MS4 permit, new development and significant redevelopment projects must incorporate LID/site design and source control BMPs to address post-construction storm water runoff management. In addition, projects that are identified as Priority Projects are required to implement site design/LID and source control BMPs applicable to their specific priority project categories, as well as implement treatment control BMPs where necessary. Selection of LID and additional treatment control BMPs is based on the pollutants of concern for the specific project site and the BMP's ability to effectively treat those pollutants, in consideration of site conditions and constraints. Further, both Priority and Non-Priority projects must develop a project-specific Water Quality Management Plan (WQMP) that describes the menu of BMPs chosen for the project, as well as include operation and maintenance requirements for all structural and any treatment control BMPs.

Since the Corona GPU does not include a specific or detailed development plan, project-specific WQMP will not be developed for the project at this time. Future project-specific WQMPs, preliminary and/or final, will be prepared consistent with the prevailing terms and conditions of the City LIP, and Model WQMP at the time of project application. Moreover, LID and water quality treatment solutions prescribed in project specific WQMPs shall be designed to support or enhance the regional BMPs and efforts implemented by the City as part of their City and SOI-wide efforts to improve water quality.

[24] California Stormwater Quality Association. (2003, January). *Stormwater Best Management Practices Handbook for New Development and Redevelopment*. Retrieved January 27, 2009, from http://www.cabmphandbooks.com

LID Design Approach

The overall approach to water quality treatment for the individual projects within the Corona GPU area will include incorporation of site design/LID strategies and source control measures throughout the sites in a systematic manner that maximizes the use of LID features to provide treatment of storm water and reduce runoff. In accordance with the MS4 Permit, the use of LID features will be consistent with the prescribed hierarchy of treatment provided in the Permit: infiltration, evapotranspiration, harvest/reuse and biotreatment. For those areas of the site where LID features are not feasible or do not meet the feasibility criteria, treatment control BMPs with biotreatment enhancement design features will be utilized to provide treatment. Where applicable, LID features will be analyzed to demonstrate their ability to treat portions of the required design capture volume (DCV) and reduce the size of downstream on-site treatment control BMPs.

Consistent with regulatory requirements and design guidelines for water quality protection, the following principles are being followed for the project and will be supported by construction level documents in the final LID Design Plans prior to grading permit(s) issuance by the City of Corona:

- Where feasible, LID features will be sized for water quality treatment credit according to local Regional Board sizing criteria as defined in the Fourth-Term MS4 Permit for either flow-based or volume-based BMPs. LID techniques within the internal development areas (site design objectives), thereby providing treatment of low-flow runoff directly at the source and runoff reduction of small (i.e., more frequent) storm event runoff (first-flush). In most instances, LID features will be sized by volume-based analyses to demonstrate compliance with the required design capture volume for the project.
- Detailed field investigations, drainage calculations, grading, and BMP sizing to occur during the detailed design phase and future project-specific WQMP documentation.
- Where feasible, LID features will be designed to infiltrate and/or reuse treated runoff on-site in accordance with feasibility criteria as defined in the 2012 Water Quality Management Plan Guidance Document for the Santa Ana Region of Riverside County.[25]
- For those areas of the project where infiltration is not recommended or acceptable and harvest/reuse landscaping demands are insufficient, biotreatment LID features will be designed to treat runoff and discharge controlled effluent flows to downstream receiving waters.

Unlike flood control measures that are designed to handle peak storm flows, LID BMPs and treatment control BMPs are designed to retain, filter or treat more frequent, low-flow runoff or the "first-flush" runoff from storm events. In accordance with the Fourth-Term MS4 Permit for Riverside County, the LID BMPs shall be sized and designed to ensure on-site retention of the volume of runoff produced from a 24-hour 85th percentile storm event, as determined from the Riverside County's Isohetyl Map for the 85th Percentile 24-Hour Storm Event[26]. This is termed the "design capture volume", or DCV. The 2012 Water Quality Management Plan Guidance Document and LID Design Handbook provide design criteria, hydrologic methods and

[25] Santa Ana Region of Riverside County. (October 2012). Water Quality Management Plan (WQMP) Guidance Document

[26] Exhibit A in the WQMP Guidance Document (Riverside County, 2012).

calculations for combining use of infiltration, retention, and biofiltration BMPs to meet the required design capture volume.

Sustainable Infrastructure Opportunities
As part of an on-going sustainable effort to improve water conservation, reduce potable water usage, support green infrastructure features within the Public right-of-way and reduce environmental "footprint" within the GPU area, there are several emerging trends and technologies that should be considered and incorporated where feasible within the future redevelopment opportunities within the City and SOI, particularly in areas where infiltration has been deemed infeasible. These include the following:

- Gray Water Systems – The use of gray water systems to collect and reuse gray water from various new developments and redevelopments can greatly reduce on-site potable water usage. The process typically includes routing water from showers, sinks and washing machines, treating the water to NSF 350 standards[27] (or equivalent) and reusing the treated gray water within the building for toilet flushing or exterior landscaping. Gray water systems are especially opportune and cost-effective multi-family residential developments where the consistent use of water from showers, sinks and washing machines can be reused for toilet flushing and/or landscape irrigation. Reuse of gray water can help reduce both potable water and sewer generation fees.

- Small-scale and Large-scale Cistern and Reuse Systems – Both small- and large-scale harvest and reuse systems may be feasible based on certain project types. Depending on the type of potable demand for landscape irrigation and toilet flushing of a new development of redevelopment, the implementation of a harvested rainwater BMP would provide a multi-benefit solution that could satisfy both water quality regulations and provide for a sustainable water quantity solution that would offset potable water costs. The efficiency and cost-effectiveness for harvest and reuse systems increases when combined with on-site gray water recycling systems.

- Green Street Features – Green streets are sustainable design features with many benefits. Green street design components include stormwater infiltration planters within parkways to treat lot runoff and roadway runoff; bulb out planters that provide traffic calming along with runoff treatment, tree boxes and light reflective paving surfaces which reduce heat island effects.

- Green Roofs and Green Walls – Green roofs and green walls offer some of the most advanced ways to reduce stormwater runoff volumes and common pollutants. As open space becomes more limited within high density areas, green roofs provide a solution with many additional benefits including stormwater treatment, internal and external cooling effects for the building and aesthetic benefits, all within a shared footprint. Green roofs are most feasible when there is a sturdy building structure included in a project. On the other hand, green walls require less structural stability and can be implemented on almost any vertical surface. Some opportunities include implementing green walls on the sides of large, above-ground parking structures. Green roof/wall

[27] NSF/ANSI 350 and 350-1: Onsite Water Reuse Specifications. Found here: http://www.nsf.org/services/by-industry/water-wastewater/onsite-wastewater/onsite-reuse-water-treatment-systems

design can be combined with harvest and reuse cisterns and gray water systems to provide a constant source of treated water for irrigation without increasing demands on local and regional potable water supplies.

Each of these opportunities should be evaluated to determine feasibility and appropriateness for the proposed development and redevelopment projects within the GPU area.

Consistency with the State-wide Trash TMDL
As part of the state-wide mandate to reduce trash within receiving waters, the City of Corona and its SOI will be required to adhere to the requirements of the amended CA Trash Total Maximum Daily Load (TMDL) from July 2016 onwards. The requirements will include the installation and maintenance of trash screening devices at all public curb inlets, grate inlets and catch basin inlets. The trash screening devices must be approved by the local agency and consistent with the minimum standards of the Trash TMDL. The City of Corona has selected Track 1 as its compliance option. By selecting Track 1, the City has agreed to install, operate, and maintain full capture systems in storm drains that capture runoff from one or more priority land use areas.

4.5.3 Water Quality Impacts

The impact assessments are based on the significance criteria established in Section 3.2for water quality.

Impact A *Would the Project violate any water quality standards or waste discharge requirements?*

Impact Analysis:
Construction activities within the GPU area would potentially result in soil erosion and temporary adverse impacts to surface water quality from construction materials and wastes if left unregulated or unmitigated.

Both State and Local regulations will effectively mitigate construction storm water runoff impacts from the proposed land use changes under the GPU. Standard erosion control practices shall be implemented for all construction within the City and SOI. Additionally, construction sites will be required to prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) in accordance with the requirements of the Statewide General Construction Permit and subject to the oversight of the Santa Ana Regional Water Quality Control Board. The SWPPP must include BMPs to reduce or eliminate erosion and sedimentation from soil disturbing activities, as well as proper materials and waste management. Implementation of these State and Local requirements would effectively protect projects from violating any water quality standards or waste discharge requirements from construction activities.

In terms of post-construction related impacts, the incorporation of site design, LID features and BMPs as required under the Riverside County MS4 Permit, the individual development and redevelopment projects within the GPU will effectively retain or treat the 85th percentile 24-hour storm water runoff for pollutants such as bacteria, metals, nutrients, oil & grease, organics, pesticides, sediment, trash, and oxygen demanding substances prior to discharge off their property. As properties within the City and SOI undergo redevelopment, existing properties that do not have water quality BMPs will be replaced with project incorporating LID BMPs. Therefore, long-term surface water quality of runoff from the GPU area would be expected to improve over existing conditions as more LID BMPs are implemented. This is considered an overall beneficial effect of the proposed land use changes associated with implementation of the GPU.

Impact F Would the Project otherwise substantially degrade water quality?

Impact Analysis: As a result of the construction-related, site design, LID and source control BMPs, water quality exceedances are not anticipated, and pollutant loads in runoff are not expected to adversely affect beneficial uses in downstream receiving waters, such as Temescal Creek or the Santa Ana River. See Impact Analysis to Impact A for additional details.

5. CONCLUSION

The proposed land use changes under the City of Corona GPU will increase the demand of potable water and sewer flows over existing conditions while largely maintaining existing runoff conditions for built out areas or ensure new development runoff is managed in conformance with regional or master plans of drainage. In all cases of new development or redevelopment, project specific analyses will be required during to evaluate individual storm drain, water and sewer facilities related to the individual projects to ensure impacts are less than significant and infrastructure systems are upgraded as necessary

Based on the existing built out condition and the proposed land use changes under the City of Corona GPU including the implementation of low impact development features, no substantial additional sources of pollutants or significant increases in Project runoff for the 85th percentile storm event are anticipated. Based on the findings of this technical study, the incorporation of site design/LID features, and infiltration/biotreatment BMPs as required under the MS4 Permit and local LID requirements, the individual projects will adequately reduce project related impacts to hydrology and water quality to a level less than significant.

