Creekside/Vineyards at Sand Creek Project

SCH# 2020039044

Draft Environmental Impact Report

Prepared for

City of Antioch

July 2020

Prepared by

RANEY PLANNING & MANAGEMENT, INC. 20 years

1501 Sports Drive, Suite A, Sacramento, CA 95834

Creekside / Vineyards at Sand Creek Project
Draft Environmental Impact Report

SCH# 2020039044

Lead Agency

City of Antioch
Community Development Department
P.O. Box 5007
Antioch, CA 94531

Alexis Morris
Planning Manager
(925)779-7035

Prepared By

Raney Planning and Management, Inc.
1501 Sports Drive, Suite A
Sacramento, CA 95834
(916) 372-6100

Contact:
Cindy Gnos
Senior Vice President

Rod Stinson
Division Manager / Air Quality Specialist

TABLE OF CONTENTS

TABLE OF CONTENTS

CHAPTER **PAGE**

Appendices

LIST OF FIGURES

FIGURE **PAGE**

3. Project Description

4.2 Transportation

LIST OF TABLES

TABLE **PAGE**

6. Alternatives Analysis

1. Introduction

1. INTRODUCTION

1.1 TYPE AND PURPOSE OF THE EIR

The Creekside/Vineyards at Sand Creek Project Environmental Impact Report (EIR) has been prepared in accordance with the California Environmental Quality Act (CEQA) of 1970, Pub. Res. Code §§ 21000-21178, as amended, and the Guidelines for Implementation of the California Environmental Quality Act, Cal. Code Regs. Title 14, §§ 15000-15387 (CEQA Guidelines). The City of Antioch is the lead agency for the environmental review of the Creekside/Vineyards at Sand Creek Project (proposed project) evaluated herein and has the principal responsibility for approving the project. As required by Section 15121 of the CEQA Guidelines, this EIR will (a) inform public agency decision-makers, and the public generally, of the significant environmental effects of the project, (b) identify possible ways to minimize the significant adverse environmental effects, and (c) describe reasonable and feasible project alternatives which reduce environmental effects. The public agency shall consider the information in the EIR along with other information that may be presented to the agency.

As provided in the CEQA Guidelines Section 15021, public agencies are charged with the duty to avoid or minimize environmental damage where feasible. The public agency has an obligation to balance a variety of public objectives, including economic, environmental, and social issues. CEQA requires the preparation of an EIR prior to approving any project that may have a significant effect on the environment. For the purposes of CEQA, the term project refers to the whole of an action, which has the potential for resulting in a direct physical change or a reasonably foreseeable indirect physical change in the environment (CEQA Guidelines Section 15378[a]). With respect to the proposed project, the City has determined that the proposed development is a *project* within the definition of CEQA, which has the potential for resulting in significant environmental effects.

The lead agency, which is the City of Antioch for this project, is required to consider the information in the EIR along with any other available information in deciding whether to approve the application. The basic requirements for an EIR include discussions of the environmental setting, environmental impacts, mitigation measures, alternatives, growth-inducing impacts, and cumulative impacts.

The CEQA Guidelines identify several types of EIRs, each applicable to different project circumstances. This EIR has been prepared as a *project-level EIR* pursuant to CEQA Guidelines Section 15161, which is an analysis that examines the environmental impacts of a specific development project. A *project-level EIR* focuses primarily on the changes in the environment that would result from the development of the project, and examines all phases of the project including planning, construction, and operation.

1.2 KNOWN RESPONSIBLE AND TRUSTEE AGENCIES

"Responsible agency" means a public agency that proposes to carry out or approve a project for which a lead agency is preparing or has prepared an EIR or Negative Declaration. For the purpose of CEQA, the term responsible agency includes all California public agencies other than the lead agency that have discretionary approval power over the project or an aspect of the project. The

Central Valley Regional Water Quality Control Board (RWQCB) would be considered a responsible agency for the proposed project.

"Trustee agency" means a State agency having jurisdiction by law over natural resources affected by a project, which are held in trust for the people of the State of California. The only known possible trustee agency is the California Department of Fish and Wildlife (CDFW).

Although not subject to California law, and, thus, outside the definitions of responsible agency or trustee agency, the U.S. Army Corps of Engineers (USACE) and U.S. Fish and Wildlife Service (USFWS) will also be called upon to grant approvals — under federal law — necessary for the development of the project site. The above agencies do not have duties under CEQA, but, rather, are governed by a variety of federal statutes, such as the Clean Water Act, which governs the dredging and filling of waters of the U.S. (e.g., wetlands), and the Endangered Species Act, which requires USACE to consult with the USFWS as part of the review process for any wetland or fill permits that may be required.

1.3 PROJECT SUMMARY

This section provides an overview of the project location and components. For additional project description details, please refer to Chapter 3, Project Description, of this EIR.

Project Location and Setting

The project site consists of approximately 158.2 acres south of the future extension of Sand Creek Road in the southeastern portion of the City of Antioch, California. The project site is bordered by the City of Antioch/Contra Costa County line to the south and the City of Antioch/City of Brentwood limit to the east. Sand Creek is located to the north of the site, and State Route (SR) 4 is located approximately 0.38-mile east of the site. The site is identified by Assessor's Parcel Number (APN) 057-050-024. The project site is situated within the Sand Creek Focus Area of the General Plan.

Per the City's General Plan, the eastern portion of the project site is designated Open Space/Senior Housing, while the western portion is designated Hillside, Estate and Executive Residential/Open Space. The site is zoned Study Area (S). Currently, the site consists primarily of ruderal grasses and is absent of structures or other indications of prior development. The project site has been dry-land farmed since the 1930s and consists primarily of non-native vegetation. Sand Creek flows west to east through the northern portion of the project site. A total of nine energy and communication access and utility easements exist on the project site. In addition, existing oil and gas pipelines within the project site run below ground, and cross Sand Creek and the natural drainage area in a number of locations.

Project Components

The proposed project would include development of 220 single-family homes and associated improvements on approximately 58.9 acres of the 158.2-acre project site, as well as 1.8 acres of off-site improvements. The project improvements would include, but would not be limited to, parks, trails, landscaping, circulation improvements, and utility installation. The remainder of the site, including Sand Creek and the associated buffer area, would be retained as open space. Implementation of the proposed project would require approval by the City of a General Plan Amendment (GPA), a Master Development Plan/Rezone, a Vesting Tentative Subdivision Map, Design Review, a Resource Management Plan, and a Development Agreement.

A fully detailed project description is provided in Chapter 3, Project Description, of this EIR.

1.4 EIR PROCESS

The EIR process begins with the decision by the lead agency to prepare an EIR, either during a preliminary review of a project or at the conclusion of an Initial Study. Once the decision is made to prepare an EIR, the lead agency sends a Notice of Preparation (NOP) to appropriate government agencies and, when required, to the State Clearinghouse (SCH) in the Office of Planning and Research (OPR), which will ensure that responsible and trustee State agencies reply within the required time. The SCH assigns an identification number to the project, which then becomes the identification number for all subsequent environmental documents on the project. Commenting agencies have 30 days to respond to the NOP and provide information regarding alternatives and mitigation measures they wish to have explored in the Draft EIR and to provide notification regarding whether the agency will be a responsible agency or a trustee agency for the project. An NOP, as well as a detailed Initial Study (see Appendix A), was prepared for the proposed project and circulated from March 16, 2020 to April 14, 2020. A public scoping meeting was held on April 9, 2020 for the purpose of informing the public and receiving comments on the scope of the environmental analysis to be prepared for the proposed project. See Section 1.6 below for a summary of comments received on the NOP.

As soon as the Draft EIR is completed, a Notice of Completion will be filed with the SCH and a public notice of availability will be published to inform interested parties that a Draft EIR is available for agency and public review. In addition, the notice provides information regarding the location of copies of the Draft EIR available for public review and any public meetings or hearings that are scheduled. The Draft EIR will be circulated for a period of 45 days, during which time reviewers may make comments. The lead agency must respond to comments in writing, describing the disposition of any significant environmental issues raised and explaining in detail the reasons for not accepting any specific comments concerning major environmental issues. If significant new information, as defined in CEQA Guidelines section 15088.5, is added to an EIR after public notice of availability is given but before certification of the EIR, the revised EIR or affected chapters must be recirculated for an additional public review period with related comments and responses.

A Final EIR will be prepared, containing comments and responses to comments on the Draft EIR. The Final EIR will also include any changes to the Draft EIR text made as a result of public comment. Before approving a project, the lead agency shall certify that the Final EIR has been completed in compliance with CEQA, and that the Final EIR has been presented to the decision-making body of the lead agency, which has reviewed and considered the EIR. The lead agency shall also certify that the Final EIR reflects the lead agency's independent judgment and analysis.

The findings prepared by the lead agency must be based on substantial evidence in the administrative record and must include an explanation that bridges the gap between evidence in the record and the conclusions required by CEQA. If the decision-making body elects to proceed with a project that would have unavoidable significant impacts, then a Statement of Overriding Considerations explaining the decision to balance the benefits of the project against unavoidable environmental impacts must be prepared.

1.5 SCOPE OF THE EIR

This EIR constitutes a project-level analysis for the Creekside/Vineyards at Sand Creek Project and, pursuant to CEQA Guidelines Section 15161, covers "all phases of the project including planning, construction, and operation." State CEQA Guidelines § 15126.2(a) states, in pertinent part:

> An EIR shall identify and focus on the significant environmental effects of the proposed project. In assessing the impact of a proposed project on the environment, the lead agency should normally limit its examination to changes in the existing physical conditions in the affected area as they exist at the time the notice of preparation is published, or where no notice of preparation is published, at the time environmental analysis is commenced.

Pursuant to the CEQA Guidelines, the scope of this EIR addresses specific issues and concerns identified as potentially significant in the Initial Study prepared for the proposed project.

Environmental Issues Addressed in this EIR

The sections of the CEQA Guidelines Appendix G Checklist identified for study in this EIR include the following:

- Air Quality and Greenhouse Gas Emissions; and
- Transportation.

The evaluation of effects is presented on a resource-by-resource basis in Chapters 4.1 and 4.2 of the EIR. Each chapter is divided into the following four sections: Introduction, Existing Environmental Setting, Regulatory Context, and Impacts and Mitigation Measures. Impacts that are determined to be significant in Chapters 4.1 and 4.2, and for which feasible mitigation measures are not available to reduce those impacts to a less-than-significant level, are identified as *significant and unavoidable*. Chapter 5 presents a discussion of growth-inducing impacts, a summary of cumulative impacts, and significant irreversible as well as significant unavoidable environmental changes associated with the project. Alternatives to the proposed project are discussed in Chapter 6 of this EIR.

1.6 COMMENTS RECEIVED ON THE NOTICE OF PREPARATION

During the NOP public review period from March 16, 2020 to April 14, 2020, the City of Antioch received five comment letters. Verbal comments were not received at the public scoping meeting held on April 9, 2020. A copy of each letter submitted is provided in Appendix B to this EIR. The letters regarding the NOP were received from the following public agencies and groups:

- California Department of Fish and Wildlife — Gregg Erickson;
- California Department of Transportation — Mark Leong;
- Contra Costa County Flood Control and Water Conservation District — Joe Smithonic;
- Native American Heritage Commission — Nancy Gonzalez-Lopez; and
- Save Mount Diablo — Juan Pablo Galván.

The following list, categorized by issue, summarizes the concerns brought forth in the comment letters and verbal comments received on the scope of the EIR:

EIR Air Quality and Greenhouse Gas Emissions	Concerns related to: • Provisions of rooftop solar and electric vehicle (EV) charging stations in residential units. • Provision of a Transportation Demand Management (TDM) Program to reduce greenhouse gas emissions.

EIR Transportation	Concerns related to: • Increase in Vehicle Miles Traveled (VMT). • Access to the site and to transit facilities for pedestrians, bicyclists, travelers with disabilities, and transit users. • Access to transit connections, types of transit connections, and connection between project site and nearby activity centers. • Bicycle and pedestrian facilities. • A Transportation Demand Management (TDM) Program to reduce VMT. • Construction-related impacts to the State Right-of-Way (ROW).
Initial Study Biological Resources	Concerns related to: • Impacts to special-status plants and wildlife species. • Compliance with State regulations. • Defining nesting bird season as from February 1 to September 15. • Providing nesting buffer areas of 250 feet for passerines, 500 feet for small raptors, and 1,000 feet for larger raptors. • Impact of project construction and operations on wildlife movement within the Sand Creek corridor. • Indirect impacts to aquatic features and aquatic habitats.
Initial Study Geology and Soils	Concerns related to: • Potential for stream and channel erosion due to increased runoff.
Initial Study Hydrology and Water Quality	Concerns related to: • Downstream impacts to drainage areas and impacts on the capacity of State facilities due to increased water flow. • Effects on natural watercourses. • Design and construction of storm drain facilities. • Overflow from significant storm events and post-development peak flows. • Compliance with environmental permit requirements, special conditions, and mitigation measures for new outfalls, bridges, or creek improvements. • Impacts to Sand Creek and its natural stream processes.
Initial Study Land Use and Planning	Concerns related to: • Increased density due to the proposed General Plan Amendment.
Initial Study Recreation	Concerns related to: • Suggestion of an additional trail to be added to the project for recreational use.
Initial Study Tribal Cultural Resources	Concerns related to: • Compliance with Assembly Bill 52 and Senate Bill 18 requirements. • Contacting the appropriate information centers regarding archaeological records searches and field surveys. • Conducting a Sacred Lands File search and attaining a Native American Tribal Consultation list from the Native American Heritage Commission (NAHC). • Inadvertently discovered Native American cultural items and/or human remains.

Concerns related to air quality and greenhouse gas emissions, as well as transportation are addressed in this EIR. All other issues are discussed in the Initial Study (see Appendix A) prepared for the proposed project.

1.7 DRAFT EIR AND PUBLIC REVIEW

This Draft EIR is being circulated for public review and comment for a period of 45 days. During this period, the general public, organizations, and agencies can submit comments to the Lead Agency on the Draft EIR's accuracy and completeness. Release of the Draft EIR marks the beginning of a 45-day public review period pursuant to CEQA Guidelines Section 15105. The public can review the Draft EIR at the City's website at:

https://www.antiochca.gov/community-development-department/planning-division/environmental-documents/

All comments or questions regarding the Draft EIR should be addressed to:

Alexis Morris, Planning Manager
City of Antioch Community Development Department
P.O. Box 5007
Antioch, CA 94531
(925) 779-6141
amorris@ci.antioch.ca.us

1.8 ORGANIZATION OF THE DRAFT EIR

The EIR is organized into the following sections:

Chapter 1 – Introduction

Provides an introduction and overview describing the intended use of the Draft EIR and the review and certification process, as well as summaries of the chapters included in the Draft EIR and summaries of the issues and concerns received from the public and public agencies during the NOP review period.

Chapter 2 – Executive Summary

Summarizes the elements of the project and the environmental impacts that would result from implementation of the proposed project, describes proposed mitigation measures, and indicates the level of significance of impacts after mitigation.

Chapter 3 – Project Description

Provides a detailed description of the proposed project, including the project's location, background information, objectives, and technical characteristics.

Chapter 4.0 – Environmental Setting, Impacts, and Mitigation

Contains a project-level and cumulative analysis of environmental issue areas associated with the proposed project. The section for each environmental issue contains an introduction and description of the setting of the project site, identifies impacts, and recommends appropriate mitigation measures.

Chapter 4.1 – Air Quality and Greenhouse Gas Emissions

The Air Quality and Greenhouse Gas Emissions chapter of the EIR describes the impacts of construction and operation of the proposed project related to air quality and global climate change. The chapter was prepared using methodologies and assumptions recommended by the Bay Area Air Quality Management District.

Chapter 4.2 – Transportation

The Transportation chapter of the EIR discusses existing transportation and circulation conditions within the project area and the effects to the roadway network as a result of the proposed project and future, projected growth. The analysis includes consideration of vehicle traffic impacts on roadway capacity, transit impacts, bicycle impacts, and pedestrian impacts. An analysis of the proposed project's vehicle miles traveled (VMT) is also included.

Chapter 5 – Statutorily Required Sections

The Statutorily Required Sections chapter of the EIR provides discussions required by CEQA regarding impacts that would result from the proposed project, including a summary of cumulative impacts, potential growth-inducing impacts, significant and unavoidable impacts, and significant irreversible changes to the environment.

Chapter 6 – Alternatives Analysis

The Alternatives Analysis chapter of the EIR describes and evaluates the alternatives to the proposed project. It should be noted that the alternatives will be analyzed at a level of detail less than that of the proposed project; however, the analyses will include sufficient detail to allow for a meaningful comparison of impacts

Chapter 7 – EIR Authors and Persons Consulted

The EIR Authors and Persons Consulted chapter of the EIR lists EIR and technical report authors who provided technical assistance in the preparation and review of the EIR.

Chapter 8 – References

The References chapter of the EIR provides bibliographic information for all references and resources cited.

Appendices

The Appendices include the NOP and Initial Study, comments received during the NOP comment period, and all technical reports prepared for the proposed project.

2. Executive Summary

2. EXECUTIVE SUMMARY

2.1 INTRODUCTION

The Executive Summary chapter of the EIR provides an overview of the Creekside/Vineyards at Sand Creek Project (proposed project) and summarizes the conclusions of the environmental analysis provided in Chapters 4.1 and 4.2. In addition, the chapter outlines the mitigation monitoring plan, summarizes the alternatives to the proposed project that are described in the Alternatives Analysis chapter, identifies the Environmentally Superior Alternative, and discusses areas of controversy and issues to be resolved. Table 2-1, found at the end of this chapter, provides a summary of the environmental effects of the proposed project, as identified in each technical chapter of this EIR and the Initial Study prepared for the project (see Appendix A). Table 2-1 also contains the potential environmental impacts associated with the proposed project, the significance of the impacts, the proposed mitigation measures for the impacts, and the significance of the impacts after implementation of the mitigation measures.

2.2 SUMMARY DESCRIPTION OF THE PROPOSED PROJECT

The project site consists of approximately 158.2 acres south of the future extension of Sand Creek Road in the southeastern portion of the City of Antioch, California. The project site is bordered by the City of Antioch/Contra Costa County line to the south and the City of Antioch/City of Brentwood limit to the east. Sand Creek is located to the north of the site, and State Route (SR) 4 is located approximately 0.38-mile east of the site. The site is identified by Assessor's Parcel Number (APN) 057-050-024. The project site is situated within the Sand Creek Focus Area of the General Plan.

Per the City's General Plan, the eastern portion of the project site is designated Open Space/Senior Housing, while the western portion is designated Hillside, Estate and Executive Residential/Open Space. The site is zoned Study Area (S). Currently, the site consists primarily of ruderal grasses and is absent of structures or other indications of prior development. Sand Creek flows west to east through the northern portion of the project site. The project site has been dry-land farmed since the 1930s and consists primarily of non-native vegetation. A total of nine energy and communication access and utility easements exist on the project site. In addition, existing oil and gas pipelines within the project site run below ground, and cross Sand Creek and the natural drainage area in a number of locations.

The proposed project would include development of 220 single-family homes and associated improvements on approximately 58.9 acres of the 158.2-acre project site, as well as 1.8 acres of off-site improvements. The project improvements would include, but would not be limited to, parks, trails, landscaping, circulation improvements, and utility installation. The remainder of the site, including Sand Creek and the associated buffer area, would be retained as open space.

The proposed project would require City approval of the following:

- General Plan Amendment. The proposed project would require the approval of a General Plan text and map amendment to the Sand Creek Focus Area of the General Plan to change the land use designations of the site from Open Space/Senior Housing and

Hillside, Estate and Executive Residential/Open Space to Medium Low Density Residential/Open Space.

- Master Development Plan/Rezone. The proposed project would require a Rezone from Study District (S) to Planned Development (PD). The PD would include special development standards for the project.

- Vesting Tentative Subdivision Map. The proposed project would require approval of Small Lot and Large Lot Vesting Tentative Subdivision Maps for the subdivision of the project site into multiple parcels to accommodate a total of 220 single-family residential units, as well as public roadway, parks, and open space parcels;

- Design Review. The proposed project would require Design Review to authorize the proposed building conceptual architecture, landscaping, and site design of the residential community and to ensure consistency with the City of Antioch's General Plan and Zoning Ordinance design policies and criteria, except where specifically amended by the requested approvals.

- Resource Management Plan. Pursuant to section 4.4.6.7(t) of the City of Antioch General Plan, the applicant will prepare a Resource Management Plan for City approval.

- Development Agreement. The Development Agreement would allow the City and the applicant to enter into an agreement to assure the City that the proposed project would be completed in compliance with the plans submitted by the applicant, and assure the applicant of vested rights to develop the project.

In addition to approvals from the City of Antioch, the proposed project would require the following approvals/permits from other responsible and trustee agencies:

- Section 404 Nationwide Permit (or Letter of Permission) (U.S. Army Corps of Engineers);
- Section 401 Water Quality Certification (Central Valley Regional Water Quality Control Board); and
- Potential Section 1600 Lake or Streambed Alteration Agreement (California Department of Fish and Wildlife).

Please refer to Chapter 3, Project Description, of this EIR for a detailed description of the proposed project and entitlements, as well as a full list of the project objectives.

2.3 ENVIRONMENTAL IMPACTS AND PROPOSED AND RECOMMENDED MITIGATION

Under CEQA, a significant effect on the environment is defined as a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project, including land, air, water, mineral, flora, fauna, ambient noise, and objects of historic or aesthetic significance. Mitigation measures must be implemented as part of the proposed project to reduce potential adverse impacts to a less-than-significant level. Such mitigation measures are noted in this EIR and are found in the Initial Study prepared for the proposed project (see Appendix A) and the following technical chapters: Air Quality and Greenhouse Gas Emissions, and Transportation. The mitigation measures presented in the EIR will form the basis of the

Mitigation Monitoring and Reporting Program. Any impact that remains significant after implementation of mitigation measures is considered a significant and unavoidable impact.

A summary of the identified impacts in the technical chapters of the EIR is presented in Table 2-1. In addition, Table 2-1 includes the level of significance of each impact, any mitigation measures required for each impact, and the resulting level of significance after implementation of mitigation measures for each impact.

2.4 SUMMARY OF PROJECT ALTERNATIVES

The following section presents a summary of the evaluation of the alternatives considered for the proposed project, which include the following:

- No Project (No Build) Alternative;
- Buildout Pursuant to Existing Land Use Designations Alternative;
- Reduced Density Alternative; and
- Senior Housing Alternative.

For a more thorough discussion of project alternatives, refer to Chapter 6, Alternatives Analysis, of this EIR.

No Project (No Build) Alternative

The No Project (No Build) Alternative is defined as the continuation of the existing conditions of the project site, which currently consists primarily of ruderal grasses and is absent of structures. The No Project (No Build) Alternative would not require grading or ground disturbance within the project site. However, the City's General Plan identifies portions of the site as an area suitable for development. The No Project (No Build) Alternative would not fulfill the stated aims of the City's General Plan or the project's objectives.

Buildout Pursuant to Existing Land Use Designations Alternative

The Buildout Pursuant to Existing Land Use Designations Alternative would consist of buildout of the project site per the current City of Antioch General Plan land use designations at the maximum allowable densities. Per the City's General Plan, approximately 115 acres in the eastern portion of the project site are designated Open Space/Senior Housing, while the remaining 43 acres in the western portion of the site are designated Hillside and Estate and Executive Residential/Open Space. It should be noted that the project site contains substantial constraints to development, such as excessive slopes and the Sand Creek Corridor. Although the site contains the foregoing development constraints, should the applicant find a solution to those constraints, the Alternative would be a viable option. Thus, in order to provide a more accurate comparison of impacts to the proposed project, the Alternative has been included in this EIR. Other alternatives within this chapter reflect development of the site with respect to the existing constraints.

Notwithstanding the aforementioned constraints, of the 115 acres currently designated as Open Space/Senior Housing, 57.5 acres were assumed to be developed with senior housing, with the remainder being retained as open space. Based on the maximum allowable density for the Open Space/Senior Housing land use designation of 4.0 dwelling units per acre (du/ac), the Alternative would result in a maximum of approximately 230 senior housing units. For this analysis, of the 43 acres designated as Hillside and Estate and Executive Residential/Open Space, 21.5 acres were assumed to be developed with residences and 21.5 acres would be retained as open space. The maximum allowable density for the Hillside and Estate and Executive/Open Space land use

designation is 2.0 du/ac. Thus, the Alternative would result in approximately 43 Hillside and Estate and Executive/Open Space residential units. In total, the Alternative would include development of approximately 273 residential units.

Because the Buildout Pursuant to Existing Land Use Designations Alternative would include a mix of housing types, including senior housing, near major transportation and regional trail connections, the Alternative would be capable of meeting Project Objectives #2, #5, and #6. In addition, the Alternative would include development within the Sand Creek Focus Area, which would allow Project Objectives #1 and #7 to be met. Most of the remaining project objectives would be fully or partially met, as the Alternative would provide a mix of residential development and associated infrastructure improvements.

Reduced Density Alternative

The Reduced Density Alternative would consist of buildout of the project site with half as many residences as the proposed project. As such, the Alternative would develop 110 single-family residential units. The total disturbance area would be identical to the proposed project. Similar to the proposed project, the Alternative would include 110 residential units that consist of either non-age-restricted units, senior/active adult units, or a combination of both. With development of 110 residential units on 58.9 acres of land, the overall density would be reduced compared to the proposed project. In addition, the parks and open space features included as part of the proposed project would remain the same. Off-site improvements required under the Reduced Density Alternative would be identical to those required for the proposed project.

Because the Reduced Density Alternative would include a mix of housing types, including senior housing, the Alternative would be capable of meeting Project Objectives #2 and #6. Project Objective #5 establishes the goal of increased land use intensities near regional transportation connections. However, the Reduced Density Alternative would include less development, which would ultimately reduce the intensity of development on the project site. As such, Project Objective #5 would be partially met under the Alternative. Most of the remaining project objectives would be fully or partially met under the Alternative.

Senior Housing Alternative

Under the Senior Housing Alternative, the total area to be disturbed would be the same as the proposed project. Furthermore, the total number and type of units developed under the Alternative would be identical to that of the proposed project. The only difference between the proposed project and the Senior Housing Alternative would be that under the Senior Housing Alternative, all 220 units would consist of age-restricted senior/active adult units. The Senior Housing Alternative would be designed to reduce the total ADT and VMT. The Alternative would include similar roadway and utility improvements as the proposed project.

Because the Senior Housing Alternative would only include senior/adult units, the Alternative would not be capable of meeting Project Objective #2. However, the Senior Housing Alternative would include senior/adult units, and, thus, would be capable of meeting Project Objective #6. In addition, because the Alternative would include similar features as the proposed project, such as roadway and utility infrastructure improvements, Project Objectives #3 and #4 would be met. Most of the remaining project objectives would be fully or partially met under the Alternative.

Environmentally Superior Alternative

An EIR is required to identify the environmentally superior alternative from among the range of reasonable alternatives that are evaluated. Section 15126(e)(2) of the CEQA Guidelines requires that an environmentally superior alternative be designated and states, "If the environmentally superior alternative is the 'no project' alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives." The No Project (No Build) Alternative would be considered the environmentally superior alternative, because the project site is assumed to remain in its current condition under the alternative. Consequently, the impacts resulting from the proposed project would not occur under the Alternative.

However, as noted above, the No Project (No Build) Alternative would not meet any of the project objectives. The Buildout Pursuant to Existing Land Use Designations Alternative would fully meet five of the project objectives and partially meet three of the objectives. The Reduced Density Alternative would fully meet seven of the project objectives and partially meet one of the objectives. The Senior Housing Alternative would fully meet seven of the project objectives and would not meet one of the objectives.

As discussed throughout the Alternatives Analysis chapter, the Buildout Pursuant to Existing Land Use Designations Alternative would result in greater impacts related to air quality and GHG emissions and similar impacts related to transportation. Impacts related to air quality and GHG emissions and transportation would be fewer under both the Reduced Density Alternative and Senior Housing Development Alternative. However, the Reduced Density Alternative has the potential to result in 470 ADT during operation as compared to 940 ADT under the Senior Housing Alternative. As such, impacts related to transportation under the Reduced Density Alternative would be fewer than the Senior Housing Alternative.

The development of the Reduced Density Alternative would partially satisfy the project objectives and would result in fewer impacts compared to the proposed project. In addition, although the Reduced Density Alternative would still require implementation of mitigation, emission of GHGs as compared to the proposed project would ultimately be fewer.

Because fewer vehicle trips would be generated by the Reduced Density Alternative, the intensity of traffic-related impacts, including impacts to study intersections, would be reduced compared to the proposed project. However, because the Alternative would still result in a substantial amount of new vehicle trips, a detailed traffic study would be required to evaluate potential impacts on the surrounding roadways. Because a conclusive determination cannot be reached without a quantitative analysis, impacts to study freeway segments under Near-Term With Project conditions and study intersections under Cumulative With Project conditions, as well as impacts related to VMT, would be anticipated to remain significant and unavoidable. Mitigation Measures 4.2-5 and 4.2-10(a) through 4.2-10(c) would likely still be required.

Overall, because the Reduced Density Alternative would result in fewer impacts related to air quality and GHG emissions and transportation, the Reduced Density Alternative would be considered the environmentally superior alternative to the proposed project.

2.5 AREAS OF CONTROVERSY

The CEQA Guidelines, Section 15123(b), require that this EIR consider areas of controversy known to the lead agency, including issues raised by agencies and the public. Areas of

controversy that were identified in NOP comment letters should be considered, as well. The areas of known controversy for the project site relate to the following:

- Ownership status of undeveloped parcels and conservation easements.
- Direct and indirect impacts to aquatic features, aquatic habitats, watersheds, watercourses, tributaries, and man-made facilities within and adjacent to the project site, and maps of the affected water courses.
- Direct and indirect impacts of increased water flow on drainage areas, State facilities, and soils.
- Design, construction, funding, and performance of proposed improvements to natural watercourses and storm drain facilities.
- Additional permit requirements, including encroachment permits and environmental permit requirements as required by State and federal agencies.
- Programs to reduce the emission of greenhouse gasses and Vehicle Miles Traveled (VMT), including a Transportation Demand Management (TDM) Program, a travel demand analysis, and inclusion of rooftop solar and electric vehicle (EV) charging stations within mitigation measures.
- Access to and feasibility of transit connections.
- Additional recreational uses.
- Fees related to drainage and transportation.
- Increased density due to the proposed General Plan Amendment (GPA) which would increase the allowable number of developed units per acre (du/ac) from 1.0 du/ac for Hill side Estate and 2.0 du/ac for Executive Residential land uses to 3.7 du/ac.
- Inclusion of the Lead Agency fair share contribution, financing, scheduling, implementation responsibilities, and Lead Agency monitoring within all proposed mitigation measures.

Table 2-1
Summary of Impacts and Mitigation Measures

Impact		Level of Significance Prior to Mitigation	Mitigation Measures		Level of Significance After Mitigation
4.1 Air Quality and Greenhouse Gas Emissions					
4.1-1	Conflict with or obstruct implementation of the applicable air quality plan during project construction.	S	*4.1-1*	*Prior to approval of any grading plans, the project applicant shall show on the plans via notation that the contractor shall ensure that the heavy-duty off-road vehicles (50 horsepower or more) to be used in the construction project, including owned, leased, and subcontractor vehicles, shall achieve a project wide fleet average three percent NO_X reduction compared to the year 2022 California Air Resources Board (CARB) fleet average. The three percent NO_X reduction may be achieved by requiring a combination of engine Tier 3 or Tier 4 off-road construction equipment or the use of hybrid, electric, or alternatively fueled equipment. For instance, the emissions presented in Table 4.1-8 were achieved by requiring Rubber Tired Dozers and Cranes to be engine Tier 3.* *In addition, all off-road equipment operating at the construction site must be maintained in proper working condition according to manufacturer's specifications. Idling shall be limited to 5 minutes or less in accordance with the Off-Road Diesel Fueled Fleet Regulation as required by CARB. Clear signage regarding idling restrictions should be placed at the entrances to the construction site.*	LS

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact		Level of Significance Prior to Mitigation	Mitigation Measures		Level of Significance After Mitigation
				Portable equipment over 50 horsepower must have either a valid District Permit to Operate (PTO) or a valid statewide Portable Equipment Registration Program (PERP) placard and sticker issued by CARB. *Conformance with the foregoing requirements shall be included as notes and be confirmed through review and approval of grading plans by the City of Antioch Community Development Department.*	
4.1-2	Conflict with or obstruct implementation of the applicable air quality plan during project operation.	S	4.1-2	*Prior to issuance of building permits for the proposed project, the project applicant shall demonstrate via project design and/or notation included on project design that only natural gas hearths (fireplaces) shall be installed in the proposed residences and wood-burning hearths shall be prohibited.* *Conformance with the foregoing requirements shall be confirmed through review and approval of building permit plans by the City of Antioch Community Development Department.*	LS
4.1-3	Expose sensitive receptors to substantial pollutant concentrations.	LS	*None required.*		N/A
4.1-4	Result in other emissions (such as those leading to odors) affecting a substantial number of people.	LS	*None required.*		N/A

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact		Level of Significance Prior to Mitigation	Mitigation Measures		Level of Significance After Mitigation
4.1-5	Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).	LCC	*None required.*		N/A
4.1-6	Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, or conflict with an applicable plan, policy, regulation adopted for the purpose of reducing the emissions of GHGs.	CC	*4.1-6*	*Prior to the issuance of building permits, the applicant shall prepare and submit to the City a GHG Reduction Plan to reduce GHG emissions to the maximum extent feasible. Proof of implementation of the GHG Reduction Plan shall be submitted to the City of Antioch Community Development Department.* *Examples of measures that may be used to reduce GHG emissions include, but are not limited to, the following:* • *Orient buildings to maximize passive solar heating;* • *Use renewable diesel to fuel construction fleets;* • *Promote ridesharing, transit, bicycling, and walking for work trips through dedication of*	SU

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		preferential parking spaces, provision of on-site bicycle parking, provision of end-of-trip facilities such as bicycle lockers and on-site showers; • *Install electric vehicle charging infrastructure in excess of existing CBSC requirements;* • *Provide fully operational charging stations and preferential parking spots for electric vehicles;* • *Install energy star or equivalent appliances in all residences;* • *Limit installation of natural gas fueled appliances;* • *Install solar water heating;* • *Use water efficient landscapes and native/drought-tolerant vegetation;* • *Provide outdoor electrical outlets to allow for use of electrically powered landscaping equipment at all residences and park spaces within the project site;* • *Construct on-site or fund off-site carbon sequestration projects (such as tree plantings or reforestation projects); and* • *Purchase carbon credits to offset project annual emissions. Carbon offset credits shall be verified and registered with The Climate Registry, the Climate Action Reserve, or*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact		Level of Significance Prior to Mitigation	Mitigation Measures		Level of Significance After Mitigation
				another source approved by CARB, BAAQMD, or the City of Antioch. *If off-site mitigation measures are proposed, the applicant must be able to show that the emission reductions from identified projects are real, permanent through the duration of the project, enforceable, and are equal to the pollutant type and amount of the project impact being offset. In addition, any off-site measures shall be subject to review and approval by the City of Antioch Community Development Department. BAAQMD recommends that off-site mitigation projects occur within the nine-county Bay Area in order to reduce localized impacts and capture potential co-benefits. If BAAQMD has established an off-site mitigation program at the time a development application is submitted, as an off-site mitigation measure, the applicant may choose to enter into an agreement with BAAQMD and pay into the established off-site mitigation program fund, where BAAQMD would commit to reducing the type and amount of emissions identified in the agreement.*	
4.2 Transportation					
4.2-1	Conflict with a program, plan, ordinance, or policy addressing the circulation system during construction activities.	S	*4.2-1*	*Prior to issuance of grading and building permits, the project applicant shall submit a construction management plan, subject to review and approval by the City Engineer. The requirements within the*	LS

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact		Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
			construction management plan shall include, but are not necessarily limited to, the following elements: • *Project staging plan to maximize on-site storage of materials and equipment;* • *A set of comprehensive traffic control measures, including scheduling of major truck trips and deliveries to avoid peak hours; lane closure proceedings; signs, cones, and other warning devices for drivers; and designation of construction access routes;* • *Permitted construction hours;* • *Location of construction staging;* • *Identification of parking areas for construction employees, site visitors, and inspectors, including on-site locations; and* • *Provisions for street sweeping to remove construction related debris on public streets.*	
4.2-2	Conflict with a program, plan, ordinance, or policy addressing study intersections under Existing With Project conditions.	LS	*None required.*	N/A
4.2-3	Conflict with a program, plan, ordinance, or policy addressing study roadway segments under Existing With Project conditions.	LS	*None required.*	N/A
4.2-4	Conflict with a program, plan, ordinance, or policy addressing	LS	*None required.*	N/A

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact		Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
	study freeway segments under Existing With Project conditions.			
4.2-5	Conflict with a program, plan, ordinance, or policy addressing study intersections under Near-Term With Project conditions.	LS	*None required.*	N/A
4.2-6	Conflict with a program, plan, ordinance, or policy addressing study roadway segments under Near-Term With Project conditions.	LS	*None required.*	N/A
4.2-7	Conflict with a program, plan, ordinance, or policy addressing study freeway segments under Near-Term With Project conditions.	S	*4.2-7 Prior to issuance of building permits for the proposed project, the project applicant shall pay applicable regional transportation impact fees to the East Contra Costa Regional Fee and Financing Authority (ECCRFFA). Proof of fee payment shall be submitted to the City of Antioch.*	SU
4.2-8	Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b).	S	*None feasible.*	SU
4.2-9	Conflict with a program, plan, ordinance, or policy addressing transit, bicycle, or pedestrian facilities.	LS	*None required.*	N/A
4.2-10	Substantially increase hazards to vehicle safety due to a geometric design feature (e.g., sharp curves or dangerous	LS	*None required.*	N/A

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
intersections) or incompatible uses (e.g., farm equipment).			
4.2-11 Result in inadequate emergency access.	LS	*None required.*	N/A
4.2-12 Conflict with a program, plan, ordinance, or policy addressing study intersections under Cumulative With Project conditions.	CC	*4.2-12(a)* *Prior to the issuance of the 165th building permit, the project applicant shall modify the eastbound approach to the Lone Tree Way at Hillcrest Avenue intersection to provide two left-turn lanes, two through lanes, and a through-right-shared lane through the reconstruction of the median, restriping, and signal modifications. Details of the improvements shall be defined in the Development Agreement. The improvements shall be completed to the satisfaction of the City Engineer.* *4.2-12(b)* *Prior to issuance of building permits, the project applicant shall pay applicable regional transportation impact fees to the ECCRFFA that would fund improvements at the Sand Creek Road/SR 4 eastbound ramps intersection, including construction of a slip-ramp for the eastbound Sand Creek to southbound SR 4 movement, eliminating the conflicting left-turn movement at the intersection. Proof of payment shall be submitted to the City of Antioch Community Development Department. It should be noted that the Sand Creek Road/SR 4 eastbound ramps intersection is located outside of*	SU

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact		Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
			the City of Antioch and is under the jurisdiction of Caltrans. *4.2-12(c)* *Prior to issuance of building permits, if the required improvements are added to the ECCRFFA regional fee program, the project applicant shall pay applicable regional transportation impact fees to the ECCRFFA that would fund the improvements. Proof of payment shall be submitted to the City of Antioch Community Development Department. It should be noted that the Sand Creek Road/SR 4 westbound ramps intersection is located outside of the City of Antioch and is under the jurisdiction of Caltrans.*	
4.2-13	Conflict with a program, plan, ordinance, or policy addressing study roadway segments under Cumulative With Project conditions.	LS	*None required.*	N/A
4.2-14	Conflict with a program, plan, ordinance, or policy addressing study freeway segments under Cumulative With Project conditions.	LS	*None required.*	N/A
Initial Study Impacts Requiring Mitigation				
IV-a	Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species	S	*Special Status Plants* *IV-1* *Prior to initiation of ground-disturbing activities on the project site and off-site improvement areas, the*	LS

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?		*project proponent shall retain a qualified biologist to conduct rare plant surveys within one year of the anticipated groundbreaking for the proposed project. The surveys shall be conducted following the CDFW (2018), USFWS (2000), and CNPS (2001), or the most current published survey guidelines. During the surveys, qualified botanists shall search for all the plants identified in the Biological Resources Analysis (Monk & Associates, 2020) as having the potential to occur on the project site and off-site improvement areas, and all plants that are considered locally rare as listed in the East Bay Chapter of the CNPS Database of Rare, Unusual and Significant Plants of Alameda and Contra Costa Counties for the Marsh Creek/Lone Tree Valley area. Project construction shall not be initiated until all special-status plant surveys are completed and the mitigation is implemented, if necessary and required prior to starting construction.* *A special-status plant survey report that includes the methods used, survey participants, and associated findings shall be prepared and submitted to the City no more than 30 days following the completion of the final site visit. A record of any special-status plant species identified within the project site during the preconstruction surveys shall be submitted to the CNDDB. If new special-status plant populations are not found on the site during the appropriately timed*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		surveys, additional mitigation is not required. If construction is not started within two years after the rare plant surveys are completed, the City may require additional rare plant surveys. *If special-status plants are observed on the site during the survey, the populations shall be avoided to the maximum degree possible during project development, and a Mitigation and Monitoring Plan shall be prepared detailing the measures to be implemented to avoid the plant population. Measures shall include establishment of appropriate buffers during construction, fencing of the population prior to and during construction, and regular monitoring of the preserved population by a biologist during and after construction activities. The Mitigation and Monitoring Plan shall be implemented prior to the initiation of project grading. If the plant populations cannot be avoided, the applicant shall hire a qualified biologist to prepare a seed collection and replanting plan in coordination with the City of Antioch to reduce impacts to the identified special-status plant populations, subject to review and approval by the City of Antioch Community Development Department.* *California Red-Legged Frog* *IV-2 Prior to initiation of ground-disturbing activities on*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		the project site and off-site improvement areas, the project applicant shall implement the following measures: • *An education program shall be conducted by a qualified biologist to explain the endangered species concerns to contractors/operators working at the project site. The education/training program shall include a description of California red-legged frog and its habitat, a review of the Endangered Species Act and the federal listing of the species, the general protection measures to be implemented to protect the frog and minimize take, and a delineation of the limits of the work area. A sign-in sheet shall be distributed to all participants of the education/training program and submitted to the City of Antioch within two weeks of program completion.* • *The work areas adjacent to Sand Creek shall be isolated with suitable wildlife exclusion fencing (see below) that would block the movement of California red-legged frogs from entering the work areas. The wildlife exclusion fence shall also prevent mammals migrating along Sand Creek from entering the project site. The fence shall be installed*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		along the northern border of the project site, adjacent to the Sand Creek Buffer Area, prior to the time any site grading or vegetation removal activities are implemented. The exact location of the fencing shall be determined by a qualified biologist. The fence shall remain in place during site grading or other construction-related activities and shall prevent frogs and wildlife from entering the project site work areas. While normally California red-legged frog exclusion fencing often consists of silt fencing, owing to the duration of project construction, the project proponent may install a more weather resilient fence that is durable enough to remain in place for the duration of construction, such as a commercially available exclusion fencing (e.g., ERTEC Fence). Fencing shall be installed by staking the route of the wildlife exclusion fencing in a 4- inch-deep trench. Then, the bottom of the fence shall be firmly seated in the trench. The project proponent may replace the wildlife exclusion fencing during construction with permanent fencing, approved by the City. • *A qualified biologist shall be onsite when grading activities occur within 300 feet of Sand Creek to conduct daily inspections of*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		the fencing and to otherwise ensure that stranded animals are salvaged and relocated back to the stream channel. The biological monitor shall be responsible for ensuring that the wildlife exclusion fencing is not compromised and shall notify the onsite contractor representative when fencing needs to be repaired. • *All construction work in Sand Creek associated with the outfall structures shall be scheduled for the dry season (May 15 through October 15) and when Sand Creek is dry or there is reduced flow in this creek. See also the permitting requirements specified in Mitigation Measure IV-14. Any necessary in-drainage work when there are flows shall be isolated from flows via the installation of temporary coffer dams that have flow-through bypass pipes ensuring that flows pass by the stormwater outfall work areas. Flows shall be diverted around isolated work areas either by gravity flow or, if necessary, by pumping water around the work area. No silty water shall be allowed to reenter the tributary below any in-drainage work area. Methods and materials shall be adapted in the field to match the size, shape, and anticipated flow volume of the drainage, and shall be pre-approved by the biological*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		monitor. All divisions shall conform to the following provisions: o *A qualified 10(a)(1)(A) biologist shall conduct preconstruction surveys for California red-legged frog prior to isolating any work area within Sand Creek. If any frogs are found in the work area, the USFWS shall be notified, and if the USFWS authorizes relocation, the frogs shall be moved from the two stormwater outfall work areas, up or downstream in Sand Creek to appropriate aquatic habitats. Upon completion of the survey, if the outfall construction areas must be dewatered, coffer dams may be installed. Any isolated water shall be dip-netted or as appropriate, seined by the biologist to search for frogs prior to pumping water out of the isolated work areas. The project biological monitor shall be present during all in-drainage work. Dewatered work areas shall not result in stranded aquatic wildlife.* o *Drainage diversion shall be practiced only where deemed unavoidable by the proposed project engineer and biological monitor.*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		o *Diversion shall be limited to the minimum time period necessary to complete the work and restore the channel.* o *Construction equipment shall work from above the top-of-bank. There shall be no vehicle passage, vehicle parking, or materials storage below the top-of-bank.* o *All in-drainage and diversion work plans shall reflect and incorporate standard erosion control measures and Best Management Practices (BMPs) as prescribed in the project's Stormwater Pollution and Prevention Plan (SWPPP).* o *In certain cases where water seeps into the dewatered area, sump pits may be excavated in the work area and seepage water would then be pumped back upstream behind the coffer dam. All discharged water shall be silt free. If silt is a problem, water shall be pumped through a silt sock into baker tank(s) prior to discharge back into the channel.* o *All downstream flows shall be maintained throughout the period that coffer dams are installed.*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		o *The entire work area below the top-of-bank, including the coffer dam location, shall be restored to the approximate pre-construction contours and shall be stabilized as necessary to withstand the expected high-water flows. All dam materials shall be completely removed from the channel when work is complete and shall not be disposed of in or near the channel.* o *All trash that might attract predators to the project site shall be properly contained and removed from the site and disposed of regularly. All construction debris and trash shall be removed from the site when construction activities are complete.* o *All fueling and maintenance of equipment and vehicles, and staging areas shall be at least 60 feet from Sand Creek. The construction personnel shall ensure that contamination of California red-legged frog habitat does not occur and shall have a plan to promptly address any accidental spills.* • *To mitigate for permanent impacts to 60.7 acres of California red-legged frog dispersal habitat, the project proponent shall preserve*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		dispersal habitat adjacent to occupied California red-legged frog habitat, or as otherwise approved by USFWS, at a minimum of a 1:1 impacts to replacement. Protection shall be via the purchase of the mitigation land fee title or via recordation of a conservation easement over the mitigation land. Alternatively, the project proponent may purchase California red-legged frog credits at a 1:1 ratio from a USFWS-approved mitigation bank. • *If mitigation credits are not used, prior to the start of construction, the project proponent shall record a conservation easement over the mitigation property preserving it in perpetuity as wildlife habitat. The easement shall be granted to a qualified conservation organization as defined by Section 815.3 of the California Civil Code. Prior to the start of construction, the project proponent shall prepare a habitat management plan that addresses management of the mitigation land that inures to the benefit of the California red-legged frog and shall submit the plan to the City of Antioch prior to the start of construction. The project proponent shall also establish an endowment fund, or other funding mechanism to provide for the long-*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		term management, maintenance, and monitoring of the mitigation site. *The project proponent may satisfy the requirements of this mitigation measure by providing the City of Antioch with a copy of a biological opinion issued by the USFWS that includes these, or other functionally equivalent, habitat preservation measures prior to the start of construction.* *As an alternative to completion of MM IV-2, the project applicant could comply with one of the following conditions:* *1. Comply with the applicable terms and conditions of the ECCC HCP/NCCP, as determined in written "Conditions of Coverage" by the Conservancy, provided that the City has first entered into an agreement with the Conservancy for coverage of impacts to ECCC HCP/NCCP Covered Species; or* *2. Comply with a habitat conservation plan and/or natural community conservation plan developed and adopted by the City, including payment of applicable fees, provided that CDFW and USFWS have approved the conservation plan.*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		California Tiger Salamander *IV-3* *Prior to initiation of construction activities, to mitigate for the permanent impacts to 60.7 acres of potential California tiger salamander migration/over-summering habitat, the project applicant shall compensate for impacted California tiger salamander migration/over-summering habitat at a minimum of a 1:1 impacts to replacement ratio.9 Mitigation land shall be permanently protected land within the Central California DPS range of the California tiger salamander within 1.3 miles of a known breeding site, or as otherwise approved by CDFW and USFWS. Protection shall be accomplished through the purchase of the mitigation land in fee title or via recordation of a conservation easement over the mitigation land. In lieu of this mitigation prior to construction, the project proponent may purchase California tiger salamander credits at a 1:1 ratio from a approved mitigation bank.* *If mitigation credits are not used, prior to the start of construction, the project proponent shall record a conservation easement over the mitigation property preserving it in perpetuity as wildlife habitat. The easement shall be granted to a qualified conservation organization as defined by Section 815.3 of the California Civil Code. The project*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		proponent shall prepare a habitat management plan that addresses management of the mitigation land that inures to the benefit of the California tiger salamander and shall submit the plan to the City of Antioch prior to the start of construction. The project proponent shall also establish an endowment fund, or other funding mechanism to provide for the long-term management, maintenance, and monitoring of the mitigation site. *The project proponent may satisfy the requirements of this mitigation measure by providing the City of Antioch with a copy of a biological opinion issued by the USFWS that includes these, or other functionally equivalent, habitat preservation measures, to be implemented prior to initiation of construction activities.* *As an alternative to completion of MM IV-3, the project applicant could comply with one of the following conditions:* *1. Comply with the applicable terms and conditions of the ECCC HCP/NCCP, as determined in written "Conditions of Coverage" by the Conservancy, provided that the City has first entered into an agreement with the Conservancy for*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		coverage of impacts to ECCC HCP/NCCP Covered Species; or *2. Comply with a habitat conservation plan and/or natural community conservation plan developed and adopted by the City, including payment of applicable fees, provided that CDFW and USFWS have approved the conservation plan.* *Western Pond Turtle* *IV-4 Prior to initiation of construction activities, a qualified biologist shall conduct a preconstruction survey of the two stormwater outfall work areas in Sand Creek, and if a western pond turtle is identified in the work area, the turtle shall be relocated to suitable habitat downstream. A written summary of the survey results shall be submitted to the City of Antioch Community Development Department. The work areas adjacent to Sand Creek shall be isolated with exclusion fencing in accordance with Mitigation Measure IV-2 that shall prevent western pond turtle from entering the work site and accidentally being harmed by construction activities.* *Preconstruction surveys for turtle nest sites in uplands adjacent to suitable aquatic habitat during spring and summer months shall be conducted within 30 days prior to beginning any ground-disturbing*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		activities. If nests are not found, further consideration for western pond turtle nests is not warranted. If nest sites are located during preconstruction surveys adjacent to a proposed work area, the nest site plus a 50-foot buffer around the nest site shall be fenced where the buffer intersects a project work area to avoid impacts to the eggs or hatchlings which over-winter at the nest site. In addition, if nest(s) are located during surveys, moth balls (naphthalene) should be sprinkled around the vicinity of the nest (no closer than 10 feet) to mask human scent and discourage predators. *Construction at the nest site and within the 50-foot buffer area shall be delayed until the young leave the nest (this could be a period of many months) or as otherwise advised and directed by a qualified biologist. A qualified CDFW approved biologist, with the concurrence of CDFW, may also relocate young pond turtles.* *Golden Eagle* *IV-5* *Prior to initiation of ground-disturbing activities or tree removal, preconstruction surveys shall be conducted by a qualified raptor biologist on the project site and within a zone of influence (determined by a qualified biologist) of all project-related activities during the golden eagle breeding season (January through*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		August). The zone of influence is affected by geographic barriers that affect direct line of sight from disturbance to the nest site, and/or distances that proposed activities could influence nesting behavior. The zone of influence shall be determined by a qualified raptor biologist. If nesting golden eagles are found nesting within the zone of influence, a qualified raptor biologist shall determine an appropriate buffer consistent with the USFWS' 2017 Recommended Buffer Zones for Ground-Based Human Activities Around Nesting Sites of Golden Eagles in California and Nevada. A written summary of the survey results shall be submitted to the City of Antioch Community Development Department. *The USFWS' 2017 Recommended Buffer Zones for Ground-Based Human Activities Around Nesting Sites of Golden Eagles in California and Nevada, recommends buffer zones for active nests. Such recommended buffer zones may increase or decrease in size depending on specific site or activity circumstances and local jurisdiction recommendations. For any active nest found within a zone of influence of the project site, the qualified raptor biologist shall determine the appropriate buffer size(s) to ensure that project activities do not impact the active nest site. Buffer sizes are likely to be reduced in size when a qualified raptor biologist makes a determination that the nesting golden eagles*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		are acclimated to mechanized activities and disturbances of the like, or the nest is shielded from disturbance by geographic barriers. *If no active nesting golden eagles are identified during survey(s), project construction may commence without further regard for protection of nesting eagles. If golden eagles are found nesting in the project vicinity after project construction has commenced, it should be assumed that the golden eagles began nesting while the project site was under construction and thus, that the eagles are habituated to the ambient level of noise and disturbance emanating from the project site.* *If active nesting golden eagles are identified during the preconstruction surveys, the qualified biologist shall establish a nest protection buffer and no project-related disturbance shall be allowed within any established nesting buffer until the young fledge the nest or the nesting attempt is otherwise complete for the year. The buffer shall remain in place until the fledglings become independent of the nesting tree. The young can be considered successfully fledged when the eaglets no longer return to the nesting tree for several consecutive nights. A qualified raptor biologist shall monitor the nesting eagles initially for a period long enough to understand the nesting eagles' response to disturbance, and thereafter on a routine*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		basis (at least once per week) until the nestlings successfully fledge and become independent of the nesting tree. *It should be noted that if the developer initiates grading of the project site in the non-nesting season (September to December) and development disturbance remains continuous through the nesting season, and the golden eagles return and nest, it can be assumed that the golden eagles are sufficiently acclimated to the project disturbance. A qualified raptor biologist would be required to confirm the level of acclimation and would have to monitor the nesting attempt continuously through the nesting season to ensure that the project disturbance is not affecting the golden eagles nesting efforts and behaviors. After commencement of nesting, if the golden eagles respond negatively to the ongoing disturbance, a 600-foot buffer shall be immediately established and maintained under the supervision of the raptor biologist until the nesting cycle is completed, as determined by a qualified raptor biologist.* *Swainson's Hawk* *IV-6* *Prior to any project-related ground disturbance that occurs during the nesting season (March 15th to September 15th), a qualified biologist shall conduct a preconstruction survey at least two survey periods*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		prior to the start of construction. Surveys shall follow the protocol in the Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley (Swainson's Hawk Technical Advisory Committee 2000), including the survey period lengths identified therein. A written summary of the survey results shall be submitted to the City of Antioch Community Development Department. *If the proposed project could result in take of the Swainson's hawk, its nest, or eggs, typically assumed to be the case if a nest is detected within a 0.25-mile of the project site, the project proponent shall prepare a Swainson's Hawk Monitoring and Habitat Management Plan. If take of Swainson's hawk eggs, nestlings, fledglings could occur from the proposed activities, as determined by a qualified raptor biologist, protective buffers shall be established on the project site that shall prevent such take from occurring. The protective buffer around the active nest site shall be maintained until such time that the Swainson's hawks have completed their nesting cycle as determined by a qualified raptor biologist. The nest protection buffer shall be coordinated with the CDFW.* *If the preconstruction surveys find Swainson's hawk nests within 0.25 mile of the project site, impacts to*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		its foraging habitat shall be mitigated by preserving 60.7 acres of suitable Swainson's hawk foraging habitat (1:1 mitigation for permanent impacts to foraging habitat).10 The mitigation land used to mitigate impacts to the California tiger salamander (see Mitigation Measure IV-3) shall also constitute suitable Swainson's hawk foraging habitat. *As an alternative to completion of Mitigation Measure IV-6, the project applicant could comply with one of the following conditions:* *1. Comply with the applicable terms and conditions of the ECCC HCP/NCCP, as determined in written "Conditions of Coverage" by the East Contra Costa County Habitat Conservancy (Conservancy), provided that the City has first entered into an agreement with the Conservancy for coverage of impacts to ECCCHCP/NCCP Covered Species; or* *2. Comply with a habitat conservation plan and/or natural community conservation plan developed and adopted by the City, including payment of applicable fees, provided that CDFW and FWS have approved the conservation plan.*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		Western Burrowing Owl *IV-7* *Prior to initiation of ground-disturbing activities, a preconstruction survey for burrowing owls shall be conducted. The CDFG's Staff Report on Burrowing Owl Mitigation (CDFG 2012) states that take avoidance (preconstruction) surveys shall be conducted 14 days prior to ground disturbance. As burrowing owls may recolonize a site after only a few days, time lapses between project activities trigger subsequent take avoidance surveys including but not limited to a final survey conducted within 24 hours prior to ground disturbance to ensure absence of the species. The results of the survey shall be submitted to the City of Antioch Community Development Department.* *Burrowing owl surveys shall be conducted by walking the entire project site and (where possible) in areas within 150 meters (approximately 500 feet) of the proposed project impact zone. The 150-meter buffer zone shall be surveyed to identify burrows and owls outside of the proposed disturbance area which may be impacted by factors such as noise and vibration (heavy equipment) during project construction.* *Pedestrian survey transects shall be spaced to allow 100 percent visual coverage of the ground surface. The distance between transect center lines shall be 7*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		meters to 20 meters and shall be reduced to account for differences in terrain, vegetation density, and ground surface visibility. Poor weather may affect the surveyor's ability to detect burrowing owls thus, the biologist shall avoid conducting surveys when wind speed is greater than 20 kilometers per hour and the site is affected by precipitation or dense fog. To avoid impacts to owls from surveyors, owls and/or occupied burrows shall be avoided by a minimum of 50 meters (approximately 160 feet) wherever practical to avoid flushing occupied burrows. Disturbance to occupied burrows shall be avoided during all seasons. *If burrowing owls are detected on the site, the following restricted activity dates and setback distances are recommended per the CDFG's Staff Report on Burrowing Owl Mitigation (CDFG 2012).* • *From April 1 through October 15, low disturbance and medium disturbance activities shall have a 200-meter buffer while high disturbance activities shall have a 500-meter buffer from occupied nests.* • *From October 16 through March 31, low disturbance activities shall have a 50- meter buffer, medium disturbance activities shall have a 100-meter buffer, and high*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		disturbance activities shall have a 500-meter buffer from occupied nests. • *No earth-moving activities or other disturbance shall occur within the afore-mentioned buffer zones of occupied burrows. The buffer zones shall be fenced as well. If burrowing owls are found in the proposed project area, a qualified biologist shall delineate the extent of western burrowing owl habitat on the site.* *The mitigation land used to mitigate impacts to the California tiger salamander (see Mitigation Measure IV-3) shall also constitute suitable western burrowing owl mitigation land.* *Tricolored Blackbird* *IV-8* *Prior to any ground-disturbing activities commencing between February 1 and August 31, the project applicant shall retain a qualified biologist to conduct a nesting survey for tricolored blackbird. A written summary of the survey results shall be submitted to the City of Antioch Community Development Department. If tricolored blackbirds are not identified during the surveys, further mitigation is not required.* *If nesting tricolored blackbirds are identified during the surveys, a 300-foot radius around the nesting*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		colony shall be staked with bright orange lath or other suitable staking. The size of the buffer may be altered if a qualified biologist conducts behavioral observations and determines the nesting tricolored blackbirds are well acclimated to disturbance. In such a case, the biologist shall prescribe a modified buffer that allows sufficient room to prevent undue disturbance or harassment to the nesting tricolored blackbirds. Construction or earth-moving activity shall not occur within the established buffer until it is determined by a qualified biologist that the young have fledged (i.e., left the nest) and have attained sufficient flight skills to avoid project construction zones, as typically occurs by August 1. Construction or earth-moving activity may occur earlier or later, subject to the discretion of a qualified biologist. If a qualified biologist is not hired to watch the nesting tricolored blackbirds, then the buffers shall be maintained in place through the month of August and work within the buffer can commence September 1. If buffers are removed prior to September 1, the qualified biologist monitoring the nesting buffer(s) shall prepare and submit a report to the City of Antioch that provides details about the nesting outcome and the removal of buffers. The report shall be submitted prior to the time that nest protection buffers are removed if the date is before September 1.	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		Nesting Migratory Birds *IV-9* *If project site disturbance associated with the proposed project would commence between March 1 and September 1, a preconstruction nesting survey shall be completed in the 15-day period prior to commencing with any proposed project related disturbance on the project site or off-site improvement areas. The nesting survey shall be conducted on the project site and within a zone of influence around the project site. The zone of influence includes those areas off the project site where birds could be disturbed by earth-moving vibrations or noise as determined by a qualified ornithologist. Accordingly, the nesting survey(s) must cover the project site and an area around the project site boundary. A written summary of the survey results shall be submitted to the City of Antioch Community Development Department. If special-status birds are not identified during the surveys, further mitigation is not required.* *If special-status birds are identified nesting on or adjacent to the project site, a non-disturbance buffer of 100 feet shall be established or as otherwise prescribed by a qualified ornithologist. If common (that is, not special-status) birds, for example, California towhee, California scrub jay, or acorn woodpeckers (Melanerpes formicivorus), are*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		identified nesting on or adjacent to the project site, a non-disturbance buffer of 75 feet shall be established or as otherwise prescribed by a qualified ornithologist. The buffer shall be demarcated with painted orange lath or via the installation of orange construction fencing. Disturbance within the buffer shall be postponed until it is determined by a qualified ornithologist that the young have fledged and have attained sufficient flight skills to leave the area or that the nesting cycle has otherwise completed. *Nesting buffers shall be maintained until September 1 unless a qualified ornithologist determines that young have fledged and are independent of their nests at an earlier date. If nest projection buffers are removed prior to September 1, the qualified biologist conducting the nesting surveys shall prepare and submit a report to the City of Antioch that provides details about the nesting outcome and the removal of buffers. The report shall be submitted prior to the time that nest protection buffers are removed if the date is before September 1.* *Raptors (Including White-Tailed Kite)* *IV-10 Prior to commencement of ground-disturbing activities or tree removal between February 1 and August 31, the project applicant shall retain a qualified biologist to conduct raptor nesting surveys.*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		The raptor nesting surveys shall include examination of all trees within 300 feet of the entire project site, including trees that are not planned for removal. A written summary of the survey results shall be submitted to the City of Antioch Community Development Department. If nesting raptors are not identified during the surveys, further mitigation is not required. *If nesting raptors, including white-tailed kite, are identified during the surveys, the dripline of the nest tree shall be fenced with orange construction fencing (provided the tree is on the project site), and a 300-foot radius around the nest tree shall be staked with bright orange lath or other suitable staking. If the tree is located off the project site, then the buffer shall be demarcated per above where the buffer intersects the project site. The size of the buffer may be altered if a qualified raptor biologist conducts behavioral observations and determines the nesting raptors are well acclimated to disturbance. In such case, the raptor biologist shall prescribe a modified buffer that allows sufficient room to prevent undue disturbance/harassment to the nesting raptors. Construction or earth-moving activity shall not occur within the established buffer until it is determined by a qualified raptor biologist that the young have fledged (i.e., left the nest) and have attained sufficient flight skills to avoid project construction zones, which*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		typically occurs by August 1. Initiation of construction or earth-moving activity may be earlier or later, as determined by a qualified raptor biologist. If a qualified biologist is not hired to watch the nesting raptors, then the buffers shall be maintained in place through the month of August and work within the buffer may commence September 1. If buffers are removed prior to September 1, the qualified raptor biologist monitoring the nesting buffer shall prepare and submit a report to the City of Antioch that provides details about the nesting outcome and the removal of buffers. The report shall be submitted prior to the time that nest protection buffers are removed if the date is before September 1. *San Joaquin Kit Fox* *IV-11 The project applicant shall implement the following standard avoidance measures for San Joaquin kit fox:* • *An education program shall be conducted by a qualified biologist prior to the start of construction to explain the endangered species concerns to contractors working at the project site. The program shall include an explanation of the FESA and CESA and any endangered species concerns in the area. A sign-in sheet shall be distributed to all*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		participants of the education program and submitted to the City of Antioch within two weeks of program completion. • *Qualified biologists shall conduct preconstruction den surveys no more than 14 days prior to site grading to ensure that potential kit fox dens are not disrupted. If "potential dens" are not identified during the surveys (potential dens are defined as burrows at least four inches in diameter which open up within two feet), further mitigation is not required. If potential dens are identified, infrared camera stations shall be set up and maintained for three consecutive nights at den openings prior to initiation of grading activities to determine the status of the potential dens. If kit fox is not found to be using the den, site grading may proceed unhindered. However, if a kit fox is found using a den site within the project site, the USFWS and the CDFW shall be notified and consulted before work activities resume. A written summary of the survey results shall be submitted to the City of Antioch Community Development Department.* • *To prevent harm to San Joaquin kit fox, any steep-walled holes and/or trenches excavated on the project site shall be*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		completely covered at the end of each workday or escape ramps shall be provided to allow any entrapped animals to escape unharmed. All pipe sections stored at the project site overnight that are four inches in diameter or greater shall be inspected for San Joaquin kit fox before the pipes are moved or buried. If San Joaquin kit fox are identified in the work area at any time, the USFWS and/or the CDFW, as well as the City, shall be notified and consulted before work activities resume. All trash items shall be removed from the site to reduce the potential for attracting predators of San Joaquin kit fox. Contractors shall be prohibited from bringing firearms and pets to the job site. *American Badger* *IV-12 The project applicant shall retain a qualified biologist to conduct a preconstruction den survey within 21 days prior to site grading. If potential dens are not identified, further mitigation is not required. If a potential den is located, infrared camera stations shall be set up and maintained for three consecutive nights at the potential den openings prior to initiation of grading/work activities to determine the status of the potential dens. If American badger is not found to*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact		Level of Significance Prior to Mitigation	Mitigation Measures		Level of Significance After Mitigation
				be using the den, the burrow shall be filled, and site grading may proceed in the vicinity of the burrow(s) unhindered. However, if American badger is found to be using a den site within the area of proposed grading, provided it is not a natal den, the badger shall be passively and humanely evicted from its den if the individual could be impacted by grading or other activities. If a natal den is found, the project proponent shall consult with CDFW to prepare an eviction plan and shall submit the eviction plan to the City prior to implementation. A written summary of the survey results shall be submitted to the City of Antioch Community Development Department.	
IV-b	Would the project have 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 California Department of Fish and Wildlife or US Fish and Wildlife Service? IV-c Would the project have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool,	S	*IV-13*	*Prior to discharging any dredged or fill materials into any waters of the U.S. within the project site and/or the off-site improvement areas, the applicant shall obtain permit authorization to fill wetlands under Section 404 of the federal CWA (Section 404 Permit) from USACE. The Section 404 Permit application shall include an assessment of directly impacted, avoided, and preserved acreages to waters of the U.S. Mitigation measures shall be developed as part of the Section 404 Permit to ensure no net loss of wetland function and values. Mitigation for direct impacts to waters of the U.S. within the project site and/or the off-site improvement areas would occur at a minimum of 1:1 ratio for direct impacts by purchasing seasonal wetland credits from the Cosumnes Mitigation Bank or other wetland*	LS

