STATEWIDE ANAEROBIC DIGESTER FACILITIES FOR THE TREATMENT OF MUNICIPAL ORGANIC SOLID WASTE

Draft Program Environmental Impact Report
SCH No. 2010042100

Prepared for the
California Department of Resources
Recycling and Recovery (CalRecycle)

February 2011

ESA

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NOTICE OF COMPLETION OF DRAFT EIR

Opportunity for Public Comment on Draft Program Environmental Impact Report for Statewide Anaerobic Digester Facilities for the Treatment of Municipal Organic Solid Waste (SCH #2010042100)

NOTICE IS HEREBY GIVEN that the California Department of Resources Recycling and Recovery (CalRecycle), as the lead agency, has released a Draft Program Environmental Impact Report (EIR) for Statewide Anaerobic Digester (AD) Facilities for the Treatment of Municipal Organic Solid Waste. The public review and comment period for the Draft Program EIR has started and will end on April 4, 2011. During the review period, CalRecycle will hold a public meeting on March 15, 2011 (see meeting information below) to discuss the Draft Program EIR and receive comments. In addition, the public may provide written comments on the Draft Program EIR during the review period.

BACKGROUND

The Draft Program EIR provides a programmatic analysis of potential environmental effects that may result from the adoption of an Anaerobic Digestion (AD) Initiative and subsequent development of AD facilities in the State of California, in accordance with the California Environmental Quality Act (CEQA).

CalRecycle plans to adopt an Anaerobic Digestion Initiative (the AD Initiative) in 2011, which will be a set of comprehensive program elements to foster the development of AD facilities that convert organic solid wastes into sources of energy and can produce valuable compost feedstocks, soil amendments, and other products. Implementation of the AD Initiative will assist in meeting the following objectives:

- Support CalRecycle Strategic Directive 6.1: to reduce the amount of organics in the waste stream by 50 percent by 2020.
- Support Assembly Bill 32 (AB 32), the California Global Warming Solutions Act of 2006, greenhouse gas reduction measures related to the use of anaerobic digestion.
- Assist local governments and state agencies (both lead and responsible agencies) by providing program-level analyses that will identify potential environmental effects of AD facilities and discuss mitigation measures or best management practices that can reduce or eliminate the environmental effects.

SIGNIFICANT ENVIRONMENTAL EFFECTS

The Draft EIR evaluates and describes, on a statewide, program-level basis, the potential environmental impacts associated with the construction and operation of AD facilities, identifies those impacts that could be significant, and presents mitigation measures, which, if adopted by CalRecycle or other responsible agencies, could avoid or minimize these impacts. There are no significant and unavoidable impacts identified in the Draft Program EIR.

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DOCUMENT AVAILABILITY

The Draft Program EIR will be available for public review at the CalEPA Library during the review period:

CalEPA Building, 2nd Floor
1001 I Street
P.O. Box 2815
Sacramento, CA
95812-2815
Phone: (916) 322-4027

Electronic copies of the Draft Program EIR can be downloaded in PDF format from the CalRecycle website at:

http://www.calrecycle.ca.gov/SWFacilities/Compostables/AnaerobicDig

Additional access to copies may also be accomplished by contacting Paul Miller, by phone at (916) 564-4500 or by e-mail (PMiller@esassoc.com); there will be a reasonable fee charged for a hardcopy or CD version.

CONTACT PERSON

Ken Decio, CalRecycle – (916) 341-6313 (ken.decio@calrecycle.ca.gov)

PUBLIC MEETING AND SCHEDULE

The public will have an opportunity to provide comments on the Draft Program EIR during the following CalRecycle Monthly Public Meeting:

Date: Tuesday, March 15, 2011

Time: 10:00 AM

Address: CalEPA building
1001 I Street
Byron Sher Auditorium (2nd floor)
Sacramento, CA 95814

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CHAPTER 1
Executive Summary

1.1 Introduction

CalRecycle has prepared this Draft Program Environmental Impact Report (EIR) to assess the potential environmental effects that may result from the adoption of an Anaerobic Digestion (AD) Initiative, a comprehensive program to foster the development of AD facilities to process the organic fraction of municipal solid waste and other organic wastes throughout the State of California. Throughout the document, the adoption of the AD Initiative and subsequent development of AD facilities in California will be referred to as the "project".

This Draft Program EIR will inform future policy considerations related to AD facilities and assist state and local agencies in preparing site-specific environmental documentation that may be required for AD facility applications and/or permits submitted to CalRecycle, regulatory agencies and local jurisdictions. In the event CalRecycle or other public agencies adopt regulations or ordinances relating to regulating or permitting AD facilities, the Draft Program EIR provides useful information and can serve as the basis for analyzing the environmental effects of individual projects.

By preparing this Program EIR, CalRecycle is providing additional focus in California on the potential development of AD facilities. While there has been considerable discussion and interest in AD facilities in California, to date there has not been a broad review of the potential environmental impacts of developing AD facilities. This Program EIR responds to the need for such environmental review. Some members of the Technical Advisory Group (TAG) have a concern that, by preparing the Program EIR, CalRecycle is indicating a preference for AD technologies over other technologies, or that it will appear that way to the public. CalRecycle emphasizes that the intent of this document is not to identify AD facilities as preferred to alternative waste management options, or to identify preferred AD facility systems or vendors. CalRecycle has previously provided RMDZ loans, permitting guidance, and technical assistance for projects using a range of technologies including biochemical and thermochemical conversion technologies. This effort should best be understood as an effort by CalRecycle to use its very limited funding to analyze the potential environmental impacts of AD facilities, which is but one of the conversion technologies available to reduce the level of organics going to landfills in California. The Program EIR is a starting point for the environmental review of AD facilities proposed in local jurisdictions. By tapping into the considerable California specific knowledge and experience of CalRecycle staff and the TAG, this effort provides a technical outreach and overview that would not otherwise be available to local jurisdictions considering a specific AD facility proposal.

1.2 Anaerobic Digestion Initiative

Under its Strategic Directive 6.1, CalRecycle seeks to reduce by 50 percent the amount of organic waste disposed in the state's landfills by 2020. In addition to helping conserve limited landfill capacity, this CalRecycle policy recognizes that organic wastes are a resource, not just solid wastes that must be disposed. Organic wastes have an energy value that can be captured and utilized and are also a necessary component of compost, soil amendments, and other useful products. Directive 6.1 also encompasses one of CalRecycle's actions to help California significantly reduce its generation of greenhouse gases. Under the State's *Climate Change Scoping Plan* (CARB, 2008), CalRecycle is responsible for taking actions to reduce the emission of methane, a potent greenhouse gas, from landfills. AD facilities utilize organic wastes as a feedstock from which to produce biogas (which is captured and contains a high percentage of methane). Typically the methane gas produced by the anaerobic digestion process is converted to liquefied natural gas (LNG), compressed natural gas (CNG), or electricity (using internal combustion engines or fuel cells) for on-site energy needs and export to the energy grid (CARB, 2008). The development of AD facilities is one of CalRecycle's charges under the AB 32 Climate Change Scoping Plan. The AB 32 Climate Change Scoping Plan estimates that AD facilities in California could avoid methane emissions from landfills at a level of 2 million metric tons of carbon dioxide equivalents (CO_2e) per year by the year 2020 (CARB, 2008). Anaerobic digestion also can contribute to meeting the State's Renewable Portfolio Standard and Low Carbon Fuel Standard. To assist in achieving those objectives, CalRecycle intends to adopt the AD Initiative, a comprehensive program to foster the development of AD facilities to convert organic solid wastes into sources of energy, valuable compost feedstocks, soil amendments, and other products.

The AD Initiative consists of CalRecycle's adoption of a policy and a series of discrete actions to implement the policy, together with additional actions that will be developed and implemented in the future:

- It is the policy of CalRecycle to encourage the development of AD facilities in California as an alternative to the landfill disposal of organic solid waste. Specifically, as an initial measure, CalRecycle will encourage the establishment of in-vessel digesters located at existing or new solid waste facilities and in areas zoned for industrial or solid waste handling activities.
- CalRecycle shall, not later than January 1, 2012, establish programs to implement the above policy, including without limitation:
    - Provide research grants, loans, and contracts (dependent on funding availability) to develop AD facilities and for activities that advance the state of knowledge about anaerobic digestion and its applications and the uses of products and by-products, including anaerobic digestion demonstration projects that use the organic fraction of municipal solid waste as a feedstock.
    - Develop guidance publications to assist operators who seek to establish AD facilities.
    - Develop guidance publications to assist LEAs and other local and regional government agencies that permit and regulate AD facilities, specifically guidance for co-location at solid waste facilities.

- Draft revised regulations for aspects of specific design, operation and permitting of AD facilities within the authority and responsibility of CalRecycle.
- Promote anaerobic digestion through CalRecycle's participation with the California Energy Commission in implementing AB 118 (Alternative and Renewable Fuel and Vehicle Technology Program), the Bioenergy Interagency Working Group, and with the Air Resources Board in implementing the Anaerobic Digestion and Low Carbon Fuel Standard measures in the AB 32 Climate Change Scoping Plan.
- Work with the California Pollution Control Financing Authority and California Alternative Energy and Advanced Transportation Financing Authority to help anaerobic digestion project proposals obtain funding.
- Participate on technical workgroups convened by the Climate Action Reserve to develop or modify protocols, such as the Organic Waste Digestion Project Protocol, for projects that divert and anaerobically digest organic waste that otherwise would have gone to solid waste landfills.

1.3 Project Objectives

The project has several objectives including the following:

- Assist in meeting CalRecycle Strategic Directive 6.1: Reduce the amount of organics in the waste stream by 50 percent by 2020.
- Support Assembly Bill 32 (AB 32), the California Global Warming Solutions Act of 2006, greenhouse gas reduction measures related to the use of anaerobic digestion:
  - Measures E-3. Achieve a 33 percent renewable energy mix by 2020. (AD facilities produce biogas which is a renewable energy source.)
  - RW-3. High Recycling/Zero Waste. (Anaerobic digestion is one of five subcategories listed under this measure.)
- Assist local governments and state agencies (both lead and responsible agencies) by providing program-level analyses that will identify potential environmental effects of AD facilities and discuss mitigation measures or best management practices that can reduce or eliminate the environmental effects.

1.4 Proposed Facilities

The scope of proposed facility types has been focused by the objective of reducing the organic content of the solid wastes that are disposed in municipal solid waste landfills and to generate or recover energy from the solid wastes.

AD Facilities included in the scope: In-vessel AD facilities which are located at existing or new permitted solid waste facilities or stand-alone AD facilities in areas zoned for industrial or solid waste handling activities.

AD Facilities not included in the scope: Dairy manure digesters, dairy manure co-digesters and wastewater treatment plant digesters. In-ground digester cell technology (for example the landfill-

based anaerobic digester-compost pilot project developed at the Yolo County Central Landfill), though not included in the project, is discussed and evaluated as an alternative in **Chapter 13**.

There are several variations of in-vessel digester technologies. This Draft Program EIR allows for flexibility in technology choices at the local level. Different in-vessel technologies have the same general processes which are discussed in the siting, construction and operational sections, below.

1.5 Feedstocks

The scope of this Draft Program EIR is focused on reducing organic portions of the municipal solid waste stream and feedstocks which enhance the efficiency of the AD process.

Feedstock materials included in the scope: Food waste, green material and mixed solid waste. The food and green material categories are intended to be inclusive and not limited by current regulatory definitions or collection methods – "food" includes cannery waste, meat, poultry, fish, cheese waste, food processing waste, fats, oils and greases (FOG), etc., and "green material" includes urban, agricultural, crop residues, contaminated green materials, etc. Use of manure will be considered as nitrogen nutrient amendment material for the purpose of increasing the growth of microorganisms and digester efficiency, but not as a primary waste stream to be evaluated.

Feedstock materials not included in the scope: Biosolids, untreated septage, waste co-digested with biosolids at wastewater treatment plants or dairy manure co-digesters, and hazardous waste.

1.6 Summary of Significant Impacts and Mitigation Measures

Potential environmental impacts of the project are summarized in **Table 1-1**, below. As indicated in the table, all the impacts could be mitigated to a less-than-significant level with implementation of the mitigation measures. Please refer to Chapters 5 through Chapter 11 in this Draft Program EIR for a complete discussion of each impact. As discussed in Chapter 2, a Mitigation Monitoring or Reporting Program (MMRP) will be prepared at the time of the Final Program EIR for this project.

Notably, the development of AD facilities would have substantial benefits in regards to diverting organic material from landfills and reducing greenhouse gas (GHG) emissions in comparison to existing practices.

1.7 Areas of Controversy and Other CEQA Considerations

For the most part, comments received from members of the Technical Advisory Group (TAG) (see the list of members in Chapter 14) and in response to the EIR Notice of Preparation (NOP) have been supportive of the goals of the Program EIR. There was general support from the TAG members that the Program EIR move forward quickly to provide information that can help AD facility projects that are in the early phases of planning and/or permitting. Also there was considerable support from the TAG for regulations to specifically address the permitting of AD facilities.

The inclusion of the Landfill In-Ground Digester Cell Alternative was a topic that raised some controversy in the TAG meetings. Some members (on one NOP comment letter) indicated that it should be included as part of the project. Other TAG members wanted it discussed as an alternative or not at all in the Program EIR. Ultimately the in-ground digester cell was considered as an alternative to the project (in the Program EIR) because, while it has similar target feedstocks, it is unique in comparison to the in-vessel systems considered in the Program EIR.

Some TAG members indicated that the Thermal Conversion Alternative is not an appropriate project alternative, because thermal conversion technologies have different target feedstock materials than AD facilities. Because of the differences in target feedstock materials, the Thermal Conversion Alternative was described in some detail in Chapter 13, but it was not directly compared as an alternative to the project.

1.8 Alternatives

The purpose of the alternatives analysis in an EIR is to describe a range of reasonable alternatives to the project that could feasibly attain the objectives of the project, and to evaluate the comparative merits of the alternatives (CEQA Guidelines §15126.6(a)). Additionally, CEQA Guidelines §15126.6(b) requires consideration of alternatives that could avoid or substantially lessen any significant adverse environmental effects of the proposed project, including alternatives that may be more costly or could otherwise impede the project's objectives. The range of alternatives considered must include those that offer substantial environmental advantages over the proposed project and may be feasibly accomplished in a successful manner considering economic, environmental, social, technological, and legal factors.

The following alternatives are fully analyzed and evaluated in Chapter 13, Alternatives:

- No Project Alternative. Under the No Project Alternative, CalRecycle would not undertake the AD Initiative. This would maintain the status quo for AD facilities with respect to CEQA and permitting. AD facilities would be required to comply with current CEQA and other regulatory requirements without the benefit of the project. Development of AD facilities would continue in its current form and would be regulated by CalRecycle, by other permits from responsible agencies (i.e., County Use Permits, air and water quality permits, etc.), and by local and regional governments through local ordinances and regulations. The potential for reducing disposal of organics at California landfills would be reduced.
- Co-Digestion at Wastewater Treatment Plants (WWTPs) Alternative. Under the Co-Digestion at WWTPs Alternative, the AD Initiative would apply to the construction and operation of co-digestion facilities at existing AD facilities at WWTPs for the diversion of organic materials from landfills and the production of biogas from organics in the waste stream.
- Co-Digestion at Dairy Manure Digesters Alternative. Under the Co-Digestion at Dairy Manure Digesters Alternative, the AD Initiative would apply to the construction and operation of co-digestion facilities at dairy manure digesters for the diversion of organic materials (as co-digestion feedstocks) from California landfills and the production of biogas from organics in the waste stream.
- Increased Aerobic Composting Alternative. Under the Increased Aerobic Composting Alternative, the AD Initiative would apply to the construction and/or operation

changes needed at existing or new compost facilities to divert more organic materials from California landfills.

- Landfill In-Ground Digester Cell Alternative. Under the Landfill In-Ground "Digester Cell" Alternative, the AD Initiative would apply to the construction and operation of in-ground digesters at a landfill that are limited to organic materials and which would utilize liquid injection and recirculation.

The analysis of the alternatives found that only the Increased Aerobic Composting Alternative and the Co-Digestion at Existing WWTPs Alternative are promising for being able to substantially assist in reducing the amount of organics in the waste stream by 2020, a key project objective. Between the two alternatives that could substantially reduce organics, the Increased Aerobic Composting Alternative would appear to have more flexibility in expanding existing facilities or adding new facilities to handle the increased organic materials. While WWTPs could use any current excess capacity they have to digest the additional organics, once that capacity is maximized, it would be a major step for a WWTP to add a new AD facility to their facility for the purpose of digesting municipal organic solid wastes, which is not the primary role of WWTPs. Therefore, compared to the alternatives analyzed in this chapter, the Aerobic Composting Alternative is the environmentally superior alternative because it is most likely to result in substantial reductions in organics in the waste stream by 2020. However, it should be noted that the proposed project (the AD Initiative) could substantially achieve all the project objectives and could be implemented with mitigation measures that would reduce most of the project impacts to a level that would be less than significant.

TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
5. Air Quality and Greenhouse Gas			
Impact 5.1: Construction and operations of AD facilities within California would result in emissions of criteria air pollutants at levels that could substantially contribute to a potential violation of applicable air quality standards or to nonattainment conditions.	**Measure 5.1a:** Applicants shall prepare and submit an Air Quality Technical Report as part of the environmental assessments for the development of future AD facilities on a specific project-by-project basis. The technical report shall include an analysis of potential air quality impacts (including a screening level analysis to determine if construction and operation related criteria air pollutant emissions would exceed applicable air district thresholds, as well as greenhouse gas (GHG) emissions and any health risk associated with toxic air contaminants (TACs) from all AD facility sources) and reduction measures. Preparation of the technical report should be coordinated with the appropriate air district and shall identify compliance with all applicable New Source Review and Best Available Control Technology (BACT) requirements. The technical report shall identify all project emissions from permitted (stationary) and non-permitted (mobile and area) sources and mitigation measures (as appropriate) designed to reduce significant emissions to below the applicable air district thresholds of significance, and if these thresholds cannot be met with mitigation, then the individual AD facility project could require additional CEQA review or additional mitigation measures. **Measure 5.1b:** Applicants shall require construction contractors and system operators to implement the following Best Management Practices (BMPs) as applicable during construction and operations: • Facilities shall be required to comply with the rules and regulations from the applicable Air Quality Management District (AQMD) or Air Pollution Control District (APCD). • Facilities shall require substrate unloading and pre-processing activities to occur indoors within enclosed, negative pressure buildings. Collected foul air (including volatile organic compounds (VOCs) off-gassed from undigested substrates) should be treated via biofilter or air scrubbing system. • Use equipment meeting, at a minimum, Tier II emission standards. • Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes (as required by the state airborne toxics control measure [Title 13, §2485 of the California Code of Regulations]). Provide clear signage that posts this requirement for workers at the entrances to the site. • Maintain all equipment in proper working condition according to manufacturer's specifications. • Use electric equipment when possible. • Where feasible as an alternative to internal combustion engines, which generate nitrogen oxides (NOx) emissions, use biogas from AD facilities as a transportation fuel (compressed biomethane), in fuel cells to generate clean electricity, or inject biomethane into the utility gas pipeline system. If there are other low NOx technologies available at the time of AD facility development, these should be considered as well during the facility design process.	S	LSM
Impact 5.2: Operation of AD facilities in California could create objectionable odors affecting a substantial number of people.	**Measure 5.2a:** Applicants for the development of AD facilities shall comply with appropriate local land use plans, policies, and regulations, including applicable setbacks and buffer areas from sensitive land uses for potentially odoriferous processes.	S	LSM

LS – Less than Significant LSM – Less than Significant with Mitigation NI – No Impact S – Significant

TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
	Measure 5.2b: If an AD facility handles compostable material and is classified as a compostable material handling facility, the facility must develop an Odor Impact Minimization Plan (OIMP) pursuant to 14 CCR 17863.4. Otherwise, applicants shall develop and implement an Odor Management Plan (OMP) that incorporates equivalent odor reduction controls for digester operations. Odor control strategies that can be incorporated into these plans include, but are not limited to, the following: • A list of potential odor sources. • Identification and description of the most likely sources of odor. • Identification of potential, intensity, and frequency of odor from likely sources. • A list of odor control technologies and management practices that could be implemented to minimize odor releases. These management practices shall include the establishment of the following criteria: - Require substrate haulage to the AD facility within sealed containers. - Establish time limit for on-site retention of undigested substrates (i.e., substrates must be put into the digester within 24 hours of receipt). - Provide enclosed, negative pressure buildings for indoor receiving and pre-processing. Treat collected foul air in a biofilter or air scrubbing system. - Establish contingency plans for operating downtime (e.g., equipment malfunction, power outage). - Manage delivery schedule to facilitate prompt handling of odorous substrates. - Handle digestate within enclosed building and/or directly pump to sealed containers for transportation. - Protocol for monitoring and recording odor events. - Protocol for reporting and responding to odor events.		
Impact 5.3: Construction and operation of AD facilities in California could lead to increases in chronic exposure of sensitive receptors in the vicinity to certain toxic air contaminants from stationary and mobile sources.	**Measure 5.3a:** Implement Mitigation Measures 5.1a and 5.1b. **Measure 5.3b:** Based on the Air Quality Technical Report (specified in Measure 5.1a), if the health risk is determined to be significant on a project-by-project basis with diesel particulate matter (DPM) as a major contributor, then the applicants shall implement control measures such that the AD facility health risk would be below the applicable air district threshold, which may include implementation of one or more of the following requirements, where feasible and appropriate: • Use either new diesel engines that are designed to minimize DPM emissions (usually through the use of catalyzed particulate filters in the exhaust) or retrofit older engines with catalyzed particulate filters (which will reduce DPM emissions by 85%); • Use electric equipment to be powered from the grid, which would eliminate local combustion emissions; • Use alternative fuels, such as compressed natural gas (CNG) or liquefied natural gas (LNG).	S	LSM

LS – Less than Significant LSM – Less than Significant with Mitigation NI – No Impact S – Significant

TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
	Measure 5.3c: Hydrogen sulfide (H2S) contained in the biogas shall be scrubbed (i.e., via iron sponge or other technology) before emission to air can occur.		
Impact 5.4: Development of AD facilities in California would reduce GHG emissions.	**Measure 5.4:** Implement Mitigation Measure 5.1a.	NI	NI
Impact 5.5: Development of AD facilities in California, together with anticipated cumulative development in the area, would contribute to regional criteria pollutants.	**Measure 5.5:** Implement Mitigation Measures 5.1a and 5.1b.	S	LSM
6. Hydrology			
Impact 6.1: Construction of AD Facilities could generate loose, erodible soils and other water quality pollutants that may impair water quality.	None required.	LS	LS
Impact 6.2: The operation of AD facilities could adversely affect surface and groundwater quality.	**Measure 6.2a:** During pre-processing, all water that contacts digester feedstock, including stormwater from feedstock handling and storage facilities and water from equipment washdown and feedstock wetting, shall be contained until appropriately disposed or utilized. Best Management Practices (BMPs) may be used to reduce loading of sediment, nutrients, trash, organic matter, and other pollutants. These BMPs may include, but are not limited to, trash grates and filters, oil-water separators, mechanical filters such as sand filters, vegetated swales, engineered wastewater treatment wetlands, settling ponds, and other facilities to reduce the potential loading of pollutants into surface waters or groundwater. All discharges of stormwater are prohibited unless covered under the General Industrial Stormwater Permit, other National Pollutant Discharge Elimination System (NPDES) permit, or are exempted from NPDES permitting requirements. The NPDES permits will generally require implementation of management measures to achieve a performance standard of best available technology economically achievable (BAT) and best conventional pollutant control technology (BCT), as appropriate. The General Industrial Stormwater Permit also requires the development of a storm water pollution prevention plan (SWPPP) and a monitoring plan, in compliance with permit requirements.[1] Other liquid and solid wastes may only be discharged pursuant to an NPDES permit or waste discharge requirement (WDR) order. **Measure 6.2b**: In order to minimize the amount of fugitive trash or feedstock released to surface waters, the following measures shall be implemented. When feasible, the project proponent shall preferentially select feedstocks that contain minimal amounts of trash that could become entrained in surface water, either via direct contact with stormwater flows or via other accidental release, such as due to wind. Processing of such feedstocks may, however, be unavoidable, such as in support of an AD facility that processes MSW. Therefore, the project applicant shall ensure that (1) drainage from all feedstock loading, unloading, and storage areas is contained onsite or treated to remove trash and stray feedstock, and sediment prior to release; (2) in all feedstock loading and unloading areas, and all areas where feedstock is moved by front loaders or other uncovered or uncontained transport machinery, the applicant shall ensure that mechanical sweeping and/or equivalent trash control operational procedures are performed at least daily, during operations; and (3) the facility operator shall train all employees involved in feedstock handling so as to	S	LSM

1 For more information, please refer to: http://www.swrcb.ca.gov/water_issues/programs/stormwater/industrial.shtml

LS – Less than Significant LSM – Less than Significant with Mitigation NI – No Impact S – Significant

TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance: Before Mitigation	Impact Significance: After Mitigation
	discourage, avoid, and minimize the release of feedstock or trash during operations. **Measure 6.2c**: In order to minimize water quality degradation associated with accidental spills at AD facilities, the applicant for individual projects that would be implemented under the Program EIR shall require project proponents to complete and adhere to the requirements of a Spill Prevention, Control, and Countermeasure Plan (SPCC). The SPCC shall contain measures to prevent, contain, and otherwise minimize potential spills of pollutants during facility operation, in accordance with federal, state, and local requirements. Additionally, the project applicant shall adhere to the requirements and recommendations of WDRs, which would be provided for the project by the applicable regional board. Requirements under WDRs include implementation of measures to minimize water quality degradation, including but not limited to restrictions on the concentration of water quality pollutants discharged from a proposed facility, and maximum acceptable flow volumes for a given facility. **Measure 6.2d:** Any proposed discharge to a pond for an individual project would require the project applicant to acquire WDRs from the appropriate regional board. The project applicant shall ensure that all ponds and discharges to such ponds adhere to all requirements under applicable WDRs. The need for pond liners in order to protect groundwater quality would be assessed during the regional board's review of the project, and requirements for pond liners would be included in the WDRs, as warranted. If appropriate, the WDRs would impose requirements for Class II surface impoundments as presented in Title 27 of the California Code of Regulations. Requirements include, but are not limited to, groundwater monitoring, double liner systems with leachate collection, water balance, a preliminary closure plan for clean closure, seismic analysis, and financial assurances. Compliance with WDRs may require the installation of facilities such as tanks and containers to store and process the digestate, the use of filter presses, and implementation of other water quality protection practices. **Measure 6.2e**: This measure would reduce potential for the movement of nutrients and other pollutants to groundwater and surface water for individual projects that would employ land application for liquid digestate or residual solids. The operators of individual projects implemented under this Program EIR shall ensure that land application of liquid digestate and/or residual solids adheres to all requirements of applicable WDRs. WDR requirements include but are not limited to, groundwater monitoring, completion of an anti-degradation analysis, and in some cases best practicable treatment and control to achieve salinity reduction in materials prior to discharge to land. WDRs would be issued by the appropriate regional board, and would consider site-specific conditions and waste characteristics, in order to determine applicable control measures and procedures that protect water quality. **Measure 6.2f:** This measure would reduce the potential for water quality degradation from projects that include discharge of liquid digestate to surface waters. The applicant for individual projects implemented under this Program EIR shall ensure that the discharge of liquid digestate to surface waters adheres to all NPDES permitting recommendations and requirements, as established by the appropriate regional board. Specific measures may include, but are not limited to, limitations on discharge volumes, seasonal discharge restrictions, limitations on loading rates and/or concentrations of specific constituents, and other facility-specific water quality control measures designed to protect receiving water quality and preserve beneficial uses identified in Basin Plans.		