6. TECHNICAL APPENDICES

Appendix A Corona GPU Area Drainage System

Appendix B Corona GPU Area Sewer System

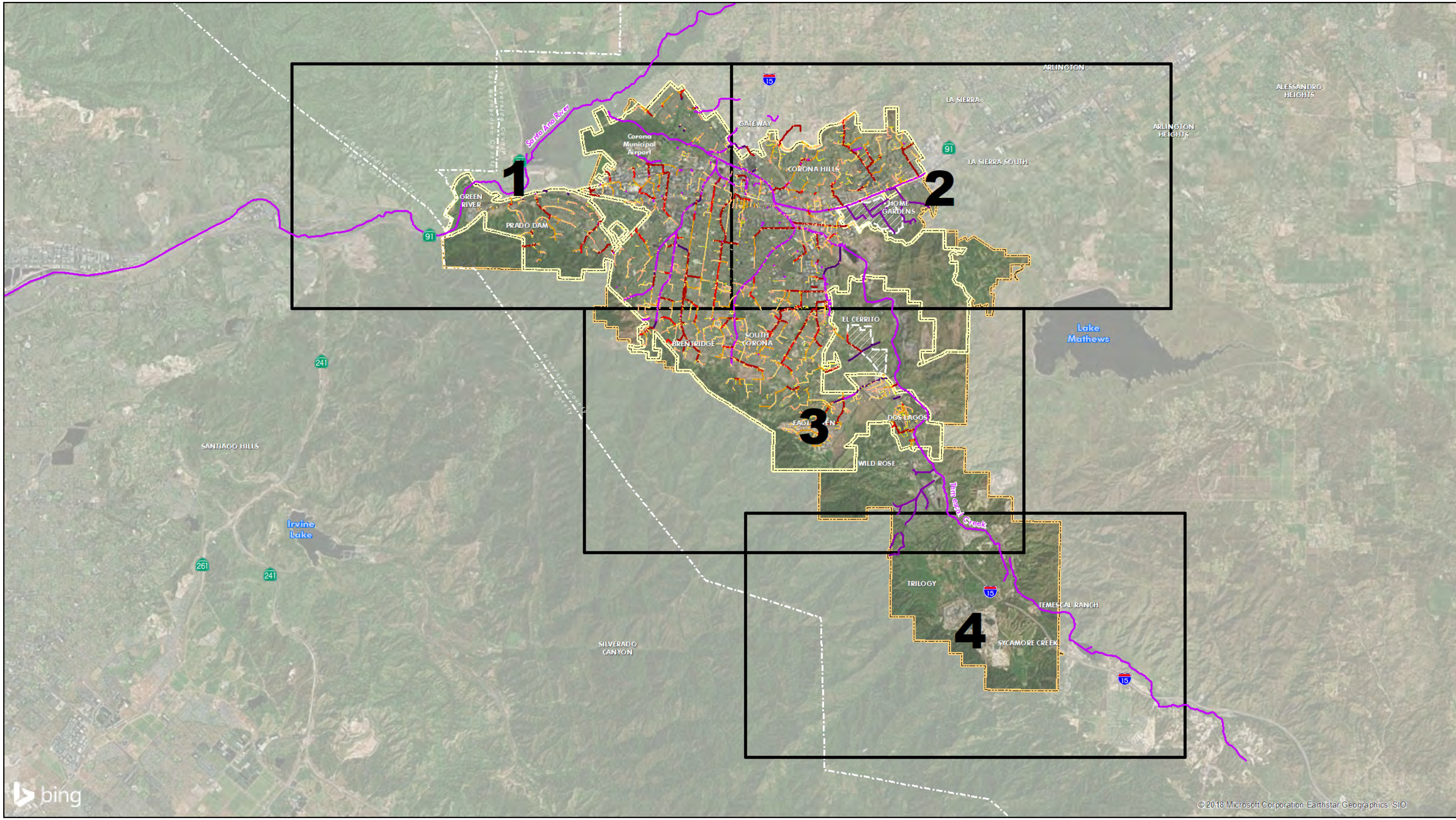
Appendix C Corona GPU Area Water System

Appendix D Sewer Flow Calculations

Appendix E Water Demand Calculations

APPENDIX A

CORONA GPU AREA DRAINAGE SYSTEM



Aerial Date: 2010

City of Corona and SOI Storm Drain System

City of Corona General Plan Update

FUSCOE ENGINEERING

City of Corona
City of Corona Sphere of Influence
Disadvantaged Unincorporated Communities

Storm Drain Lines

- 8" to 12"
- 13" to 18"
- 20" to 29"
- 30" to 39"
- 42" to 48"
- 51" to 58"
- 60" to 124"
- Storm Drain Channels
- District Facilities (Riverside County)

Index

08/24/2018

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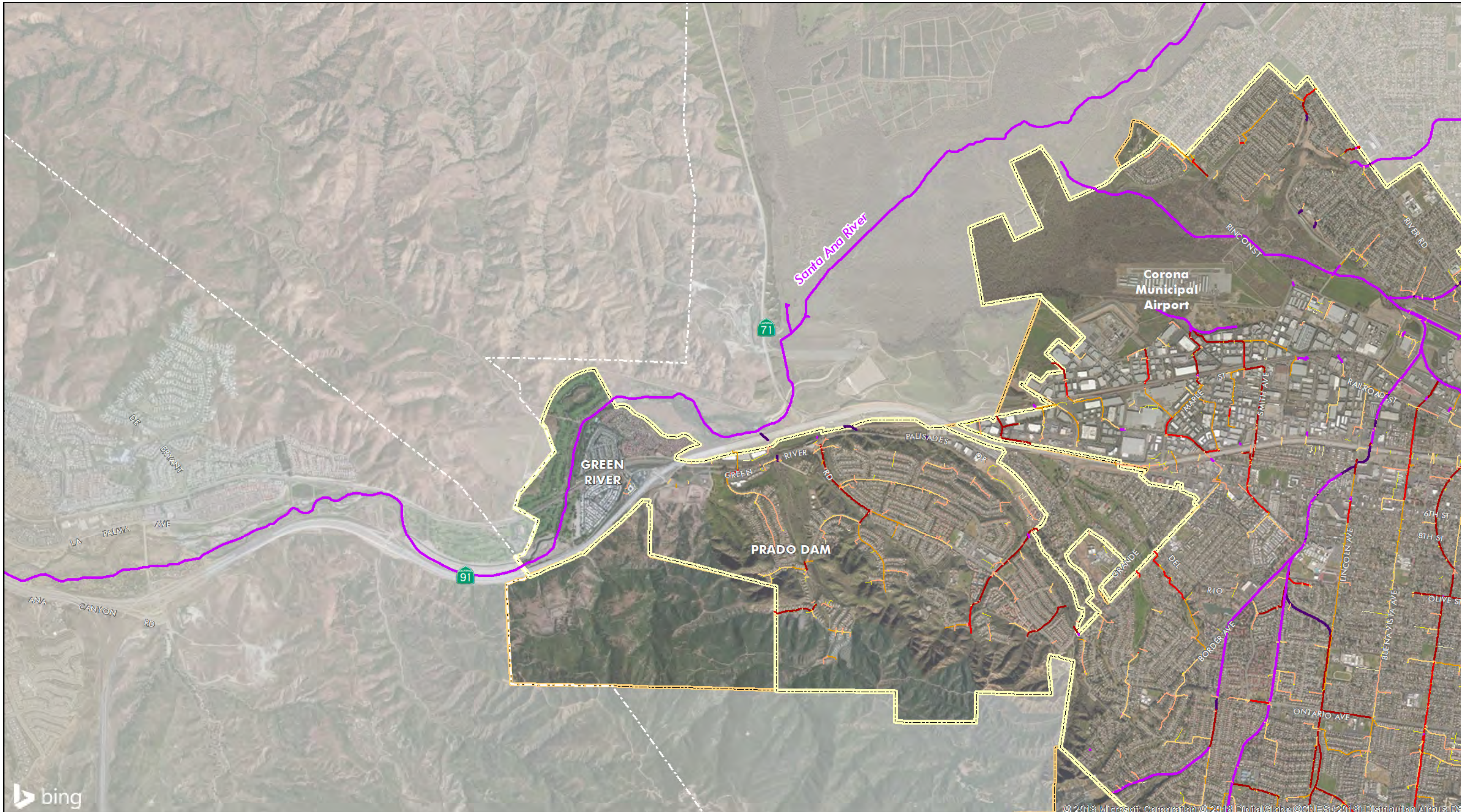

Aerial Date: 2010

City of Corona and SOI Storm Drain System

Sheet 1 of 4

City of Corona General Plan Update

08/24/2018

FUSCOE ENGINEERING

- City of Corona
- City of Corona Sphere of Influence
- Disadvantaged Unincorporated Communities