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
coastal, etc.) through direct removal, filling, hydrological interruption, or other means?		*mitigation bank that services the project site, as approved by the USACE and the RWQCB.* *Alternatively, the project proponent may create, preserve, and manage new seasonal wetlands on or off of the project site at a 2:1 mitigation ratio. A project-specific Wetland Mitigation and Monitoring Plan prepared by a qualified wetland restoration ecologist that includes the following information shall be provided to the City prior to conducting any activity that would result in the placement of any fill material into a water of the U.S. or water of the State:* • *A description of the impacted water;* • *A map depicting the location of the mitigation site(s) and a description of existing site conditions;* • *A detailed description of the mitigation design that includes: (i) the location of the new seasonal wetlands; (ii) proposed construction schedule; (iii) a planting/vegetation plan; (iv) specific monitoring metrics, and objective performance and success criteria, such as delineation of created area as jurisdictional waters using USACE published methods; and (v) contingency measures if the created*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		wetlands do not achieve the specified success criteria; and • *Short-term and long-term management and monitoring methods.* *If the wetland mitigation site is a separate mitigation property, the project proponent will grant a conservation easement to a qualified entity, as defined by Section 81.5.3 of the California Civil Code, preserving the created seasonal wetland(s) in perpetuity, and establish an endowment fund to provide for the long-term management, maintenance, and monitoring of the created seasonal wetland(s). If the proposed project includes placing fill material into jurisdictional waters of the U.S. or waters of the State, the project proponent shall provide the City with a copy of permits issued by the USACE and RWQCB authorizing the fill.* *In addition, a Water Quality Certification or waiver pursuant to Section 401 of the CWA must be obtained for Section 404 permit actions. Proof of compliance with the mitigation measure shall be submitted to the City of Antioch Community Development Department prior to the issuance of grading permits.* *IV-14* *Impacts to riparian habitat within CDFW's Section 1602 jurisdictional areas that would occur during the installation of two stormwater outfalls in Sand Creek,*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		construction of the Hillcrest Avenue bridge over Sand Creek, and the installation of the potential EVA/Pedestrian Bridge over Sand Creek, shall be mitigated through planting California native trees and/or shrubs within the Sand Creek buffer area. Impacted trees and shrubs shall be mitigated with a 3:1 (replacement to impacts) ratio. Replacement trees and shrubs shall be a minimum of one gallon size trees/shrub replacements. *In addition, the project proponent will implement appropriate BMPs to prevent construction related impacts that could introduce de minimus fill or other pollutants into Sand Creek and the eastern ephemeral channel on the project site. The measures shall include the installation of wildlife- friendly hay wattles and/or silt fence that will prevent unintended de minimus fill impacts to Sand Creek while the stormwater outfalls are constructed. In addition, orange silt fencing shall be installed at the top-of-bank of Sand Creek to prevent unintended human and equipment traffic adjacent to Sand Creek. Finally, the dripline of all protected trees within the drainages on the project site, if near work areas, shall be protected through the installation of orange construction fencing.* *The project proponent shall satisfy this mitigation by providing the City of Antioch with a fully executed*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact		Level of Significance Prior to Mitigation	Mitigation Measures		Level of Significance After Mitigation
				copy of a Streambed Alteration Agreement (SBAA) with the CDFW, if one is necessary, that includes these, or other functionally equivalent, BMPs, prior to installation of the two stormwater outfalls in Sand Creek, construction of the Hillcrest Avenue bridge over Sand Creek, and/or installation of the potential EVA/Pedestrian Bridge over Sand Creek. The project proponent shall implement the conditions of the executed SBAA.	
IV-e	Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	S	*IV-15*	*Prior to issuance of certificates of occupancy, all trees that are legally removed as part of the proposed project shall be replaced according to the following schedule, to the satisfaction of the City of Antioch Community Development Department:* *1. Each established tree: two 24-inch box trees.* *2. Each mature tree: two 48-inch box trees.* *The locations and sizes of the replacement trees shall be clearly shown on the final landscape plans, subject to review and approval by the City.*	LS
V-b	Would the project cause a substantial adverse change in the significance of a unique archaeological resource pursuant to Section 15064.5?	S	*V-1*	*Prior to initiation of ground-disturbing activities, a consultant and construction worker tribal cultural resources training program shall be provided for all personnel involved in project implementation, to be administered by a qualified cultural resources specialist. The training program shall include relevant information regarding sensitive tribal cultural*	LS

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact		Level of Significance Prior to Mitigation	Mitigation Measures		Level of Significance After Mitigation
V-c	Would the project disturb any human remains, including those interred outside of dedicated cemeteries?			*resources, including applicable regulations, protocols for avoidance, and consequences of violating State laws and regulations. The worker cultural resources awareness program shall also describe appropriate avoidance and minimization measures for resources that have the potential to be located on the project site, and shall outline what to do and whom to contact if any potential archaeological resources or artifacts are encountered. The program shall also underscore the requirement for confidentiality and culturally-appropriate treatment for any find of significance to Native Americans and behaviors, consistent with Native American tribal values. A sign-in sheet shall be distributed to all participants of the training program and submitted to the City of Antioch within two weeks of program completion.*	
			V-2	*In the event of the accidental discovery or recognition of any or human remains, further excavation or disturbance of the find or any nearby area reasonably suspected to overlie adjacent human remains shall not occur until compliance with the provisions of CEQA Guidelines Section 15064.5(e)(1) and (2) has occurred. The Guidelines specify that in the event of the discovery of human remains other than in a dedicated cemetery, no further excavation at the site or any nearby area suspected to contain human remains shall occur until the County Coroner has been notified to determine if an investigation into the*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		cause of death is required. If the coroner determines that the remains are Native American, then, within 24 hours, the Coroner must notify the Native American Heritage Commission, which in turn will notify the most likely descendants who may recommend treatment of the remains and any grave goods. If the Native American Heritage Commission is unable to identify a most likely descendant or most likely descendant fails to make a recommendation within 48 hours after notification by the Native American Heritage Commission, or the landowner or his authorized agent rejects the recommendation by the most likely descendant and mediation by the Native American Heritage Commission fails to provide a measure acceptable to the landowner, then the landowner or his authorized representative shall rebury the human remains and grave goods with appropriate dignity at a location on the property not subject to further disturbances. Should human remains be encountered, a copy of the resulting County Coroner report noting any written consultation with the Native American Heritage Commission shall be submitted as proof of compliance to the City's Community Development Department. *V-3* *If any prehistoric or historic artifacts, or other indications of cultural deposits, such as historic privy pits or trash deposits, are found once ground disturbing activities are underway, all work within the*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		vicinity of the find(s) shall cease, the City of Antioch shall be notified, and the find(s) shall be immediately evaluated by a qualified archaeologist and Native American representatives from culturally affiliated Native American tribes to assess the significance of the find and make recommendations for further evaluation and treatment, as necessary. Such recommendations shall be documented in the project record. For any recommendations made by interested Native American tribes which are not implemented, a justification for why the recommendation was not followed will be provided in the project record. If the find is determined to be a historical or unique archaeological resource, contingency funding and a time allotment to allow for implementation of avoidance measures or appropriate mitigation shall be made available (CEQA Guidelines Section 15064.5). Work may continue on other parts of the project site while historical or unique archaeological resource mitigation takes place (Public Resources Code Sections 21083 and 21087). *If inadvertent adverse impacts to tribal cultural resources, unique archeology, or other cultural resources occurs, consultation with the culturally affiliated Native American tribes regarding the standards contained in Public Resources Code sections 21084.3(a) and (b) and CEQA Guidelines*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact		Level of Significance Prior to Mitigation	Mitigation Measures		Level of Significance After Mitigation
				section 15370 should occur, in order to coordinate for compensation for the adverse impacts by replacing or providing substitute resources or environments.	
VII-a	Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: iii. Seismic-related ground failure, including liquefaction? iv. Landslides? VII-c Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse? VII-d Would the project be located on expansive soil, as defined in Table 18-1B of the Uniform Building Code (1994), creating	S	*VII-1* *VII-2*	*Prior to issuance of any grading permits, all recommendations set forth in Sections 5.0, 6.0, and 7.0 of the Geotechnical Summary Report prepared for the proposed project shall be reflected on the project grading and foundation plans, subject to review and approval by the City Engineer.* *Prior to issuance of any grading permits, the project applicant shall submit to the City of Antioch Engineering Department, for review and approval, a design-level geotechnical exploration study produced by a California Registered Civil Engineer or Geotechnical Engineer and identify grading and building practices necessary to achieve compliance with the latest adopted edition of the California Building Standards Code's geologic, soils, and seismic requirements. Consistent with Section 8.0 of the Geotechnical Summary Report prepared for the proposed project, the design-level geotechnical exploration study shall include supplemental borings, surface samples, Cone Penetration Tests (CPTs) and laboratory soil testing to address the following geotechnical concerns:* • *Liquefaction-induced settlement risks, lateral*	LS

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

	Impact	Level of Significance Prior to Mitigation		Mitigation Measures	Level of Significance After Mitigation
	substantial direct or indirect risks to life or property?			*spreading risks, and design considerations.* • *Detailed foundation design criteria based on building types and surficial soil material properties.* • *Identification of any undocumented fill located on the property.* *The design-level geotechnical exploration study shall identify measures to address construction requirements to mitigate any potential geotechnical hazards.*	
VII-b	Would the project result in substantial erosion or the loss of topsoil?	S	*VII-3*	*Prior to issuance of grading and building permits, the project applicant shall submit, for the review and approval by the City Engineer, an erosion control plan that utilizes standard construction practices to limit the erosion effects during construction of the proposed project. Measures shall include, but are not limited to, the following:* • *Hydro-seeding;* • *Placement of erosion control measures within drainage ways and ahead of drop inlets;* • *The temporary lining (during construction activities) of drop inlets with "filter fabric" (a specific type of geotextile fabric);* • *The placement of straw wattles along slope contours;*	LS

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact		Level of Significance Prior to Mitigation	Mitigation Measures		Level of Significance After Mitigation
				• *Directing subcontractors to a single designation "wash-out" location (as opposed to allowing them to wash-out in any location they desire);* • *The use of siltation fences; and* • *The use of sediment basins and dust paliatives.*	
VII-f	Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	S	*VII-4*	*Prior to initiation of ground-disturbing activities, the applicant shall retain the services of a professional paleontologist to conduct a Worker's Environmental Awareness Training for the construction crew that will be conducting earthmoving activities (i.e., grading and excavation) at the project site and off-site improvement areas. The Environmental Awareness Training may be conducted concurrently with the tribal cultural resources training program required per Mitigation Measure V-1 of this Initial Study. Consistent with the recommendations of the 2020 Cultural Resources Assessment prepared for the proposed project by Natural Investigations, training shall include information on the types of fossils that may be encountered during project work, relevant compliance requirements, and the course to action to be taken in the event of an inadvertent fossil discovery.* *Should any vertebrate fossils (e.g., teeth, bones), an unusually large or dense accumulation of intact*	LS

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact		Level of Significance Prior to Mitigation	Mitigation Measures		Level of Significance After Mitigation
				invertebrates, or well-preserved plant material (e.g., leaves) be unearthed by the construction crew, ground-disturbing activity shall be diverted to another part of the project site and the City and paleontologist shall be called on-site to assess the find and, if significant, recover the find in a timely matter. Finds determined significant by a paleontologist shall then be conserved and deposited with a recognized repository, such as the University of California Museum of Paleontology. The alternative mitigation would be to leave the significant finds in place, determine the extent of significant deposit, and avoid further disturbance of the significant deposit. Within two weeks of training completion, proof of the construction crew awareness training shall be submitted to the City's Community Development Department in the form of a copy of training materials and the completed training attendance roster.	
IX-b	Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment?	S	*IX-1*	*Prior to final map approval, the project applicant shall submit to the City of Antioch Engineering Department, for review and approval, plans which show that future inhabited structures will not be located over the four on-site abandoned oil/gas wells. The plans shall be completed in compliance with the Division of Oil, Gas, and Geothermal Resources (DOGGR) Construction Site Review Program, which includes guidelines and recommendations for setbacks and mitigation measures for venting systems. If grading is proposed proximate to the four*	LS

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		abandoned well locations, DOGGR shall be consulted to determine if the wells will require modification in casing height. In addition, DOGGR shall be consulted to determine if the well abandonment procedures are consistent with current requirements. *IX-2* *If remnant oil/gas pipelines are encountered during site development work, the pipelines shall be abandoned and/or removed in accordance with applicable federal, State, and/or local standards to the satisfaction of the Contra Costa Environmental Health Department and the City Engineer. If any indicators of apparent soil contamination (soil staining, odors, debris fill material, etc.) are found at the project site associated with the petroleum pipelines, the impacted area shall be isolated from surrounding, non-impacted areas. The project environmental professional shall obtain samples of the potentially impacted soil for analysis of the contaminants of concern and comparison with applicable regulatory residential screening levels (i.e., Environmental Screening Levels, California Human Health Screening Levels, Regional Screening Levels, etc.). Where the soil contaminant concentrations exceed the applicable regulatory residential screening levels, the impacted soil shall be excavated and disposed of offsite at a licensed landfill facility to the satisfaction of the Contra Costa*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact		Level of Significance Prior to Mitigation	Mitigation Measures		Level of Significance After Mitigation
				Environmental Health Department. If soil contaminants do not exceed the applicable regulatory residential screening levels, further action is not required.	
X-a	Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	S	*X-1*	*Prior to issuance of grading permits, the contractor shall prepare a Storm Water Pollution Prevention Plan (SWPPP). The developer shall file the Notice of Intent (NOI) and associated fee to the SWRCB. The SWPPP shall serve as the framework for identification, assignment, and implementation of BMPs. The contractor shall implement BMPs to reduce pollutants in stormwater discharges to the maximum extent practicable. The SWPPP shall be submitted to the Director of Public Works/City Engineer for review and approval and shall remain on the project site during all phases of construction. Following implementation of the SWPPP, the contractor shall subsequently demonstrate the SWPPP's effectiveness and provide for necessary and appropriate revisions, modifications, and improvements to reduce pollutants in stormwater discharges to the maximum extent practicable.*	LS
XIII-a	Would the project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local	S	*XIII-1*	*During construction activities, the use of heavy construction equipment shall adhere to Sections 5-17.04 and 5-17.05 of the City's Municipal Code with regard to hours of operation, which state that it is unlawful for any person to operate heavy construction equipment or otherwise be involved in construction*	LS

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
general plan or noise ordinance, or applicable standards of other agencies?		*activities during the hours specified below:* *1. On weekdays prior to 7:00 AM and after 6:00 PM.* *2. On weekdays within 300 feet of occupied dwelling space, prior to 8:00 AM and after 5:00 PM.* *3. On weekends and holidays, prior to 9:00 AM and after 5:00 PM, irrespective of the distance from the occupied dwelling.* *Such standards shall be included, via written notation, on final improvement plans, to the satisfaction of the City Engineer.* *XIII-2 The project applicant shall ensure that all on-site construction activities occur pursuant to the criteria identified in Policy 11.6.2, Temporary Construction, of the City of Antioch General Plan. Such criteria include, but are not limited to, preparation of a construction-related noise mitigation plan. The construction-related noise mitigation plan shall be submitted to the Community Development Department for review and approval prior to issuance of grading permits for the project. Items included in the plan could contain, but would not be limited to, the following:* • *All equipment driven by internal combustion*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
		engines shall be equipped with mufflers which are in good working condition and appropriate for the equipment; • *The construction contractor shall utilize "quiet" models of air compressors and other stationary noise sources where the technology exists;* • *At all times during project grading and construction, stationary noise-generating equipment shall be located as far as practical from noise-sensitive receptors;* • *Unnecessary idling of internal combustion engines shall be prohibited;* • *Owners and occupants of residential and non-residential properties located with 300 feet of the construction site shall be notified of the construction schedule in writing; and* • *The construction contractor shall designate a "noise disturbance coordinator" who shall be responsible for responding to any local complaints about construction noise. The disturbance coordinator would determine the cause of the noise complaint (e.g., starting too early, bad muffler, etc.) and institute reasonable measures as warranted to correct the problem. A telephone number for the disturbance coordinator shall be conspicuously posted at the construction site.*	

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact		Level of Significance Prior to Mitigation	Mitigation Measures		Level of Significance After Mitigation
			XIII-3	*A solid noise barrier measuring a minimum of six feet in height shall be constructed along Hillcrest Avenue where residences are located within 157 feet of the roadway. Suitable materials for the noise barrier include concrete panels, concrete masonry units, earthen berms, or any combination thereof. If roadway elevations and building pad elevations are not equal, the barrier heights and locations shall be reviewed once final grading plans are available. The final design of the noise barrier shall be approved by the Community Development Department prior to building permit issuance.*	
			XIII-4	*Prior to building permit issuance, the construction drawings for the project shall include a suitable form of forced-air mechanical ventilation for all proposed residential units, subject to approval by the Community Development Department, such that doors and windows may be kept closed at the occupant's discretion to control interior noise and achieve the City's 45 dB Ldn interior noise level threshold.*	
XVIII-a	Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is	S	*XVIII-1*	*Implement Mitigation Measures V-1, V-2, and V-3.*	LS

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

	Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
	geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American Tribe, and that is:listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)?			
XVIII-b	Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American Tribe, and that is a resource determined by the lead agency, in its discretion and supported			

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

Table 2-1
Summary of Impacts and Mitigation Measures

Impact	Level of Significance Prior to Mitigation	Mitigation Measures	Level of Significance After Mitigation
by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?			

N/A = *Not Applicable*; LS = *Less-than-Significant*; S = *Significant*; SU = *Significant and Unavoidable; LCC = Less than Cumulatively Considerable; CC = Cumulatively Considerable*

3. Project Description

3. PROJECT DESCRIPTION

3.1 INTRODUCTION

Section 15125 of CEQA Guidelines requires an EIR to include a description of the physical environmental conditions of the project site and the site vicinity, as they exist at the time the Notice of Preparation is published, from a local and regional perspective. Knowledge of the existing environmental setting is critical to the assessment of environmental impacts. Per CEQA Guidelines Section 15125, the description of the environmental setting shall not be longer than necessary to understand the potential significant effects of the project. Please note that detailed discussions of the existing setting in compliance with CEQA Guidelines Section 15125, specific to each environmental resource area, are included in each corresponding technical chapter of this EIR.

The Project Description chapter of the EIR provides a comprehensive description of the Creekside/Vineyards at Sand Creek Project (proposed project) in accordance with CEQA Guidelines Section 15124. A detailed description of the project location, project setting and surrounding land uses, project objectives, project components, and required project approvals is presented below.

3.2 PROJECT LOCATION

The project site consists of 158.2 acres located south of the future extension of Sand Creek Road in the southeastern portion of the City of Antioch, California. The City of Antioch is located within eastern Contra Costa County and is bordered to the north by the San Joaquin River Delta; to the east by the City of Brentwood and the City of Oakley; to the west by the City of Pittsburg and unincorporated portions of Contra Costa County; and to the south by unincorporated portions of Contra Costa County (see Figure 3-1).

The project site is bordered by the City of Antioch/Contra Costa County line to the south and the City of Antioch/City of Brentwood limit to the east. Sand Creek is located to the north of the site, and State Route (SR) 4 is located approximately 0.38-mile east of the site (see Figure 3-2). The site is identified by Assessor's Parcel Number (APN) 057-050-024. The project site is situated within the Sand Creek Focus Area of the General Plan, which contains lands designated by the City of Antioch General Plan for open space, residential, commercial, and mixed-use development.

3.3 PROJECT SETTING AND SURROUNDING LAND USES

The following sections describe the existing setting of the project site and the surrounding land uses in the project vicinity.

Project Site Setting

Per the City's General Plan, the eastern portion of the project site is designated Open Space/Senior Housing, while the western portion is designated Hillside, Estate and Executive Residential/Open Space. The site is zoned Study Area (S). Currently, the site consists primarily of ruderal grasses and is absent of structures or other indications of prior development.

Figure 3-1
Regional Location

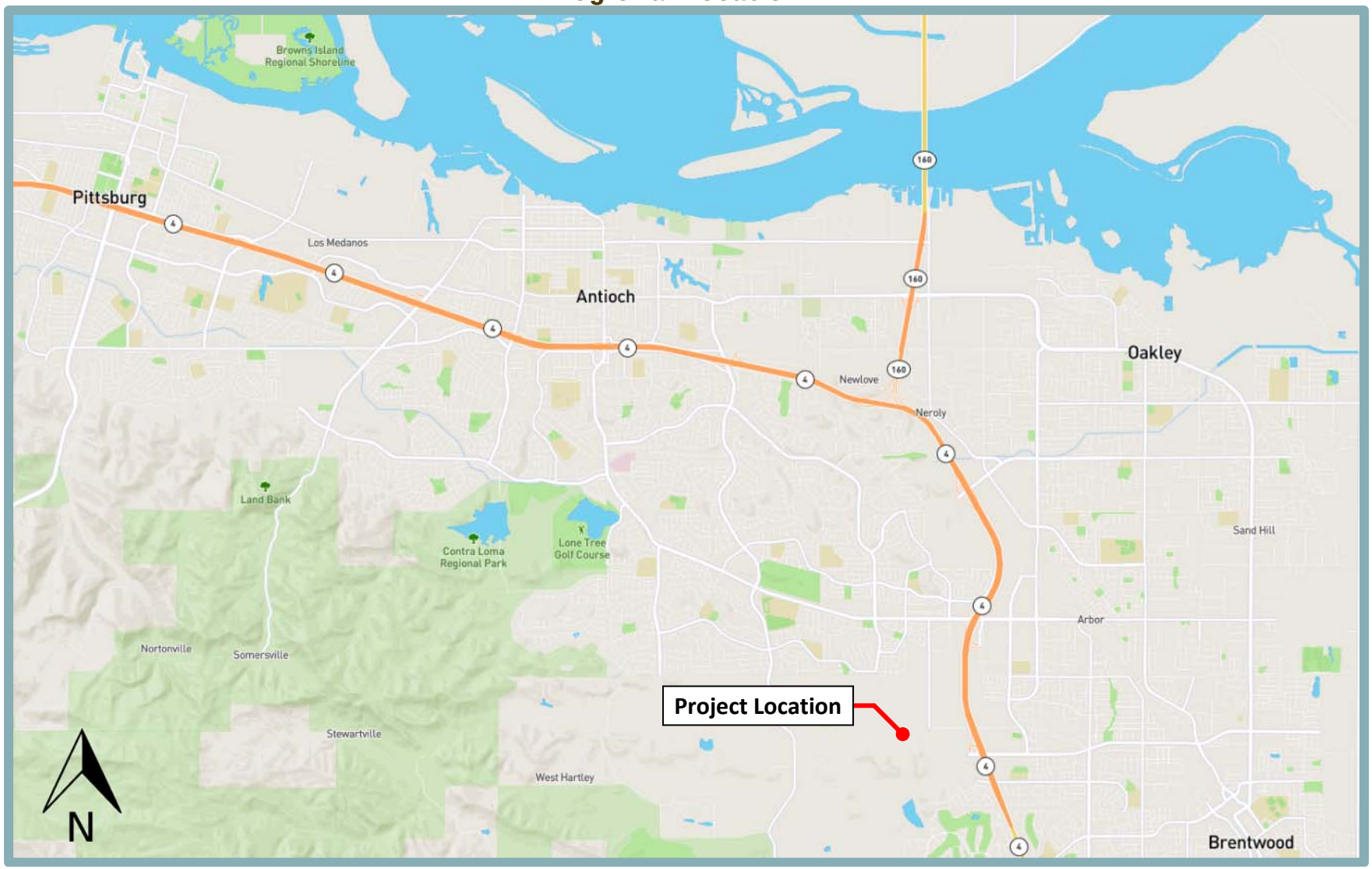
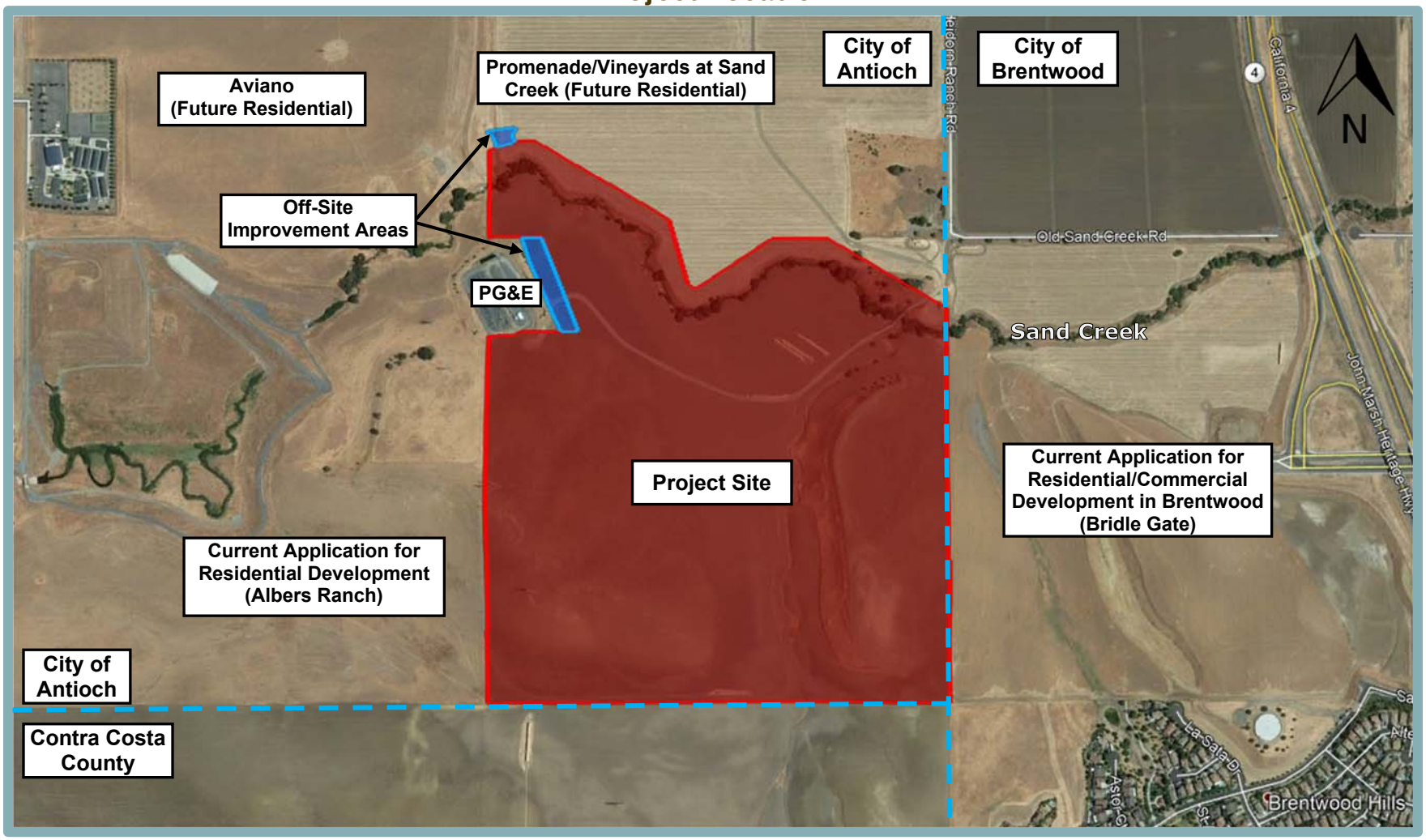


Figure 3-2
Project Location



The site is generally rectangular; however, the northern boundary shifts north and south in an irregular shape, following the alignment of Sand Creek. The site's terrain is characterized by a flat valley bordered by hill forms on the west and east sides. Elevations on-site range from 150 to 325 feet above mean sea level (msl). A shallow area exists at the base of the eastern hillslope and appears to collect local natural drainage during rainfall events, draining into Sand Creek. Sand Creek, a tributary of Marsh Creek, flows through the northern portion of the project site in an easterly direction.

The project site has been dry-land farmed since the 1930s and consists primarily of non-native vegetation. A total of nine energy and communication access and utility easements exist on the project site. Within the northeastern portion of the site, PG&E maintains an access easement that includes a bridge over Sand Creek, which allows PG&E to drive through the project site to access existing off-site utility infrastructure to the west of the project site. An existing PG&E tower line easement extends through the western portion of the project site. In addition, existing oil and gas pipelines within the project site run below ground and cross Sand Creek and the natural drainage area in a number of locations. A 10-foot-wide pole line easement extends along the length of the southern site boundary.

Surrounding Land Uses

As shown in Figure 3-2, the majority of the surrounding area has been approved or planned for residential development. Within the City of Antioch, the area to the north of the project site is currently approved for development with residential uses as part of the Promenade/Vineyards at Sand Creek project. The area to the northwest of the site is approved for development with the Aviano residential project. The area to the southwest of the project is anticipated for buildout with residential uses per the City's General Plan, and an application to develop the area with residential uses (Albers Ranch) has been received by the City. To the east of the project site, the City of Brentwood has received an application for development of the Bridle Gate project, which, if approved, would include both single-family and multi-family residential uses, and would allow for future development of commercial uses. An existing PG&E-owned parcel developed with an electrical substation, designated Public/Quasi Public per the General Plan, is located within a carve-out parcel at the site's western boundary. The area further to the west of the PG&E parcel includes the Sand Creek Basin, managed by the Contra Costa County Flood Control District. The area to the south of the project site consists of undeveloped dry-farmed land outside the City's Sphere of Influence and Planning Area, within unincorporated Contra Costa County.

3.4 PROJECT OBJECTIVES

Similar to the Promenade/Vineyards at Sand Creek Project, the proposed Creekside/Vineyards at Sand Creek project would develop a private gated residential community that includes the flexibility to be developed as non-age-restricted or senior single family, consisting of approximately 220 detached residential units in a Medium Low Density Residential/Small Lot Single Family Detached density of four to six units per acre. The following project objectives have been developed by the project applicant:

1. To implement the City's General Plan and Sand Creek Focus Area of the General Plan goals by creating an economically viable project that is capable of providing various infrastructure improvements that are able to serve the project and facilitate service to future planned development, including trunk line infrastructure that is necessary for the ultimate development of the Sand Creek Focus Area of the General Plan, and public roadway improvements.

2. To help the City of Antioch provide its fair share of housing, and help alleviate a regional housing shortage, by providing a mix of housing types and sizes, some moderately affordable, and which can meet the needs of a variety of different and growing household sizes.
3. To expand upon Antioch's first residential gated community, and make it compatible with the surrounding residential uses, yet a visually identifiable community that is at a scale and quality similar to gated residential developments in the greater East Bay.
4. To provide on-site amenities and recreational opportunities, such as a pool club and both a private and public pedestrian connection to the future Sand Creek trail.
5. To provide housing near major transportation and regional trails connections, with increased land use intensities near regional transportation connections.
6. To create a community that is family friendly or that could accommodate senior residents.
7. To implement the County's Growth Management Program by providing for urban development within the Urban Limit Line.
8. To contribute to the City of Antioch's economic and social viability by creating a community that creates jobs and attracts investment and positive attention.

3.5 PROJECT COMPONENTS

The proposed project would include development of 220 single-family residential units and associated improvements on approximately 58.9 acres of the 158.2-acre project site, as well as 1.8 acres of off-site improvements (see Figure 3-3). The project improvements would include, but would not be limited to, parks, trails, landscaping, circulation improvements, and utility installation. The remainder of the site, including Sand Creek and the associated buffer area, would be retained as open space.

The proposed project would require an amendment to the City of Antioch General Plan, a Master Development Plan/Rezone, Design Review, and a Development Agreement. The project components are discussed in greater detail below.

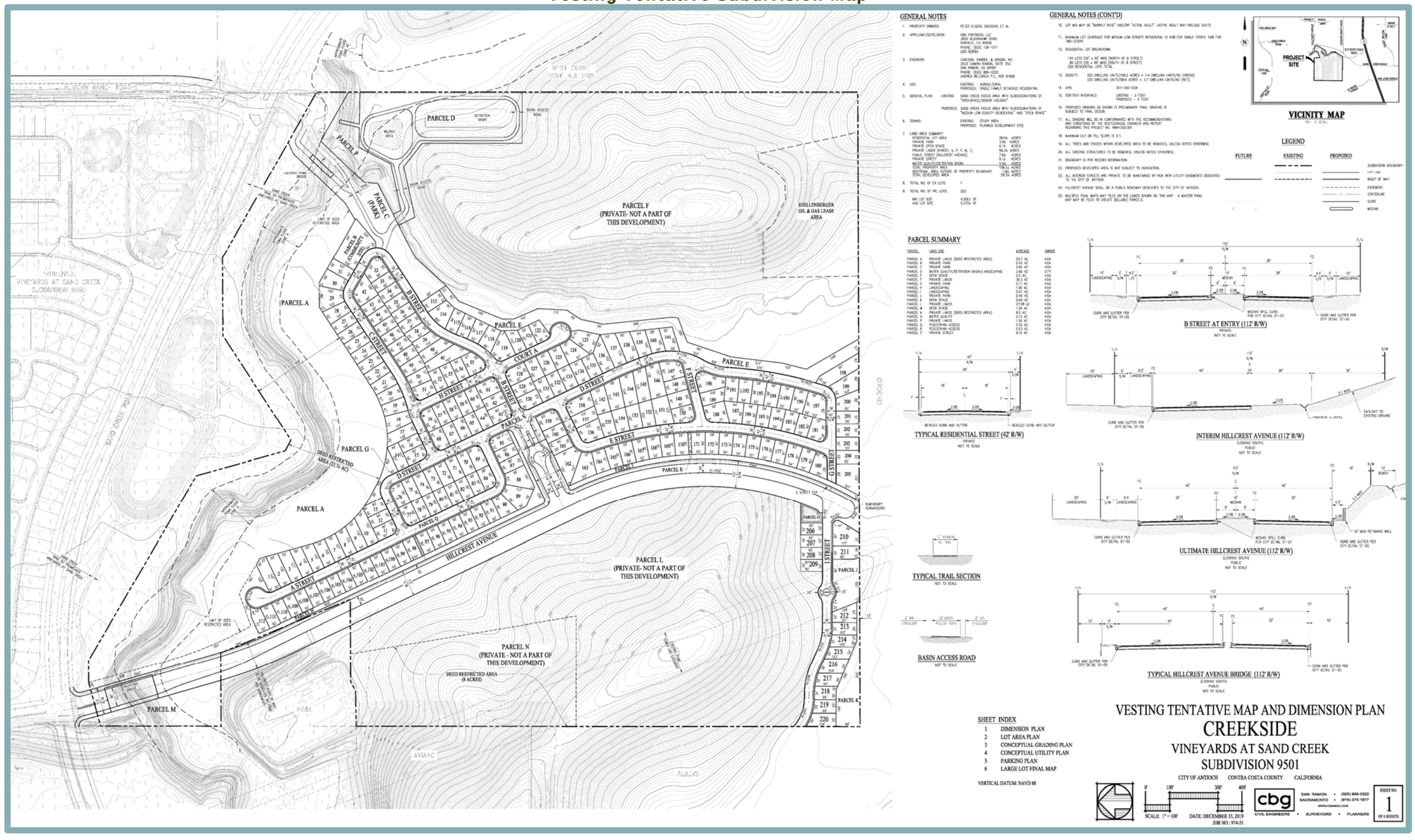
General Plan Amendment

The proposed project would include a General Plan Amendment (GPA) to the Land Use Map for the Sand Creek Focus Area of the General Plan to change the land use designations of the site from Open Space/Senior Housing and Hillside, Estate and Executive Residential/Open Space to Medium Low Density Residential/Open Space, as well as an amendment to the text of the Sand Creek Focus Area of the General Plan in order to add the option of non-age-restricted or senior residential on small lots.

Master Development Plan/Rezone/ Development Agreement

The proposed project would require approval of a Rezone to change the zoning designation of the site from Study District (S) to Planned Development District (PD), subject to a Master Development Plan. The Master Development Plan and PD district would list the development standards applicable to the project site, including setbacks, lot sizes and building heights. Such details are included in the Creekside/Vineyards at Sand Creek Project Design Guidelines that have been prepared for the proposed project.

Figure 3-3
Vesting Tentative Subdivision Map



In addition, the project would include a Development Agreement, which would allow the City and the applicant to enter into an agreement to assure the City that the proposed project would be completed in compliance with the plans submitted by the applicant, and assure the applicant of vested rights to develop the project.

Vesting Tentative Subdivision Map

The proposed project would include a Vesting Tentative Subdivision Map (see Figure 3-3) to subdivide the project site into 220 single-family residential lots, as well as parcels for associated improvements. Table 3-1 provides a summary of the proposed land uses. Each of the proposed land uses are described in further detail below.

Table 3-1
Proposed Land Uses

Proposed Land Use	Parcels	Acreage
Residential	--	28.0
Private Parks	B, C, G, J	3.9
Landscaping/Private Open Space	E, H, I, K, M, Q, R	6.1
Public Street (Hillcrest Avenue)	--	7.8
Private Streets	S	9.1
Water Quality/Detention	D, O	4.0
Private Land*	A, F, L, N, P	99.3
Total Project Site	**--**	**158.2**

* With the exception of approximately 11 acres proposed to be graded, the proposed project would not include disturbance of Parcels A, F, L, N, or P.

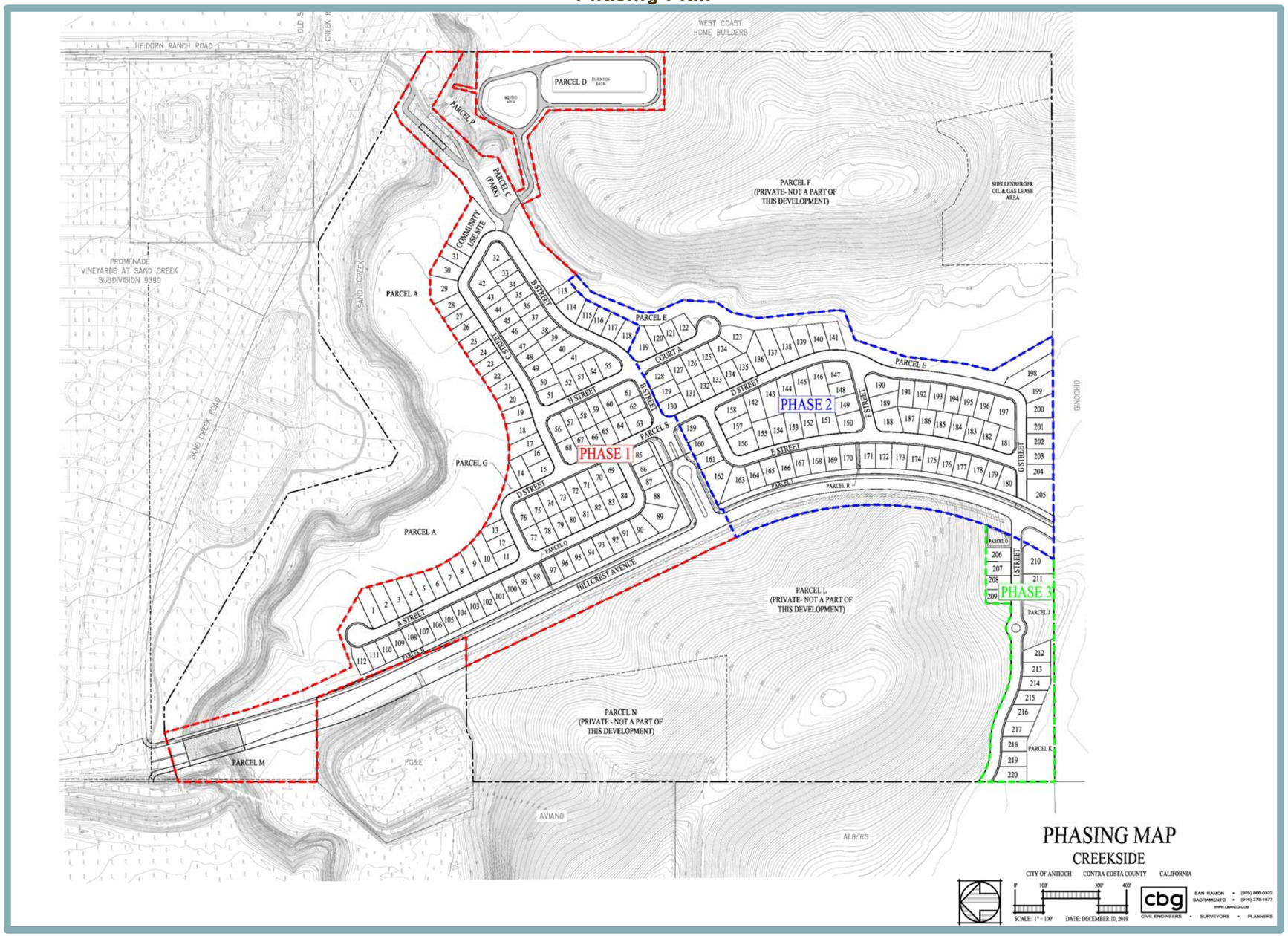
Residential Uses

The proposed residential uses would represent a continuation of other planned development in the project vicinity, specifically the Promenade/Vineyards at Sand Creek Project to the north of the site. Thus, the neighborhood design, lot size, density, and house design included in the proposed project would be similar to what is anticipated for the Promenade/Vineyards at Sand Creek Project. The average density of the proposed residential development would be approximately 3.7 units/acre (net) (220 units / 58.9 acres). Similar to the Promenade/Vineyards at Sand Creek project, at least six different models, each with three different elevations, would be constructed, on lots ranging from approximately 4,500 to 5,473 square feet (sf). The proposed residential units would consist of either non-age-restricted units, senior/active adult units, or a combination of both.

The site is anticipated to be developed in three phases (Phases I, II, and III) (see Figure 3-4). Phase I would include construction of the residential lots east of Hillcrest Avenue and north of the main entry. Phase I would also include the community pool and associated recreational amenities within Parcels B and C. Phase II would include the residential lots east of Hillcrest Avenue and south of the main entry. Phase III would include the residential lots west of Hillcrest Avenue and a park area within the PG&E tower easement along Hillcrest Avenue.

If developed as non-age-restricted units, the majority of the proposed homes would be two-story, with two car garages. If developed as senior/active adult units, the proposed homes would include a mix of two-story and single-story homes.

Figure 3-4
Phasing Plan



Access and Circulation

As part of the project, Hillcrest Avenue would be extended through the project site. Hillcrest Avenue at the proposed location is identified as an Arterial in the City General Plan. The alignment of the roadway has been designed to span Sand Creek and provide permanent access to the existing PG&E facility and beyond.

Vehicular ingress and egress to the proposed project would be provided from Hillcrest Avenue by way of a centrally located main entry, and an emergency vehicle access (EVA)/secondary entry intersection to the south. In addition, a clear span EVA/pedestrian bridge may be constructed adjacent to the existing PG&E bridge spanning Sand Creek in the northeastern portion of the project site, subject to final negotiations with PG&E and final utility designs. The Hillcrest Avenue extension would include sidewalk and landscaping on the east side of the roadway. The Hillcrest Avenue bridge over Sand Creek would be constructed in the ultimate width to facilitate two southbound and two northbound lanes. Right-of-way improvements would be limited to the necessary roadway width, utilities, and pedestrian facilities within the area of the Sand Creek crossing.

Phase I of the proposed project would include construction of approximately 1,500 lineal feet of Hillcrest Avenue in a two-lane undivided roadway configuration from south of the future Sand Creek Road right-of-way to the main entry and all necessary turning lanes at intersections, as well as right-of-way for the ultimate four-lane configuration. Phase I would also include construction of the main entry and the potential EVA/pedestrian bridge.

Phase II of the proposed project would include construction of approximately 1,000 additional lineal feet of Hillcrest Avenue in a two-lane undivided roadway configuration from south of the main entry to the southerly EVA/secondary entry intersection. Phase II would also include construction of the southern EVA into the eastern neighborhood area. Phase III of the proposed project would include construction of the southern secondary entry on the west side of Hillcrest Avenue, across from the Phase II EVA. It should be noted that the main entry to the Phase I and II development would be gated, while the proposed Phase III development west of Hillcrest Avenue would not be gated and would provide access to the property to the west. Ultimate construction of the four-lane Hillcrest Avenue configuration would occur as part of buildout of future residential uses on the area to the west of the project site (Albers Ranch), when such development necessitates connection to Hillcrest Avenue.

A new traffic signal would be installed at the main entry. Pedestrian access to the site would be provided by a sidewalk located on Hillcrest Avenue, adjacent to the project site, as well as by the proposed pedestrian trail connection within the northeast corner of the project site. Pedestrian facilities are not proposed on the west side of Hillcrest Avenue.

Interior vehicular circulation would be provided by a traditional grid pattern of private two-way streets that connect back to the entrances. The private streets are proposed with a 41-foot right-of-way, including 36 feet curb-to-curb with a five-foot attached monolithic sidewalk on one side of the street. The streets would allow two-way traffic and parking on both sides. Each residential unit would have a two-car garage and driveway with additional street parking.

Parks, Trails, Open Space, Landscaping, and Fencing

As part of the proposed project, a total of 3.9 acres would be developed as private parks (Parcels B, C, G, and J) (see Figure 3-5).

Figure 3-5
Preliminary Landscaping Plan

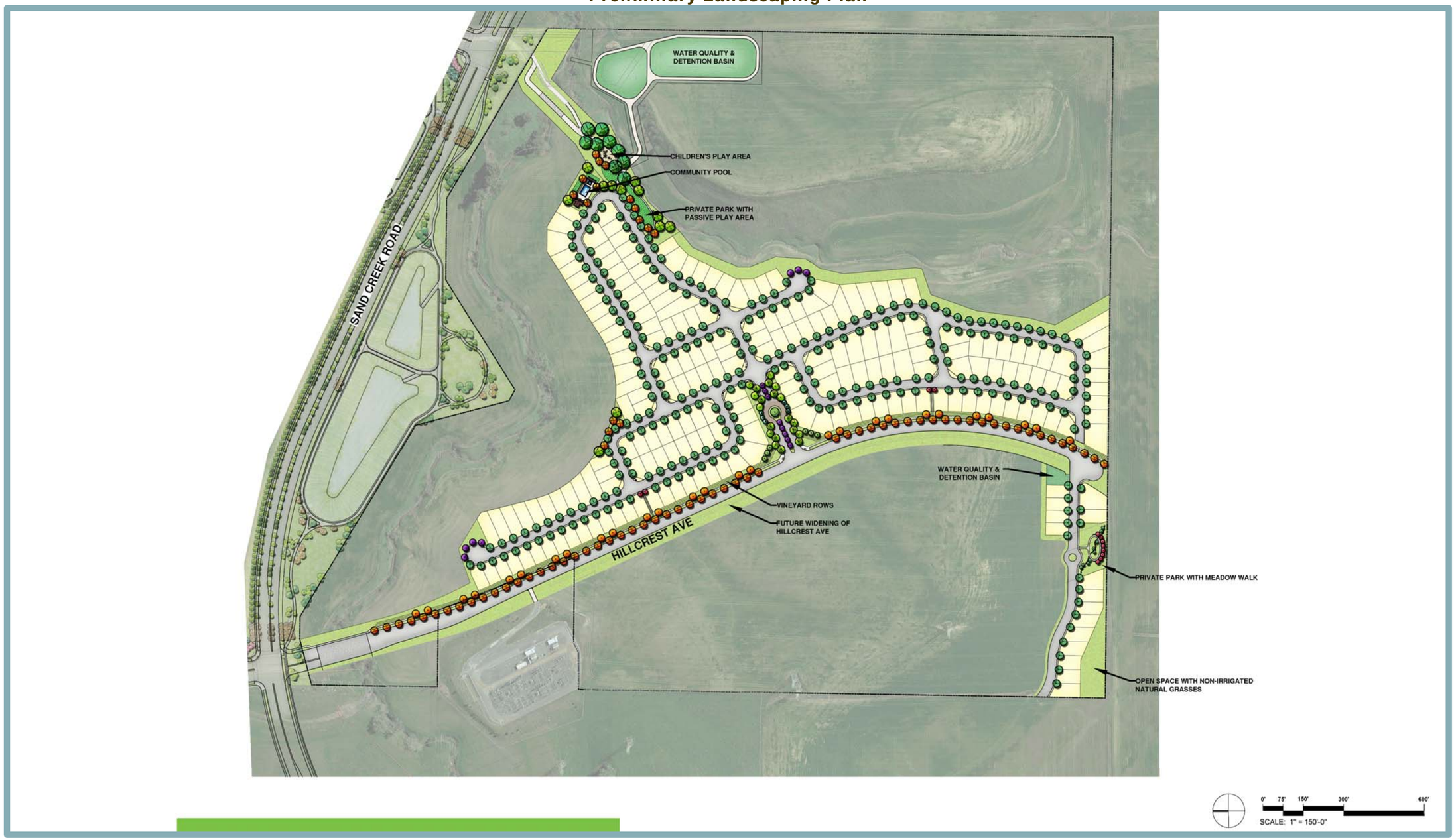
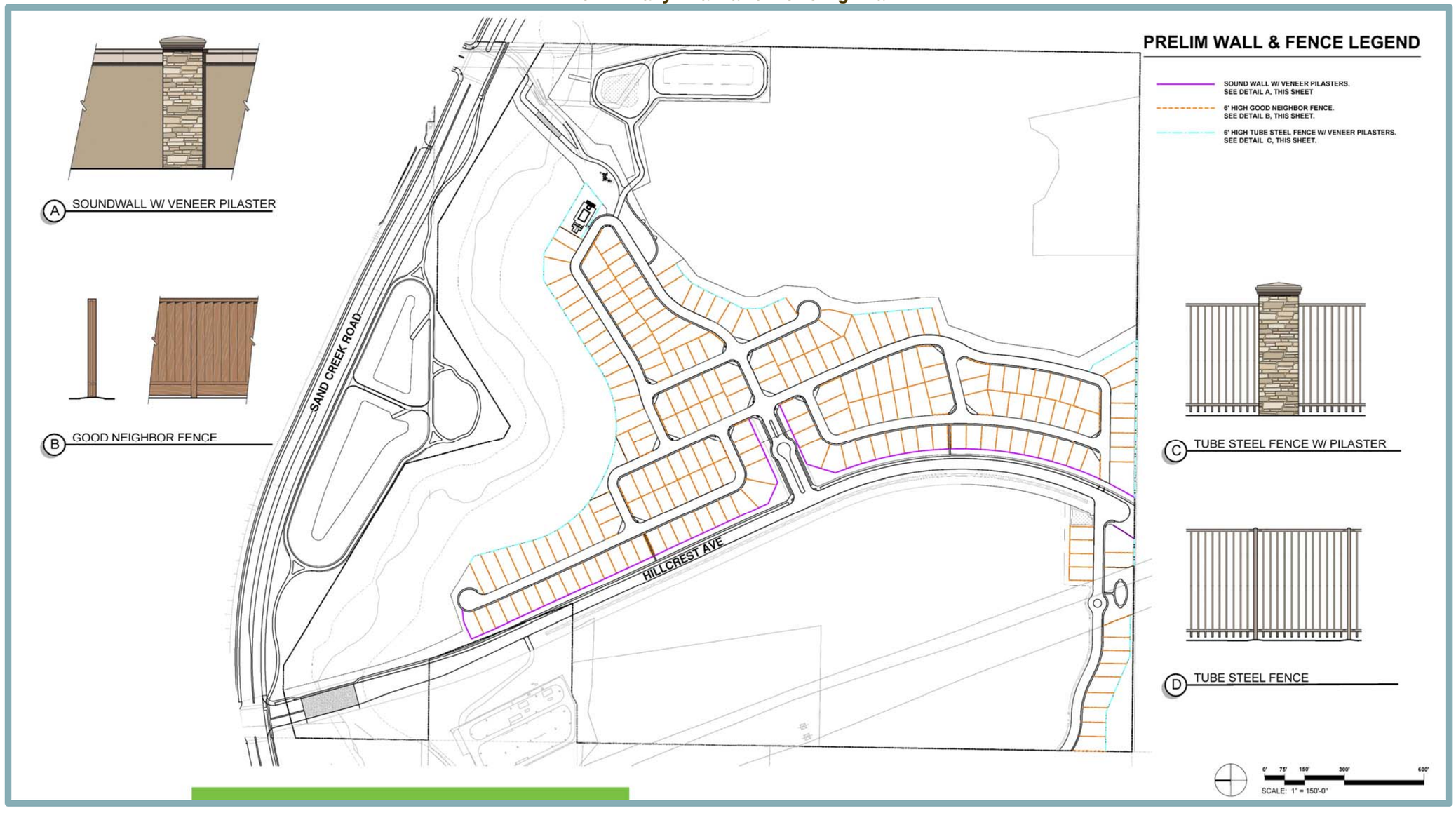


Figure 3-6
Preliminary Wall and Fencing Plan



Parcels B and C, located in the northeastern portion of the site are anticipated to include a children's play area, picnic areas, a community pool, and a passive play area; however, the ultimate programming of the parks would be dictated by the City of Antioch Parks and Recreation Commission. As noted previously, the proposed project may include construction of a new EVA/pedestrian bridge within Parcel C, which includes an existing PG&E-owned bridge over Sand Creek. The project would include a new private pedestrian trail connection extending from the proposed residential neighborhood across either the new bridge or the existing PG&E bridge to connect to the public Sand Creek Trail included in the planned Promenade/Vineyards at Sand Creek development to the north of the site. Parcel G, located at the northern edge of the proposed residential neighborhood, would consist of an open meadow with non-irrigated grasses and oak trees. Parcel J, located in the southwestern portion of the site, would include an open meadow area with a concrete pedestrian path, benches, and various other landscaping features.