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TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
Impact 6.3: AD facilities could be exposed to flooding hazards.	**Measure 6.3:** Individual applicants seeking coverage under this Program EIR shall ensure that, for their proposed AD facilities including pre-processing areas, feedstock storage areas, and digestate handling facilities, are protected from FEMA-defined 100-year flood events. Design measures may include, but are not limited to: facility siting, access placement, grading, elevated foundations, and site protection such as installation of levees or other protective features.	S	LSM
Impact 6.4: Construction of AD facilities could change drainage and flooding patterns	**Measure 6.4:** In order to ensure that the AD facilities would not result in detrimental increases in stormwater flow or flooding on site or downstream, the Applicant for each AD facility project shall prepare a comprehensive drainage plan (prior to construction) and implement the plan during construction. The comprehensive drainage plan shall include engineered stormwater retention facility designs, such as retention basins, flood control channels, storm drainage facilities, and other features as needed to ensure that, at a minimum, no net increase in stormwater discharge would occur during a 10-year, 24-hour storm event, as a result of project implementation. Project related increases in stormwater flows shall be assessed based on proposed changes in impervious surface coverage on site, as well as proposed grading and related changes in site topography.	S	LSM
Impact 6.5: AD facilities could require additional water supplies resulting in depletion of groundwater.	None required.	LS	LS
Impact 6.6: AD facilities could become inundated as a result of seiche, tsunami, or mudflow.	**Measure 6.6:** To ensure that proposed AD facilities would not incur impacts associated with seiche, tsunami, or mudflow, the applicant for each individual project shall ensure that all facilities are located outside of potential risk areas for seiche, tsunami, and mudflow. In the event that a proposed facility would be sited within a potential risk area for one of these hazards, the facility shall be raised above projected maximum base inundation elevations, or shall be protected from inundation by the installation of berms, levees, or other protective facilities.	S	LSM
Impact 6.7: AD facilities could contribute to cumulative impacts to water quality.	**Measure 6.7:** Implement Mitigation Measures 6.2 (a-f) and 6.3.	S	LSM
7. Noise			
Impact 7.1: Construction of AD facilities could temporarily increase noise levels at nearby sensitive receptor locations or result in noise levels in excess of standards in local general plans, noise ordinances, or other applicable standards.	**Measure 7.1a:** Construction activities shall be limited to the hours between 7 a.m. and 7 p.m., Monday through Saturday, or an alternative schedule established by the local jurisdiction, or other limits to construction hours normally enforced by the local jurisdiction (see Measure 7.1d below). **Measure 7.1b:** Construction equipment noise shall be minimized by muffling and shielding intakes and exhaust on construction equipment to a level no less effective than the manufacture's specifications, and by shrouding or shielding impact tools. **Measure 7.1c:** Construction contractors within 750 feet of sensitive receptors shall locate fixed construction equipment, such as compressors and generators, and construction staging areas as far as possible from nearby sensitive receptors. **Measure 7.1d**: Construction contractors shall comply with all local noise ordinances and regulations.	S	LSM

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TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
Impact 7.2: Noise from operation of AD facilities could substantially increase ambient noise levels at nearby land uses or result in noise levels in excess of standards in local general plans, local noise ordinances, or other applicable standards.	**Measure 7.2:** AD facilities located within 2,000 feet of a sensitive receptor shall conduct a site specific noise study. If operational sound levels would exceed local regulations, or 45 dBA at a sensitive receptor (if no regulations are available), additional sound-proofing such as enclosures, muffling, shielding, or other attenuation measures shall be installed to meet the required sound level.	S	LSM
Impact 7.3: AD facility operational activities associated with transportation would not increase ambient noise levels at nearby land uses.	None required.	LS	LS
Impact 7.4: Development of AD facilities could result in a cumulative increase in noise levels.	**Measure 7.4:** Implement Mitigation Measures 7.1a through 7.1d and Measure 7.2.	S	LSM
8. Public Services and Utilities			
Impact 8.1: The project would not substantially increase demands on fire protection services.	None required.	LS	LS
Impact 8.2: The project could potentially exceed wastewater treatment requirements of the Regional Water Quality Control Board (RWQCB).	**Measure 8.2a:** Implement Mitigation Measure 8.3b if the operator does not have an existing agreement, such as for co-located facilities. **Measure 8.2b:** In addition to an agreement for service, coordination with the wastewater treatment provider would be needed to determine if pre-treatment would be required to meet the RWQCB requirements for the existing wastewater treatment facility.	S	LSM
Impact 8.3: The project could result in significant environmental effects from the construction and operation of new water and wastewater treatment facilities or expansion of existing facilities.	**Measure 8.3a:** If the project proposes to obtain water from a water supplier (municipal system or other public water entity), the developer would enter into an agreement for service with the supplier. **Measure 8.3b**: If the project proposes to obtain wastewater service from a wastewater treatment provider (municipal or other public entity), the developer would enter into an agreement for service with the provider.	S	LSM
Impact 8.4: The project would not result in significant environmental effects from the construction of new stormwater treatment facilities or expansion of existing facilities.	None required.	LS	LS
Impact 8.5: The project would not require significant levels of new or expanded water supply resources or entitlements.	None required.	LS	LS
Impact 8.6: The project could result in exceeding the capacity of a wastewater treatment provider.	**Measure 8.6:** If the project proposes to obtain wastewater service from a wastewater treatment provider (municipal or other public entity), implement Mitigation Measure 8.3b.	S	LSM
Impact 8.7: The project could result in the construction of new energy supplies and could require additional energy infrastructure.	**Measure 8.7:** Projects requiring off-site energy infrastructure must complete CEQA review for the proposed energy improvements as a separate project. Infrastructure improvements may qualify as a categorical exemption pursuant to CEQA.	S	LSM
Impact 8.8: Development of AD facilities would not contribute to cumulative impacts to public services and utilities.	None required.	LS	LS

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TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance: Before Mitigation	Impact Significance: After Mitigation
9. Transportation			
Impact 9.1: Construction of AD facilities would intermittently and temporarily increase traffic congestion due to vehicle trips generated by construction workers and construction vehicles on area roadways.	**Measure 9.1:** The contractor(s) will obtain any necessary road encroachment permits prior to installation of pipelines within the existing roadway right-of-way. As part of the road encroachment permit process, the contractor(s) will submit a traffic safety / traffic management plan (for work in the public right-of-way) to the agencies having jurisdiction over the affected roads. Elements of the plan will likely include, but are not necessarily limited to, the following: • Develop circulation and detour plans to minimize impacts to local street circulation. Use haul routes minimizing truck traffic on local roadways to the extent possible. Use flaggers and/or signage to guide vehicles through and/or around the construction zone. • To the extent feasible, and as needed to avoid adverse impacts on traffic flow, schedule truck trips outside of peak morning and evening commute hours. • Limit lane closures during peak traffic hours to the extent possible. Restore roads and streets to normal operation by covering trenches with steel plates outside of allowed working hours or when work is not in progress. • Limit, where possible, the pipeline construction work zone to a width that, at a minimum, maintains alternate one-way traffic flow past the construction zone. • Install traffic control devices as specified in Caltrans' Manual of Traffic Controls for Construction and Maintenance Work Zones where needed to maintain safe driving conditions. Use flaggers and/or signage to safely direct traffic through construction work zones. • Coordinate with facility owners or administrators of sensitive land uses such as police and fire stations, hospitals, and schools. Provide advance notification to the facility owner or operator of the timing, location, and duration of construction activities. • Coordinate with the local public transit providers so that bus routes or bus stops in work zones can be temporarily relocated as the service provider deems necessary.	S	LSM
Impact 9.2: AD facility operations would not substantially increase on-going (operational) traffic volumes on roadways serving the facilities.	**Measure 9.2:** Measures will be imposed by applicable local agencies, as needed, to address site-specific significant traffic impacts identified during subsequent facility-specific analyses, implementation of which would reduce those impacts to a less-than-significant level.	S	LSM
Impact 9.3: AD facilities could potentially cause traffic safety hazards for vehicles, bicyclists, and pedestrians on public roadways, and could increase traffic hazards due to possible road wear or to accidental spills of digestate (liquids and solids).	**Measure 9.3a:** Implement Measure 9.1, which stipulates actions required of the contractor(s) to reduce potential traffic safety impacts to a less-than-significant level. **Measure 9.3b:** Prior to construction, the contractor(s), in cooperation with the agencies having jurisdiction over the affected roadways, will survey and describe the pre-construction roadway conditions on rural roadways and residential streets. Within 30 days after construction is completed, the affected agencies will survey these same roadways and residential streets in order to identify any damage that has occurred. Roads damaged by construction will be repaired to a structural condition equal to the condition that existed prior to construction activity.	S	LSM

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TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
	Measure 9.3c: Prior to initiation of project operations, the project sponsor(s) will submit a Spill Prevention Plan to the appropriate local agency. The Spill Prevention Plan will include, among other provisions, a requirement that each truck driver know how to carry out the emergency measures described in the Spill Prevention Plan (therefore reducing roadway hazards if an accidental spill were to occur).		
Impact 9.4: AD facilities could intermittently and temporarily impede access to local streets or adjacent uses (including access for emergency vehicles), as well as disruption to bicycle/pedestrian access and circulation.	**Measure 9.4:** Implement Measure 9.1, which stipulates actions required of the contractor(s) to reduce potential access impacts to a less-than-significant level.	S	LSM
Impact 9.5: The project could contribute to cumulative impacts to traffic and transportation (traffic congestion, traffic safety, and emergency vehicle access).	**Measure 9.5a:** Prior to construction, the project sponsor will coordinate with the appropriate local government departments, Caltrans, and utility districts and agencies regarding the timing of construction projects that would occur near AD project sites. Specific measures to mitigate potential significant impacts will be determined as part of the interagency coordination, and could include measures such as employing flaggers during key construction periods, designating alternate haul routes, and providing more outreach and community noticing. **Measure 9.5b:** Implement Mitigation Measure 9.2. **Measure 9.5c:** Implement Mitigation Measures 9.1, 9.3b and 9.3c.	S	LSM
10. Aesthetics			
Impact 10.1: AD facilities could have adverse effects on a scenic vista and/or scenic resources.	**Measure 10.1a:** Avoid siting AD facilities near scenic vistas and corridors designated within an applicable land use plan and the State Scenic Highway Program. **Measure 10.1b**: Landscaping and/or vegetated berms should be used to minimize views of facilities from sensitive views.	S	LSM
Impact 10.2: AD facilities could degrade the existing visual character/quality of the site and its surroundings.	**Measure 10.2a:** Implement Mitigation Measures 10.1a and 10.1b above. **Measure 10.2b:** Facilities using truck tippers or other un-enclosed unloading should consider using litter fences to manage blowing litter. Facilities should educate haulers delivering materials to the AD facility through literature, web links, or provide training on the acceptance of waste at the facilities to minimize litter. Facility operators should develop a protocol to identify feedstocks that are severely contaminated with potential litter and reject unacceptable loads. **Measure 10.2c:** Clean-up crews can be used as necessary to control litter. **Measure 10.2d:** Feedstocks and digestate byproducts should be stored in enclosed facilities or processed in a timely manner to prevent visibly deteriorated site conditions. **Measure 10.2e:** Project operators should consider enclosure of pre-processing operations if it provides an aesthetic and/or noise attenuating benefit.	S	LSM

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TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
Impact 10.3: AD facilities could create a new source of light or glare with adverse affects to daytime and/or nighttime views.	**Measure 10.3a:** Implement 10.1b above. **Measure 10.3b:** Any lighting (portable or permanent) should be hooded and directed onto the project site. This would reduce effects to nighttime skies from uplighting, reduce glare, and prevent light from spilling onto adjoining properties and roads. **Measure 10.3c:** Flares may be enclosed to reduce the visibility of flames during operation.	S	LSM
Impact 10.4: The project could result in cumulative impacts to visual resources.	**Measure 10.4:** Implement Mitigation Measures 10.1a, 10.1b, 10.2a, 10.2b, 10.2c, 10.2d, 10.2e, 10.3a, 10.3b, and 10.3c, above.	S	LSM
11. Hazards and Hazardous Materials			
Impact 11.1: Construction of AD facilities could result in the potential exposure of construction workers, the public and the environment to preexisting soil and/or groundwater contamination.	**Mitigation Measure 11.1:** Prior to final project design and any earth disturbing activities, the applicant or agency(ies) responsible shall conduct a Phase I Environmental Site Assessment (ESA). The Phase I ESA shall be prepared by a Registered Environmental Assessor (REA) or other qualified professional to assess the potential for contaminated soil or groundwater conditions at the project site; specifically in the area proposed for construction of AD facilities. The Phase I ESA shall include a review of appropriate federal, State and local hazardous materials databases to identify hazardous waste sites at on-site and off-site locations within a one quarter mile radius of the project location. This Phase I ESA shall also include a review of existing and past land uses through aerial photographs, historical records, interviews of owners and/or operators of the property, observations during a reconnaissance site visit, and review of other relevant existing information that could identify the potential existence of contaminated soil or groundwater. If no contaminated soil or groundwater is identified or if the Phase I ESA does not recommend any further investigation then the project applicant or agency(ies) responsible shall proceed with final project design and construction. OR If existing soil or groundwater contamination is identified, and if the Phase I ESA recommends further review, the applicant or agency(ies) responsible shall retain a REA to conduct follow-up sampling to characterize the contamination and to identify any required remediation that shall be conducted consistent with applicable regulations prior to any earth disturbing activities. The environmental professional shall prepare a report that includes, but is not limited to, activities performed for the assessment, summary of anticipated contaminants and contaminant concentrations at the proposed construction site, and recommendations for appropriate handling of any contaminated materials during construction.	S	LSM
Impact 11.2: Transportation, use, disposal or accidental spill of hazardous materials during construction of AD facilities would not result in the potential exposure of construction workers, the public and the environment to hazardous materials.	None required.	LS	LS

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TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
Impact 11.3: Transportation, use, disposal or accidental spill of hazardous materials during the operation and maintenance of AD facilities would not result in potential harmful exposures of the public or the environment to hazardous materials.	None required.	LS	LS
Impact 11.4: Operation of AD facilities could increase the risk of fire hazards due to the potential release of biogas.	**Mitigation Measure 11.4a:** Prior to project approval, AD facility operators shall prepare and implement a Fire Safety Plan that outlines fire hazards, describes facility operations procedures to prevent ignition of fires, requires regular inspection of fire suppression systems, and provides for worker training in safety procedures as well as protocols for responding to fire incidents. The Fire Safety Plan shall be reviewed and approved by the local fire enforcement agency. **Mitigation Measure 11.4b**: Implement Mitigation Measure 11.5.	S	LSM
Impact 11.5: AD facilities could be located within one quarter mile of a school resulting in potential hazards associated with accidental release of hazardous materials, including biogas.	**Mitigation Measure 11.5:** AD facilities shall be sited at least one quarter mile from existing or proposed schools, daycare facilities, hospitals and other sensitive land uses.	LS	LS
Impact 11.6: AD facility operations could generate vectors (flies, mosquitoes, rodents, etc.) exceeding regulatory agency thresholds for the presence of vectors.	None required.	LS	LS
Impact 11.7: AD facilities could be located within five miles of a public airport or private airstrip and create an aviation hazard.	**Mitigation Measure 11.7:** For any AD facility proposed within 5 statute miles of an airport's air operations area, the operator will notify the Federal Aviation Administration (FAA) Regional Airports Division office and the airport operator of the proposed facility as early in the process as possible. Such AD facilities must receive an FAA Determination of No Hazard prior to project approval.	S	LSM
Impact 11.8: Development of AD facilities could contribute to cumulative impacts related to hazardous materials.	**Mitigation Measure 11.8:** Implement Mitigation Measures 11.1, 11.4, 11.5, and 11.7.	LS	LS

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CHAPTER 2
Introduction

2.1 Purpose and Use of this Draft Program EIR

The California Department of Resources Recycling and Recovery (CalRecycle) intends to adopt the Anaerobic Digestion Initiative, a comprehensive program to foster the development of anaerobic digester facilities (AD facilities) that could assist in reducing the amount of organics in the waste stream, convert organic solid wastes into sources of renewable energy, and produce valuable compost feedstocks, soil amendments and other products. CalRecycle has prepared this Draft Program EIR to provide information concerning the potential environmental effects that may result from the development of AD facilities in California. This document has been prepared pursuant to the California Environmental Quality Act (CEQA) of 1970 (as amended), and the CEQA Guidelines (California Code of Regulations, Title 14). CEQA requires that state and local government agencies consider the environmental consequences of projects over which they have discretionary authority.

CalRecycle emphasizes that the intent of this document is not to identify AD facilities as preferred to alternative waste management options, or to identify preferred AD facility systems or vendors. CalRecycle has previously provided RMDZ loans, permitting guidance, and technical assistance for projects using a range of technologies including biochemical and thermochemical conversion technologies. This effort should best be understood as an effort by CalRecycle to use its very limited funding to analyze the potential environmental impacts of AD facilities, which is but one of the conversion technologies available to reduce the level of organics going to landfills in California.

An EIR is a public informational document for use by governmental agencies and the public to identify and evaluate potential environmental effects of a proposed project, to recommend mitigation measures to lessen or eliminate adverse impacts, and to examine feasible alternatives to the project. The Program EIR may be used by public agencies when considering approval of future individual site-specific projects for AD facilities within their jurisdictions.

2.2 Project Background

Compostable organic materials comprise approximately 25 percent or 10 million tons per year of the solid waste stream for California landfills (CalRecycle, 2009). Currently there are no commercial-scale stand-alone AD facilities or AD digesters co-located at solid waste facilities that process municipal organic solid waste in California. However, interest in developing such AD facilities is growing, and CalRecycle anticipates that AD facilities will be developed across the state to meet the increasing need to divert organic waste from landfills and to develop renewable energy

technologies. The following summaries highlight some of the recent activity to develop or expand AD facilities in California.

A pilot-scale AD facility has been in operation since 2006 at the University of California (UC) Davis and is currently going through a process of commercialization and scale-up of operations.

CR&R Incorporated is in the funding and permitting stage of developing an anaerobic digestion project at their MRF and Transfer Station in Perris, CA. Utilizing the ArrowBio technology, the project will process post-recycled residual municipal solid waste and convert it into biogas for injection into the gas utility pipeline or upgrade the biogas into a transportation fuel. The Los Angeles County Board of Supervisors selected this project in 2010 as a demonstration facility for the Southern California Conversion Technology Program.

CalRecycle recently approved a Recycling Market Development Zone (RMDZ) loan to Environ Strategy Consultants, Inc. (Environ) that will be used for equipment for an anaerobic digestion project that will process food waste derived from commercial and industrial sources to produce biomethane gas. The project will rebuild and expand the AD facilities owned by the Inland Empire Utilities Agency (IEUA) in Chino, California. Environ anticipates starting production by October 2011.

In January 2011, the Humboldt County Waste Management Authority published a California Environmental Quality Act (CEQA) Initial Study and Mitigated Negative Declaration (MND) for a proposed regional food waste diversion program to serve Humboldt County. The proposed program would divert food waste (which is currently hauled an average of 190 miles and landfilled) to a local, anaerobic food waste digester facility (HWMA, 2011).

The Port of San Diego is planning a food waste AD facility that could divert organics from landfills in San Diego County.

Based on Green Vision goals of diversion and renewable energy production, the City of San Jose has pursued anaerobic digestion as a key infrastructure strategy since 2008. On February 4, 2011, after a two year procurement process, the City staff released a notice of intent to award the processing of all commercial organic waste (up to 60,000 tons/year) to Zero Waste Energy Development Company who has proposed the Kompoferm high solids dry fermentation system for implementation in 2012. The initial study for this project is expected to be released in Spring 2011.

Several other AD facility projects are in the early planning stages. Although co-digestion at wastewater treatment plants (WWTPs) is not covered by this Program EIR (except as an alternative to the project), the following summaries highlight current activities at WWTPs.

Food waste is currently co-digested with primary and secondary municipal wastewater solids and other high-strength wastes at East Bay Municipal Utilities District's (EBMUD) Main Wastewater Treatment Plant (MWWTP) in Oakland.

Central Marin Sanitation Agency (CMSA) is planning a food waste to energy program that would generate renewable energy and maximize unused AD capacity at CMSA (Kennedy/Jenks, 2009). The Digester Improvement/FOG and Food-to-Energy Facility project's final design documents were approved February 8, 2011 and CMSA plans to award the construction contract in April 2011 (CalRecycle, 2011).

2.3 CEQA EIR Process

2.3.1 Type of EIR

A Program EIR is an EIR prepared on a related set of actions, in this case the development of expanded or new AD facilities throughout the State of California. This Draft Program EIR provides a broad analysis of environmental impacts and through the CEQA tiering process will expedite future site-specific environmental review by lead agencies with discretion to approve AD facilities, pursuant to CEQA. To comply with CEQA, lead agencies considering individual AD facility projects in the future will prepare a Negative Declaration or Mitigated Negative Declaration or site-specific EIR to address local impacts, but may utilize the information and analysis in this Program EIR. The process is expedited for site-specific projects as this Draft Program EIR reduces the need for duplicative review of general environmental impacts, cumulative impacts and broad alternatives. This Draft Program EIR also should assist in achieving consistent mitigation between individual projects. Program EIR and tiering regulations can be found in California Public Resources Code §21093 and §21094, and CEQA Guidelines §15152 and §15168.

2.3.2 Notice of Preparation and Scoping

In accordance with Section 15082(a) of the CEQA Guidelines, CalRecycle circulated a Notice of Preparation (NOP) for the project on April 30, 2010, which is included in **Appendix A**. The NOP was circulated to state and local agencies to solicit comments on the project as well as published on CalRecycle's website[1]. Recipients were given at least 30 days from receipt of the notice to respond. Six comment letters were received. Comments received on the NOP were used in consideration of the scope and content of this Draft Program EIR, including comments regarding the need for a more clearly defined project, which resulted in the development of the AD Initiative (described in detail in Chapter 3).

CalRecycle also formed a Technical Advisory Group (TAG) prior to the NOP to discuss the project description and environmental issues to be considered in this Draft Program EIR. The TAG includes state and regional regulatory agencies, solid waste industry representatives, AD facility developer representatives, and local jurisdictions. The project description incorporated input from the TAG regarding facilities and feedstocks that should be considered in this Draft Program EIR, and alternatives to be considered in the Program EIR.

[1] http://www.calrecycle.ca.gov/SWFacilities/

2.3.3 Draft Program EIR

This document constitutes the Draft Program EIR which contains a description of the project, a description of the environmental setting, applicable regulatory requirements, discussions of project impacts, discussions of measures to be implemented to mitigate impacts found to be significant, as well as an analysis of project alternatives. As required by CEQA, this Draft Program EIR focuses on significant or potentially significant environmental effects (CEQA Guidelines §15143) as summarized in the NOP.

2.3.4 Public Review

This Draft Program EIR for the project is being distributed by the State Clearinghouse to state agencies and CalRecycle will also notify numerous other agencies, organizations, and interested groups and persons (including the members of the TAG) about the availability of the Draft Program EIR and encourage their comments during the 45-day public review period for this Draft Program EIR. For the duration of the comment period, the Draft Program EIR will be available at the Cal EPA library at the following location during regular business hours:

California Environmental Protection Agency
1001 I Street
P.O. Box 2815
Sacramento, CA
95812-2815

The Draft Program EIR will be available on the CalRecycle website at:

http://www.calrecycle.ca.gov/SWFacilities/Compostables/AnaerobicDig/

2.3.5 Final Program EIR and Certification

Written and oral comments received in response to the Draft Program EIR will be addressed in a response to comments document, which, together with the Draft Program EIR, will constitute the Final Program EIR. CalRecycle will receive public comments and consider the certification of the Final Program EIR and approval or denial of the project.

If the Final Program EIR includes impacts that cannot be mitigated to a less-than-significant level, the lead agency must state in writing the reasons for its actions. A statement of overriding considerations must be included in the record of the project approval and mentioned in the notice of determination (CEQA Guidelines, §15093(c)).

2.3.6 Mitigation Monitoring and Reporting

California Public Resources Code §21081.6(a)(1) requires public agencies, as part of the certification of an EIR, to prepare and approve a mitigation monitoring and reporting program. This program

should be structured to ensure that changes to the project that the lead agency has adopted to mitigate or avoid significant environmental impacts are carried out during project implementation.