Storm Drain Lines

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- 13" to 18"
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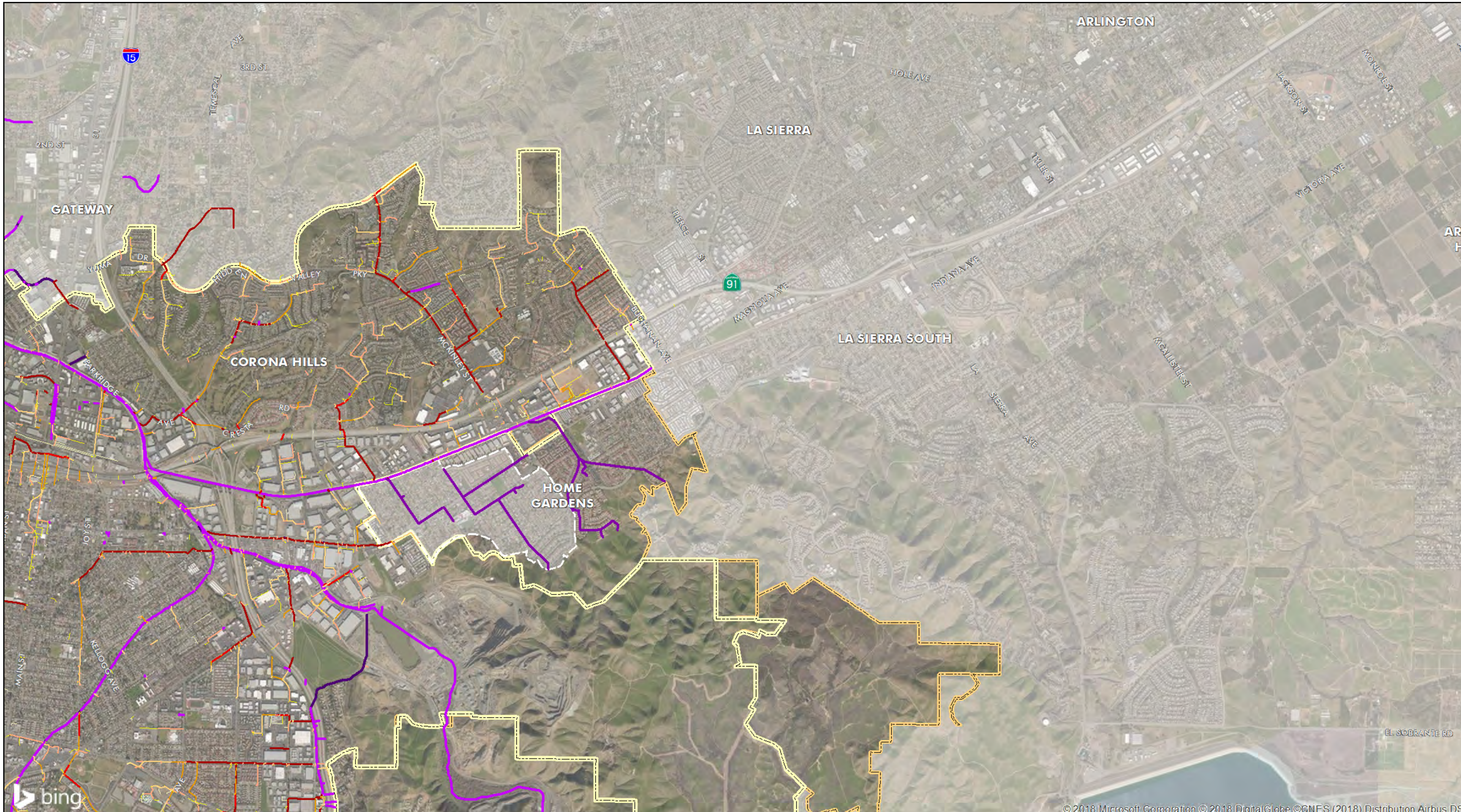

Aerial Date: 2010

City of Corona and SOI Storm Drain System **Sheet 2 of 4**

City of Corona General Plan Update

08/24/2018

FUSCOE ENGINEERING

City of Corona
City of Corona Sphere of Influence
Disadvantaged Unincorporated Communities

Storm Drain Lines
8" to 12"
13" to 18"
20" to 29"
30" to 39"
42" to 48"
51" to 58"
60" to 124"
Storm Drain Channels
District Facilities (Riverside County)

0 3,050 6,100 Feet

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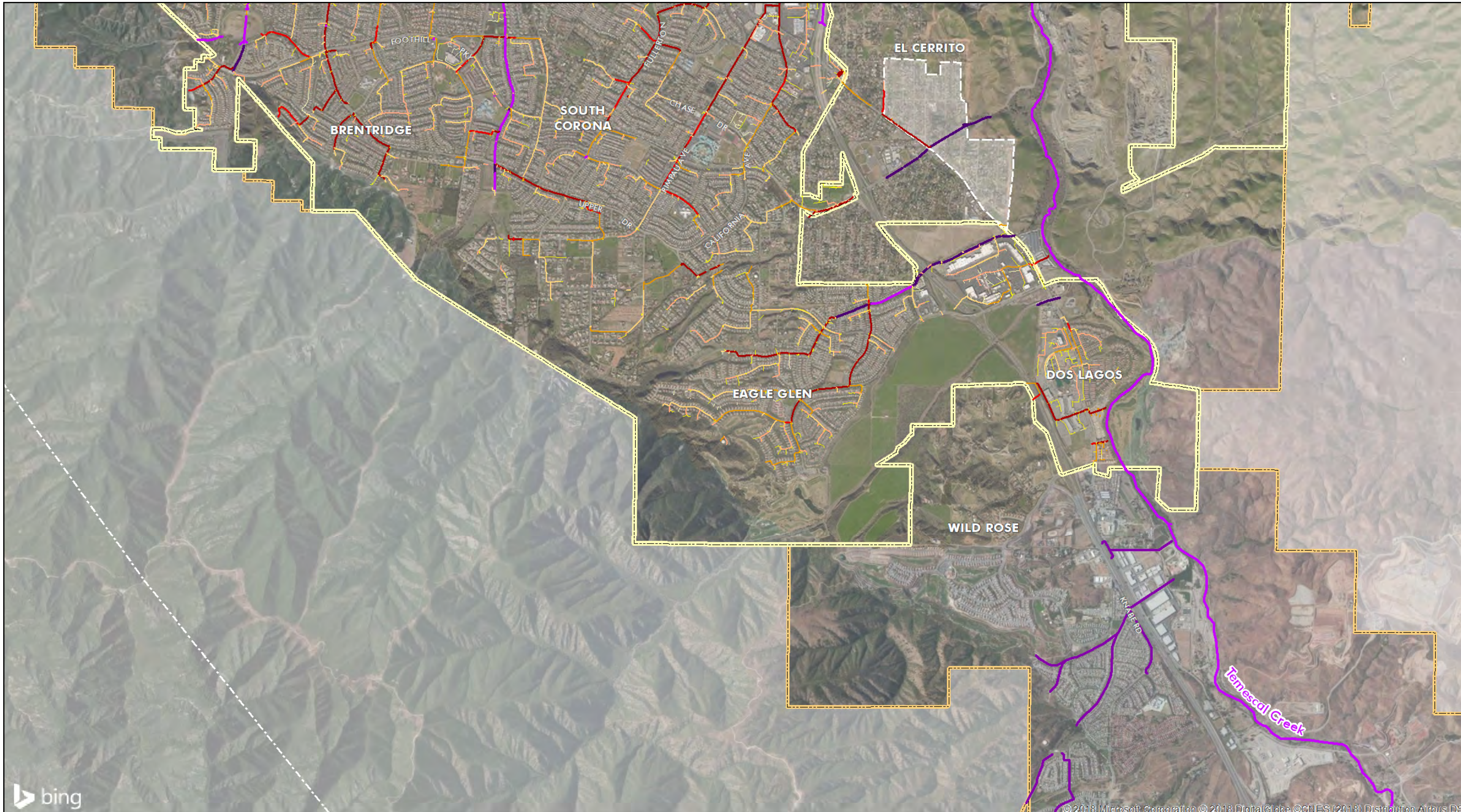

Aerial Date: 2010

City of Corona and SOI Storm Drain System

Sheet 3 of 4

City of Corona General Plan Update

08/24/2018

City of Corona
City of Corona Sphere of Influence
Disadvantaged Unincorporated Communities

Storm Drain Lines

8" to 12"
13" to 18"
20" to 29"
30" to 39"
42" to 48"
51" to 58"
60" to 124"
Storm Drain Channels
District Facilities (Riverside County)

0 3,050 6,100 Feet

FUSCOE ENGINEERING

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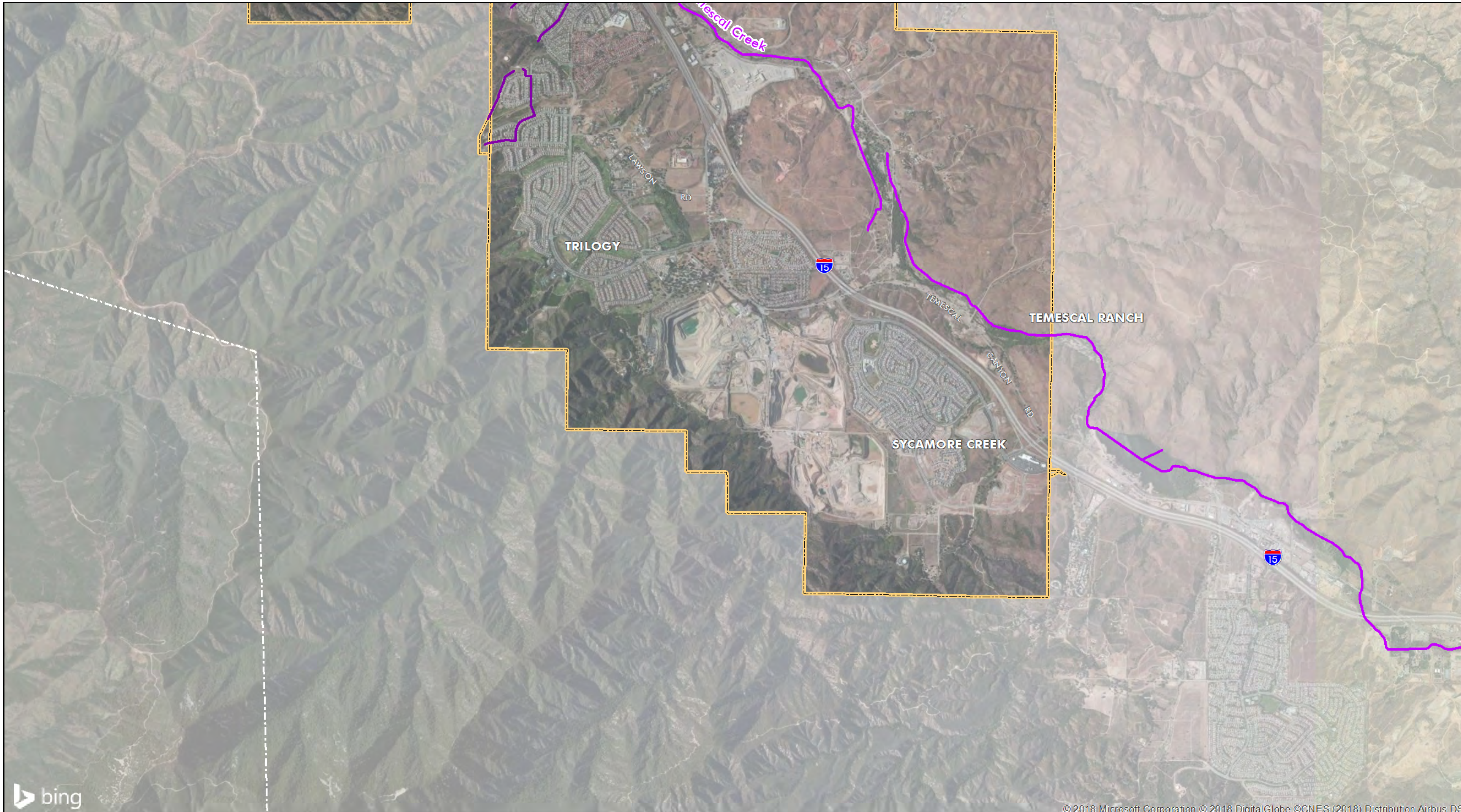