Parcels A, P, and M, which include Sand Creek, as well as a 200-foot-wide buffer to the south of the creek, would be preserved as private land and would not be graded or otherwise disturbed as part of the project, with the exception of a storm drain outfall within Parcel M. Parcel A has been deed-restricted as open space for environmental purposes as part of the Promenade/Vineyards at Sand Creek project. The buffer would include the full extent of the 100-year floodplain associated with Sand Creek. In addition, the eastern and western hill forms within the site would be retained as private land and would not be developed with any residential uses or other permanent structures (Parcels F, L, and N).

It should be noted that minor grading activities totaling approximately 11 acres would be required within Parcels F and L; however, the upper portions of the hillsides would remain undisturbed. The grading activities would be required to accommodate the proposed detention basin, adjacent to Parcel F, and to accommodate the grade of the proposed Hillcrest Avenue extension, adjacent to Parcel L. Parcel N, which includes an 8.0-acre area located along the western site boundary, would continue to be deed-restricted as a habitat area.

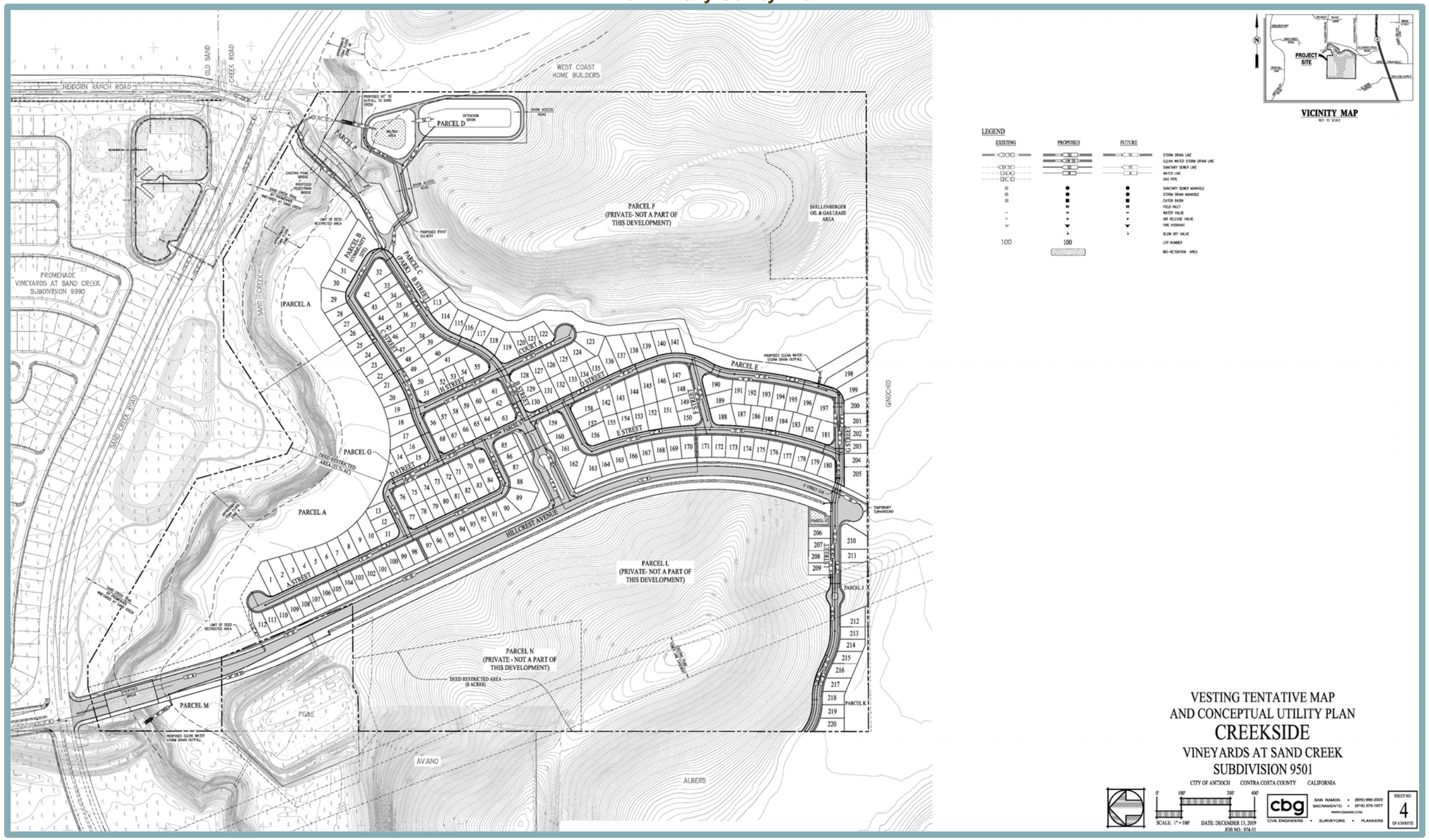
Landscaping features would be provided throughout the proposed development area, and would conform to the requirements and provisions of Section 9-5.1001 of the City of Antioch Municipal Code. Project landscaping would consist of street trees, shrubs, groundcover, agricultural plantings, and open lawn areas. Both the project entries would be landscaped, as would the east side of Hillcrest Avenue and the roadway medians. Private landscaping and parks throughout the project site would be maintained by a Homeowners Association (HOA). Individual residences would also be landscaped with trees, shrubs, groundcover and some lawns, and would be maintained by either the individual owners or the HOA. Public spaces, common spaces, and private landscaping areas would have an emphasis on drought-tolerant and adaptive plant species.

Along the project frontage at Hillcrest Avenue, the project would include a new masonry sound wall with veneer pilasters (see Figure 3-6). In addition, the project would include six-foot-tall tube steel fencing at the rear of the residential lots adjacent to the proposed open space areas. Within the proposed residential neighborhoods, lots would be separated by six-foot-tall good neighbor fencing.

Utilities

Figure 3-7 provide an overview of the proposed water, sewer, stormwater, and electrical/communications utility improvements associated with the project.

Figure 3-7
Preliminary Utility Plan



Potable water would be distributed to the project site by an extension of the existing 16-inch Zone III trunk line in Hillcrest Avenue. The waterline would be looped back to a Heidorn Ranch Road line by way of a connection over Sand Creek, at the same location as existing PG&E bridge. The City has also indicated an interest in reserving space in Phase III of the project to facilitate looping of the waterline within Hillcrest Avenue for future residential development to the west of the project site. Sanitary sewer service would be provided to the project site by an extension of the existing 24-inch sanitary sewer pipe from the Promenade/Vineyards at Sand Creek Project through a connection over Sand Creek at the same location as the existing PG&E bridge.

The project site naturally drains to the northeast. The site is within the Sand Creek Drainage Area, and is located just downstream of Sand Creek Basin, a regional detention facility recently constructed by the Contra Costa County Flood Control District. While construction has been completed, the facility is not yet operational. Stormwater runoff from the proposed development area (Hillcrest Avenue and the proposed residential neighborhoods) would be directed to new detention and bio-retention basins located within the northeastern portion of the site (Parcel D). The basins would provide for treatment and detention of captured stormwater runoff. Treated stormwater runoff would flow into Sand Creek by way of a new outfall structure to be constructed on the south side of the existing outfall facility that was constructed by the Promenade/Vineyards at Sand Creek Project.

Stormwater runoff from the open space area in the western hillside of the project site (Parcels L and N) would be captured prior to reaching Hillcrest Avenue; a portion of the captured runoff would be directed north to a new clean water outfall adjacent to the Hillcrest Avenue bridge and the remainder would be directed east to a new clean water outfall releasing towards an existing natural drainage feature within the southern portion of the project site. The eastern hillslope (Parcel F) would continue to drain naturally into the same natural drainage area as occurs under existing conditions.

Electricity for the proposed project would be provided by PG&E. Telecommunications would be provided by AT&T, Comcast, and Astound. Dry utilities, electrical, gas, and technology lines would be extended from existing lines beneath Hillcrest Avenue.

Off-Site Improvements

In order to construct the proposed Hillcrest Avenue roadway extension, a total of 0.25-acre of off-site improvement area would be required to create the planned intersection with Sand Creek Road. The off-site improvement area is primarily flat and is located north of the project site, on the Promenade/Vineyards at Sand Creek Project site. Additional off-site improvements would be necessary to extend Hillcrest Avenue through the eastern edge of the PG&E carve-out parcel at the site's western boundary. The extension through the PG&E parcel has been anticipated by the landowners and is required to replace the overland access easement that PG&E currently uses.

In addition, the proposed project would include construction of new off-site sewer and water connections across Sand Creek near Heidorn Ranch Road. The Promenade/Vineyards at Sand Creek Project proposes to extend such utilities and their easements (located west of Parcel E, Subdivision 9360) to the south of the ultimate Sand Creek Road right-of-way. The proposed project would extend the utilities further south to the project site, crossing Sand Creek with a new pedestrian/EVA bridge, adjacent to the existing PG&E bridge. Overall, the off-site improvement areas would total 1.8 acres.

Project Construction

All project improvements, including off-site improvements, are anticipated to be built over three phases. Phase I of the project would commence after resource agency permits are obtained (anticipated in 2022), and Phase III is expected to be completed within four years of Phase I.

All residential lots within the project site would be pad graded. Overall, the site is anticipated to balance; thus, substantial import or export of soil materials would not be required. Accounting for the proposed off-site improvements, as well as minor grading activities within Parcels F and L, the proposed project would include disturbance of approximately 71.7 acres. Table 3-2 below provides a summary of the proposed disturbance area associated with the proposed project.

Table 3-2
Proposed Disturbance Area

Proposed Use	Acreage
On-Site Development Area (Permanent Disturbance)	58.9
Off-Site Improvement Area (Permanent Disturbance)	1.8
Graded Open Space (Temporary Disturbance)	11.0
Undisturbed	88.3
Total Disturbance	**71.7**

3.6 PROJECT APPROVALS

The proposed project would require City approval of the following:

- General Plan Amendment. The proposed project would require the approval of a General Plan text and map amendment to the Sand Creek Focus Area of the General Plan to change the land use designations of the site from Open Space/Senior Housing and Hillside, Estate and Executive Residential/Open Space to Medium Low Density Residential/Open Space.
- Master Development Plan/Rezone. The proposed project would require a Rezone from S to PD. The PD would include special development standards for the project.
- Vesting Tentative Subdivision Map. The proposed project would require approval of Small Lot and Large Lot Vesting Tentative Subdivision Maps for the subdivision of the project site into multiple parcels to accommodate a total of 220 single-family residential units, as well as public roadway, parks, and open space parcels;
- Design Review. The proposed project would require Design Review to authorize the proposed building conceptual architecture, landscaping, and site design of the residential community and to ensure consistency with the City of Antioch's General Plan and Zoning Ordinance design policies and criteria, except where specifically amended by the requested approvals.
- Resource Management Plan. Pursuant to section 4.4.6.7(t) of the City of Antioch General Plan, the applicant will prepare a Resource Management Plan for City approval.
- Development Agreement. The Development Agreement would allow the City and the applicant to enter into an agreement to assure the City that the proposed project would be completed in compliance with the plans submitted by the applicant, and assure the applicant of vested rights to develop the project.

In addition to approvals from the City of Antioch, the proposed project would require the following approvals/permits from other responsible and trustee agencies:

- Section 404 Nationwide Permit (or Letter of Permission) (U.S. Army Corps of Engineers);
- Section 401 Water Quality Certification (Central Valley Regional Water Quality Control Board); and
- Potential Section 1600 Lake or Streambed Alteration Agreement (California Department of Fish and Wildlife).

4. Existing Environmental Setting, Impacts, and Mitigation

4.0 Introduction to the Analysis

4.0 INTRODUCTION TO THE ANALYSIS

4.0.1 INTRODUCTION

The technical chapters of the EIR analyze the potential impacts of buildout of the proposed project on Air Quality and Greenhouse Gas Emissions, and Transportation. Chapters 4.1 and 4.2 of the EIR include the following: the environmental setting as the setting relates to the specific issue; standards of significance; method of analysis; and project-specific impacts and mitigation measures. Additionally, Chapters 4.1 and 4.2 describe the cumulative impacts of the project combined with past, present and reasonably probable future projects for each issue area. The format of each of the technical chapters is described at the end of this chapter. It should be noted that all technical reports are either attached to this EIR or available at the City by request.

4.0.2 DETERMINATION OF SIGNIFICANCE

Under CEQA, a significant effect is defined as a substantial or potentially substantial adverse change in the environment (Public Resources Code § 21068). The Guidelines implementing CEQA direct that the determination be based on scientific and factual data. The specific criteria for determining the significance of a particular impact are identified within the impact discussion in each chapter and are consistent with significance criteria set forth in the CEQA Guidelines.

4.0.3 ENVIRONMENTAL ISSUES DISMISSED IN THE INITIAL STUDY

The Initial Study prepared for the proposed project (Appendix A to this EIR) includes a detailed environmental checklist addressing a range of technical environmental issues. For each technical environmental issue, the Initial Study identifies the level of impact for the proposed project. The Initial Study identifies the environmental effects as “no impact,” “less than significant,” “less than significant with mitigation incorporated,” and “potentially significant.”

Impacts identified in the Initial Study as less than significant or no impact are summarized below. All remaining issues identified in the Initial Study as potentially significant are discussed in the subsequent technical chapters of this EIR.

- *Aesthetics (All Sections):* The proposed project site is not located within the vicinity of a designated scenic vista. In addition, State Route (SR) 160 in the project region has not been designated an official State Scenic Highway Therefore, the proposed project would not have a substantial adverse effect on a scenic vista and would not substantially damage scenic resources. In addition, the Initial Study concluded that impacts related to substantially degrading the visual character or quality of the site and introduction of new sources of light and glare would be less than significant. Overall, the proposed project would result in *less-than-significant* impacts related to aesthetics.

- *Agriculture and Forest Resources (All Sections):* The project site is identified by the California Department of Conservation Farmland Mapping and Monitoring Program as Farmland of Local Importance and Grazing Land. The site does not contain Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, and the site is not currently designated for agriculture by the City’s General Plan. Therefore, development of

the proposed project would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to a non-agricultural use, or otherwise result in the loss of Farmland to non-agricultural use. Furthermore, the site is not under a Williamson Act Contract. The project is not considered forest land or timberland, and is not zoned for Timberland Production. Therefore, the proposed project would have *no impact* or a *less-than-significant* impact with regard to agricultural and forest resources.

- *Biological Resources (All Sections):* Per the Initial Study, the proposed project could result in potential impacts to special-status plants and wildlife. Additionally, construction of two stormwater outfalls on the banks of Sand Creek and a culverted road crossing could result in permanent and potentially significant impacts to waters of the U.S. and/or the State. However, the Initial Study includes mitigation to reduce such impacts to less-than-significant levels. Given the distance to the nearest known movement corridor, and the fact that the project site would retain existing on-site open space areas that may currently serve as limited migration corridors, impacts related to wildlife corridors and nursery sites were determined to be less-than-significant. The possibility exists that existing trees would require removal during construction; thus, the Initial Study includes mitigation to ensure compliance with the City's Tree Preservation and Regulation Ordinance. The project site is not located in an area with an approved Habitat Conservation Plan/Natural Community Conservation Plan (HCP/NCCP); therefore, no impact would occur regarding a conflict with an HCP/NCCP. Overall, the Initial Study concluded that the proposed project would result in *no impact* or *less-than-significan*t impacts related to biological resources.

- *Cultural Resources (All Sections).* According to the Initial Study, the project site and the off-site improvement areas do not contain any known historical or cultural resources. The Initial Study includes mitigation sufficient to ensure that, in the event resources are encountered during construction, impacts would be reduced to a *less-than-significant* level.

- *Energy (All Sections):* The proposed project is anticipated to result in increased energy usage during construction and operations of the project. However, the energy usage would not be considered a wasteful, inefficient, or unnecessary consumption of energy resources and would not conflict with or obstruct a State or local plan for renewable energy or energy efficiency. Thus, the proposed project would result in a *less-than-significant* impact related to energy.

- *Geology and Soils (All Sections):* Due to the site's proximity to nearby active faults, the potential exists for the proposed residential buildings to be subject to seismic ground shaking. However, conformance with the appropriate engineering standards set forth by the California Building Standards Code (CBSC) and design standards enforced through the City of Antioch Building Division would ensure that impacts related to seismic surface rupture and strong seismic ground shaking would be less than significant. In addition, the Initial Study includes mitigation sufficient to ensure that impacts related to liquefaction and landslides, as well as risks related to being located on potentially unstable soils, would be reduced to less-than-significant levels. Furthermore, while the potential exits for the project to result in the uncovering of paleontological fossils, the Initial Study includes mitigation sufficient to ensure that, in the event such resources are encountered during construction, significant impacts would not occur. Overall, impacts related to geology and soils would be *less than significant.*

- *Hazards and Hazardous Materials (All Sections):* The potential exists for ground-disturbing activities related to the proposed project to encounter oil/gas pipelines associated with former petroleum extraction operations on the project site. However, the Initial Study includes mitigation to reduce the impacts associated with hazardous materials being released into the environment to a less-than-significant level. As noted in the Initial Study, the proposed project would not involve the routine transport, use, or disposal of hazardous materials. The project site is not located within a quarter mile of any existing or proposed schools. In addition, the project site is not identified on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. The project site is not located within two miles of any public airports, and does not fall within an airport land use plan area. The Initial Study concluded that development of the proposed project would not impair the implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. The proposed project would not expose people or structures to the risk of loss, injury or death involving wildland fires. Overall, the proposed project would result in *no impact* or *less-than-significant* impact related to hazards and hazardous materials.

- *Hydrology and Water Quality (All Sections):* The proposed project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge and would not conflict with an applicable groundwater management plan or water quality control plan. While the proposed project would alter the existing drainage pattern of the site through the addition of impervious surfaces, the project would comply with applicable standards related to stormwater management and would not result in substantial risks related to flooding or erosion. Due to the project's distance from the coast and other large bodies of water, impacts related to tsunamis or seiches would not occur. The Initial Study determined that a potentially significant impact with regard to violation of water quality standards and degradation of water quality could occur. However, the Initial Study includes mitigation measures to reduce such impacts to a less-than-significant level. Overall, impacts related to hydrology and water quality would be *less than significant*.

- *Land Use and Planning (All Sections):* The proposed project would not physically divide an established community or conflict with City policies and regulations adopted for the purpose of avoiding or mitigating an environmental effect. The project would be consistent with nearby urban development. As such, the proposed project would result in a *less-than-significant* impact.

- *Mineral Resources (All Sections):* The project site does not constitute a likely source of minerals that would be of value to the region or residents of the State. Because the proposed project would not result in the loss of availability of a known mineral resource or locally important recovery site, *no impact* would occur.

- *Noise (All Sections):* Vibration generated by construction activities associated with the proposed project would fall below the threshold at which vibration levels become distinctly perceptible. Additionally, the project site is not located within an airport land use plan or in the vicinity of a private airstrip. The Initial Study determined that the proposed project could generate a substantial temporary or permanent increase in ambient noise levels. However, the Initial Study includes mitigation to ensure compliance with the applicable standards during construction and operation of the proposed project. Overall, the

proposed project would result in *no impact* or a *less-than-significant* impact related to noise.

- *Population and Housing (All Sections):* The project site is currently vacant; thus, the proposed project would not result in the displacement of existing housing or residents. While the proposed project would directly induce population growth in the area, population growth itself does not constitute an environmental impact; rather, increased demands on the physical environment resulting from increases in population are considered environmental impacts. Physical environmental effects associated with development of the proposed project area would be evaluated throughout the Initial Study and this EIR. Therefore, the proposed project would result in *no impact* or *less-than-significant* impact related to population and housing.

- *Public Services (All Sections):* The project would be required to comply with General Plan policies and to pay development fees that support emergency police and fire services. In addition, the project would be required to pay applicable fees to the Antioch Unified School District (AUSD). The proposed project would meet the park dedication requirements established by Section 9-4.1004 of the Antioch Municipal Code through dedication of parkland, payment of in-lieu park fees, or a combination of both. Overall, the proposed project would result in a *less-than-significant* impact related to public services.

- *Recreation (All Items):* The proposed project would include the construction of new park facilities within the project site and would be required to comply with the City's parkland requirements. While the project would include the construction of new park facilities within the project site, the physical effects associated with construction of such facilities has been evaluated throughout the Initial Study and this EIR. Overall, a *less-than-significant* impact would occur related to recreation.

- *Tribal Cultural Resources (All Items):* Based on the history of disturbance at the project site as a result of past development and agricultural uses, as well as the lack of identified tribal cultural resources at the site, known tribal cultural resources are not expected to occur within the site. Nevertheless, in the event that tribal cultural resources are discovered on the site during construction, the Initial Study includes mitigation sufficient to reduce any potential impacts to a *less-than-significant* level.

- *Utilities and Service Systems (All Sections):* The proposed project would not require or result in the relocation or construction of new or expanded water, storm drainage, or sewer infrastructure. Sufficient capacity of existing utilities and service systems exists to adequately serve the proposed project. Therefore, the proposed project would result in a *less-than-significant* impact related to utilities and service systems.

- *Wildfire (All Sections):* According to the California Department of Forestry and Fire Protection, the Fire and Resource Assessment Program indicates that the project site is not located within or adjacent to a Very High Fire Hazard Severity Zone. In addition, the site is not located in or near a State Responsibility Area. Thus, the proposed project would not be expected to be subject to or result in substantial adverse effects related to wildfires, and a *less-than-significant* impact would occur.

- *Mandatory Findings of Significance (a):* Implementation of the proposed project would have the potential to result in adverse effects to special-status plant and wildlife species, in addition to eliminating important examples of major historical or cultural resources. However, the project would be required to comply with applicable General Plan and Municipal Code policies in addition to the mitigation measures provided by the Initial Study that would reduce any potential impacts to *less-than-significant* levels.

4.0.4 ENVIRONMENTAL ISSUES ADDRESSED IN THIS EIR

The EIR provides the analysis necessary to address the technical environmental impacts of the proposed project. The following environmental issues are addressed in this EIR:

- Air Quality and Greenhouse Gas Emissions; and
- Transportation.

See Chapter 5, Section 5.3, for additional information on the scope of the cumulative impact analysis for each environmental issue addressed in the EIR.

4.0.5 CHAPTER FORMAT

Each technical chapter addressing a specific environmental issue begins with an **introduction** describing the purpose of the section. The introduction is followed by a description of the project's **existing environmental setting** as the setting pertains to that particular issue. The setting description is followed by the **regulatory context** and the **impacts and mitigation measures** discussion, which contains the **standards of significance**, followed by the **method of analysis**. The **impact and mitigation** discussion includes impact statements prefaced by a number in bold-faced type (for both project-level and cumulative analyses). An explanation of each impact and an analysis of the impact's significance follow each impact statement. All mitigation measures pertinent to each individual impact follow directly after the impact statement (see below). The degree of relief provided by identified mitigation measures is also evaluated. An example of the format is shown below.

Project-Specific Impacts and Mitigation Measures

The following discussion of impacts is based on the implementation of the proposed project in comparison with the standards of significance.

4.x-1 Statement of Project-Specific Impact

Discussion of impact for the proposed project in paragraph format.

Statement of ***level of significance*** of impact prior to mitigation is included at the end of each impact discussion. The following levels of significance are used in the EIR: less than significant, significant, or significant and unavoidable. If an impact is determined to be significant, mitigation will be included in order to reduce the specific impact to the maximum extent feasible.

Mitigation Measure(s)

Statement of *level of significance* after the mitigation is included immediately preceding mitigation measures.

4.x-1(a) *Required mitigation measure(s) presented in italics and listed in consecutive order.*

4.x-1(b) *Required additional mitigation measure, if necessary.*

Cumulative Impacts and Mitigation Measures

The following discussion of cumulative impacts is based on implementation of the proposed project in combination with cumulative development within the applicable area or region.

4.x-2 Statement of Cumulative Impact

Discussion of cumulative impacts for the proposed project in paragraph format.

As discussed in detail in Chapter 5, Statutorily Required Sections, of the EIR, the cumulative setting for the proposed project is generally considered to be development anticipated to occur upon buildout of the Antioch General Plan (i.e., Antioch City limits), as well as buildout of a number of approved or reasonably foreseeable projects within the project region.

Statement of ***level of significance*** of cumulative impact prior to mitigation is included at the end of each impact discussion. The following levels of significance are used in the EIR for cumulative impacts: less than significant, less than cumulatively considerable, cumulatively considerable, or significant and unavoidable. If an impact is determined to be cumulatively considerable, mitigation will be included in order to reduce the specific impact to the maximum extent feasible.

Mitigation Measure(s)

Statement of *level of significance* after the mitigation is included immediately preceding mitigation measures.

4.x-2(a) *Required mitigation measure(s) presented in italics and listed in consecutive order.*

4.x-2(b) *Required additional mitigation measure, if necessary.*

4.1 Air Quality and Greenhouse Gas Emissions

4.1. AIR QUALITY AND GREENHOUSE GAS EMISSIONS

4.1.1 INTRODUCTION

The Air Quality and Greenhouse Gas Emissions chapter of this EIR describes the effects of the proposed project on local and regional air quality. The chapter includes a discussion of the existing air quality and greenhouse gas (GHG) setting, construction-related air quality and GHG impacts resulting from grading and equipment emissions, direct and indirect emissions associated with the project, the impacts of these emissions on both the local and regional scale, and mitigation measures warranted to reduce or eliminate any identified significant impacts. The chapter relies on information obtained from the *City of Antioch General Plan*[1] and associated EIR,[2] the California Emissions Estimator Model (CalEEMod) version 2016.3.2,[3] and is primarily based on information, guidance, and analysis protocol provided by the Bay Area Air Quality Management District (BAAQMD).

4.1.2 EXISTING ENVIRONMENTAL SETTING

The following information provides an overview of the existing environmental setting in relation to air quality within the proposed project area. Air basin characteristics, ambient air quality standards (AAQS), attainment status and regional air quality plans, local air quality monitoring, odors, sensitive receptors, and GHGs are discussed.

Air Basin Characteristics

The project site is located in the eastern portion of the nine-county San Francisco Bay Area Air Basin (SFBAAB), and is within the jurisdictional boundaries of the BAAQMD. The SFBAAB consists of coastal mountain ranges, inland valleys, and bays. The proposed project is located on the south side of the San Joaquin River delta, east of the Carquinez Strait, and would be considered to be within the Carquinez Strait region of the SFBAAB. Being located between the greater Bay Area and the Central Valley has great influence on the climate and air quality of the area. During the summer and fall months, marine air is drawn eastward through the Carquinez Strait, with common wind speeds of 15 to 20 miles per hour throughout the region. The general west-to-east flow of the winds in the straits tends to move pollutants east. Thus, the winds dilute pollutants and transport them away from the area, so that emissions released in the project area have more influence on air quality in the Sacramento and San Joaquin Valleys than locally. However, stationary sources located in upwind cities could influence the local air quality.

Average daily maximum temperatures (in degrees Fahrenheit) are in the mid to high 50s in the winter and the high 80s in the summer. Average minimum temperatures are in the high 30s to low 40s in the winter and the mid-50s in the summer. Rainfall amounts in the region vary from 14.4 inches annually in Antioch to 22 inches annually in Fairfield.

---

1 City of Antioch. *City of Antioch General Plan*. Updated November 24, 2003.
2 City of Antioch. *Draft General Plan Update Environmental Impact Report*. July 2003.
3 ENVIRON International Corporation and the California Air Districts. *California Emissions Estimator Model User's Guide Version 2016.3.2*. November 2017.

Ambient Air Quality Standards

Both the U.S. Environmental Protection Agency (USEPA) and the California Air Resources Board (CARB) have established AAQS for common pollutants. The federal standards are divided into primary standards, which are designed to protect the public health, and secondary standards, which are designed to protect the public welfare. The ambient air quality standards for each contaminant represent safe levels that avoid specific adverse health effects. Pollutants for which air quality standards have been established are called "criteria" pollutants. Table 4.1-1 identifies the major pollutants, characteristics, health effects and typical sources. The federal and California ambient air quality standards (NAAQS and CAAQS, respectively) are summarized in Table 4.1-2. The NAAQS and CAAQS were developed independently with differing purposes and methods. As a result, the federal and State standards differ in some cases. In general, the State of California standards are more stringent than the federal standards, particularly for ozone and particulate matter (PM).

A description of each criteria pollutant and its potential health effects is provided in the following section.

Ozone

Ozone is a reactive gas consisting of three oxygen atoms. In the troposphere, ozone is a product of the photochemical process involving the sun's energy, and is a secondary pollutant formed as a result of a complex chemical reaction between reactive organic gases and oxides of nitrogen emissions in the presence of sunlight. As such, unlike other pollutants, ozone is not released directly into the atmosphere from any sources. In the stratosphere, ozone exists naturally and shields the Earth from harmful incoming ultraviolet radiation. The primary source of ozone precursors is mobile sources, including cars, trucks, buses, construction equipment, and agricultural equipment. Ground-level ozone reaches the highest level during the afternoon and early evening hours. High levels occur most often during the summer months. Ground-level ozone is a strong irritant that could cause constriction of the airways, forcing the respiratory system to work harder in order to provide oxygen. Ozone at the Earth's surface causes numerous adverse health effects and is a major component of smog. High concentrations of ground level ozone can adversely affect the human respiratory system and aggravate cardiovascular disease and many respiratory ailments.

Reactive Organic Gas

Reactive Organic Gas (ROG) is a reactive chemical gas composed of hydrocarbon compounds typically found in paints and solvents that contributes to the formation of smog and ozone by involvement in atmospheric chemical reactions. A separate health standard does not exist for ROG. However, some compounds that make up ROG are toxic, such as the carcinogen benzene.

Oxides of Nitrogen

Oxides of Nitrogen (NO_X) are a family of gaseous nitrogen compounds and are precursors to the formation of ozone and particulate matter. The major component of NO_X, nitrogen dioxide (NO_2), is a reddish-brown gas that discolors the air and is toxic at high concentrations. NO_X results primarily from the combustion of fossil fuels under high temperature and pressure. On-road and off-road motor vehicles and fuel combustion are the major sources of NO_X. NO_X reacts with ROG to form smog, which could result in adverse impacts to human health, damage the environment, and cause poor visibility. Additionally, NO_X emissions are a major component of acid rain. Health effects related to NO_X include lung irritation and lung damage and can cause increased risk of acute and chronic respiratory disease.

Table 4.1-1
Summary of Criteria Pollutants

Pollutant	Characteristics	Health Effects	Major Sources
Ozone	A highly reactive gas produced by the photochemical process involving a chemical reaction between the sun's energy and other pollutant emissions. Often called photochemical smog.	• Eye irritation • Wheezing, chest pain, dry throat, headache, or nausea • Aggravated respiratory disease such as emphysema, bronchitis, and asthma	Combustion sources such as factories, automobiles, and evaporation of solvents and fuels.
Carbon Monoxide	An odorless, colorless, highly toxic gas that is formed by the incomplete combustion of fuels.	• Impairment of oxygen transport in the bloodstream • Impaired vision, reduced alertness, chest pain, and headaches • Can be fatal in the case of very high concentrations	Automobile exhaust, combustion of fuels, and combustion of wood in woodstoves and fireplaces.
Nitrogen Dioxide	A reddish-brown gas that discolors the air and is formed during combustion of fossil fuels under high temperature and pressure.	• Lung irrigation and damage • Increased risk of acute and chronic respiratory disease	Automobile and diesel truck exhaust, industrial processes, and fossil-fueled power plants.
Sulfur Dioxide	A colorless, irritating gas with a rotten egg odor formed by combustion of sulfur-containing fossil fuels.	• Aggravation of chronic obstruction lung disease • Increased risk of acute and chronic respiratory disease	Diesel vehicle exhaust, oil-powered power plants, and industrial processes.
Particulate Matter (PM_{10} and $PM_{2.5}$)	A complex mixture of extremely small particles and liquid droplets that can easily pass through the throat and nose and enter the lungs.	• Aggravation of chronic respiratory disease • Heart and lung disease • Coughing • Bronchitis • Chronic respiratory disease in children • Irregular heartbeat • Nonfatal heart attacks	Combustion sources such as automobiles, power generation, industrial processes, and wood burning. Also from unpaved roads, farming activities, and fugitive windblown dust.
Lead	A metal found naturally in the environment as well as in manufactured products.	• Loss of appetite, weakness, apathy, and miscarriage • Lesions of the neuromuscular system, circulatory system, brain, and gastrointestinal tract	Industrial sources and combustion of leaded aviation gasoline.

Sources:

- ***California Air Resources Board. California Ambient Air Quality Standards (CAAQS). Available at: http://www.arb.ca.gov/research/aaqs/caaqs/caaqs.htm. Accessed April 2020.***
- ***Sacramento Metropolitan, El Dorado, Feather River, Placer, and Yolo-Solano Air Districts, Spare the Air website. Air Quality Information for the Sacramento Region. Available at: http://www.sparetheair.com/health.cfm?page=healthoverall. Accessed April 2020.***
- ***California Air Resources Board. Glossary of Air Pollution Terms. Available at: http://www.arb.ca.gov/html/gloss.htm. Accessed April 2020.***

Table 4.1-2
Ambient Air Quality Standards

Pollutant	Averaging Time	CAAQS	NAAQS	
			Primary	Secondary
Ozone	1 Hour	0.09 ppm	-	Same as primary
	8 Hour	0.070 ppm	0.070 ppm	
Carbon Monoxide	8 Hour	9 ppm	9 ppm	-
	1 Hour	20 ppm	35 ppm	
Nitrogen Dioxide	Annual Mean	0.030 ppm	53 ppb	Same as primary
	1 Hour	0.18 ppm	100 ppb	-
Sulfur Dioxide	24 Hour	0.04 ppm	-	-
	3 Hour	-	-	0.5 ppm
	1 Hour	0.25 ppm	75 ppb	-
Respirable Particulate Matter (PM_{10})	Annual Mean	20 ug/m^3	-	Same as primary
	24 Hour	50 ug/m^3	150 ug/m^3	
Fine Particulate Matter ($PM_{2.5}$)	Annual Mean	12 ug/m^3	12 ug/m^3	15 ug/m^3
	24 Hour	-	35 ug/m^3	Same as primary
Lead	30 Day Average	1.5 ug/m^3	-	-
	Calendar Quarter	-	1.5 ug/m^3	Same as primary
Sulfates	24 Hour	25 ug/m^3	-	-
Hydrogen Sulfide	1 Hour	0.03 ppm	-	-
Vinyl Chloride	24 Hour	0.010 ppm	-	-
Visibility Reducing Particles[1]	8 Hour	see note below	-	-

ppm = parts per million
ppb = parts per billion
µg/m^3 = micrograms per cubic meter

1. Statewide Visibility Reducing Particle Standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70 percent. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.

- ***Source: California Air Resources Board. California Ambient Air Quality Standards (CAAQS). Available at: http://www.arb.ca.gov/research/aaqs/caaqs/caaqs.htm. Accessed April 2020.***

Carbon Monoxide

Carbon monoxide (CO) is a colorless, odorless, poisonous gas produced by incomplete burning of carbon-based fuels such as gasoline, oil, and wood. When CO enters the body, the CO combines with chemicals in the body, which prevents blood from carrying oxygen to cells, tissues, and organs. Symptoms of exposure to CO can include problems with vision, reduced alertness, and general reduction in mental and physical functions. Exposure to CO can result in chest pain, headaches, reduced mental alertness, and death at high concentrations.

Sulfur Dioxide

Sulfur Dioxide (SO_2) is a colorless, irritating gas with a rotten egg odor formed primarily by the combustion of sulfur-containing fossil fuels from mobile sources, such as locomotives, ships, and off-road diesel equipment. SO_2 is also emitted from several industrial processes, such as petroleum refining and metal processing. Similar to airborne NO_X, suspended sulfur oxide

particles contribute to poor visibility. The sulfur oxide particles are also a component of particulate matter, discussed below.

Particulate Matter

Particulate matter, also known as particle pollution or PM, is a complex mixture of extremely small particles and liquid droplets. Particle pollution is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. The size of particles is directly linked to their potential for causing health impacts. The USEPA is concerned about particles that are 10 micrometers in diameter or smaller (PM_{10}) because those are the particles that generally pass through the throat and nose and enter the lungs. Once inhaled, the particles could affect the heart and lungs and cause serious health effects. USEPA groups particle pollution into three categories based on their size and where they are deposited:

- "Inhalable coarse particles ($PM_{2.5-10}$)," which are found near roadways and dusty industries, are between 2.5 and 10 micrometers in diameter. $PM_{2.5-10}$ is deposited in the thoracic region of the lungs.
- "Fine particles ($PM_{2.5}$)," which are found in smoke and haze, are 2.5 micrometers in diameter and smaller. $PM_{2.5}$ particles could be directly emitted from sources such as forest fires, or could form when gases emitted from power plants, industries, and automobiles react in the air. They penetrate deeply into the thoracic and alveolar regions of the lungs.
- “Ultrafine particles (UFP),” are very, very small particles (less than 0.1 micrometers in diameter) largely resulting from the combustion of fossil fuels, meat, wood, and other hydrocarbons. While UFP mass is a small portion of $PM_{2.5}$, their high surface area, deep lung penetration, and transfer into the bloodstream could result in disproportionate health impacts relative to their mass. UFP is not currently regulated separately, but is analyzed as part of $PM_{2.5}$.

PM_{10}, $PM_{2.5}$, and UFP include primary pollutants, which are emitted directly to the atmosphere and secondary pollutants, which are formed in the atmosphere by chemical reactions among precursors. Generally speaking, $PM_{2.5}$ and UFP are emitted by combustion sources like vehicles, power generation, industrial processes, and wood burning, while PM_{10} sources include the same sources plus roads and farming activities. Fugitive windblown dust and other area sources also represent a source of airborne dust. Long-term PM pollution, especially fine particles, could result in significant health problems including, but not limited to, the following: increased respiratory symptoms, such as irritation of the airways, coughing or difficulty breathing; decreased lung function; aggravated asthma; development of chronic respiratory disease in children; development of chronic bronchitis or obstructive lung disease; irregular heartbeat; heart attacks; and increased blood pressure.

Lead

Lead is a relatively soft and chemically resistant metal that is a natural constituent of air, water, and the biosphere. Lead is neither created nor destroyed in the environment, and, thus, essentially persists forever. Lead forms compounds with both organic and inorganic substances. As an air pollutant, lead is present in small particles. Sources of lead emissions in California include a variety of industrial activities. Gasoline-powered automobile engines were a major source of airborne lead through the use of leaded fuels. The use of leaded fuel has been mostly phased out, with the result that ambient concentrations of lead have dropped dramatically. However, because lead was emitted in large amounts from vehicles when leaded gasoline was

used, lead is present in many soils (especially urban soils) as a result of airborne dispersion and could become re-suspended into the air.

Because lead is only slowly excreted by the human body, exposures to small amounts of lead from a variety of sources could accumulate to harmful levels. Effects from inhalation of lead above the level of the ambient air quality standard may include impaired blood formation and nerve conduction. Lead can adversely affect the nervous, reproductive, digestive, immune, and blood-forming systems. Symptoms could include fatigue, anxiety, short-term memory loss, depression, weakness in the extremities, and learning disabilities in children. Lead also causes cancer.

Sulfates

Sulfates are the fully oxidized ionic form of sulfur and are colorless gases. Sulfates occur in combination with metal and/or hydrogen ions. In California, emissions of sulfur compounds occur primarily from the combustion of petroleum-derived fuels (e.g., gasoline and diesel fuel) that contain sulfur. The sulfur is oxidized to SO_2 during the combustion process and subsequently converted to sulfate compounds in the atmosphere. The conversion of SO_2 to sulfates takes place comparatively rapidly and completely in urban areas of California due to regional meteorological features.

The sulfates standard established by CARB is designed to prevent aggravation of respiratory symptoms. Effects of sulfate exposure at levels above the standard include a decrease in ventilatory function, aggravation of asthmatic symptoms, and an increased risk of cardio-pulmonary disease. Sulfates are particularly effective in degrading visibility, and, because they are usually acidic, can harm ecosystems and damage materials and property.

Hydrogen Sulfide

Hydrogen Sulfide (H_2S) is associated with geothermal activity, oil and gas production, refining, sewage treatment plants, and confined animal feeding operations. Hydrogen sulfide is extremely hazardous in high concentrations, especially in enclosed spaces (800 ppm can cause death).

Vinyl Chloride

Vinyl Chloride (C_2H_3Cl, also known as VCM) is a colorless gas that does not occur naturally, but is formed when other substances such as trichloroethane, trichloroethylene, and tetrachloro-ethylene are broken down. Vinyl chloride is used to make polyvinyl chloride (PVC) which is used to make a variety of plastic products, including pipes, wire and cable coatings, and packaging materials.

Visibility Reducing Particles

Visibility Reducing Particles are a mixture of suspended particulate matter consisting of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. The standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.

Toxic Air Contaminants

In addition to the criteria pollutants discussed above, Toxic Air Contaminants (TACs) are also a category of environmental concern. TACs are present in many types of emissions with varying degrees of toxicity. Public exposure to TACs can result from emissions from normal operations, as well as accidental releases. Common stationary sources of TACs include gasoline stations, dry cleaners, and diesel backup generators, which are subject to BAAQMD stationary source

permit requirements. The other, often more significant, common source type is on-road motor vehicles, such as cars and trucks, on freeways and roads, and off-road sources such as construction equipment, ships, and trains.

Fossil fueled combustion engines, including those used in cars, trucks, and some pieces of construction equipment, release at least 40 different TACs. In terms of health risks, the most volatile contaminants are diesel particulate matter (DPM), benzene, formaldehyde, 1,3-butadiene, toluene, xylenes, and acetaldehyde. Gasoline vapors contain several TACs, including benzene, toluene, and xylenes. Diesel engines emit a complex mixture of air pollutants, including both gaseous and solid material. The solid material in diesel exhaust, DPM, is composed of carbon particles and numerous organic compounds, including over 40 known cancer-causing organic substances. Examples of such chemicals include polycyclic aromatic hydrocarbons, benzene, formaldehyde, acetaldehyde, acrolein, and 1,3-butadiene. Diesel exhaust also contains gaseous pollutants, including volatile organic compounds and NO_X. Due to the published evidence of a relationship between diesel exhaust exposure and lung cancer and other adverse health effects, the CARB has identified DPM from diesel-fueled engines as a TAC. Although a variety of TACs are emitted by fossil fueled combustion engines, the cancer risk due to DPM exposure represents a more significant risk than the other TACs discussed above.[4]

More than 90 percent of DPM is less than one micrometer in diameter, and, thus, DPM is a subset of $PM_{2.5}$. As a California statewide average, DPM comprises about eight percent of $PM_{2.5}$ in outdoor air, although DPM levels vary regionally due to the non-uniform distribution of sources throughout the State. Most major sources of diesel emissions, such as ships, trains, and trucks, operate in and around ports, rail yards, and heavily-traveled roadways. Such areas are often located near highly populated areas. Accordingly, elevated DPM levels are mainly an urban problem, with large numbers of people exposed to higher DPM concentrations, resulting in greater health consequences compared to rural areas.

Due to the high levels of diesel activity, high volume freeways, stationary diesel engines, rail yards and facilities attracting heavy and constant diesel vehicle traffic are identified as having the highest associated health risks from DPM. Construction-related activities also have the potential to generate concentrations of DPM from on-road haul trucks and off-road equipment exhaust emissions.

Health risks from TACs are a function of both the concentration of emissions and the duration of exposure, which typically are associated with long-term exposure and the associated risk of contracting cancer. Health effects of exposure to TACs other than cancer include birth defects, neurological damage, and death. Because chronic exposure can result in adverse health effects, TACs are regulated at the regional, State, and federal level. The identification, regulation, and monitoring of TACs is relatively new compared to criteria air pollutants that have established AAQS. TACs are regulated or evaluated on the basis of risk to human health rather than comparison to an AAQS or emission-based threshold.

Odors

While offensive odors rarely cause physical harm, they can be unpleasant, leading to considerable annoyance and distress among the public and can generate citizen complaints to local governments and air districts. Due to the subjective nature of odor impacts, the number of variables that can influence the potential for an odor impact, and the variety of odor sources,

[4] California Air Resources Board. *Reducing Toxic Air Pollutants in California's Communities*. February 6, 2002.

quantitative or formulaic methodologies to determine the presence of a significant odor impact are difficult. Adverse effects of odors on residential areas and other sensitive receptors warrant the closest scrutiny; but consideration should also be given to other land use types where people congregate, such as recreational facilities, worksites, and commercial areas. The potential for an odor impact is dependent on a number of variables including the nature of the odor source, distance between a receptor and an odor source, and local meteorological conditions.

One of the most important factors influencing the potential for an odor impact to occur is the distance between the odor source and receptors, also referred to as a buffer zone or setback. The greater the distance between an odor source and receptor, the less concentrated the odor emission would be when reaching the receptor.

Meteorological conditions also affect the dispersion of odor emissions, which determines the exposure concentration of odiferous compounds at receptors. The predominant wind direction in an area influences which receptors are exposed to the odiferous compounds generated by a nearby source. Receptors located upwind from a large odor source may not be affected due to the produced odiferous compounds being dispersed away from the receptors. Wind speed also influences the degree to which odor emissions are dispersed away from any area.

Odiferous compounds could be generated from a variety of source types including both construction and operational activities. Examples of common land use types that typically generate significant odor impacts include, but are not limited to, wastewater treatment plants; composting/green waste facilities; recycling facilities; petroleum refineries; chemical manufacturing plants; painting/coating operations; rendering plants; and food packaging plants. The proposed project does not include the construction or operation of any such land uses.

Although less common, diesel fumes associated with substantial diesel-fueled equipment and heavy-duty trucks, such as from construction activities, freeway traffic, or distribution centers, can be found to be objectionable. Existing nearby sensitive receptors could be subjected to diesel fumes associated with construction of the project.

Attainment Status and Regional Air Quality Plans

Areas not meeting the NAAQS presented in Table 4.1-2 above are designated by the USEPA as nonattainment. Further classifications of nonattainment areas are based on the severity of the nonattainment problem, with marginal, moderate, serious, severe, and extreme nonattainment classifications for ozone. Nonattainment classifications for PM range from marginal to serious. The Federal Clean Air Act (FCAA) requires areas violating the NAAQS to prepare an air quality control plan referred to as the State Implementation Plan (SIP). The SIP contains the strategies and control measures for states to use to attain the NAAQS. The SIP is periodically modified to reflect the latest emissions inventories, planning documents, rules, and regulations of air basins as reported by the agencies with jurisdiction over them. The USEPA reviews SIPs to determine if they conform to the mandates of the FCAA amendments and would achieve air quality goals when implemented.

The CARB is the agency responsible for coordination and oversight of State and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA) of 1988. The CCAA classifies ozone nonattainment areas as moderate, serious, severe, and extreme based on severity of violations of the CAAQS. For each nonattainment area classification, the CCAA specifies air quality management strategies that must be adopted. For all nonattainment

areas, attainment plans are required to demonstrate a five-percent-per-year reduction in nonattainment air pollutants or their precursors, averaged every consecutive three-year period, unless an approved alternative measure of progress is developed. Air districts with air quality that is in violation of CAAQS are required to prepare an air quality attainment plan that lays out a program to attain the CCAA mandates.

Table 4.1-3 presents the current attainment status of the SFBAAB, including Contra Costa County. As shown in the table, the area is currently designated as a nonattainment area for the State and federal ozone, State and federal $PM_{2.5}$, and State PM_{10} standards. The SFBAAB is designated attainment or unclassified for all other AAQS.

Table 4.1-3
Contra Costa County Attainment Status Designations

Pollutant	Averaging Time	California Standards	Federal Standards
Ozone	1 Hour	**Nonattainment**	Revoked in 2005
	8 Hour	**Nonattainment**	**Nonattainment**
Carbon Monoxide	8 Hour	Attainment	Attainment
	1 Hour	Attainment	Attainment
Nitrogen Dioxide	Annual Mean	-	Attainment
	1 Hour	Attainment	Unclassified
Sulfur Dioxide	Annual Mean	Attainment	Attainment
	24 Hour	Attainment	Attainment
	3 Hour	-	Unclassified
	1 Hour	Attainment	Attainment
Respirable Particulate Matter (PM_{10})	Annual Mean	**Nonattainment**	-
	24 Hour	**Nonattainment**	Unclassified
Fine Particulate Matter ($PM_{2.5}$)	Annual Mean	**Nonattainment**	Attainment
	24 Hour	-	**Nonattainment**
Lead	30 Day Average	-	-
	Calendar Quarter	-	Attainment
	Rolling 3-Month Average	-	Attainment
Sulfates	24 Hour	Attainment	-
Hydrogen Sulfide	1 Hour	Unclassified	-
Visibility Reducing Particles	8 Hour	Unclassified	-

Source: Bay Area Air Quality Management District. Air Quality Standards and Attainment Status. Available at: http://www.baaqmd.gov/research-and-data/air-quality-standards-and-attainment-status. Accessed March 2020.

In compliance with the FCAA and CCAA, the BAAQMD periodically prepares and updates air quality plans that provide emission reduction strategies to achieve attainment of the AAQS, including control strategies to reduce air pollutant emissions through regulations, incentive programs, public education, and partnerships with other agencies. The current air quality plans were prepared in cooperation with the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG).

The most recent federal ozone plan is the 2001 Ozone Attainment Plan, which is a proposed revision to the Bay Area part of the SIP to achieve the federal ozone standard.[5] The plan was adopted on October 24, 2001 and approved by the CARB on November 1, 2001.

The most recent State ozone plan is the 2017 Clean Air Plan, adopted on April 19, 2017.[6] The 2017 Clean Air Plan was developed as a multi-pollutant plan that provides an integrated control strategy to reduce ozone, PM, TACs, and GHGs. The control strategies included in the 2017 Clean Air Plan serve as the backbone of the 2017 Clean Air Plan, and build upon existing regional, state, and national programs for emissions reductions. The 2017 Clean Air Plan includes 85 control measures, which provide an integrative approach to reducing ozone, PM, TAC, and GHG emissions.

The aforementioned air quality plans contain mobile source controls, stationary source controls, and transportation control measures to be implemented in the region to attain the State and federal standards within the SFBAAB. The plans are based on population and employment projections provided by local governments, usually developed as part of the General Plan update process.

Local Air Quality Monitoring

Air quality is monitored by BAAQMD and CARB at various locations in the region that provide information on ambient concentrations of criteria air pollutants and TACs to help determine which air quality standards are being violated, and to direct the BAAQMD emission reduction efforts, such as developing attainment plans and rules, incentive programs, etc. The nearest monitoring station to the project site is the Bethel Island Road monitoring site, which is located approximately 7.3 miles northeast of the project site at 5551 Bethel Island Road. Data for $PM_{2.5}$, was not available for the Bethel Island Road monitoring site; thus, such data was obtained from the next nearest monitoring site, which is the Concord monitoring site located approximately 14 miles west of the project site at 2975 Treat Boulevard. Table 4.1-4 shows historical occurrences of pollutant levels exceeding the State and federal AAQS for the three-year period from 2016 to 2018. The number of days that each standard was exceeded is presented in the tables as well. As shown in the table, the State and the federal 8-hour AAQS for ozone were exceeded. In addition, the State PM_{10} and federal $PM_{2.5}$ AAQS were exceeded. All other State and federal AAQS were met in the area.

Sensitive Receptors

Some land uses are considered more sensitive to air pollution than others, due to the types of population groups or activities involved. Children, pregnant women, the elderly, and those with existing health problems are especially vulnerable to the effects of air pollution. Accordingly, land uses that are typically considered to be sensitive receptors include residences, schools, day care centers, playgrounds, and medical facilities. The nearest sensitive receptors would be the single-family residences currently under construction as part of the Promenade/Vineyards at Sand Creek Project approximately 150 feet north of the project site, across Sand Creek.

[5] Bay Area Air Quality Management District. *Air Quality Plans*. Available at: http://www.baaqmd.gov/Divisions/Planning-and-Research/Plans.aspx. Accessed March 2020.
[6] *Ibid.*

Table 4.1-4
Air Quality Data Summary for the Bethel Island Road Air Quality Monitoring Site (2016-2018)

Pollutant	Standard	Days Standard Was Exceeded		
		2016	2017	2018
1-Hour Ozone	State	0	0	0
	Federal	0	0	0
8-Hour Ozone	State	2	2	1
	Federal	2	1	1
24-Hour PM_{10}	State	0	1	2
	Federal	0	0	0
24-Hour $PM_{2.5}$*	Federal	0	6	14
1-Hour Nitrogen Dioxide	State	0	0	0
	Federal	0	0	0

*Data obtained from the Concord monitoring site.

***Source:** California Air Resources Board, Aerometric Data Analysis and Management (iADAM) System, http://www.arb.ca.gov/adam/topfour/topfour1.php. Accessed March 2020.*

Greenhouse Gases

GHGs are gases that absorb and emit radiation within the thermal infrared range, trapping heat in the earth's atmosphere. Some GHGs occur naturally and are emitted into the atmosphere through both natural processes and human activities. Other GHGs are created and emitted solely through human activities. The principal GHGs that enter the atmosphere due to human activities are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and fluorinated carbons. Other common GHGs include water vapor, ozone, and aerosols. Since the beginning of the Industrial Revolution, global atmospheric concentrations of GHGs have increased due to human activities such as the burning of fossil fuels, clearing of forests and other activities. The increase in atmospheric concentrations of GHG due to human activities has resulted in more heat being held within the atmosphere, which is the accepted explanation for global climate change.[7]

The primary GHG emitted by human activities is CO_2, with the next largest components being CH_4 and N_2O. The primary sources of CH_4 emissions include domestic livestock sources, decomposition of wastes in landfills, releases from natural gas systems, coal mine seepage, and manure management. The main human activities producing N_2O are agricultural soil management, fuel combustion in motor vehicles, nitric acid production, manure management, and stationary fuel combustion. Emissions of GHG by economic sector indicate that energy-related activities account for the majority of U.S. emissions. Electricity generation is the largest single-source of GHG emissions, and transportation is the second largest source, followed by industrial activities. The agricultural, commercial, and residential sectors account for the remainder of GHG emission sources.[8] Emissions of GHG are partially offset by uptake of carbon and sequestration in forests, trees in urban areas, agricultural soils, landfilled yard trimmings and food scraps, and absorption of CO_2 by the earth's oceans; however, the rate of emissions of GHGs currently

[7] U.S. Environmental Protection Agency. *Climate Change Indicators: Atmospheric Concentrations of Greenhouse Gases*. Available at: https://www.epa.gov/climate-indicators/climate-change-indicators-atmospheric-concentrations-greenhouse-gases. Accessed March 2020.

[8] U.S. Environmental Protection Agency. *Sources of Greenhouse Gas Emissions*. Available at: https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions. Accessed March 2020.

outpaces the rate of uptake, thus causing global atmospheric concentrations to increase.[9] Attainment concentration standards for GHGs have not been established by the federal or State government.