Throughout this Draft Program EIR, mitigation measures have been clearly identified and presented in language that will facilitate establishment of a mitigation monitoring and reporting program. Mitigation measures are listed in **Table 1-1** in the Executive Summary. A mitigation monitoring and reporting program will be prepared at the time of the Final Program EIR for this project and will identify the specific timing and roles and responsibilities for implementing mitigation measures.

2.4 Environmental Issues

This section discusses the environmental issue areas which are evaluated at a program level within this Program EIR. The following lists incorporate input from the TAG which reviewed a preliminary summary of potential environmental impacts.

This EIR analyzes the following environmental issues areas for which the project may have potentially significant impacts at the program level:

- Aesthetics
- Air Quality and Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Noise
- Public Services and Utilities
- Transportation and Traffic
- Cumulative Impacts

The following environmental issue areas are discussed in much less detail as they are not anticipated to have potentially significant impacts at the program level, although they could require evaluation for individual projects due to the potential for local effects:

- Agricultural and Forest Resources
- Biological Resources
- Cultural Resources
- Geology, Soils and Seismicity
- Land Use and Land Use Planning
- Mineral Resources
- Population and Housing
- Recreation

2.5 References

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CHAPTER 3
Project Description

3.1 Introduction

CalRecycle has prepared this Draft Program Environmental Impact Report (EIR) to assess the potential environmental effects that may result from the adoption of an Anaerobic Digestion (AD) Initiative, a comprehensive program to foster the development of AD facilities to process the organic fraction of municipal solid waste and other organic wastes throughout the State of California. Throughout the document, the adoption of the AD Initiative and subsequent development of AD facilities in California will be referred to as the "project".

This Draft Program EIR will inform future policy considerations related to AD facilities and assist state and local agencies in preparing site-specific environmental documentation that may be required for AD facility applications and/or permits submitted to CalRecycle, regulatory agencies and local jurisdictions. In the event CalRecycle or other public agencies adopt regulations or ordinances relating to regulating or permitting AD facilities, the Draft Program EIR provides useful information and can serve as the basis for analyzing the environmental effects of individual projects.

By preparing this Program EIR, CalRecycle is providing additional focus in California on the potential development of AD facilities. While there has been considerable discussion and interest in AD facilities in California, to date there has not been a broad review of the potential environmental impacts of developing AD facilities. This Program EIR responds to the need for such environmental review. Some members of the Technical Advisory Group (TAG) have a concern that, by preparing the Program EIR, CalRecycle is indicating a preference for AD technologies over other technologies, or that it will appear that way to the public. CalRecycle emphasizes that the intent of this document is not to identify AD facilities as preferred to alternative waste management options, or to identify preferred AD facility systems or vendors. CalRecycle has previously provided RMDZ loans, permitting guidance, and technical assistance for projects using a range of technologies including biochemical and thermochemical conversion technologies. This effort should best be understood as an effort by CalRecycle to use its very limited funding to analyze the potential environmental impacts of AD facilities, which is but one of the conversion technologies available to reduce the level of organics going to landfills in California. The Program EIR is a starting point for the environmental review of AD facilities proposed in local jurisdictions. By tapping into the considerable California specific knowledge and experience of CalRecycle staff and the TAG this effort provides a technical outreach and overview that would not otherwise be available to local jurisdictions considering a specific AD facility proposal.

3.2 Anaerobic Digestion Initiative

Under its Strategic Directive 6.1, CalRecycle seeks to reduce by 50 percent the amount of organic waste disposed in the state's landfills by 2020. In addition to helping conserve limited landfill capacity, this CalRecycle policy recognizes that organic wastes are a resource, not just solid wastes that must be disposed. Organic wastes have an energy value that can be captured and utilized and are also a necessary component of compost, soil amendments, and other useful products. Directive 6.1 also encompasses one of CalRecycle's actions to help California significantly reduce its generation of greenhouse gases. Under the State's *Climate Change Scoping Plan* (CARB, 2008), CalRecycle is responsible for taking actions to reduce the emission of methane, a potent greenhouse gas, from landfills. AD facilities utilize organic wastes as a feedstock from which to produce biogas (which is captured and contains a high percentage of methane). Typically the methane gas produced by the anaerobic digestion process is converted to liquefied natural gas (LNG), compressed natural gas (CNG), or electricity (using internal combustion engines or fuel cells) for on-site energy needs and export to the energy grid (CARB, 2008). The development of AD facilities is one of CalRecycle's charges under the AB 32 Climate Change Scoping Plan. The AB 32 Climate Change Scoping Plan estimates that AD facilities in California could avoid methane emissions from landfills at a level of 2 million metric tons of carbon dioxide equivalents (CO_2e) per year by the year 2020 (CARB, 2008). Anaerobic digestion also can contribute to meeting the State's Renewable Portfolio Standard and Low Carbon Fuel Standard. To assist in achieving those objectives, CalRecycle intends to adopt the AD Initiative, a comprehensive program to foster the development of AD facilities to convert organic solid wastes into sources of energy, valuable compost feedstocks, soil amendments, and other products.

The AD Initiative consists of CalRecycle's adoption of a policy and a series of discrete actions to implement the policy, together with additional actions that will be developed and implemented in the future:

- It is the policy of CalRecycle to encourage the development of AD facilities in California as an alternative to the landfill disposal of organic solid waste. Specifically, as an initial measure, CalRecycle will encourage the establishment of in-vessel digesters located at existing or new solid waste facilities and in areas zoned for industrial or solid waste handling activities.
- CalRecycle shall, not later than January 1, 2012, establish programs to implement the above policy, including without limitation:
    - Provide research grants, loans, and contracts (dependent on funding availability) to develop AD facilities and for activities that advance the state of knowledge about anaerobic digestion and its applications and the uses of products and by-products, including anaerobic digestion demonstration projects that use the organic fraction of municipal solid waste as a feedstock.
    - Develop guidance publications to assist operators who seek to establish AD facilities.
    - Develop guidance publications to assist LEAs and other local and regional government agencies that permit and regulate AD facilities, specifically guidance for co-location at solid waste facilities.

- Draft revised regulations for aspects of specific design, operation and permitting of AD facilities within the authority and responsibility of CalRecycle.
- Promote anaerobic digestion through CalRecycle's participation with the California Energy Commission in implementing AB 118 (Alternative and Renewable Fuel and Vehicle Technology Program), the Bioenergy Interagency Working Group, and with the Air Resources Board in implementing the Anaerobic Digestion and Low Carbon Fuel Standard measures in the AB 32 Climate Change Scoping Plan.
- Work with the California Pollution Control Financing Authority and California Alternative Energy and Advanced Transportation Financing Authority to help anaerobic digestion project proposals obtain funding.
- Participate on technical workgroups convened by the Climate Action Reserve to develop or modify protocols, such as the Organic Waste Digestion Project Protocol, for projects that divert and anaerobically digest organic waste that otherwise would have gone to solid waste landfills.

3.3 Project Objectives

The project has several objectives including the following:

- Assist in meeting CalRecycle Strategic Directive 6.1: Reduce the amount of organics in the waste stream by 50 percent by 2020.
- Support Assembly Bill 32 (AB 32), the California Global Warming Solutions Act of 2006, greenhouse gas reduction measures related to the use of anaerobic digestion:
  - Measures E-3. Achieve a 33 percent renewable energy mix by 2020. (AD facilities produce biogas which is a renewable energy source.)
  - RW-3. High Recycling/Zero Waste. (Anaerobic digestion is one of five subcategories listed under this measure.)
- Assist local governments and state agencies (both lead and responsible agencies) by providing program-level analyses that will identify potential environmental effects of AD facilities and discuss mitigation measures or best management practices that can reduce or eliminate the environmental effects.

3.4 Background on Anaerobic Digestion

Anaerobic digestion is the biological decomposition of organic matter with little or no oxygen. The anaerobic digestion process occurs naturally in marshes and wetlands. There are a variety of controlled systems where AD technology is currently utilized in the United States including wastewater treatment facilities and dairy manure digesters and co-digesters. In other countries (primarily in Europe), AD technology is utilized to process and treat the organic fraction of municipal solid waste to recover energy and to reduce the volume of solid waste that must be landfilled.

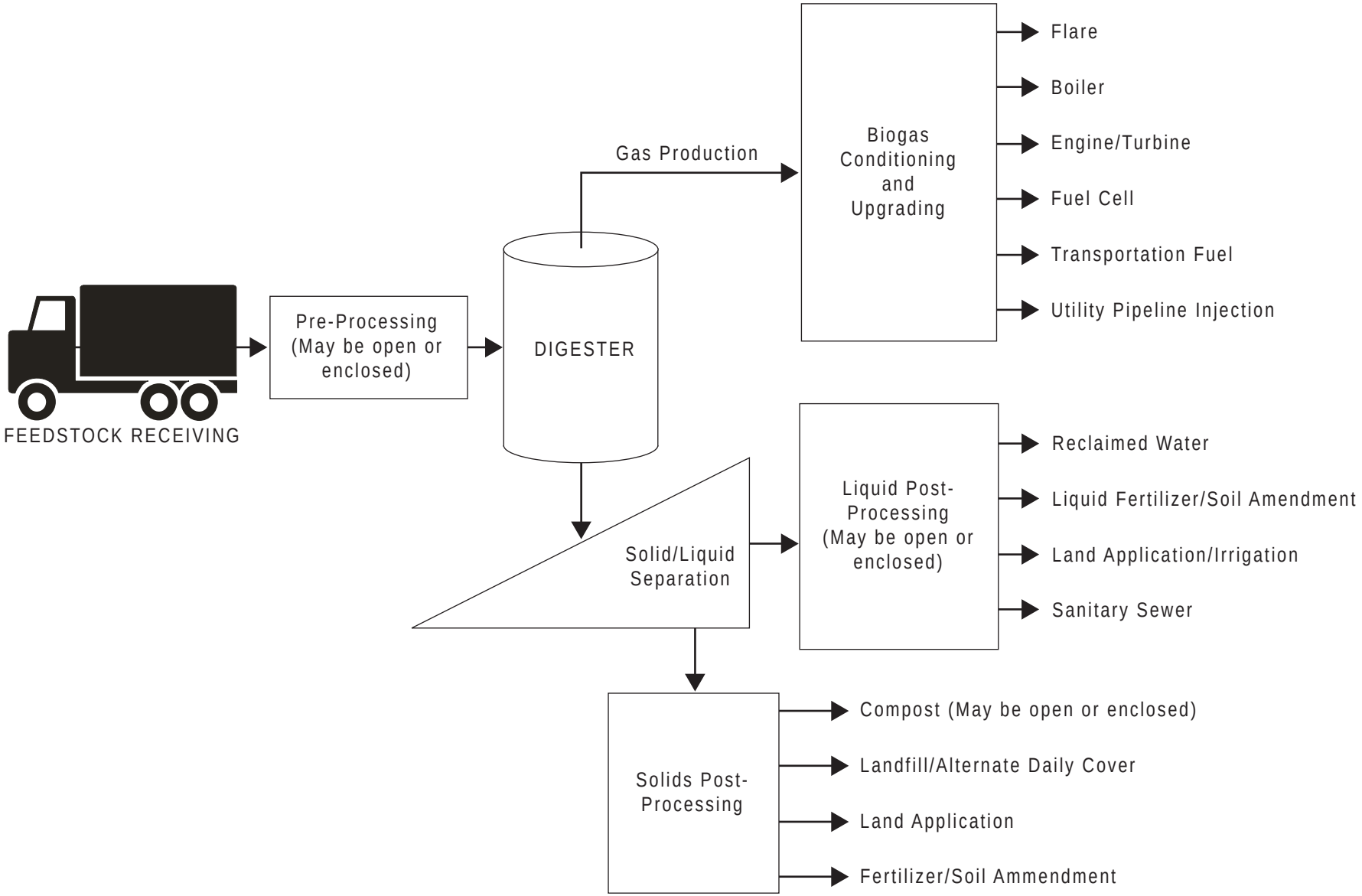
AD facilities for municipal organic waste would generally operate according to the process flow diagram shown in **Figure 3-1**. As with composting, organic materials are pre-processed prior to loading into the digester. Within the digester, decomposition occurs in four phases as shown in **Figure 3-2**: hydroloysis, acidogenesis, acetogenesis, and methanogeneis resulting in methane, carbon dioxide, water and digestate/residuals. Post-processing of gas, liquid and/or solids from the digester is always necessary. **Figure 3-3** shows the potential environmental effects during the three major operational phases (pre-processing, digestion and post-processing). These potential environmental effects, as well as regulations and mitigation measures to reduce potential impacts, are the focus of the Program EIR.

AD facilities that process solid waste produce biogas and digestate (liquids and solids). The biogas consists primarily of methane (CH_4), carbon dioxide (CO_2), with small amounts of hydrogen sulfide (H_2S), and ammonia (NH_3). Typically, biogas is saturated with water vapor and may have trace amounts of hydrogen (H_2), nitrogen (N_2), oxygen (O_2), dust and siloxanes (Greer, 2010). Digestate is the remaining solid and/or liquid residuals from the AD process.

Benefits of AD include a reduction in the mass of organic waste in landfills, reduced fugitive methane emissions from landfills, generation of liquid and/or solid soil amendments, reduction in odor, generation of renewable energy from biogas, and stabilization of organic material prior to disposal which reduces environmental impacts to air and water quality. One of the primary goals of this project is to divert organic waste from landfill disposal. There is a high diversity of organic waste in California, and it is often concentrated in areas with limited organic processing options that make it difficult to manage due to economic and environmental constraints. This geographic distribution directly affects the feasibility of organics diversion; and given the high costs of transportation; the economic feasibility of organics diversion is often determined primarily by geographic considerations. The diversity of organics also plays a significant role in identifying an appropriate technology.

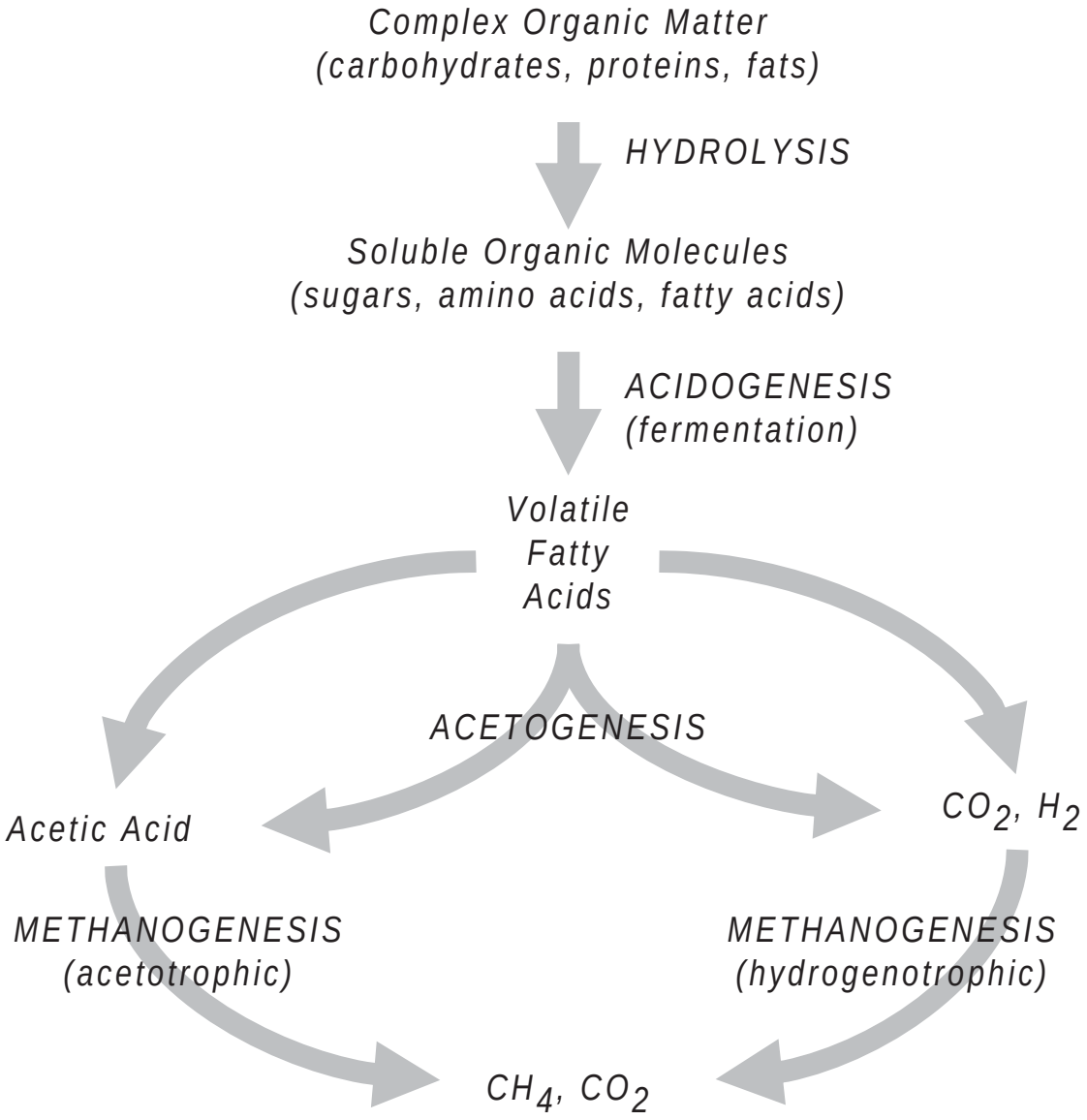
This is a program level EIR analyzing statewide impacts of anaerobic digestion (AD) facilities, but organics management decisions are often made at the local and regional level. There is no single best, most feasible or most environmentally benign organics management option suitable to all regions. Ultimately, each region must analyze its own organic waste streams and determine which management options are best based on the availability of technologically and economically feasible options.

AB 32 directed ARB to prepare a Scoping Plan that identifies how best to reach the 2020 GHG emissions limit. As part of this effort, and in consultation with CalRecycle, ARB proposed the Mandatory Commercial Recycling Measure. This measure requires development of regulations requiring recycling of commercial waste by the State's businesses. This regulation is expected to result in diversion of an additional 2 million tons of compostable organic materials annually once fully implemented. These regulations will assist CalRecycle in achieving Strategic Directive 6.1, which calls for a reduction in the amount of organics in the waste stream of 50 percent by 2020.



SOURCE: ESA, 2011

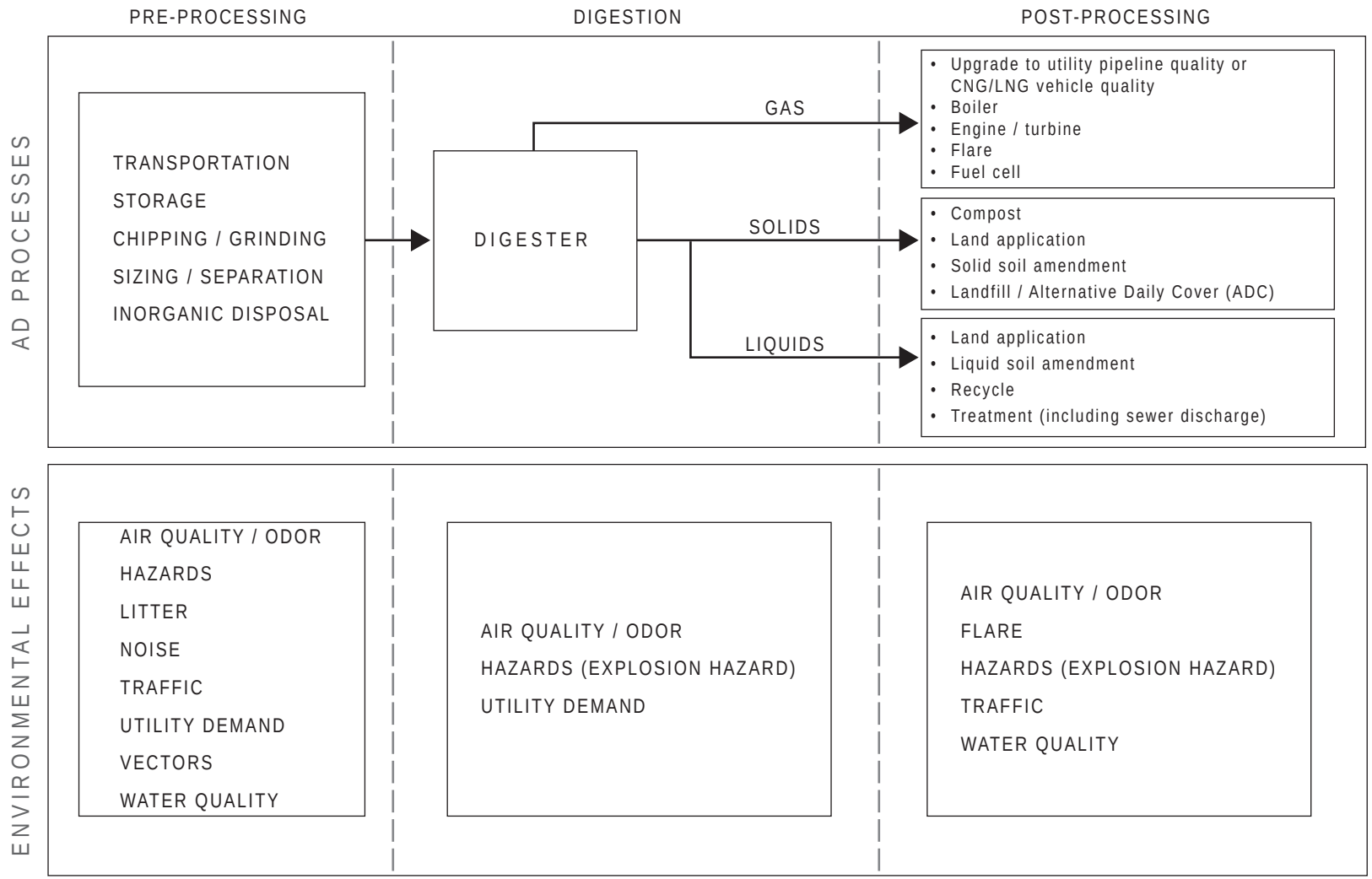
Figure 3-1
Anaerobic Digestion of Municipal Organic Solid Waste



CalRecycle Statewide AD Facilities Program EIR . 209134

SOURCE: CIWMB, 2009; and ESA, 2010

Figure 3-2
Anaerobic Digestion Phases



SOURCE: ESA, 2010

Figure 3-3
Anaerobic Digestion Processes and Potential Environmental Effects from Operational Phases

3.5 Proposed Facilities

The scope of proposed facility types has been focused by the objective of reducing the organic content of the solid wastes that are disposed in municipal solid waste landfills and to generate or recover energy from the solid wastes.

AD Facilities included in the scope: In-vessel AD facilities which are located at existing or new permitted solid waste facilities or stand-alone AD facilities in areas zoned for industrial or solid waste handling activities.

AD Facilities not included in the scope: Dairy manure digesters, dairy manure co-digesters and wastewater treatment plant digesters. In-ground digester cell technology (for example the landfill-based anaerobic digester-compost pilot project developed at the Yolo County Central Landfill), though not included in the project, is discussed and evaluated as an alternative in **Chapter 13**.

There are several variations of in-vessel digester technologies. This Draft Program EIR allows for flexibility in technology choices at the local level. Different in-vessel technologies have the same general processes which are discussed in the siting, construction and operational sections, below.

3.6 Feedstocks

The scope of this Draft Program EIR is focused on reducing organic portions of the municipal solid waste stream and feedstocks which enhance the efficiency of the AD process.

Feedstock materials included in the scope: Food waste, green material and mixed solid waste. The food and green material categories are intended to be inclusive and not limited by current regulatory definitions or collection methods – "food" includes cannery waste, meat, poultry, fish, cheese waste, food processing waste, fats, oils and greases (FOG), etc., and "green material" includes urban, agricultural, crop residues, contaminated green materials, etc. Use of manure will be considered as nitrogen nutrient amendment material for the purpose of increasing the growth of microorganisms and digester efficiency, but not as a primary waste stream to be evaluated.

Feedstock materials not included in the scope: Biosolids, untreated septage, waste co-digested with biosolids at wastewater treatment plants or dairy manure co-digesters, and hazardous waste.

3.7 Operation

The main operational phases for AD facilities are pre-processing, digestion and post-processing. Some photos of anaerobic digestion facilities are provided in **Appendix B** of this Program EIR, **Figure B-1** (photos of low-solids/ wet systems), **Figure B-2** (photos of high-solids/ dry systems) and **Figure B-3** (photos of pre-processing feedstocks and equipment). These photographs in **Appendix B** are provided only to show the industrial nature of the AD facilities, they are in no way an endorsement of specific AD technologies, vendors or service providers.

3.7.1 Pre-Processing

Pre-processing involves the activities necessary to prepare the feedstocks for delivery into the AD vessel. Pre-processing activities include feedstock receiving, storage of feedstock, all processing steps required to prepare the feedstock for the digester (such as sorting, screening, grinding and wetting), and the process of feedstock delivery into the digester. Some pre-processing activities (such as source-separation of the organic fraction and pre-screening) can occur prior to delivery to the AD facility. The amount of pre-processing equipment and residual waste (or waste that must be removed prior to digestion) would depend on the type of feedstock and digester technology. Some anaerobic digestion technologies are designed to remove inert solids in the pre-processing stage, while others are designed to remove inert solids after digestion during post-processing. Digester systems that are designed to remove inert solids during pre-processing use different techniques depending on the needs of the digester and the extent of contamination. For example, systems that require pre-pulping of wastes with water may use density separation technologies, while systems that minimize water inputs may use size separation techniques. Furthermore, source-separated organic loads that contain fewer inorganic solids than mixed solid wastes may require less pre-processing time and/or equipment, with fewer residual wastes to handle at the digestion facility.