Aerial Date: 2010

City of Corona and SOI Storm Drain System

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City of Corona General Plan Update

08/24/2018

FUSCOE ENGINEERING

City of Corona
City of Corona Sphere of Influence
Disadvantaged Unincorporated Communities

Storm Drain Lines
8" to 12"
13" to 18"
20" to 29"
30" to 39"
42" to 48"
51" to 58"
60" to 124"
Storm Drain Channels
District Facilities (Riverside County)

0 3,050 6,100 Feet

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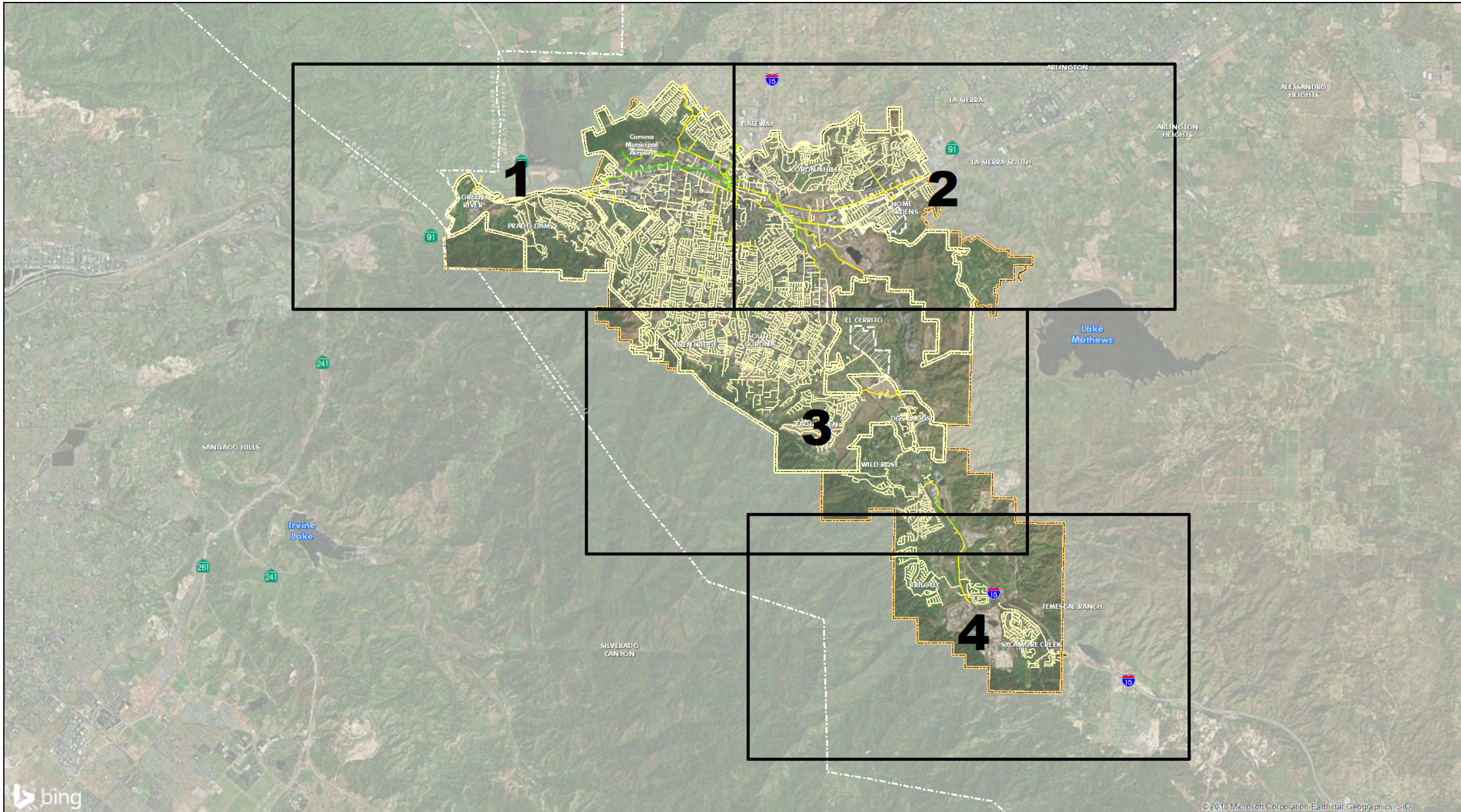
APPENDIX B

CORONA GPU AREA SEWER SYSTEM



Aerial Date: 2010

City of Corona and SOI Sewer System

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City of Corona General Plan Update

08/24/2018

City of Corona
City of Corona Sphere of Influence
Disadvantaged Unincorporated Communities

Sewer Lines
8" - 12"
13" - 18"
19" - 27"
28" - 48"
49" - 75"

0 10,000 20,000 Feet

FUSCOE ENGINEERING

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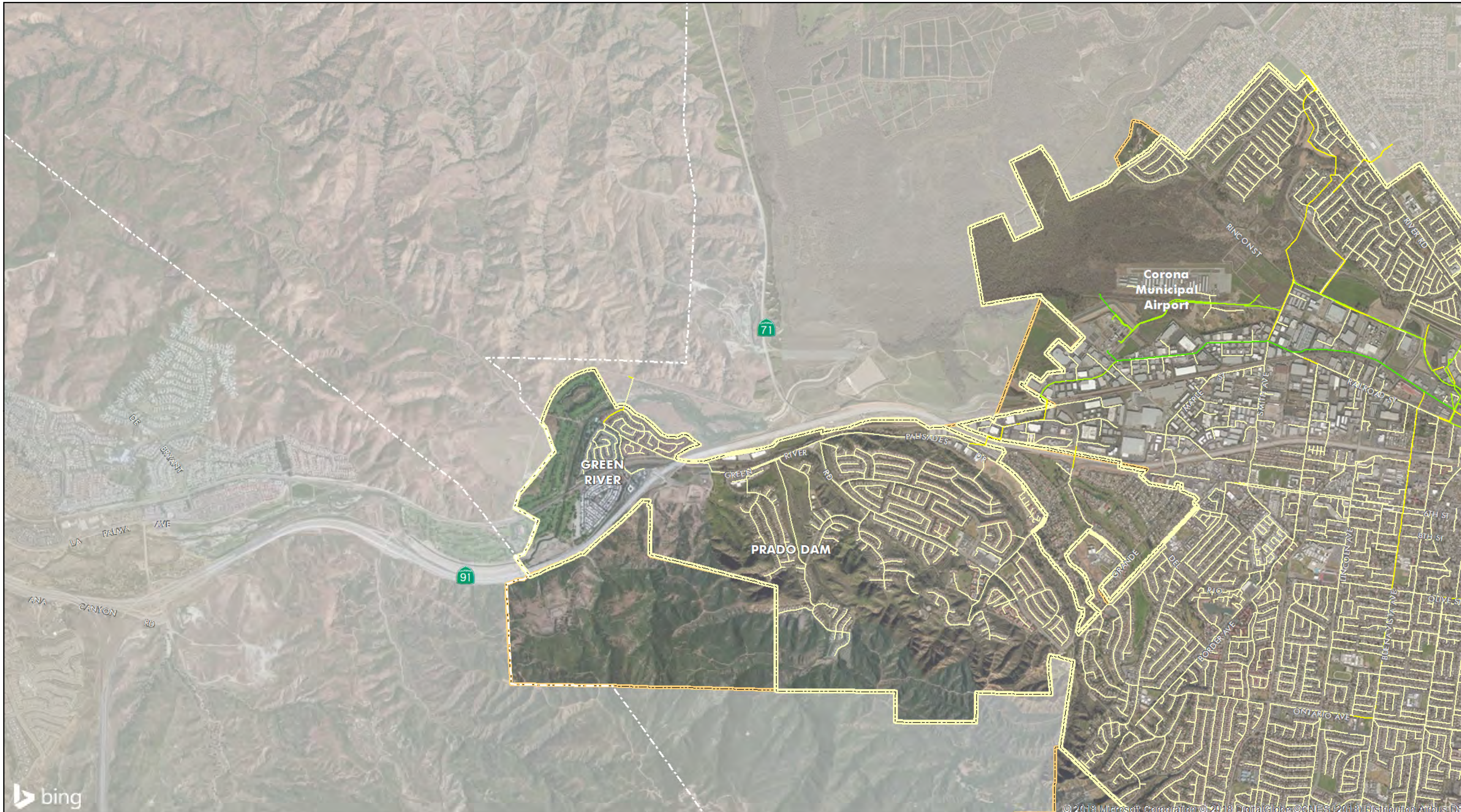

Aerial Date: 2010

City of Corona and SOI Sewer System

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City of Corona General Plan Update

08/24/2018

City of Corona
City of Corona Sphere of Influence
Disadvantaged Unincorporated Communities

Sewer Lines

8" - 12"
13" - 18"
19" - 27"
28" - 48"
49" - 75"