Global Warming Potential

Global Warming Potential (GWP) is one type of simplified index (based upon radiative properties) that can be used to estimate the potential future impacts of emissions of various gases. According to the USEPA, the global warming potential of a gas, or aerosol, to trap heat in the atmosphere is the "cumulative radiative forcing effects of a gas over a specified time horizon resulting from the emission of a unit mass of gas relative to a reference gas." The reference gas for comparison is CO_2. GWP is based on a number of factors, including the heat-absorbing ability of each gas relative to that of CO_2, as well as the decay rate of each gas relative to that of CO_2. Each gas's GWP is determined by comparing the radiative forcing associated with emissions of that gas versus the radiative forcing associated with emissions of the same mass of CO_2, for which the GWP is set at one. Methane gas, for example, is estimated by the USEPA to have a comparative global warming potential 25 times greater than that of CO_2, as shown in Table 4.1-5.

As shown in the table, at the extreme end of the scale, sulfur hexafluoride is estimated to have a comparative GWP 22,800 times that of CO_2. The "specified time horizon" is related to the atmospheric lifetimes of such GHGs, which are estimated by the USEPA to vary from 50 to 200 years for CO_2, to 50,000 years for tetrafluoromethane. Longer atmospheric lifetimes allow GHG to buildup in the atmosphere; therefore, longer lifetimes correlate with the global warming potential of a gas. The common indicator for GHG is expressed in terms of metric tons of CO_2 equivalents ($MTCO_2e$).

Table 4.1-5
Global Warming Potentials and Atmospheric Lifetimes of Select GHGs

Gas	Atmospheric Lifetime (years)	Global Warming Potential (100 year time horizon)
Carbon Dioxide (CO_2)	50-200[1]	1
Methane (CH_4)	12	25
Nitrous Oxide (N_2O)	114	298
HFC-23	270	14,800
HFC-134a	14	1,430
HFC-152a	1.4	124
PFC: Tetrafluoromethane (CF_4)	50,000	7,390
PFC: Hexafluoroethane (C_2F_6)	10,000	12,200
Sulfur Hexafluoride (SF_6)	3,200	22,800

1. For a given amount of carbon dioxide emitted, some fraction of the atmospheric increase in concentration is quickly absorbed by the oceans and terrestrial vegetation, some fraction of the atmospheric increase will only slowly decrease over a number of years, and a small portion of the increase will remain for many centuries or more.

Source: USEPA. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2013. April 15, 2017.

9 U.S. Environmental Protection Agency. *Climate Change Indicators: Atmospheric Concentrations of Greenhouse Gases.* Available at: https://www.epa.gov/climate-indicators/climate-change-indicators-atmospheric-concentrations-greenhouse-gases. Accessed March 2020.

Effects of Global Climate Change

Uncertainties exist as to exactly what the climate changes will be in various local areas of the Earth. According to the Intergovernmental Panel on Climate Change's Working Group II Report, *Climate Change 2007: Impacts, Adaptation and Vulnerability*,[10] as well as the California Natural Resources Agency's report *Safeguarding California: Reducing Climate Risk*[11] climate change impacts to California may include:

- Increasing evaporation;
- Rearrangement of ecosystems as species and ecosystems shift northward and to higher elevations;
- Increased frequency, duration, and intensity of conditions conducive to air pollution formation (particularly ozone);
- Reduced precipitation, changes to precipitation and runoff patterns, reduced snowfall (precipitation occurring as rain instead of snow), earlier snowmelt, decreased snowpack, and increased agricultural demand for water;
- Increased experiences of heat waves;
- Increased growing season and increased growth rates of weeds, insect pests and pathogens;
- Inundation by sea level rise, and exacerbated shoreline erosion; and
- Increased incidents and severity of wildfire events and expansion of the range and increased frequency of pest outbreaks.

4.1.3 REGULATORY CONTEXT

Air quality is monitored through the efforts of various international regulations and federal, State, regional, and local government agencies. The agencies work jointly and individually to improve air quality through legislation, regulations, planning, policy-making, education, and a variety of programs. The agencies responsible for regulating and improving the air quality and GHG emissions within the City of Antioch area are discussed below.

Federal Regulations

The most prominent federal regulation is the FCAA, which is implemented and enforced by the USEPA.

FCAA and USEPA

The FCAA requires the USEPA to set NAAQS and designate areas with air quality not meeting NAAQS as nonattainment. The USEPA is responsible for enforcement of NAAQS for atmospheric pollutants and regulates emission sources that are under the exclusive authority of the federal government including emissions of GHGs. The USEPA's air quality mandates are drawn primarily from the FCAA, which was signed into law in 1970. Congress substantially amended the FCAA in 1977 and again in 1990. The USEPA has adopted policies consistent with FCAA requirements demanding states to prepare SIPs that demonstrate attainment and maintenance of the NAAQS.

State Regulations

California has adopted a variety of regulations aimed at reducing air pollution emissions. Only the most prominent and applicable California air quality-related legislation is included below; however,

[10] Intergovernmental Panel on Climate Change. *Climate Change 2007: Impacts, Adaptation, and Vulnerability.* 2007.
[11] California Natural Resources Agency. *Safeguarding California: Reducing Climate Risk*. July 2014.

an exhaustive list and extensive details of California air quality legislation can be found at the CARB website (http://www.arb.ca.gov/html/lawsregs.htm).

CCAA and CARB

The CARB is the agency responsible for coordination and oversight of State and local air pollution control programs in California and for implementing the CCAA. The CCAA requires that air quality plans be prepared for areas of the State that have not met the CAAQS for ozone, CO, NO_X, and SO_2. Among other requirements of the CCAA, the plans must include a wide range of implementable control measures, which often include transportation control measures and performance standards. In order to implement the transportation-related provisions of the CCAA, local air pollution control districts have been granted explicit authority to adopt and implement transportation controls. The CARB, California's air quality management agency, regulates and oversees the activities of county air pollution control districts and regional air quality management districts. The CARB regulates local air quality indirectly using State standards and vehicle emission standards, by conducting research activities, and through planning and coordinating activities. In addition, the CARB has primary responsibility in California to develop and implement air pollution control plans designed to achieve and maintain the NAAQS established by the USEPA. Furthermore, the CARB is charged with developing rules and regulations to cap and reduce GHG emissions.

Air Quality and Land Use Handbook

CARB's *Air Quality and Land Use Handbook: A Community Health Perspective* (CARB Handbook) addresses the importance of considering health risk issues when siting sensitive land uses, including residential development, in the vicinity of intensive air pollutant emission sources including freeways or high-traffic roads, distribution centers, ports, petroleum refineries, chrome plating operations, dry cleaners, and gasoline dispensing facilities.[12] The CARB Handbook draws upon studies evaluating the health effects of traffic traveling on major interstate highways in metropolitan California centers within Los Angeles (I-405 and I-710), the San Francisco Bay, and San Diego areas. The recommendations identified by CARB, including siting residential uses a minimum distance of 500 feet from freeways or other high-traffic roadways, are consistent with those adopted by the State of California for location of new schools. Specifically, the CARB Handbook recommends, "Avoid siting new sensitive land uses within 500 feet of a freeway, urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day" (CARB 2005).

Importantly, the Introduction chapter of the CARB Handbook clarifies that the guidelines are strictly advisory, recognizing that: "[l]and use decisions are a local government responsibility. The Air Resources Board Handbook is advisory and these recommendations do not establish regulatory standards of any kind." CARB recognizes that there may be land use objectives as well as meteorological and other site-specific conditions that need to be considered by a governmental jurisdiction relative to the general recommended setbacks, specifically stating, "[t]hese recommendations are advisory. Land use agencies have to balance other considerations, including housing and transportation needs, economic development priorities, and other quality of life issues" (CARB 2005).

[12] California Air Resources Board. *Air Quality and Land Use Handbook: A Community Health Perspective*. April 2005.

Assembly Bill 1807

Assembly Bill (AB) 1807, enacted in September 1983, sets forth a procedure for the identification and control of TACs in California. CARB is responsible for the identification and control of TACs, except pesticide use, which is regulated by the California Department of Pesticide Regulation.

AB 2588

The Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588), California Health and Safety Code Section 44300 et seq., provides for the regulation of over 200 TACs, including DPM, and is the primary air contaminant legislation in California. Under the act, local air districts may request that a facility account for its TAC emissions. Local air districts then prioritize facilities on the basis of emissions, and high priority designated facilities are required to submit a health risk assessment and communicate the results to the affected public.

Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations

In 2002, the Asbestos Airborne Toxic Control Measure (ATCM) for Construction, Grading, Quarrying, and Surface Mining Operations (Title 17, Section 93105, of the California Code of Regulations) went into effect, which requires each air pollution control and air quality management district to implement and enforce the requirements of Section 93105 and propose their own asbestos ATCM as provided in Health and Safety Code section 39666(d).[13]

Senate Bill 656

In 2003, the Legislature passed Senate Bill (SB) 656 to reduce public exposure to PM_{10} and $PM_{2.5}$ above the State CAAQS. The legislation requires the CARB, in consultation with local air pollution control and air quality management districts, to adopt a list of the most readily available, feasible, and cost-effective control measures that could be implemented by air districts to reduce PM_{10} and $PM_{2.5}$ emissions. The CARB list is based on California rules and regulations existing as of January 1, 2004, and was adopted by CARB in November 2004. Categories addressed by SB 656 include measures for reduction of emissions associated with residential wood combustion and outdoor green waste burning, fugitive dust sources such as paved and unpaved roads and construction, combustion sources such as boilers, heaters, and charbroiling, solvents and coatings, and product manufacturing. Some of the measures include, but are not limited to, the following:

- Reduce or eliminate wood-burning devices allowed;
- Prohibit residential open burning;
- Permit and provide performance standards for controlled burns;
- Require water or chemical stabilizers/dust suppressants during grading activities;
- Limit visible dust emissions beyond the project boundary during construction;
- Require paving/curbing of roadway shoulder areas; and
- Require street sweeping.

Under SB 656, each air district is required to prioritize the measures identified by CARB, based on the cost effectiveness of the measures and their effect on public health, air quality, and emission reductions. Per SB 656 requirements, the BAAQMD amended the existing public awareness project to provide additional outreach and educational resources, enhanced the

[13] California Air Resources Board. *2002-07-29 Asbestos ATCM for Construction, Grading, Quarrying, and Surface Mining Operations*. Available at: http://www.arb.ca.gov/toxics/atcm/asb2atcm.htm. Accessed March 2020.

existing wood-burning ordinance, and amended the existing program aimed at the voluntary curtailment of wood burning by adjusting the "Spare the Air Tonight" thresholds.

Heavy-Duty Vehicle Idling Emission Reduction Program

On October 20, 2005, CARB approved a regulatory measure to reduce emissions of toxics and criteria pollutants by limiting idling of new and in-use sleeper berth equipped diesel trucks.[14] The regulation consists of new engine and in-use truck requirements and emission performance requirements for technologies used as alternatives to idling the truck's main engine. For example, the regulation requires 2008 and newer model year heavy-duty diesel engines to be equipped with a non-programmable engine shutdown system that automatically shuts down the engine after five minutes of idling, or optionally meet a stringent NO_X emission standard. The regulation also requires operators of both in-state and out-of-state registered sleeper berth equipped trucks to manually shut down their engine when idling more than five minutes at any location within California beginning in 2008. Emission producing alternative technologies such as diesel-fueled auxiliary power systems and fuel-fired heaters are also required to meet emission performance requirements that ensure emissions are not exceeding the emissions of a truck engine operating at idle.

In-Use Off-Road Diesel Vehicle Regulation

On July 26, 2007, CARB adopted a regulation to reduce DPM and NO_X emissions from in-use (existing), off-road, heavy-duty diesel vehicles in California.[15] Such vehicles are used in construction, mining, and industrial operations. The regulation is designed to reduce harmful emissions from vehicles by subjecting fleet owners to retrofit or accelerated replacement/repower requirements, imposing idling limitations on owners, operators, renters, or lessees of off-road diesel vehicles. The idling limits require operators of applicable off-road vehicles (self-propelled diesel-fueled vehicles 25 horsepower and up that were not designed to be driven on-road) to limit idling to less than five minutes. The idling requirements are specified in Title 13 of the California Code of Regulations.

State Regulations Related to Greenhouse Gases

The following regulations address GHG and climate change within California.

AB 1493

California AB 1493 (Stats. 2002, ch. 200) (Health & Safety Code, §§42823, 43018.5), known as Pavley I, was enacted on July 22, 2002. AB 1493 requires that the CARB develop and adopt regulations that achieve "the maximum feasible reduction of GHGs emitted by passenger vehicles and light-duty truck and other vehicles determined by the CARB to be vehicles whose primary use is noncommercial personal transportation in the state." On June 30, 2009, the USEPA granted a waiver of CAA preemption to California for the State's GHG emission standards for motor vehicles, beginning with the 2009 model year. Pursuant to the CAA, the waiver allows for the State to have special authority to enact stricter air pollution standards for motor vehicles than the federal government's. On September 24, 2009, the CARB adopted amendments to the Pavley regulations (Pavley I) that reduce GHG emissions in new passenger vehicles from 2009 through 2016. The second phase of the Pavley regulations (Pavley II) is expected to affect model year vehicles from 2016 through 2020. The CARB estimates that the regulation would reduce GHG

[14] California Air Resources Board. *Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling*. October 24, 2013. Available at: http://www.arb.ca.gov/msprog/truck-idling/truck-idling.htm. Accessed March 2020.

[15] California Air Resources Board. *In-Use Off-Road Diesel Vehicle Regulation*. December 10, 2014. Available at: http://www.arb.ca.gov/msprog/ordiesel/ordiesel.htm. Accessed March 2020.

emissions from the light-duty passenger vehicle fleet by an estimated 18 percent in 2020 and by 27 percent in 2030.

On September 19, 2019 the federal government revoked the 2013 California CAA Waiver, which prevents the state from setting vehicle emissions standards. As a separate action, the USEPA has proposed amendments to the corporate average fuel economy (CAFE) standards that would weaken the previously approved fuel economy standards. Both actions by the federal government have been legally challenged by California as well as various other states, cities, and the District of Columbia. Although the fate of judicial proceedings regarding California's waiver and the CAFE standards are currently unknown, should the federal government's actions be allowed to take effect, ambient air quality could degrade throughout the state, including in the project area.

Methodologies for analyzing air pollution resulting from vehicle use within California are predicated on the implementation of the Pavley standards as well as the more stringent CAFE. Consequently, in revoking California's 2013 California CAA Waiver, and with the potential amendment to weaken CAFE standards, the federal government has invalidated the CARB's mobile source emissions factor (EMFAC) model, which is used extensively within the State to estimate mobile emissions. Further discussion of the implications of the invalidation of the EMFAC model is provided in the method of analysis section below.

Renewable Portfolio Standard

Established in 2002 under SB 1078, accelerated in 2006 under SB 107, and expanded in 2011 under SB 2, California's Renewables Portfolio Standard (RPS) is one of the most ambitious renewable energy standards in the country. The RPS program requires investor-owned utilities, electric service providers, and community choice aggregators to increase procurement from eligible renewable energy resources to 33 percent of total procurement by 2020.

Since the inception of the RPS program, the program has been extended and enhanced multiple times. In 2015, SB 350 extended the State's RPS program by requiring that publicly owned utilities procure 50 percent of their electricity from renewable energy sources by 2030. The requirements of SB 350 were expanded and intensified in 2018 through the adoption of SB 100, which mandated that all electricity generated within the State by publicly owned utilities be generated through carbon-free sources by 2045. In addition, SB 100 increased the previous renewable energy requirement for the year 2030 by 10 percent; thus, requiring that 60 percent of electricity generated by publicly owned utilities originate from renewable sources by 2030.

Executive Order S-03-05

On June 1, 2005, then-Governor Schwarzenegger signed Executive Order S-03-05, which established total GHG emission targets. Specifically, emissions are to be reduced to year 2000 levels by 2010, 1990 levels by 2020, and to 80 percent below 1990 levels by 2050. The Executive Order directed the Secretary of the California Environmental Protection Agency (Cal-EPA) to coordinate a multi-agency effort to reduce GHG emissions to the target levels. The Secretary is also directed to submit biannual reports to the governor and state legislature describing: (1) progress made toward reaching the emission targets; (2) impacts of global warming on California's resources; and (3) mitigation and adaptation plans to combat these impacts.

To comply with the Executive Order, the Secretary of the Cal-EPA created a Climate Act Team (CAT) made up of members from various State agencies and commissions. In March 2006, CAT

released their first report. In addition, the CAT has released several "white papers" addressing issues pertaining to the potential impacts of climate change on California.

AB 32

In September 2006, AB 32, the California Climate Solutions Act of 2006, was enacted (Stats. 2006, ch. 488) (Health & Saf. Code, §38500 et seq.). AB 32 delegated the authority for its implementation to the CARB and directs CARB to enforce the State-wide cap. Among other requirements, AB 32 required CARB to (1) identify the State-wide level of GHG emissions in 1990 to serve as the emissions limit to be achieved by 2020, and (2) develop and implement a Scoping Plan. Accordingly, the CARB has prepared the *Climate Change Scoping Plan* (Scoping Plan) for California, which was approved in 2008 and updated in 2014.[16] The 2008 Scoping Plan identified GHG reduction measures that would be necessary to reduce statewide emissions as required by AB 32. Many of the GHG reduction measures identified in the 2008 Scoping Plan have been adopted, such as the Low Carbon Fuel Standard, Pavley, Advanced Clean Car standards, Renewable Portfolio Standard (RPS), and the State's Cap-and-Trade system.

Building upon the 2008 Scoping Plan, the 2013 Scoping Plan Update introduced new strategies and recommendations to continue GHG emissions reductions. The 2013 Scoping Plan Update created a framework for achievement of 2020 GHG reduction goals and identified actions that may be built upon to continue GHG reductions past 2020, as required by AB 32. A second update to the Scoping Plan has recently been prepared and was adopted by CARB on December 14, 2017.[17]

California GHG Cap-and-Trade Program

The AB 32 Scoping Plan identifies a cap-and-trade program as one of the strategies California will employ to reduce the GHG emissions that cause climate change.[18] The program will help put California on the path to meet the GHG emission reduction goal of 1990 levels by the year 2020, and ultimately achieving an 80 percent reduction from 1990 levels by 2050. Under cap-and-trade, an overall limit on GHG emissions from capped sectors would be established by the cap-and-trade program and facilities subject to the cap would be able to trade permits (allowances) to emit GHGs. The CARB has designed a California cap-and-trade program that is enforceable and meets the requirements of AB 32. The program started on January 1, 2012, with an enforceable compliance obligation beginning with the 2013 GHG emissions. On January 1, 2014 California linked the state's cap-and-trade plan with Quebec's, and on January 1, 2015 the program expanded to include transportation and natural gas fuel suppliers.

Executive Order S-01-07

On January 18, 2007, then-Governor Schwarzenegger signed Executive Order S-01-07, which mandates that a State-wide goal be established to reduce carbon intensity of California's transportation fuels by at least 10 percent by 2020. The Order also requires that a Low Carbon Fuel Standard (LCFS) for transportation fuels be established for California.

SB 97

As amended, SB 97, signed in August 2007, acknowledges that climate change is an important environmental issue that requires analysis under CEQA. The bill directed the Governor's Office

[16] California Air Resources Board. *First Update to the Climate Change Scoping Plan*. May 22, 2014.
[17] California Air Resources Board. *California's 2017 Climate Change Scoping Plan*. November 2017.
[18] California Air Resources Board. *AB 32 Scoping Plan*. Available at: https://www.arb.ca.gov/cc/scopingplan/scopingplan.htm. Accessed March 2020.

of Planning and Research (OPR) to prepare, develop, and transmit to the Resources Agency guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions. As directed by SB 97, the OPR amended the CEQA Guidelines to provide guidance to public agencies regarding the analysis and mitigation of GHG emissions and the effects of GHG emissions in CEQA documents. The amendments included revisions to the *Appendix G Initial Study Checklist* that incorporated a new subdivision to address project-generated GHG emissions and contribution to climate change. The new subdivision emphasizes that the effects of GHG emissions are cumulative, and should be analyzed in the context of CEQA's requirements for cumulative impacts analysis. Under the revised CEQA Appendix G checklist, an agency should consider whether a project would generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, and whether a project conflicts with an applicable plan, policy, or regulation adopted for the purpose of reducing emission of GHGs.

Further guidance based on SB 97 suggests that the lead agency make a good-faith effort, based on available information, to describe, calculate, or estimate the amount of GHG emissions resulting from a project. When assessing the significance of impacts from GHG emissions on the environment, lead agencies should consider the extent to which the project may increase or reduce GHG, as compared to the existing environmental setting, whether the project emissions exceed a threshold of significance determined applicable to the project, and/or the extent to which the project complies with adopted regulations or requirements to implement a state wide, regional, or local plan for the reduction or mitigation of GHG emissions. Feasible mitigation under SB 97 includes on-site and off-site measures, such as GHG emission-reducing design features and GHG sequestration.

SB 375

In September 2008, SB 375, known as the Sustainable Communities and Climate Protection Act of 2008, was enacted, which is intended to build on AB 32 by attempting to control GHG emissions by curbing sprawl. SB 375 enhances CARB's ability to reach goals set by AB 32 by directing CARB to develop regional GHG emission reduction targets to be achieved by the State's 18 metropolitan planning organizations (MPOs), including the Association of Bay Area Governments (ABAG). Under SB 375, MPOs must align regional transportation, housing, and land-use plans and prepare a "Sustainable Communities Strategy" (SCS) to reduce the amount of vehicle miles traveled in their respective regions and demonstrate the region's ability to attain its GHG reduction targets. SB 375 provides incentives for creating walkable and sustainable communities and revitalizing existing communities, and allows home builders to get relief from certain environmental reviews under CEQA if they build projects consistent with the new sustainable community strategies. Furthermore, SB 375 encourages the development of alternative transportation options, which will reduce traffic congestion.

Executive Order S-13-08

Then-Governor Arnold Schwarzenegger issued Executive Order S-13-08 on November 14, 2008. The Executive Order is intended to hasten California's response to the impacts of global climate change, particularly sea level rise, and directs state agencies to take specified actions to assess and plan for such impacts, including requesting the National Academy of Sciences to prepare a Sea Level Rise Assessment Report, directing the Business, Transportation, and Housing Agency to assess the vulnerability of the State's transportation systems to sea level rise, and requiring the Office of Planning and Research and the Natural Resources Agency to provide land use planning guidance related to sea level rise and other climate change impacts.

The order also required State agencies to develop adaptation strategies to respond to the impacts of global climate change that are predicted to occur over the next 50 to 100 years. The adaption strategies report summarizes key climate change impacts to the State for the following areas: public health; ocean and coastal resources; water supply and flood protection; agriculture; forestry; biodiversity and habitat; and transportation and energy infrastructure. The report recommends strategies and specific responsibilities related to water supply, planning and land use, public health, fire protection, and energy conservation.

AB 197 and SB 32

On September 8, 2016, AB 197 and SB 32 were enacted with the goal of providing further control over GHG emissions in the State. SB 32 built on previous GHG reduction goals by requiring that the CARB ensure that statewide GHG emissions are reduced to 40 percent below the 1990 level by the year 2030. Achieving a 40 percent reduction of statewide GHG emissions by 2030 represents a critical milestone on the path to reducing statewide GHG Emissions by 80 percent by 2050, as required by Executive Order S-03-05. Additionally, SB 32 emphasizes the critical role that reducing GHG emissions would play in protecting disadvantaged communities and public health from adverse impacts of climate change. Enactment of SB 32 was predicated on the enactment of AB 197, which seeks to make the achievement of SB 32's mandated GHG emission reductions more transparent to the public and responsive to the Legislature. Transparency to the public is achieved by AB 197 through the publication of an online inventory of GHG and TAC emissions from facilities required to report such emissions pursuant to Section 38530 of California's Health and Safety Code. AB 197 further established a six-member Joint Legislative Committee on Climate Change Policies, which is intended to provide oversight and accountability of the CARB, while also adding two new legislatively-appointed, non-voting members to the CARB. Additionally, AB 197 directs the CARB to consider the "social costs" of emission reduction rules and regulations, with particular focus on how such measures may impact disadvantaged communities.

The CARB has recently prepared an update to the State's Climate Change Scoping Plan in accordance with the 2030 GHG emissions targets codified by SB 32, which was adopted by CARB on December 14, 2017.

California Building Standards Code

California's building codes (California Code of Regulations [CCR], Title 24) are published on a triennial basis, and contain standards that regulate the method of use, properties, performance, or types of materials used in the construction, alteration, improvement, repair, or rehabilitation of a building or other improvement to real property. The California Building Standards Commission is responsible for the administration and implementation of each cycle of the California Building Standards Code (CBSC), which includes the proposal, review, and adoption process. Supplements and errata are issued throughout the cycle to make necessary mid-term corrections. The 2019 code has been prepared and became effective January 1, 2020. The California building code standards apply State-wide; however, a local jurisdiction may amend a building code standard if the jurisdiction makes a finding that the amendment is reasonably necessary due to local climatic, geological, or topographical conditions.

California Green Building Standards Code

The 2019 California Green Building Standards Code, otherwise known as the CALGreen Code (CCR Title 24, Part 11), is a portion of the CBSC, which became effective with the rest of the CBSC on January 1, 2020. The purpose of the CALGreen Code is to improve public health, safety,

and general welfare by enhancing the design and construction of buildings through the use of building concepts having a reduced negative impact or positive environmental impact and encouraging sustainable construction practices. The provisions of the code apply to the planning, design, operation, construction, use, and occupancy of every newly constructed building or structure throughout California.

The CALGreen Code encourages local governments to adopt more stringent voluntary provisions, known as Tier 1 and Tier 2 provisions, to further reduce emissions, improve energy efficiency, and conserve natural resources. If a local government adopts one of the tiers, the provisions become mandates for all new construction within that jurisdiction.

Building Energy Efficiency Standards

The 2019 Building Energy Efficiency Standards is a portion of the CBSC (CCR Title 24, Parts 6 and 11) expands upon energy efficiency measures from the 2016 Building Energy Efficiency Standards resulting in a seven percent reduction in energy consumption from the 2016 standards for commercial structures. Energy reductions relative to previous Building Energy Efficiency Standards would be achieved through various regulations including requirements for the use of high efficacy lighting, improved water heating system efficiency, and high-performance attics and walls.

One of the improvements included within the 2019 Building Energy Efficiency Standards is the requirement that certain residential developments, including some single-family and low-rise residential developments, include on-site solar energy systems capable of producing 100 percent of the electricity demanded by the residences. Certain residential developments, including developments that are subject to substantial shading, rendering the use of on-site solar photovoltaic systems infeasible, are exempted from the foregoing requirement; however, such developments would continue to be subject to all other applicable portions of the 2019 Building Energy Efficiency Standards.

Local Regulations

The following are the regulatory agencies and regulations pertinent to the proposed project on a local level.

Plan Bay Area 2040

Plan Bay Area 2040 is a long-range integrated transportation and land use/housing strategy through 2040 for the San Francisco Bay Area, designed to reduce GHG emissions from cars and light-duty trucks. On July 18, 2013, the Plan was jointly approved by the MTC and the ABAG. Pursuant to SB 375, the Plan includes the region's Sustainable Communities Strategy (SCS) and 2040 Regional Transportation Plan. Plan Bay Area 2040 provides a strategy for meeting 80 percent of the region's future housing needs in Priority Development Areas (PDAs). While intended to accommodate the region's housing needs, as a SCS, the Plan Bay Area 2040 is required to comply with regional targets for reducing GHG emissions through the integration of transportation and land use planning.[19]

Plan Bay Area 2040 anticipates that from 2010 to 2040, Contra Costa County is projected to experience 12 percent of the total regional housing growth, or an estimated 93,390 additional

[19] Association of Bay Area Governments and Metropolitan Transportation Commission. *Plan Bay Area 2040: Final.* Available at: http://2040.planbayarea.org/reports. Accessed March 2020.

households. The County will also take 11 percent of the region's job growth, or 70,300 new jobs, the majority of which will be in PDAs. Both job and housing growth will cluster along San Pablo Avenue in the western part of the County, including Richmond, as well as in the suburbs of Antioch, Pittsburg, Walnut Creek, and San Ramon. The project site is not located within a PDA.

The plan assists jurisdictions seeking to implement the plan at the local level by providing funding for PDA planning and transportation projects. Plan Bay Area also provides jurisdictions with the option of increasing the efficiency of the development process for projects consistent with the plan and other criteria included in SB 375.

Bay Area Air Quality Management District

The BAAQMD is the public agency entrusted with regulating stationary sources of air pollution in the nine counties that surround San Francisco Bay: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, southwestern Solano, and southern Sonoma counties. The BAAQMD has prepared their own *CEQA Air Quality Guidelines* (May 2017), which is intended to be used for assistance with CEQA review. The BAAQMD CEQA Air Quality Guidelines include thresholds of significance and project screening levels for criteria air pollutants (ROG, NO_X, PM_{10}, and $PM_{2.5}$), GHGs, TACs, CO, and odors, as well as methods to assess and mitigate project-level and plan-level impacts.

Regional Air Quality Plans

As discussed above, the 2001 Ozone Attainment Plan was prepared as a revision to the Bay Area part of the SIP to achieve the federal ozone standard. The plan was adopted on October 24, 2001, approved by the CARB on November 1, 2001, and was submitted to the USEPA on November 30, 2001 for review and approval as a revision to the SIP. In addition, in order to fulfill federal air quality planning requirements, the BAAQMD adopted a $PM_{2.5}$ emissions inventory for the year 2010, which was submitted to the USEPA on January 14, 2013 for inclusion in the SIP.

The most recent State ozone plan is the 2017 Clean Air Plan, adopted on April 19, 2017. The 2017 Clean Air Plan is an update of the most recent Bay Area ozone plan, the 2010 Clean Air Plan, and focuses on two primary goals: protecting public health, and protecting the climate. The 2017 Clean Air Plan includes feasible measures to reduce emissions of ozone precursors, including ROG and NOx. In addition, the 2017 Clean Air Plan builds upon and enhances the BAAQMD's efforts to reduce emissions of fine particulate matter and toxic air contaminants.[20]

Although the CCAA does not require the region to submit a plan for achieving the State PM_{10} standard, the BAAQMD has prioritized measures to reduce PM in developing the control strategy for the 2017 Clean Air Plan. It should be noted that on January 9, 2013, the USEPA issued a final rule to determine that the San Francisco Bay Area has attained the 24-hour $PM_{2.5}$ federal standard, which suspends federal SIP planning requirements for the Bay Area.

The aforementioned applicable air quality plans contain mobile source controls, stationary source controls, and transportation control measures to be implemented in the region to attain the State and federal standards within the SFBAAB. The plans are based on population and employment projections provided by local governments, usually developed as part of the General Plan update process.

[20] Bay Area Air Quality Management District. *Final 2017 Clean Air Plan: Spare the Air, Cool the Climate*. April 2017.

Rules and Regulations

All projects under the jurisdiction of the BAAQMD are required to comply with all applicable BAAQMD rules and regulations. Applicable BAAQMD's regulations and rules include, but are not limited to, the following:

- Regulation 2: Permits
  - Rule 5: New Source Review of Toxic Air Contaminates
- Regulation 6: Particulate Matter and Visible Emissions
  - Rule 2: Commercial Cooking Equipment
  - Rule 3: Wood-burning Devices
- Regulation 7: Odorous Substances
- Regulation 8: Organic Compounds
  - Rule 3: Architectural Coatings
- Regulation 11: Hazardous Pollutants
  - Rule 2: Asbestos Demolition, Renovation and Manufacturing

City of Antioch General Plan

The following goals and policies related to air quality and GHG emissions are from the City of Antioch General Plan, including policies from Section 4.4.6.7 specific to the Sand Creek Focus Area:

Policy 4.4.6.7.ee. The Sand Creek Focus Area is intended to be "transit-friendly," including appropriate provisions for public transit and nonmotorized forms of transportation.

Objective 10.6.1 Minimize air pollutant emissions within the Antioch Planning Area so as to assist in achieving state and federal air quality standards.

Construction Emissions

Policy 10.6.2.a Require development projects to minimize the generation of particulate emissions during construction through implementation of the dust abatement actions outlined in the CEQA Handbook of the Bay Area Air Quality Management District.

Mobile Emissions

Policy 10.6.2.b Require developers of large residential and non-residential projects to participate in programs and to take measures to improve traffic flow and/or reduce vehicle trips resulting in decreased vehicular emissions. Examples of such efforts may include, but are not limited to the following:

- Development of mixed-use projects, facilitating pedestrian and bicycle transportation and permitting consolidation of vehicular trips.

- Installation of transit improvements and amenities, including dedicated bus turnouts and sufficient rights-of-way for transit movement, bus shelters, and pedestrian easy access to transit.
- Provision of bicycle and pedestrian facilities, including bicycle lanes and pedestrian walkways connecting residential areas with neighborhood commercial centers, recreational facilities, schools, and other public areas.
- Contributions for off-site mitigation for transit use.
- Provision of charging stations for electric vehicles within large employment-generating and retail developments.

Stationary Source Emissions

Policy 10.6.2.f Provide physical separations between (1) proposed new industries having the potential for emitting toxic air contaminants and (2) existing and proposed sensitive receptors (e.g., residential areas, schools, and hospitals).

Policy 10.6.2.g Require new wood burning stoves and fireplaces to comply with EPA and BAAQMD approved standards.

City of Antioch Climate Action Planning

In 2007, the City of Antioch joined the International Council for Local Environmental Initiatives (ICLEI). As a member of the ICLEI, the City drafted and adopted two Climate Action Plans, one for municipal operations and the other for community-wide operations. Both Climate Action Plans provided GHG emissions inventories, with the Municipal Climate Action Plan considering emissions related to the provision of water, wastewater, and solid waste services, as well as assessing emissions related to the City's vehicle fleet, street lights within the City, City facilities, and employee commutes. Concurrently, the Community Climate Action Plan (CCAP) inventoried emissions related to residential energy consumption, industrial energy use, commercial energy use, solid waste, transportation and other mobile sources, solid waste generation, water consumption, and wastewater production. In compliance with AB 32, emissions reduction targets were established for both community and municipal emissions, and two different approaches were implemented to meet the identified targets. The Municipal Climate Action Plan established measures and policies related to each emission source category, which would reduce existing and future emission from the identified sources. Simultaneously, the CCAP included GHG reduction strategies related to land use and transportation, green building and energy, and education and behavior change.

Although the CCAP does not include quantitative thresholds to assess a project's compliance with the CCAP, projects that are in compliance with AB 32 would be considered compliant with the CCAP. For instance, project's showing emissions reductions as required by AB 32, or projects incorporating reduction strategies from the CCAP are understood to be in compliance with the CCAP's GHG emissions reductions goals.

4.1.4 IMPACTS AND MITIGATION MEASURES

This section describes the standards of significance and methodology used to analyze and determine the proposed project's potential impacts related to air quality and GHG emissions. A discussion of the project's impacts, as well as mitigation measures where necessary, is also presented.

Standards of Significance

Based on the recommendations of BAAQMD, City of Antioch standards, and consistent with Appendix G of the CEQA Guidelines, the proposed project would result in a significant impact related to air quality and GHG emissions if the project would result in any of the following:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations (including localized CO concentrations and TAC emissions);
- Result in other emissions (such as those leading to odors) affecting a substantial number of people;
- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or
- Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs.

Further discussion of each of the above thresholds is provided below.

Criteria Pollutant Emissions

The air quality and GHG emissions analysis in this EIR uses the thresholds for criteria pollutants, localized CO, TAC emissions, and GHG emissions as discussed below.

The BAAQMD thresholds of significance for ozone precursor and PM emissions are presented in Table 4.1-6 and are expressed in pounds per day (lbs/day) for construction and operational average daily emissions and tons per year (tons/year) for maximum annual operational emissions. In addition to the thresholds of significance presented below for criteria air pollutants of particular concern for the SFBAAB, BAAQMD has developed thresholds for GHG emissions, localized CO emissions, and TACs. Pursuant to CEQA Guidelines Section 15064.4(b)(2), the lead agency is charged with determining a threshold of significance that is applicable to the project. For the analysis within this EIR, the City has elected to use the BAAQMD's thresholds of significance.

Table 4.1-6
BAAQMD Thresholds of Significance

Pollutant	Construction	Operational	
	Average Daily Emissions (lbs/day)	Average Daily Emissions (lbs/day)	Maximum Annual Emissions (tons/year)
ROG	54	54	10
NO_X	54	54	10
PM_{10}	82 (exhaust)	82	15
$PM_{2.5}$	54 (exhaust)	54	10

Source: BAAQMD, CEQA Guidelines, May 2017.

Localized CO Emissions

If a project would cause localized CO emissions to exceed the 1-hour and 8-hour CAAQS of 20.0 parts per million (ppm) and 9.0 ppm, respectively, BAAQMD would consider the project to result in a significant impact to air quality. In order to provide a conservative indication of whether a project would result in localized CO emissions that would exceed the applicable threshold of significance, the BAAQMD has established screening criteria for localized CO emissions. According to BAAQMD, a project would result in a less-than-significant impact related to localized CO emission concentrations if the following screening criteria are met:

- The project is consistent with an applicable congestion management program established by the county congestion management agency for designated roads or highways, regional transportation plan, and local congestion management agency plans;
- The project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour; and
- The project traffic would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, underpass, etc.).

TAC Emissions

According to BAAQMD, a significant impact related to TACs would occur if a new source would cause any of the following:

- An increase in cancer risk levels of more than 10 persons in one million;
- A non-cancer (chronic or acute) hazard index greater than 1.0; or
- An annual average $PM_{2.5}$ concentration of 0.3 micrograms per cubic meter ($\mu g/m^3$) or greater.

An impact associated with TACs would also occur if the aggregate total of all past, present, and foreseeable future sources within a 1,000-foot radius from the fence line of a source, or from the location of a receptor, plus the contribution from the project, would exceed the following:

- An increase in cancer risk levels (from all local sources) of more than 100 persons in one million;
- A chronic non-cancer hazard index (from all local sources) greater than 10.0; or
- An annual average $PM_{2.5}$ concentration (from all local sources) of 0.8 $\mu g/m^3$ or greater.

The foregoing risk thresholds are intended for use in analyzing potential impacts related to the siting of a new source of emissions. The proposed project involves development of the project site for residential uses. The proposed uses are not anticipated to involve any substantial stationary sources of TACs. Thus, the BAAQMD thresholds presented above would not directly apply to the proposed uses.

GHG Emissions

The BAAQMD developed a threshold of significance for project-level GHG emissions in 2009. The District's approach to developing the threshold was to identify a threshold level of GHG emissions for which a project would not be expected to substantially conflict with existing California legislation. At the time that the thresholds were developed, the foremost legislation regarding GHG emissions was AB 32, which established an emissions reductions goal of reducing statewide emissions to 1990 levels by 2020.[21] If a project would generate GHG emissions above the threshold level, the project would be considered to generate significant GHG emissions and conflict with AB 32. The GHG emissions thresholds of significance recommended by BAAQMD to determine compliance with AB 32 are as follows:

- 1,100 $MTCO_2e$/yr; or
- 4.6 $MTCO_2e$/SP/yr, where "SP" equates to service population, which is the total residents plus employees.

Because BAAQMD emissions thresholds include both a mass emissions threshold (i.e., 1,100 $MTCO_2e$/yr), and an emissions efficiency threshold (i.e., 4.6 $MTCO_2e$/SP/yr), a project may result in operational emissions in excess of 1,100 $MTCO_2e$/yr, but still avoid a significant impact by resulting in emissions below the 4.6 $MTCO_2e$/SP/yr efficiency threshold, or vice versa. It should be noted that the foregoing thresholds are intended for use in assessing operational GHG emissions only. However, construction of a proposed project would result in GHG emissions over a short-period of time. To capture the construction-related GHG emissions due to buildout of the proposed project, such emissions are amortized over the duration of the construction period and added to the operational GHG emissions. Given that construction-related GHG emissions would not occur concurrently with operational emissions and would cease upon completion of construction activities, combining the two emissions sources represents a conservative estimate of total project GHG emissions.

Since the adoption of BAAQMD's GHG thresholds of significance, the State legislature has passed AB 197 and SB 32, which builds off of AB 32 and establishes a statewide GHG reduction target of 40 percent below 1990 levels by 2030. Considering the legislative progress that has occurred regarding statewide reduction goals since the adoption of BAAQMD's standards, the emissions thresholds presented above would determine whether a proposed project would be in compliance with the 2020 emissions reductions goals of AB 32, but would not demonstrate whether a project would be in compliance with SB 32. In accordance with the changing legislative environment, the BAAQMD has begun the process of updating the District's CEQA Guidelines; however, updated thresholds of significance have not yet been adopted. In the absence of BAAQMD-adopted thresholds to assess a project's compliance with SB 32, the City has chosen to consider additional GHG emissions thresholds.

[21] Bay Area Air Quality Management District. *California Environmental Quality Act Guidelines Update: Proposed Thresholds of Significance*. December 7, 2009.

The BAAQMD has determined that projects with operational emissions equal to or less than 1,100 $MTCO_2e$/yr or 4.6 $MTCO_2e$/SP/yr would comply with the emission reductions target of 1990 levels by 2020 set forth by AB 32. SB 32 requires that by 2030 statewide emissions be reduced by 40 percent beyond the 2020 reduction target set by AB 32; therefore, in the absence of specific guidance from BAAQMD or the CARB, the City assumes that in order to meet the reduction targets of SB 32, a proposed project would be required to reduce emissions by an additional 40 percent beyond the emissions reductions currently required by BAAQMD for compliance with AB 32. Assuming a 40 percent reduction from current BAAQMD targets, adjusted for the projected population, a proposed project would be in compliance with SB 32 if the project's emissions did not exceed the following thresholds:

- 660 $MTCO_2e$/yr; or
- 2.6 $MTCO_2e$/SP/yr.

In addition to the quantitative thresholds described above, the City has also determined that a qualitative analysis assessing the project's compliance with the CARB's 2017 Scoping Plan and the Plan Bay Area 2040 is warranted. The CARB's 2017 Scoping Plan establishes a strategy to meet California's 2030 GHG targets; accordingly, should the project be shown to comply with the 2017 Scoping Plan, the proposed project would be considered consistent with Statewide reduction targets for the year 2030. Based on recommendations from BAAQMD, a project's compliance with the local actions contained in Appendix B of the 2017 Scoping Plan may be used to assess a project's compliance with the 2017 Scoping Plan.[22] The Plan Bay Area 2040 is a SCS that is intended to accommodate planned growth within the Bay Area while simultaneously achieving regional targets for reducing GHG emissions.[23] Thus, consistency with the Plan Bay Area 2040 would indicate that the project would not inhibit attainment of regional GHG emissions reductions goals, which have been established in compliance with statewide reduction targets.

By using the BAAQMD thresholds of significance for GHG, the updated SB 32 thresholds discussed above, and assessing compliance with the CARB's 2017 Scoping Plan as well as the Plan Bay Area 2040, the City would comply with Section 15064.4(b)(3) of the CEQA Guidelines, which suggests that lead agencies consider the extent that the project would comply with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction of GHG emissions.

Method of Analysis

A comparison of project-related emissions to the thresholds discussed above shall determine the significance of the potential impacts to air quality and climate change resulting from the proposed project. Emissions attributable to the proposed project which exceed the significance thresholds could have a significant effect on regional air quality and the attainment of the federal and State AAQS. Where potentially significant air quality impacts are identified, mitigation measures are described that would reduce or eliminate the impact.

It should be noted that the proposed residences would be either senior housing or standard non-age-restricted, all ages housing. However, in both scenarios, the physical structures would be the same and, therefore, emissions resulting from construction would be identical under both

[22] Flores, Areana, Bay Area Air Quality Management District. Personal communication [phone], Jacob Byrne, Senior Associate/Air Quality Technician, Raney Planning & Management. September 17, 2019.

[23] Association of Bay Area Governments and Metropolitan Transportation Commission. *Plan Bay Area 2040: Final.* Available at: http://2040.planbayarea.org/reports. Accessed March 2020.

scenarios. Although many operational emissions would not be affected by the type of resident (i.e., emissions from the use of in-home electricity, household cleaning products, water heaters, air conditioning and space heating systems, etc.), mobile sourced emissions would be different. As shown in the Transportation Impact Assessment, non-age-restricted single-family residences would result in higher trip rates and, thus, more emissions, as compared to the senior housing scenario. Therefore, due to the less frequent use of single-passenger vehicles, the senior housing scenario is expected to result in fewer emissions during project operations. As such, the analysis included in this chapter assumes that the housing would be used for all ages in order to assess the worst case, most emissions-intensive scenario.

Construction Emissions

The proposed project's short-term construction emissions were estimated using the CalEEMod version 2016.3.2 software, which is a statewide model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify air quality emissions from land use projects. The model applies inherent default values for various land uses, including trip generation rates based on the ITE Manual, vehicle mix, trip length, average speed, etc. However, where project-specific data was available, such data was input into the model. The following inherent design features and project-specific information were included in the model:

- Construction would begin in January of 2022;
- Construction would occur over approximately seven years;
- The modeled land uses include 220 single-family residential units on 28 acres, four parks on 3.92 acres, and public and private streets making up 16.9 acres;
- 4,555 cubic yards (CY) of net soil import would be required;
- 71.7 total acres would be disturbed during grading;
- Trip generation rates were adjusted based on the information included in the Transportation Impact Assessment prepared by Fehr & Peers for the proposed project;
- The project would include development of on-site sidewalks that would connect to existing off-site sidewalks;
- Low volatile organic compounds (VOC) cleaning supplies and exterior paints would be used, as required by BAAQMD; and
- 100 percent of electricity demand would be met by renewable energy generated on-site, as required by the 2019 CBSC.

The proposed project is anticipated to be developed in three phases. To provide a conservative approach to analysis, construction was modeled to reflect continuous buildout of the project over an approximately six-year period with three weeks of overlap between each construction phase. Should construction of the project occur in three separate phases, construction-related emissions would likely be lower than the levels analyzed in this EIR.

The results of emissions estimations were compared to the standards of significance discussed above in order to determine the associated level of impact. Results of the modeling are expressed in lbs/day for criteria air pollutant emissions and $MTCO_2e$/yr for GHG emissions, which allows for comparison between the model results and the thresholds of significance. All CalEEMod modeling results are included in Appendix C to this EIR.

Operational Emissions

The proposed project's operational emissions were estimated using CalEEMod. The modeling performed for the proposed project included compliance with BAAQMD rules and regulations (i.e.,

low-VOC paints and low-VOC cleaning supplies), as well as with the 2019 CBSC. All buildings constructed after January 1, 2020 within California are required to comply with the mandatory standards within the 2019 CBSC. Compliance with the 2019 CBSC would be verified as part of the City's building approval review process. Provisions within the 2019 CBSC include energy efficiency requirements for residential and non-residential structures, as well as the requirement that all new residential structures of three or fewer stories be constructed with renewable energy systems sufficient to meet 100 percent of the structure's electricity demand. Considering the provisions of the 2019 CBSC, CalEEMod was adjusted to reflect the energy efficiency and renewable energy requirements of the single-family residences.

In addition to adjustments related to on-site renewable energy and energy efficiency, the CO_2 intensity factor was adjusted within CalEEMod in order to reflect PG&E's anticipated progress towards the State RPS goals.[24]

The results of emissions estimations were compared to the standards of significance discussed above in order to determine the associated level of impact. Results of the modeling are expressed in lbs/day for project-level emissions, tons/yr for cumulative emissions, and $MTCO_2e$/yr for GHG emissions, which allows for comparison between the model results and the thresholds of significance. All CalEEMod modeling results are included in Appendix C to this EIR.

Project-Specific Impacts and Mitigation Measures

Global climate change is, by nature, a cumulative impact. Emissions of GHG contribute, on a cumulative basis, to the significant adverse environmental impacts of global climate change (e.g., sea level rise, impacts to water supply and water quality, public health impacts, impacts to ecosystems, impacts to agriculture, and other environmental impacts). While GHG emissions from a project in combination with other past, present, and future projects contribute to the world-wide phenomenon of global climate change and the associated environmental impacts, a single project could not generate enough GHG emissions to contribute noticeably to a change in the global average temperature. Because the effects of GHG emissions are cumulative by nature, separate discussions for project-level and cumulative-level impacts for the proposed project are not necessary for this section of the EIR, and all analysis of GHG impacts is presented within the cumulative impact discussions of this Section.

However, potential impacts related to air quality may occur on both a project-level and a cumulative basis. Accordingly, both a project-level and a cumulative analysis of potential air quality-related impacts are presented below.

4.1-1 Conflict with or obstruct implementation of the applicable air quality plan during project construction. Based on the analysis below, and with the implementation of mitigation, the impact is *less than significant*.

During construction of the project, various types of equipment and vehicles would temporarily operate on the project site. Construction-related emissions would be generated from construction equipment, vegetation clearing and earth movement activities, construction workers' commute, and construction material hauling for the

[24] California Public Utilities Commission. *California Renewables Portfolio Standard (RPS)*. Available at: http://www.cpuc.ca.gov/renewables/. Accessed March 2020.

entire construction period. The aforementioned activities would involve the use of diesel- and gasoline-powered equipment that would generate emissions of criteria pollutants. Project construction activities also represent sources of fugitive dust, which includes $PM_{2.5}$ emissions. As construction of the proposed project would generate emissions of criteria air pollutants, including ROG, NO_X, PM_{10}, and $PM_{2.5}$ intermittently within the site and in the vicinity of the site, until all construction has been completed, construction is a potential concern, as the proposed project is located in a nonattainment area for ozone and PM.

The proposed project is required to comply with all BAAQMD rules and regulations including Regulation 8, Rule 3 related to architectural coatings. In addition, all projects under the jurisdiction of the BAAQMD are recommended to implement all of the Basic Construction Mitigation Measures provided in the BAAQMD CEQA Guidelines, which include the following:

1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
4. All vehicle speeds on unpaved roads shall be limited to 15 mph.
5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.
7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified visible emissions evaluator.
8. Post a publicly visible sign with the telephone number and person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

Using CalEEMod, the maximum construction-related emissions were estimated for development of the proposed project and are presented in Table 4.1-7. Although BAAQMD recommends that all construction activity within the SFBAAB implement the above listed Basic Construction Mitigation Measures, the proposed project was modeled without the inclusion of such measures to provide a conservative, worst-case emissions scenario. Even under the conservative assumptions used for this analysis, and should exhaust and fugitive emissions be considered together, emissions of $PM_{2.5}$ and PM_{10} would remain below the BAAQMD's thresholds of significance. As noted above, construction emissions would remain the same under both housing scenarios (i.e., senior housing, or non-age-restricted housing).

Modeling assumptions are discussed in the Method of Analysis section above. As presented in Table 4.1-7, implementation of the proposed project would result in construction-related emissions of ROG, PM_{10}, and $PM_{2.5}$ below the applicable thresholds of significance. However, construction-related emissions of NO_X would slightly exceed the BAAQMD threshold of significance. Therefore, construction of the proposed project could significantly contribute to the region's nonattainment status for ozone or PM nor would the project obstruct implementation of an applicable air quality plan, and a ***potentially significant*** impact associated with construction-related emissions would result.

Table 4.1-7
Maximum Unmitigated Construction Emissions (lbs/day)

Pollutant	Proposed Project Emissions	Threshold of Significance	Exceeds Threshold?
ROG	28.80	54	**NO**
NO_x	54.78	54	**YES**
PM_{10} (exhaust)	1.75	82	**NO**
PM_{10} (fugitive)	23.91	None	**N/A**
$PM_{2.5}$ (exhaust)	1.62	54	**NO**
$PM_{2.5}$ (fugitive)	11.51	None	**N/A**

Source: CalEEMod, April 2020 (see Appendix C).

Mitigation Measure(s)

The primary source of construction-related NO_X emissions is from off-road construction equipment. Therefore, implementation of Mitigation Measure 4.1-1, which requires the use of some higher-tier off-road equipment, would substantially reduce the emissions of NO_X. Such emissions reductions are presented in Table 4.1-8. As shown in the table, with implementation of Mitigation Measure 4.1-1, emissions of NO_X would be reduced to below BAAQMD's thresholds, and the impact would be *less than significant.*

Table 4.1-8
Maximum Mitigated Construction Emissions (lbs/day)

Pollutant	Proposed Project Emissions	Threshold of Significance	Exceeds Threshold?
ROG	28.80	54	**NO**
NO_x	51.81	54	**NO**
PM_{10} (exhaust)	1.75	82	**NO**
PM_{10} (fugitive)	23.91	None	**N/A**
$PM_{2.5}$ (exhaust)	1.62	54	**NO**
$PM_{2.5}$ (fugitive)	11.51	None	**N/A**

Source: CalEEMod, April 2020 (see Appendix C).

4.1-1 *Prior to approval of any grading plans, the project applicant shall show on the plans via notation that the contractor shall ensure that the heavy-duty off-road vehicles (50 horsepower or more) to be used in the construction project, including owned, leased, and subcontractor vehicles, shall achieve a project wide fleet average three percent NO_X reduction compared to the year 2022 California Air Resources Board (CARB) fleet average. The three percent NO_X reduction may be achieved by requiring a combination of*

engine Tier 3 or Tier 4 off-road construction equipment or the use of hybrid, electric, or alternatively fueled equipment. For instance, the emissions presented in Table 4.1-8 were achieved by requiring Rubber Tired Dozers and Cranes to be engine Tier 3.

In addition, all off-road equipment operating at the construction site must be maintained in proper working condition according to manufacturer's specifications. Idling shall be limited to 5 minutes or less in accordance with the Off-Road Diesel Fueled Fleet Regulation as required by CARB. Clear signage regarding idling restrictions should be placed at the entrances to the construction site.

Portable equipment over 50 horsepower must have either a valid District Permit to Operate (PTO) or a valid statewide Portable Equipment Registration Program (PERP) placard and sticker issued by CARB.

Conformance with the foregoing requirements shall be included as notes and be confirmed through review and approval of grading plans by the City of Antioch Community Development Department.

4.1-2 Conflict with or obstruct implementation of the applicable air quality plan during project operation. Based on the analysis below, and with the implementation of mitigation, the impact is *less than significant*.

Operational emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ would be generated by the proposed project from both mobile and stationary sources. The use of fireplaces/hearths would make up the majority of project-related emissions under unmitigated operations of the proposed project. Emissions would also occur from area sources such as natural gas combustion from heating mechanisms, landscape maintenance equipment exhaust, hearths within proposed residences, and consumer products (e.g., deodorants, cleaning products, spray paint, etc.).

Consistency with the applicable air quality plan during project operations can be assessed quantitatively, through air quality modeling, or qualitatively, through a consistency discussion with the BAAQMD's 2017 Clean Air Plan. The discussion below includes both a quantitative and qualitative discussion of the proposed project's consistency with the local air quality plans. As noted previously, the analysis below assumes that the proposed residences would be used for general, all ages housing, to encompass the worst-case scenario.

Operational emissions resulting from development of the project were modeled in CalEEMod, and the results are presented in Table 4.1-9. The various assumptions included in the modeling are discussed in the Method of Analysis section above.

Table 4.1-9
Maximum Unmitigated Operational Emissions (lbs/day)

Pollutant	Project Emissions				Threshold of Significance	Exceeds Threshold?
	Area	Energy	Mobile	Total		
ROG	238.26	0.18	2.19	**240.63**	54	**YES**
NO_X	4.60	1.51	9.69	**15.80**	54	**NO**
PM_{10}	41.80	0.12	10.05	**51.97**	82	**NO**
$PM_{2.5}$	41.80	0.12	2.73	**44.65**	54	**NO**

Source: CalEEMod, April 2020 (see Appendix C).

As demonstrated in Table 4.1-9, operational emissions of NO_X, PM_{10}, and $PM_{2.5}$ would be below the BAAQMD's thresholds of significance. However, implementation of the project would result in emissions of ROG in excess of the applicable threshold of significance. Thus, implementation of the proposed project could generate long-term operational criteria air pollutant emissions in excess of thresholds, and the project could contribute to the region's nonattainment status of ozone and/or violate an air quality standard.

According to the BAAQMD CEQA Guidelines, if a project would not result in significant and unavoidable air quality impacts, after the application of all feasible mitigation, the project may be considered consistent with the air quality plans. Additionally, if approval of a project would not cause the disruption, delay, or otherwise hinder the implementation of any air quality plan control measure, the project may be considered consistent with the air quality plans. Because the proposed project is expected to generate long-term operational criteria air pollutant emission in excess of thresholds, the project would be considered to conflict with or obstruct implementation of regional air quality plans.

A qualitative assessment of the proposed project's consistency with the relevant emission reduction measures included in BAAQMD's 2017 Clean Air Plan is included in Table 4.1-10 below.

Table 4.1-10
Project Consistency with the 2017 Clean Air Plan

Control Measure	Consistency Discussion
Building Control Measures	
BL1: Green Buildings – Collaborate with partners such as KyotoUSA to identify energy-related improvements and opportunities for onsite renewable energy systems in school districts; investigate funding strategies to implement upgrades. Identify barriers to effective local implementation of the CALGreen (Title 24) statewide building energy code; develop solutions to improve implementation/enforcement. Work with ABAG's BayREN program to make additional funding available for energy-related projects in the buildings sector. Engage with additional partners to target reducing emissions from specific types of buildings.	The proposed project would be required to comply with the CALGreen Code and the 2019 Building Energy Efficiency Standards, both of which mandate efficiency features that would reduce energy consumption associated with operations of the proposed residences. As such, the proposed project would comply with the measure.