3.7.2 Digestion

Various technologies are available for AD facilities. While new digestion technologies are regularly being developed, and existing technologies continuously improved, a good description of the range of these technologies is included in the March 2008 California Integrated Waste Management Board (now CalRecycle) report, *Current Anaerobic Digestion Technologies Used for Treatment of Municipal Organic Solid Waste* (CIWMB, 2008).

The anaerobic digestion systems developed for commercial applications differ based on the digester configurations and material handling systems. Digesters can be designed in single or two-stage configurations. Single-stage digester configurations may include multiple reactors, but each operates under the same conditions (i.e. initial solids content, loading rate, and temperature) and is loaded in parallel. Single-stage systems may incorporate pre-processing reactors (i.e. equalization tanks, hydropulpers, or tunnel sorting drums) in which some biological activity takes place, blurring the distinction between one and two-stage systems. However, pre-processing reactors are typically designed to optimize sorting and preparation of the waste materials for anaerobic digestion and are loaded in series with the digester. Two-stage systems typically include a hydrolysis stage optimized for acidification and fermentation of organic materials to acetate followed by a methanification stage optimized for methane production. The hydrolysis reactor is typically loaded first and the products are transferred to the methanification reactor. However, systems may also be designed to re-circulate digestate between reactors.

The reactors used for both single and two-stage systems may be designed to operate at different initial solids concentrations, loading rates, and temperatures. Typically, organic wastes contain 20 - 40% solids on a mass basis as received, although the initial solids concentration of the waste

stream depends heavily on its composition (e.g. green and paper wastes tend to have higher initial solids concentrations than food wastes). Some systems dilute the waste with water to facilitate sorting, pumping and microbial contact within the reactor. Other systems minimize the addition of water and use heavy-duty pumps, conveyors, and/or front-end loaders to transfer incoming waste to the digester.

Plant operators often attempt to control the loading rate in order to allow sufficient time for degradation and to develop steady-state gas production. Over-loading the reactors can lead to acidification and inhibition of microbial decomposition, which may require re-inoculation or complete re-start of the system. Some digesters are loaded in batches (e.g. every one to five days a new batch is loaded). This may simplify the loading equipment and system operation, but the kinetics of degradation in batch-loaded reactors is different from continuous-loaded reactors. Typically, batch loading results in slower degradation and uneven gas production and methane content. Therefore, batch systems may have lower material throughput per given process area than continuous systems. In order to alleviate these problems, many batch-loaded digester systems incorporate multiple reactors with phased loading and/or continuous second-stage reactors.

Whether loaded continuously or in batches, the majority of commercial anaerobic digesters treating organic solid wastes are temperature controlled for enhanced degradation stability and rate. The microbes that degrade organic materials have evolved to thrive optimally at two different temperature ranges. Mesophilic microorganisms prefer temperatures of 30 to 40 degrees Celsius, while thermophilic microorganisms prefer temperatures of 45 to 55 degrees Celsius. Studies have revealed microorganisms capable of degrading organic materials at higher and lower temperatures, but hyperthermophilic and psychrophilic digesters have yet to enter the marketplace. Therefore, such systems will not be considered at present. Differences in operational temperature may impact gas production rates and methane contents, organic loading rates, pathogen destruction, digestate quality, and the type of permits required. Thermophilic microorganisms tend to degrade some materials at a higher rate than mesophilic microorganisms. This can reduce the size of the reactors required, but it increases the energy input requirement.

The final reactor design may incorporate different combinations of the above design considerations into a completed system. For example, commercial digesters include single-stage systems with waste diluted to less than 10% solids-mass fraction; single-stage systems that process undiluted wastes; two-stage systems in which diluted wastes are loaded into the first stage; and two-stage systems with undiluted waste (i.e., high solids AD facilities) loaded in batches into the first-stage reactors and leachate loaded continuously into the second-stage reactor. The potential exists for other configurations to be utilized as well. For example, some reactors may be aerated, solids may be separated and re-circulated, and other design innovations could be envisioned.

As noted above, there are many final reactor designs available, some that were reviewed in preparing this Program EIR can be found in the References at the end of this Chapter. These references are provided in the interest of making this Program EIR a better informational document to help the reader in understanding more about the operation of AD facilities. These include Waasa (SMUD, 2005), BTA (BTA, 2010), BIMA (Entec, 2010), Dranco (De Baere, 2010), Kompogas (Evergreen

Energy Corporation, 2007), Valorga (Valorga International, 2010), Schwarting-Uhde (STOWA, 2006), , Biopercolat (Wherle Werk Ag, 2010), Biocel (CIWMB, 2008), SEBAC (Teixeira, 2004), APS (CIWMB, 2008), Bioferm (BIOFirm, 2009), and Kompoferm (Eggersmann, 2010). References to these systems are in no way an endorsement of specific AD technologies, vendors or service providers.

3.7.3 Post-Processing

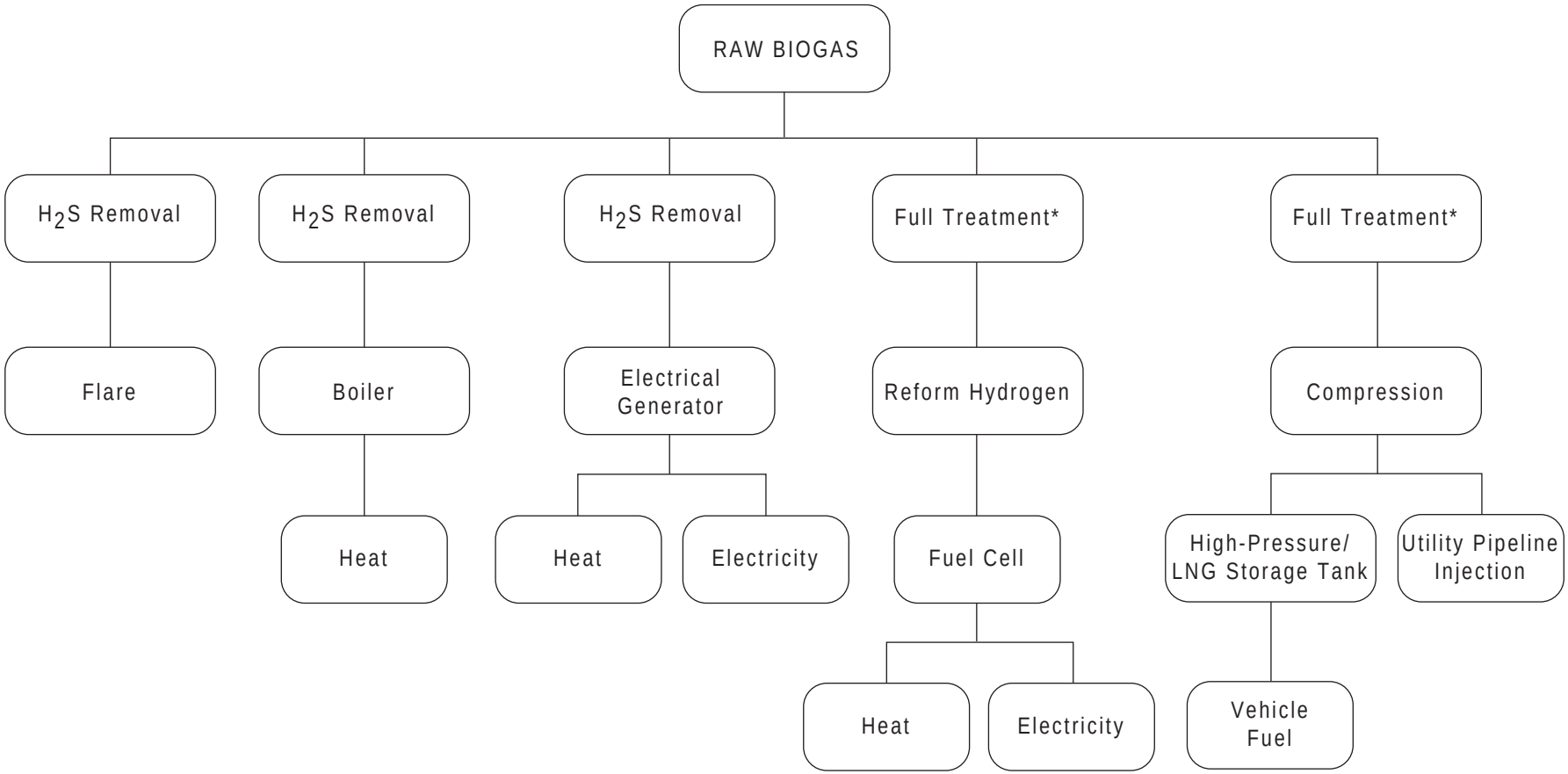
The products of the AD process are digestate and biogas. The digestate is further processed or dewatered resulting in separate liquid and solid products.

Biogas

Biogas generated through the AD process is captured and can be combusted in a flare, used directly in boilers or in reciprocating or gas turbine engines to produce electricity and heat, or the biogas can be upgraded to biomethane through the removal of hydrogen sulfide, carbon dioxide (CO_2), and moisture. Biomethane is a product almost equivalent to natural gas, which typically contains more than 95 percent methane (CH_4). Biomethane can be used in place of natural gas for various processes, and can be used onsite, piped to neighboring facilities, or by utility companies. Biomethane can be upgraded to utility standards and pumped into a natural gas supply pipeline, as well as for electrical generation, heating, cooling, and for natural gas-fueled vehicles. For each biogas optional use specific gas conditioning measures would be required. Although there are methodological variations in how the biogas can be conditioned, **Figure 3-4** below depicts the general processes considered in this Draft Program EIR.

Digestate

Through the AD process, biomass in the waste stream is reduced through conversion to biogas and the nutrients are concentrated in the remaining effluent. The effluent from the AD process consists of liquids, remaining biomass, and inorganic solids. The post-treatment options to separate the liquids from the solids in the effluent include screening and presses. The liquid can be discharged to surface waters, percolation ponds, sanitary sewers, or beneficially used as irrigation water for agricultural crops. Efforts are underway to convert the liquid digestate into value added liquid fertilizer. However, the chemical composition of the liquid effluent may restrict discharge options. Some post-digestion aeration and/or filtration may be required prior to discharge to reduce the solids content, oxygen demand, ammonia concentration, and/or salt concentration. The solid (or remaining digestate) can be aerobically composted, disposed of in landfills or beneficially used as a soil amendment for agricultural crops. Use of the solid as alternative daily cover could potentially be approved on a site-specific basis.



*Full treatment includes removal of H_2S, water, siloxane, and CO_2

SOURCE: Extension, 2010; and ESA, 2010

Figure 3-4
Alternative Biogas Utilization and Required Cleanup

3.8 Construction

Construction of AD facilities would require site preparation and earthwork, consisting of stripping the area of vegetation (or demolition of structures if the site were previously developed) and either removing or storing the materials for later use in the finished grading phase. Rough earthwork would consist of cutting or filling the site to produce overall site gradients as specified by each project. In general, surfaces would be graded to drain to on-site retention/detention facilities. Excavation may occur for on-site utility infrastructure. Road paving may be required for entrance and on-site access roads.

If biogas at an AD facility is delivered by pipeline offsite, project construction activities could include surface preparation, excavation, trench shoring, pipeline installation, trench backfilling, and surface restoration, which may include paving if the pipelines are constructed within roadway rights-of-way.

3.9 Structures

Digester structures would vary depending on the type of AD facility, feedstocks, and use of end products (biogas and digestate). Co-located facilities may share structures with existing operations. Structures could include:

- Administrative buildings, which would be typical for industrial operations and would likely be prefabricated metal buildings.
- Digester tanks and potentially an operating control room.
- Storage tanks or storage areas or buildings for materials in the pre-processing phase, prior to entering the digester.
- Storage tanks or areas for liquid or solid or biogas end products.
- Structures may be needed to house the biogas post-processing equipment used to generate electricity from the biogas.

3.10 Infrastructure

Development of AD facilities could require the construction of various supporting infrastructure including, but not limited to, pipelines for transporting effluent, stormwater treatment and disposal facilities, water and wastewater infrastructure and on-site access roads.

3.11 Off-Site Improvements

In addition to the on-site improvements, some off-site improvements could also be needed such as signage, utility or traffic improvements, biogas processing equipment or additional wastewater processing infrastructure.

3.12 Governmental Agency Approvals

Approvals and permits that may be required from agencies for the development of site-specific AD projects are identified in **Table 3-1**. This is not an exhaustive list but represents the most likely permits and approvals which may be needed for project construction and operation.

TABLE 3-1
APPROVALS POTENTIALLY NEEDED FOR ANAEROBIC DIGESTER FACILITIES

Approvals	Authority	Potentially Affected Resources
Federal		
*Clean Water Act Section 404/ Rivers and Harbor Act Section 10 Dredge and Fill Permit (Clean Water Act, 33 USC 1344)	U.S. Army Corps of Engineers	Project facilities involving the discharge of dredge for fill material into waters of the U.S, including wetlands, or construction in navigable waters or activities within a floodplain.
*Federal Endangered Species Act compliance (Sections 7 and 9, 16 USC 1536)	U.S. Fish and Wildlife Service	Project facilities affecting species listed as endangered and threatened
*Federal Endangered Species Act compliance (Sections 7 and 9, 16 USC 1536)	National Marine Fisheries Service	Project facilities affecting designated special-status Anadromous fish species and critical habitat
*Magnuson Stevens Fisheries Conservation and Management Act Compliance	National Marine Fisheries Service	Project facilities affecting Essential Fish Habitat
State		
CalRecycle Discretionary Action Compostable Material Handling Permit or, Transfer/Processing Permit, Grants, Loans	CalRecycle	General protection of Public Health, Safety and the Environment Based on incoming feedstocks and operations
*California Endangered Species Act compliance (California Fish and Game Code, Section 2081 and 2090)	California Department of Fish and Game	Portions of project facilities affecting state designated special-status species
*Section 1601 *et seq.* Streambed Alteration Agreement (California Fish and Game Code, Sections 1600-1616)	California Department of Fish and Game	Portions of project facilities include activities affecting bed, bank, or channel of surface waters and adjacent riparian habitat.
*Williamson Act contract	Department of Conservation	Agricultural land when portions of project facilities require public acquisition of land under a Williamson Act contract
*Encroachment Permit	California Department of Transportation	Portions of project facilities (pipelines, etc.) within rights-of-way or easements managed by Caltrans
* Water Quality Certification (Clean Water Act, Section 401, 33 USC 1341)	Regional Water Board	Water quality certification for projects that affect wetlands and waters of the U.S.
NPDES Construction Stormwater Permit (Clean Water Act, Section 402, 33 USC 1342)	Regional Water Board	Water quality permit when portions of project activities or facilities may result in discharges to waters of the U.S.
Stormwater Pollution Prevention Plan (SWPPP)	Regional Water Board	Water quality plan required to receive NPDES permit coverage for construction site stormwater discharges.
*General Order for Dewatering and Other Low Threat Discharge to Surface Waters	Regional Water Board	Water quality permit when portions of project construction may require local groundwater dewatering, resulting in discharges to surface waters
Waste Discharge Requirements (WDRs)	Regional Water Board	Water quality permit when portions of project activities or facilities may result in discharges of residual solids and/or liquids to land.
*National Historic Preservation Act	State Historic Preservation Office	For activities in portions of project that could

TABLE 3-1
APPROVALS POTENTIALLY NEEDED FOR ANAEROBIC DIGESTER FACILITIES

Approvals	Authority	Potentially Affected Resources
Section 106 Compliance		affect cultural and historic resources considered eligible for inclusion in the National Register of Historic Places
Local		
CalRecycle Discretionary Action Compostable Material Handling Permit or, Transfer/ Processing Permit	Local Enforcement Agency	General protection of Public Health, Safety and the Environment Based on incoming feedstocks and operations
Authority to Construct	Air District with jurisdiction	Air quality ATC, in compliance with the local air district rules and regulations.
Permit To Operate	Air District with jurisdiction	Air quality PTO, upon completion of facility construction in compliance with the local air district rules and regulations.
*Rezoning, conditional use permit or similar land use approval	Counties and cities	Facilities or activities modifying land uses regulated under county or city land use codes
*Site plan review and approval	Counties and cities	Facilities or activities affecting land regulated under county or city site planning regulations
Wastewater Discharge Permit	Counties and cities	Facilities or activities that would result in wastewater discharge to the sewerage system
Local grading and erosion control Permit	Counties and cities	Earthmoving conducted as part of project
Building Permit	Counties and cities	Building(s) constructed as part of project
*Encroachment Permit	Counties or cities or other local jurisdictions such as special districts	Pipelines or other facilities in portions of project area on or affecting rights-of-way or easements

* - Permit or approval may be applicable based upon location of site-specific activities and facilities.

3.13 CalRecycle Permitting/Regulatory Framework

The proposed AD facilities could be regulated under CalRecycle's existing composting and transfer/processing regulations. The application of permitting requirements must be applied on a case-by-case basis. The determination as to the type of facility would be based on the nature of the feedstock and the temperature of on-site processes. If the feedstock reach a temperature of at least 50 degrees Celsius/122 degrees Fahrenheit (50°C/122°F) on site, then the facility could be regulated as a compostable material handling facility. If the feedstock does not reach the temperature of 50°C/122°F on site, then the facility could be regulated as a transfer/processing facility. This permitting discussion does not address potential on-site disposal of solid byproducts from AD facilities.

3.13.1 Compostable Materials Handling Facility

Composting is defined broadly as "the controlled or uncontrolled biological decomposition of organic wastes" (California Public Resources Code [PRC] Section 40116.1). Anaerobic digestion fits within this statutory definition. Thus, AD facilities could be regulated under CalRecycle's compostable material handling regulations, located at Title 14 California Code of Regulations (CCR) Section 17850 et seq., if the feedstocks and processes meet the definitions within the implementing regulations. The relevant definitions from the Compostable Materials Handling Requirements include the following from Title 14 CCR Section 17852:

> "Active Compost" means compost feedstock that is in the process of being rapidly decomposed and is unstable. Active compost is generating temperatures of at least 50 degrees Celsius (122 degrees Fahrenheit) during decomposition; or is releasing carbon dioxide at a rate of at least 15 milligrams per gram of compost per day, or the equivalent of oxygen uptake.
>
> "Compostable Material" means any organic material that when accumulated will become active compost as defined in section 17852(a)(1).
>
> "Compostable Material Handling Operation" or "Facility" means an operation or facility that processes, transfers, or stores compostable material. Handling of compostable materials results in controlled biological decomposition. Handling includes composting, screening, chipping and grinding, and storage activities related to the production of compost, compost feedstocks, and chipped and ground materials.
>
> "Feedstock" means any compostable material used in the production of compost or chipped and ground material including, but not limited to, agricultural material, green material, food material, biosolids, and mixed solid waste. Feedstocks shall not be considered as either additives or amendments.

The determination of whether or not feedstocks meet the definition of compostable materials would be made on a case-by-case basis. Additionally if feedstocks do not reach a temperature of 50°C/122°F on site, then they are precluded from becoming active compost and the compostable material handling regulations would not apply. The temperature could be reached during pre-processing, within the digester, or if aerobic composting of digestate occurs during post-processing on site.

Thus it is foreseeable that an AD facility could be regulated as a compostable materials handling facility if feedstocks are organic wastes and the feedstock reaches a temperature of 50°C/122°F on site (pre-processing, in the digester, or during post-processing)[1]. If the AD facility does not meet these two requirements, then it could be regulated as a transfer/processing facility as discussed below. The determination of whether the facility requires a permit, EA notification, or is excluded would be made by the LEA; the tier regulatory placement is shown in **Table 3-2**.

TABLE 3-2
COMPOSTABLE MATERIAL HANDLING OPERATIONS AND FACILITIES - LEVEL OF PERMITTING OR AUTHORIZATION REQUIRED

Determination made by Local Enforcement Agency (LEA)	Compostable Material Handling Facilities
Full Permit	All compostable handling operations which do not meet the requirements for EA notification and are not excluded require a full permit (14 CCR Section 17854).
Registration Permit	N/A
EA Notification	EA Notification applies to the following operations and facilities: Agricultural Material Composting Operations pursuant to 14 CCR Section 17856 Green Material Composting Operations and Facilities pursuant to 14 CCR Section 17857.1 Research Composting Operations pursuant to 14 CCR Section 17862
Exclusion from regulatory requirements	Excluded activities are listed at 14 CCR 17855. Within-vessel composting (less than 50 cubic yards) Feedstock does not reach 50° C/122° F

1 It should also be noted that if the digestate fails the standards set for metals or pathogens set in Title 14 CCR Sections 17868.2 and 17868.3, the end product would require additional processing or disposal.

3.13.2 Transfer Processing Operations and Facilities

It is anticipated that projects which do not qualify as compostable materials handling facilities could be regulated as transfer processing operations and facilities. Transfer or processing stations are defined as "those facilities utilized to receive solid wastes, temporarily store, separate, convert, or otherwise process the materials in the solid wastes, or to transfer the solid wastes directly from smaller to larger vehicles for transport, and those facilities utilized for transformation" (California PRC Section 40200). The determination of whether the facility requires a permit, qualifies under a notification tier or is excluded from regulations would be made by the LEA; the tier regulatory placement is shown in **Table 3-3**. Additionally, it is anticipated that proposed facilities would not meet the three-part test at 14 CCR Section 17402.5 because of the putrescible nature of the anticipated feedstocks.

TABLE 3-3
TRANSFER PROCESSING OPERATIONS AND FACILITIES - LEVEL OF PERMITTING OR AUTHORIZATION REQUIRED

Determination made by Local Enforcement Agency (LEA)	Transfer/Processing Operations and Facilities
Full Permit	If project receives 100 tons per day or more of solid waste it would be considered a Large Volume Transfer/Processing Facility and requires a full permit (14 CCR Section 17403.7).
Registration Permit	If project receives 15 tons per day or more of solid waste but less than 100 tons per day, it would be considered a Medium Volume Transfer/Processing Facility and requires a registration permit (14 CCR Section 17403.6).
EA Notification	If a project receives less than 15 tons per day of solid waste, it would be considered a Limited Volume Transfer Operation and requires an EA Notification (14 CCR Section 17403.3).
Exclusion from regulatory requirements	Excluded activities are listed at 14 CCR Section 17403.1 None are anticipated to apply to the proposed project. Facilities which meet the three-part test at 14 CCR Section 17402.5 are not subject to regulation; however, AD facilities as described within this Draft Program EIR would not meet the three-part test.

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CHAPTER 4
Approach to Environmental Analysis

4.1 Introduction

This chapter presents the general approach to analysis that was used in this Draft Program EIR to evaluate the impacts of the project.

Developing the approach to the environmental analysis involves:

- Identifying the types of facilities that the program would cover and thereby facilitate development, and
- Projecting the extent of digester facilities development that may occur as a result of the program,

This chapter expands upon each of these items.

4.2 Anaerobic Digester (AD) Facilities

In the United States, AD facilities have been used to digest or decompose agricultural waste (such as animal feeding operations and dairies) and in wastewater treatment operations. However, no commercial-scale municipal solid waste (MSW) digesters are in operation. The groundbreaking of the first commercial-scale dry fermentation AD facility in the U.S. was held September 15, 2010 at the University of Wisconsin Oshkosh, and is scheduled to begin operations in April 2011. This facility will process up to 8,000 tons of organic waste per year and will generate renewable heat and power for the campus (University of Wisconsin Oshkosh, 2010).

The adoption of the CalRecycle AD Initiative will foster the development of AD facilities to process the organic fraction of MSW and other organic wastes in California. Therefore, this Draft Program EIR evaluates the effects of the development and operation of these facilities in California.

For the purpose of this Program EIR, AD facility development is expected to consist of in-vessel digesters to be located at permitted solid waste facilities and within industrially zoned areas. Under CEQA, a Program EIR may evaluate "individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental effects which can be mitigated in similar ways" (CEQA Guidelines §15168(a)(4)). Because these actions would be directly facilitated by the proposed project, this document programmatically evaluates the environmental impacts of the development of AD facilities as actions that could result from program implementation.

As identified in Chapter 3, Project Description, the following types of commercial-scale AD facilities could be developed under the program: one-stage continuous, two-stage continuous and batch systems with wet or dry processes. This Program EIR evaluates the physical effects to the environment from construction and operation of these commercial-scale AD facilities. Each of the resource chapters in the Program EIR considers the various phases of digester projects (construction, pre-processing, the digestion phase, and post-processing uses of the gases, liquids and solids) and analyzes those phases that could affect the physical environment. Because of the programmatic review, specific equipment brands or vendors are not analyzed and the analysis is more general.

This Program EIR does not evaluate the impacts of solid waste or industrial facilities which are already permitted, independent of the AD facility. On a site-specific project level, the CEQA analysis would need to include an assessment of changes to other existing facilities by development of the AD facility (such as residuals being sent to the digester rather than an existing co-located landfill).

4.3 Impacts and Mitigation Measures

Types of Impacts

The environmental setting is the physical environmental conditions in the vicinity of the project, as they exist at the time the Notice of Preparation (NOP) was published, April 30, 2010 (CEQA Guidelines §15125(a)).

This Program EIR evaluates the potential adverse environmental effects of CalRecycle's adoption and implementation of the project. The environmental resources analyzed in this Program EIR (see Chapters 5 – 11) are those identified as being potentially affected by AD facility projects. Each resource chapter includes a discussion of existing environmental setting and regulatory requirements. The analysis first determines the extent to which each of the studied resources could be affected if AD facilities are developed. The analysis then applies a set of specific significance criteria (Thresholds of Significance) to categorize the severity of the potential environmental effects. These standards of significance are defined at the beginning of each impact analysis in Chapters 5 - 11, following a discussion of environmental and regulatory settings. Once the potential environmental changes are identified in this analysis, they are compared to the standards of significance for each impact area in Chapters 5-11. The impacts are then divided into the following categories:

- **Less-Than-Significant Impact.** A project impact is considered less-than-significant when it does not reach the standard of significance and would therefore cause no substantial change in the environmental. No mitigation is required for less-than-significant impacts.
- **Significant Impact.** Significant impacts are identified by the evaluation of project effects against the significance criteria identified in the Program EIR. A project impact is considered significant if it reaches or could potentially reach the level of significance identified in the Program EIR. Mitigation measures are identified to reduce these effects to the environment.
- **No Impact.** There are not impacts because the project is not anticipated to create change or the project would result in a beneficial impact.