0 3,050 6,100 Feet

FUSCOE ENGINEERING

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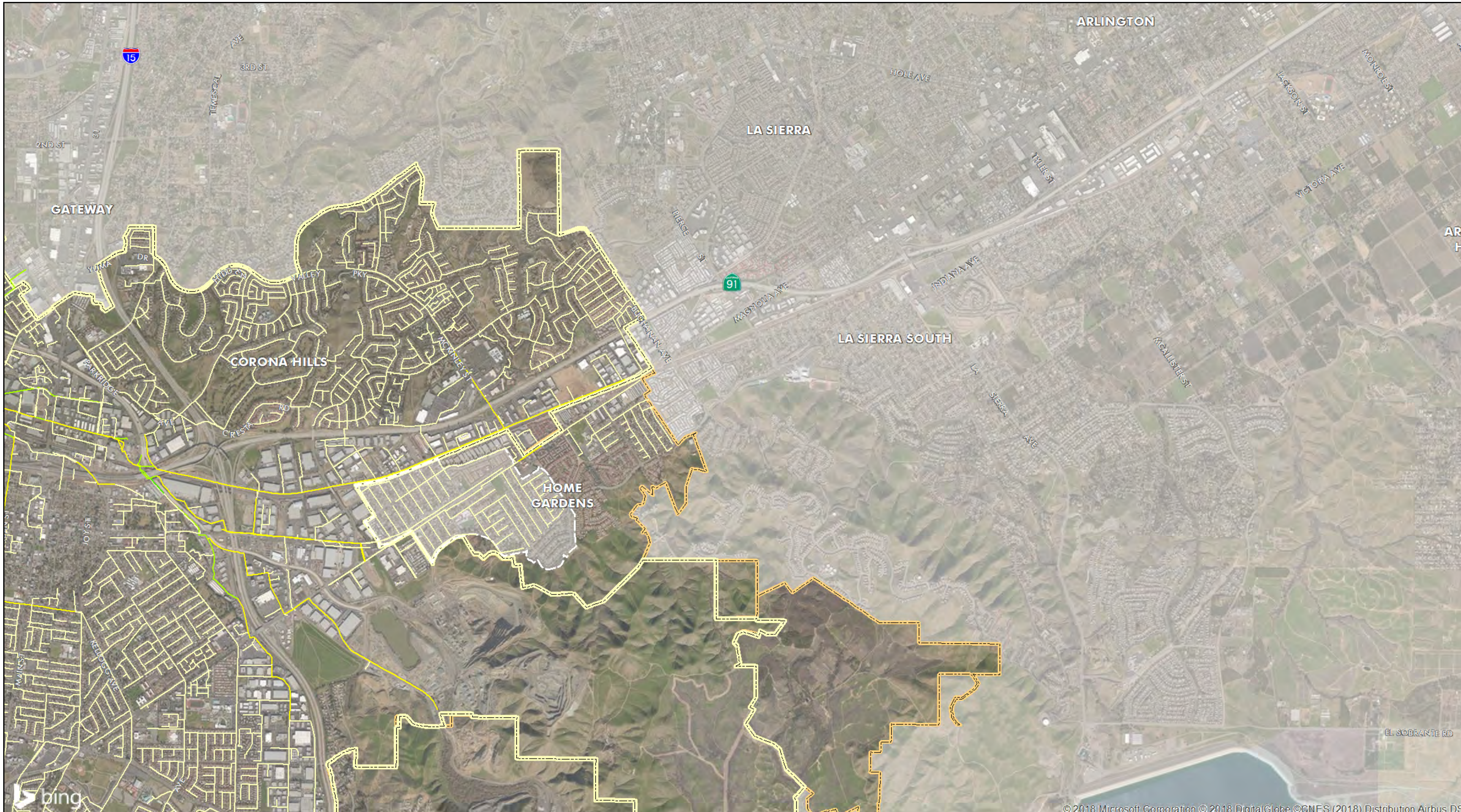

Aerial Date: 2010

City of Corona and SOI Sewer System

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City of Corona General Plan Update

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FUSCOE ENGINEERING

City of Corona
City of Corona Sphere of Influence
Disadvantaged Unincorporated Communities

Sewer Lines
8" - 12"
13" - 18"
19" - 27"
28" - 48"
49" - 75"

0 3,050 6,100 Feet

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City of Corona and SOI Sewer System

City of Corona General Plan Update

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FUSCOE ENGINEERING

- City of Corona
- City of Corona Sphere of Influence
- Disadvantaged Unincorporated Communities

Sewer Lines

- 8" - 12"
- 13" - 18"
- 19" - 27"
- 28" - 48"
- 49" - 75"

Feet 0 3,050 6,100

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City of Corona and SOI Sewer System

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City of Corona General Plan Update

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City of Corona
City of Corona Sphere of Influence
Disadvantaged Unincorporated Communities

Sewer Lines

8" - 12"
13" - 18"
19" - 27"
28" - 48"
49" - 75"

0 3,050 6,100 Feet

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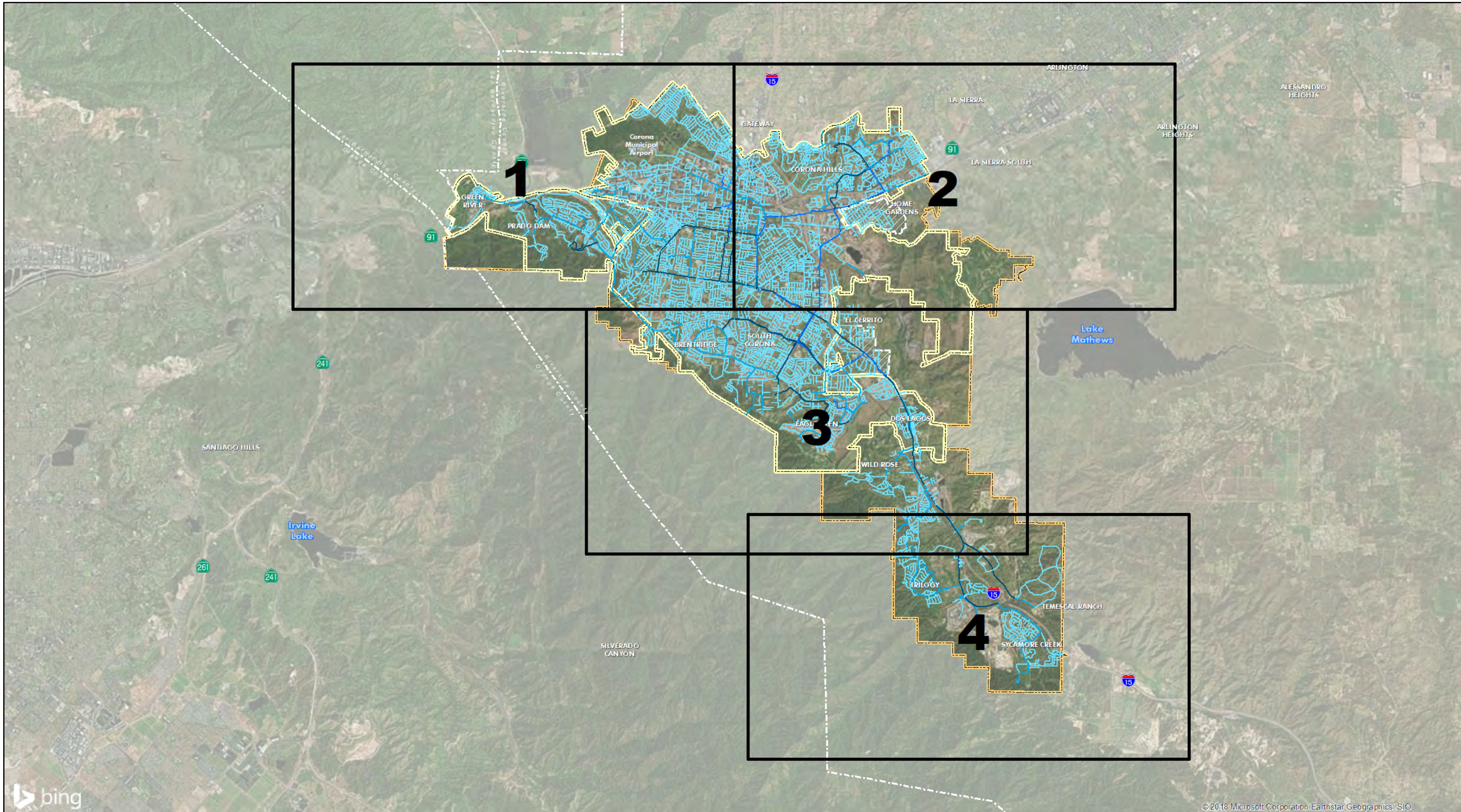
APPENDIX C

Corona GPU Area Water System



Aerial Date: 2010

City of Corona and SOI Water System

City of Corona General Plan Update

FUSCOE ENGINEERING

City of Corona
City of Corona Sphere of Influence
Disadvantaged Unincorporated Communities

Water Lines
6" - 12"
14" - 18"
20" - 28"
30" - 48"
> 48"

Index

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0 9,500 19,000 Feet

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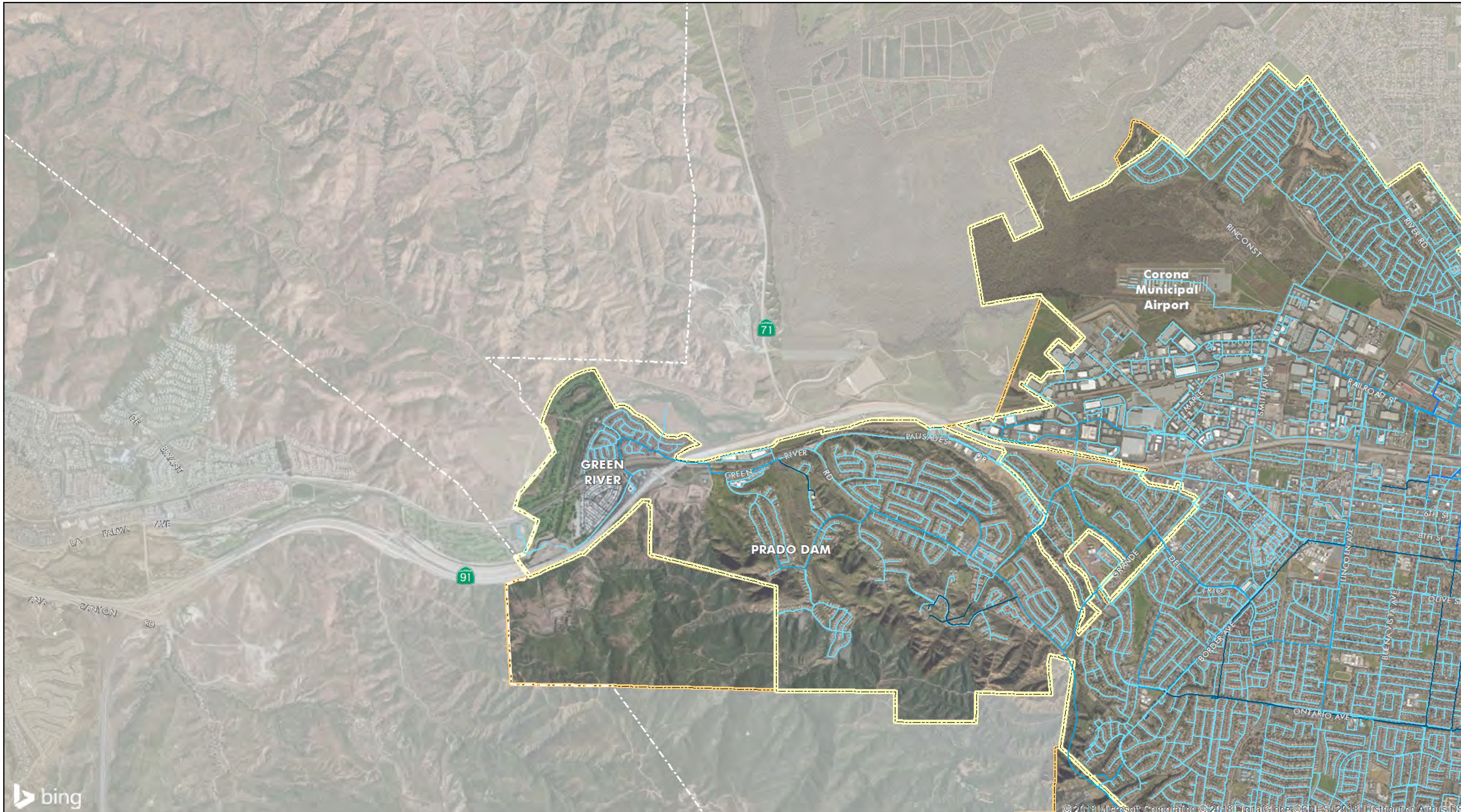