Table 4.1-10
Project Consistency with the 2017 Clean Air Plan

Control Measure	Consistency Discussion
BL4: Urban Heat Island Mitigation – Develop and urge adoption of a model ordinance for "cool parking" that promotes the use of cool surface treatments for new parking facilities, as well existing surface lots undergoing resurfacing. Develop and promote adoption of model building code requirements for new construction or re-roofing/roofing upgrades for commercial and residential multi-family housing. Collaborate with expert partners to perform outreach to cities and counties to make them aware of cool roofing and cool paving techniques, and of new tools available.	The proposed project does not include expansive areas of parking, commercial land uses, nor multi-family housing. However, the proposed landscaping would be required to comply with the standards set forth in Section 9-5.1001 of the City's Municipal Code, which serve to increase shade and thereby reduce the urban heat island effect. Therefore, the proposed project would comply with the measure.
Energy Control Measures	
EN2: Decrease Electricity Demand – Work with local governments to adopt additional energy efficiency policies and programs. Support local government energy efficiency program via best practices, model ordinances, and technical support. Work with partners to develop messaging to decrease electricity demand during peak times.	The proposed project would be required to comply with the 2019 Title 24 of the CBSC as well as the 2019 Building Energy Efficiency Standards. As such, the project would be required to implement rooftop solar, electric vehicle charging infrastructure, efficient appliances, and more. Therefore, the proposed project would comply with the measure.
Natural and Working Lands Control Measures	
NW2: Urban Tree Planting – Develop or identify an existing model municipal tree planting ordinance and encourage local governments to adopt such an ordinance. Include tree planting recommendations the Air District's technical guidance, best practices for local plans and CEQA review.	The proposed landscaping includes street trees along all internal roadways, as well as several trees within the proposed community park, and would be required to comply with the standards set forth in Section 9-5.1001 of the City's Municipal Code. As such, the proposed project would comply with the measure.
WA3: Green Waste Diversion – Develop model policies to facilitate local adoption of ordinances and programs to reduce the amount of green waste going to landfills.	Section 6-3.02 of the City's Municipal Code requires all property owners to maintain a subscription to a solid waste and recycling service. Republic Services provides organic waste collection throughout Antioch, which includes pick up of green wastes such as yard clippings, uncooked food, branches, and other forms of yard waste. In addition, Republic Services would be required to meet AB 341, SB 939, and SB 1374 requirements that require waste service providers to divert green waste away from landfills. Based on the above, the proposed project would comply with the measure.
WA4: Recycling and Waste Reduction – Develop or identify and promote model ordinances on community-wide zero waste goals and recycling of construction and demolition materials in commercial and public construction projects.	As noted above, the waste service provider would be required to comply with all State regulations mandating that waste be recycled, and residents would be required to subscribe to a waste and recycling service pursuant to the City's Municipal Code. In addition, the CALGreen Code requires the diversion of construction and demolition materials, and the proposed project would be required to

Table 4.1-10
Project Consistency with the 2017 Clean Air Plan

Control Measure	Consistency Discussion
	comply with the most up-to-date CALGreen Code. As such, the proposed project would comply with the measure.
Stationary Control Measures	
SS29: Asphaltic Concrete – Evaluate the cost effectiveness, and feasibility of limiting solvent content of emulsified asphalt and the availability of substitutes for diesel to clean asphalt related equipment.	All paving activities associated with the proposed project would be required to comply with BAAQMD's emissions standards. As shown under Impact statement 4.1-1, all phases of construction are expected to result in emissions under BAAQMD's thresholds of significance. Therefore, the proposed project would comply with the measure.
SS34: Wood Smoke – Consider further limits on wood burning, including additional limits to exemptions from Air District Rule 6-3: Wood Burning Devices.	Pursuant to Mitigation Measure 4.1-2, only natural gas hearths/fireplaces would be allowed in the proposed residences. As such, the proposed project would comply with the measure.
SS36: PM from Trackout – Develop new Air District rule to prevent mud/dirt and other solid trackout from construction, landfills, quarries and other bulk material sites.	Construction would be required to comply with the BAAQMD's Basic Construction Mitigation Measures, including Rules 1 thorough 5 that specifically related to dirt and dust trackout. As such, the proposed project would comply with the measure.
SS38: Fugitive Dust – Consider applying the Air District's proposed fugitive dust visible emissions limits to a wider array of sources.	The proposed project would be required to implement BAAQMD's Basic Construction Mitigation Measures related to fugitive dust emissions during construction. Operations of the proposed project are not anticipated to involve substantial sources of fugitive dust. Therefore, the proposed project would comply with the measure.
Transportation Control Measures	
TR9: Bicycle and Pedestrian Access and Facilities – Encourage planning for bicycle and pedestrian facilities in local plans, e.g., general and specific plans, fund bike lanes, routes, paths and bicycle parking facilities.	The proposed project would include a sidewalk along Hillcrest Avenue, and all private streets would include a five-foot sidewalk on one side. In addition, Class II bike lanes are provided along the length of Hillcrest Avenue, which would be extended to the project site as part of the proposed project. Lone Tree Way in the project vicinity has a striped shoulder that can be used by bicyclists along some roadway sections, but the facility is a not a designated bicycle lane. In addition, the project would include a trail connection to the Sand Creek Trail on the north side of Sand Creek, as consistent with local bicycle and pedestrian planning goals. Furthermore, the project design would be required to comply with the transportation goals and objectives set forth in Section 4-15.01 of the City's Municipal Code as well as Objective 7.4.1 of the General Plan. Therefore, the proposed project would comply with the measure.

Table 4.1-10
Project Consistency with the 2017 Clean Air Plan

Control Measure	Consistency Discussion
TR10: Land Use Strategies – Support implementation of Plan Bay Area, maintain and disseminate information on current climate action plans and other local best practices, and collaborate with regional partners to identify innovative funding mechanisms to help local governments address air quality and climate change in their general plans.	A full discussion of the proposed project with the Plan Bay Area is included in Table 4.1-15. As noted therein, the proposed project conflicts with several measures within the Play Bay Area. Therefore, the project would not comply with this measure.

Source: Bay Area Air Quality Management District. Final 2017 Clean Air Plan: Spare the Air, Cool the Climate. April 2017.

As indicated in Table 4.1-10, the proposed project would be generally consistent with the 2017 Clean Air Plan. However, based on the results of air quality modeling and the anticipated level of ROG emissions associated with project operations, the proposed project would result in a ***potentially significant*** impact associated with the generation of operational emissions of ROG in excess of thresholds and a conflict with or obstruction of implementation of regional air quality plans.

Mitigation Measure(s)

Implementation of Mitigation Measure 4.1-2 would reduce the operational emissions of ROG associated with implementation of the proposed project. Such emissions reductions are presented in **Error! Reference source not found.** As shown in the table, with implementation of Mitigation Measure 4.1-2, emissions of ROG would be reduced to below the BAAQMD's thresholds, and the impact would be *less than significant*. It should be noted that Mitigation Measure 4.1-2 would serve to reduce emissions of PM_{10} and $PM_{2.5}$ further below the BAAQMD's thresholds.

Table 4.1-11
Maximum Mitigated Operational Emissions (lbs/day)

Pollutant	Project Emissions				Threshold of Significance	Exceeds Threshold?
	Area	Energy	Mobile	Total		
ROG	10.61	0.18	2.19	**12.97**	54	**NO**
NO_X	3.10	1.51	9.36	**13.98**	54	**NO**
PM_{10}	0.33	0.12	10.05	**10.51**	82	**NO**
$PM_{2.5}$	0.33	0.12	2.73	**3.19**	54	**NO**

Source: CalEEMod, July 2020 (see Appendix C).

4.1-2 Prior to issuance of building permits for the proposed project, the project applicant shall demonstrate via project design and/or notation included on project design that only natural gas hearths (fireplaces) shall be installed in the proposed residences and wood-burning hearths shall be prohibited.

Conformance with the foregoing requirements shall be confirmed through review and approval of building permit plans by the City of Antioch Community Development Department.

4.1-3 Expose sensitive receptors to substantial pollutant concentrations. Based on the analysis below, the impact is *less than significant*.

The major pollutant concentrations of concern are localized CO emissions, TAC emissions, and criteria pollutant emissions, which are addressed in further detail below.

Localized CO Emissions

Localized concentrations of CO are related to the levels of traffic and congestion along streets and at intersections. Implementation of the proposed project would increase traffic volumes on streets near the project site; therefore, the project would be expected to increase local CO concentrations. High levels of localized CO concentrations are only expected where background levels are high, and traffic volumes and congestion levels are high. The statewide CO Protocol document identifies signalized intersections operating at Level of Service (LOS) E or F, or projects that would result in the worsening of signalized intersections to LOS E or F, as having the potential to result in localized CO concentrations in excess of the State or federal AAQS, as a result of large numbers of cars idling at stop lights.

In accordance with the State CO Protocol, the BAAQMD established preliminary screening criteria for determining whether the effect that a project would have on any given intersection would cause a potential CO hotspot. If the following criteria are met by the proposed project at all affected intersections, the proposed project would not be expected to result in a CO hotspot:

- The project is consistent with an applicable congestion management program established by the county congestion management agency for designated roads or highways, regional transportation plan, and local congestion management agency plans;
- The project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour; and
- The project traffic would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, underpass, etc.).

While BAAQMD has established the foregoing screening criteria for potential impacts, it should be noted that the SFBAAB has been in attainment of CAAQS and NAAQS for CO for more than 20 years.[25] Due to the continued attainment of CAAQS and NAAQS, and advances in vehicle emissions technologies, the likelihood that any single project would create a CO hotspot is minimal. With regard to the proposed project, based on data provided in the Transportation Impact Assessment prepared for the proposed project,[26] the maximum traffic volume anticipated at any affected intersection would not reach 44,000 vehicles per hour. In addition, development of the proposed project would not result in the increase of traffic volumes beyond 24,000

[25] Bay Area Air Quality Management District. *Air Quality Summary Reports*. Available at: http://www.baaqmd.gov/about-air-quality/air-quality-summaries. Accessed March 2020.
[26] Fehr and Peers. *Transportation Impact Assessment: Creekside (Vineyards at Sand Creek)*. June 2020.

vehicles per hour at any intersections where vertical and/or horizontal mixing is substantially limited. The foregoing conclusions would apply with development of the project site as either non-age-restricted or senior only housing. Therefore, the project would not be expected to result in substantial levels of localized CO at surrounding intersections or generate localized concentrations of CO that would exceed standards.

TAC Emissions

Another category of environmental concern is TACs. The CARB's *Air Quality and Land Use Handbook: A Community Health Perspective* (Handbook) provides recommendations for siting new sensitive land uses near sources typically associated with significant levels of TAC emissions, including, but not limited to, freeways and high traffic roads, distribution centers, and rail yards.[27] The CARB has identified DPM from diesel-fueled engines as a TAC; thus, high-volume roadways, stationary diesel engines, and facilities attracting heavy and constant diesel vehicle traffic are identified as having the highest associated health risks from DPM. Health risks from TACs are a function of both the concentration of emissions and the duration of exposure.

The proposed project would include construction activity within the project site that would involve the use of off-road equipment, much of which would likely be diesel powered. The potential for construction activity to generate DPM emissions is dependent on the number and types of equipment implemented for construction activity. Off-road heavy-duty diesel equipment used for site grading, paving, utility trenching and other construction activities result in the generation of DPM.

The nearest sensitive receptors to the project site are the residences currently under construction as part of the Promenade/Vineyards at Sand Creek Project approximately 150 feet north of the project site, across Sand Creek. Although the receptors are located in relatively close proximity to the project site boundary, the overall project site is approximately 158 acres, and approximately 72 acres would ultimately be disturbed by development. Considering the large development area, off-road construction equipment would operate at various locations throughout the project site intermittently. For instance, construction equipment operating within the southern portions of the site would be between 2,200 and 2,900 feet away from the nearest receptors. Operation of construction equipment at varying distances from the nearest sensitive receptors would allow for dispersal of DPM, which would reduce the exposure of nearby receptors.

Methodologies for conducting health risk assessments are associated with long-term exposure periods (e.g., over a 30-year lifetime). However, construction activity associated with implementation of the proposed project would occur over an approximately seven-year period. While overall construction activity would occur over approximately seven years, construction of any phase of the project would occur over a shorter period of time. During the construction period, construction activity would only occur during the days and hours specified in Section 5-17.05 of the City's Municipal Code, and required by Mitigation Measure XIII-1 of the Initial Study prepared for the proposed project. Limitation of construction activity to certain hours would ensure that emissions only occur intermittently throughout the course of a day, as opposed to emissions being generated constantly throughout an entire day.

[27] California Air Resources Board. *Air Quality and Land Use Handbook: A Community Health Perspective*. April 2005.

Furthermore, considering the large site area and the varying distance between the construction area and the nearest receptor, individual receptors would not be exposed to high concentrations of DPM from construction activity consistently throughout the seven-year construction period.

Furthermore, all construction equipment and operation thereof would be regulated per CARB's In-Use Off-Road Diesel-Fueled Fleets Regulation.[28] The In-Use Off-Road Diesel Vehicle Regulation includes emissions reducing requirements such as limitations on vehicle idling, disclosure, reporting, and labeling requirements for existing vehicles, as well as standards relating to fleet average emissions and the use of Best Available Control Technologies.

Considering the above, emissions from construction equipment would be dispersed throughout the project site, would occur over a relatively limited amount of time, would occur intermittently throughout the day and construction period, and all construction equipment would be required to comply with the CARB's rules and regulations related to emissions control. Accordingly, construction of either development scenario would not be expected to expose sensitive receptors to substantial concentrations of TACs.

Operation of residential developments does not typically involve substantial TAC emissions. Considering the above, the proposed project is not anticipated to involve any uses that would be considered to generate a substantial amount of TAC emissions. Therefore, the proposed project is not anticipated to result in the exposure of nearby sensitive receptors to substantial concentrations of TACs during project operations.

Criteria Pollutants

As discussed in the Existing Environmental Setting section and summarized in Table 4.1-1, criteria pollutant emissions can cause negative health effects. With regard to the proposed project, the principal criteria pollutants of concern are localized CO, ozone and PM. As discussed above, the proposed project is not anticipated to result in impacts related to localized exposure of sensitive receptors to substantial concentrations of CO. Unlike CO and many TACs, due to atmospheric chemistry and dynamics ozone and atmospheric PM typically act to impact public health on a cumulative and regional level, rather than a localized level. Due to the cumulative and regional nature of effects from criteria pollutants, the analysis of potential health effects of criteria pollutants is further discussed in Impact 4.1-5.

Conclusion

As discussed above, the proposed project would not cause any substantial levels of localized CO concentrations or other TACs. Construction-related emissions would be temporary, intermittent throughout the day, spread over the project site, and regulated. Thus, the proposed project would be expected to result in a ***less-than-significant*** impact associated with exposure of sensitive receptors to substantial levels of pollutant concentrations.

[28] California Code of Regulations, Title 13, Article 4.8, Chapter 9, Section 2449.

Mitigation Measure(s)
None required.

4.1-4 Result in other emissions (such as those leading to odors) affecting a substantial number of people. Based on the analysis below, the impact is *less than significant*.

Pollutants of principal concern include emissions leading to odors, emission of dust, or emissions considered to constitute air pollutants. Air pollutants have been discussed in items 4.1-1 through 4.1-3 above. Therefore, the following discussion focuses on emissions of odors and dust.

Per the BAAQMD CEQA Guidelines, odors are generally regarded as an annoyance rather than a health hazard.[29] Manifestations of a person's reaction to odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache). The presence of an odor impact is dependent on a number of variables including: the nature of the odor source; the frequency of odor generation; the intensity of odor; the distance of odor source to sensitive receptors; wind direction; and sensitivity of the receptor.

Due to the subjective nature of odor impacts, the number of variables that can influence the potential for an odor impact, and the variety of odor sources, quantitative analysis to determine the presence of a significant odor impact is difficult. Typical odor-generating land uses include, but are not limited to, wastewater treatment plants, landfills, and composting facilities. The proposed project would not introduce any such land uses and is not located in the vicinity of any such existing or planned land uses.

Construction activities often include diesel fueled equipment and heavy-duty trucks, which could create odors associated with diesel fumes that may be considered objectionable. However, construction activities would be temporary and operation of construction equipment would be restricted to the hours of 7:00 AM to 6:00 PM, Monday through Friday, and 9:00 AM to 5:00 PM on weekends and holidays, per Section 5-17.05 of the City's Municipal Code, and as required by Mitigation Measure XIII-1 of the Initial Study prepared for the proposed project. In addition, while the nearest sensitive receptors are located in relatively close proximity to the project site boundary, only approximately 72 acres of the overall 158-acre project site would be disturbed. Considering the large development area, construction equipment would operate at various locations throughout the project site intermittently, and the distances from the nearest sensitive receptors would allow for dispersal of diesel odors. Project construction would also be required to comply with all applicable BAAQMD rules and regulations, particularly associated with permitting of air pollutant sources. The aforementioned regulations would help to minimize air pollutant emissions as well as any associated odors. Accordingly, substantial objectionable odors would not be expected to occur during construction activities.

[29] Bay Area Air Quality Management District. *California Environmental Quality Act Air Quality Guidelines* [pg. 7-1]. May 2017.

It should be noted that BAAQMD regulates objectionable odors through Regulation 7, Odorous Substances, which does not become applicable until the Air Pollution Control Officer (APCO) receives odor complaints from ten or more complainants within a 90-day period. Once effective, Regulation 7 places general limitation on odorous substances and specific emission limitations on certain odorous compounds, which remain effective until such time that citizen complaints have been received by the APCO for one year. The limits of Regulation 7 become applicable again when the APCO receives odor complaints from five or more complainants within a 90-day period. Thus, although not anticipated, if odor complaints are made after the proposed project is developed, the BAAQMD would ensure that such odors are addressed and any potential odor effects reduced to less than significant.

As noted previously, all projects under the jurisdiction of BAAQMD are required to implement the BAAQMD's Basic Construction Mitigation Measures, including the following measures that specifically relate to dust suppression:

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
- All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- All vehicle speeds on unpaved roads shall be limited to 15 mph.
- All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.

The aforementioned measures would ensure that construction of the proposed project does not result in substantial emissions of dust. Following project construction, the project site would not include any exposed topsoil. Thus, project operations would not include any substantial sources of dust.

For the aforementioned reasons, construction and operation of the proposed project would not result in emissions (such as those leading to odors) adversely affecting a substantial number of people, and a ***less-than-significant*** impact would result.

Mitigation Measure(s)

None required.

Cumulative Impacts and Mitigation Measures

As defined in Section 15355 of the CEQA Guidelines, "cumulative impacts" refers to two or more individual effects which, when considered together, are considerable, compound, or increase other environmental impacts. The individual effects may be changes resulting from a single project or a number of separate projects. The cumulative impact from several projects is the change in the environment that results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects.

A project's emissions may be individually limited, but cumulatively considerable when taken in combination with past, present, and future development projects. The geographic context for the cumulative air quality analysis includes Contra Costa County and surrounding areas within the portion of the SFBAAB that is designated nonattainment for ozone and PM_{10}.

As discussed previously, climate change occurs on a global scale, and emissions of GHGs, even from a single project, contribute to the global impact. However, due to the existing regulations within the State, for the purposes of this analysis, the geographic context for the analysis of GHG emissions presented in this EIR is the State of California.

4.1-5 Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors). Based on the analysis below, the project's incremental contribution is *less than cumulatively considerable.*

Buildout of the proposed project would lead to the release of emissions that would contribute to the cumulative regional air quality setting. The following section includes a discussion of the proposed project's cumulative contribution to construction emissions in concert with other local proposed projects, the cumulative operational emissions associated with implementation of the project, and the cumulative health effects of exposure to criteria pollutants.

Cumulative Construction Emissions from the Proposed Project

Construction activities result in one-time, relatively short-term emissions, and typically are not considered to contribute to cumulative emissions. However, when several large-scale construction projects occur within the same timeframe and within the same geographic region, the construction emissions may contribute to a cumulative impact. The City of Antioch is currently processing applications for several development projects in the vicinity of the project site, including The Ranch Project and the Albers Ranch Project. The proposed developments in the vicinity of the project site would include development of low- and medium-density residences, public facilities, commercial and retail buildings, public parks, and open space areas. The Albers Ranch Project site is located adjacent to the western edge of the Creekside/Vineyards at Sand Creek project site while the Ranch Project site is located on property to the northwest of the Creekside/Vineyards at Sand Creek project site. Construction of The Ranch Project, the Albers Ranch Project, and the proposed project could potentially overlap if all three projects were approved. The Ranch Project, however, will require additional entitlements, such as tentative maps, in the future from the City of Antioch. Additionally, the Albers Ranch Project has not yet undergone CEQA review and would require independent discretionary approval subsequent to review under CEQA.

Both the proposed project and The Ranch Project assume that construction would begin immediately following approval, and would continue without interruptions until buildout of each project. In practice, construction may not occur as soon as the projects are approved, and the phasing may be temporally separated. Thus, the possibility

exists that construction periods for each project may overlap for some phases, and occur separately during others. The construction schedule for the Albers Ranch Project has not yet been determined; as a result, the timing of implementation of the Albers Ranch Project is speculative. Therefore, the potential for construction of each project to overlap is speculative and too uncertain for a quantitative analysis. Per Section 15145 of the CEQA Guidelines, CEQA does not require evaluation of speculative impacts, and, given the above, the potential overlap of the construction periods is considered speculative.

Furthermore, both projects include mitigation measures to reduce construction-related emissions below the BAAQMD's thresholds of significance.[30] Therefore, each individual project would independently fall below the applicable thresholds and, consistent with BAAQMD's guidance, would be considered to have a less than significant contribution to the emissions of criteria pollutants during construction.

Ultimately, overlap of the construction of both projects could contribute to the cumulatively significant impacts related to air quality in the SFBAAB. However, because emissions related to construction of the proposed project are below thresholds, the project's incremental contribution to this cumulatively significant impact is less than cumulatively considerable.

Cumulative Operational Emissions from the Proposed Project

The long-term emissions associated with operation of the proposed project in conjunction with other existing or planned development in the area would incrementally contribute to impacts to the region's air quality. The proposed project's contribution to cumulative emissions of criteria air pollutants were calculated using CalEEMod and are presented in Table 4.1-12.

As shown in the table, the proposed project's operational cumulative emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ would be below BAAQMD's thresholds of significance. The required implementation of Mitigation Measure 4.1-2 would result in reductions in operational emissions associated with implementation of the project, and would bring the operations emissions further below BAAQMD's thresholds.

Table 4.1-12
Project Cumulative Emissions (tons/yr)

	ROG	NO_X	PM_{10}	$PM_{2.5}$
Unmitigated Project Emissions	3.50	2.06	2.07	0.78
Mitigated Project Emissions	2.20	2.05	1.79	0.51
BAAQMD Thresholds	10	10	15	10
Emissions Exceed Thresholds?	**NO**	**NO**	**NO**	**NO**

Source: CalEEMod April 2020 (see Appendix C).

Cumulative Health Effects of Criteria Pollutants

As noted in Table 4.1-1, exposure to criteria air pollutants can result in adverse health effects. The AAQS presented in Table 4.1-2 are health-based standards designed to

[30] FirstCarbon Solutions. *The Ranch Project Draft Environmental Impact Report*. March 20, 2020.

ensure safe levels of criteria pollutants that avoid specific adverse health effects. Because the SFBAAB is designated as nonattainment for State and federal eight-hour ozone and State PM_{10} standards, the BAAQMD, along with other air districts in the SFBAAB region, has adopted federal and state attainment plans to demonstrate progress towards attainment of the AAQS. Full implementation of the attainment plans would ensure that the AAQS are attained and sensitive receptors within the SFBAAB are not exposed to excess concentrations of criteria pollutants. The BAAQMD's thresholds of significance were established with consideration given to the health-based air quality standards established by the AAQS, and are designed to aid the district in implementing the applicable attainment plans to achieve attainment of the AAQS.[31] Thus, if a project's criteria pollutant emissions exceed the BAAQMD's emission thresholds of significance, a project would be considered to conflict with or obstruct implementation of the BAAQMD's air quality planning efforts, thereby delaying attainment of the AAQS. Because the AAQSs are representative of safe levels that avoid specific adverse health effects, a project's hinderance of attainment of the AAQS could be considered to contribute towards regional health effects associated with the existing nonattainment status of ozone and PM_{10} standards.

However, as discussed in Impact 4.1-1 and 4.1-2, and following implementation of Mitigation Measures 4.1-1 and 4.1-2, the proposed project would not result in exceedance of the BAAQMD's thresholds of significance. Consequently, implementation of the proposed project would not conflict with the BAAQMD's adopted attainment plans nor would the proposed project inhibit attainment of regional AAQS. Therefore, implementation of the proposed project would not contribute towards regional health effects associated with the existing nonattainment status of ozone and PM_{10} standards.

Conclusion

The proposed project is expected to result in emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ that would fall below BAAQMD's thresholds of significance. Therefore, emissions resulting from project operations would not result in a cumulatively considerable net increase in criteria pollutant emissions, for which the region is in nonattainment for federal and state ozone standards. As such, the proposed project's incremental contribution to regional air quality impacts could be ***less than cumulatively considerable***.

Mitigation Measure(s)

None required.

4.1-6 Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, or conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. Based on the analysis below, and with implementation of mitigation measures, the proposed project's incremental contribution to

[31] Bay Area Air Quality Management District. *Air Quality Guidelines* [pg. 2-1]. May 2017.

this significant cumulative impact is *cumulatively considerable* and *significant and unavoidable*.

An individual project's GHG emissions are at a micro-scale level relative to global emissions and effects to global climate change; however, an individual project could result in a cumulatively considerable incremental contribution to a significant cumulative macro-scale impact. As such, impacts related to emissions of GHG are inherently considered cumulative impacts.

Implementation of the proposed project would cumulatively contribute to increases of GHG emissions that are associated with global climate change. Estimated GHG emissions attributable to future development would be primarily associated with increases of CO_2 and, to a lesser extent, other GHG pollutants, such as CH_4 and N_2O. Sources of GHG emissions include area sources, mobile sources or vehicles, utilities (electricity and natural gas), water usage, wastewater generation, and the generation of solid waste.

Potential impacts resulting from implementation of the proposed project are considered in comparison with BAAQMD's adopted thresholds of significance and the year 2030 thresholds of significance discussed above, as well in comparison with the Local Actions included in Appendix B of the CARB's Scoping Plan, and the goals of the Plan Bay Area 2040.

BAAQMD Emissions Thresholds

Construction GHG emissions are a one-time release and are, therefore, not typically expected to generate a significant contribution to global climate change. Neither the City nor BAAQMD has an adopted threshold of significance for construction-related GHG emissions and does not require quantification. Nonetheless, GHG emissions related to construction of the proposed project have been estimated. The CalEEMod emissions estimates prepared for the proposed project determined that unmitigated construction would result in total emissions of 7,699.13 $MTCO_2e$.

Following estimation of construction related emissions, such emissions were amortized and included in the annual operational GHG emissions. Amortizing the construction GHG emissions (a one-time release that would occur only during construction of the project) and including them in the annual operational emissions (which would occur every year over the lifetime of the entire project) represents a conservative analysis for the annual operational emissions. The BAAQMD does not recommend any specific operational lifetimes for use in amortizing construction-related GHG emissions; however, the emissions were amortized based on the duration of construction activity. Thus, the total construction emissions amortized over seven years would be 1,099.87 $MTCO_2e$.

The proposed project's operational GHG emission estimations were conducted using CalEEMod and are included in Appendix C to this EIR.

BAAQMD's adopted thresholds make use of service populations, which consist of the number of residents and the number of employees included in a project. The proposed project would include the development of 220 single-family residential units. Per the

City's 2015-2023 Housing Element, as of the 2010 census, the City of Antioch had an average household size of 3.15 persons per household. Consequently, the proposed project could provide housing for up to approximately 693 people and, therefore, the proposed project would have a service population of approximately 693.

Compliance with AB 32

Total unmitigated annual GHG emissions during the first year of project operations is presented in Table 4.1-13. As shown in the table, operations of the proposed project would result in unmitigated annual GHG emissions below the BAAQMD's thresholds for AB 32, and the proposed project would not be considered to conflict with the emissions reductions targets of AB 32.

Table 4.1-13
Unmitigated Year 2029 Project GHG Emissions

	Annual GHG Emissions
Construction-Related GHG Emissions	1,099.87 $MTCO_2e$/yr
Operational GHG Emissions:	2,066.03 $MTCO_2e$/yr
Area	39.36 $MTCO_2e$/yr
Energy	321.83 $MTCO_2e$/yr
Mobile	1,541.52 $MTCO_2e$/yr
Waste	133.03 $MTCO_2e$/yr
Water	30.29 $MTCO_2e$/yr
Total Annual GHG Emissions	3,165.90 $MTCO_2e$/yr
Total Annual GHG Emissions Per Service Population[1]	**4.56 $MTCO_2e$/SP/yr**
BAAQMD AB 32 Threshold	4.60 $MTCO_2e$/SP/yr
Exceeds Threshold?	**NO**

Note:
[1] Service population for project calculated to be approximately 693.

Source: CalEEMod, April 2020 (see Appendix C).

Compliance with SB 32

Total unmitigated annual GHG emissions from project operations during the year 2030 is presented for in Table 4.1-14. As shown in the table, operation of the proposed project would result in unmitigated annual GHG emissions in excess of the thresholds of significance being used for GHG emissions in the year 2030, and, thus, the proposed project would be considered to conflict with SB 32.

Project Consistency with the 2017 Scoping Plan

Appendix B to the CARB's 2017 Scoping Plan provides examples of potentially feasible mitigation measures that could be considered to assess a project's compliance with the 2017 Scoping Plan. Because the 2017 Scoping Plan represents the CARB's strategy for meeting the State's 2030 GHG emissions reductions goals, compliance with the Local Actions within the 2017 Scoping Plan would demonstrate the project's compliance with SB 32. The project's consistency with the Local Actions within the 2017 Scoping Plan is assessed in Table 4.1-15 below.

Table 4.1-14
Unmitigated Year 2030 Project GHG Emissions

	Annual GHG Emissions
Construction-Related GHG Emissions	1,099.87 $MTCO_2e$/yr
Operational GHG Emissions:	2,038.61 $MTCO_2e$/yr
Area	39.36 $MTCO_2e$/yr
Energy	321.83 $MTCO_2e$/yr
Mobile	1,514.77 $MTCO_2e$/yr
Waste	133.03 $MTCO_2e$/yr
Water	29.62 $MTCO_2e$/yr
Total Annual GHG Emissions	3,138.48 $MTCO_2e$/yr
Total Annual GHG Emissions Per Service Population[1]	**4.52 $MTCO_2e$/SP/yr**
BAAQMD SB 32 Threshold	2.6 $MTCO_2e$/SP/yr
Exceeds Threshold?	**YES**

Note:
[1] Service population for project calculated to be approximately 693.

Source: CalEEMod, April 2020 (see Appendix C).

Table 4.1-15
Project Consistency with the 2017 Scoping Plan

Suggested Measure	Consistency Discussion
Construction	
Enforce idling time restrictions for construction vehicles.	CARB's In-Use Off-Road Vehicle Regulations include restrictions that limit idling time to five minutes under most situations. Construction fleets and all equipment operated as part of on-site construction activities would be subject to CARB's idling restrictions. As such, the proposed project would be required to comply with this measure.
Require construction vehicles to operate with the highest tier engines commercially available.	The project applicant has not committed to using construction equipment that complies with the highest tier engines commercially available, but Mitigation Measure 4.1-1 requires the use of some construction equipment with high-tier engines. Therefore, the project would partially comply with this measure.
Divert and recycle construction and demolition waste, and use locally-sourced building materials with a high recycled material content to the greatest extent feasible.	The CALGreen code requires the diversion of construction and demolition waste, and the proposed project would be required to comply with the most up-to-date CALGreen Code. The project applicant has not committed to using locally-sourced building materials or materials with a high recycled content, and, thus, compliance with this portion of the suggested measure is uncertain at this time.
Minimize tree removal, and mitigate indirect GHG emissions increases that occur due to vegetation removal, loss of sequestration, and soil disturbance.	The proposed project would result in substantial soil disturbance as well as removal of the majority of the on-site grassland areas, and the project would not comply with this measure.
Utilize existing grid power for electric energy rather than operating temporary gasoline/diesel powered generators.	The project applicant has not committed to the use of grid power for electric energy rather than operating temporary power generators; thus, compliance with this suggested measure is uncertain at this time.
Increase use of electric and renewable fuel powered construction equipment	The project applicant has not committed to the use of alternatively fueled construction equipment. Furthermore, the

Table 4.1-15
Project Consistency with the 2017 Scoping Plan

Suggested Measure	Consistency Discussion
and require renewable diesel fuel where commercially available.	commercial availability of renewable diesel in the project area is currently unknown. Consequently, compliance with this suggested measure is uncertain at this time.
Require diesel equipment fleets to be lower emitting than any current emission standard.	As required by Mitigation Measure 4.1-1, the project applicant would be required to reduce emissions from the construction fleet beyond any current emissions standards. Consequently, the proposed project would comply with the suggested measure.
Operations	
Comply with lead agency's standards for mitigating transportation impacts under SB 743.	The City of Antioch has not yet adopted standards for mitigating transportation impacts under SB 743. However, an analysis of project-level vehicle miles travelled (VMT) was prepared for the proposed project. As noted in Chapter 4.2, Transportation, VMT impacts resulting from implementation of the project are expected to be significant and unavoidable. Considering the impact would be significant and unavoidable, the proposed project is assumed to conflict with the suggested measure.
Require on-site EV charging capabilities for parking spaces serving the project to meet jurisdiction-wide EV proliferation goals.	Per the 2019 CALGreen Code, residential projects are required to install a listed raceway to accommodate a dedicated 208/240-volt branch circuit for each unit, which would be suitable for EV charging. Compliance with the 2019 CALGreen Code would ensure that the proposed project provides sufficient EV charging infrastructure to comply with this suggested measure.
Allow for new construction to install fewer on-site parking spaces than required by local municipal building code, if appropriate.[1]	This measure relates to multi-family residences and commercial land use where separated parking areas are typically provided, and is not applicable to single-family residential uses, such as those proposed as part of the project. Consequently, the measure is not appropriate for the proposed project, and the project is considered consistent with this measure.
Dedicate on-site parking for shared vehicles.	Like the measure above, this measure relates to multi-family residences and commercial land uses where separated parking areas are typically provided that would allow for the designation of preferential parking spaces. As such, the measure is not applicable to the proposed project, and the project is considered consistent with the measure.
Provide adequate, safe, convenient, and secure on-site bicycle parking and storage in multi-family residential projects and in non-residential projects.	The proposed project is a single-family residential development. Therefore, this measure does not apply.
Provide on- and off-site safety improvements for bike, pedestrian, and transit connections, and/or implement relevant improvements identified in an applicable bicycle and/or pedestrian master plan.	The proposed project would provide internal pedestrian walkways and bicycle infrastructure to facilitate pedestrian and bicycle circulation on-site per City of Antioch requirements. Tri-Delta Transit provides public transportation in the project area, but existing bus lines do not exist in close proximity to the project site. However, following implementation of the project, Tri-Delta may adjust routes and add a closer bus stops as necessary. Furthermore, a public transit stop is currently

Table 4.1-15
Project Consistency with the 2017 Scoping Plan

Suggested Measure	Consistency Discussion
	planned within the Promenade/Vineyards at Sand Creek Project in proximity to the proposed project site. Considering the sidewalk and bike trail connections to the planned public transit stop within the Promenade/Vineyards at Sand Creek Project, the proposed project would be generally consistent with the suggested measure.
Require on-site renewable energy generation.	The CBSC requires that residential structures that are three-stories or less in height be constructed with renewable energy systems sufficient to provide 100 percent of the electricity required for the residence. The proposed single-family residences would be subject to such requirements. Due to the CBSC's requirements regarding renewable energy systems for residential land uses, the proposed project would include on-site renewable energy generation and would comply with this measure.
Prohibit wood-burning fireplaces in new development, and require replacement of wood-burning fireplaces for renovations over a certain size development.	Pursuant to Mitigation Measure 4.1-2, only natural gas hearths/fireplaces would be installed in the proposed residences. As such, the proposed project would comply with this measure.
Require cool roofs and "cool parking" that promotes cool surface treatment for new parking facilities as well as existing surface lots undergoing resurfacing.	The proposed project would not include parking facilities, and the single-family residences would include rooftop solar and other features as required by the CBSC and CALGreen. As such, the project would comply with this suggested measure.
Require solar-ready roofs.	The CBSC requires that new residential structures be built with rooftop solar. Therefore, the proposed project would be required to provide solar-ready roofs and would comply with this suggested measure.
Require organic collection in new developments.	Section 6-3.02 of the City's Municipal Code requires that all property owners maintain a subscription to a level of solid waste and recycling service. Republic Services provides organic waste collection throughout Antioch, which refers to green wastes such as yard clippings, uncooked food, branches, and other forms of yard waste. Thus, the proposed project would be required to comply with this measure by the City's existing Municipal Code Standards.
Require low-water landscaping in new developments (see CALGreen Divisions 4.3 and 5.3 and the Model Water Efficient Landscape Ordinance [MWELO], which is referenced in CALGreen). Require water efficient landscape maintenance to conserve water and reduce landscape waste.	Landscaping within the project site would be required to comply with the CALGreen code and all water efficiency measures therein, including the MWELO or any similar regulations adopted by the City of Antioch. Accordingly, the proposed project is anticipated to comply with this measure.
Achieve Zero Net Energy performance building standards prior to dates required by the Energy Code.	Through the CBSC requirements, the proposed single-family residences are anticipated to achieve Zero Net Energy. Therefore, the proposed project is anticipated to comply with this measure.

Table 4.1-15
Project Consistency with the 2017 Scoping Plan

Suggested Measure	Consistency Discussion
Encourage new construction, including municipal building construction, to achieve third-party green building certifications, such as the GreenPoint Rated program, LEED rating system, or Living Building Challenge.	The project applicant has not committed to achieving third-party green building certification. Consequently, compliance with this suggested measure is uncertain at this time.
Require the design of bike lanes to connect to the regional bicycle network.	The closest existing regional bicycle trail is the Sand Creek Trail, which currently ends on the eastern side of SR 4. However, the Sand Creek Trail would be extended to continue along the north side of Sand Creek, adjacent to the project site, following buildout of the Promenade/Vineyards at Sand Creek Project. The proposed project includes connection to the Sand Creek Trail and, thus, the project would comply with the suggested measure.
Expand urban forestry and green infrastructure in new land development.	The proposed project would include landscaping features throughout the development that would consist of street trees, shrubs, groundcover, agricultural plantings, and open lawn areas. Individual residences would also be landscaped with trees, shrubs, groundcover and some lawns. Public spaces, common spaces, and private landscaping areas would have an emphasis on drought-tolerant and adaptive plant species. As such, the development would expand upon urban forestry and green infrastructure, and would comply with this measure.
Require preferential parking spaces for park and ride to incentivize carpooling, vanpooling, commuter bus, electric vehicles, and rail service use.	The measure relates to multi-family residential development and commercial land uses, and the proposed project includes only single-family development. As a result, the measure does not apply to the proposed project.
Require a transportation management plan for specific plans which establishes a numeric target for non-single occupancy vehicle travel and overall VMT.	The proposed project is not a specific plan. As a result, the measure does not apply to the proposed project.
Develop a rideshare program targeting commuters to major employment centers.	The project site would be developed with residences and therefore, would not be considered a major employment center. Consequently, the measure does not apply to the proposed project.
Require the design of bus stops/shelters/express lanes in new developments to promote the usage of mass-transit.	Project plans do not currently demonstrate that transit infrastructure would be developed within the project site. However, the Promenade/Vineyards at Sand Creek Project includes the construction of bus shelters that would be accessible from the project site via connecting sidewalks and trails. As such, the proposed project partially complies with the suggested measure.
Require gas outlets in residential backyards for use with outdoor cooking appliances such as gas barbeques if natural gas service is available.	The project applicant has not committed to providing natural gas service for outdoor cooking appliances. Accordingly, compliance with this measure is uncertain at this time.

Table 4.1-15
Project Consistency with the 2017 Scoping Plan

Suggested Measure	Consistency Discussion
Require the installation of electrical outlets on the exterior walls of both the front and back of residences to promote the use of electric landscape maintenance equipment.[2]	Pursuant to California Electrical Code, Article 210.52(E), the project would be required to include at least one electrical outlet to be located in the perimeter of a balcony, desk, or porch. The project applicant has not committed to providing additional exterior electrical outlets to promote the use of electric landscape maintenance equipment. Consequently, the project would partially comply with the suggested measure.
Require the design of the electric outlets and/or wiring in new residential unit garages to promote electric vehicle usage.	The CBSC requires that new residential unit garages be designed with wiring sufficient to provide future installation of electric vehicle charging infrastructure. Therefore, the proposed project would be required to comply with this measure.
Require electric vehicle charging station (Conductive/inductive) and signage for non-residential developments.	The proposed project includes only residential development. Consequently, the measure does not apply to the proposed project.
Provide electric outlets to promote the use of electric landscape maintenance equipment to the extent feasible on parks and public/quasi-public lands.	The project applicant has not committed to providing electrical outlets in the private parks or landscaping areas proposed for the project site. Compliance with this measure is uncertain at this time.
Require each residential unit to be "solar ready," including installing the appropriate hardware and proper structural engineering.	The CBSC requires all residences three-stories or less in height to include renewable energy systems. The proposed residences would by three-stories or less in height, and would thereby be required to include rooftop solar. Thus, the proposed project would comply with this measure.
Require the installation of energy conserving appliances such as on-demand tank-less water heaters and whole-house fans.	Title 20 and Title 24 of the California Code and Regulations require the use of energy efficient appliances and building systems. The proposed project would be required to comply with all applicable efficiency standards sets forth in Title 20 and Title 24 and, therefore, the project would substantially comply with the suggested measure.
Require each residential and commercial building equip buildings [sic] with energy efficient AC units and heating systems with programmable thermostats/timers.	As noted above, the proposed project would be required to comply with all energy efficiency standards set forth in Title 20 and Title 24 of the California Code and Regulations. As such, the project would generally comply with the suggested measure.
Require large-scale residential developments and commercial buildings to report energy use, and set specific targets for per-capita energy use.	The project applicant has not committed to reporting energy use or setting specific energy use targets. Accordingly, compliance with this suggested measure is uncertain at this time.
Require each residential and commercial building to utilize low flow water fixtures such as low flow toilets and faucets (see CALGreen Divisions 4.3 and 5.3 as well as Appendices A4.3 and A5.3).	The proposed project would be required to comply with the residential water efficiency regulations within CALGreen. Thus, the proposed project would comply with this suggested measure.
Require the use of energy-efficient lighting for all street, parking, and area lighting.	Plans for street, parking, and area lighting have not been finalized. Thus, the use of energy-efficient lighting features within the project site is currently unknown, and compliance with this suggested measure is uncertain at this time.

Table 4.1-15
Project Consistency with the 2017 Scoping Plan

Suggested Measure	Consistency Discussion
Require the landscaping design for parking lots to utilize tree cover and compost/mulch.	Parking lots are not included as part of the proposed development. Consequently, this measure does not apply to the proposed project.
Incorporate water retention in the design of parking lots and landscaping, including using compost/mulch.	Parking areas are not proposed as part of the project. Accordingly, the measure does not apply to the project, and the project is considered consistent with the suggested measure.
Require the development project to propose an off-site mitigation project which should generate carbon credits equivalent to the anticipated GHG emission reductions. This would be implemented via an approved protocol for carbon credits from California Air Pollution Control Officers Association (CAPCOA), the CARB, or other similar entities determined acceptable by the local air district.	The project applicant has not committed to an off-site mitigation project that would generate carbon credits. Consequently, compliance with this suggested measure is uncertain at this time.
Require the project to purchase carbon credits from the CAPCOA GHG Reduction Exchange Program, American Carbon Registry (ACR), Climate Action Reserve (CAR) or other similar carbon credit registry determined to be acceptable by the local air district.	The project applicant has not committed to purchasing carbon credits. Accordingly, compliance with this suggested measure is uncertain at this time.
Encourage the applicant to consider generating or purchasing local and California-only carbon credits as the preferred mechanism to implement its off-site mitigation measure for GHG emissions and that will facilitate the State's efforts in achieving the GHG emission reduction goal.	The project applicant has not committed to purchasing local or California-only carbon credits. Therefore, compliance with this suggested measure is uncertain at this time.

Notes:
[1] This is not to be confused with the Americans with Disabilities Act (ADA) requirements or other minimum parking requirements for dedicating space to clean air vehicles and/or EV charging infrastructure
[2] The requirements for outdoor receptacle outlets are located in the California Electrical Code, Article 210.52(E).
[3] Governor's Office of Planning and Research. *Technical Advisory on Evaluating Transportation Impacts in CEQA*. December 2018.

Source: California Air Resources Board. AB 32 Scoping Plan [Appendix B]. Accessible at: https://www.arb.ca.gov/cc/scopingplan/scopingplan.htm. Accessed March 2020.

As shown in Table 4.1-15 the proposed project would comply with a majority of the suggested measures and, thus, the proposed project would be considered generally consistent with the 2017 Scoping Plan. Because the 2017 Scoping Plan is the CARB's strategy for meeting the State's 2030 emissions goals established by SB 32, the project would be considered to comply with the goals of SB 32.

Consistency with Plan Bay Area 2040

The San Francisco Bay area's Plan Bay Area 2040 has been prepared jointly by the San Francisco Bay Area Metropolitan Transportation Commission (MTC) and the ABAG. Plan Bay Area 2040 is a long-range regional plan intended to provide a strategy for the reduction of GHG emissions and air pollutants within the San Francisco Bay Area. The Plan Bay Area 2040 serves as a Regional Transportation Plan and Sustainable Communities Strategy (SCS). As an SCS, the Plan Bay Area 2040 is required to comply with regional targets for reducing GHG emissions through the integration of transportation and land use planning. ABAG has not provided a specified means of identifying an individual development project's compliance with the Plan Bay Area 2040; however, for the purposes of this analysis, the conformance of the proposed project with the overall goal of the Plan Bay Area 2040 to reduce regional GHG emissions is generally considered.

Overall, the Plan Bay Area 2040 supports further growth in the region's housing stock and increases in employment opportunities in the area. In order to achieve the identified GHG reduction targets for the region while still accommodating such growth, the Plan Bay Area 2040 identifies Priority Development Areas (PDAs), where existing public transit and neighborhoods make compact development desirable. Compact development within PDAs allows for decreases in VMT as residents of existing areas can use alternative means of transportation to access new development. The project site is not within a PDA identified in the Plan Bay Area 2040.

Public transit does not currently exist in close proximity to the project site, and future residents of the proposed development would likely need to drive to their places of employment. However, the adjacent Promenade/Vineyards at Sand Creek Project is required to install bus stop shelters, and the proposed project would help facilitate the extension of public transit services to the area by increasing potential ridership. Nonetheless, implementation of the proposed project would result in a substantial increase in VMT. VMT is discussed in further detail in Chapter 4.2, Transportation, of this EIR.

Although the Plan Bay Area strongly encourages growth within PDAs, the Plan Bay Area 2040 does anticipate growth to continue to occur outside of PDAs. For instance, in Antioch the Plan Bay Area 2040 anticipates that a total of 3,900 residential units will be added within PDAs by the year 2040, while a total of 4,100 housing units are anticipated to be added outside of PDAs.[32] Thus, while the proposed project site is not within a PDA, the anticipated growth in housing units that would occur with implementation of the project has likely been anticipated by the Plan Bay Area. However, the Plan Bay Area 2040's core strategy, focused growth, supports dense development adjacent to existing public transit infrastructure that would contribute to decreased rates of per capita VMT. The proposed project is a low-density development located distant from existing services. While future transit service is planned for the area, the project is anticipated to result in a significant and unavoidable impact related to VMT. Therefore, the proposed project conflicts with the general intent of the Plan Bay Area 2040.

[32] Plan Bay Area 2040. *Land Use Modeling Report*. July 2017.

Conclusion

Based on the above, project emissions would be below the BAAQMD's threshold of significance and would not be considered to conflict with the emissions reductions required by AB 32. In addition, the project would be generally consistent with the 2017 Scoping Plan. However, project emissions in the year 2030 would not achieve the emissions reductions required by SB 32 and the project would conflict with Plan Bay Area 2040. Therefore, the proposed project would be considered to conflict with the goals of SB 32, and would contribute to a ***cumulatively considerable*** and ***significant*** impact related to GHG emissions.

Mitigation Measure(s)

Implementation of the following mitigation measure would reduce GHG emissions from operation of the proposed project. The overarching goals of AB 32, SB 32, the 2017 Scoping Plan, and the Plan Bay Area 2040 is to reduce statewide GHG emissions. Therefore, the project as proposed does not include measures sufficient to ensure adequate emissions reductions, but the mitigation measure presented below would require the project to incorporate design features to reduce GHG emissions to the maximum extent feasible. Consequently, with implementation of the following mitigation measures, the project's incremental contribution to the cumulatively significant effects of GHG emissions and global climate change would be reduced, but cannot be quantified with certainty at this point, and, therefore, would remain *cumulatively considerable* and *significant and unavoidable*.

4.1-6 *Prior to the issuance of building permits, the applicant shall prepare and submit to the City a GHG Reduction Plan to quantifiably reduce GHG emissions so that the project will not cause a net increase in GHG emissions either through the implementation of the following on-site measures, through off-site measures such as purchasing carbon offsets that use CARB-consistent protocols or through other off-site mitigation measures as described in this mitigation measure, or a combination of on-site, carbon offsets, and other off-site mitigation measures. Proof of implementation of the GHG Reduction Plan shall be submitted to the City of Antioch Community Development Department.*

Examples of measures that may be used to reduce GHG emissions include, but are not limited to, the following:

- *Orient buildings to maximize passive solar heating;*
- *Use renewable diesel to fuel construction fleets;*
- *Promote ridesharing, transit, bicycling, and walking for work trips through dedication of preferential parking spaces, provision of on-site bicycle parking, provision of end-of-trip facilities such as bicycle lockers and on-site showers;*
- *Install electric vehicle charging infrastructure in excess of existing CBSC requirements;*
- *Provide fully operational charging stations and preferential parking spots for electric vehicles;*
- *Install energy star or equivalent appliances in all residences;*
- *Limit installation of natural gas fueled appliances;*

- *Install solar water heating;*
- *Use water efficient landscapes and native/drought-tolerant vegetation;*
- *Provide outdoor electrical outlets to allow for use of electrically powered landscaping equipment at all residences and park spaces within the project site;*
- *Construct on-site or fund off-site carbon sequestration projects (such as tree plantings or reforestation projects); and*
- *Purchase carbon credits to offset project annual emissions. Carbon offset credits shall be verified and registered with The Climate Registry, the Climate Action Reserve, or another source approved by CARB, BAAQMD, or the City of Antioch.*

If off-site mitigation measures are proposed, the applicant must be able to show that the emission reductions from identified projects are real, permanent through the duration of the project, enforceable, and are equal to the pollutant type and amount of the project impact being offset. In addition, any off-site measures shall be subject to review and approval by the City of Antioch Community Development Department. BAAQMD recommends that off-site mitigation projects occur within the nine-county Bay Area in order to reduce localized impacts and capture potential co-benefits. If BAAQMD has established an off-site mitigation program at the time a development application is submitted, as an off-site mitigation measure, the applicant may choose to enter into an agreement with BAAQMD and pay into the established off-site mitigation program fund, where BAAQMD would commit to reducing the type and amount of emissions identified in the agreement.

4.2 Transportation

4.2 TRANSPORTATION

4.2.1 INTRODUCTION

The Transportation chapter of the EIR discusses the existing transportation and circulation facilities within the project vicinity, as well as applicable policies and guidelines used to evaluate operation of such facilities. Where development of the proposed project would conflict with applicable policies or guidelines, mitigation measures are identified. The information contained within this chapter is primarily based on the Transportation Impact Assessment (TIA) prepared for the proposed project by Fehr & Peers,[1] as well as the City of Antioch General Plan[2] and associated EIR.[3] The TIA was peer reviewed by Kimley-Horn.[4] All technical calculations are included as an appendix to the TIA, which is included as Appendix D to this EIR.

4.2.2 EXISTING ENVIRONMENTAL SETTING

The section below describes the physical and operational characteristics of the existing transportation system within the study area, including the surrounding roadway network, transit, bicycle, and pedestrian facilities.

Existing Roadways

The following sections provide a summary of the existing roadways within the project area.

State Route 4

State Route (SR) 4 is an east-west freeway that extends from Hercules in the west to Stockton and beyond in the east. In the study area, SR 4 has an east/west orientation from west of SR 160 and a northwest/southeast orientation between SR 160 and Walnut Boulevard in eastern Contra Costa County. The facility is an eight-lane freeway in the west to SR 160, a six-lane freeway from SR 160 to Laurel Road, and a four-lane freeway from Laurel Road to Sand Creek Road. Between Sand Creek Road and Walnut Boulevard, the facility is a two-lane highway with an interchange at Balfour Road and an at-grade intersection at Marsh Creek Road. Each intersection is signalized and operated by the California Department of Transportation (Caltrans). Per the Contra Costa County Transportation Agency (CCTA), SR 4 is a designated Route of Regional Significance. Routes of Regional Significance are roadways that connect two or more subareas of Contra Costa County, cross County boundaries, carry significant through traffic, and/or provide access to a regional highway or transit facility.

Lone Tree Way

Lone Tree Way is an east-west roadway located north of the project site. The roadway provides three travel lanes to the west of Hillcrest Avenue in the easterly direction, as well as in the westerly direction to Bluerock Drive/Golf Course Road. To the east of Hillcrest Avenue, the roadway provides three travel lanes in both directions. The posted speed limit is 45 miles per hour (mph). On-street parking is not permitted. Lone Tree Way is a designated Route of Regional Significance.

---

1 Fehr & Peers. *Transportation Impact Assessment, Creekside (Vineyards at Sand Creek).* June 2020.
2 City of Antioch. *City of Antioch General Plan*. Updated November 24, 2003.
3 City of Antioch. *Draft General Plan Update Environmental Impact Report*. July 2003.
4 Kimley-Horn. *Peer Review of the Creekside (Vineyards at Sand Creek) Project in Antioch, CA*. November 20, 2019.

Sand Creek Road

Sand Creek Road is a four-lane, east-west roadway that extends east from SR 4 through Brentwood. The posted speed limit is 45 mph. On-street parking is not permitted on Sand Creek Road. Class II bicycle lanes and sidewalks are provided along most of the roadway through Brentwood. Sand Creek Road from Brentwood Boulevard to its current terminus at SR 4 is a Route of Regional Significance. To the west of SR 4, Sand Creek Road is planned to be constructed as part of adjacent development, ultimately connecting Sand Creek Road to Deer Valley Road. West of Deer Valley Road, Sand Creek Road would continue as Dallas Ranch Road, ultimately providing a connection from Lone Tree Way to the existing terminus at SR 4 in Brentwood. When constructed, the future extension of Sand Creek Road/Dallas Ranch Road would be a designated Route of Regional Significance.

Deer Valley Road

Deer Valley Road is a north-south roadway connecting Brentwood to Antioch. From Balfour Road north to the Sand Creek Focus Area, Deer Valley Road is two-lane rural road with adjacent areas mostly undeveloped and agricultural ranchettes. Along the rural section, the roadway does not include bicycle or pedestrian facilities, or paved shoulders. North of Sand Creek Road at Kaiser Medical Center, Deer Valley Road has been improved to provide two-travel lanes in the northbound direction, with sidewalks and Class II bicycle facilities on the east side of the roadway. At Mammoth Way, Deer Valley Road provides two travel lanes in each direction, with Class II bicycle lanes and sidewalks. North of Sand Creek Road, a center median allows for the provision of left-turn pockets at intersections. Deer Valley has a posted speed limit of 45 mph and is a designated Route of Regional Significance.

Hillcrest Avenue

Hillcrest Avenue is a north-south oriented roadway that provides two travel lanes per direction from north of Prewett Ranch Drive in the project study area. Hillcrest Avenue provides a connection of the project area to SR 4 with a posted speed limit of 45 mph. Sidewalks and bicycle facilities are provided along the full length of Hillcrest Avenue north of Prewett Ranch Drive. North of Lone Tree Way, Hillcrest Avenue is a designated Route of Regional Significance.

Prewett Ranch Drive

Prewett Ranch Drive is an east-west residential collector roadway that extends from Heidorn Ranch Road to west of Dallas Ranch Road where it terminates in a residential neighborhood. The roadway provides one travel lane in each direction with a median along some portions of the roadway, turn pockets at intersections, and a Class II bicycle facility. Most intersections on Prewett Ranch Drive are side-street stop-controlled, although a few are signalized. Most sections on the roadway in the immediate project vicinity do not have fronting housing, expect for a portion between Grass Valley Way and Hillcrest Avenue.

Between Prewett Ranch Drive and the future Sand Creek Road extension, Hillcrest Avenue is being constructed to provide two travel lanes in each direction, a median to facilitate left-turn access at intersections, and pedestrian and bicycle facilities. Two lanes are being constructed by the Promenade/Vineyards at Sand Creek Project, which is bound on the west side by the roadway extension, and two lanes are being constructed by the Aviano development, which is bound on the east side by the roadway extension.

Study Intersections and Freeway Segments

The following study intersections were selected for analysis in the TIA selected based on the project location, estimates of project-generated traffic, and locations of planned roadways in the project vicinity (see Figure 4.2-1):

1. Lone Tree Way at Hillcrest Avenue;
2. Lone Tree Way at Heidorn Ranch Road;
3. Sand Creek Road at Deer Valley Road;
4. Sand Creek Road at Hillcrest Avenue (Future Intersection);
5. Sand Creek Road at Heidorn Ranch Road (Future Intersection);
6. Sand Creek Road at SR 4 Eastbound Ramps;
7. Sand Creek Road at SR 4 Westbound Ramps;
8. Prewett Ranch Drive at Deer Valley Road;
9. Prewett Ranch Drive at Hillcrest Avenue;
10. Hillcrest Avenue at B Street (Future Intersection); and
11. Hillcrest Avenue at I Street (Future Intersection).

In addition to the analysis of peak hour intersection operations, a daily roadway segment analysis was conducted for the following roadway segments for informational purposes only:

1. Prewett Ranch Drive, east of Deer Valley Road;
2. Prewett Ranch Drive at Diablo Vista Elementary School; and
3. Prewett Ranch Drive, west of Hillcrest Avenue.