- **Cumulative Significant Impact.** A cumulative impact can result when a change in the environment results from the incremental impact of a project when added to other related past, present or reasonably foreseeable future projects. Significant cumulative impacts may result from individually minor but collectively significant projects.

For all ***significant*** impacts, the Program EIR is required to include a description of feasible measures that could be implemented to avoid or substantially lessen the adverse change in any of the physical conditions within the area affected by the proposed project or to mitigate (reduce in magnitude) the impacts to a level that is below the defined standard of significance. Where available, mitigation measures are presented for all impacts determined to be significant. Where implementation of the mitigation measures would reduce the magnitude of the impact to below the defined standard of significance, the impact is determined to be less than significant after mitigation. Where implementation of the mitigation measures would not reduce the magnitude of the impact below the defined standard of significance, the impact is determined to be ***significant and unavoidable***.

Mitigation Measures

Where significant adverse impacts are identified, the Program EIR must "describe feasible measures which could minimize" those impacts to a less-than-significant level (CEQA Guidelines §15126.4). For each significant impact, mitigation measures are identified. In some cases, the Program EIR includes a list of alternative mitigation measures, which could reduce the impact to a less-than-significant level, or contribute to doing so, any of which may be selected by CalRecycle or a Lead Agency tiering from this Program EIR. Where multiple measures are required to reduce an impact to a less-than-significant level, the discussion clearly identifies which combination or permutation of measures would be necessary to achieve the appropriate level of mitigation.

Where measures are available that can reduce the magnitude of an impact, but not to a less-than-significant level, these are also identified. The Program EIR strives not to include measures that are clearly infeasible. Under CEQA, "feasible means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors" (CEQA Guidelines §15364).

If, even with imposition of mitigation measures, the project will generate unavoidable significant effects, CalRecycle can only approve the project if it makes a written statement of overriding considerations and finds that the benefits of the project outweigh the occurrence of those unavoidable effects (CEQA Guidelines §15092 and §15093).

For any mitigation measures imposed by CalRecycle, CEQA requires that CalRecycle adopt a Mitigation Monitoring and Reporting Program (MMRP) specifying how it will ensure compliance with the mitigation measures. The MMRP would be developed prior to action on the project (Public Resources Code §21081.6(a)(1)).

4.4 Environmental Setting and Baseline

The environmental setting is the physical environmental conditions in the vicinity of the project, as they exist at the time the NOP was published, April 30, 2010 (CEQA Guidelines §15125). As with any Program EIR, the existing environmental setting for certain topics will include a reasonable amount of historical data in order to accurately and meaningfully portray existing conditions. This environmental setting will normally constitute the baseline physical conditions by which a Lead Agency determines whether an impact is significant. The description of the environmental setting needs to be no longer than is necessary to understand the significant effects of the project and its alternatives (CEQA Guidelines §15125).

The environmental baseline is that condition against which the future "with-project" condition is compared to determine the amount of impact. Normally, the environmental baseline is the same as existing conditions, as is the case for this Program EIR. **Figure 4-1** and **Table 4-1** show the existing composition of the disposed waste stream in California.

TABLE 4-1
COMPOSITION OF CALIFORNIA'S OVERALL DISPOSED WASTE STREAM

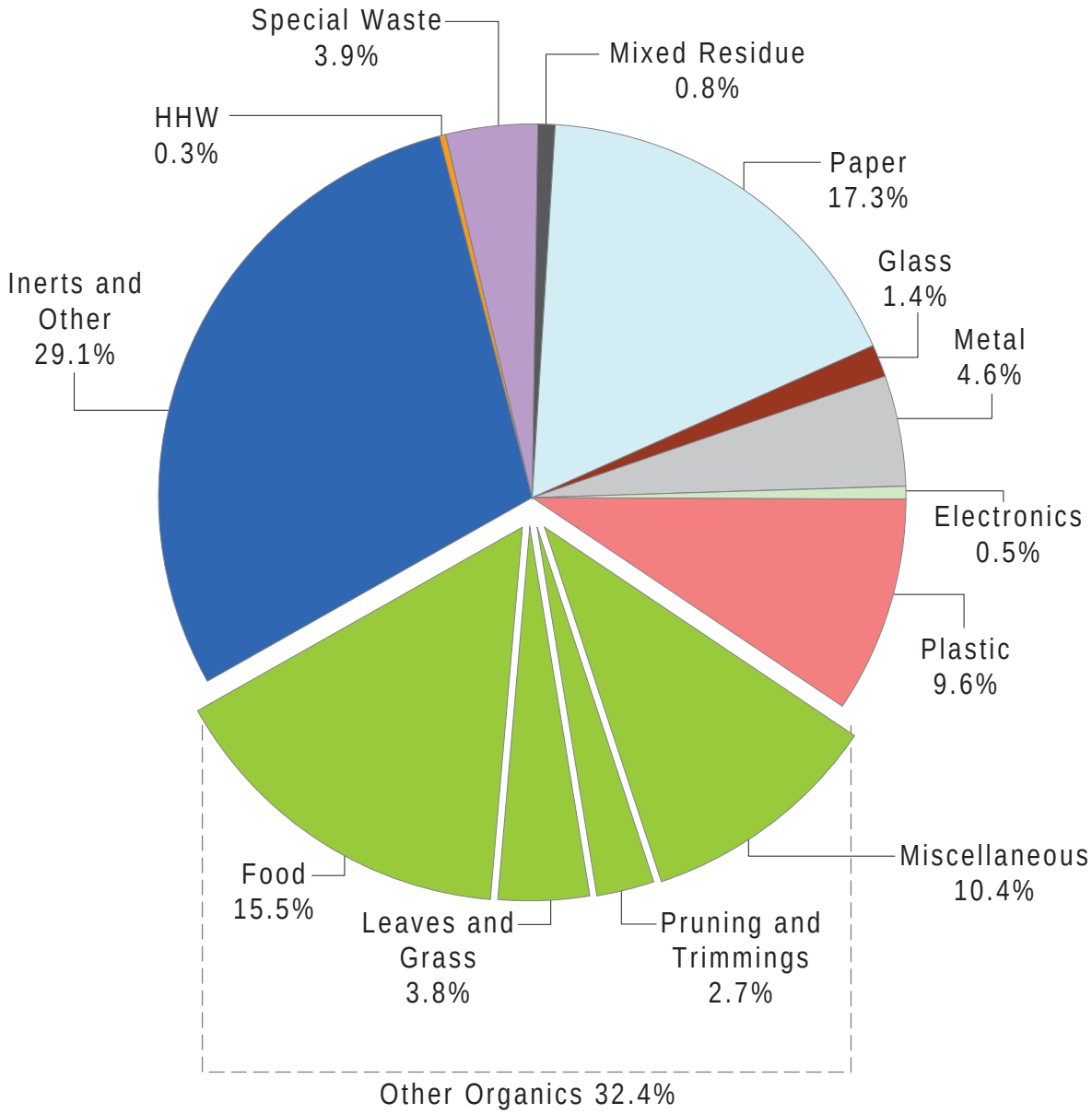
Material	Est. Percent	+ / -	Est. Tons
Paper	17.3%		6,859,121
Uncoated Corrugated Cardboard	4.8%	0.9%	1,905,897
Paper Bags	0.4%	0.1%	155,848
Newspaper	1.3%	0.3%	499,960
White Ledger Paper	0.7%	0.3%	259,151
Other Office Paper	1.2%	0.6%	472,147
Magazines and Catalogs	0.7%	0.2%	283,069
Phone Books and Directories	0.1%	0%	24,149
Other Miscellaneous Paper	3.0%	0.4%	1,202,354
Remainder/Composite Paper	5.2%	0.7%	2,056,546
Glass	1.4%		565,844
Clear Glass Bottles and Containers	0.5%	0.1%	196,093
Green Glass Bottles and Containers	0.2%	0.1%	79,491
Brown Glass Bottles and Containers	0.3%	0.1%	108,953
Other Colored Glass Bottles and Containers	0.1%	0%	40,570
Flat Glass	0.1%	0.1%	33,899
Remainder/Composite Glass	0.3%	0.1%	106,838
Metal	4.6%		1,809,684
Tin/Steel Cans	0.6%	0.1%	236,405
Major Appliances	0%	0.1%	17,120
Used Oil Filters	0%	0%	3,610
Other Ferrous	2.0%	0.4%	801,704
Aluminum Cans	0.1%	0%	47,829
Other Non-Ferrous	0.2%	0.1%	84,268
Remainder/Composite Metal	1.6%	0.5%	618,747
Electronics	0.5%		216,297
Brown Goods	0.2%	0.1%	76,725
Computer-related Electronics	0.1%	0.1%	32,932
Other Small Consumer Electronics	0.1%	0%	34,588
Video Display Devices	0.2%	0.1%	72,053

TABLE 4-1
COMPOSITION OF CALIFORNIA'S OVERALL DISPOSED WASTE STREAM

Material	Est. Percent	+ / -	Est. Tons
Plastic	9.6%		3,807,952
PETE Containers	0.5%	0.1%	199,644
HDPE Containers	0.4%	0.1%	157,779
Miscellaneous Plastic Containers	0.4%	0.1%	163,008
Plastic Trash Bags	0.9%	0.1%	361,997
Plastic Grocery and Other Merchandise Bags	0.3%	0%	123,405
Non-Bag Commercial and Industrial Packaging Film	0.5%	0.2%	194,863
Film Products	0.3%	0.2%	113,566
Other Film	1.4%	0.3%	554,002
Durable Plastic Items	2.1%	0.4%	834,970
Remainder/composite Plastic	2.8%	0.7%	1,104,719
Other Organic	32.4%		12,888,039
Food	15.5%	1.9%	6,158,120
Leaves and Grass	3.8%	0.7%	1,512,832
Pruning and Trimmings	2.7%	1.5%	1,058,854
Branches and Stumps	0.6%	0.4%	245,830
Manures	0.1%	0.1%	20,373
Textiles	2.2%	0.3%	886,814
Carpet	3.2%	2.0%	1,285,473
Remainder/Composite Organic	4.3%	0.5%	1,719,743
Inerts and Other	29.1%		11,577,768
Concrete	1.2%	0.4%	483,367
Asphalt Paving	0.3%	0.4%	129,834
Asphalt Roofing	2.8%	1.5%	1,121,945
Lumber	14.5%	2.2%	5,765,482
Gypsum Board	1.6%	0.7%	642,511
Rock, Soil and Fines	3.2%	1.1%	1,259,308
Remainder/Composite Inerts and Other	5.5%	1.3%	2,175,322
Household Hazardous Waste (HHW)	0.3%		120,752
Paint	0.1%	0.1%	48,025
Vehicle and Equipment Fluids	0%	0%	6,424
Used Oil	0%	0%	3,348
Batteries	0%	0%	19,082
Remainder/Composite Household Hazardous	0.1%	0.1%	43,873
Special Waste	3.9%		1,546,470
Ash	0.1%	0.1%	40,736
Treated Medical Waste	0%	0%	0
Bulky Items	3.5%	1.2%	1,393,091
Tires	0.2%	0.1%	60,180
Remainder/Composite Special Waste	0.1%	0.1%	52,463
Mixed Residue	0.8%		330,891
Mixed Residue	0.8%	0.2%	330,891
Totals	100%		39,722,818
Sample Count	751		

Notes: Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

SOURCE: CalRecycle, 2009. *California 2008 Statewide Waste Characterization Study*. August 2009.



NOTE: Numbers may not total exactly due to rounding.

SOURCE: CalRecycle, 2009; and ESA, 2010

Figure 4-1

Overview of California's Overall Disposed Waste Stream

4.5 Cumulative Impacts

Cumulative impacts are defined in the State CEQA Guidelines (§15355) as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." A cumulative impact 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." In a manner consistent with state CEQA Guidelines §15130[a], the discussion of cumulative impacts in this Draft Program EIR focuses on potentially significant cumulative impacts.

Cumulative impacts associated with each of the environmental resources (e.g., Air Quality, Traffic, Noise, etc.) are discussed within their respective chapters. The appropriate geographic scope for cumulative impacts analysis associated with resource areas ranges from site-specific to statewide.

The project does not directly propose the construction of any new AD facilities, but the Program EIR does analyze the impacts from these facilities because the Program EIR and the project will help facilitate AD facility CEQA reviews and permits; thus directly facilitating their development. While the Program EIR resource sections analyze the impacts of AD facility development located at permitted solid waste facilities and within industrially zoned areas, the cumulative analysis also considers the impacts from other closely related past, present, and reasonably foreseeable probable future projects throughout California.

Probable Future AD Facility Projects

Forecasting future development involves estimating and projection. Invariably projecting a precise level of future development for AD facilities in California under the AD Initiative is extremely challenging. Notwithstanding, the Program EIR must provide information about physical environmental effects that could occur as a result of implementing the CalRecycle AD Initiative project. To ensure that potential errors that are part of any projection do not downplay or minimize the potential for environmental impacts, this Program EIR has made assumptions that lead to projections of a high level of AD facility development so that the cumulative impact analysis does not understate the development of AD facilities (and potential impacts) that could occur.

As mentioned above, there are no existing commercial-scale AD facilities to process MSW in the U.S. Thus, for the purpose of projecting potential AD facility development, a primary consideration is Strategic Directive 6.1, whereby CalRecycle seeks to reduce the amount of organic waste disposed in California landfills by 50 percent by 2020, as well as information contained in technical articles, primarily *Life-Cycle Analysis of Energy and Greenhouse Gas Emissions from Anaerobic Biodegradation of Municipal Solid Waste* (DiStefano and Belenky, 2009) , with a data check against results in *Assessing the Environmental Burdens of Anaerobic Digestion in Comparison to Alternative Options for Managing the Biodegradable Fraction of Municipal Solid Waste* (Haight, 2005). The DiStefano and Belenky article assumed an average AD facility size of 50,000 tons MSW to be processed per year. This facility size was based on MSW throughput capacity of dry digesters in

Western Europe (DiStefano and Belenky, 2009). For the cumulative analysis in this Program EIR, it was assumed that 70 AD facilities (each assumed to process 50,000 tons of MSW) could be developed statewide by 2020 based on the 28 million tons of biodegradable MSW landfilled in California in 2007, half (about 14 million tons) of which is goal-set to be reduced as part of Strategic Directive 6.1. The diverted material would be processed by a suite of alternative technologies. These technologies could include composting, source reduction, waste to energy conversion, and AD facilities. Based on the proportion of organics in the disposed waste stream (shown in **Table 4-1**) that would be usable substrate for AD facilities, which would primarily be the "Food" fraction, it was assumed that aggressive programs could result in up to 3.5 million tons of organics per year diverted to AD facilities. This estimate would represent about 25 percent of the total 14 million ton diversion goal of Strategic Directive 6.1 and would result in the development of 70 AD facilities, assuming each would process 50,000 tons of biodegradable MSW per year. Notably, these AD diversion and facility projections are conservative, based on the assumption that AD technologies are very successful.

It is acknowledged that currently, AD facility development in California faces difficult economic conditions; capital requirements are high and the financial return from the systems may not justify the cost. Several factors would need to be necessary to develop up to 70 AD facilities in California. Key factors could include:

- Mandatory food waste collection programs;
- Restriction on organic material disposal at landfills;
- Increased tipping fees at landfills and compost facilities;
- Increased demand for new energy sources;
- Increased demand for local renewable energy sources;
- Increased efforts in California (AB 32) to reduce greenhouse gases (GHGs);
- Improvements in AD technologies; and
- Public financial support or the development of profitable business models.

There have been a variety of factors that have caused the price of fossil-fuels to spike over the past 50 years and there are no sources of energy that can be developed without environmental consequences. Changes in public opinion could dramatically change the types of energy projects that are supported or required in the future. AD facilities could benefit from increased incentives for local, renewable energy sources. Using factors from the DiStefano and Belenky study (2009), the assumed 70 AD facilities in California could generate approximately 200 million cubic meters of methane, which would correspond to about 500 million megawatt-hours of annual electrical capacity.

For the purpose of cumulative impact analyses in the various resource chapters in this Program EIR, development of the digesters can be assumed to be concentrated geographically near major population centers (within reasonable limits), to the extent that such assumptions will help to identify potentially significant cumulative impacts.

Operating Parameters of Future AD Facilities

It is understood that the 70 AD facilities statewide could use biogas for electricity or co-generation, or upgrade biogas to biomethane quality through the removal of hydrogen sulfide, CO_2, and moisture. Biomethane can be used in place of natural gas for various processes, including use by utility companies if the biomethane is upgraded to utility standards and pumped into a natural gas supply pipeline, as well as for electrical generation, heating, and for natural gas-fueled vehicles.

Several of the environmental resource chapters analyze vehicles trips directly (Chapter 9, Transportation and Traffic) or indirectly (Chapter 5, Air Quality and GHG Emissions, and Chapter 7, Noise). In regards to truck trips, the analyses in this Program EIR have relied upon estimates detailed in recent information incorporated in the DiStefano and Belenky study (2009), which assumed 100 miles round trip per 18-ton haul truck per facility, or about 275,000 miles traveled annually per AD facility.

4.6 References

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CHAPTER 5
Air Quality and Greenhouse Gas

5.1 Environmental Setting

The environmental setting first identifies the air quality pollutants of concern in California; including criteria air pollutants, toxic air contaminants (TACs), odors, and greenhouse gases (GHGs) that could be emitted during the construction and operation of anaerobic digester (AD) facilities. This discussion also explains California's climate and meteorology and their effect on air quality.

Air Quality Pollutants of Concern

Criteria Air Pollutants

Ozone. Short-term exposure to ozone can irritate the eyes and cause constriction of the airways. Besides causing shortness of breath, ozone can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema. Ozone is not emitted directly into the atmosphere, but is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG) (also termed volatile organic compounds or VOCs) and nitrogen oxides (NOx). ROG and NOx are known as precursor compounds for ozone. Significant ozone production generally requires ozone precursors to be present in a stable atmosphere with strong sunlight for approximately three hours. Ozone is a regional air pollutant because it is not emitted directly by sources, but is formed downwind of sources of ROG and NOx under the influence of wind and sunlight. Ozone concentrations tend to be higher in the late spring, summer, and fall, when the long sunny days combine with regional subsidence inversions to create conditions conducive to the formation and accumulation of secondary photochemical compounds, like ozone. Ground level ozone in conjunction with suspended particulate matter in the atmosphere leads to hazy conditions generally termed as "smog."

Notably, some hydrocarbons are less ozone-forming than other hydrocarbons, so the United States Environmental Protection Agency (USEPA) has officially excluded them from the definition of regulated hydrocarbons under the VOC classification. This definition excludes methane, ethane, and compounds not commonly found in large quantities in engine exhaust from consideration as VOCs.

Carbon Monoxide (CO). Ambient CO concentrations normally are considered a local effect and typically correspond closely to the spatial and temporal distributions of vehicular traffic. Wind speed and atmospheric mixing also influence carbon monoxide concentrations. Under inversion conditions, CO concentrations may be distributed more uniformly over an area that may extend

some distance from vehicular sources. When inhaled at high concentrations, CO combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This results in reduced oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease, or anemia, as well as for fetuses.

Carbon monoxide concentrations have declined dramatically in California due to existing controls and programs, and most areas of the state have no problem meeting the CO State and federal standards. CO measurements and modeling were important in the early 1980's when CO levels were regularly exceeded throughout California. In more recent years, CO measurements and modeling have not been a priority in most California air districts due to the retirement of older polluting vehicles, less emissions from new vehicles and improvements in fuels. The clear success in reducing CO levels is evident in the first paragraph of the executive summary of the California Air Resources Board *2004 Revision to the California State Implementation Plan for Carbon Monoxide Updated Maintenance Plan for Ten Federal Planning Areas* (CARB, 2004), shown below:

> "The dramatic reduction in carbon monoxide (CO) levels across California is one of the biggest success stories in air pollution control. Air Resources Board (CARB or Board) requirements for cleaner vehicles, equipment and fuels have cut peak CO levels in half since 1980, despite growth. All areas of the State designated as non-attainment for the federal 8-hour CO standard in 1991 now attain the standard, including the Los Angeles urbanized area. Even the Calexico area of Imperial County on the congested Mexican border had no violations of the federal CO standard in 2003. Only the South Coast and Calexico continue to violate the more protective State 8-hour CO standard, with declining levels beginning to approach that standard."

Respirable Particulate Matter (PM10 and PM2.5). PM10 and PM2.5 consist of particulate matter that is 10 microns or less in diameter and 2.5 microns or less in diameter, respectively. (A micron is one-millionth of a meter). PM10 and PM2.5 represent fractions of particulate matter that can be inhaled into the air passages and the lungs and can cause adverse health effects. Some sources of particulate matter, such as wood burning in fireplaces, demolition, and construction activities, are more local in nature, while others, such as vehicular traffic, have a more regional effect. Very small particles of certain substances (e.g., sulfates and nitrates) can cause lung damage directly, or can contain adsorbed gases (e.g., chlorides or ammonium) that may be injurious to health. Particulates also can damage materials and reduce visibility. Large dust particles (diameter greater than 10 microns) settle out rapidly and are easily filtered by human breathing passages. This large dust is of more concern as a soiling nuisance rather than a health hazard. The remaining fraction, PM10 and PM2.5, are a health concern particularly at levels above the federal and State ambient air quality standards. PM2.5 (including diesel exhaust particles) is thought to have greater effects on health, because these particles are so small and thus, are able to penetrate to the deepest parts of the lungs. Scientific studies have suggested links between fine particulate matter and numerous health problems including asthma, bronchitis, acute and chronic respiratory symptoms such as shortness of breath and painful breathing. Recent studies have shown an association between morbidity and mortality and daily concentrations of particulate matter in the air. Children are more susceptible to the health risks of PM10 and PM2.5 because their immune and respiratory systems are still developing.

Mortality studies since the 1990s have shown a statistically significant direct association between mortality (premature deaths) and daily concentrations of particulate matter in the air. Despite important gaps in scientific knowledge and continued reasons for some skepticism, a comprehensive evaluation of the research findings provides persuasive evidence that exposure to fine particulate air pollution has adverse effects on cardiopulmonary health (Dockery and Pope, 2006). The CARB has estimated that achieving the ambient air quality standards for PM10 could reduce premature mortality rates by 6,500 cases per year (CARB, 2002).

Nitrogen Dioxide (NO_2). NO_2 is a reddish brown gas that is a by-product of combustion processes. Automobiles and industrial operations are the main sources of NO_2. NO_2 may be visible as a coloring component of a brown cloud on high pollution days, especially in conjunction with high ozone levels.

NO_2 is an air quality concern because it acts as a respiratory irritant and is a precursor of ozone. NO_2 is a major component of the group of gaseous nitrogen compounds commonly referred to as nitrogen oxides (NOx). Nitrogen oxides are produced by fuel combustion in motor vehicles, industrial stationary sources (such as industrial activities), ships, aircraft, and rail transit. Typically, nitrogen oxides emitted from fuel combustion are in the form of nitric oxide (NO) and nitrogen dioxide (NO_2). NO is often converted to NO_2 when it reacts with ozone or undergoes photochemical reactions in the atmosphere. Therefore, emissions of NO_2 from combustion sources are typically evaluated based on the amount of NOx emitted from the source.

Sulfur dioxide (SO_2). SO_2 is a combustion product of sulfur or sulfur-containing fuels such as coal, diesel, and biogas. SO_2 is also a precursor to the formation of atmospheric sulfate and particulate matter and contributes to potential atmospheric sulfuric acid formation that could precipitate downwind as acid rain. SO_2 is a major component of the group of gaseous sulfurous compounds commonly referred to as sulfur oxides (SOx).

Hydrogen sulfide (H_2S). H_2S is generated by the anaerobic decomposition of organic material. It is emitted naturally in geothermal areas and is also associated with certain industrial processes. Exposure to low concentrations of H_2S may cause irritation to eyes, nose, or throat. Exposure to higher concentrations (typically at work settings) can cause olfactory fatigue, respiratory paralysis, and death. However, no health effects have been found in humans exposed to typical environmental concentrations.

Lead. Lead has a range of adverse neurotoxin health effects, and was formerly released into the atmosphere primarily via leaded gasoline products. The phase-out of leaded gasoline in California resulted in decreasing levels of atmospheric lead. AD facilities would not introduce any new sources of lead emissions; consequently, lead emissions are not required to be quantified and are not further evaluated in this analysis.

Toxic Air Contaminants (TACs)

TACs are airborne substances that are capable of causing short-term (acute) and/or long-term (chronic and/or carcinogenic) adverse human health effects (i.e., injury or illness). TACs are substances for which federal or State criteria air pollutant standards have not been adopted. Thus, for TACs, there

is no federal or State ambient air quality standard against which to measure a project's air quality impacts. For this reason, TACs are analyzed by performing a health risk assessment. TACs include both organic and inorganic chemical substances. They may be emitted from a variety of common sources including gasoline stations, automobiles, dry cleaners, industrial operations, and painting operations. The current California list of TACs includes approximately 200 compounds, including particulate emissions from diesel-fueled engines, which can be emitted through the construction and/or operation of AD facilities. In addition, operation of AD facilities could result in trace amounts of air toxics (primarily H_2S and ammonia) that may be released as fugitives from the digester or from the potential combustion or flaring of the biogas. Additional air toxics that could be generated by the combustion of biogas (either in an engine or flare) include benzene, formaldehyde, and other products of incomplete combustion.

Diesel Particulate Matter (DPM). Diesel particulate matter is a TAC and is the most complex of diesel emissions. Diesel particulates, as defined by most emission standards, are sampled from diluted and cooled exhaust gases. This definition includes both solids and liquid material that condenses during the dilution process. The basic fractions of DPM are elemental carbon and heavy hydrocarbons derived from fuel and lubricating oil. DPM contains a large portion of the polycyclic aromatic hydrocarbons (PAH) found in diesel exhaust. Diesel particulates include small nuclei mode particles of diameters below 0.04μm and their agglomerates of diameters up to 1μm. DPM is expected to be the TAC of greatest concern generated by the construction and operation of AD facilities since it would be emitted outside of the digester and thus not captured during the digestion process.