Aerial Date: 2010

City of Corona and SOI Water System

Sheet 1 of 4

City of Corona General Plan Update

08/24/2018

FUSCOE ENGINEERING

City of Corona	**Water Lines**		
City of Corona Sphere of Influence	6" - 12"	20" - 28"	
Disadvantaged Unincorporated Communities	14" - 18"	30" - 48"	
		> 48"	

0 3,050 6,100 Feet

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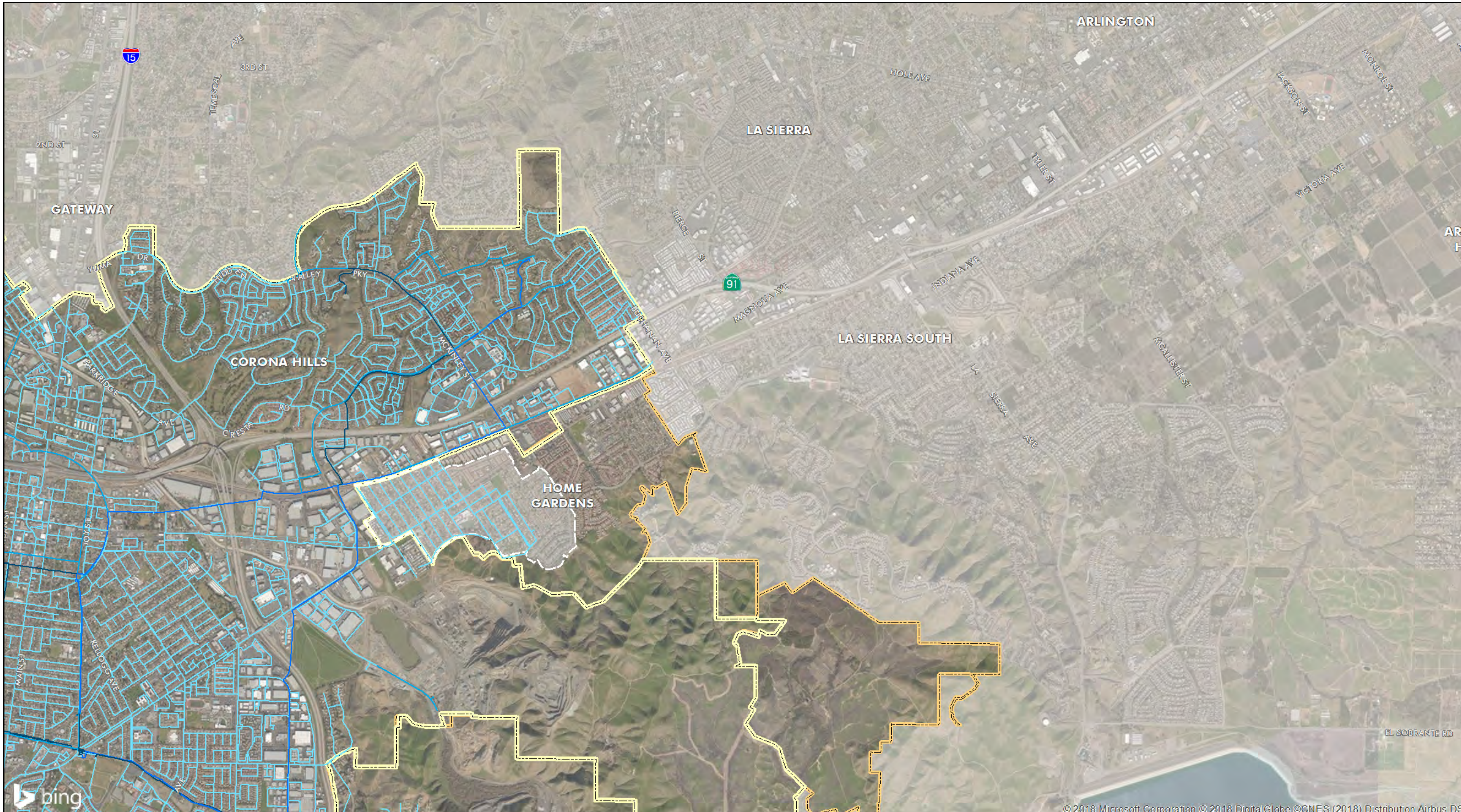

Aerial Date: 2010

City of Corona and SOI Water System

City of Corona General Plan Update

FUSCOE ENGINEERING

City of Corona
City of Corona Sphere of Influence
Disadvantaged Unincorporated Communities

Water Lines

6" - 12"	20" - 28"
14" - 18"	30" - 48"
	> 48"

Sheet 2 of 4

08/24/2018

0 3,050 6,100 Feet

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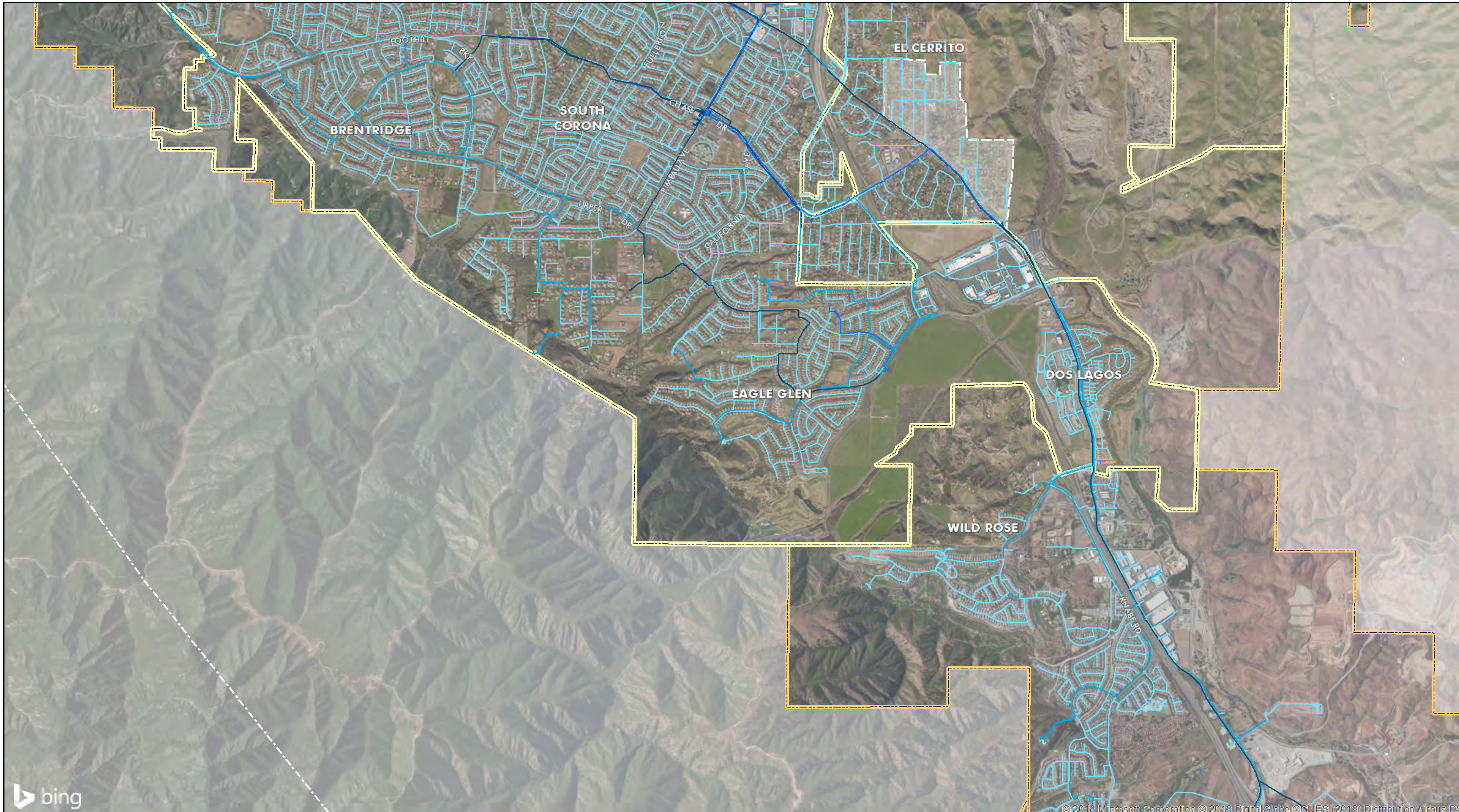

Aerial Date: 2010

City of Corona and SOI Water System

City of Corona General Plan Update

FUSCOE ENGINEERING

City of Corona

City of Corona Sphere of Influence

Disadvantaged Unincorporated Communities

Water Lines

6" - 12"