Furthermore, the following freeway segments were evaluated:

1. SR 4, west (north) of Lone Tree Way
2. SR 4, west (north) of Sand Creek Road
3. SR 4, west (north) of Balfour Road
4. SR 4, east (south) of Balfour Road

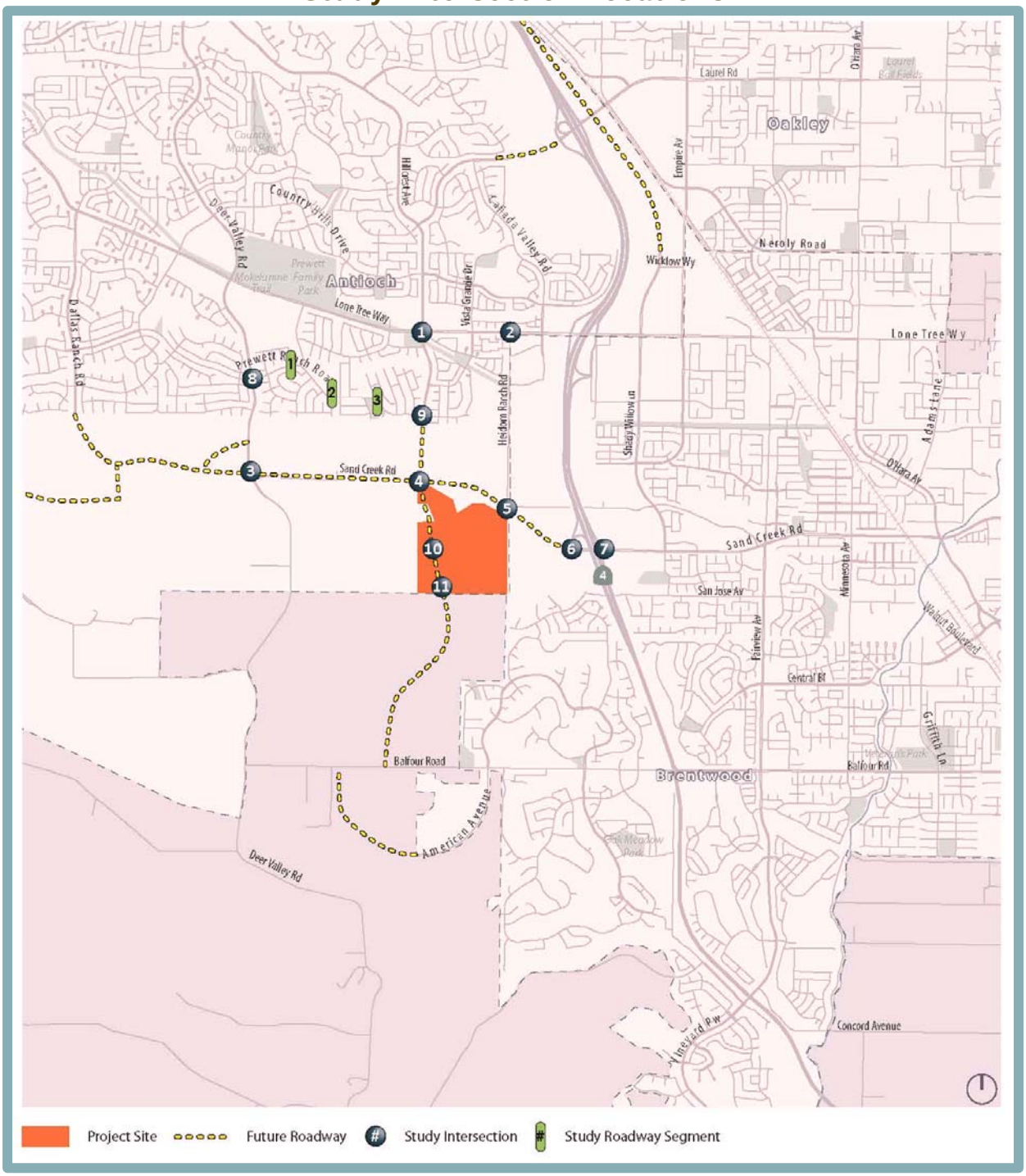
Common Traffic Analysis Terms

Per the CEQA Guidelines, vehicle miles travelled (VMT) is the primary metric used to identify transportation impacts under CEQA. VMT is a measure of the total amount of vehicle travel occurring on a given roadway system. In addition, the operations of roadway facilities are described with the term level of service (LOS), a qualitative description of traffic flow from a vehicle driver's perspective based on factors such as speed, travel time, delay, and freedom to maneuver. Six levels of service are defined ranging from LOS A (free-flow conditions) to LOS F (over capacity conditions). LOS E corresponds to operations "at capacity." When volumes exceed capacity, stop-and-go conditions result and operations are designated LOS F.

Table 4.2-1 and Table 4.2-2 summarize the relationship between delay and LOS for signalized and unsignalized intersections.

The delay ranges for unsignalized intersections are lower than for signalized intersections, as drivers expect less delay at unsignalized intersections.

Figure 4.2-1
Study Intersection Locations



Source: Fehr & Peers, 2020.

Table 4.2-1
Signalized Intersection LOS Definitions

LOS	Description of Operations	Average Delay (seconds per vehicle)
A	Progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.	≤ 10
B	Progression is good, cycle lengths are short, or both. More vehicles stop than with LOS A, causing higher levels of average delay.	> 10 to 20
C	Higher congestion may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level, though many still pass through the intersection without stopping.	> 20 to 35
D	The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	> 35 to 55
E	This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.	> 55 to 80
F	This level is considered unacceptable with oversaturation, which is when arrival flow rates exceed the capacity of the intersection. This level may also occur at high V/C ratios below	> 80

Source: Fehr & Peers, 2020.

Table 4.2-2
Unsignalized Intersection LOS Definitions

LOS	Description of Operations	Average Delay (seconds per vehicle)
A	Little or no delays	≤ 0 to 10
B	Short traffic delays	> 10 to 15
C	Average traffic delays	> 15 to 25
D	Long traffic delays	> 25 to 35
E	Very long traffic delays	> 35 to 50
F	Extreme traffic, delays where intersection capacity exceeded	> 50

Source: Fehr & Peers, 2020.

Roadway segments are evaluated by comparing daily traffic volumes on the roadway without and with the project. For residential streets, the maximum desired level of vehicle traffic is 1,500 vehicles per day (vpd). For residential collector streets with front-on housing, the maximum desired level of traffic is 3,000 vpd. For residential collectors without front-on housing, the maximum desired level of traffic is 10,000 vpd. For roadway segments that already exceed the desired threshold, the percent increase in traffic from a project is compared to the typical daily

fluctuations in traffic volume, calculated using weekday traffic counts collected on each roadway segment.

For freeway segments, the Contra Costa County Transportation Authority's (CCTA) 2017 East County Action Plan for Routes of Regional Significance has established the delay index as the Multimodal Transportation Service Objective (MTSO) for SR 4 through the study area. The delay index is the ratio of travel time on a facility divided by the travel times that occur during non-congested free-flow periods. Should the delay index exceed 2.5 during either the AM or PM peak period, freeway operations would be considered deficient. A delay index of 2.5 would equate to peak hour travel taking 2.5 times as long as off-peak travel, or an average travel speed below 26 miles per hour assuming a non-congested free-flow speed of 65 miles per hour.

Intersection LOS – Existing Conditions

Weekday morning (6:00 to 9:00 AM) and evening (3:00 to 6:00 PM) peak period intersection turning movement counts were collected at the study intersections, including separate counts of pedestrians and bicyclists, in January 2019 with area schools in normal session.

Figure 4.2-2 presents the existing lane configurations at the study intersections, as well as the observed peak hour traffic volumes at each study intersection. The study intersection LOS results are summarized in Table 4.2-3 for the AM and PM peak hours. As shown in the table, all study intersections currently operate acceptably based on the applicable City of Antioch and CCTA LOS standards.

It should be noted that Intersections #8 and #9 would be constructed as part of the proposed project and, thus, are not included in the existing roadway network.

Roadway Segments – Existing Conditions

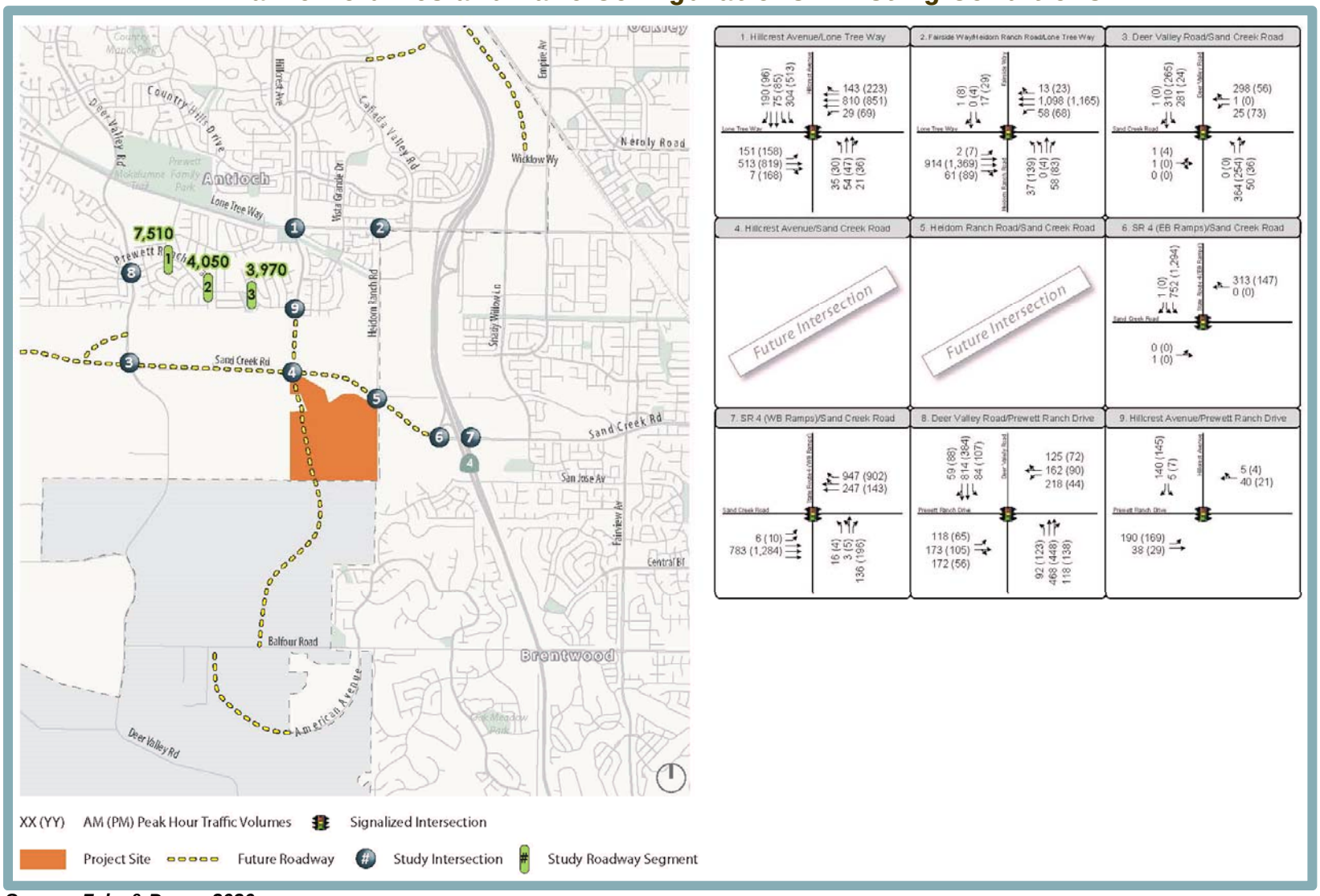
Automatic machine traffic counts were conducted over a 72-hour period (Tuesday through Thursday) on clear days in August 2019 with area schools in session along Prewett Ranch Drive, as some vehicle traffic accessing the site could travel through Prewett Ranch Drive to access Deer Valley Road prior to the completion of the Sand Creek Road extension between Hillcrest Avenue and Deer Valley Road. The average daily traffic volumes on the roadways are summarized below in Table 4.2-4 and shown on Figure 4.2-2.

Prewett Ranch Drive carries approximately 7,510 vehicles per day east of Deer Valley Road. In the vicinity of the school, traffic volumes are approximately 4,050 per day. West of Hillcrest Avenue, average daily traffic volumes decrease to approximately 3,970, which is higher than the desired amount for a residential collector roadway that has front-on housing. The peak hour of travel along the Prewett Ranch Drive corridor tends to align with school bell times.

Freeway Operations – Existing Conditions

Mainline traffic counts were conducted on SR 4 south of Balfour Road in January 2019. Traffic volumes at the interchanges along the corridor were then used to estimate traffic volumes on the mainline segments from south of Balfour Road to north of Lone Tree Way. Project traffic volumes were then considered. The traffic volumes and number of travel lanes were used to calculate vehicle speeds using the HCM 2010 method, which were then used to calculate the delay index. The results were verified through travel time runs of the corridor during peak hours.

Figure 4.2-2
Traffic Volumes and Lane Configurations: Existing Conditions



Source: Fehr & Peers, 2020.

Table 4.2-3
Intersection LOS – Existing Conditions

Intersection	Control	Peak Hour	Delay	LOS
1. Lone Tree Way at Hillcrest Avenue	Signal	AM PM	18 21	B C
2. Lone Tree Way at Heidorn Ranch Road	Signal	AM PM	11 12	B B
3. Sand Creek Road at Deer Valley Road	Signal	AM PM	10 15	A B
4. Sand Creek Road at Hillcrest Avenue (Future Intersection)	Signal	AM PM	-- --	-- --
5. Sand Creek Road at Heidorn Ranch Road (Future Intersection)	Signal	AM PM	-- --	-- --
6. Sand Creek Road at SR 4 Eastbound Ramps	Signal	AM PM	9 7	A A
7. Sand Creek Road at SR 4 Westbound Ramps	Signal	AM PM	5 5	A A
8. Prewett Ranch Drive at Deer Valley Road	Signal	AM PM	27 14	C B
9. Prewett Ranch Drive at Hillcrest Avenue	Signal	AM PM	19 16	B B

Source: Fehr & Peers, 2020.

Table 4.2-4
Roadway Segment Average Daily Traffic – Existing Conditions

Segment	Daily Traffic[1]	Peak Hour Traffic[2]	Daily Fluctuation[3]
1. Prewett Ranch Drive, east of Deer Valley Road	7,510	850	± 1.2%
2. Prewett Ranch Drive at Diablo Vista Elementary School	4,050	460	± 1.8%
3. Prewett Ranch Drive, west of Hillcrest Avenue	3,970	430	± 2.9%

[1] Average daily two-way traffic measured over three days.
[2] Average peak hour volume from the three weekdays of data collection.
[3] Percent difference between the three days of data collection.

Source: Fehr & Peers, 2020.

The existing AM and PM peak hour freeway operations are summarized in Table 4.2-5 below. As shown in the table, SR 4 north of Sand Creek Road operates at free-flow speeds during both the morning and evening peak hours. With the recent widening of SR 4 between Balfour Road and Sand Creek Road, and construction of an interchange, all mainline study freeway segments operate within the established service objective (i.e., delay index of 2.5 or less for the peak hours).

Table 4.2-5
Freeway LOS – Existing Conditions

Segment	Direction	Volume	Delay Index
AM Peak Hour			
1. SR 4, north of Lone Tree Way	SB	2,787	1.01
	NB	2,887	1.01
2. SR 4, north of Sand Creek Road	SB	2,448	1.00
	NB	2,815	1.01
3. SR 4, north of Balfour Road	SB	2,009	1.00
	NB	2,014	1.00
4. SR 4, south of Balfour Road	SB	1,201	1.20
	NB	940	1.03
PM Peak Hour			
1. SR 4, north of Lone Tree Way	SB	3,711	1.11
	NB	2,975	1.02
2. SR 4, north of Sand Creek Road	SB	3,185	1.03
	NB	2,932	1.02
3. SR 4, north of Balfour Road	SB	2,038	1.00
	NB	2,220	1.00
4. SR 4, south of Balfour Road	SB	1,015	1.05
	NB	1,431	1.82

Source: Fehr & Peers, 2020.

Transit Services and Facilities

The Eastern Contra Costa Transit Authority (Tri Delta Transit) provides transit service in eastern Contra Costa County, serving the communities of Brentwood, Antioch, Oakley, Concord, Discovery Bay, Bay Point, and Pittsburg. A total of 13 routes operate on weekdays, with four routes operating on weekends. In the vicinity of the project site, Tri Delta Transit operates along Deer Valley Road, serving the Kaiser Medical Center, and along Lone Tree Way. Dial-a-ride door-to-door service is also provided within Eastern Contra Costa County by Tri Delta Transit for disabled people of all ages and senior citizens provided the trip begins and ends within the Paratransit Area.

Bay Area Rapid Transit (BART) provides fixed rail transit to Eastern Contra Costa County. Currently, the terminus station is located in Antioch at the Hillcrest Avenue interchange, approximately five miles from the project site. Weekday service is provided on approximately 15-minute headways and weekend service is provided on approximately 20-minute headways. The Antioch Line connects to key regional employment centers, including Concord, Pleasant Hill, Walnut Creek, Oakland, and San Francisco. Transfers to other lines can be made in Oakland.

Bicycle and Pedestrian Facilities

Bicycle paths, bike lanes, bike routes, and separated bikeways are typical examples of bicycle transportation facilities, which are defined by Caltrans as follows:

- **Bike paths (Class I)** – Paved trails that are separated from roadways. Such trails are also shared with pedestrians.
- **Bike lanes (Class II)** – Lanes on roadways designated for use by bicycles through striping, pavement legends, and signs.
- **Bike routes (Class III)** – Roadways designated for bicycle use by signs only; may or may not include additional pavement width for cyclists.

- **Separated Bikeway (Class IV)** – Separated bikeways, also referred to as cycle tracks or protected bikeways, are bikeways for the exclusive use of bicycles which are physically separated from vehicle traffic. Separated bikeways were adopted by Caltrans in 2015. Types of separation may include, but are not limited to, grade separation, flexible posts, physical barriers, or on-street parking.

North of Sand Creek Road, Deer Valley Road provides Class II bicycle facilities with separate lanes designated for bicycle travel. In addition, Class II bike lanes are provided along the length of Hillcrest Avenue. Prewett Ranch Drive provides Class II bicycle lanes from west of Cedar Point Way to west of Dallas Ranch Road. Portions of Lone Tree Way in the project vicinity have a striped shoulder that can be used by bicyclists, but the facility is a not a designated bicycle lane; the Class I Mokelumne Trail generally parallels Lone Tree Way from west of Hillcrest Avenue to James Donlon Boulevard, where the trail continues until the current terminus at Buchanan Road, east of Somersville Road.

Pedestrian facilities are not provided along Old Sand Creek Road or Heidorn Ranch Road in the project vicinity. However, the extension of Hillcrest Avenue currently under construction to the north of the site as part of the Promenade/Vineyards at Sand Creek project will include sidewalks, along with Class II bike lanes. In addition, a trail would be provided along the north side of Sand Creek.

Vehicle Miles Travelled

The existing average daily VMT per resident for the City of Antioch, Contra Costa County and the Bay Area are presented in Table 4.2-6. As shown in the table, home based trips in Antioch and Contra Costa County are slightly higher than the Bay Area average.

Table 4.2-6
Existing Average Daily VMT per Resident

Land Use Type	City of Antioch	Contra Costa County	Bay Area
Home Based VMT	17.9	18.0	15.3

Source: Fehr & Peers, 2020.

4.2.3 REGULATORY CONTEXT

Existing State and local transportation policies, laws, and regulations that would apply to the proposed project are summarized below and provide a context for the impact discussion related to the project's consistency with the applicable regulatory conditions. Federal plans, policies, regulations, or laws related to transportation and circulation are not directly applicable to the proposed project.

State Regulations

The following are the regulatory agencies and regulations pertinent to the proposed project at the State level.

Guide for the Preparation of Traffic Impact Studies

Caltrans' Guide for the Preparation of Traffic Impact Studies (December 2002) provides guidance for Caltrans staff who review local development and land use change proposals. The Guide also informs local agencies about the information needed for Caltrans to analyze the traffic impacts to

state highway facilities, which include freeway segments, on- or off-ramps, and signalized intersections.

It should be noted that Caltrans has jurisdiction over State highways. Therefore, Caltrans controls all construction, modification, and maintenance of State highways, such as SR 4. Any improvements to such roadways require Caltrans approval.

Senate Bill 743

In response to Senate Bill (SB) 743, the Office of Planning and Research (OPR) has updated the California Environmental Quality Act (CEQA) guidelines to include new transportation-related evaluation metrics. Draft guidelines were developed in August 2014, with final guidelines published in November 2017 incorporating public comments from the August 2014 and January 2016 guidelines. In December 2018, the California Natural Resources Agency certified and adopted the CEQA Guidelines update package along with an updated Technical Advisory related to Evaluating Transportation Impacts in CEQA. Full compliance with the guidelines is expected by July 2020. With the establishment of new guidelines, vehicle-delay based level of service calculations cannot be a metric used to evaluate a project's impacts to the environment, and instead a VMT metric is to be evaluated.

Local Regulations

The following are the regulatory agencies and regulations pertinent to the proposed project on a local level.

Contra Costa Countywide Transportation Plan

The CCTA is a public agency formed by the Contra Costa voters to manage the County's transportation sales tax program and perform countywide transportation planning. The 2017 Countywide Comprehensive Transportation Plan, adopted September 20, 2017, is the CCTA's most recent, broadest policy and planning document.[5] The Plan identifies the criteria for analyzing transportation impacts and sets forth plans for future roadway improvements in the County. In addition, the Plan relies on collaboration with and between partners, both on the countywide and regional levels. Each of the County's five Regional Transportation Planning Committees created an Action Plan, which identifies a complete list of actions to be completed as a result of the Action Plan.

East County Action Plan

As part of the Action Plan process, each Regional Transportation Planning Committee identified projects and programs in the form of actions to be included in the Action Plan for the Routes of Regional Significance. Each Action Plan states the vision, goals, and policies; designates Routes of Regional Significance; sets objectives for such routes; and presents specific actions to achieve established objectives. The actions are listed on both a route-by-route and a regional scale, and aim to support the transportation objectives as specified by each Regional Transportation Planning Committee. The latest East County Action Plan for Routes of Regional Significance was adopted September 2017.[6]

---

5 Contra Costa County Transportation Authority. *2017 Countywide Comprehensive Transportation Plan.* Adopted September 20, 2017.

6 Contra Costa County Transportation Authority. *East County Action Plan for Routes of Regional Significance.* September 2017.

Local Regulations

Local rules and regulations applicable to the proposed project are discussed below.

City of Antioch General Plan

The following goals and policies from the City of Antioch General Plan are applicable to the proposed project:

Objective 7.3.1 Provide adequate roadway capacity to meet the roadway performance standards set forth in the Growth Management Element.

Policy 7.3.2.a Facilitate meeting the roadway performance standards set forth in the Growth Management Element and improving traffic flow on arterial roadways.

- Work with the UP and BNSF railroads to construct grade separations along the tracks at Somersville Road, Hillcrest Avenue, "A" Street, the proposed Viera Road extension, and the proposed Phillips Lane extension.
- Promote the design of roadways to optimize safe traffic flow within established roadway configurations by minimizing driveways and intersections, uncontrolled access to adjacent parcels, on-street parking, and frequent stops to the extent consistent with the character of adjacent land uses.
- Provide adequate capacity at intersections to accommodate future traffic volumes by installing intersection traffic improvements and traffic control devices, as needed, as development occurs.
- Facilitate the synchronization of traffic signals.
- Where needed, provide acceleration and deceleration lanes for commercial access drives.
- Provide for reciprocal access and parking agreements between adjacent land uses, thereby facilitating off-street vehicular movement between adjacent commercial and other nonresidential uses.
- Encourage regional goods movement to remain on area freeways and other appropriate routes.

Policy 7.3.2.b Design and reconfigure collector and local roadways to improve circulation within and connections to residential and commercial areas.

- Implement appropriate measures to mitigate speeding and other traffic impacts in residential areas.

- Implement roadway patterns that limit through traffic on local residential streets.

Policy 7.3.2.c Require the design of new developments to focus through traffic onto arterial streets.

Policy 7.3.2.d Where feasible, design arterial roadways, including routes of regional significance, to provide better service than the minimum standards set forth in Measure C and the Growth Management Element. Thus, where feasible, the City will strive to maintain a "High D" level of service (v/c [volume-to-capacity ratio] = 0.85 to 0.89) within regional commercial areas and at intersections within 1,000 feet of a freeway interchange. The City will also strive where feasible to maintain low-range "D" (v/c = 0.80 to 0.84) in all other areas of the City, including freeway interchanges.

Policy 7.3.2.e Establish Assessment Districts in areas that will require major roadway infrastructure improvements that will benefit only that area of the City, and thereby facilitate the up-front construction of needed roadways.

Policy 7.3.2.f Design street intersections to ensure the safe passage of through traffic and accommodate anticipated turning movements. Implement intersection improvements consistent with the following lane geometrics, unless traffic analyses indicate the need for additional turn lanes.

Policy 7.3.2.g Require traffic impact studies for all new developments that propose to increase the approved density or intensity of development or are projected to generate 50 peak hour trips or more at any intersection of Circulation Element roadways. The purpose of these studies is to demonstrate that:

- The existing roadway system, along with roads to be improved by the proposed project, can meet the performance standards set forth in Sections 3.4.1 and 3.4.2 of the Growth Management Element; and
- Required findings of consistency with the provisions of the Growth Management Element can be made.

Policy 7.3.2.k Where single family residences have no feasible alternative but to front on collector or arterial roadways, require, wherever possible, that circular driveways or

on-site turnarounds be provided to eliminate the need for residents to back onto the street.

Policy 7.3.2.l Locate driveways on corner parcels as far away from the intersection as is possible.

Policy 7.3.2.m Avoid locating driveways within passenger waiting areas of bus stops or within bus bays. Locate driveways so that drivers will be able to see around bus stop improvements.

Policy 7.3.2.n Use raised medians as a method for achieving one or more of the following objectives: access control, separation of opposing traffic flows, left turn storage, aesthetic improvement, and/or pedestrian refuge.

Policy 7.3.2.o Where medians are constructed, provide openings at the maximum feasible intervals, typically no less than 1/8 mile.

Policy 7.3.2.v Private streets, where permitted, shall provide for adequate circulation and emergency vehicle access. Private streets that will accommodate more than 50 vehicles per hour in the peak hour or that are designed for on-street parking shall be designed to public street standards. The design of other private streets shall be subject to the review and approval of the City Engineer. Private streets shall be improved to public street standards prior to acceptance of dedications to the City.

Policy 7.3.2.x Require new development to construct all on-site roadways, including Circulation Element routes, and provide a fair share contribution for needed off-site improvements needed to maintain the roadway performance standards set forth in the Growth Management Element. Contributions for off-site improvements may be in the form of fees and/or physical improvements, as determined by the City Engineer. Costs associated with mitigating off-site traffic impacts should be allocated on the basis of trip generation, and should have provisions for lower rates for income-restricted lower income housing projects needed to meet the quantified objectives of the General Plan Housing Element.

Objective 7.4.1 Maintenance of a safe, convenient, and continuous network of pedestrian sidewalks, pathways, and bicycle facilities serving both experienced and casual bicyclists to facilitate bicycling and walking as alternatives to the automobile.

Policy 7.4.2.a	Design new residential neighborhoods to provide safe pedestrian and bicycle access to schools, parks and neighborhood commercial facilities.
Policy 7.4.2.b	Design intersections for the safe passage of pedestrians and bicycles through the intersection.
Policy 7.4.2.c	Provide street lighting that is attractive, functional, and appropriate to the character and scale of the neighborhood or area, and that contributes to vehicular, pedestrian, and bicycle safety.
Policy 7.4.2.d	Maintain roadway designs that maintain mobility and accessibility for bicyclists and pedestrians.
Policy 7.4.2.e	Integrate multi-use paths into creek corridors, railroad rights-of-way, utility corridors, and park facilities.
Policy 7.4.2.f	Provide, as appropriate, bicycle lanes (Class II) or parallel bicycle/pedestrian paths (Class I) along all arterial streets and high volume collector streets, as well as along major access routes to schools and parks.
Policy 7.4.2.j	Permit the sharing or parallel development of pedestrian walkways with bicycle paths, where this can be safely accomplished, in order to maximize the use of public rights-of-way.
Policy 7.4.2.l	Require the construction of attractive walkways in new residential, commercial, office, and industrial developments, including provision of shading for pedestrian paths.
Policy 7.4.2.m	Maximize visibility and access for pedestrians, and encourage the removal of barriers for safe and convenient movement of pedestrians.
Policy 7.4.2.n	Ensure that the site design of new developments provides for pedestrian access to existing and future transit routes and transit centers.
Policy 7.4.2.o	Pave walks and pedestrian pathways with a hard, all-weather surface that is easy to walk on. Walks and curbs should accommodate pedestrians with disabilities. Walks within open space areas should have specially paved surfaces that blend with the surrounding environment.
Policy 7.4.2.p	In general, design walks to provide a direct route for short to medium distance pedestrian trips, and to

facilitate the movement of large numbers of pedestrians. Meandering sidewalks are appropriate in areas where the natural topography or low-density land uses lend themselves to informal landscapes.

Objective 7.5.1 Maintenance of rail and bus transit, providing both local and regional service that is available throughout the week, and operates on par with automobile travel during peak commute hours.

Policy 7.5.2.g Preserve options for future transit use when designing roadway and highway improvements.

Policy 7.5.2.i Include Tri-Delta Transit in the review of new development projects, and require new development to provide transit improvements in proportion to traffic demands created by the project. Transit improvements may include direct and paved access to transit stops, provision of bus turnout areas and bus shelters, and roadway geometric designs to accommodate bus traffic.

Objective 3.4.3 Maintain acceptable traffic levels of service on City roadways through implementation of Transportation Systems Management, Growth Management, and the City's Capital Improvement Program, and ensure that individual development projects provide appropriate mitigation for their impacts.

Policy 3.4.4.a Place ultimate responsibility for mitigating the impacts of future growth and development, including construction of new and widened roadways with individual development projects. The City's Capital Improvements Program will be used primarily to address the impacts of existing development, and to facilitate adopted economic development programs.

Policy 3.4.4.b Continue to develop and implement action plans for routes of regional significance (see Circulation Element requirements).

Policy 3.4.4.c Ensure that development projects pay applicable regional traffic mitigation fees and provide appropriate participation in relation to improvements for routes of regional significance (see also Circulation Element Policy 5.3.1f).

Policy 3.4.4.d Consider level of service standards along basic routes to be met if 20-year projections based on the City's accepted traffic model indicate that conditions at the intersections that will be impacted by the project will be equivalent to or better than those specified in the standard, or that the proposed project has been required

to pay its fair share of the improvement costs needed to bring operations at impacted intersections into conformance with the applicable performance standard.

4.2.4 IMPACTS AND MITIGATION MEASURES

This section describes the standards of significance and methodology utilized to analyze and determine the proposed project's potential impacts related to transportation.

Standards of Significance

Consistent with Appendix G of the CEQA Guidelines, the proposed project would be considered to result in a significant adverse impact on the environment in relation to transportation and circulation if the project would result in any of the following:

- Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities;
- Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b);
- Substantially increase hazards to vehicle safety due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment); or
- Result in inadequate emergency access.

Specific application of the general thresholds is provided in the following section, based on guidance from the City and the CCTA.

City of Antioch/CCTA Intersection and Freeway Standards

Based on applicable guidance provided in the City of Antioch General Plan and the CCCTA East County Action Plan, the proposed project could be considered to conflict with a program, plan, ordinance, or policy addressing the circulation system if the project would result in any of the following:

- Cause the operations of a study intersection on a Route of Regional Significance (i.e., all study intersections) to decline from LOS high-D (an average delay of 55 seconds for signalized intersections) or better to LOS E or F, based on the HCM LOS method;
- Deteriorate already unacceptable operations at a signalized intersection;
- Cause operations of an unsignalized study intersection to decline from acceptable to unacceptable, and would require the installation of a traffic signal based on the Manual on Uniform Traffic Control Devices (MUTCD) Peak Hour Signal Warrant (Warrant 3);
- Result in, or worsen, unacceptable operations (i.e., delay index of greater than 2.5 during the AM or PM peak hour) on the SR 4 mainline.

Roadway Segment Standards

The City of Antioch does not have an adopted threshold for roadway segments. However, an analysis based on standard roadway design criteria has been included in this EIR for informational purposes only. The project's impacts to roadway segments have been evaluated based on whether the proposed project would cause any of the following criteria:

- Daily traffic volumes in excess of 1,500 vpd for residential streets;
- Daily traffic volumes in excess of 3,000 vpd for residential collector streets with front-on housing;

- Daily traffic volumes in excess of 10,000 vpd for residential collector streets without front-on housing;
- For roadway segments that already exceed the daily traffic volume thresholds listed above, the project's increase in the percentage of traffic is compared to the typical daily fluctuations in traffic volume on the roadway.

VMT Standards

Section 15064.3 of the CEQA Guidelines provides specific considerations for evaluating a project's transportation impacts. Although neither the City of Antioch nor the CCTA has established any standards or thresholds on VMT, OPR suggests that residential projects that generate VMT per capita at 15 percent less than the existing City or regional average could be considered less than significant. As other standards have not been established, the OPR guidelines is used as the criteria for the purpose of this analysis.

Method of Analysis

The analysis methodology provided in the TIA prepared for the proposed project by Fehr & Peers is discussed below.

Analysis Scenarios

The following analysis scenarios are included in this chapter:

- **Existing:** Existing (2019) conditions based on current traffic counts, existing roadway geometry, and existing traffic control.
- **Existing With Project:** Existing conditions with the addition of project-related traffic. The Existing With Project conditions assume full buildout of the neighboring Promenade/Vineyards at Sand Creek Project, which would occur prior to completion of the proposed project.
- **Near-Term Without Project**: Existing (2019) conditions with approved projects within the study area that could be constructed over the next five to ten years.
- **Near-Term With Project**: Near-Term conditions with project-related traffic.
- **Cumulative Without Project**: Forecasts for the cumulative scenario based on traffic growth trends as described in both the Antioch and Brentwood General Plan EIR, and the Priority Area One Specific Plan and associated EIR, and supplemented by a check of traffic forecasts for the study area in the most recent CCTA Countywide travel demand model. The scenario reflects expected conditions in 2040.
- **Cumulative With Project**: Future forecast conditions with project-related traffic.

Intersection Operations Analysis

Traffic conditions at signalized intersections were evaluated using methods developed by the Transportation Research Board (TRB), as documented in the 2010 HCM for vehicles using the analysis software Synchro 10.0. The HCM method calculates control delay at an intersection based on inputs such as traffic volumes, lane geometry, signal phasing and timing, pedestrian crossing times, and peak hour factors. For unsignalized (all-way stop controlled and side-street stop controlled) intersections, the 2010 HCM method for unsignalized intersections was used, wherein operations are defined by the average control delay per vehicle (measured in seconds). The control delay incorporates delay associated with deceleration, acceleration, stopping, and moving up in queue. At side-street stop-controlled intersections, the delay is calculated for each stop-controlled movement, the left turn movement from the major street, as well as the

intersection average. The intersection average delay and highest movement/approach delay are reported for side-street stop-controlled intersections.

Project Trip Generation

Trip generation refers to the process of estimating the amount of vehicular traffic a project would add to the surrounding roadway system. Estimates are created for the daily condition and for the peak one-hour period during the morning and evening commute when traffic volumes on the adjacent streets are typically the highest. Given that the proposed residential units would consist of either non-age-restricted units, senior/active adult units, or a combination of both, separate trip generation estimates were made for each development scenario. For the proposed unrestricted detached single-family homes, project trip generation was estimated using rates from the Institute of Transportation Engineers (ITE) Trip Generation Manual (10th Edition). For the age-restricted detached homes, Fehr & Peers conducted a trip generation survey of over 1,700 age-restricted detached homes in Brentwood over a two-day weekday period. The trip generation study is provided in Appendix D of the TIA (Appendix D to this EIR). Using the ITE rates and locally collected rates, separate trip generation estimates were developed for the proposed project and the project variant, as presented in Table 4.2-7.

Table 4.2-7
Project Trip Generation

Land Use	Unit / Quantity	Trip Generation						
		Daily	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Non-Age-Restricted Units								
Non-Age-Restricted Detached Homes[1]	220 units	2,080	41	122	163	137	81	218
Active Adult Units								
Age-Restricted Detached[2]	220 units	940	17	35	53	40	26	66
Blended Non-Age-Restricted and Active Adult Units								
Non-Age-Restricted Detached Homes[1]	110 units	1,040	20	61	81	69	40	169
Age-Restricted Detached[2]	110 units	470	9	18	26	20	13	33
Total	*220 units*	*1,510*	*29*	*79*	*108*	*89*	*53*	*142*

Notes:
1. *ITE land use category 210 – Single-Family Homes (Adj Streets, 7-9A, 4-6P):*
   Daily: (T) = 9.44 (X)
   AM Peak Hour: T = 0.74 (X); Enter = 25%; Exit = 75% PM Peak Hour: T = 0.99 (X); Enter = 63%; Exit = 37%
2. *Based on trip generation study, provided as Appendix D to the TIA, where:*
   Daily: (T) = 4.27 (X)
   AM Peak Hour: T = 0.24 (X); Enter = 33%; Exit = 67%
   PM Peak Hour: T = 0.30 (X); Enter = 60%; Exit = 40%

Source: Fehr & peers, 2020.

As shown in the table, assuming non-age-restricted development, the proposed project is expected to generate approximately 2,080 daily vehicle trips, including approximately 163 morning peak hour and 218 evening peak hour trips. An age-restricted project scenario would generate 940 daily trips, including 53 morning peak hour and 66 evening peak hour trips. The trip generating potential of a blended scenario was also estimated – with 110 unrestricted detached homes and 110 age-restricted detached homes, as presented in Table 4.2-7. This scenario would

generate approximately 1,510 daily vehicle trips, including approximately 108 morning peak hour and 142 evening peak hour trips.

As the vehicle trip generating potential of the proposed project is higher than that of the fully age-restricted detached home scenario or the blended scenario, the evaluation of potential off-site transportation impacts of the proposed project presents a worst-case assessment. Should age-restricted detached housing be incorporated into the project, the overall trip generation would decrease as compared to the level evaluated in this chapter.

Project Trip Distribution and Assignment

Estimates of regional project trip distribution were developed based on existing travel patterns in the area, a select zone analysis using the CCTA travel demand model, and the location of complementary land uses, such as schools, employment centers, and retail/recreational opportunities, as well as regional rural routes, such as Marsh Creek Road, that connect to Vacso Road in the east and the Clayton/Concord area to the west. The resulting trip distribution percentages are shown on Figure 4.2-3. Project trips were then assigned to the roadway network under Existing, Near Term, and Cumulative Conditions (see Figure 4.2-4 through Figure 4.2-6.

Existing With Project Circulation System Improvements

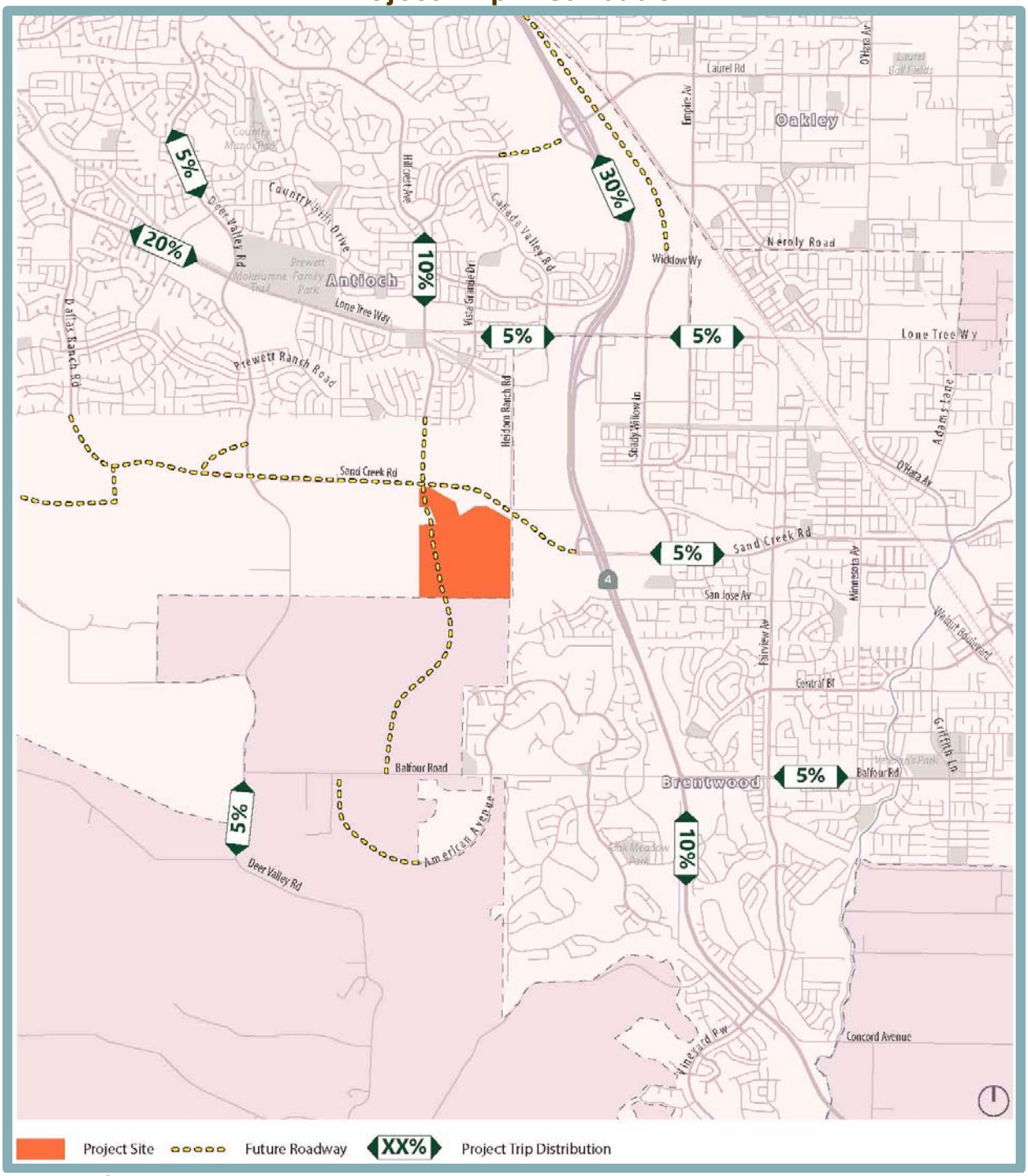
As part of the project, Hillcrest Avenue would be extended through the project site. Hillcrest Avenue at the proposed location is identified in the City of Antioch General Plan. The alignment of the roadway has been designed to span Sand Creek and provide permanent access to the existing PG&E facility and beyond.

Vehicular ingress and egress to the proposed project would be provided from Hillcrest Avenue by way of a centrally located main entry, and an emergency vehicle access (EVA)/secondary entry intersection to the south. In addition, a clear span EVA/pedestrian bridge may be constructed adjacent to the existing PG&E bridge spanning Sand Creek in the northeastern portion of the project site, subject to final negotiations with PG&E and final utility designs. The Hillcrest Avenue extension would include sidewalk and landscaping on the east side of the roadway. The Hillcrest Avenue bridge over Sand Creek would be constructed in the ultimate width to facilitate two southbound and two northbound lanes.

Right-of-way improvements would be limited to the necessary roadway width, utilities, and pedestrian facilities within the area of the Sand Creek crossing.

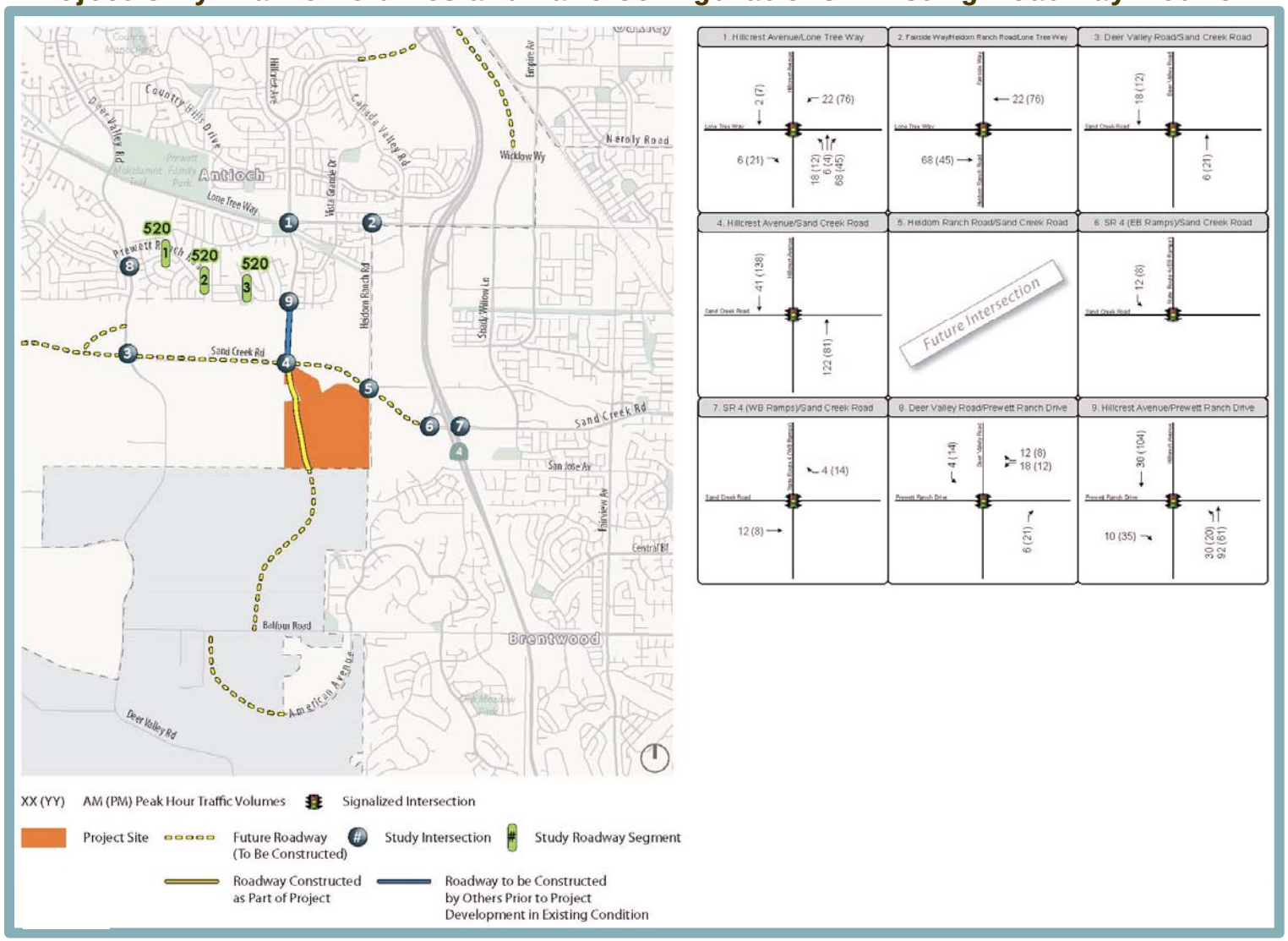
Interior vehicular circulation would be provided by a traditional grid pattern of private two-way streets that connect back to the entrances. The private streets are proposed with a 41-foot right-of-way, including 36 feet curb-to-curb with a five-foot attached monolithic sidewalk on one side of the street. The streets would allow two-way traffic and parking on both sides. Each residential unit would have a two-car garage and driveway with additional street parking.

Figure 4.2-3
Project Trip Distribution



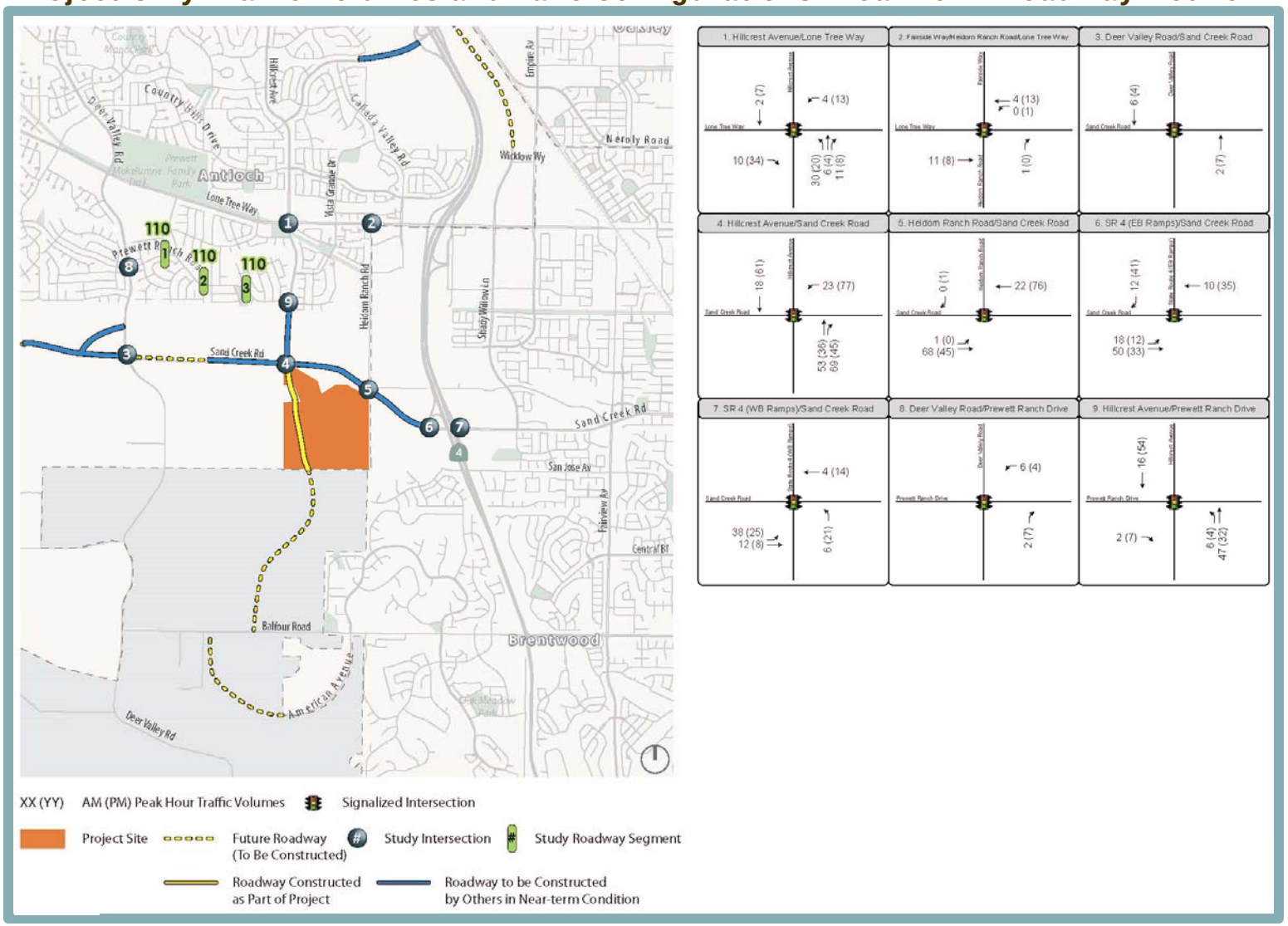
Source: Fehr & Peers, 2020.

Figure 4.2-4
Project Only Traffic Volumes and Lane Configurations: Existing Roadway Network



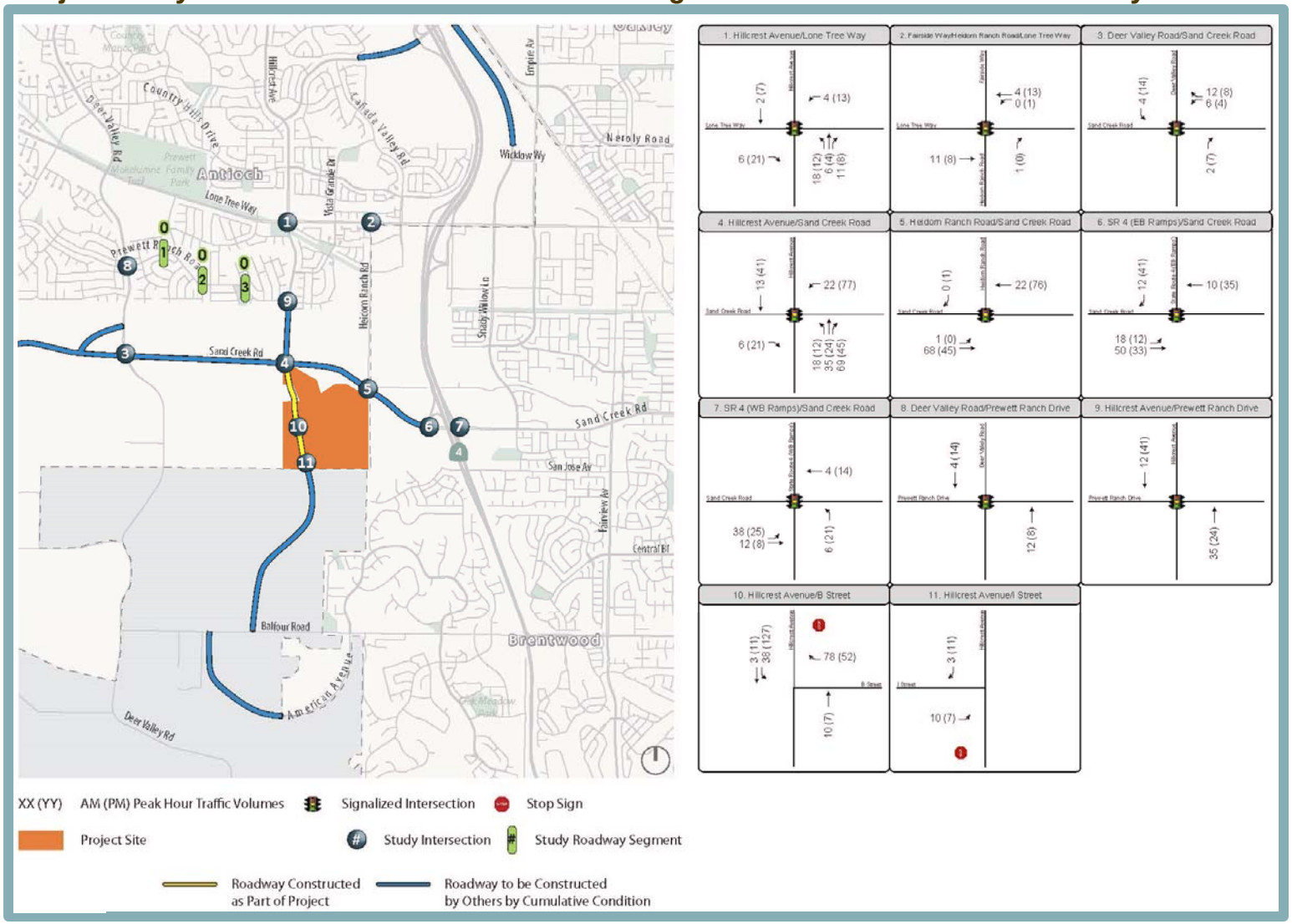
Source: Fehr & Peers, 2020.

Figure 4.2-5
Project Only Traffic Volumes and Lane Configurations: Near Term Roadway Network



Source: Fehr & Peers, 2020.

Figure 4.2-6
Project Only Traffic Volumes and Lane Configurations: Cumulative Roadway Network



Source: Fehr & Peers, 2020.

Near-Term Scenario Assumptions

In order to develop the Near-Term Without Project condition, the City of Brentwood Project Status as of May 2019 and City of Antioch Project Pipeline (as of May 2019) were reviewed by Fehr & Peers to identify planned and pending development within the project region. Such development projects are summarized in Table 6 of the TIA (see Appendix D to this EIR).

A number of roadway improvements are conditioned on near-term developments and considered in the near-term forecasts, including the following:

- Extension of Hillcrest Avenue from the current terminus to an extension of Sand Creek Road;
- Improvements to Heidorn Ranch Road along the frontage of the Promenade/Vineyards at Sand Creek project and Heidorn Village Project;
- Extension of Sand Creek Road from SR 4 in the east to a new terminus by the Dozier-Libbey Medical High School (change to the existing high school access would not occur in the near-term condition, with all access assumed to continue through Sand Creek Road to the west of the campus, adjacent to the Kaiser Hospital facility);
- Extension of Laurel Road from SR 4 to the current terminus east of Canada Valley Road;
- Extension of Prewett Ranch Drive to Heidorn Ranch Road;
- Extension of Sand Creek Road to Dallas Ranch Road; and
- Improvements to Deer Valley Road along the frontage of The Ranch development.

For the extension of Sand Creek Road, direct through travel would not be permitted between Deer Valley Road and Hillcrest Avenue; however, vehicles would be able to travel through Prewett Ranch Drive between Hillcrest Avenue and Deer Valley Road to access destinations to the west.

Signal timings were left unchanged for intersections along Lone Tree Way. For existing or new signalized intersections on Sand Creek Road, signal timings were optimized with the same timings used for the evaluation of without and with project impacts. Where peak hour factors were less than 0.90 in the existing condition and preliminary analysis indicted poor operations, the peak hour factor was increased to 0.95.

Cumulative Scenario Assumptions

To assess future growth with planned development in the East County Area, several sources of data were reviewed as part of the TIA, including the CCTA Travel Demand Model, future traffic projections as documented in the administrative draft Antioch Transportation Impact Fee, future projections from the City of Brentwood Priority Area 1 Specific Plan EIR (June 2018), and projections developed as part of the Aviano and Promenade/Vineyards at Sand Creek transportation impact studies. Traffic forecasts within the immediate study area were reviewed to ensure that known developments were adequately reflected in the forecasts, such as the Bridle Gate project located on the north and south side of the proposed Sand Creek extensions, west of SR 4, and development of the Albers Ranch project, west of the project site. Minor adjustments were made to the forecasts to balance traffic volumes between closely spaced intersections in the study area.

The Albers Ranch property has a designated access point to Sand Creek Road, and the potential for a secondary emergency vehicle access to Deer Valley Road. Currently, access through the project site has been contemplated, although a General Plan Amendment would be required. For purposes of this assessment, access to Albers Ranch is assumed to occur from Sand Creek

Road, as access through the project site has not yet been approved. For informational purposes, a secondary assessment of intersection operations with Albers Property development taking primary access through the project site, through Street I, is provided in Impact 4.2-10 of this chapter.

In November 2019, voters in the City of Brentwood defeated Measure L that would have permitted the construction of the Vineyards at Deer Creek project. That project would have extended Hillcrest Avenue from the southern property line to Balfour Road as a private roadway, in conjunction with other development. As Measure L was defeated, future development of Vineyards at Deer Creek and extension of Hillcrest Avenue to the south of the project site is uncertain at this time.

However, as the roadway connection is shown in the City of Brentwood and City of Antioch Circulation Elements, and development is assumed on the Vineyards at Deer Creek site within the City of Brentwood General Plan, development of the Vineyards at Deer Creek project was considered as part of the background cumulative condition in order to provide a conservative worst-case assessment of future conditions. Excluding the Vineyards at Deer Creek project and associated roadway improvements would not change the overall conclusions of the TIA, or change the project mitigation requirements in the Cumulative With Project condition.

Project Vehicle Miles Travelled

In order to analyze VMT associated with existing development in the project area and the proposed project, Fehr & Peers used the CCTA travel demand model, as well as information from the Metropolitan Transportation Commission (MTC). The CCTA model was used to estimate average daily vehicle miles of travel for proposed project residents, while MTC data was used to establish average trip lengths for existing residential uses in Antioch. A select zone analysis was conducted using the CCTA model whereby all the trips generated by the proposed project were tracked through the transportation system.

Project-Specific Impacts and Mitigation Measures

The proposed project impacts on the transportation system are evaluated in this section based on the thresholds of significance and methodology described above. Each impact is followed by recommended mitigation to reduce the identified impacts, if needed.

4.2-1 Conflict with a program, plan, ordinance, or policy addressing the circulation system during construction activities. Based on the analysis below and with implementation of mitigation, the impact is *less than significant*.