In 2001, CARB assessed the statewide health risks from exposure to DPM and to other TACs. Ambient exposures to diesel particulates in California are significant fractions of total TAC levels in the State. CARB subsequently developed the *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles* (CARB, 2000). According to this plan, the statewide cancer risk from exposure to diesel exhaust was about 540 per million (i.e., 540 cancers per million people) as compared to a total risk for exposure to all ambient air toxics of 760 per million as reported in 2000. This estimate of risk from diesel exhaust, which accounts for a substantial portion (about 70 percent) of the total risk from TACs, included both urban and rural areas in the State. It can be considered as an average worst-case for the State, since it assumes constant exposure to outdoor concentrations of diesel exhaust and does not account for expected lower concentrations indoors, where people spend most of their time.

Ammonia. Ammonia is a TAC and is considered a precursor to PM2.5. Ammonia is generated during AD of organic materials and is therefore of interest in evaluating the air quality impacts of the project. Ammonia gas (a base) is known to react with acids in the atmosphere (typically nitric or sulfuric acid) to form ammonium nitrates or sulfates, which are particulates. Although it is known that the release of ammonia gas is a participant in the formation of ammonium nitrate, it is difficult to forecast how much ammonium nitrate would be created by a release of a certain amount of ammonia. The reaction that forms ammonium nitrate or ammonium sulfate depends on the presence of other chemicals that are in turn part of a complex photochemical process occurring in the atmosphere (including NOx and SOx). At the same time, both ammonia and ammonium particulates are subject to removal processes that constantly remove the pollutants from the atmosphere. No

health effects have been found in humans exposed to typical environmental (moderate) concentrations of ammonia. In high concentrations, it can severely irritate the eyes, nose, ears, and throat. Lung damage and death may occur after exposure to very high concentrations of ammonia. Individuals with asthma may be more sensitive to breathing ammonia than others.

Odorous Emissions

Anaerobic decomposition of organic materials can be a source of odor. Though odors rarely cause any physical harm, they still remain unpleasant and can lead to public distress generating complaints. The occurrence and severity of odor impacts depend on the nature, frequency and intensity of the source; wind speed and direction; and the sensitivity of receptors.

Greenhouse Gas Emissions

Global climate change refers to observed changes in weather features that occur across the Earth as a whole, such as temperature, wind patterns, precipitation, and storms, over a long period (CAT, 2006; CEC, 2006; CEC, 2008; IPCC, 2007). Global temperatures are modulated by naturally occurring atmospheric gases, such as water vapor, carbon dioxide, methane, and nitrous oxide. These gases allow sunlight into the Earth's atmosphere, but prevent radiant heat from escaping into outer space, thus altering Earth's energy balance in a phenomenon called the "greenhouse effect". Some greenhouse gases are short lived, such as water vapor, while others, such as sulfur hexafluoride, have a long lifespan in the atmosphere.

Earth has a dynamic climate that is evidenced by repeated episodes of warming and cooling in the geologic record. Consistent with a general warming trend, global surface temperatures have increased by 0.74°C ± 0.18°C over the past 100 years (IPCC, 2007). The recent warming trend has been correlated with the global Industrial Revolution, which resulted in increased urban and agricultural centers at the expense of forests and reliance on fossil fuels (CAT, 2006). Eleven of the past twelve years are among the twelve warmest years recorded since 1850 (CEC, 2006). Although natural processes and sources of greenhouse gases contribute to warming periods, recent warming trends are attributed to human activities as well (CAT, 2006; CEC 2006). Potential global warming impacts may include, but are not limited to, loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years. Secondary effects are likely to include a global rise in sea level, impacts to agriculture, changes in disease vectors, and changes in habitat and biodiversity. While the possible outcomes and the feedback mechanisms involved are not fully understood, and much research remains to be done, the potential for substantial environmental, social, and economic consequences over the long term may be great.

GHGs include all of the following naturally-occurring and anthropogenic (man-made) gases: carbon dioxide (CO_2), methane, nitrous oxide (N_2O), sulfur hexafluoride, perfluorocarbons, hydrofluorocarbons, and nitrogen trifluoride (NF_3) (California Health and Safety Code §38505(g). In terms of Global Warming Potential (GWP), each of these gases varies substantially from one another. GWP is a measure of how much a given mass of GHG will contribute to global warming, comparing one GHG to the same mass of CO_2 on a relative scale (CAPCOA, 2009; CAT, 2006; IPCC, 2007). The GWP depends on the absorption of infrared radiation by a given species, the spectral

location of its absorbing wavelengths, and the atmospheric lifetime of the species. GHG emissions are measured in units of pounds or tons of CO_2 equivalents (CO_2e). As an example, HFC-23 contributes 14,800 times as much as CO_2 to the GWP over 100 years. GWP values for key GHGs are summarized in **Table 5-1**. The following sections contain a general discussion of the natural and anthropogenic sources of each GHG.

TABLE 5-1
GLOBAL WARMING POTENTIAL OF GREENHOUSE GASES

Gas	Lifetime (years)	Global Warming Potential for 100-Year Time Horizon
Carbon Dioxide (CO_2)	50-200	1
Methane (CH_4)	12	25
Nitrous Oxide (NO_2)	114	298
Perfluorocarbons (PFC-14)	50,000	7,300
Hydrofluorocarbons (HFC-23)	270	14,800
Sulfur Hexafluoride (SF_6)	3,200	22,800

SOURCE: IPCC. 2007. Table 2.14, Chapter 2, Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the IPCC. Available at: http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-chapter2.pdf

Carbon Dioxide (CO_2). In the atmosphere, carbon generally exists in its oxidized form as CO_2. Natural sources of CO_2 include animal and plant respiration, ocean-atmospheric exchange and volcanic eruptions. Anthropogenic sources of CO_2 include the combustion of fossil fuels, such as coal, oil, and gas in power plants, automobiles, industrial facilities and other sources, and specialized industrial production processes and product uses (i.e., mineral production, metal production, and use of petroleum based products). The largest source of CO_2 emissions globally is the combustion of fossil fuels. Sinks of CO_2 include forests, wetlands and agriculture. When CO_2 sources exceed CO_2 sinks, the Earth's natural balance is no longer in equilibrium. Since the late 1800s, the concentration of CO_2 in the atmosphere has risen approximately 30% (CAT, 2006; CAPCOA, 2009).

Methane (CH_4). Methane in the atmosphere is eventually oxidized, yielding carbon dioxide and water. Natural sources of methane include, but are not limited to, anaerobic production, wetlands, termites, oceans, methane gas hydrates (clathrates), volcanoes and other geologic structures, wildfires, and animals. Anthropogenic sources of methane include, but are not limited to, landfills, natural gas systems, coal mining, manure management, forested lands, wastewater treatment, rice cultivation, composting, petrochemical production, and field burning of agricultural residues. In California, agricultural processes contribute significant sources of anthropogenic methane (CAT, 2006; CAPCOA, 2009).

Nitrous Oxide (N_2O). In the atmosphere, nitrous oxide reacts with ozone. Primary natural sources of nitrous oxide include bacterial breakdown of nitrogen in soils and oceans. Anthropogenic sources of nitrous oxide include fertilizer application, production of nitrogen fixing crops, nitric acid production, animal manure management, sewage treatment, combustion of fossil fuels, and nitric acid production (CAT, 2006; CAPCOA, 2009).

Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), and Sulfur Hexafluoride (SF_6). HFCs are man-made chemicals containing the element fluorine. Developed as alternatives to ozone-depleting substances for industrial, commercial and consumer products, they are used predominantly as

refrigerants and aerosol propellants. PFCs are man-made as well, primarily used as replacements to ozone-damaging chlorofluorocarbons and hydrochlorofluorocarbons. Sources include aluminum production and semiconductor manufacturing. Man made, major releases of SF_6 come from leakage from electrical substations, magnesium smelters and some consumer goods, such as tennis balls and training shoes. Each of these GHGs possesses a relatively high GWP and long atmospheric lifetimes (CAT, 2006; CAPCOA, 2009).

California Climate and Meteorology

Air quality is affected by the rate, amount, and location of pollutant emissions and the associated meteorological conditions that influence pollutant movement and dispersal. Atmospheric conditions (for example, wind speed, wind direction, and air temperature) in combination with local surface topography (for example, geographic features such as mountains and valleys), determine how air pollutant emissions affect local air quality.

Because of the strong influence of the Pacific Ocean and mountains, variations in climate in California run in a general east-to-west direction. California's climate varies from Mediterranean (most of the State) to steppe (scattered foothill areas), to alpine (high Sierra), to desert (Colorado and Mojave Deserts).

The Sierra Nevada, Coast and Cascade Ranges act as barriers to the passage of air masses. During summer, California is protected from much of the hot, dry air masses that develop over the central United States. Because of these barriers, and California's western border of the Pacific Ocean, summer weather in portions of the State is generally milder than that in the rest of the country and is characterized by dry, sunny conditions with infrequent rain.

In winter, the same mountain ranges prevent cold, dry air masses from moving into California from the central areas of the United States. Consequently, winters in California are also milder than would be expected at these latitudes.

Regulatory Requirements

Federal

Clean Air Act

The Clean Air Act (CAA) is a federal law that regulates air emissions from stationary and mobile sources. Principal provisions include the authorization for the USEPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and public welfare and to regulate emissions of hazardous air pollutants. Six criteria pollutants include carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, particulate matter (equal to or less than PM10) and lead. **Table 5-2** shows current federal and State ambient air quality standards and provides a brief discussion of the related health effects and principal sources for each pollutant. The CAA was amended in 1977 and 1990, primarily to set new deadlines for achieving attainment of NAAQS because many areas of the country had failed to meet the deadlines.

TABLE 5-2
STATE AND NATIONAL CRITERIA AIR POLLUTANT STANDARDS, EFFECTS, AND SOURCES

Pollutant	Averaging Time	State Standard	National Standard	Pollutant Health and Atmospheric Effects	Major Pollutant Sources
Ozone	1 hour	0.09 ppm	---	High concentrations can directly affect lungs, causing irritation. Long-term exposure may cause damage to lung tissue.	Formed when reactive organic gases (ROG) and nitrogen oxides (NOx) react in the presence of sunlight. Major sources include on-road motor vehicles, solvent evaporation, and commercial / industrial mobile equipment.
	8 hours	0.07 ppm	0.075 ppm		
Carbon Monoxide	1 hour	20 ppm	35 ppm	Classified as a chemical asphyxiant, carbon monoxide interferes with the transfer of fresh oxygen to the blood and deprives sensitive tissues of oxygen.	Internal combustion engines, primarily gasoline-powered motor vehicles.
	8 hours	9.0 ppm	9 ppm		
Nitrogen Dioxide	1 hour	0.18 ppm	0.100 ppm	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown.	Motor vehicles, petroleum refining operations, industrial sources, aircraft, ships, and railroads.
	Annual Avg.	0.030 ppm	0.053 ppm		
Sulfur Dioxide	1 hour	0.25 ppm	---	Irritates upper respiratory tract; injurious to lung tissue. Can yellow the leaves of plants, destructive to marble, iron, and steel. Limits visibility and reduces sunlight.	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
	3 hours	---	0.5 ppm		
	24 hours	0.04 ppm	0.14 ppm		
	Annual Avg.	---	0.03 ppm		
Respirable Particulate Matter (PM10)	24 hours	50 μg/m3	150 μg/m3	May irritate eyes and respiratory tract, decreases in lung capacity, cancer and increased mortality. Produces haze and limits visibility.	Dust and fume-producing industrial and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-raised dust and ocean sprays).
	Annual Avg.	20 μg/m3	---		
Fine Particulate Matter (PM2.5)	24 hours	---	35 μg/m3	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and results in surface soiling.	Fuel combustion in motor vehicles, equipment, and industrial sources; residential and agricultural burning; Also, formed from photochemical reactions of other pollutants, including NOx, sulfur oxides, and organics.
	Annual Avg.	12 μg/m3	15 μg/m3		
Lead	Monthly Ave.	1.5 μg/m3	---	Disturbs gastrointestinal system, and causes anemia, kidney disease, and neuromuscular and neurological dysfunction.	Present source: lead smelters, battery manufacturing & recycling facilities. Past source: combustion of leaded gasoline.
	Quarterly	---	1.5 μg/m3		
Hydrogen Sulfide	1 hour	0.03 ppm	No National Standard	Nuisance odor (rotten egg smell), headache and breathing difficulties (higher concentrations)	Geothermal Power Plants, Petroleum Production and refining
Sulfates	24 hour	25 μg/m3	No National Standard	Breathing difficulties, aggravates asthma, reduced visibility	Produced by the reaction in the air of SO2.
Visibility Reducing Particles	8 hour	Extinction coefficient of 0.23/km; visibility of 10 miles or more	No National Standard	Reduces visibility, reduced airport safety, lower real estate value, discourages tourism.	See PM2.5.

ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter.

SOURCE: California Air Resources Board (CARB), 2010a. *Ambient Air Quality Standards,* available at http://www.arb.ca.gov/research/aaqs/aaqs2.pdf Standards last updated February 16, 2010. California Air Resources Board, 2009a. *ARB Fact Sheet: Air Pollution Sources, Effects and Control,* http://www.arb.ca.gov/research/health/fs/fs2/fs2.htm, page last reviewed December 2009.

Pursuant to the 1990 amendments to the CAA, the USEPA classifies air basins, or portions of air basins, as "attainment" or "nonattainment" for each criteria air pollutant, based on whether or not the NAAQS had been achieved. **Table 5-3** shows the current attainment statuses across the project area by air basin (shown in **Figure 5-1**) for the pollutants of highest concern (ozone and particulates).

TABLE 5-3
CRITERIA POLLUTANT ATTAINMENT STATUS BY CALIFORNIA AIR BASIN

Air Basin	State Ozone	Federal Ozone	State PM10	Federal PM10	State PM2.5	Federal PM2.5
Great Basin Valleys Air Basin	N	U	N	N	A	U
Lake County Air Basin	A	U	A	U	A	U
Lake Tahoe Air Basin	N	U	N	U	A	U
Mojave Desert Air Basin	N	N	N	N	N	U
Mountain Counties Air Basin	N	N	N	U	N	N
North Central Coast Air Basin	N	U	N	U	A	U
North Coast Air Basin	A	U	N	U	U	U
Northeast Plateau Air Basin	NT	U	N	U	U	U
Sacramento Valley Air Basin	N	N	N	N	N	N
Salton Sea Air Basin	N	N	N	N	U	N
San Diego Air Basin	N	N	N	U	N	U
San Francisco Bay Area Air Basin	N	N	N	U	N	N
San Joaquin Valley Air Basin	N	N	N	A	N	N
South Central Coast Air Basin	N	N	N	U	N	U
South Coast Air Basin	N	N	N	N	N	N

A Attainment. An area is designated attainment if the state or federal standard for the specified pollutant is met.
N Nonattainment. An area is designated nonattainment if the State or federal standard for the specified pollutant is not met.
NT Nonattainment – Transitional. An area is designated non-attainment – transitional to signify that the area is close to attaining the standard for that pollutant.
U Unclassified. An area is designated unclassified if the data are incomplete and do not support a designation of attainment or nonattainment.

Air basins classified as N or NT areas have at least one area within that basin that has shown a violation of the relevant ambient standard.

SOURCE: California Air Resources Board (CARB), 2010b. *Area Designation Maps,* http://www.arb.ca.gov/desig/adm/adm.htm, page updated July 26, 2010 and accessed July 29, 2010.

The 1990 amendments to the CAA requires each state to prepare an air quality control plan referred to as the State Implementation Plan (SIP). The amendments added requirements for states containing areas that violate the NAAQS to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is a living document that is periodically modified to reflect the latest emissions inventories, planning documents, and rules and regulations of air basins as reported by the agencies with jurisdiction over them. The USEPA has responsibility to review all state SIPs to determine if they conform to the mandates of the CAA and will achieve air quality goals when implemented. If the USEPA determines a SIP to be inadequate, it may prepare a Federal Implementation Plan (FIP) for the nonattainment area and may impose additional control measures. Failure to submit an approvable SIP or to implement the plan within mandated timeframes can result in sanctions being applied to transportation funding and stationary air pollution sources in the air basins.

Regulation of TACs, termed Hazardous Air Pollutants (HAPs) under federal regulations, is achieved through federal, State and local controls on individual sources. The 1977 amendments to the CAA required the USEPA to identify National Emission Standards for Hazardous Air Pollutants (NESHAPs) to protect public health and welfare. These substances include certain volatile organic chemicals, pesticides, herbicides, and radionuclides that present a tangible hazard, based on scientific studies of exposure to humans and other mammals. There is uncertainty in the precise degree of hazard.

SOURCE: CA Air Resources Board, 2008; and ESA, 2010

CalRecycle Statewide AD Facilities Program EIR . 209134

Figure 5-1
California Air Basins

Relevant to the CAA, GHGs and climate change, *Massachusetts v. Environmental Protection Agency* (549 U.S. 497) is the pivotal federal court case. In this case, twelve states and cities, including California, sued to force the USEPA to regulate GHGs as a pollutant pursuant to the CAA. This lawsuit was pursued in conjunction with several environmental organizations. The petitioners contended that the CAA gave the USEPA the necessary authority and the mandate to address GHGs in light of scientific evidence on global warming.

The USEPA was one of several respondents in the case. The USEPA contended that it did not have the authority under the CAA to regulate GHGs, and even if the USEPA did have such authority, it would decline to exercise it. Central to this case was the exact definition of an air pollutant as stipulated in the CAA. In April 2007, the United States Supreme Court ruled five to four that the plaintiffs had standing to sue, that the CAA gave the USEPA the authority to regulate GHGs, and that the USEPA's reasons for not regulating GHG were found to be inadequate. Since this ruling, the USEPA has been developing regulations for geologic carbon sequestration projects and will be issuing GHG permits for large sources.

State

The CARB manages air quality, regulates mobile emissions sources, and oversees the activities of county APCDs and regional AQMDs. CARB establishes state ambient air quality standards and vehicle emissions standards.

California has adopted ambient standards that are more stringent than the federal standards for the criteria air pollutants. These are shown in **Table 5-2**. Under the 1988 California Clean Air Act (CCAA) patterned after the CAA, areas have been designated as attainment or nonattainment with respect to the state standards. **Table 5-3** summarizes the attainment status with California standards of the Program area by air basin for the pollutants of highest concern (ozone and particulates).

Toxic Air Contaminants

The State Air Toxics Program was established in 1983 under Assembly Bill (AB) 1807 (Tanner). A total of 243 substances have been designated TACs under California law; they include the 189 (federal) hazardous air pollutants (HAPs) adopted in accordance with AB 2728. The Air Toxics "Hot Spots" Information and Assessment Act of 1987 (AB 2588) seeks to identify and evaluate risk from air toxics sources; however, AB 2588 does not regulate air toxics emissions. Toxic air contaminant emissions from individual facilities are quantified and prioritized. "High-priority" facilities are required to perform a health risk assessment and, if specific thresholds are violated, are required to communicate the results to the public in the form of notices and public meetings.

CARB developed the *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles* (CARB, 2000), which represents proposals to reduce diesel particulate emissions, with the goal of reducing emissions and associated health risks by 75 percent in 2010 and by 85 percent in 2020. The program aims to require the use of state-of-the-art catalyzed diesel particulate filters and ultra low sulfur diesel fuel on diesel-fueled engines.

CARB recently published the *Air Quality and Land Use Handbook: A Community Health Perspective* (CARB, 2005). The primary goal in developing the handbook was to provide information that will help keep California's children and other vulnerable populations out of harm's way with respect to nearby sources of TACs. The handbook highlights recent studies that have shown that public exposure to air pollution can be substantially elevated near freeways and certain other facilities. The health risk is greatly reduced with distance. For that reason, CARB provides some general recommendations aimed at keeping appropriate distances between sources of air pollution and sensitive land uses, such as residences.

Greenhouse Gases

Executive Order S-3-05

In 2005, in recognition of California's vulnerability to the effects of climate change, Governor Schwarzenegger established Executive Order S-3-05, which sets forth a series of target dates by which statewide emission of greenhouse gas would be progressively reduced, as follows:

- By 2010, reduce greenhouse gas emissions to 2000 levels;
- By 2020, reduce greenhouse gas emissions to 1990 levels; and
- By 2050, reduce greenhouse gas emissions to 80 percent below 1990 levels.

Assembly Bill 32 (AB 32)

In 2006, California passed the California Global Warming Solutions Act of 2006 (Assembly Bill No. 32; California Health and Safety Code Division 25.5, §s 38500, et seq., or AB 32), which requires the CARB to design and implement emission limits, regulations, and other measures, such that statewide greenhouse gas emissions will be reduced to 1990 levels by 2020.

In December 2007, CARB approved the 2020 emission limit of 427 million metric tons of CO_2 equivalents (CO_2e) of greenhouse gases. The 2020 target of 427 million metric tons of CO_2e requires the reduction of 169 million metric tons of CO_2e, or approximately 30 percent, from the state's projected 2020 emissions of 596 million metric tons of CO_2e (business-as-usual).

AB 32 required development of a mandatory reporting rule for major sources of GHGs. The CARB reporting rule (California Code of Regulations Title 17, Subchapter 10, Article 2, §95100 to 95133) became effective in January 2009. The rule requires reporting of GHG emissions for:

- Cement plants;
- Petroleum refineries ($\geq$ 25,000 metric tons of CO_2e in any calendar year);
- Hydrogen plants ($\geq$ 25,000 metric tons of CO_2e in any calendar year);
- Electric generating facilities and cogeneration facilities (> 1 MW capacity and > 2,500 metric tons of CO_2e in any year)
- Electricity retail providers and marketers
- Other facilities that emit >25,000 metric tons of CO_2e, for stationary combustion sources, in any calendar year.

Cement plants, oil refineries, fossil-fueled electric-generating facilities/providers, cogeneration facilities, and hydrogen plants and other stationary combustion sources that emit more than 25,000 metric tons/year CO_2e, make up 94 percent of the point source CO_2e emissions in California.

In June 2008, CARB published its *Climate Change Draft Scoping Plan* (CARB, 2008a) that was approved and adopted by the CARB Board on December 11, 2008 as the *Climate Change Scoping Plan* (CARB, 2008b). The *Climate Change Draft Scoping Plan* reported that CARB met the first milestones set by AB 32 in 2007: developing a list of early actions to begin sharply reducing GHG emissions; assembling an inventory of historic emissions; and establishing the 2020 emissions limit. Key elements of the *Climate Change Scoping Plan* include:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
- Achieving a statewide renewables energy mix of 33 percent;
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system;
- Establishing targets for transportation-related GHG emissions for regions throughout California, and pursuing policies and incentives to achieve those targets;
- Adopting and implementing measures pursuant to existing state laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard; and
- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the state's long-term commitment to AB 32 implementation (CARB, 2008b).

CARB has not yet determined what amount of GHG emissions reductions it recommends from local government land use decisions; however, the *Climate Change Scoping Plan* does state that successful implementation of the plan relies on local governments' land use planning and urban growth decisions because local governments have primary authority to plan, zone, approve, and permit land development to accommodate population growth and the changing needs of their jurisdictions. CARB further acknowledges that decisions on how land is used will have large effects on the GHG emissions that will result from the transportation, housing, industry, forestry, water, agriculture, electricity, and natural gas emission sectors.

The *Climate Change Scoping Plan* also includes recommended measures that were developed to reduce GHG emissions from key sources and activities while improving public health, promoting a cleaner environment, preserving our natural resources, and ensuring that the impacts of the reductions are equitable and do not disproportionately impact low-income and minority communities. These measures, shown below in **Table 5-4** by sector, also put the state on a path to meet the long-term 2050 goal of reducing California's GHG emissions to 80 percent below 1990 levels.

The total reduction for the recommended measures is 174 million metric tons/year of CO_2e, slightly exceeding the 169 million metric tons/year of CO_2e reductions estimated to be needed in the *Climate Change Draft Scoping Plan*. The measures in the *Climate Change Scoping Plan* approved by the Board will be developed over the next two years and be in place by 2012.