14" - 18"

20" - 28"

30" - 48"

> 48"

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08/24/2018

0 3,050 6,100 Feet

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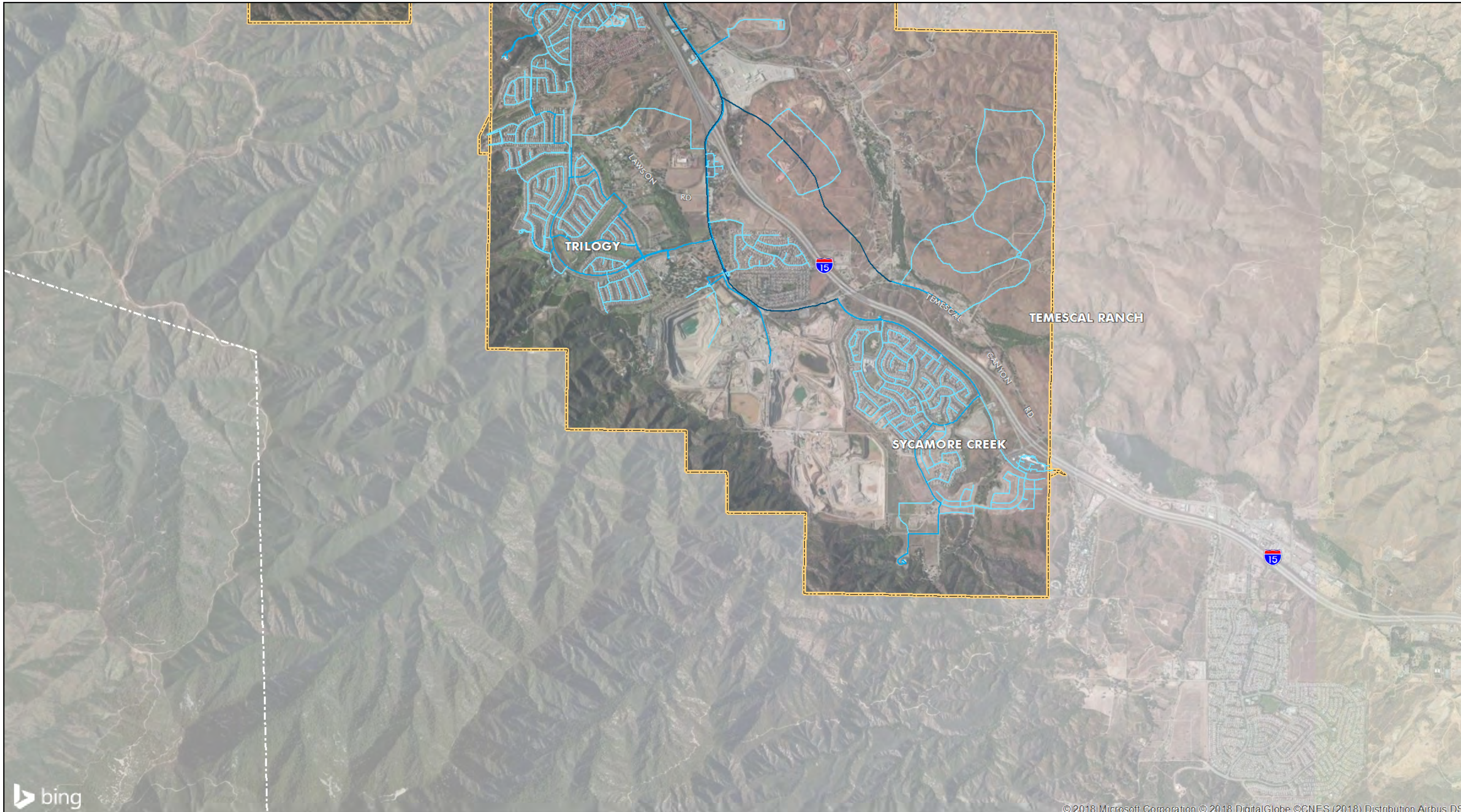

Aerial Date: 2010

City of Corona and SOI Water System

City of Corona General Plan Update

FUSCOE ENGINEERING

City of Corona
City of Corona Sphere of Influence
Disadvantaged Unincorporated Communities

Water Lines
6" - 12"
14" - 18"
20" - 28"
30" - 48"
> 48"

0 3,050 6,100 Feet

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APPENDIX D

SEWER FLOW CALCULATIONS

Corona GPU Area Existing Sewer Flows

	Building(s)		Parcel	Demand	Unit of Measure	Total Demand
	Units	Square Feet	Acres	GPD		GPD
Corona						
Residential						
Single Family Residential	32,943	--	0.00	300	/DU	9,882,900
Multi Family Residential	14,199	--	0.00	270	/DU	3,833,730
Mobile Home	1,389	--	0.00	200	/DU	277,800
Residential Total	**48,531**	--	**0.00**	--	--	**13,994,430**
Business and Commerce						
Commercial	-	385,649	8.85	1050	/acre	9,296
Airport	-	11,738,816	269.49	1050	/acre	282,960
Office Buildings	-	2,586,253	59.37	1260	/acre	74,809
Industrial	-	32,036,533	735.46	1155	/acre	849,454
Commercial Total	**-**	**46,747,251**	1073.17	--	--	**1,216,519**
Open Space Resources						
Agriculture	-	7,600	0.17	1050	/acre	183
Agriculture, DU	1	-	0.00	300	/DU	300
General Open Space	-	6,910	0.16	130	/acre	21
Open Space Resources Total	**1**	**14,510**	0.33			**504**
Parks, Cultural, Civic, Education						
Public & Institutional Facilites	-	34,852	0.80	800	/acre	640
Educational Institutions	-	2,939,010	67.47	800	/acre	53,976
Public & Recreational Open Space	-	184,063	4.23	130	/acre	549
P,C,C, & E Total	**-**	**3,157,925**	72.50	--	--	**55,166**
All Other Land Uses						
Utility Facilites	-	226,224	5.19	840	/acre	4,362
Other Land Uses Total	**-**	**39,905**	0.92	--	--	**4,362**
Corona Total	**48,532**	**49,905,176**	**1145.67**	--	--	**15,270,981**
SOI						
Residential						
Single Family Residential	10,133	--	0.00	300	/DU	3,039,900
Multi Family Residential	761	--	0.00	270	/DU	205,470
Residential Total	**10,894**	--	**0.00**	--	--	**3,245,370**
Business and Commerce						
Commercial	-	490,531	11.26	1050	/acre	11,824
Office Buildings	-	1,890	0.04	1260	/acre	55
Industrial	-	2,392,643	54.93	1155	/acre	63,441
Commercial Total	**-**	**2,885,064**	66.23	--	--	**75,320**
Open Space Resources						
Agriculture	-	-	0.00	1050	/acre	0
Agriculture, DU	2	-	0.00	300	/DU	600
General Open Space		-	0.00	130	/acre	0
Open Space Resources Total	2	-	0.00	--	--	**600**
Parks, Cultural, Civic, Education						
Public & Institutional Facilites	--	93,800	2.15	800	/acre	1,723
Educational Institutions		432,595	9.93	800	/acre	7,945
Public & Recreational Open Space	--	25,000	0.57	240	/acre	138
P,C,C, & E Total	**-**	**551,395**	12.66	--	--	**9,805**
All Other Land Uses						
Utility Facilites	--	-	**0.00**	840	/acre	0
Other Land Uses Total	-	-	**0.00**	--	--	**0**
SOI Total	**10,896**	**3,436,459**	**78.89**	--	--	**3,331,095**
Grand Total	**59,428**	**53,341,635**	**1224.56**			**18,602,076**

Table 1-2
Unit Flow Factors

Land Use		*Existing Unit Flow Factor (gpd/ac)	*Ultimate Unit Flow Factor (gpd/ac)	Residential Flow Factors (gpd/du)
RR1	Rural Residential 1 (0.2 to 0.5 du/ac)	150	150	300
RR2	Rural Residential 2 (1 du/ac)	300	300	300
E	Residential Estate (1-3 du/ac)	500	500	300
LDR	Residential Low Density (3-6 du/ac)	1,000	1,000	270
LMDR	Low Medium Density (6-8 du/ac)	1,200	1,200	270
MDR	Medium Density (6-15 du/ac)	1,700	1,700	240
HDR	High Density (15-36 du/ac)	2,000	2,000	200
CBD	Commercial Business District	1,000	1,050	-
C or GCC	General Community Commercial	1,000	1,050	-
CP or OP	Office Professional	1,200	1,260	-
GI	General Industrial	1,100	1,155	-
LI	Light Industrial	800	840	-
I or School	Institutional	800	800	-
OS-R or OS-P	Open Space Recreational	130	130	-
QP or MU	Quasi-Public / Mixed Use	700	700	-