Construction activities associated with the proposed project would include use of construction vehicles, including vehicles removing or delivering fill material, bulldozers, and other heavy machinery, as well as building materials delivery, and construction worker activity. The project would not include substantial import and/or export of fill material and, thus, would not require substantial haul truck traffic.

Any truck traffic to the site would follow designated truck routes, and project construction would likely stage any large vehicles (i.e., earth- moving equipment, cranes, etc.) on the site prior to beginning site work and remove such vehicles at project completion. However, detailed information relating to the construction schedule

during site development or a construction management plan is not available. Once the construction schedule is finalized, the schedule would require City review in conjunction with the schedule of construction of neighboring projects. In the absence of such review, construction traffic associated with the proposed project could result in adverse effects to the local roadway system, and a ***significant*** impact could occur.

As such, there could be temporary significant impacts to the transportation system during the construction period.

Mitigation Measure(s)

Implementation of the following mitigation measure would reduce the above impact to a *less-than-significant* level.

4.2-1 *Prior to issuance of grading and building permits, the project applicant shall submit a construction management plan, subject to review and approval by the City Engineer. The requirements within the construction management plan shall include, but are not necessarily limited to, the following elements:*

- *Project staging plan to maximize on-site storage of materials and equipment;*
- *A set of comprehensive traffic control measures, including scheduling of major truck trips and deliveries to avoid peak hours; lane closure proceedings; signs, cones, and other warning devices for drivers; and designation of construction access routes;*
- *Permitted construction hours;*
- *Location of construction staging;*
- *Identification of parking areas for construction employees, site visitors, and inspectors, including on-site locations; and*
- *Provisions for street sweeping to remove construction related debris on public streets.*

4.2-2 Conflict with a program, plan, ordinance, or policy addressing study intersections under Existing With Project conditions. Based on the analysis below, the impact is *less than significant*.

The proposed project would not be constructed until completion of the neighboring Promenade/Vineyards at Sand Creek Project, along with the associated Hillcrest Avenue extension from the current terminus at Prewett Ranch Drive to Sand Creek Road. Specifically, the Hillcrest Avenue extension to Sand Creek Road is necessary to provide access to the project site. The project would then construct Hillcrest Avenue into the project site.

The Promenade/Vineyards at Sand Creek Project will ultimately include 632 detached homes at buildout, including 192 non-age-restricted homes and 440 age-restricted detached homes, generating approximately 3,690 daily trips, 248 morning peak hour and 322 evening peak hour trips. Trip generation from buildout of the

Promenade/Vineyards at Sand Creek Project was assumed for the Existing With Project condition, in conjunction with the construction of Hillcrest Avenue along its project frontage to Sand Creek Road. Improvements to Heidorn Ranch Road will also be constructed such that vehicle trips generated by the Promenade/Vineyards at Sand Creek Project will access the regional roadway network from Hillcrest Avenue and Heidorn Ranch Road; however, for the purposes of this analysis, the connection of Sand Creek Road between Hillcrest Avenue and Heidorn Ranch Road was not assumed to present a conservative assessment of the effects of project traffic in the existing condition by assuming all project traffic would be concentrated along Hillcrest Avenue. This assumption allows for some flexibility in project construction timing, as construction of the proposed project could begin prior to buildout of the Promenade/Vineyards at Sand Creek Project, and construction of Sand Creek Road between Hillcrest Avenue and Heidorn Ranch Road.

The resulting Promenade trip estimates were then added to the existing traffic volumes from to estimate the Existing with Promenade traffic volumes. Project trips were then added to develop the Existing With Promenade With Project traffic volumes. The Existing With Promenade With Project analysis results are presented in Table 4.2-8. The addition of traffic from the Promenade/Vineyards at Sand Creek Project would increase delay at the study intersections, which would then further increase with the addition of project traffic. However, all study intersections would continue to operate acceptably. Therefore, a ***less-than-significant*** impact related to conflicting with applicable City/CCTA standards for study intersections would occur under Existing With Project conditions.

Mitigation Measure(s)

None required.

4.2-3 Conflict with a program, plan, ordinance, or policy addressing study roadway segments under Existing With Project conditions. Based on the analysis below, the impact is *less than significant*.

To assess the effects of the addition of project traffic on Prewett Ranch Drive in the Existing With Project condition, the daily trip generation estimates were applied to the project trip assignment. The resulting trips where then added to the existing traffic volumes. The percent increase in project trips was also calculated, with the results presented in Table 4.2-9. For Roadway Segments 1 and 2, the Existing With Project daily traffic volumes are below the maximum desired level for a residential collector roadway without front-on housing. For Roadway Segment 3, between Grass Valley Way and Hillcrest Avenue, existing traffic volumes exceed the desired level for a residential collector roadway with front-on housing (3,000 vehicles per day), with the project expected to increase vehicle traffic by up to 12 percent.

Table 4.2-8
Intersection LOS – Existing With Promenade With Project

Intersection	Control	Peak Hour	Existing		Existing with Promenade		Existing With Promenade With Project	
			Delay	LOS	Delay	LOS	Delay	LOS
1. Lone Tree Way at Hillcrest Avenue	Signal	AM PM	18 21	B C	19 21	B C	21 26	C C
2. Lone Tree Way at Heidorn Ranch Road	Signal	AM PM	11 12	B B	12 16	B B	12 16	B B
3. Sand Creek Road at Deer Valley Road	Signal	AM PM	10 15	A B	10 15	A B	10 15	A B
4. Sand Creek Road at Hillcrest Avenue (Future Intersection)	Signal	AM PM	-- --	- - --	-- --	- - --	-- --	-- --
5. Sand Creek Road at Heidorn Ranch Road (Future Intersection)	Signal	AM PM	-- --	- - --	-- --	- - --	-- --	-- --
6. Sand Creek Road at SR 4 Eastbound Ramps	Signal	AM PM	9 7	A A	9 7	A A	9 7	A A
7. Sand Creek Road at SR 4 Westbound Ramps	Signal	AM PM	5 5	A A	5 5	A A	5 5	A A
8. Prewett Ranch Drive at Deer Valley Road	Signal	AM PM	27 14	C B	29 14	C B	30 23	C C
9. Prewett Ranch Drive at Hillcrest Avenue	Signal	AM PM	19 16	B B	29 24	C C	30 23	C C

Source: Fehr & Peers, 2020.

Table 4.2-9
Roadway Segment Average Daily Traffic – Existing With Project

Segment	Daily Traffic[1]	Existing With Promenade	Project Traffic[2]	Existing With Promenade With Project	Daily Fluctuation[3]	Project Increase
1. Prewett Ranch Drive, east of Deer Valley Road	7,510	7,790	520	8,310	± 1.2%	7%
2. Prewett Ranch Drive at Diablo Vista Elementary School	4,050	4,330	520	4,850	± 1.8%	12%
3. Prewett Ranch Drive, west of Hillcrest Avenue	3,970	4,250	520	4,770	± 2.9%	12%

[1] Average daily two-way traffic measured over three days.
[2] Average peak hour volume from the three weekdays of data collection.
[3] Percent difference between the three days of data collection.

Source: Fehr & Peers, 2020.

The City of Antioch does not have an adopted threshold for roadway segments and has included an analysis in this EIR for informational purposes only. In addition, as discussed in further detail below, the traffic volumes along the study roadway segments would either be below the desired levels or the project's increase in traffic would be within the daily fluctuation under Near-Term With Project and Cumulative With Project conditions. Thus, the project's increase in vehicle traffic to the study roadway segments would only have the potential to temporarily affect the roadway segments. For the aforementioned reasons, impacts related to study roadway segment would be considered ***less than significant*** under Existing With Project conditions.

Mitigation Measure(s)

None required.

4.2-4 Conflict with a program, plan, ordinance, or policy addressing study freeway segments under Existing With Project conditions. Based on the analysis below, the impact is *less than significant*.

The Existing With Project AM and PM peak hour freeway operations are summarized in Table 4.2-10 below. It should be noted that Intersections #8 and #9 would be internal intersections, the traffic at the intersections would be primarily trips generated by the proposed project under Existing With Project conditions, which would not be considered substantial. Thus, Intersections #8 and #9 are not included in the LOS analysis for Existing With Project conditions.

As shown in the table, all study freeway segments would continue to operate within the established service objective (i.e., delay index of 2.5 or less during the peak hours) with the addition of project traffic. Therefore, a ***less-than-significant*** impact related to conflicting with applicable CCTA standards for study freeway segments would occur under Existing With Project conditions.

Mitigation Measure(s)

None required.

4.2-5 Conflict with a program, plan, ordinance, or policy addressing study intersections under Near-Term With Project conditions. Based on the analysis below, the impact is *less than significant*.

Traffic generated by approved and pending developments was added to the existing traffic volumes to provide the basis for the Near-Term Without Project analysis. In addition, the existing traffic counts were increased by five percent to account for traffic growth from projects outside the immediate study area that could add through traffic to the area in the Near-Term condition. Project traffic was added to the Near-Term Without Project forecasts to estimate Near-Term With Project volumes at the study intersections.

Table 4.2-10
Freeway LOS – Existing With Project

Segment	Direction	Existing		Existing Plus Project	
		Volume	Delay Index	Volume	Delay Index
AM Peak Hour					
1. SR 4, north of Lone Tree Way	SB	2,787	1.01	2,817	1.01
	NB	2,887	1.01	2,982	1.02
2. SR 4, north of Sand Creek Road	SB	2,448	1.00	2,511	1.00
	NB	2,815	1.01	2,836	1.01
3. SR 4, north of Balfour Road	SB	2,009	1.00	2,042	1.00
	NB	2,014	1.00	2,025	1.00
4. SR 4, south of Balfour Road	SB	1,201	1.20	1,231	1.25
	NB	940	1.03	950	1.03
PM Peak Hour					
1. SR 4, north of Lone Tree Way	SB	3,711	1.11	3,814	1.14
	NB	2,975	1.02	3,038	1.02
2. SR 4, north of Sand Creek Road	SB	3,185	1.03	3,227	1.04
	NB	2,932	1.02	3,005	1.02
3. SR 4, north of Balfour Road	SB	2,038	1.00	2,060	1.00
	NB	2,220	1.00	2,258	1.00
4. SR 4, south of Balfour Road	SB	1,015	1.05	1,035	1.06
	NB	1,431	1.82	1,466	1.99

Source: Fehr & Peers, 2020.

It should be noted that Intersections #8 and #9 would be internal intersections, the traffic at the intersections would be primarily trips generated by the proposed project under Near-Term With Project conditions, which would not be considered substantial. Thus, Intersections #8 and #9 are not included in the LOS analysis for Near-Tern With Project conditions. The analysis results are presented in Table 4.2-11 below.

Table 4.2-11
Intersection LOS – Near-Term With Project

Intersection	Control	Peak Hour	Near-Term Without Project		Near-Term With Project	
			Delay	LOS	Delay	LOS
1. Lone Tree Way at Hillcrest Avenue	Signal	AM PM	21 37	C D	21 45	C D
2. Lone Tree Way at Heidorn Ranch Road	Signal	AM PM	17 27	B C	17 27	B C
3. Sand Creek Road at Deer Valley Road	Signal	AM PM	21 18	C B	21 18	C B
4. Sand Creek Road at Hillcrest Avenue (Future Intersection)	Signal	AM PM	9 11	A B	22 21	C C
5. Sand Creek Road at Heidorn Ranch Road (Future Intersection)	Signal	AM PM	18 19	B B	19 19	B B
6. Sand Creek Road at SR 4 Eastbound Ramps	Signal	AM PM	13 39	B D	26 39	C D
7. Sand Creek Road at SR 4 Westbound Ramps	Signal	AM PM	9 9	A A	9 9	A A
8. Prewett Ranch Drive at Deer Valley Road	Signal	AM PM	46 25	D C	48 26	D C
9. Prewett Ranch Drive at Hillcrest Avenue	Signal	AM PM	21 15	C B	21 16	C C

Source: Fehr & Peers, 2020.

In the Near-Term Without Project condition, all study intersections would operate at acceptable service levels. With the addition of project traffic, all study intersections would continue to operate at acceptable service levels. Therefore, a less-than-significant impact related to conflicting with applicable City/CCTA standards for study intersections would occur under Near-Term With Project conditions.

Mitigation Measure(s)

None required.

4.2-6 Conflict with a program, plan, ordinance, or policy addressing study roadway segments under Near-Term With Project conditions. Based on the analysis below, the impact is *less than significant*.

Traffic from near-term projects was added to the existing daily traffic volumes on Prewett Ranch Drive, with the resulting volumes shown in Table 4.2-12. Project trips that could use the roadway were then estimated considering the changes to the

roadway network in the Near-Term condition discussed previously and added to the Near-Term Without Project volumes. The percent increase in project trips was also calculated, with the results presented in Table 4.2-12.

For Roadway Segments 1 and 2, the near-term daily traffic volumes considering the addition of project traffic are below the maximum desired level for a residential collector roadway without front-on housing. For Roadway Segment 3, between Grass Valley Way and Hillcrest Avenue, existing traffic volumes exceed the desired level for a residential collector roadway with front-on housing (3,000 vehicles per day). While volumes are expected to further increase under Near-Term conditions and the addition of project traffic would further add vehicle travel to the roadway, the project's expected increase in traffic volumes that would contribute to the roadway segment would be less than the existing daily fluctuation. Therefore, a ***less-than-significant*** impact related to study roadway segments would occur under Near-Term With Project conditions.

Mitigation Measure(s)

None required.

4.2-7 Conflict with a program, plan, ordinance, or policy addressing study freeway segments under Near-Term With Project conditions. Based on the analysis below, even with mitigation, the impact is *significant and unavoidable*.

Near-Term freeway forecasts were developed based on the same method used to develop the near-term intersection forecasts, both without and with the proposed project. Planned, but not yet completed freeway improvements were not included in the evaluation of near-term freeway operations.

The Near-Term With Project analysis results are presented in Table 4.2-13. As shown in the table, in the Near-Term Without Project condition, operations of SR 4 between Marsh Creek Road and Balfour Road are expected to degrade beyond the applicable CCTA 2.5 delay index standard. All other study freeway segments would continue to operate within acceptable standards. Given that the proposed project would add traffic to the impacted segment during both the AM and PM peak hours, a ***significant*** temporary impact related to conflicting with applicable CCTA standards for study freeway segments would occur under Near-Term With Project Conditions.

Mitigation Measure(s)

Payment of regional transportation impact fees to the East Contra Costa Regional Fee and Financing Authority (ECCRFFA), as required by the following mitigation measure, would ensure the project contributes a fair share towards the widening of SR 4 between Balfour Road and Marsh Creek Road. Widening of the roadway would improve freeway operations. However, given that timing for the required improvement has not yet been identified, completion of the improvement prior to occupation of the proposed project cannot be guaranteed. Thus, the impact would temporarily remain *significant and unavoidable*.

Table 4.2-12
Roadway Segment Average Daily Traffic – Near-Term With Project

Segment	Near-term Without Project Daily Traffic[1]	Project Traffic[2]	Near-term With Project	Existing Daily Fluctuation[3]	Project Increase
1. Prewett Ranch Drive, east of Deer Valley Road	9,490	110	9,600	± 1.2%	1%
2. Prewett Ranch Drive at Diablo Vista Elementary School	5,860	110	5,970	± 1.8%	2%
3. Prewett Ranch Drive, west of Hillcrest Avenue	5,780	110	5,890	± 2.9%	2%

[1] Average daily two-way traffic measured over three days.
[2] Average peak hour volume from the three weekdays of data collection.
[3] Percent difference between the three days of data collection.

Source: Fehr & Peers, 2020.

Table 4.2-13
Freeway LOS – Near-Term With Project

Segment	Direction	Near-Term Without Project		Near-Term With Project	
		Volume	Delay Index	Volume	Delay Index
AM Peak Hour					
1. SR 4, north of Lone Tree Way	SB	3,316	1.04	3,328	1.05
	NB	3,594	1.08	3,632	1.09
2. SR 4, north of Sand Creek Road	SB	2,970	1.02	2,982	1.02
	NB	3,414	1.06	3,452	1.06
3. SR 4, north of Balfour Road	SB	2,731	1.01	2,749	1.01
	NB	2,387	1.00	2,393	1.00
4. SR 4, south of Balfour Road	SB	**1,781**	**5.71**	**1,793**	**5.97**
	NB	1,254	1.28	1,258	1.29
PM Peak Hour					
1. SR 4, north of Lone Tree Way	SB	4,636	1.65	4,677	1.70
	NB	3,562	1.08	3,580	1.08
2. SR 4, north of Sand Creek Road	SB	3,870	1.15	3,911	1.17
	NB	3,465	1.06	3,483	1.07
3. SR 4, north of Balfour Road	SB	2,698	1.01	2,710	1.01
	NB	2,804	1.01	2,819	1.01
4. SR 4, south of Balfour Road	SB	1,494	2.15	1,502	2.20
	NB	**1,918**	**9.52**	**1,932**	**10.03**

Note: Bold indicates potentially deficient operations.

Source: Fehr & Peers, 2020.

4.2-7 *Prior to issuance of building permits for the proposed project, the project applicant shall pay applicable regional transportation impact fees to the East Contra Costa Regional Fee and Financing Authority (ECCRFFA). Proof of fee payment shall be submitted to the City of Antioch.*

4.2-8 Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b). Based on the analysis below, given the absence of feasible mitigation, the impact is *significant and unavoidable*.

A select zone analysis was conducted using the CCTA model whereby all the trips generated by the proposed residences were tracked through the transportation system. Based on the analysis, each future resident of the proposed non-restricted single-family residences is estimated to generate approximately 24.5 VMT per day, including all trips that either start or end at home.

As shown previously in in Table 4.2-6, the average per capita VMT for the City of Antioch, Contra Costa County, and the Bay Area is 17.9, 18.0, and 15.3, respectively. Thus, the level of vehicle travel associated with the proposed project would be higher than regional averages, due in part to the project's distance from major employment centers, as well as the relative distance to other destinations as compared to other parts of the City and region.

In the event that all or a portion of the proposed residences are age-restricted as senior residences, the absolute level of VMT would be less than an unrestricted single-family home development, as senior residences include fewer persons per household than non-age-restricted homes. Additionally, the VMT on a per resident basis could be less from an age-restricted home, as residents would tend to have fewer work-related trips over time than in a non-age-restricted development community. It should be noted that depending on the final mixture of land uses ultimately constructed within the City of Brentwood Priority Area 1, additional employment and commercial opportunities may be placed within close proximity to the proposed project site, thereby reducing project VMT. However, for the purpose of this analysis, the worst-case VMT associated with buildout of the project site with non-age-restricted residences only is assumed.

As discussed previously, per OPR guidance, OPR residential projects that generate VMT per capita at 15 percent less than the existing City or regional average may be considered less than significant. Given that the per-capita VMT associated with the proposed project would exceed regional averages, the proposed project could conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b), and a ***significant*** impact could occur.

Mitigation Measure(s)

Per the TIA, feasible mitigation to reduce the per capita VMT associated with the proposed project to less than 15 percent below regional averages (such as implementation of a transportation demand management program) does not exist. While provision of transit service to the site could slightly reduce VMT per resident, the

land use context of the project makes meaningful reductions in VMT difficult to achieve. Therefore, the VMT impact would remain *significant and unavoidable*.

None feasible.

4.2-9 Conflict with a program, plan, ordinance or policy addressing transit, bicycle, or pedestrian facilities. Based on the analysis below, the impact is *less than significant*.

Although transit service is not currently available in the vicinity of the project site, residents aged 65 and older are able to access Senior Paratransit services through Tri Delta Transit, and paratransit service would be provided to disabled residents who are not able to independently use fixed-route service. Upon development of the proposed project, as well as other pending and planned development in the project area, Tri Delta Transit may elect to extend additional transit services to the project site. Thus, the project would not conflict with any planning efforts related to public transit. Furthermore, while residents of the project may result in a slight increase in demand on existing transit services in the region, such demand is unlikely to cause an appreciable change in system ridership, and the project would not degrade transit operations.

Several roadway types are proposed within the proposed project, including arterial, collector, and local. Arterial (Hillcrest Avenue) roadways would provide a six-foot sidewalk on one side of the street. Collector (B Street Entry Way) would provide a five-foot sidewalk on both sides of the street. On local streets, a four-foot sidewalk is proposed for one side of the street. A network of trails is also proposed through the site, with a minimum trail width of 10 feet. In addition, the project would include a new private pedestrian trail connection extending from the proposed residential neighborhood to connect to the public Sand Creek Trail included in the planned Promenade/Vineyards at Sand Creek development to the north of the site. Along the proposed extension of Hillcrest Avenue, the project would include new bike lanes, connecting to bicycle facilities on the segment of Hillcrest Avenue currently under construction as part of the Promenade/Vineyards at Sand Creek Project. Thus, the proposed project would provide adequate bicycle and pedestrian infrastructure, and would not conflict with existing or planned bicycle or pedestrian facilities.

Based on the above, the proposed project would not conflict with adopted policies, plans, or programs supporting alternative transportation (i.e., bus turnouts, bicycle lanes, bicycle racks, public transit, pedestrian facilities, etc.). Thus, the project would result in a ***less-than-significant*** impact to transit, bicycle, and pedestrian facilities.

Mitigation Measure(s)

None required.

4.2-10 Substantially increase hazards to vehicle safety due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment). Based on the analysis below, the impact is *less than significant*.

Phase I of the proposed project would include construction of approximately 1,500 lineal feet of Hillcrest Avenue in a two-lane undivided roadway configuration from south of the future Sand Creek Road right-of-way to the main entry and all necessary turning lanes at intersections, as well as right-of-way for the ultimate four-lane configuration. Phase I would also include construction of the main entry and the potential EVA/pedestrian bridge. Phase II of the proposed project would include construction of approximately 1,000 additional lineal feet of Hillcrest Avenue in a two-lane undivided roadway configuration from south of the main entry to the southerly EVA/secondary entry intersection. Phase II would also include construction of the southern EVA into the eastern neighborhood area. Phase III of the proposed project would include construction of the southern secondary entry on the west side of Hillcrest Avenue, across from the Phase II EVA.

It should be noted that the main entry to the Phase I and II development would be gated, while the proposed Phase III development west of Hillcrest Avenue would not be gated and would provide access to the property to the west. Ultimate construction of the four-lane Hillcrest Avenue configuration would occur as part of buildout of future residential uses on the area to the west of the project site (Albers Ranch), when such development necessitates connection to Hillcrest Avenue.

Potential impacts related to gated access at project entrances, roadway design features, and incompatible uses are discussed below.

Gated Access

Residents of the Phase I and II development would be able to enter the neighborhood using an access code. Visitors would be able to call the resident they are visiting to gain access to the neighborhood. Should the resident they are visiting not be available to permit access, a vehicle turnaround area would be provided. Routine delivery drivers, such as USPS, and emergency services would be provided an access code.

Based on the projected trip generation, three to four vehicles per minute are expected to seek entry into the project in the peak 15-minute period of the weekday peak hour. As each entry transaction from a resident is not expected to take more than a few seconds, the potential for vehicle queues to form from the access gate to Hillcrest Avenue is statistically very low, as sufficient space would be provided for four to five vehicles to queue from the access podium to Hillcrest Avenue.

Roadway Design Features and Incompatible Uses

The proposed project would not include any new sharp curves or dangerous intersections and would not be located in the vicinity of any such roadway features. All proposed roadway improvements, including the proposed extension of Hillcrest Avenue, would comply with applicable City roadway design standards. In addition, the design of the on-site circulation system would not involve any features that would

increase traffic hazards at the site. Furthermore, the proposed project would not introduce incompatible uses, such as heavy-duty truck traffic, to area roadways during operations. Potential impacts related to project construction traffic are discussed under Impact 4.2-1 above.

Conclusion

Based on the above, the proposed gated access would not create a substantial vehicle safety risk. The proposed internal circulation system and other roadway improvements would be designed to minimize hazardous roadway design features, and the project would not introduce incompatible uses to area roadways. Therefore, a ***less-than-significant*** impact would occur.

Mitigation Measure(s)

None required.

4.2-11 Result in inadequate emergency access. Based on the analysis below, the impact is *less than significant*.

Several factors determine whether a project has sufficient access for emergency vehicles, including the following:

- Number of access points (both public and emergency access only);
- Width of access points; and
- Width of internal roadways;

Based on the 2016 California Fire Code, as amended by Contra Costa County Ordinance 2016-23, the minimum number of access roads serving residential development(s) shall be based upon the number of dwelling units served as follows:

- Multiple Family Residential Projects having more than 100 dwelling units should be provided with two separated and approved fire apparatus access roads (D106.1). Exception: Projects having up to 200 dwelling units may have a single approved fire apparatus access road when all buildings, including nonresidential occupancies, are equipped throughout with approved automatic sprinkler systems installed in accordance with Section 903.3.1.1 or 903.3.1.2.
- Multiple Family Residential Projects having more than 200 dwelling units shall be provided with two separate and approved fire apparatus access roads regardless of whether they are equipped with an approved automatic sprinkler system.
- Development of one or two-family dwellings where the number of dwelling units exceed 30 shall be provided with two separate and approved fire apparatus access roads; where there are more than 30-dwelling units on a single public or private fire apparatus access road and all dwelling units are equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3 of the California Fire Code, access from two directions shall not be required (D107.1).
- Where two fire apparatus access roads are required, they shall be placed a distance apart equal to not less than one-half of the length of the maximum

overall diagonal dimension of the property or area to be served, measured in a straight line between accesses.

Primary emergency access to the project site would be from Hillcrest Avenue to the north by way a single 44-foot-wide bridge in the existing and near-term condition. In addition, an EVA would be provided in the northeast portion of the site, either by way of the existing PG&E bridge spanning Sand Creek, or through a new clear span EVA/pedestrian bridge that constructed adjacent to the existing PG&E bridge, subject to final negotiations with PG&E and final utility designs. Emergency vehicle access could also be provided through the pending Albers Ranch development project. Thus, the proposed homes would have at least two means of accessing the neighborhood, considering the proposed roadway connection on Hillcrest Avenue and the EVA access at the northeastern portion of the project site. Furthermore, all dwelling units would be equipped with automatic sprinkler systems in accordance with California Fire Code requirements. Therefore, the proposed project would provide for sufficient emergency access, and a ***less-than-significant*** impact would occur.

Mitigation Measure(s)

None required.

Cumulative Impacts and Mitigation Measures

As defined in Section 15355 of the CEQA Guidelines, "cumulative impacts" refers to two or more individual effects which, when considered together, are considerable, compound, or increase other environmental impacts. The individual effects may be changes resulting from a single project or a number of separate projects. The cumulative impact from several projects is the change in the environment that results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. The cumulative setting for the proposed project is discussed above under the Cumulative Scenario Assumptions section.

It should be noted that increased traffic volumes on local roadway facilities under cumulative conditions would not substantially alter performance related to bicycle facilities, pedestrian facilities, transit facilities and services, and emergency vehicle access. Rather, impacts to such facilities under Cumulative With Project conditions would be identical to those discussed above. In addition, construction activities associated with the project would be complete prior to the cumulative analysis year. Therefore, such topics are not discussed further in the cumulative analysis presented herein.

4.2-12 Conflict with a program, plan, ordinance, or policy addressing study intersections under Cumulative With Project conditions. Based on the analysis below, impacts to all study intersections under Cumulative With Project conditions are less than significant, with the exception of the Lone Tree Way/Hillcrest Avenue, Sand Creek Road/SR 4 eastbound ramps, and Sand Creek Road/SR 4 westbound ramps intersections. Even with mitigation, the project's incremental contribution to significant cumulative impacts at the Sand Creek Road/SR 4 eastbound ramps and Sand Creek Road/SR

4 westbound ramps intersections is *cumulatively considerable* and *significant and unavoidable*.

As discussed previously, as part of the cumulative analysis for the proposed project, traffic from future buildout of the Albers Ranch property to the west of the site is assumed to be routed through a connection to the future Sand Creek Road extension, consistent with the circulation routes established in the City of Antioch General Plan. However, the City anticipates that access to the Albers Ranch property may be sought through the project site, connecting to "I Street". Although a General Plan Amendment would be required to allow for the alternative connection, a supplemental LOS analysis of Intersections #4, #8, and #9 was performed as part of the TIA to evaluate potential effects associated with routing Albers Ranch traffic through the project site. The results of the supplemental analysis are summarized below, for informational purposes.

CEQA Analysis: Albers Ranch Traffic Through Sand Creek Road

Table 4.2-14 below summarizes operations at each of the study intersections under Cumulative With Project conditions. As shown in the table, the following four intersections are projected to operate at deficient levels in the cumulative condition prior to the addition of project traffic; all other study intersections would operate acceptably:

1. Lone Tree Way at Hillcrest Avenue – LOS E, AM and PM Peak Hour;
6. Sand Creek Road at SR 4 eastbound ramps – LOS F, AM and PM Peak Hour;
7. Sand Creek Road at SR 4 westbound ramps – LOS E, AM Peak Hour; and
9. Prewett Ranch Drive at Deer Valley Road – LOS E, AM Peak Hour.

Under Cumulative With Project conditions, the addition of project traffic would not further degrade operations at the four intersections listed above, and all other study intersections would still operate acceptably. However, the project would increase vehicle delay at three of the impacted intersections and, thus, would be considered to deteriorate operations at intersections that already operate unacceptably. Per the applicable City of Antioch significance criteria, the proposed project's incremental contribution to cumulative impacts at the Lone Tree Way/Hillcrest Avenue, Sand Creek Road/SR 4 eastbound ramps, and Sand Creek Road/SR 4 Westbound ramps intersections would be cumulatively considerable.

Supplemental Analysis: Albers Ranch Traffic Through Project Site

Traffic forecasts were developed for the cumulative condition for the proposed intersections along the project frontage (Intersections #8 and #9), as well as the Sand Creek Road at Hillcrest Avenue intersection (Intersection #4) considering access to the Albers Property through I Street. Analysis was conducted for the three intersections of internal streets with Hillcrest avenue assuming side- street stop-control with both a two lane and four lane Hillcrest Avenue, as presented in Table 4.2-15.

As shown in the table, under Cumulative With Project conditions, all three intersections are projected to operate at acceptable service levels under either a two-lane or four-lane Hillcrest Avenue scenario with side-street stop-control.

Table 4.2-14
Intersection LOS – Cumulative With Project

Intersection	Control	Peak Hour	Cumulative Without Project		Cumulative With Project	
			Delay	LOS	Delay	LOS
1. Lone Tree Way at Hillcrest Avenue	Signal	AM PM	**69** **57**	**E** **E**	***79*** ***64***	***E*** ***E***
2. Lone Tree Way at Heidorn Ranch Road	Signal	AM PM	24 36	C D	24 36	C D
3. Sand Creek Road at Deer Valley Road	Signal	AM PM	20 20	B B	20 21	B C
4. Sand Creek Road at Hillcrest Avenue	Signal	AM PM	47 51	D D	47 52	D D
5. Sand Creek Road at Heidorn Ranch Road	Signal	AM PM	15 31	B C	15 37	B D
6. Sand Creek Road at SR 4 Eastbound Ramps	Signal	AM PM	**95** **102**	**F** **F**	***97*** ***102***	***F*** ***F***
7. Sand Creek Road at SR 4 Westbound Ramps	Signal	AM PM	**69** 28	**E** C	***74*** 29	***E*** C
8. Prewett Ranch Drive at Deer Valley Road	Signal	AM PM	**66** 24	**E** **C**	***66*** 25	***E*** C
9. Prewett Ranch Drive at Hillcrest Avenue	Signal	AM PM	32 16	C B	32 16	C B

Note: Bold indicates potentially deficient operations. ***Bold*** *Italics* indicates potentially significant impact.

Source: Fehr & Peers, 2020.

Table 4.2-15
Intersection LOS – Cumulative With Project (Albers Ranch Access Through Project Site)

Intersection	Control	Peak Hour	Two-Lane Hillcrest Avenue		Four-Lane Hillcrest Avenue	
			Delay	LOS	Delay	LOS
4. Sand Creek Road at Hillcrest Avenue	Signal	AM PM	N/A	N/A	45 50	D D
10. Hillcrest Avenue at B Street	SSSC	AM PM	2 (12) 2 (11)	A (B) A (B)	2 (11) 2 (10)	A (B) A (A)
11. Hillcrest Avenue at I Street	SSSC	AM PM	5 (13) 3 (16)	A (B) A (C)	4 (12) 3 (14)	A (B) A (B)

Note: SSSC = side-street stop-control.
Source: Fehr & Peers, 2020.

Conclusion

Based on the above, Intersections #2, #3, #4, #5, #8, and #9 would operate acceptably under Cumulative With Project conditions, with or without potential routing of future Albers Ranch traffic though the project site. However, Intersections #1, #6, and #7, are projected to operate at deficient levels in the Cumulative Without Project condition, and the addition of project traffic would increase vehicle delay at the three impacted

intersections. Per the applicable City of Antioch significance criteria, the proposed project's incremental contribution to cumulative impacts at the Lone Tree Way/Hillcrest Avenue, Sand Creek Road/SR 4 eastbound ramps, and Sand Creek Road/SR 4 Westbound ramps intersections would be ***cumulatively considerable***.

Mitigation Measure(s)

The following sections provide a discussion of potential circulation system improvements to address impacts to the three study intersections listed above.

Lone Tree Way at Hillcrest Avenue

Mitigation Measure 4.2-10(a) below would require modification of the eastbound approach to the Lone Tree Way at Hillcrest Avenue intersection to provide two left-turn lanes, two through lanes, and a through-right-shared lane through the reconstruction of the median, restriping, and signal modifications. As shown in Table 4.2-16, with completion of the required improvements, the intersection would operate acceptably. Thus, the project's contribution to the cumulative impact would be reduced to a less than cumulatively considerable level.

Table 4.2-16
Intersection LOS – Cumulative With Project (Mitigated)

Intersection	Control	Peak Hour	Cumulative Without Project		Cumulative With Project		Cumulative With Project (Mitigated)	
			Delay	LOS	Delay	LOS	Delay	LOS
1. Lone Tree Way at Hillcrest Avenue	Signal	AM	**69**	**E**	***79***	***E***	46	D
		PM	**57**	**E**	***64***	***E***	53	D
6. Sand Creek Road at SR 4 Eastbound Ramps	Signal	AM	**95**	**F**	***97***	***F***	21	C
		PM	**102**	**F**	***102***	***F***	30	C
7. Sand Creek Road at SR 4 Westbound Ramps	Signal	AM	**69**	**E**	***74***	***E***	36	D
		PM	28	C	29	C	23	C

Note: Bold indicates potentially deficient operations. ***Bold*** *Italics* indicates potentially significant impact.

Source: Fehr & Peers, 2020.

Sand Creek Road at SR 4 Eastbound Ramps

Mitigation Measure 4.2-10(b) would require the project applicant to participate in the ECCRFFA regional fee program. The ECCRFFA regional fee program identifies planned improvements at the Sand Creek Road/SR 4 eastbound ramps intersection, including construction of a slip-ramp for the eastbound Sand Creek to southbound SR 4 movement, eliminating the conflicting left-turn movement at the intersection. As shown in Table 4.2-16, with completion of the required improvements, the intersection would operate acceptably. However, given that the ECCRFFA regional fee program does not identify timing for the improvements, completion of such improvements prior to buildout of the proposed project and other cumulative development cannot be guaranteed. Thus, the impact could be temporarily significant and unavoidable.

Sand Creek Road at SR 4 Westbound Ramps

Mitigation Measure 4.2-10(c) would require the project applicant to either pay a fair-share contribution towards improvements at the Sand Creek Road/SR 4 westbound ramps intersection, or participate in the ECCRFFA regional fee program. Such improvements would include modifying the westbound approach to provide two through lanes and two right-turn only lanes. As shown in Table 4.2-16, the improvements would result in acceptable operations at the intersection. However, the improvements are not included in the ECCRFFA regional fee program, and the ECCRFFA does not have a mechanism to collect fair-share payments for improvements not in the fee program. In addition, given that the intersection is under the jurisdiction of Caltrans, completion of the required improvements cannot be guaranteed solely by the City of Antioch. As the City cannot assure that the necessary improvements would be implemented, the impact would remain significant and unavoidable.

Conclusion

Based on the above, with implementation of mitigation, the project's contribution to the cumulative impact at the Lone Tree Way/Hillcrest Avenue intersection would be reduced to a less than cumulatively considerable level. However, given uncertainty regarding timing and funding for required improvements to the Sand Creek Road/SR 4 eastbound ramps and Sand Creek Road/SR 4 westbound ramps intersections, and the fact that both intersections are located outside of the City's jurisdiction, the projects incremental contribution to the cumulative impacts at the affected intersections would remain *cumulatively considerable* and *significant and unavoidable*.

4.2-12(a) *Prior to the issuance of the 165th building permit, the project applicant shall modify the eastbound approach to the Lone Tree Way at Hillcrest Avenue intersection to provide two left-turn lanes, two through lanes, and a through-right-shared lane through the reconstruction of the median, restriping, and signal modifications. Details of the improvements shall be defined in the Development Agreement. The improvements shall be completed to the satisfaction of the City Engineer.*

4.2-12(b) *Prior to issuance of building permits, the project applicant shall pay applicable regional transportation impact fees to the ECCRFFA that would fund improvements at the Sand Creek Road/SR 4 eastbound ramps intersection, including construction of a slip-ramp for the eastbound Sand Creek to southbound SR 4 movement, eliminating the conflicting left-turn movement at the intersection. Proof of payment shall be submitted to the City of Antioch Community Development Department. It should be noted that the Sand Creek Road/SR 4 eastbound ramps intersection is located outside of the City of Antioch and is under the jurisdiction of Caltrans.*

4.2-12(c) *Prior to issuance of building permits, if the required improvements are added to the ECCRFFA regional fee program, the project applicant shall pay applicable regional transportation impact fees to the ECCRFFA that would fund the improvements. Proof of payment shall*

be submitted to the City of Antioch Community Development Department. It should be noted that the Sand Creek Road/SR 4 westbound ramps intersection is located outside of the City of Antioch and is under the jurisdiction of Caltrans.

4.2-13 Conflict with a program, plan, ordinance, or policy addressing study roadway segments under Cumulative With Project conditions. Based on the analysis below, the impact is *less than significant*.

Cumulative traffic forecasts were developed for Prewett Ranch Drive based on the same procedures and assumptions described previously for intersections, with the resulting volumes shown in Table 4.2-17. Project trips were then estimated considering the changes to the roadway network in the Cumulative With Project condition, and then added to the Cumulative Without Project volumes. With the construction of the project roadway system, some existing trips that originate in the Dallas Ranch neighborhoods are expected to shift from traveling on Prewett Ranch Drive to Sand Creek Road. The percent increase in project trips was also calculated, with the results presented in Table 4.2-17.

With completion of the Sand Creek Road corridor, and the resulting traffic shifts away from Prewett Ranch Drive, the segments of Prewett Ranch Drive between Deer Valley Road and Hillcrest Avenue are expected to experience levels of daily traffic appropriate for the roadway type. Additionally, the project is not expected to increase through traffic on Prewett Ranch Drive in the Cumulative With Project condition. Therefore, a ***less-than-significant*** impact related to study roadway segments would occur under Cumulative With Project conditions.

Mitigation Measure(s)
None required.

4.2-14 Conflict with a program, plan, ordinance, or policy addressing study freeway segments under Cumulative With Project conditions. Based on the analysis below, the impact is *less than significant*.

The Cumulative With Project AM and PM peak hour freeway operations are summarized in Table 4.2-18 below. As shown in the table, all study freeway segments would continue to operate within the established service objective (i.e., delay index of 2.5 or less during the peak hours) with the addition of project traffic, accounting for the planned widening of SR 4 between Balfour Road to Marsh Creek Road to provide two lanes in each direction.

Therefore, a ***less-than-significant*** cumulative impact related to conflicting with applicable CCTA standards for study freeway segments would occur under Cumulative With Project conditions.

Table 4.2-17
Roadway Segment Average Daily Traffic – Cumulative With Project

Segment	Near-term Without Project Daily Traffic	Project Traffic	Near-term With Project	Existing Daily Fluctuation[1]	Project Increase
1. Prewett Ranch Drive, east of Deer Valley Road	6,330	0	6,330	± 1.2%	0%
2. Prewett Ranch Drive at Diablo Vista Elementary School	3,130	0	3,130	± 1.8%	0%
3. Prewett Ranch Drive, west of Hillcrest Avenue	3,030	0	3,030	± 2.9%	0%

[1] Percent difference between the three days of data collection.

Source: Fehr & Peers, 2020.

Table 4.2-18
Freeway LOS – Cumulative With Project

Segment	Direction	Cumulative Without Project		Cumulative With Project	
		Volume	Delay Index	Volume	Delay Index
AM Peak Hour					
1. SR 4, north of Lone Tree Way	SB	3,640	1.09	3,652	1.10
	NB	3,960	1.18	3,998	1.20
2. SR 4, north of Sand Creek Road	SB	2,590	1.01	2,602	1.01
	NB	3,440	1.06	3,478	1.07
3. SR 4, north of Balfour Road	SB	2,380	1.00	2,398	1.00
	NB	2,570	1.01	2,576	1.01
4. SR 4, south of Balfour Road	SB	1,420	1.00	1,432	1.00
	NB	1,250	1.00	1,254	1.00
PM Peak Hour					
1. SR 4, north of Lone Tree Way	SB	4,990	2.17	5,031	2.25
	NB	4,570	1.58	4,595	1.61
2. SR 4, north of Sand Creek Road	SB	4,200	1.30	4,241	1.32
	NB	4,060	1.23	4,085	1.24
3. SR 4, north of Balfour Road	SB	2,850	1.01	2,862	1.01
	NB	3,280	1.04	3,301	1.04
4. SR 4, south of Balfour Road	SB	1,760	1.00	1,768	1.00
	NB	2,400	1.00	2,414	1.00

Source: Fehr & Peers, 2020.

Mitigation Measure(s)

None required.

5. Statutorily Required Sections

5. STATUTORILY REQUIRED SECTIONS

5.1 INTRODUCTION

The Statutorily Required Sections chapter of the Draft EIR includes discussions regarding those topics that are required to be included in an EIR, pursuant to CEQA Guidelines, Section 15126.2. The chapter includes a discussion of the proposed project's potential to result in growth-inducing impacts; the cumulative setting analyzed in this EIR; significant irreversible environmental changes; and significant and unavoidable impacts caused by the proposed project.

5.2 GROWTH-INDUCING IMPACTS

State CEQA Guidelines section 15126.2(d) requires an EIR to evaluate the potential growth-inducing impacts of a proposed project. Specifically, an EIR must discuss the ways in which a proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Growth can be induced in a number of ways, including the elimination of obstacles to growth, or by encouraging and/or facilitating other activities that could induce growth. Examples of projects likely to have growth-inducing impacts include extensions or expansions of infrastructure systems beyond what is needed to serve project-specific demand, and development of new residential subdivisions or office complexes in areas that are currently only sparsely developed or are undeveloped.

The CEQA Guidelines are clear that while an analysis of growth-inducing effects is required, it should not be assumed that induced growth is necessarily significant or adverse. This analysis examines the following potential growth-inducing impacts related to implementation of the proposed project and assesses whether these effects are significant and adverse (see CEQA Guidelines, Section 15126.2[d]):

1. Foster population and economic growth and construction of housing.
2. Eliminate obstacles to population growth.
3. Affect service levels, facility capacity, or infrastructure demand.
4. Encourage or facilitate other activities that could significantly affect the environment.

Foster Population and Economic Growth and Construction of Housing

As discussed throughout the Initial Study prepared for the proposed project and this EIR, development of the site with 220 single-family units would increase the available housing within the Antioch area, which would be expected to increase population in the area. Using the City's 2015-2023 Housing Element average household size of 3.15 persons per household , the proposed project could result in a maximum population of 693 (220 proposed households x 3.15 persons per household = 693 new residents). According to the City of Antioch Housing Element, Antioch's population increased by approximately 4.0 percent between the years 2010 and 2014, from 102,372 residents to 106,455 residents.[1] Contra Costa County's population has increased at a similar pace, growing by approximately 3.6 percent from 2010 to 2014, from 1,049,025 to 1,087,008. Per the City's Housing Element, the Association of Bay Area Governments (ABAG) estimates that the City's population would be 116,200 in 2030, increasing by 9,745 persons.

[1] City of Antioch. *City of Antioch Housing Element 2015-2023* [pg. 2-2]. Adopted April 14, 2015.

Assuming that the proposed project would be fully built out and operating at full capacity by 2030, the project's contribution to the overall population increase by 2030 would not contribute to an increase above the anticipated population levels. It should be noted that the City of Antioch has previously considered buildout of the project site with residential uses (as well as the Sand Creek Focus Area) as part of the General Plan. Therefore, the proposed project would not result in substantially more intensive population growth beyond what has been previously analyzed for the site.

Appendix G of CEQA Guidelines has been recently amended to clarify that unplanned population growth would be considered a potentially significant impact. However, growth that is planned, and the environmental effects of which have been analyzed in connection with a land use plan or a regional plan, should not by itself be considered an impact. Because, as discussed above, the proposed project would not result in substantially more intensive population growth beyond what has been previously analyzed for the site, the environmental effects of such growth would not constitute a significant impact. Thus, the economic growth associated with buildout of the site would be reasonably within what has been anticipated by the City. All physical environmental effects of the proposed project, including single-family residential development, open and recreational space, and utilities and infrastructure improvements have been addressed throughout this EIR and the Initial Study prepared for the proposed project. Overall, the proposed project would not be expected to generate any new growth-inducing impacts beyond impacts identified in this EIR as impacts of the project.

Eliminate Obstacles to Population Growth

The elimination of either physical or regulatory obstacles to growth is considered to be a growth-inducing effect. A physical obstacle to growth typically involves the lack of public service infrastructure. The extension of public service infrastructure, including roadways, water mains, and sewer lines, into areas that are not currently provided with these services, would be expected to support new development. Similarly, the elimination or change to a regulatory obstacle, including existing growth and development policies, could result in new growth.

As discussed in Section XIX, Utilities and Service Systems, of the Initial Study prepared for the proposed project, potable water would be distributed to the project site by an extension of the existing 16-inch Zone III trunk line in Hillcrest Avenue. The City has also indicated an interest in reserving space in Phase III of the project to facilitate looping of the waterline within Hillcrest Avenue for future residential development to the west of the project site. The water distribution system improvements planned for in the Water System Master Plan Update and associated CIP, as well as the infrastructure improvements included in the proposed project, would be capable of accommodating the increased demand for water supplies associated with buildout of the proposed project. Sanitary sewer service would be provided to the project site by an extension of the existing 24-inch sanitary sewer pipe from the Promenade/Vineyards at Sand Creek Project through a connection over Sand Creek at the same location as the existing PG&E bridge.

The proposed project would include the extension of Hillcrest Avenue through the project site, an emergency vehicle access (EVA) secondary entry intersection to the south, and a potential clear span EVA/pedestrian bridge adjacent to the existing PG&E bridge spanning Sand Creek in the northeastern portion of the project site. A new traffic signal would be installed at the main entry. Pedestrian access to the site would be provided by a sidewalk located on Hillcrest Avenue, adjacent to the project site, as well as by the proposed pedestrian trail connection within the northeast corner of the project site.

The primary infrastructure systems included as part of the proposed project would be sized based on the growth anticipated for the Sand Creek Focus Area per the City's General Plan and the City's utility master plans. All infrastructure improvements proposed for the project area were reviewed and approved by the City of Antioch Public Works Department and would be financed by the project applicant. Because the surrounding area would result in population growth with or without the proposed project, the extension of utilities and construction of roadways would not be considered the elimination of an obstacle to population growth. Consequently, the roadway and utlity infrastructure improvements would not be anticipated to result in elimination of obstacles to population growth.

Affect Service Levels, Facility Capacity, or Infrastructure Demand

Increases in population that would occur as a result of a proposed project may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental impacts. As discussed in the Initial Study prepared for the proposed project, the proposed project would increase demands for fire and police protection services. Pursuant to the California Constitution and upheld by CEQA case law, the obligation to provide adequate fire and emergency medical services falls to the City. In *City of Hayward v. Board of Trustees of the California State University*, the court cited CEQA Guidelines § 15382 and *Goleta Union School District v. Regents of University of California*, in holding that the need for additional fire protection service is not an environmental impact that CEQA requires a project to mitigate. Furthermore, the court found that the potential dangers associated with delayed response times do not mandate a finding of significance under CEQA Guidelines § 15065(a)(4). The proposed project would be subject to payment of applicable fire protection fees per the City's Master Fee Schedule, fire protection requirements of the most recent California Fire Code, and review by the Contra Costa County Fire Protection District (CCCFPD) and the City's Building Inspection Services Division to ensure compliance with all code requirements. Therefore, impacts related to the need for new or physically altered fire protection facilities, the construction of which could cause significant environmental impacts, were determined to be less than significant in the Initial Study.

Construction of a new police station or other Antioch Police Department (APD) facilities would not be necessary in order to adequately serve the proposed project. In addition, the project applicant would be required to pay Development Impact Fees for police facilities per Section 9-3.50 of the City Municipal Code, and the project site would be required to annex into a community facilities district (CFD) for financing police services. Accordingly, impacts related to the need for new or physically altered police protection facilities, the construction of which could cause significant environmental impacts, were determined to be less than significant in the Initial Study.

In addition, as discussed in Section XIX, Utilities and Service Systems, of the Initial Study, wastewater generated by the proposed project could be accommodated by existing wastewater treatment facilities and infrastructure, and sufficient water supplies would be available to server the proposed project and reasonably foreseeable future development. Furthermore, the proposed project would include on-site detention and bio-retention facilities sized to exceed the minimum volume requirement necessary to adequately manage all runoff from the proposed impervious surfaces. Thus, the project would not require new or expanded off-site stormwater infrastructure. The landfill that would serve the proposed project has adequate capacity to manage the solid waste generated as result of the project.

Therefore, the proposed project would not increase population such that service levels, facility capacity, and/or infrastructure demand would require construction of new facilities that could cause significant environmental impacts.

Encourage or Facilitate other Activities That Could Significantly Affect the Environment

This EIR and the Initial Study prepared for the proposed project provide a comprehensive assessment of the potential for environmental impacts associated with implementation of the proposed project. Please refer to Chapters 4.1 and 4.2 of this EIR, as well as the attached Initial Study, which comprehensively address the potential for impacts from urban development on the project site.

5.3 CUMULATIVE IMPACTS

CEQA Guidelines, Section 15130 requires that an EIR discuss the cumulative and long-term effects of the proposed project that adversely affect the environment. "Cumulative impacts" are defined as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts" (CEQA Guidelines, Section 15355). "[I]ndividual effects may be changes resulting from a single project or a number of separate projects" (CEQA Guidelines, Section 15355, subd. [a]). "The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time" (CEQA Guidelines, Section 15355, subd. [b]).

The need for cumulative impact assessment reflects the fact that, although a project may cause an "individually limited" or "individually minor" incremental impact that, by itself, is not significant, the increment may be "cumulatively considerable," and, thus, significant, when viewed together with environmental changes anticipated from past, present, and probable future projects (CEQA Guidelines, Section 15064, subd. [h(1)], Section 15065, subd. [c], and Section 15355, subd. [b]). Accordingly, particular impacts may be less than significant on a project-specific basis but significant on a cumulative basis if their small incremental contribution, viewed against the larger backdrop, is cumulatively considerable. However, it should be noted that CEQA Guidelines, Section 15064, Subdivision (h)(5) states, "[…]the mere existence of significant cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed project's incremental effects are cumulatively considerable." Therefore, even where cumulative impacts are significant, any level of incremental contribution is not necessarily deemed cumulatively considerable.

Section 15130(b) of CEQA Guidelines indicates that the level of detail of the cumulative analysis need not be as great as for the project impact analyses, but that analysis should reflect the severity of the impacts and their likelihood of occurrence, and that the analysis should be focused, practical, and reasonable. To be adequate, a discussion of cumulative effects must include the following elements:

> (1) Either (a) a list of past, present and probable future projects, including, if necessary, those outside the agency's control, or (b) a summary of projections contained in an adopted general plan or related planning document, or in a prior certified EIR, which described or evaluated regional or area-wide conditions contributing to the cumulative impact, provide that such documents are reference and made available for public inspection at a specified location;

(2) A summary of the individual projects' environmental effects, with specific reference to additional information and stating where such information is available; and

(3) A reasonable analysis of all of the relevant projects' cumulative impacts, with an examination of reasonable, feasible options for mitigating or avoiding the project's contribution to such effects (Section 15130[b]).

For some projects, the only feasible mitigation measures will involve the adoption of ordinances or regulations, rather than the imposition of conditions on a project-by-project basis (Section 15130[c]). Section 15130(a)(3) states that an EIR may determine that a project's contribution to a significant cumulative impact will be rendered less than cumulatively considerable, and thus not significant, if a project is required to implement or fund the project's fair share of a mitigation measure or measures designed to alleviate the cumulative impact.

A discussion of cumulative impacts is provided within each of the technical chapters of this EIR pursuant to CEQA Guidelines Section 15130.

Cumulative Setting

The lead agency should define the relevant geographic area of inquiry for each impact category (id., Section 15130, subd. [b][3]), and should then identify the universe of "past, present, and probable future projects producing related or cumulative impacts" relevant to the various categories, either through the preparation of a "list" of such projects or through the use of "a summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area wide conditions contributing to the cumulative impact" (id., subd. [b][1]).

As discussed above, there are two approaches to identifying cumulative projects and their associated impacts. The "list" approach identifies individual projects known to be occurring or proposed in the surrounding area in order to identify potential cumulative impacts. The "projection" approach uses a summary of projections in adopted General Plans or related planning documents to identify potential cumulative impacts. This EIR uses the projection approach for the cumulative analysis and considers the development anticipated to occur upon buildout of the City of Antioch General Plan, as well as other reasonably foreseeable projects within the project region.

Limited situations exist where the geographic setting differs for the various resource areas. For example, the cumulative geographic setting for air quality is the San Francisco Bay Area Air Basin (SFBAAB), which is the air basin that the proposed project is located within. Global climate change is, by nature, a cumulative impact. Emissions of greenhouse gases (GHG) contribute, on a cumulative basis, to the significant adverse environmental impacts of global climate change (e.g., sea level rise, impacts to water supply and water quality, public health impacts, impacts to ecosystems, impacts to agriculture, and other environmental impacts). A single project could not generate enough GHG emissions to contribute noticeably to a change in the global average temperature. However, the combination of GHG emissions from a project in combination with other past, present, and future projects could contribute substantially to the world-wide phenomenon of global climate change and the associated environmental impacts. Although the geographical context for global climate change is the Earth, for analysis purposes under CEQA, and due to the regulatory context pertaining to GHG emissions and global climate change applicable to the proposed project, the geographical context for global climate change in this EIR is limited to the State of California.

As discussed in Chapter 4.2, Transportation, of this EIR, the cumulative traffic analysis relied on the Contra Costa Transportation Agency (CCTA) Travel Demand Model, traffic growth trends as described in both the Antioch and Brentwood General Plan EIR, future traffic projections as documented in the administrative draft Antioch Transportation Impact Fee, future projections from the City of Brentwood Priority Area 1 Specific Plan EIR (June 2018), and projections developed as part of the Aviano and Promenade/Vineyards at Sand Creek transportation impact studies. Traffic forecasts within the immediate study area were reviewed to ensure that known developments were adequately reflected in the forecasts, such as the Bridle Gate project located in the City of Brentwood on the north and south side of the proposed Sand Creek extensions, west of SR 4, and development of the Albers Ranch project, west of the project site.

Cumulative impacts are analyzed in each of the technical chapters of this EIR, where the specific cumulative setting for each resource area is presented along with the cumulative impact discussion in the relevant resource area section of the EIR.

5.4 SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL CHANGES

Per CEQA Guidelines Section 15126.2(c), this EIR is required to include consideration of significant irreversible environmental changes that would be caused by the proposed project, should the project be implemented. An impact would be determined to be a significant and irreversible change in the environment if:

- Buildout of the project area could involve a large commitment of nonrenewable resources;
- The primary and secondary impacts of development could generally commit future generations to similar uses (e.g., a highway provides access to a previously remote area);
- Development of the proposed project could involve uses in which irreversible damage could result from any potential environmental accidents associated with the project; or
- The phasing and eventual development of the project could result in an unjustified consumption of resources (e.g., the wasteful use of energy).

The proposed project would likely result in, or contribute to, the following significant irreversible environmental changes:

- Conversion of vacant land to a fully built-out residential community, thus precluding alternative land uses in the future; and
- Placement and/or extension of roadways and bridges in areas providing access to the proposed project and connecting to adjacent developments;
- Irreversible consumption of goods and services, such as fire, police, and school services, associated with the future population; and
- Irreversible consumption of energy and natural resources, such as water, electricity, and natural gas, associated with the future residents.

5.5 SIGNIFICANT AND UNAVOIDABLE IMPACTS

According to CEQA Guidelines, an EIR must include a description of those impacts identified as significant and unavoidable should the proposed action be implemented (CEQA Guidelines §15126.2[b]). Such impacts would be considered unavoidable when the determination is made that either mitigation is not feasible or only partial mitigation is feasible such that the impact is not reduced to a level that is less-than-significant.

Based on the analysis provided in Chapters 4.1 and 4.2 of this EIR, the below listed impacts were determined to be significant and unavoidable. All other impacts identified in this EIR could be eliminated or reduced to a less-than-significant level by mitigations imposed by the City. The final determination of the significance of impacts and the feasibility of mitigation measures would be made by the City as part of the City's certification action.

4.1-6 Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, or conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

4.2-7 Conflict with a program, plan, ordinance, or policy addressing study freeway segements under Near-Term With Project conditions (specifically related to SR 4 between Marsh Creek Road and Balfour Road).

4.2-8 Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b).

4.2-12 Conflict with a program, plan, ordinance, or policy addressing study intersections under Cumulative With Project conditions (specifically related to the project's incremental contribution to significant cumulative impacts at the Sand Creek Road/SR 4 eastbound ramps and Sand Creek Road/SR 4 westbound ramps intersections).

6. Alternatives Analysis

6. ALTERNATIVES ANALYSIS

6.1 INTRODUCTION

The Alternatives Analysis chapter of the EIR includes consideration and discussion of a range of reasonable alternatives to the proposed project, as required per CEQA Guidelines Section 15126.6. Generally, the chapter includes discussions of the following: the purpose of an alternatives analysis; alternatives considered but dismissed; reasonable range of project alternatives and their associated impacts in comparison to the proposed project's impacts; and the environmentally superior alternative.

6.2 PURPOSE OF ALTERNATIVES

The primary intent of the alternatives evaluation in an EIR, as stated in Section 15126.6(a) of the CEQA Guidelines, is to "[…] describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives." In the context of CEQA Guidelines Section 21061.1, "feasible" is defined as:

> ...capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social and technological factors.