TABLE 5-4
LIST OF RECOMMENDED ACTIONS BY SECTOR

Measure No.	Measure Description	GHG Reductions (Annual Million Metric Tons CO_2e)
Transportation		
T-1	Pavley I and II – Light Duty Vehicle Greenhouse Gas Standards	31.7
T-2	Low Carbon Fuel Standard (Discrete Early Action)	15
T-3[1]	Regional Transportation-Related Greenhouse Gas Targets	5
T-4	Vehicle Efficiency Measures	4.5
T-5	Ship Electrification at Ports (Discrete Early Action)	0.2
T-6	Goods Movement Efficiency Measures. • Ship Electrification at Ports • System-Wide Efficiency Improvements	3.5
T-7	Heavy-Duty Vehicle Greenhouse Gas Emission Reduction Measure – Aerodynamic Efficiency (Discrete Early Action)	0.93
T-8	Medium- and Heavy-Duty Vehicle Hybridization	0.5
T-9	High Speed Rail	1
Electricity and Natural Gas		
E-1	Energy Efficiency (32,000 GWh of Reduced Demand) • Increased Utility Energy Efficiency Programs • More Stringent Building & Appliance Standards Additional Efficiency and Conservation Programs	15.2
E-2	Increase Combined Heat and Power Use by 30,000 GWh (Net reductions include avoided transmission line loss)	6.7
E-3	Renewables Portfolio Standard (33% by 2020)	21.3
E-4	Million Solar Roofs (including California Solar Initiative, New Solar Homes Partnership and solar programs of publicly owned utilities) • Target of 3000 MW Total Installation by 2020	2.1
CR-1	Energy Efficiency (800 Million Therms Reduced Consumptions) • Utility Energy Efficiency Programs • Building and Appliance Standards • Additional Efficiency and Conservation Programs	4.3
CR-2	Solar Water Heating (AB 1470 goal)	0.1
Green Buildings		
GB-1	Green Buildings	26
Water		
W-1	Water Use Efficiency	1.4†
W-2	Water Recycling	0.3†
W-3	Water System Energy Efficiency	2.0†
W-4	Reuse Urban Runoff	0.2†
W-5	Increase Renewable Energy Production	0.9†
W-6	Public Goods Charge (Water)	TBD†
Industry		
I-1	Energy Efficiency and Co-Benefits Audits for Large Industrial Sources	TBD
I-2	Oil and Gas Extraction GHG Emission Reduction	0.2
I-3	GHG Leak Reduction from Oil and Gas Transmission	0.9
I-4	Refinery Flare Recovery Process Improvements	0.3
I-5	Removal of Methane Exemption from Existing Refinery Regulations	0.01
Recycling and Water Management		
RW-1	Landfill Methane Control (Discrete Early Action)	1
RW-2	Additional Reductions in Landfill Methane • Increase the Efficiency of Landfill Methane Capture	TBD†

TABLE 5-4
LIST OF RECOMMENDED ACTIONS BY SECTOR

Measure No.	Measure Description	GHG Reductions (Annual Million Metric Tons CO_2e)
RW-3	High Recycling/Zero Waste • Commercial Recycling • Increase Production and Markets for Organic Products • Anaerobic Digestion • Extended Producer Responsibility • Environmentally Preferable Purchasing	9†
Forests		
F-1	Sustainable Forest Target	5
High Global Warming Potential (GWP) Gases		
H-1	Motor Vehicle Air Conditioning Systems: Reduction of Refrigerant Emissions from Non-Professional Services (Discrete Early Action)	0.26
H-2	SF_6 Limits in Non-Utility and Non-Semiconductor Applications (Discrete Early Action)	0.3
H-3	Reduction of Perfluorocarbons in Semiconductor Manufacturing (Discrete Early Action)	0.15
H-4	Limit High GWP Use in Consumer Products Discrete Early Action (Adopted June 2008)	0.25
H-5	High GWP Reductions from Mobile Sources • Low GWP Refrigerants for New Motor Vehicle Air Conditioning Systems • Air Conditioner Refrigerant Leak Test During Vehicle Smog Check • Refrigerant Recovery from Decommissioned Refrigerated Shipping Containers • Enforcement of Federal Ban on Refrigerant Release during Servicing or Dismantling of Motor Vehicle Air Conditioning Systems	3.3
H-6	High GWP Reductions from Stationary Sources • High GWP Stationary Equipment Refrigerant Management Program: - Refrigerant Tracking/Reporting/Repair Deposit Program - Specifications for Commercial and Industrial Refrigeration Systems • Foam Recovery and Destruction Program • SF Leak Reduction and Recycling in Electrical Applications • Alternative Suppressants in Fire Protection Systems • Residential Refrigeration Early Retirement Program	10.9
H-7	Mitigation Fee on High GWP Gases	5
Agriculture		
A-1	Methane Capture at Large Dairies	1.0†

1. This is not the SB 375 regional target. CARB will establish regional targets for each California's 18 Metropolitan Planning Organization (MPO's) regions following the input of the regional targets advisory committee and a consultation process with MPO's and other stakeholders per SB 375

† GHG emission reduction estimates are not included in calculating the total reductions needed to meet the 2020 target

Senate Bill 97 (SB 97)

SB 97, signed August 2007 (Chapter 185, Statutes of 2007; Public Resources Code §21083.05 and 21097), acknowledges that climate change is a prominent environmental issue that requires analysis under CEQA. This bill directed the Governor's Office of Planning and Research (OPR), which is part of the state Resources Agency, to prepare, develop, and transmit to CARB guidelines for the feasible mitigation of GHG emissions (or the effects of GHG emissions), as required by CEQA, by July 1, 2009. The Resources Agency was required to certify and adopt those guidelines by January 1, 2010. On December 31, 2009, the Natural Resources Agency delivered its rulemaking package to the Office of Administrative Law for their review pursuant to the Administrative Procedure Act. The adopted guidelines became effective on March 18, 2010.

California Air Pollution Control Officers Association (CAPCOA)

In January 2008, CAPCOA issued a "white paper" on evaluating and addressing GHGs under CEQA (CAPCOA, 2008). This resource guide was prepared to support local governments as they develop their programs and policies around climate change issues. The paper is not a guidance document. It is not intended to dictate or direct how any agency chooses to address GHG emissions. Rather, it is intended to provide a common platform of information about key elements of CEQA as they pertain to GHG, including an analysis of different approaches to setting significance thresholds.

The paper notes that for a variety of reasons, local agencies may decide not to have a CEQA threshold. Local agencies may also decide to assess projects on a case-by-case basis when the projects come forward. The paper also discusses a range of GHG emission thresholds that could be used. The range of thresholds discussed includes a GHG threshold of zero and several non-zero thresholds. Non-zero thresholds include percentage reductions for new projects that would allow the state to meet its goals for GHG emissions reductions by 2020 and perhaps 2050. These would be determined by a comparison of new emissions versus business as usual emissions and the reductions required would be approximately 30 percent to achieve 2020 goals and 90 percent (effectively immediately) to achieve the more aggressive 2050 goals. These goals could be varied to apply differently to a new project, by economic sector, or by region in the state.

Other non-zero thresholds are discussed in the paper, including:

- 900 metric tons/year CO_2e (a market capture approach);
- 10,000 metric tons/year CO_2e (potential CARB mandatory reporting level with Cap and Trade);
- 25,000 metric tons/year CO_2e (the CARB mandatory reporting level for the statewide emissions inventory);
- 40,000 to 50,000 metric tons/year CO_2e (regulated emissions inventory capture – using percentages equivalent to those used in air districts for criteria air pollutants),
- Projects of statewide importance (9,000 metric tons/year CO_2e for residential, 13,000 metric tons/year CO_2e for office project, and 41,000 metric tons/year CO_2e for retail projects), and
- Unit-based thresholds and efficiency-based thresholds that were not quantified in the report.

Local Jurisdictions

The CARB has delegated much of its air pollution control authority to local air pollution control districts (APCDs) and air quality management districts (AQMDs). California's 15 air basins are identified in **Figure 5-1**. For some air basins covering more than one county, a unified air district has been formed to manage air quality issues throughout the basin. In other multicounty air basins, individual county air districts manage air quality in only their county. Individual air districts or groups of air districts prepare air quality management plans designed to bring an air basin into compliance for nonattainment criteria pollutants. Those plans are submitted to the CARB for approval and usually contain an emissions inventory and a list of rules proposed for adoption. The project would not preempt or supersede the authority of local agencies to prohibit, restrict, or control air pollutant sources subject to those agencies' control.

5.2 Impacts and Mitigation Measures

Approach and Methods

Criteria Pollutants

Construction and operations of AD facilities would result in criteria pollutant emissions. Construction of AD facilities would produce emissions of PM10 and PM2.5 from fugitive dust primarily during earthmoving activities, as well as construction equipment and haul truck exhaust emissions of ROG, NOx, PM10, PM2.5, CO, and CO_2. Implementation of standard best management practices would reduce the potential for air quality violations from construction of digester facilities. In regards to criteria air pollutant emissions for the operation of anaerobic digesters, additional sources and emissions would include any diesel equipment on-site for pre-processing, increased traffic on the local and regional roadway network, and the post processing of the biogas. These impacts are discussed and mitigation measures are identified below in Impact 5.1. Finally, regional cumulative criteria pollutant impacts are discussed in Impact 5.5. Notably, due to the uncertainties associated with this programmatic assessment, such as potential size and locations of potential facilities, as well as pertinent jurisdictional AQMD or APCD thresholds of significance that would apply to the AD facilities, these impacts are discussed on a qualitative basis.

Odors

Due to the collection, transport, storage, and pre-processing activities of the potentially odiferous organic substrates for digestion and resultant digestates, the siting of these AD facilities could lead to objectionable odors at off-site receptors in the vicinity of an AD facility. This impact is discussed and mitigation measures are identified below in Impact 5.2.

Toxic Air Contaminants

Since accurate quantification of health risks requires detailed site specific information which is not available on a programmatic level, health risk impacts are discussed qualitatively below in Impact 5.3. This includes a description of general methodology, risk models, TAC sources, and potential mitigation measures.

Greenhouse Gases

The development of AD facilities could result in changes in temporary, short-term, and operation-related (long-term) emissions of GHGs. Similar to several other resource areas, there are no adopted quantitative statewide guidelines (significance thresholds) for GHG emission impacts. Lead agencies should develop methods to analyze the impact of GHG in CEQA review documents. This project would be considered to have a significant impact if it would be in conflict with the AB 32 State goals for reducing GHG emissions. It is assumed that AB 32 will be successful in reducing GHG emissions and reducing the cumulative GHG emissions statewide by 2020. Therefore, the project has been reviewed to determine whether it would conflict with the goals of AB 32. This impact is discussed below in Impact 5.4.

Thresholds of Significance

CEQA defines a significant effect on the environment as a substantial, or potentially substantial, adverse change in the physical conditions of the area affected by the project. According to Appendix G of the CEQA Guidelines, a project would have a significant effect on air quality or associated with GHG if it would:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any non-attainment pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations;
- Create objectionable 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 an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG.

The following discussion of environmental impacts is limited to those potential impacts that could result in some level of potentially significant environmental change, as defined by CEQA. However, consistent with the CEQA Guidelines for a program-level EIR (CEQA Guidelines §15168), as individual AD facilities are proposed, the lead agency will examine these individual projects to determine whether their construction and operational effects were fully analyzed in this Program EIR. Future review of individual AD facilities may require additional site-specific CEQA review, including site specific air quality studies that could include further modeling (e.g., AERMOD) or analysis of these particular air quality impacts on a project-by-project basis.

Impact Analysis

Impact 5.1: Construction and operations of AD facilities within California would result in emissions of criteria air pollutants at levels that could substantially contribute to a potential violation of applicable air quality standards or to nonattainment conditions. (Significant)

Construction

Construction related emissions for AD facilities would arise from a variety of activities, including: (1) grading, excavation, road building, and other earth moving activities; (2) travel by construction equipment and employee vehicles, especially on unpaved surfaces; (3) exhaust from construction equipment; (4) architectural coatings; and (5) asphalt paving.

Construction-related fugitive dust emissions would vary from day to day, depending on the level and type of activity, silt and clay content of the soil, and the weather. In the absence of mitigation, construction activities may result in significant quantities of dust, and as a result, local visibility and PM10 concentrations may be adversely affected on a temporary and intermittent basis during construction. In addition, the fugitive dust generated by construction would include not only PM10, but also larger particles, which would fall out of the atmosphere within several hundred feet of the site and could result in nuisance-type impacts.

Construction equipment and construction-worker commute vehicles would also generate criteria air pollutant emissions. Criteria pollutant emissions of ROG and NOx from these emissions sources would incrementally add to regional atmospheric loading of ozone precursors during the construction period.

Although construction activities would be short-term in duration, due to the uncertainties regarding size and locations of potential facilities, as well as pertinent jurisdictional AQMD or APCD thresholds of significance that would apply to the AD facilities, digester construction activities are considered potentially significant prior to mitigation. Mitigation measures have been incorporated below to determine if emissions would be significant on a project specific level and control strategies to reduce these emissions.

Operations

Emissions associated with digester operations would depend on several factors, such as the size and type of AD facility (e.g., one-stage or two-stage continuous systems, batch systems, wet or dry processes), any equipment needed for pre-processing, the increased traffic on the local and regional roadway network (including additional waste haul trucks and employees), and the post processing of the biogas (e.g., flaring of excess biogas, combusting for electricity, or cleaning up biogas for use as a transportation fuel or injection to utility transmission lines). Operational sources of fugitive dust would primarily be processing equipment and truck movement over paved and unpaved surfaces. In addition, non-methane VOCs released from pre-digested substrate materials during the receipt and pre-processing activities at AD facilities would not be a regional change but could result in increased localized emissions. Although there will be emissions associated with these sources at AD facilities, the operation of these facilities would divert organics out of landfills. By doing so, there would be less activity at the landfill, such as potentially fewer pieces of off-road equipment and a potential decrease in the vehicle miles traveled (VMT) for haul trucks. The AD facilities could also generate biogas to replace fossil fuels for electricity production or for vehicle transportation. However, quantification of operational emissions is too speculative on this statewide programmatic level since there are too many unknown localized variables and operational considerations. Project-by-project analysis will be able to obtain specific information, such as landfill and AD facility distances to the applicable solid waste centroid (for VMT), operating information for the landfill that organics are being diverted from (i.e., equipment operations, methane capture rate and end use of the biogas), as well as individual AD facility operating characteristics (i.e., organics throughput, equipment, biogas usage), which will be evaluated to develop an informative emissions inventory.

Due to the uncertainties underlying this programmatic assessment regarding the variable criteria described above for AD facility operations, as well as pertinent jurisdictional AQMD or APCD thresholds of significance that would apply to the AD facilities, digester operations are considered potentially significant prior to mitigation. Mitigation measures have been incorporated below to determine if emissions would be significant on a project specific level and to identify control strategies to reduce these emissions.

Mitigation Measures

Measure 5.1a: Applicants shall prepare and submit an Air Quality Technical Report as part of the environmental assessments for the development of future AD facilities on a specific project-by-project basis. The technical report shall include an analysis of potential air quality impacts (including a screening level analysis to determine if construction and operation related criteria air pollutant emissions would exceed applicable air district thresholds, as well as greenhouse gas (GHG) emissions and any health risk associated with toxic air contaminants (TACs) from all AD facility sources) and reduction measures. Preparation of the technical report should be coordinated with the appropriate air district and shall identify compliance with all applicable New Source Review and Best Available Control Technology (BACT) requirements. The technical report shall identify all project emissions from permitted (stationary) and non-permitted (mobile and area) sources and mitigation measures (as appropriate) designed to reduce significant emissions to below the applicable air district thresholds of significance, and if these thresholds cannot be met with mitigation, then the individual AD facility project could require additional CEQA review or additional mitigation measures.

Measure 5.1b: Applicants shall require construction contractors and system operators to implement the following Best Management Practices (BMPs) as applicable during construction and operations:

- Facilities shall be required to comply with the rules and regulations from the applicable Air Quality Management District (AQMD) or Air Pollution Control District (APCD).
- Facilities shall require substrate unloading and pre-processing activities to occur indoors within enclosed, negative pressure buildings. Collected foul air (including volatile organic compounds (VOCs) off-gassed from undigested substrates) should be treated via biofilter or air scrubbing system.
- Use equipment meeting, at a minimum, Tier II emission standards.
- Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes (as required by the state airborne toxics control measure [Title 13, §2485 of the California Code of Regulations]). Provide clear signage that posts this requirement for workers at the entrances to the site.
- Maintain all equipment in proper working condition according to manufacturer's specifications.
- Use electric equipment when possible.
- Where feasible as an alternative to internal combustion engines, which generate nitrogen oxides (NOx) emissions, use biogas from AD facilities as a transportation fuel (compressed biomethane), in fuel cells to generate clean electricity, or inject biomethane into the utility gas pipeline system. If there are other low NOx

technologies available at the time of AD facility development, these should be considered as well during the facility design process.

Impact Significance After Mitigation: Less than Significant

Implementation of Mitigation Measures 5.1a and 5.1b would ensure that BMPs are followed during construction and operational activities and that emissions associated with AD facilities to be built under this Program EIR would be reduced to a less–than-significant level.

Impact 5.2: Operation of AD facilities in California could create objectionable odors affecting a substantial number of people. (Significant)

Factors that affect odor impacts include the proposed AD facility design, sensitive receptor proximity, and exposure duration. Anaerobic digestion is the biological decomposition of organic matter in the absence of molecular oxygen. As a result, odorous compounds, such as ammonia and H_2S, are generated and could be released into the environment. The anaerobic digestion process occurs naturally in marshes, wetlands and is the principal decomposition process in landfills. However, in the operation of AD facilities, the digestion process occurs in a closed system. Volatile organic compounds are broken down through the anaerobic digestion process, and exhaust is generally processed in a more controlled environment.

However, the collection transport, storage, and pre-processing activities of the potentially odiferous organic substrates for digestion and the resultant digestate could produce nuisance odors at AD facilities. In addition, the siting of these digester facilities could lead to objectionable odors at off-site receptors in the vicinity. Mitigation measures shall be implemented in order to ensure the potential nuisance impact associated with odors would not affect a substantial number of people.

Mitigation Measures

Measure 5.2a: Applicants for the development of AD facilities shall comply with appropriate local land use plans, policies, and regulations, including applicable setbacks and buffer areas from sensitive land uses for potentially odoriferous processes.

Measure 5.2b: If an AD facility handles compostable material and is classified as a compostable material handling facility, the facility must develop an Odor Impact Minimization Plan (OIMP) pursuant to 14 CCR 17863.4. Otherwise, applicants shall develop and implement an Odor Management Plan (OMP) that incorporates equivalent odor reduction controls for digester operations. Odor control strategies that can be incorporated into these plans include, but are not limited to, the following:

- A list of potential odor sources.
- Identification and description of the most likely sources of odor.
- Identification of potential, intensity, and frequency of odor from likely sources.
- A list of odor control technologies and management practices that could be implemented to minimize odor releases. These management practices shall include the establishment of the following criteria:

- Require substrate haulage to the AD facility within sealed containers.
- Establish time limit for on-site retention of undigested substrates (i.e., substrates must be put into the digester within 24 hours of receipt).
- Provide enclosed, negative pressure buildings for indoor receiving and pre-processing. Treat collected foul air in a biofilter or air scrubbing system.
- Establish contingency plans for operating downtime (e.g., equipment malfunction, power outage).
- Manage delivery schedule to facilitate prompt handling of odorous substrates.
- Handle digestate within enclosed building and/or directly pump to sealed containers for transportation.
- Protocol for monitoring and recording odor events.
- Protocol for reporting and responding to odor events.

Impact Significance After Mitigation: Less than Significant

Impact 5.3: Construction and operation of AD facilities in California could lead to increases in chronic exposure of sensitive receptors in the vicinity to certain toxic air contaminants from stationary and mobile sources. (Significant)

For construction impacts, emissions of toxics can occur from site preparation and construction activities that are required for AD facilities. Large construction projects may last many months and may result in significant levels of DPM emissions and possibly resulting in long-term significant health risks. The nearest sensitive receptors must be included in the modeling analysis to determine worst case impacts from construction activities.

The impacts from operation of a typical AD facility can be determined by comparing the facility's pre- and post-project emissions. For operations, air toxics emissions could include DPM from trucks that deliver substrate to the facility, or from trace amounts of air toxics (primarily H_2S and ammonia) that may be released as fugitives from the anaerobic digester or from the potential combustion or flaring of the biogas. Additional air toxics that could be generated by the combustion of biogas (either in an engine or flare) include benzene, formaldehyde, and other products of incomplete combustion.

Combustion of biogas containing H_2S generates sulfur dioxide, which can react with water to produce sulfuric acid. AD facilities typically include control technologies that convert the H_2S to sulfur, which is then removed from the gas stream in order to avoid corrosion of engine parts in the combustion chamber and in the exhaust system. In addition, ammonia may form in the anaerobic digestion process from nitrogen compounds contained in the organic substrates.

Health impacts from exposure to toxic emissions related to the AD facilities are dependent on the magnitude of concentrations that the public can be exposed to, as well as to the relative toxicities of the individual pollutants released from each type of facility. Exposure levels are determined by

carrying out dispersion modeling of estimated toxics emissions from typical proposed facility sources (described above) by using a screening model, such as the EPA model SCREEN3 (USEPA, 1995). The SCREEN3 model predicts possible worst-case impacts, by using hypothetical worst-case meteorology. For calculating more accurate impacts at site-specific facilities, the EPA model AERMOD can be used (American Meteorological Society, 2006). AERMOD uses meteorological data that is representative of the site, as well as multiple toxic emission source types, such as point, area, or volume to represent the emission sources.

For a screening analysis, cancer and non-cancer health risks can be calculated by applying algorithms given in the document published by California Office of Environmental Health Hazard Assessment (OEHHA) to calculate health risks (OEHHA, 2003). For more accurate site specific risks, AERMOD can be run in conjunction with the CARB model "Hot Spots Analysis Reporting Program" (HARP) to estimate cancer and non-cancer health risks that the public can be exposed to (CARB, 2009b). HARP uses the same toxicity values as are given in the OEHHA Risk Assessment Guidelines and incorporates multi-pathway uptake factors for the various toxic species to calculate risks.

The estimated cancer risks from AD facility emissions are then compared to the applicable AQMD or APCD significance thresholds to determine if the impacts from the scenarios evaluated might result in significant impacts to the public. In addition, Hazard Quotients are estimated for non-carcinogens in HARP to determine if the modeled exposure levels exceed established health thresholds, called Reference Exposure Levels (RELs), to test for significance. The estimated risks for the various digester scenarios can then be used to estimate health risks, and for those scenarios with unacceptable risks, mitigation measures are applied to determine if the projects can achieve acceptable health risks to the public. Due to the unknown site specific exposure and information that is needed to quantify and evaluate health risk associated with AD facilities, this impact is considered potentially significant.

Mitigation Measures

Measure 5.3a: Implement Mitigation Measures 5.1a and 5.1b.

Measure 5.3b: Based on the Air Quality Technical Report (specified in Measure 5.1a), if the health risk is determined to be significant on a project-by-project basis with diesel particulate matter (DPM) as a major contributor, then the applicants shall implement control measures such that the AD facility health risk would be below the applicable air district threshold, which may include implementation of one or more of the following requirements, where feasible and appropriate:

- Use either new diesel engines that are designed to minimize DPM emissions (usually through the use of catalyzed particulate filters in the exhaust) or retrofit older engines with catalyzed particulate filters (which will reduce DPM emissions by 85%);
- Use electric equipment to be powered from the grid, which would eliminate local combustion emissions;
- Use alternative fuels, such as compressed natural gas (CNG) or liquefied natural gas (LNG).

Measure 5.3c: Hydrogen sulfide (H_2S) contained in the biogas shall be scrubbed (i.e., via iron sponge or other technology) before emission to air can occur.

Impact Significance After Mitigation: Less than Significant

Implementation of Mitigation Measures 5.3a, 5.3b, and 5.3c would ensure that BMPs are followed during construction and operations and that TAC emissions from digester operations to be built under this Program EIR would be reduced to a less-than-significant level.

Impact 5.4: Development of AD facilities in California would reduce GHG emissions. (No Impact)

"The most common GHG that results from human activity is carbon dioxide, followed by methane and nitrous oxide" (OPR, 2008). State law defines GHG to also include hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride. These latter GHG compounds would not be expected to be emitted by AD facilities. GHG impacts are considered to be exclusively cumulative impacts; there are no non-cumulative GHG emission impacts from a climate change perspective (CAPCOA, 2008).

Four types of criterion are used to determine whether the project could conflict with the state goals for reducing GHG emissions. The analyses are as follows:

a. Any potential conflicts with the CARB's 39 recommended actions in the Climate Change Scoping Plan.
b. The relative size of the potential AD facilities. This criterion is typically applied on a project-by-project basis.
c. The general energy efficiency parameters of AD facilities to determine whether the design is inherently energy efficient.
d. Any potential conflicts with applicable City or County plans, policies, or regulations adopted for the purpose of reducing the emissions of GHGs.

With regard to Criterion A described above, the project does not pose any apparent conflict with the most recent list of the CARB early action strategies (see **Table 5-4**). In fact, an established goal of the project is the furthering of compliance with the GHG reduction measures contained in AB 32, specifically Measures E-3 (achieve a 33% renewables mix by 2020) and RW-3 (high recycling/zero waste). Anaerobic digestion produces biogas which is a renewable energy source (supports Measure E-3) and anaerobic digestion is one of the categories listed under measure RW-3.

In regards to Criterion B, GHG emissions associated with digester operations would depend on several factors, such as the size and type of AD facility, any equipment needed for pre-processing, the increased traffic on the local and regional roadway network, and the post processing of the biogas (e.g., flaring of excess biogas, combusting for electricity, or cleaning up biogas for use as a transportation fuel or injection into natural gas utility transmission lines). Although there will be emissions associated with these sources at AD facilities, the operation of these facilities would divert organics out of landfills. By doing so, there would be less activity at the landfill, such as potentially

fewer pieces of off-road equipment and a potential decrease in the vehicle miles traveled (VMT) for haul trucks. The AD facilities could also generate biogas to replace fossil fuels for electricity production or for vehicle transportation. Notably, several studies have projected reductions in GHGs by the diversion of organics into AD facilities (DiStefano and Belenky, 2009; Haight, 2005). Results and potential applicability drawbacks of these studies are described below.