**Unit flow factors based on gross acres*

Corona GPU Area Proposed Condition Sewer Flow Increases

	Building(s)		Parcel	Demand	Unit of Measure	Total Demand
	Units	Square Feet	Acres	GPD		GPD
Corona						
Residential						
Single Family Residential	3,296	--	0.00	300	/DU	988,800
Multi Family Residential	2,190	--	0.00	270	/DU	591,300
Mobile Home	-	--	0.00	200	/DU	0
Residential Total	**5,486**	--	**0.00**	--	--	**1,580,100**
Business and Commerce						
Commercial	-	1,916,457	44.00	1050	/acre	46,196
Airport	-	-	0.00	1050	/acre	0
Office Buildings	-	521,036	11.96	1260	/acre	15,071
Industrial	-	6,929,936	159.09	1155	/acre	183,748
Commercial Total	**-**	**9,367,429**	215.05	--	--	**245,015**
Open Space Resources						
Agriculture	-	-	0.00	1050	/acre	0
Agriculture, DU	8			300	/DU	2,400
General Open Space	-	-	0.00	130	/acre	0
Open Space Resources Total	**8**	**-**	0.00	--	--	**2,400**
Parks, Cultural, Civic, Education						
Public & Institutional Facilites	-	148,375	3.41	800	/acre	2,725
Educational Institutions	-	-	0.00	800	/acre	0
Public & Recreational Open Space	-	-	0.00	130	/acre	0
P,C,C, & E Total	**-**	**148,375**	3.41	--	--	**2,725**
All Other Land Uses						
Utility Facilites	-	-	0.00	840	/acre	0
Other Land Uses Total	**-**	-	0.00	--	--	**0**
Corona Total	**5,494**	**9,515,804**	**218.45**	--	--	**1,830,240**
SOI						
Residential						
Single Family Residential	5,096	--	3.15	300	/DU	1,528,800
Multi Family Residential	846	--	1.28	270	/DU	228,420
Residential Total	**5,942**	--	**15.06**	--	--	**1,757,220**
Business and Commerce						
Commercial	-	617,309	14.17	1050	/acre	14,880
Office Buildings	-	1,094,189	25.12	1260	/acre	31,650
Industrial	-	14,969,850	343.66	1155	/acre	396,928
Commercial Total	**-**	**16,681,348**	382.95	--	--	**443,458**
Open Space Resources						
Agriculture	-	-	0.00	1050	/acre	0
Agriculture, DU	23		0.00	300	/DU	6,900
General Open Space	-	-	0.00	130	/acre	0
General Open Space, DU	52		0.00	300	/DU	15,600
Open Space Resources Total	**75**	-	0.00	--	--	**22,500**
Parks, Cultural, Civic, Education						
Public & Institutional Facilites	--	279,200	6.41	800	/acre	5,128
Educational Institutions		-	0.00	800	/acre	0
Public & Recreational Open Space	--	-	0.00	240	/acre	0
P,C,C, & E Total	**-**	**279,200**	6.41	--	--	**5,128**
All Other Land Uses						
Utility Facilites	--	-	**0.00**	840	/acre	0
Other Land Uses Total	**-**	-	**0.00**	--	--	**0**
SOI Total	**6,017**	**16,960,548**	**389.36**	--	--	**2,228,306**
Grand Total	**11,511**	**26,476,352**	**607.81**			**4,058,546**

APPENDIX E

WATER DEMAND CALCULATIONS

Corona GPU Area Existing Condition Water Demands

	Building(s)		Parcel	Demand	Unit of Measure	Total Demand	
	Units	Square Feet	Acres	GPD		GPD	
Corona							
Residential							
Single Family Residential	32,943	--	0.00	522.5	/DU	17,212,718	
Multi Family Residential	14,199	--	0.00	171.4	/DU	2,433,709	
Mobile Home	1,389	--	0.00	171.4	/DU	238,075	
Residential Total	**48,531**	--	**0.00**	--	--	**19,884,501**	
Business and Commerce							
Commercial	-	385,649	8.85	1610	/acre	14,254	
Airport	-	11,738,816	269.49	1610	/acre	433,873	
Office Buildings	-	2,586,253	59.37	1720	/acre	102,120	
Industrial	-	32,036,533	735.46	1720	/acre	1,264,987	
Commercial Total	**-**	**46,747,251**	1073.17	--	--	**1,815,234**	
Open Space Resources							
Agriculture	-	7,600	0.17	1200	/acre	209	
Agriculture DU	1	-	0.00	522.5	/DU	523	
General Open Space	-	6,910	0.16	1000	/acre	159	
Open Space Resources Total	**1**	**14,510**	0.33	--	--	**890**	
Parks, Cultural, Civic, Education							
Public & Institutional Facilites	-	34,852	0.80	1500	/acre	1,200	
Educational Institutions	-	2,939,010	67.47	1500	/acre	101,206	
Public & Recreational Open Space	-	184,063	4.23	1200	/acre	5,071	
P,C,C, & E Total	**-**	**3,157,925**	72.50	--	--	**107,476**	
All Other Land Uses							
Utility Facilites	-	226,224	5.19	1500	/acre	339,336	Mixed Use/ Quasi Public
Other Land Uses Total	**-**	**39,905**	0.92	--	--	**339,336**	
Corona Total	**48,532**	**49,905,176**	**1145.67**	--	--	**22,147,437**	
SOI							
Residential							
Single Family Residential	10,133	--	3.15	522.5	/DU	5,294,493	
Multi Family Residential	761	--	1.28	171.4	/DU	130,435	
Residential Total	**10,894**	--	**15.06**	--	--	**5,424,928**	
Business and Commerce							
Commercial	-	490,531	11.26	1610	/acre	18,130	
Office Buildings	-	1,890	0.04	1720	/acre	75	
Industrial	-	2,392,643	54.93	1720	/acre	94,475	
Commercial Total	**-**	**2,885,064**	66.23	--	--	**112,680**	
Open Space Resources							
Agriculture	-	-	0.00	1200	/acre	0	
Agriculture DU	2			522.5	/DU	1,045	
General Open Space		-	0.00	1000	/acre	0	
Open Space Resources Total	2	-	0.00	--	--	**1,045**	
Parks, Cultural, Civic, Education							
Public & Institutional Facilites	--	93,800	2.15	1500	/acre	3,230	
Educational Institutions		432,595	9.93	1500	/acre	14,897	
Public & Recreational Open Space	--	25,000	0.57	1200	/acre	689	
P,C,C, & E Total	-	**551,395**	12.66	--	--	**18,815**	
All Other Land Uses							
Utility Facilites	--	-	**0.00**	1500	/acre	0	
Other Land Uses Total	-	-	**0.00**	--	--	**0**	
SOI Total	**10,896**	**3,436,459**	**78.89**	--	--	**5,557,468**	
Grand Total	**59,428**	**53,341,635**	**1224.56**			**27,704,906**	

Assumptions

- According to the US Census[8], there are 3.42 persons per household on average.
- In 2015, 28% of households were low income.
- In 2020 and following, 42% of all new housing units will be low income.
- Low income housing units are distributed as 80% occupying multi-family residential units anc 20% occupying single family residential units.
- A single family residential unit has a demand of 0.585 AFY based on 2014 billing records. 522.5 GPD/DU
- A multi-family residential unit has a demand of 0.192 AFY based on 2014 billing records. 171.4 GPD/DU

Table 1-1
Unit Flow Factors

Existing Land Use	Calibration Water Unit Flow Factor (gpd/ac)	Existing Water Unit Flow Factor (gpd/ac)	Ultimate Water Unit Flow Factor (gpd/ac)
AG (Agriculture)	1,200	1,200	1,200
GCC (Commercial)	1,500	1,610	1,610
CBD, OP (Commercial/ Professional)	1,600	1,720	1,720
E (Estate)	900	940	1,200
FC (Flood Control)	0	0	0
GI (General Industrial)	1,600	1,720	1,720
I (Institutional / School)	1,500	1,500	1,500
LI (Light Industrial)	1,300	1,400	1,400
LDR (Low Density Residential)	3,400	3,540	3,540
LMDR (Low Medium Density Res)	3,600	3,750	3,750
MDR (Medium Density Residential)	3,800	4,000	4,000
HDR (High Density Residential)	4,000	4,160	4,160
OS (Open Space)	1,000	1,000	1,000
OS-P (Open Space Park / Recreational)	1,200	1,200	1,200
MU (Mixed Use / Quasi-Public)	1,500	1,500	1,500
Vacant/ROW	0	0	0

Corona GPU Area Proposed Condition Water Demand Increases

	Building(s)		Parcel	Demand	Unit of Measure	Total Demand
	Units	Square Feet	Acres	GPD		GPD
Corona						
Residential						
Single Family Residential	3,296	--	0.00	522.5	/DU	1,722,160
Multi Family Residential	2,190	--	0.00	171.4	/DU	375,366
Mobile Home	-	--	0.00	171.4	/DU	0
Residential Total	**5,486**	--	**0.00**	--	--	**2,097,526**
Business and Commerce						
Commercial	-	1,916,457	44.00	1610	/acre	70,833
Airport	-	-	0.00	1610	/acre	0
Office Buildings	-	521,036	11.96	1720	/acre	20,574
Industrial	-	6,929,936	159.09	1720	/acre	273,634
Commercial Total	**-**	**9,367,429**	215.05	--	--	**365,041**
Open Space Resources						
Agriculture	-	-	0.00	1200	/acre	0
Agriculture DU	8	-	0.00	522.5	/DU	4,180
General Open Space	-	-	0.00	1000	/acre	0
Open Space Resources Total	**8**	**-**	0.00	--	--	**4,180**
Parks, Cultural, Civic, Education						
Public & Institutional Facilites	-	148,375	3.41	1500	/acre	5,109
Educational Institutions	-	-	0.00	1500	/acre	0
Public & Recreational Open Space	-	-	0.00	1200	/acre	0
P,C,C, & E Total	**-**	**148,375**	3.41	--	--	**5,109**
All Other Land Uses						
Utility Facilites	-	-	0.00	1500	/acre	0
Other Land Uses Total	**-**	-	0.00	--	--	**0**
Corona Total	**5,494**	**9,515,804**	**218.45**	--	--	**2,471,856**
SOI						
Residential						
Single Family Residential	5,096	--	3.15	522.5	/DU	2,662,660
Multi Family Residential	846	--	1.28	171.4	/DU	145,004
Residential Total	**5,942**	--	**15.06**	--	--	**2,807,664**
Business and Commerce						
Commercial	-	617,309	14.17	1610	/acre	22,816
Office Buildings	-	1,094,189	25.12	1720	/acre	43,205
Industrial	-	14,969,850	343.66	1720	/acre	591,096
Commercial Total	**-**	**16,681,348**	382.95	--	--	**657,117**
Open Space Resources						
Agriculture	-	-	0.00	1200	/acre	0
Agriculture DU	23	-	0.00	522.5	/DU	12,018
General Open Space	-	-	0.00	1000	/acre	0
General Open Space DU	52	-	0.00	171.4	/DU	8,913
Open Space Resources Total	**75**	-	0.00	--	--	**20,930**
Parks, Cultural, Civic, Education						
Public & Institutional Facilites	--	279,200	6.41	1500	/acre	9,614
Educational Institutions		-	0.00	1500	/acre	0
Public & Recreational Open Space	--	-	0.00	1200	/acre	0
P,C,C, & E Total	**-**	**279,200**	6.41	--	--	**9,614**
All Other Land Uses						
Utility Facilites	--	-	**0.00**	1500	/acre	0
Other Land Uses Total	**-**	-	**0.00**	--	--	**0**
SOI Total	**6,017**	**16,960,548**	**389.36**	--	--	**3,495,326**
Grand Total	**11,511**	**26,476,352**	**607.81**			**5,967,182**

Corona General Plan Technical Update