Section 15126.6(f) of CEQA Guidelines states, "The range of alternatives required in an EIR is governed by a "rule of reason" that requires the EIR to set forth only those alternatives necessary to permit a reasoned choice." Section 15126.6(f) of CEQA Guidelines further states:

> The alternatives shall be limited to ones that would avoid or substantially lessen any of the significant effects of the project. Of those alternatives, the EIR need examine in detail only the ones that the lead agency determined could feasibly attain most of the basic objectives of the project.

In addition, an EIR is not required to analyze alternatives when the effects of the alternative "cannot be reasonably ascertained and whose implementation is remote and speculative."

The CEQA Guidelines provide the following guidance for discussing alternatives to a proposed project:

- An EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project, but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives (CEQA Guidelines Section 15126.6[a]).
- Because an EIR must identify ways to mitigate or avoid the significant effects that a project may have on the environment (Public Resources Code Section 21002.1), the discussion of alternatives shall focus on alternatives to the project or its location which are capable

of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly (CEQA Guidelines Section 15126.6[b]).

- The EIR should briefly describe the rationale for selecting the alternatives to be discussed. The EIR should also identify any alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process and briefly explain the reasons underlying the lead agency's determination […] Among the factors that may be used to eliminate alternatives from detailed consideration in an EIR are: (i) failure to meet most of the basic project objectives, (ii) infeasibility, or (iii) inability to avoid significant environmental impacts (CEQA Guidelines Section 15126.6[c]).
- The EIR shall include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project. A matrix displaying the major characteristics and significant environmental effects of each alternative may be used to summarize the comparison (CEQA Guidelines Section 15126.6[d]).
- If an alternative would cause one or more significant effects in addition to those that would be caused by the project as proposed, the significant effects of the alternative shall be discussed, but in less detail than the significant effects of the project as proposed (CEQA Guidelines Section 15126.6[d]).
- The specific alternative of "no project" shall also be evaluated along with its impact. The purpose of describing and analyzing a no project alternative is to allow decision-makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project. The no project alternative analysis is not the baseline for determining whether the proposed project's environmental impacts may be significant, unless it is identical to the existing environmental setting analysis which does establish that baseline (CEQA Guidelines Section 15126.6[e][1]).
- If the environmentally superior alternative is the "no project" alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives (CEQA Guidelines Section 15126.6[e][2]).

Project Objectives

Based on the above, reasonable alternatives to the project must be capable of feasibly attaining most of the basic objectives of the project. The proposed project is being pursued with the following objectives:

1. To implement the City's General Plan and Sand Creek Focus Area of the General Plan goals by creating an economically viable project that is capable of providing various infrastructure improvements that are able to serve the project and facilitate service to future planned development, including trunk line infrastructure that is necessary for the ultimate development of the Sand Creek Focus Area of the General Plan, and public roadway improvements.
2. To help the City of Antioch provide its fair share of housing, and help alleviate a regional housing shortage, by providing a mix of housing types and sizes, some moderately affordable, and which can meet the needs of a variety of different and growing household sizes.
3. To expand upon Antioch's first residential gated community, and make it compatible with the surrounding residential uses, yet a visually identifiable community that is at a scale and quality similar to gated residential developments in the greater East Bay.
4. To provide on-site amenities and recreational opportunities, such as a pool club and both a private and public pedestrian connection to the future Sand Creek trail.

5. To provide housing near major transportation and regional trails connections, with increased land use intensities near regional transportation connections.
6. To create a community that is family friendly or that could accommodate senior residents.
7. To implement the County's Growth Management Program by providing for urban development within the Urban Limit Line.
8. To contribute to the City of Antioch's economic and social viability by creating a community that creates jobs and attracts investment and positive attention.

Impacts Identified in the EIR

In addition to attaining the majority of project objectives, reasonable alternatives to the project must be capable of reducing the magnitude of, or avoiding, identified significant environmental impacts of the proposed project. The significance level of impacts identified in the EIR are presented below.

Significant and Unavoidable

Impacts of the proposed project that have been determined to remain significant and unavoidable, even after implementation of the feasible mitigation measures set forth in this EIR, include the following:

- ***Air Quality and Greenhouse Gas Emissions:*** The EIR determined that implementation of the proposed project could result in a significant impact related to greenhouse gas (GHG) emissions, as well as the creation of conflicts with the goals of Assembly Bill (AB) 32 and Senate Bill (SB) 32. The EIR requires mitigation to minimize impacts to the maximum extent; however, despite implementation of mitigation measures, the proposed project would still result in significant and unavoidable impacts.

- ***Transportation:*** The EIR determined that even with mitigation, the proposed project would result in significant and unavoidable impacts to study freeway segments (State Route [SR] 4 between Marsh Creek Road and Balfour Road) under the Near-Term With Project conditions. Although widening of the roadway would improve freeway operations, because timing for the required improvement has not yet been identified, completion of the improvement prior to occupation cannot be guaranteed. In addition, the proposed project would result in per-capita vehicle miles traveled (VMT) that would exceed regional averages and, thus, would not comply with OPR's suggested threshold for residential project VMT of 15 percent less than the existing City or regional average. Because feasible mitigation to reduce the per capita VMT associated with the proposed project to less than 15 percent below regional averages does not exist, the proposed project could conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b), and the impact would remain significant and unavoidable. Furthermore, the proposed project could conflict with a program, plan, ordinance, or policy addressing study intersections under Cumulative With Project conditions. Due to the uncertainty regarding timing and funding for the required improvements, impacts under Cumulative With Project conditions to the Sand Creek Road/SR 4 eastbound ramps and Sand Creek Road/SR 4 westbound ramps intersections would remain significant and unavoidable.

Less Than Significant with Mitigation

Significant environmental impacts of the proposed project that have been identified as requiring mitigation measures to ensure that the level of significance is ultimately less than significant include the following:

- ***Air Quality and Greenhouse Gas Emissions:*** The EIR determined that implementation of the proposed project could conflict with or obstruct implementation of the applicable air quality plan during project construction (e.g., related to NO_X emissions) and operation (e.g., related to ROG emissions). The EIR requires mitigation in order to ensure that the impacts are reduced to less-than-significant levels.

- ***Transportation:*** The EIR determined that implementation of the proposed project could conflict with a program, plan, ordinance, or policy addressing the circulation system during construction activities. In addition, the proposed project's incremental contribution to cumulative impacts at the Lone Tree Way/Hillcrest Avenue intersection would be cumulatively considerable; however, the EIR requires mitigation in order to ensure that the impacts are reduced to less-than-significant levels.

Less Than Significant or No Impact

As discussed in Chapter 4.1, Air Quality and Greenhouse Gas Emissions, and Chapter 4.2, Transportation, within this EIR, the proposed project would result in no impact or a less-than-significant impact related to the following topics associated with the resource areas indicated:

- ***Air Quality***
  - Expose sensitive receptors to substantial pollutant concentrations.
  - Result in other emissions (such as those leading to odors) affecting a substantial number of people.

- ***Transportation***
  - Conflict with a program, plan, ordinance or policy addressing study intersections under Existing With Project conditions.
  - Conflict with a program, plan, ordinance or policy addressing study freeway segments under Existing With Project conditions.
  - Conflict with a program, plan, ordinance, or policy addressing study intersections under Near-Term With Project conditions.
  - Conflict with a program, plan, ordinance or policy addressing transit, bicycle and pedestrian facilities.
  - Substantially increase hazards to vehicle safety due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).
  - Result in inadequate emergency access.
  - Conflict with a program, plan, ordinance, or policy addressing study freeway segments under Cumulative With Project conditions.

The Initial Study prepared for the proposed project during the scoping period (see Appendix A) includes a detailed environmental checklist addressing a range of technical environmental issues. For each technical environmental issue, the Initial Study identifies the level of impact for the proposed project. The Initial Study identifies the environmental effects as either "no impact," "less-than-significant," "less-than-significant with mitigation incorporated," or "potentially significant."

Impacts identified for the proposed project in the Initial Study as "no impact," "less-than-significant," or "less-than-significant with mitigation incorporated" are listed below, and summarized further in Chapter 4.0, Introduction to the Analysis, of this EIR.

- Aesthetics (All Items);
- Agriculture and Forest Resources (All Items);
- Biological Resources (All Items);
- Cultural Resources (All Items);
- Energy (All Items);
- Geology and Soils (All Items);
- Hazards and Hazardous Materials (All Items);
- Hydrology and Water Quality (All Items);
- Land Use and Planning (All items);
- Mineral Resources (All Items);
- Noise (All Items);
- Population and Housing (All Items);
- Public Services (All Items);
- Recreation (All Items);
- Tribal Cultural Resources (All Items);
- Utilities and Service Systems (All Items); and
- Wildfire (All Items).

The alternatives discussed herein have been chosen based on feasibility to meet project objectives, as well as the ability to reduce potential impacts analyzed within this EIR. Impacts identified and fully-mitigated in the Initial Study prepared for the proposed project would be similar or fewer for all of the alternatives included in this chapter. Accordingly, topics dismissed within the Initial Study prepared for the proposed project are not specifically addressed within the sections below.

6.3 SELECTION OF ALTERNATIVES

The requirement that an EIR evaluate alternatives to the proposed project or alternatives to the location of the proposed project is a broad one; the primary intent of the alternatives analysis is to disclose other ways that the objectives of the project could be attained, while reducing the magnitude of, or avoiding, one or more of the environmental impacts of the proposed project. Alternatives that are included and evaluated in the EIR must be feasible alternatives. However, the CEQA Guidelines require the EIR to "set forth only those alternatives necessary to permit a reasoned choice." As stated in Section 15126.6(a), an EIR need not consider every conceivable alternative to a project. Rather it must consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation. The CEQA Guidelines provide a definition for "a range of reasonable alternatives" and thus limit the number and type of alternatives that may need to be evaluated in a given EIR. According to the CEQA Guidelines Section 15126.6(f):

> The alternatives shall be limited to ones that would avoid or substantially lessen any of the significant effects of the project. Of those alternatives, the EIR need examine in detail only the ones that the lead agency determined could feasibly attain most of the basic objectives of the project.

First and foremost, alternatives in an EIR must be feasible. In the context of CEQA Guidelines Section 21061.1, "feasible" is defined as:

> ...capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social and technological factors.

Finally, an EIR is not required to analyze alternatives when the effects of the alternative "cannot be reasonably ascertained and whose implementation is remote and speculative."

Alternatives Considered But Dismissed From Further Analysis

Consistent with CEQA, primary consideration was given to alternatives that could reduce significant impacts, while still meeting most of the basic project objectives.

As stated in Guidelines Section 15126.6(c), among the factors that may be used to eliminate alternatives from detailed consideration in an EIR are:

(i) failure to meet most of the basic project objectives,
(ii) infeasibility, or
(iii) inability to avoid significant environmental impacts.

Regarding item (ii), infeasibility, among the factors that may be taken into account when addressing the feasibility of alternatives are site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries (projects with a regionally significant impact should consider the regional context), and whether the proponent can reasonably acquire, control or otherwise have access to the alternative site (or the site is already owned by the proponent). No one of these factors establishes a fixed limit on the scope of reasonable alternatives.

Off-Site Alternative

As noted previously, the purpose of an alternatives analysis is to develop alternatives to the proposed project that substantially lessen at least one of the significant environmental effects identified as a result of the project, while still meeting most, if not all, of the basic project objectives. Development of the proposed project at an off-site location would not be capable of meeting a portion of the project objectives due to a number of the project objectives being specific to the project site size and location. Other locations that are designated Medium Low Density exist within the City of Antioch; however, the alternative locations consist of existing development. In addition, Project Objective #1 establishes the goal of creating an economically viable project that is capable of providing various infrastructure improvements that are able to serve the project and facilitate service to future planned development, including trunk line infrastructure that is necessary for the ultimate development of the Sand Creek Focus Area of the General Plan, and public roadway improvements. Because alternative locations designated Medium Low Density do not exist within the Sand Creek Focus Area, the Alternative site would not meet Project Objective #1. Project Objective #3 establishes the goal of expanding upon the City's first residential gated community. Given that the Off-Site Alternative would not be located in near the gated community, the Alternative would not be capable of meeting Project Objective #3. Project Objective #4 aims to provide amenities and recreational opportunities, such as a private and public pedestrian connection to the future Sand Creek Trail. Construction of the project at a different location would not include connection to the future Sand Creek Trail, and, thus, Project Objective #4 could not be fully met. Should an undeveloped alternative location designated Medium Low Density become

available within the City, then the remaining project objectives, including Project Objectives #2 and #5 through #8 could be fully or partially met.

Furthermore, The CEQA Guidelines (Section 15126.6[b]) requires that only locations that would avoid or substantially lessen any of the significant effects of the project need be considered for inclusion in the EIR. The Off-Site Alternative would involve the construction of the proposed project on an alternative location. The Off-Site Alternative would have the same type and intensity of uses as the proposed project. The majority of other areas designated Medium Low Density are located near existing development. Given the proximity to existing residences, development of the Off-site Alternative would likely result in greater impacts than the proposed project related to air quality, GHG emissions, and noise. Development of an Off-Site Alternative would be expected to result in at least the same, if not greater, level of impacts related to transportation as compared to the proposed project. Furthermore, the Applicant does not own an alternative location that would be adequate to construct the proposed project.

It is also important to consider that the project site is located adjacent to other proposed and approved projects in the City of Antioch, as well as existing and planned urban areas within the City of Brentwood. Overall, a feasible off-site location that would meet the requirements of CEQA, as well as meet the basic objectives of the proposed project, does not exist. Therefore, an Off-Site Alternative was dismissed from detailed analysis within this EIR.

Non-Gated Development Alternative

Similar to the proposed project, the Non-Gated Development Alternative would include development of 220 single-family residences, extension of Hillcrest Avenue through the project site, and associated improvements, and would include the same disturbance footprint as the proposed project. However, the Non-Gated Development Alternative would not include a gate at the project site entrance, but, rather, would allow for public access to the site. As a result, the Alternative would include 3.9 acres to be developed as public parks rather than private parks. The Non-Gated Development Alternative would also include construction of the pedestrian trail connection within the northeast corner of the project site. Accordingly, in the absence of a gate, the Alternative would provide additional community amenities to the area.

Under the Non-Gated Development Alternative, the total area to be disturbed would be the same as the proposed project. Furthermore, the total number and type of units developed under the Alternative would be identical to that of the proposed project. The only difference between the proposed project and the Non-Gated Development Alternative would be that the alternative would not include gated access for the residences in the eastern portion of the project site. As such, because the Alternative would include the same amount of area to be disturbed, constructions emissions would be similar to that of the proposed project. Operational emissions under the Non-Gated Development Alternative would be slightly higher than emissions under the proposed project. The increase would result from slightly increased daily vehicle trips accessing the on-site park, which would be publicly accessible under this alternative. Thus, the Non-Gated Development Alternative would result in slightly greater impacts related to air quality and GHG emissions as compared to the proposed project.

Similar to the proposed project, the Non-Gated Alternative would add construction vehicle traffic to area roadways, thereby potentially conflicting with existing traffic patterns. As such, Mitigation Measure 4.2-1 related to preparation of a construction management plan would still be required. Although the Alternative would not include a gated entry, all other aspects of the Alternative would

remain the same. Because the 3.9-acre park area would be public, as opposed to private, residents of the surrounding community would be able to drive to the park, which could result in a slight increase in vehicle trips as compared to the proposed project. Accordingly, impacts to study freeway segments under Near-Term With Project and Cumulative With Project conditions would be anticipated to remain significant and unavoidable. In addition, the VMT for the Alternative would be anticipated to be slightly greater than the proposed project and the significant and unavoidable impact would still occur.

Because the significant and unavoidable impacts identified for the proposed project would not be avoided or substantially reduced with the Non-Gated Development Alternative, the Alternative was dismissed from detailed analysis within this EIR.

6.4 ALTERNATIVES CONSIDERED IN THIS EIR

The following alternatives are considered and evaluated in this section:

- No Project (No Build) Alternative;
- Buildout Pursuant to Existing Land Use Designations Alternative;
- Reduced Density Alternative; and
- Senior Housing Alternative.

Each of the project alternatives is described in detail below, with a corresponding analysis of each alternative's impacts in comparison to the proposed project. While an effort has been made to include quantitative data for certain analytical topics, where possible, qualitative comparisons of the various alternatives to the project are primarily provided. Such an approach to the analysis is appropriate as evidenced by CEQA Guidelines Section 15126.6[d], which states that the significant effects of the alternative shall be discussed, but in less detail than the significant effects of the project as proposed. For instance, with regard to construction-related emissions of each alternative, the proposed project is anticipated to be built out in phases, and some overlap of construction phases was assumed in the construction analysis prepared for the proposed project. However, the construction schedules for the foregoing development alternatives cannot be known at this time, and any assumptions made to approximate construction for the development alternatives would be highly speculative. Due to such uncertainty, construction emissions have not been quantified for the alternatives, but are instead discussed on a qualitative basis. In contrast, operational characteristics can be known with a reasonable degree of certainty, and operational emissions have been quantified in this chapter.

The analysis evaluates impacts that would occur with the alternatives relative to the significant impacts identified for the proposed project. When comparing the potential impacts resulting from implementation of the foregoing alternatives, the following terminology is used:

- "Fewer" = Less than Proposed Project;
- "Similar" = Similar to Proposed Project; and
- "Greater" = Greater than Proposed Project.

When the term "fewer" is used, the reader should not necessarily equate this to elimination of significant impacts identified for the proposed project. For example, in many cases, an alternative would reduce the relative intensity of a significant impact identified for the proposed project, but the impact would still be expected to remain significant under the alternative, thereby requiring mitigation. In other cases, the use of the term "fewer" may mean the actual elimination of an

impact identified for the proposed project altogether. Similarly, use of the term "greater" does not necessarily imply that an alternative would require additional mitigation beyond what has been required for the proposed project. To the extent possible, this analysis will distinguish between the two implications of the comparative words "fewer" and "greater".

A comparison of the environmental impacts resulting from the considered alternatives and the proposed project is provided in Table 6-10.

No Project (No Build) Alternative

CEQA requires the evaluation of the comparative impacts of the "No Project" alternative (CEQA Guidelines Section 15126.6[e]). Analysis of the no project alternative shall:

> "… discuss […] existing conditions […] as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services." (*Id.*, subd. [e][2])

In addition:

> "[i]f the project is other than a land use or regulatory plan, for example a development project on identifiable property, the 'no project' alternative is the circumstance under which the project does not proceed. Here the discussion would compare the environmental effects of the property remaining in the property's existing state against environmental effects which would occur if the project is approved. If disapproval of the project under consideration would result in predictable actions by others, such as the proposal of some other project, this 'no project' consequence should be discussed. In certain instances, the no project alternative means 'no build,' wherein the existing environmental setting is maintained. However, where failure to proceed with the project would not result in preservation of existing environmental conditions, the analysis should identify the practical result of the project's non-approval and not create and analyze a set of artificial assumptions that would be required to preserve the existing physical environment." (*Id.*, subd. [e][3][B]).

The No Project (No Build) Alternative is defined as the continuation of the existing conditions of the project site, which currently consists primarily of ruderal grasses and is absent of structures. The No Project (No Build) Alternative would not require grading or ground disturbance within the project site. However, the City's General Plan identifies the site as an area suitable for development. The No Project (No Build) Alternative would not fulfill the stated aims of the City's General Plan or the project's objectives.

Air Quality and Greenhouse Gas Emissions

Because the No Project (No Build) Alternative would not involve construction activities, the Alternative would not result in any construction emissions. In addition, the Alternative would not result in any operational emissions of criteria pollutants or GHGs. Thus, the impacts identified for the proposed project related to air quality and GHG emissions would not occur under the No Project (No Build) Alternative, and Mitigation Measures 4.1-1, 4.1-2, and 4.1-6 would not be required. Overall, no impacts related to air quality and GHG emissions would occur under the No Project (No Build) Alternative.

Transportation

The No Project (No Build) Alternative would not generate construction traffic on local roadways and, thus, Mitigation Measure 4.2-1 related to preparation of a construction management plan

would not be required. In addition, the Alternative would not result in any development and, thus, would not increase traffic in the project area. Accordingly, the Alternative would not result in any of the impacts identified for the proposed project associated with project operations and Mitigation Measures 4.2-7 and 4.2-12(a) through 4.2-12(c) would not be required. Overall, no impacts related to transportation would occur under the No Project (No Build) Alternative.

Buildout Pursuant to Existing Land Use Designations Alternative

The No Project (No Build) Alternative discussed above would be considered a "no build" alternative, wherein the existing environmental setting is maintained. However, failure to proceed with the proposed project would not necessarily result in the preservation of the existing environmental conditions, but would rather result in the future buildout of the site pursuant to existing City planning documents. As such, the Buildout Pursuant to Existing Land Use Designations Alternative would be considered another type of "no project" alternative.

The Buildout Pursuant to Existing Land Use Designations Alternative would consist of buildout of the project site per the current City of Antioch General Plan land use designations at the maximum allowable densities. Per the City's General Plan, approximately 115 acres in the eastern portion of the project site are designated Open Space/Senior Housing, while the remaining 43 acres in the western portion of the site are designated Hillside and Estate and Executive Residential/Open Space. It should be noted that the project site contains substantial constraints to development, such as excessive slopes and the Sand Creek corridor. Although the site contains the foregoing development constraints, should the applicant find a solution to those constraints, the Alternative would be a viable option. Thus, in order to provide a more accurate comparison of impacts to the proposed project, the Alternative has been included in this EIR. Other alternatives within this chapter reflect development of the site with respect to the existing constraints.

Notwithstanding the aforementioned constraints, of the 115 acres currently designated as Open Space/Senior Housing, 57.5 acres were assumed to be developed with senior housing, with the remainder being retained as open space. Based on the maximum allowable density for the Open Space/Senior Housing land use designation of 4.0 dwelling units per acre (du/ac), the Alternative would result in a maximum of approximately 230 senior housing units. For this analysis, of the 43 acres designated as Hillside and Estate and Executive Residential/Open Space, 21.5 acres were assumed to be developed with residences and 21.5 acres would be retained as open space. The maximum allowable density for the Hillside and Estate and Executive/Open Space land use designation is 2.0 du/ac. Thus, the Alternative would result in approximately 43 Hillside and Estate and Executive/Open Space residential units. In total, the Alternative would include development of approximately 273 residential units.

Because the Buildout Pursuant to Existing Land Use Designations Alternative would include a mix of housing types, including senior housing, near major transportation and regional trail connections, the Alternative would be capable of meeting Project Objectives #2, #5, and #6. In addition, the Alternative would include development within the Sand Creek Focus Area, which would allow Project Objectives #1 and #7 to be met. Most of the remaining project objectives would be fully or partially met, as the Alternative would provide a mix of residential development and associated infrastructure improvements.

Air Quality and Greenhouse Gas Emissions

Under the Buildout Pursuant to Existing Land Use Designations Alternative, a total of 21.5 acres of the project site would be developed with 43 units. In addition, 230 senior housing units would

be developed on 57.5 acres of land. In total, the Alternative would allow for 273 residential units while the remaining portions of the site would be retained as open space.

Construction of the proposed project would occur under a phased development plan, the potential phasing of any of the following alternative is speculative. Consequently, construction-related emissions are qualitatively analyzed, while operational emissions are quantitatively analyzed.

The grading phase of construction would likely be the most emissions-intensive phase of project construction. Considering that the Alternative would result in a greater amount of land disturbed and graded, the Alternative would likely result in greater emissions during construction as compared to the project. As such, mitigation would still be required under the Alternative.

Operational emissions under the Buildout Pursuant to Existing Land Use Designations Alternative were quantified to compare to BAAQMD's thresholds for emissions, as well as the proposed project (see Table 6-1 and Table 6-2). As shown in Table 6-1, the unmitigated operational emissions of criteria air pollutants associated with the Buildout Pursuant to Existing Land Use Designations Alternative would exceed the BAAQMD's operational pounds per day (lbs/day) threshold for ROG. Because emissions of the Buildout Pursuant to Existing Land Use Designations Alternative would exceed the BAAQMD's thresholds, Mitigation Measures 4.1-2 would still be required in order to reduce the impact. Table 6-2 below provides a comparison of the Alternative's mitigated emissions to the proposed project.

Table 6-1
Buildout Pursuant to Existing Land Use Designations Alternative
Unmitigated and Mitigated Operational and Cumulative Emissions

	ROG	NO_X	PM_{10}	$PM_{2.5}$
Unmitigated Operational Emissions (lbs/day)				
Alternative Emissions	297.25	14.06	58.74	53.84
BAAQMD Thresholds	54	54	82	54
Emissions Exceed Thresholds?	**YES**	**NO**	**NO**	**NO**
Unmitigated Alternative Cumulative Emissions (tons/yr)				
Alternative Emissions	4.12	1.57	1.55	0.70
BAAQMD Thresholds	10	10	15	10
Emissions Exceed Thresholds?	**NO**	**NO**	**NO**	**NO**
Mitigated Operational Emissions (lbs/day)				
Alternative Emissions	14.75	12.21	7.29	2.39
BAAQMD Thresholds	54	54	82	54
Emissions Exceed Thresholds?	**NO**	**NO**	**NO**	**NO**
Mitigated Alternative Cumulative Emissions (tons/yr)				
Alternative Emissions	4.27	1.60	1.58	0.71
BAAQMD Thresholds	10	10	15	10
Emissions Exceed Thresholds?	**NO**	**NO**	**NO**	**NO**

Source: CalEEMod, April 2020 (see Appendix C).

Table 6-2
Mitigated Operational and Cumulative Emissions Comparison

	ROG	NO_X	PM_{10}	$PM_{2.5}$
Mitigated Operational Emissions (lbs/day)				
Project Emissions	12.64	11.41	10.28	2.95
Alternative Emissions	14.75	12.21	7.29	2.39
Difference	**+2.11**	**+0.80**	**-2.99**	**-0.56**
Mitigated Cumulative Emissions (tons/yr)				
Project Emissions	2.20	2.04	1.79	0.51
Alternative Emissions	4.27	1.60	1.58	0.71
Difference	**+2.07**	**-0.44**	**-0.21**	**+0.20**

Source: CalEEMod, April 2020 (see Appendix C).

In addition to exceeding BAAQMD's operational emissions threshold for ROG, emissions of ROG, as well as NO_X in lbs/day and $PM_{2.5}$ in tons/yr, under the Buildout Pursuant to Existing Land Use Designations Alternative would exceed the emissions anticipated to occur under the proposed project. Consequently, the Buildout Pursuant to Existing Land Use Designations Alternative would result in greater impacts as compared to the proposed project.

As discussed in Chapter 4.1, even with implementation of Mitigation Measure 4.1-6, the proposed project would result in a significant and unavoidable impact related to GHG emissions. According to BAAQMD, projects with operational emissions equal to or less than 1,100 metric tons of carbon dioxide equivalence per year ($MTCO_2e$/yr) or 4.6 $MTCO_2e$/SP/yr, where "SP" equates to service population, would comply with the emission reductions target of 1990 levels by 2020 set forth by AB 32. SB 32 requires that, by 2030, statewide emissions be reduced by 40 percent beyond the 2020 reduction target set by AB 32. In order to address consistency with AB 32 and SB 32, operational emissions have been estimated for the year 2029, which is anticipated to be the first full year of project operations, and 2030. The Buildout Pursuant to Existing Land Use Designations Alternative would result in unmitigated operational GHG emissions equaling approximately 1,633.89 $MTCO_2e$/yr in the year 2029 and 1,614.57 $MTCO_2e$/yr in 2030. Despite the existing constraints within the project site, the Buildout Pursuant to Existing Land Use Designations Alternative includes the assumption that the entire 158.2-acre project site would be developed under the existing land use designations. A development area of 158.2-acres would far exceed the 58.9 acres of on-site development included as part of the proposed project. Development over a larger area would require a greater intensity of grading and paving activities, which would involve increased use of GHG-emitting heavy-duty off-road equipment. Furthermore, the existing site constraints include excessive slopes; ameliorating the existing slope conditions would require large amounts of grading and/or material import/export, both of which would result in increased GHG emissions. Considering the greater disturbance area and increase in intensity of construction activity, development of the Buildout Pursuant to Existing Land Use Designations Alternative would result in greater construction GHG emissions as compared to the proposed project.

Overall, GHG emissions associated with the Buildout Pursuant to Existing Land Use Designations Alternative would exceed what is anticipated for the proposed project. Consequently, mitigation similar to Mitigation Measure 4.1-6 would continue to be required for the Buildout Pursuant to Existing Land Use Designations Alternative. However, in order for the Buildout Pursuant to Existing Land Use Designations Alternative to achieve GHG reductions sufficient to comply with AB 32 and SB 32, which is the goal of Mitigation Measure 4.1-6, the Alternative would be required

to reduce a larger amount of GHG emissions as compared to the proposed project. Consequently, the Buildout Pursuant to Existing Land Use Designations Alternative would result in greater impacts related to the emission of GHGs as compared to the proposed project, and impacts would remain significant and unavoidable.

Based on the above, impacts related to air quality and GHG emissions would be greater with implementation of the Buildout Pursuant to Existing Land Use Designations Alternative compared to the proposed project.

Transportation

Similar to the proposed project, the Buildout Pursuant to Existing Land Use Designations Alternative would add construction vehicle traffic to area roadways, thereby potentially conflicting with existing traffic patterns. As such, Mitigation Measure 4.2-1 related to preparation of a construction management plan would still be required. In addition, because the Alternative would involve 79 acres of residential development, as compared to 23 acres under the proposed project, the overall duration of construction traffic, and associated impacts, would be greater.

As discussed in Chapter 4.2, Transportation, this EIR assumes buildout of the project site with non-age-restricted units in order to provide a conservative analysis of traffic impacts. Should a portion of the units be a combination of single-family units and senior/adult units, the project trip generation would be less than what is presented herein. The analysis of the project alternatives, including the Buildout Pursuant to Existing Land Use Designations Alternative, uses the same approach in order to provide a direct comparative analysis.

Based on the vehicle trip generation rates provided in the Transportation Impact Assessment prepared for the proposed project by Fehr & Peers (see Appendix D),[1] the Buildout Pursuant to Existing Land Use Designations Alternative would result in approximately 1,389 average daily trips (ADT) during operations, as compared to 2,080 ADT occurring with development of 220 single-family units assumed for the proposed project (see Table 6-3).

As such, the Alternative would result in fewer trips compared to the proposed project. However, the Alternative would still result in additional trips on the surrounding roadways. In order to conclusively determine whether the additional traffic associated with the Alternative would exceed the applicable significance thresholds for impacted study intersections and freeway segments, a detailed traffic impact study would be required. Because a conclusive determination cannot be reached without a quantitative analysis, the impacts to study freeway segments under Near-Term With Project conditions and study intersections under Cumulative With Project conditions are assumed to remain significant and unavoidable. Accordingly, Mitigation Measures 4.2-7 and 4.2-12(a) through 4.2-12(c) would still be required.

Given that the Alternative would result in fewer trips than the proposed project and would house a greater number of residents, the per capita VMT associated with the Alternative would likely be reduced. However, as previously mentioned, a detailed traffic impact study would be required to quantify the per capita VMT associated with the Alternative in order to conclusively determine impacts. As such, the impact associated with VMT identified for the proposed project is assumed to remain significant and unavoidable under the Alternative.

[1] Fehr & Peers. *Transportation Impact Assessment, Creekside (Vineyards at Sand Creek).* June 2020.

Table 6-3
Buildout Pursuant to Existing Land Use Designations Trip Generation

Land Use	Unit / Quantity	Trip Generation						
		Daily	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Blended Non-Age-Restricted and Active Adult Units								
Unrestricted Detached Homes[1]	43 units	406	9	24	33	27	16	43
Age-Restricted Detached[2]	230 units	983	19	37	56	42	28	70
Total	*273 units*	*1,389*	*28*	*61*	*89*	*69*	*448*	*113*
Proposed Project Trip Generation								
Unrestricted Detached Homes[1]	220 units	2,080	41	122	163	137	81	218

Notes:
1. *ITE land use category 210 – Single-Family Homes (Adj Streets, 7-9A, 4-6P):*
   Daily: (T) = 9.44 (X)
   AM Peak Hour: T = 0.74 (X); Enter = 25%; Exit = 75% PM Peak Hour: T = 0.99 (X); Enter = 63%; Exit = 37%
2. *Based on trip generation study, provided as Appendix D to the TIA, where:*
   Daily: (T) = 4.27 (X)
   AM Peak Hour: T = 0.24 (X); Enter = 33%; Exit = 67%
   PM Peak Hour: T = 0.30 (X); Enter = 60%; Exit = 40%

Source: Fehr & Peers, 2020.

Overall, development of the Buildout Pursuant to Existing Land Use Designations Alternative would result in similar impacts related to transportation compared to the proposed project.

Reduced Density Alternative

The Reduced Density Alternative would consist of buildout of the project site with half as many residences as the proposed project. As such, the Alternative would develop 110 single-family residential units. The total disturbance area would be identical to the proposed project. Similar to the proposed project, the Alternative would include 110 residential units that consist of either non-age-restrictedunits, senior/active adult units, or a combination of both. With development of 110 residential units on 58.9 acres of land, the overall density would be reduced compared to the proposed project. In addition, the parks and open space features included as part of the proposed project would remain the same. Off-site improvements required under the Reduced Density Alternative would be identical to those required for the proposed project.

Because the Reduced Density Alternative would include a mix of housing types, including senior housing, the Alternative would be capable of meeting Project Objectives #2 and #6. Project Objective #5 establishes the goal of increased land use intensities near regional transportation connections. However, the Reduced Density Alternative would include less development, which would ultimately reduce the intensity of development on the project site. As such, Project Objective #5 would be partially met under the Alternative. Most of the remaining project objectives would be fully or partially met under the Alternative.

Air Quality and Greenhouse Gas Emissions

Under the Reduced Density Alternative, a total of 110 residential units would be developed on 58.9 acres of the project site. The 110 units would equate to an overall decrease in units, but the

disturbance area would remain the same as would occur with the proposed project. Because the Alternative would result in fewer residential units, emissions from the construction of buildings would likely be reduced. However, because grading of the site would continue to disturb the same 58.9 acres of the site as would be disturbed under the proposed project, and considering that grading is often the most emissions intensive phase of construction, the potential exists for construction emissions to exceed the applicable BAAQMD thresholds. Thus, implementation of Mitigation Measure 4.1-1 would still be required in order to reduce the impact to a less-than-significant level.

Operational emissions under the Reduced Density Alternative were quantified to compare to BAAQMD's emissions thresholds, as well as the proposed project. As shown in Table 6-4, the unmitigated operational emissions of criteria air pollutants associated with the Reduced Density Alternative would exceed the BAAQMD's operational pounds per day (lbs/day) threshold for ROG. Because emissions of the Reduced Density Alternative would exceed the BAAQMD's thresholds, Mitigation Measures 4.1-2 would still be required in order to reduce the impact. However, criteria pollutant emissions under the Reduced Density Alternative would be reduced compared to the proposed project. Consequently, the Reduced Density Alternative would result in fewer impacts as compared to the proposed project. As shown in Table 6-4, implementation of mitigation would be sufficient to reduce ROG emissions below the BAAQMD's threshold.

Table 6-4
Reduced Density Alternative Unmitigated and Mitigated Operational and Cumulative Emissions

	ROG	NO_X	PM_{10}	$PM_{2.5}$
Unmitigated Operational Emissions (lbs/day)				
Alternative Emissions	120.49	7.90	25.99	22.32
BAAQMD Thresholds	54	54	82	54
Emissions Exceed Thresholds?	**YES**	**NO**	**NO**	**NO**
Unmitigated Alternative Cumulative Emissions (tons/yr)				
Alternative Emissions	1.78	1.03	1.03	0.391
BAAQMD Thresholds	10	10	15	10
Emissions Exceed Thresholds?	**NO**	**NO**	**NO**	**NO**
Mitigated Operational Emissions (lbs/day)				
Alternative Emissions	6.66	7.15	5.26	1.59
BAAQMD Thresholds	54	54	82	54
Emissions Exceed Thresholds?	**NO**	**NO**	**NO**	**NO**
Mitigated Alternative Cumulative Emissions (tons/yr)				
Alternative Emissions	1.13	1.03	0.90	0.26
BAAQMD Thresholds	10	10	15	10
Emissions Exceed Thresholds?	**NO**	**NO**	**NO**	**NO**

Source: CalEEMod, March 2020 (see Appendix C).

Table 6-5 below provides a comparison of the Alternative's mitigated emissions to the proposed project.

Table 6-5
Mitigated Operational and Cumulative Emissions Comparison

	ROG	NO_X	PM_{10}	$PM_{2.5}$
Mitigated Operational Emissions (lbs/day)				
Project Emissions	12.64	11.41	10.28	2.95
Alternative Emissions	6.66	7.15	5.26	1.59
Difference	**-5.98**	**-4.26**	**-5.02**	**-1.36**
Mitigated Cumulative Emissions (tons/yr)				
Project Emissions	2.20	2.04	1.79	0.51
Alternative Emissions	1.13	1.03	0.90	0.26
Difference	**-1.07**	**-1.01**	**-0.89**	**-0.25**

Source: CalEEMod, April 2020 (see Appendix C).

As discussed in Chapter 4.1, even with implementation of Mitigation Measure 4.1-6, the proposed project would result in a significant and unavoidable impact related to GHG emissions. The Reduced Density Alternative would result in GHG emissions during construction and operations, with unmitigated operational GHG emissions equaling approximately 1,015.60 metric tons of carbon dioxide equivalence per year ($MTCO_2e$/yr) in the year 2029, and 1,001.47 $MTCO_2e$/yr in 2030.

Because the Alternative would include a similar disturbance area as the proposed project, emissions of GHGs during construction activities would be similar to that of the proposed project. However, operational emissions would be below that of the proposed project, and would be below BAAQMD's mass emissions thresholds of 1,100 $MTCO_2e$/yr, which may be used to assess a project's compliance with AB 32. Although emissions under the Reduced Density Alternative would be below BAAQMD's AB 32 thresholds, operational emissions would be anticipated to exceed the SB 32 thresholds applied in the analysis presented in Chapter 4.1.

Because emissions under the Reduced Density Alternative would continue to exceed the SB 32 thresholds used in this analysis, Mitigation Measure 4.1-6 would continue to be required for the Reduced Density Alternative. However, in order for the Reduced Density Alternative to achieve GHG reductions sufficient to achieve compliance with AB 32 and SB 32, which is the goal of Mitigation Measure 4.1-6, the Reduced Density Alternative would be required to reduce a smaller amount of GHG emissions as compared to the proposed project. Consequently, the Reduced Density Alternative would result in fewer impacts related to the emission of GHGs as compared to the proposed project. Although the Reduced Density Alternative would result in fewer impacts related to the emission of GHGs, the Alternative could still conflict with AB 32 and SB 32. Thus, the significant and unavoidable impact would remain under the Reduced Density Alternative.

Based on the above, impacts related to air quality and GHG emissions would be fewer with implementation of the Reduced Density Alternative compared to the proposed project.

Transportation

Because the Reduced Density Alternative would still add construction vehicle traffic to area roadways, a potential conflict with existing traffic patterns could occur. In addition, although the Alternative includes a fewer number of units, the overall area of disturbance would be the same and require the same area of grading during construction. As such, Mitigation Measure 4.2-1 related to preparation of a construction management plan would still be required.

Given that the Reduced Density Alternative would include fewer residential units than the proposed project, operational vehicle trips would be reduced. Based on vehicle trip generation rates provided in the Transportation Impact Assessment prepared for the proposed project by Fehr & Peers (see Appendix D),[2] the Reduced Density Alternative would result in a maximum of approximately 1,039 ADT during operations (see Table 6-6). Should a portion of the units be a combination of single-family units and senior/adult units, project trip generations would be reduced. However, as discussed in Chapter 4.2, Transportation, of this EIR assumes buildout of the project site with non-age-restricted units in order to provide a conservative analysis of traffic impacts. As shown in Table 6-6, the proposed project would result in a maximum of 2,080 ADT. Given that the Reduced Density Alternative would result in a maximum of 1,039 ADT, the Alternative would result in fewer trips than the proposed project during operations.

Table 6-6
Reduced Density Alternative Trip Generation

Land Use	Unit / Quantity	Trip Generation						
		Daily	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Non-Age-Restricted Units								
Unrestricted Detached Homes[1]	110 units	1,039	21	61	82	69	41	110
Proposed Project Trip Generation								
Unrestricted Detached Homes[1]	220 units	2,080	41	122	163	137	81	218

Notes:
1. *ITE land use category 210 – Single-Family Homes (Adj Streets, 7-9A, 4-6P):*
   Daily: (T) = 9.44 (X)
   AM Peak Hour: T = 0.74 (X); Enter = 25%; Exit = 75% PM Peak Hour: T = 0.99 (X); Enter = 63%; Exit = 37%

Source: Fehr & Peers, 2020.

Because traffic levels under the Alternative would be substantially reduced, study intersections and freeway segments would be anticipated to operate at acceptable levels. However, because a conclusive determination cannot be reached without a quantitative analysis, the significant and unavoidable impacts identified for the proposed project could remain under the Alternative, and Mitigation Measures 4.2-7 and 4.2-12(a) through 4.2-12(c) would likely still be required.

Overall, development of the Reduced Density Alternative would result in fewer impacts related to transportation compared to that of the proposed project.

Senior Housing Alternative

Under the Senior Housing Alternative, the total area to be disturbed would be the same as the proposed project. Furthermore, the total number and type of units developed under the Alternative would be identical to that of the proposed project. The only difference between the proposed project and the Senior Housing Alternative would be that under the Senior Housing Alternative, all 220 units would consist of age-restricted senior/active adult units. The Senior Housing Alternative would be designed to reduce the total ADT and VMT. The Alternative would include similar roadway and utility improvements as the proposed project.

[2] Fehr & Peers. *Transportation Impact Assessment, Creekside (Vineyards at Sand Creek).* June 2020.

Because the Senior Housing Alternative would only include senior/adult units, the Alternative would not be capable of meeting Project Objective #2. However, the Senior Housing Alternative would include senior/adult units, and, thus, would be capable of meeting Project Objective #6. In addition, because the Alternative would include similar features as the proposed project, such as roadway and utility infrastructure improvements, Project Objectives #3 and #4 would be met. Most of the remaining project objectives would be fully or partially met under the Alternative.

Air Quality and Greenhouse Gas Emissions

Because the Senior Housing Alternative's area of disturbance would be similar to that of the proposed project, construction emissions associated with the Senior Housing Alternative would be similar to that of the proposed project. Thus, implementation of Mitigation Measure 4.1-1 would still be required in order to reduce the impact to a less-than-significant level.

Operational emissions under the Senior Housing Alternative were quantified to compare to BAAQMD's emissions thresholds, as well as the proposed project. As shown in Table 6-7, the unmitigated operational emissions of criteria air pollutants associated with the Senior Housing Alternative would exceed the BAAQMD's operational pounds per day (lbs/day) threshold for ROG. Because emissions of the Alternative would exceed the BAAQMD's thresholds, Mitigation Measures 4.1-2 would still be required in order to reduce the impact. As shown in Table 6-7, implementation of mitigation would be sufficient to reduce ROG emissions below the BAAQMD's threshold. However, as shown in Table 6-8, emissions under the Senior Housing Alternative would be below the emissions anticipated to occur under the proposed project. Consequently, the Senior Housing Alternative would result in fewer impacts as compared to the proposed project.

Table 6-7
Senior Housing Alternative Unmitigated Operational and Cumulative Emissions

	ROG	NO_X	PM_{10}	$PM_{2.5}$
Unmitigated Operational Emissions (lbs/day)				
Alternative Emissions	239.42	10.49	46.46	43.15
BAAQMD Thresholds	54	54	82	54
Emissions Exceed Thresholds?	**YES**	**NO**	**NO**	**NO**
Unmitigated Alternative Cumulative Emissions (tons/yr)				
Alternative Emissions	3.31	1.11	1.10	0.52
BAAQMD Thresholds	10	10	15	10
Emissions Exceed Thresholds?	**NO**	**NO**	**NO**	**NO**
Mitigated Operational Emissions (lbs/day)				
Alternative Emissions	11.77	8.99	5.00	1.69
BAAQMD Thresholds	54	54	82	54
Emissions Exceed Thresholds?	**NO**	**NO**	**NO**	**NO**
Mitigated Alternative Cumulative Emissions (tons/yr)				
Alternative Emissions	2.01	1.10	0.83	0.25
BAAQMD Thresholds	10	10	15	10
Emissions Exceed Thresholds?	**NO**	**NO**	**NO**	**NO**

Source: CalEEMod, April 2020 (see Appendix C).

Table 6-8
Mitigated Operational and Cumulative Emissions Comparison

	ROG	NO_X	PM_{10}	$PM_{2.5}$
Mitigated Operational Emissions (lbs/day)				
Project Emissions	12.64	11.41	10.28	2.95
Alternative Emissions	11.77	8.99	5.00	1.69
Difference	**-0.87**	**-2.42**	**-5.28**	**-1.26**
Mitigated Cumulative Emissions (tons/yr)				
Project Emissions	2.20	2.04	1.79	0.51
Alternative Emissions	2.01	1.10	0.83	0.25
Difference	**-0.19**	**-0.94**	**-0.96**	**-0.26**

Source: CalEEMod, April 2020 (see Appendix C).

As discussed in Chapter 4.1, even with implementation of Mitigation Measure 4.1-6, the proposed project would result in a less-than-significant impact related to GHG emissions. The Senior Housing Alternative would result in GHG emissions during construction and operations, with unmitigated operational GHG emissions equaling approximately 1,184.42 metric tons of carbon dioxide equivalence per year ($MTCO_2e$/yr) in the year 2029, and 1,171.00 $MTCO_2e$/yr in 2030. Such emissions would be below that of the proposed project.

In addition, because the alternative would include the same area of disturbance as the proposed project, emissions of GHGs during construction would be identical to that of the proposed project. Although emissions under the Senior Housing Alternative would be fewer than under the proposed project, emissions would still be anticipated to exceed the thresholds applied in Chapter 4.1. Consequently, Mitigation Measure 4.1-6 would still be required. However, in order for the Senior Housing Alternative to achieve GHG reductions sufficient to achieve compliance with AB 32 and SB 32, which is the goal of Mitigation Measure 4.1-6, the Senior Housing Alternative would be required to reduce a smaller amount of GHG emissions as compared to the proposed project. Consequently, the Senior Housing Alternative would result in fewer impacts related to the emission of GHGs as compared to the proposed project. Although the Senior Housing Alternative would result in fewer impacts related to the emission of GHGs, the Alternative could still conflict with AB 32 and SB 32. Thus, the significant and unavoidable impact would remain under the Senior Housing Alternative.

Transportation

Because the Senior Housing Alternative would add construction vehicle traffic to area roadways, the Alternative could conflict with existing traffic patterns in the area. However, because the Alternative would involve construction of 220 adult/senior units, as compared to 220 residential units that consist of either non-age-restricted units, senior/active adult units, or a combination of both under the proposed project, the overall intensity of construction, and associated impacts, would be reduced. Nonetheless, because construction vehicle traffic could conflict with existing traffic patterns, Mitigation Measure 4.2-1 related to preparation of a construction management plan would still be required.

Given that the Senior Housing Alternative would include 220 senior/adult units, the maximum number of trips would be fewer than the maximum number of trips that would result from the proposed project. Based on vehicle trip generation rates provided in the Transportation Impact Assessment, the Senior Housing Alternative would result in approximately 940 ADT during

operations, as compared to a maximum of 2,080 ADT occurring with development of 220 non-age-restricted units under the proposed project (see Table 6-9).

Table 6-9
Senior Housing Alternative Trip Generation

Land Use	Unit / Quantity	Trip Generation						
		Daily	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Active Adult Units								
Age-Restricted Detached[1]	220 units	940	17	35	53	40	26	66
Proposed Project Trip Generation								
Unrestricted Detached Homes[1]	220 units	2,080	41	122	163	137	81	218

Notes:
1. Based on trip generation study, provided as Appendix D to the TIA, where:
Daily: (T) = 4.27 (X)
AM Peak Hour: T = 0.24 (X); Enter = 33%; Exit = 67%
PM Peak Hour: T = 0.30 (X); Enter = 60%; Exit = 40%

Source: Fehr & Peers, 2020.

As discussed in Chapter 4.2, Transportation, the proposed project would result in significant and unavoidable impacts to study freeway segments under the Near-Term With Project conditions. In addition, the proposed project would result in significant and unavoidable impacts under Cumulative With Project conditions to the Sand Creek Road/SR 4 eastbound ramps and Sand Creek Road/SR 4 westbound ramps intersections. The Senior Housing Alternative could result in fewer impacts under Near-Term With Project and Cumulative With Project conditions. In order to determine whether the trips occurring as a result of the Alternative would exceed the applicable significance thresholds for impacted intersections, a detailed traffic impact study would be required. Because a conclusive determination cannot be reached without a quantitative analysis, the impacts to study freeway segments under Near-Term With Project conditions and study freeway segments under Cumulative With Project conditions would be anticipated to remain significant and unavoidable. Mitigation Measures 4.2-7 and 4.2-12(a) through 4.2-12(c) would likely still be required.

Based on the above, development of the Senior Housing Alternative would result in fewer impacts related to transportation compared to the proposed project.

6.5 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

An EIR is required to identify the environmentally superior alternative from among the range of reasonable alternatives that are evaluated. Section 15126(e)(2) of the CEQA Guidelines requires that an environmentally superior alternative be designated and states, "If the environmentally superior alternative is the 'no project' alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives." In this case, the No Project (No Build) Alternative would be considered the environmentally superior alternative, because the project site is assumed to remain in its current condition under the Alternative. Consequently, many of the impacts resulting from the proposed project would not occur under the Alternative, as shown in Table 6-10 below.

As noted above, the No Project (No Build) Alternative would not meet any of the project objectives. The Buildout Pursuant to Existing Land Use Designations Alternative would fully meet five of the project objectives and partially meet three of the objectives. The Reduced Density Alternative would fully meet seven of the project objectives and partially meet one of the objectives. The Senior Housing Alternative would fully meet seven of the project objectives and would not meet one of the objectives.

As discussed throughout this chapter, the Buildout Pursuant to Existing Land Use Designations Alternative would result in greater impacts related to air quality and GHG emissions and similar impacts related to transportation. Impacts related to air quality and GHG emissions and transportation would be fewer under both the Reduced Density Alternative and Senior Housing Development Alternative. However, the Reduced Density Alternative has the potential to result in 470 ADT during operation as compared to 940 ADT under the Senior Housing Alternative. As such, impacts related to transportation under the Reduced Density Alternative would be fewer than the Senior Housing Alternative.

The development of the Reduced Density Alternative would partially satisfy the project objectives and would result in fewer impacts compared to the proposed project. In addition, although the Reduced Density Alternative would still require implementation of mitigation, emission of GHGs as compared to the proposed project would ultimately be fewer.

Because fewer vehicle trips would be generated by the Reduced Density Alternative, the intensity of traffic-related impacts, including impacts to study intersections, would be reduced compared to the proposed project. However, because the Alternative would still result in a substantial amount of new vehicle trips, a detailed traffic study would be required to evaluate potential impacts on the surrounding roadways. Because a conclusive determination cannot be reached without a quantitative analysis, impacts to study freeway segments under Near-Term With Project conditions and study intersections under Cumulative With Project conditions, as well as impacts related to VMT, would be anticipated to remain significant and unavoidable. Mitigation Measures 4.2-7 and 4.2-12(a) through 4.2-12(c) would likely still be required.

Overall, because the Reduced Density Alternative would result in fewer impacts related to air quality and GHG emissions and transportation, the Reduced Density Alternative would be considered the environmentally superior alternative to the proposed project.

Table 6-10
Comparison of Environmental Impacts for Project Alternatives

Resource Area	Proposed Project	No Project (No Build) Alternative	Buildout Pursuant to Existing Land Use Designations Alternative	Reduced Density Alternative	Senior Housing Alternative
Air Quality and Greenhouse Gas Emissions	Less-Than-Significant with Mitigation and Significant and Unavoidable	None	Greater*	Fewer*	Fewer*
Transportation	Less-Than-Significant with Mitigation and Significant and Unavoidable	None	Similar*	Fewer*	Fewer*
	Total Fewer:	**2**	**0**	**2**	**2**
	Total Similar:	**0**	**1**	**0**	**0**
	Total Greater	**0**	**1**	**0**	**0**

Note: No Impact = "None;" Less than Proposed Project = "Fewer;" and Similar to Proposed Project = "Similar"

* Significant and Unavoidable impact(s) determined for the proposed project would still be expected to occur under the Alternative.

7. EIR Authors and Persons Consulted

7. EIR AUTHORS AND PERSONS CONSULTED

Raney Planning & Management, Inc.

C. Timothy Raney, AICP	President
Cindy Gnos, AICP	Senior Vice President
Nick Pappani	Vice President
Rod Stinson	Division Manager / Air Quality Specialist
Angela DaRosa	Assistant Division Manager / Air Quality Specialist
Jacob Byrne	Senior Associate / Air Quality Technician
Zac Smith	Associate
Clay Gallagher	Associate
Briette Shea	Associate
Jessica Chuidian-Ingersoll	Associate

City of Antioch

Alexis Morris	Planning Manager

Fehr & Peers

Kathrin Tellez, AICP, PTP	Principal

Kimley-Horn and Associates, Inc.

Michael Mowery, P.E.	Principal-In-Charge
Ben Huie, P.E.	Project Manager

Other

Other persons and sources consulted in preparation of this EIR are listed in Chapter 8, References, of this EIR. In addition, please see Appendix A for references and persons consulted in preparation of the Initial Study for the proposed project.

8. References

8. REFERENCES

Association of Bay Area Governments and Metropolitan Transportation Commission. *Plan Bay Area 2040: Final.* Available at: http://2040.planbayarea.org/reports. Accessed March 2020.

Association of Bay Area Governments and Metropolitan Transportation Commission. *Plan Bay Area 2040: Land Use Modeling Report.* Available at: http://2040.planbayarea.org/reports. Accessed March 2020.

Bay Area Air Quality Management District. *Air Quality Plans*. Available at: http://www.baaqmd.gov/Divisions/Planning-and-Research/Plans.aspx. Accessed March 2020.

Bay Area Air Quality Management District. *Air Quality Standards and Attainment Status.* Available at: http://www.baaqmd.gov/research-and-data/air-quality-standards-and-attainment-status. Accessed March 2020.

Bay Area Air Quality Management District. *Air Quality Summary Reports*. Available at: http://www.baaqmd.gov/about-air-quality/air-quality-summaries. Accessed March 2020.

Bay Area Air Quality Management District. *California Environmental Quality Act Guidelines.* May 2017.

Bay Area Air Quality Management District. *California Environmental Quality Act Guidelines Update: Proposed Thresholds of Significance.* December 7, 2009.

Bay Area Air Quality Management District. *Final 2017 Clean Air Plan: Spare the Air, Cool the Climate.* April 2017.

California Air Resources Board. *2002-07-29 Asbestos ATCM for Construction, Grading, Quarrying, and Surface Mining Operations.* June 3, 2015. Available at: http://www.arb.ca.gov/toxics/atcm/asb2atcm.htm. Accessed March 2020.

California Air Resources Board. *Aerometric Data Analysis and Management (iADAM) System.* Available at: http://www.arb.ca.gov/adam/topfour/topfour1.php. Accessed March 2020.

California Air Resources Board. *AB 32 Scoping Plan.* Available at: https://www.arb.ca.gov/cc/scopingplan/scopingplan.htm. Accessed March 2020.

California Air Resources Board. *Air Quality and Land Use Handbook: A Community Health Perspective.* April 2005.

California Air Resources Board. *Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling.* October 24, 2013. Available at: http://www.arb.ca.gov/msprog/truck-idling/truck-idling.htm. Accessed April 2020.

California Air Resources Board*. California Ambient Air Quality Standards (CAAQS).* Available at: https://www.arb.ca.gov/research/aaqs/caaqs/caaqs.htm. Accessed November 2019.

California Air Resources Board. *California's 2017 Climate Change Scoping Plan.* November 2017.

California Air Resources Board. *First Update to the Climate Change Scoping Plan.* May 22, 2014.

California Air Resources Board. *Glossary of Air Pollution Terms.* Available at: http://www.arb.ca.gov/html/gloss.htm. Accessed April 2020.

California Air Resources Board. *In-Use Off-Road Diesel Vehicle Regulation.* December 10, 2014. Available at: http://www.arb.ca.gov/msprog/ordiesel/ordiesel.htm. Accessed March 2020.

California Air Resources Board*. Reducing Toxic Air Pollutants in California's Communities*. February 6, 2002.

California Code of Regulations, Title 13, Article 4.8, Chapter 9, Section 2449.

California Natural Resources Agency. *Safeguarding California: Reducing Climate Risk*. July 2014.

California Public Utilities Commission*. California Renewables Portfolio Standard (RPS).* Available at: http://www.cpuc.ca.gov/renewables/. Accessed March 2020.

City of Antioch*. City of Antioch General Plan*. November 23, 2003.

City of Antioch*. City of Antioch Housing Element 2015-2023*. Adopted April 14, 2015.

City of Antioch. *Draft General Plan Update Environmental Impact Report*. July 2003.

Contra Costa County Transportation Authority. *2017 Countywide Comprehensive Transportation Plan.* Adopted September 20, 2017.

ENVIRON International Corporation and the California Air Districts. *California Emissions Estimator Model User's Guide Version 2016.3.2*. November 2017.

Fehr and Peers. *Transportation Impact Assessment: Creekside (Vineyards at Sand Creek).* June 2020.

FirstCarbon Solutions. *The Ranch Project Draft Environmental Impact Report*. March 20, 2020.

Flores, Areana. Bay Area Quality Management District. Personal communication [phone], Jacob Byrne, Senior Associate/Air Quality Technician, Raney Planning & Management, Inc. September 17, 2019.

Intergovernmental Panel on Climate Change. *Climate Change 2007: Impacts, Adaptation, and Vulnerability*. 2007.

Kimley-Horn. *Peer Review of the Creekside (Vineyards at Sand Creek) Project in Antioch, CA*. November 20, 2019.

Sacramento Metropolitan, El Dorado, Feather River, Placer, and Yolo-Solano Air Districts, Spare the Air website. *Air Quality Information for the Sacramento Region.* Available at: http://www.sparetheair.com/health.cfm?page=healthoverall. Accessed April 2020.

U.S. Environmental Protection Agency. *Climate Change Indicators: Atmospheric Concentrations of Greenhouse Gases.* Available at: https://www.epa.gov/climate-indicators/climate-change-indicators-atmospheric-concentrations-greenhouse-gases. Accessed March 2020.

U.S. Environmental Protection Agency. *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2013*. April 15, 2017.

U.S. Environmental Protection Agency. *Sources of Greenhouse Gas Emissions*. Available at: https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions. Accessed March 2020.