The emission estimates presented below are based on life-cycle analyses and depict potential CO_2 equivalents (CO_2e) reductions in comparison to landfill processes by the capture and combustion of methane in biogas and subsequent electricity displacement due to on-site generation. As presented in the *Life-Cycle Analysis of Energy and Greenhouse Gas Emissions from Anaerobic Biodegradation of Municipal Solid Waste* (DiStefano and Belenky, 2009), construction of each AD facility would result in approximately 10,750 metric tons of CO_2e. Key assumptions included in this article, which studied the energy requirements and GHG emissions associated with current landfilling of municipal solid waste (MSW) in comparison to potential MSW digestion in AD facilities for the whole United States, included an average AD facility size of 50,000 tons MSW to be processed per year. The analysis included emissions associated with the collection and transport of MSW to AD facilities, transport of rejected MSW and associated landfill operations, production of biogenic methane, transport of digestate to landfills, construction of AD facilities, and operation of AD facilities (assumed to be dry single-stage thermophilic reactors with electricity generation from the biogas). In summary, the article found that AD systems would result in an approximate 57,480 metric ton to 60,236 metric ton CO_2e reduction (depending on if the electricity displaced natural gas or coal, respectively) per AD facility versus landfilling of the MSW. In addition, the study *Assessing the Environmental Burdens of Anaerobic Digestion in Comparison to Alternative Options for Managing the Biodegradable Fraction of Municipal Solid Waste* (Haight, 2005), found that AD systems for processing 108,322 tons of organic MSW would result in a reduction of 121,908 metric tons CO_2e per year versus landfilling. The following California specific assumptions could impact the findings of these studies in terms of applicability to this programmatic assessment:

- Several California test facilities have described variable methane potential for organic substrates, which was not accounted for in the above studies;
- The above studies did not encapsulate the full spectrum of facility types that could be developed in California (i.e., wet systems, mesophilic systems, batch systems, etc.);
- The above studies did not analyze all potential uses of the solids portion of digestate that are covered in this programmatic assessment (i.e., aerobically composted, used as a soil amendment, alternative daily cover, etc.);
- The above studies did not analyze all potential uses of the biogas that are covered in this programmatic assessment (i.e., flaring of excess biogas, combusting for electricity, or cleaning up biogas for use as a transportation fuel or injection to utility transmission lines)
- California's energy grid mix differs from the assumptions in the above studies;
- CARB estimates a 75 percent landfill gas collection efficiency for California, which matches the DiStefano and Belenky study, but is greater than the assumption of 50 percent collection in the Haight study;
- The Haight study assumes all organics in the MSW are appropriate for AD. However, in California, about 50 percent of current disposal is organic waste and less than half of this is appropriate for AD;

- Landfill carbon sequestration is not considered an emission offset, which was not discussed in the above studies.

Due to the many unknown variables and operational considerations associated with quantification of GHGs on a statewide programmatic level, GHG emissions determination is too speculative at this juncture. Project-by-project analysis (as required in Mitigation Measure 5.1a) will be able to obtain specific information, such as landfill and AD facility distances to the applicable solid waste centroid (for VMT), operating information for the landfill (i.e., equipment operations, methane capture rate and usage) that organics are being diverted from, as well as individual AD facility operating characteristics (i.e., organics throughput, equipment, biogas usage), which will be evaluated to develop an informative GHG inventory.

With respect to GHG analysis Criterion C, biogas generated through the anaerobic digestion process is captured in the digester and can be combusted in a flare, used directly in internal combustion engines to produce electricity and heat, or the biogas can be upgraded to biomethane through the removal of hydrogen sulfide, CO_2, and moisture. Biomethane can be used in place of natural gas for various processes, including use by utility companies if the biomethane is upgraded to utility standards and pumped into a natural gas supply pipeline, as well as for electrical generation, heating, and for natural gas-fueled vehicles. Thus, development of AD facilities would result in an inherently efficient and renewable source of energy.

Finally, with regard to Criterion D, digester development and operations would be expected to comply with applicable City or County plans, policies, or regulations adopted for the purpose of reducing the emissions of GHGs. As described for Criterion A, the Program would directly support several GHG reduction measures contained in AB 32 (increased renewables mix and high recycling/zero waste), which would also be beneficial in meeting any local jurisdiction reduction goals.

Mitigation Measures

Measure 5.4: Implement Mitigation Measure 5.1a.

Impact Significance After Mitigation: Less than Significant.

Based upon the analysis of Criteria A, B, C and D presented above, development of AD facilities would support the CARB early action strategies, may result in a net decrease in GHG emissions, would result in an inherently efficient and renewable source of energy, and would be expected to comply with any applicable City or County plans, policies, or ordinance/regulations to reduce GHG emissions. With implementation of Mitigation Measures 5.1a, which will assess GHG emissions on a project-by-project basis to ensure compliance with the applicable air district thresholds and/or guidance and incorporate further emission mitigation if required, the development of AD facilities would not result in a cumulatively considerable increase in GHG emissions and would not impair the State's ability to implement AB 32.

Impact 5.5: Development of AD facilities in California, together with anticipated cumulative development in the area, would contribute to regional criteria pollutants. (Significant)

CEQA requires that the EIR examine cumulative impacts. As discussed in CEQA Guidelines §15130(a)(1), a cumulative impact "consists of an impact which is created as a result of the combination

of the project evaluated in the EIR together with other projects causing related impacts." The analysis of cumulative impacts need not provide the level of detail required of the analysis of impacts from the project itself, but shall "reflect the severity of the impacts and their likelihood of occurrence" (CEQA Guidelines §15130(b)). A cumulative impact occurs when two or more individual effects, considered together, are considerable or would compound or increase other environmental impacts. Cumulative impacts can result from individually minor but collectively significant impacts, meaning that the project's incremental effects are considerable when viewed in connection with the effects of past, current, and probable future projects. Notably, any project that would individually have a significant air quality impact would also be considered to have a significant cumulative air quality impact.

Additional sources of criteria pollutant emissions associated with AD facility operations would include any additional diesel equipment on-site for pre-processing, increased traffic on the local roadway network (though for AD facilities co-located at a solid waste facility, there would be no net increase in traffic as the organics would be transported there already), and the post processing of the biogas. Although AD facility operations would result in air pollutant emissions from these sources, AD facilities would also divert organics from landfills. By doing so, there would be less activity at the landfill, such as potentially fewer pieces of off-road equipment and a potential decrease in the VMT for haul trucks. The AD facilities could also generate biogas to replace fossil fuels for electricity production or for vehicle transportation. Other land development projects, industrial projects, and the increase in air quality emissions resulting from activities associated with population growth would also contribute to an increase in air quality emissions. Individual air districts classified as nonattainment areas for the state or federal ozone or federal PM10 ambient standards are required to prepare state implementation plans (SIPs) and air quality management plans (AQMPs) showing how they will come into compliance with the ambient standards. AQMPs include policies to reduce air emissions from industrial operations, auto and truck exhaust, increases in population, and other activities that could result in increased air emissions. This-cumulative impact is considered less than significant because AQMPs include policies aimed at reducing emissions and direct air quality impacts would be reduced to a less-than-significant level with implementation of mitigation.

Mitigation Measure

Measure 5.5: Implement Mitigation Measures 5.1a and 5.1b.

Impact Significance After Mitigation: Less than Significant

Implementation of Mitigation Measure 5.5 would ensure that BMPs are followed during operational activities at all AD facilities to be developed under this Program EIR. In addition, because the jurisdictionally appropriate SIPs and AQMPs describe the measures that would be used to reduce emissions (from vehicular and non-vehicular sources) and to attain the ambient standards, cumulative development under this Program would be considered less than significant.

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CHAPTER 6
Hydrology and Water Quality

6.1 Environmental Setting

The following text provides an overview of the environmental setting for the project, as relevant to surface and groundwater supply and quality.

Surface Water

California's surface water resources are diverse and varied, ranging from large and long-reaching perennial rivers in the north and central areas of the state, to primarily intermittent waterways along much of the southern coast, to desert washes and dry lakes in the inland east and south. Major waterways include the Trinity River system which drains the northern reaches of California's Coastal Range and the southern Cascades; the Sacramento-San Joaquin River system, which is the largest river system in the state and which drains the southern tip of the Cascade Range, the western Sierra Nevada, the eastern Coastal Range, and the Central Valley; and the Colorado River, which flows along California's eastern border and into Mexico. There are many smaller perennial and intermittent waterways that drain California's seaboard and the eastern slope of the Sierras.

Northern portions of the state generally receive substantially more precipitation than southern portions of the state. Snowpack in the Sierra Nevada and the southern Cascades serves as a significant reservoir for water storage. Snowpack accumulates over the winter and early spring months, and gradually melts in the late spring and summer, feeding surface flows, filling reservoirs, and recharging groundwater. Captured snowmelt, especially east and north of the Central Valley, is highly managed, and is released from reservoirs to supply regional agriculture and urban needs, and to provide water for export to other areas of the state.

Water from the Sacramento-San Joaquin Delta is pumped from Clifton Court into a network of aqueducts and reservoirs that supply water to Central and Southern California for agricultural and urban uses. Other state, federal, and local water projects provide water to specific cities or areas. Such projects include diversions from the Sierra Nevada to the San Francisco Bay Area, from the Owens Valley to Los Angeles, and from the Colorado River to the Imperial Valley and San Diego. Other water projects provide surface water supply to Santa Barbara, Blythe, San Luis Obispo, the northern San Francisco Bay Area, Vacaville, and other urban areas.

In recent decades, California's natural and engineered water systems have come under increasing demand pressure, in an attempt to meet urban, agricultural, industrial, and environmental water

requirements. During dry years it is almost impossible to meet the needs of all water users, and recent droughts have resulted in reductions in water supplied for urban, environmental, and agricultural uses.

Groundwater

Groundwater is used extensively in many areas of the state to support urban, agricultural, and industrial users, especially in areas where surface water supplies are limited, or infrastructure for the delivery of surface water is lacking. Such areas include California's Central Valley, the southern portion of the San Francisco Bay Area, the greater Los Angeles area, and the inland desert areas of southern California.

California's major aquifers have been delineated by the California Department of Water Resources (DWR, 2003). Additional minor aquifers are scattered across the state; these minor aquifers are smaller in extent and contain less water than the aquifers delineated by DWR. However, these minor aquifers are frequently important localized sources of water, and are used for rural residential supply, grazing and farming, and, to a limited extent, for municipal water supply.

Groundwater overdraft has been a significant problem in California for many decades. In some portions of the southern half of the Central Valley, groundwater levels have been historically depleted on the order of 3 to 6 feet per year. Although state and local agencies are collaborating to reduce groundwater overdraft in many areas of the state, workable and realistic solutions are difficult to develop. As a result, groundwater overdraft is expected to continue for decades across the Central Valley, the Bay Area, southern desert areas, and several other areas. Over an extended period of time, extensive groundwater overdraft can result in irreversible land subsidence as depleted aquifers compact. Areas of significant land subsidence are characterized by reduced aquifer capacity and lowered land surfaces relative to historic conditions.

Water Quality

Surface water quality in California is highly variable, and ranges from very high quality lakes and streams in the Sierra Nevada and Cascade mountains and in remote or undeveloped areas, to highly-polluted drainage courses that carry municipal, agricultural, and industrial wastewater. The New River, the most polluted river in the United States, flows across the Mexico-United States border and into California, carrying with it municipal and industrial pollutants that include fecal bacteria, heavy metals, pesticides, and other toxic substances. Intermediate to these two extremes are waterways from which California's inhabitants, farmers, and industry get much of their water supply.

Groundwater quality is also highly variable both by geographical area and by depth within an area. High-quality groundwater exists in the Sierra Nevada, Cascades, and along the eastern side of the Central Valley, but is in aquifers of limited extent. High-quality groundwater also exists in other locations around the state that have limited agricultural and urban development. Groundwater across much of the Coastal Range and western flank of the southern Central Valley, and southern deserts often have high levels of naturally-occurring salts and metals that make the water unfit for

many uses. In areas with extensive urban or agricultural activities, waste discharges have induced high levels of salts and other contaminants that make the groundwater unfit for consumption or other uses unless it is treated.

Surface water quality is affected by agricultural, urban, and industrial sources of pollution. Point sources, which are defined as specific outfalls discharging into natural waters, are easily identified and are regulated by California's Regional Water Boards and the US EPA. Nonpoint sources, including polluted runoff from urban and agricultural sources, are more challenging to identify. Nonpoint sources generally drain into a river or waterway over an extended area, or via many individual inlets. In some instances, the waterways that receive polluted runoff and wastewater discharges serve as water supply sources for downstream water users.

Major sources of groundwater pollution include historic and ongoing waste discharges, leaking underground storage tanks, and infiltration of polluted runoff from agricultural and urban areas. Nitrogen fertilizers in particular are of concern, because increased nitrate levels in groundwater exceed drinking water standards in many areas of the state. Groundwater pollution can be extremely costly and difficult to remediate.

Common classes of water quality pollutants that are regulated under state and federal regulations include inorganics, pathogens, and pesticides and other organic compounds. Inorganics include nutrients (phosphorus and various forms of nitrogen including nitrate), salts, and metals (aluminum, antimony, arsenic, copper, cyanide, lead, mercury, nickel, etc.). Pathogens include total coliforms and fecal coliforms. Pesticides include herbicides and insecticides. Other organic compounds include volatile organic compounds (VOCs), and petroleum products (fuels, oils, greases, etc.). Water quality physical parameters such as dissolved oxygen are also regulated.

Both point sources and nonpoint sources of water pollution can degrade surface water and groundwater. Water pollution is a substantial issue in many areas, from the perspective of both environmental quality and human health. Water pollutant levels in California are regulated by state agencies including the Water Boards[1] and the California Department of Health Services. As discussed in the "Regulatory Setting" section below, these agencies implement federal water quality and drinking water quality requirements under the Clean Water Act, the Safe Drinking Water Act, and various state-level laws and regulations.

Regulatory Requirements

The Water Boards generally regulate point source waste discharges using National Pollutant Discharge Elimination System (NPDES) permits and Waste Discharge Requirement (WDR) orders. The Water Boards address nonpoint source discharges by mandating the use of best management practices (BMPs) and/or by establishing Total Maximum Daily Loads pursuant to the Clean Water Act. The relevant federal and state laws and regulations are discussed below.

1 The Water Boards consist of the State Water Resources Control Board (State Water Board) and nine Regional Water Quality Control Boards (regional boards)

Federal

Clean Water Act

The federal Clean Water Act (CWA) established the basic structure for regulating discharges of pollutants into "waters of the United States." The act specifies a variety of regulatory and non-regulatory tools to sharply reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff. The CWA includes the following sections:

- Sections 303 and 304, which provide for water quality standards, criteria, and guidelines.
- Section 401, which requires every applicant for a federal permit or license for any activity that may result in a discharge to a water body to obtain a water quality certification that the proposed activity will comply with applicable water quality standards.
- Section 402, which regulates point- and nonpoint-source discharges to surface waters through the NPDES program. In California, the State Water Board oversees the NPDES program, which is administered by the regional boards. The NPDES program provides for both general permits (those that cover a number of similar or related activities) and individual permits. Anti-backsliding requirements provided for under CWA Sections 402(o)(2) and 303(d)(4) prohibit slackening of discharge requirements and regulations under revised NPDES permits. With isolated/limited exceptions, these regulations require effluent limitations in a reissued permit to be at least as stringent as those contained in the previous permit.
- Section 404, which establishes a program to regulate the discharge of dredged and fill material into waters of the U.S., including some wetlands. Activities in waters of the U.S. that are regulated under this program include fills for development, water resource projects (e.g., dams and levees), infrastructure development (e.g., highways and airports), and conversion of wetlands to uplands for farming and forestry.

Clean Water Act Section 303(d) Impaired Waters List

Under Section 303(d) of the CWA, states are required to develop lists of water bodies that would not attain water quality objectives after implementation of required levels of treatment by point-source dischargers (municipalities and industries). Section 303(d) requires that the state develop a TMDL for each of the listed pollutants. The TMDL is the amount of loading that the water body can receive and still be in compliance with water quality objectives. The TMDL can also act as a plan to reduce loading of a specific pollutant from various sources to achieve compliance with water quality objectives. The TMDL prepared by the state must include an allocation of allowable loadings to point and nonpoint sources, with consideration of background loadings and a margin of safety. The TMDL must also include an analysis that shows the linkage between loading reductions and the attainment of water quality objectives. EPA must either approve a TMDL prepared by the state or, if it disapproves the state's TMDL, issue its own. NPDES permit limits for listed pollutants must be consistent with the waste load allocation prescribed in the TMDL. After implementation of the TMDL, it is anticipated that the problems that led to placement of a given pollutant on the Section 303(d) list would be remediated. In California, preparation and management of the Section 303(d) list is administered by the regional boards.

Section 401 Water Quality Certification or Waiver

Under Section 401 of the CWA, an applicant for a Section 404 permit (to discharge dredged or fill material into waters of the United States) must first obtain a certificate from the appropriate state agency stating that the fill is consistent with the state's water quality standards and criteria. In California, the authority to either grant water quality certification or waive the requirement is delegated by the State Water Board to the nine regional boards.

National Pollutant Discharge Elimination System Permit Program

The NPDES permit program was established by the CWA to regulate municipal and industrial discharges to surface waters of the United States. Federal NPDES permit regulations have been established for broad categories of discharges, including point-source municipal waste discharges and nonpoint-source stormwater runoff. NPDES permits generally identify the following:

- effluent and receiving-water limits on allowable concentrations and/or mass emissions of pollutants contained in the discharge;
- prohibitions on discharges not specifically allowed under the permit; and
- provisions that describe required actions by the discharger, including industrial pretreatment, pollution prevention, self-monitoring, and other activities.

In November 1990, EPA published regulations establishing NPDES permit requirements for municipal and industrial stormwater discharges. Phase 1 of the permitting program applied to municipal discharges of stormwater in urban areas where the population exceeded 100,000 persons. Phase 1 also applied to stormwater discharges from a large variety of industrial activities, including general construction activity if the project would disturb more than 5 acres. Phase 2 of the NPDES stormwater permit regulations, which became effective in March 2003, required that NPDES permits be issued for construction activity for projects that disturb between 1 and 5 acres. Phase 2 of the municipal permit system (known as the "NPDES General Permit for Small MS4s") required small municipal areas of less than 100,000 persons to develop stormwater management programs.

In California, the USEPA has delegated its NPDES permitting functions to the State Water Board (state board) and the regional boards.

Executive Order 11988 and the Federal Emergency Management Agency

Under Executive Order 11988, the Federal Emergency Management Agency (FEMA) is responsible for management of floodplain areas. FEMA administers the National Flood Insurance Program (NFIP) to provide subsidized flood insurance to communities that comply with FEMA regulations limiting development in floodplains. FEMA also issues Flood Insurance Rate Maps (FIRMs) that identify which land areas are subject to flooding. These maps provide flood information and identify flood hazard zones in the community. The design standard for flood protection is established by FEMA, with the minimum level of flood protection for new development determined to be the 1-in-100 annual exceedance probability (AEP) (i.e., the 100-year flood event). Specifically, where levees provide flood protection, FEMA requires that the levee crown have 3 feet of freeboard above the 1-in-100 AEP water surface elevation, except in the vicinity of a structure such as a

bridge, where the levee crown must have 4 feet of freeboard for a distance of 100 feet upstream and downstream of the structure.

Federal Antidegradation Policy

The federal antidegradation policy, established in 1968, is designed to protect existing uses and water quality and national water resources. The federal policy directs states to adopt a statewide policy that includes the following primary provisions:

- Existing in-stream uses and the water quality necessary to protect those uses shall be maintained and protected.
- Where existing water quality is better than necessary to support fishing and swimming conditions, that quality shall be maintained and protected unless the state finds that allowing lower water quality is necessary for important local economic or social development.
- Where high-quality waters constitute an outstanding national resource, such as waters of national and state parks, wildlife refuges, and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.

National Toxics Rule

For 14 states, including California, the National Toxics Rule promulgates chemical-specific numeric criteria for priority toxic pollutants as needed to bring all states into compliance with the requirements of section 303(c)(2)(B) of the CWA. States determined by EPA to fully comply with section 303(c)(2)(B) requirements are not affected by this rule, however California is not in compliance.

The rule addresses two situations. For a few states, EPA is promulgating a limited number of criteria which were previously identified as necessary in disapproval letters to such states, and which the state has failed to address. For other states, Federal criteria are necessary for all priority toxic pollutants for which EPA has issued section 304(a) water quality criteria guidance and that are not the subject of approved state criteria. When these standards take effect, they will be the legally enforceable standards in the affected states for all purposes and programs under the CWA, including planning, monitoring, NPDES permitting, enforcement and compliance.

Safe Drinking Water Act

Under the Safe Drinking Water Act (SDWA) (Public Law 93-523), passed in 1974, the US EPA regulates contaminants of concern to domestic water supply. Contaminants of concern relevant to domestic water supply are defined as those that pose a public health threat or that alter the aesthetic acceptability of the water. These types of contaminants are regulated by EPA primary and secondary Maximum Contaminant Levels (MCLs) that are applicable to treated water supplies delivered to the distribution system. MCLs and the process for setting these standards are reviewed triennially. Amendments to the SDWA enacted in 1986 established an accelerated schedule for setting MCLs for drinking water. EPA has delegated to the California Department of Public Health (CDPH; formerly the Department of Health Services) the responsibility for administering California's drinking-water program. CDPH is accountable to EPA for program implementation and for adopting standards and regulations that are at least as stringent as those developed by EPA. The applicable state

primary and secondary MCLs are set forth in Title 22, Division 4, Chapter 15, Article 4 of the California Code of Regulations.

State

California State Nondegradation Policy

In 1968, as required under the federal antidegradation policy described above, the State Water Board adopted Resolution No. 68-16 a "Statement of Policy with Respect to Maintaining High Quality of Waters in California." Resolution 68-16 states that the disposal of wastes into state waters shall be regulated to achieve the highest water quality consistent with maximum benefit to the people of the state and to promote the peace, health, safety, and welfare of the people of the state, and provides as follows:

1. "Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies."
2. "Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained."

California Toxics Rule

In May 2000, the State Water Board adopted and EPA approved the California Toxics Rule, which establishes numeric water quality criteria for approximately 130 priority pollutant trace metals and organic compounds. The State Water Board subsequently adopted its State Implementation Policy of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries (SIP). The SIP outlines procedures for NPDES permitting for toxic-pollutant objectives that have been adopted in Basin Plans and in the California Toxics Rule.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act[2] (Division 7 of the California Water Code) established the State Water Board and divided the state into nine regions, each overseen by a regional board. The nine regional boards have the primary responsibility for the coordination and control of water quality within their respective jurisdictional boundaries. Pursuant to the Porter-Cologne Water Quality Control Act, the regional boards establish water quality objectives for the purpose of protecting beneficial uses. The Act recognizes that water quality may be changed to some degree without unreasonably affecting beneficial uses. Designated beneficial uses, together with the corresponding water quality objectives, constitute water quality standards under the federal CWA. Therefore, the

[2] http://www.swrcb.ca.gov/laws_regulations/docs/portercologne.pdf

water quality objectives form the regulatory references for meeting state and federal requirements for water quality control.

Under authority of the Porter-Cologne Water Quality Control Act, the regional boards require persons who discharge or propose to discharge waste that could affect the quality of waters of the State to file a Report of Waste Discharge with the appropriate RWQCB. The regional board then issues or waives WDRs for the discharge or requires the discharger to enroll under a general NPDES Order or general WDR order.

State Water Resources Control Board

Created by the California State Legislature in 1967, the State Water Board holds authority over water resources allocation and water quality protection within the state. The five-member State Water Board allocates water rights, adjudicates water right disputes, develops statewide water protection plans, establishes water quality standards, and guides the nine regional water boards. The mission of State Water Board is to, "preserve, enhance, and restore the quality of California's water resources, and ensure their proper allocation and efficient use for the benefit of present and future generations."

Regional Water Boards

The nine regional water boards in California maintain jurisdiction over water quality within their regions. Each regional board is responsible for supporting the development of NPDES permits within their region, and for defining and enforcing water quality limitations for specific waters within their domain. Each of the regional boards has prepared water quality control plans (commonly referred to as Basin Plans) for relevant large scale watersheds or basins within its purview. These plans identify the existing and potential beneficial uses of waters of the State and establish water quality objectives to protect these uses. The basin plans also contain implementation, surveillance, and monitoring plans. Statewide and regional water quality control plans include enforceable prohibitions against certain types of discharges, including those that may pertain to nonpoint sources. Basin plans also establish beneficial uses and their corresponding water quality objectives, in order to meet state and federal regulatory criteria for water quality standards. As such, California's basin plans serve as regulatory references for meeting both State and federal requirements for water quality control (40 CFR Parts 130 and 131).

Waste Discharge Requirements (WDRs)

California's regional boards also oversee permitting as authorized under the Porter-Cologne Water Quality Control Act. If a project does not require federal permitting, it may still require a state permit. Found in Division 7 of the California Water Code, the Porter-Cologne Act requires persons who discharge waste that could affect the quality of waters of the State to file a Report of Waste Discharge with the appropriate regional board. Each regional board can adopt WDR General Orders (GOs) or individual WDR orders to regulate such discharges, and a given discharger will be subject to Waste Discharge Requirements (WDRs) either under a GO or a project specific state permit. WDRs usually include discharge prohibitions and discharge specifications including flow volumes and water quality constituent limitations to which a discharger must adhere. WDRs usually impose water quality monitoring requirements, and may require liner systems or other engineered features.

The limitations imposed by WDRs vary from region to region and from project to project, depending upon proposed discharge characteristics, and sensitivities of affected resources. In this manner, WDRs protect waters of the State from significant water quality degradation. Alternatively, if no degradation of water quality is anticipated from a proposed discharge, the regional board may issue a conditional waiver of WDRs.

Construction Stormwater NPDES Permit

The federal CWA prohibits discharges of stormwater from construction projects unless the discharge is in compliance with an NPDES permit. The State Water Board is the permitting authority in California and adopted a statewide General Permit for Stormwater Discharges Associated with Construction Activity (Order No. 99-08) for construction projects that disturb one or more acres of soil. Effective July 1, 2010 all dischargers are required to obtain coverage under the updated Construction General Permit Order 2009-0009-DWQ (the Construction General Permit), adopted on September 2, 2009. Construction activities include clearing, grading, excavation, stockpiling, and reconstruction of existing facilities (removal or replacement).

In general, the Construction General Permit requires that the landowner and/or contractor submit a notice of intent (NOI) and develop and implement a storm water pollution prevention plan (SWPPP). It is the responsibility of the landowner to obtain coverage under the Construction General Permit prior to commencement of construction activities. To obtain coverage, the landowner must file an NOI with a vicinity map and the appropriate fee to the State Water Board. The NOI requirements of the Construction General Permit are intended to establish a mechanism which can be used to clearly identify the responsible parties, locations, and scope of operations of dischargers covered by the Construction General Permit and to document the discharger's knowledge of the requirements for a SWPPP.

The Construction General Permit requires a risk-based permitting approach, dependent upon the likely level of risk imparted by a project. The Construction General Permit contains several additional compliance items, including (1) additional mandatory BMPs to reduce erosion and sedimentation, which may include incorporation of vegetated swales, setbacks and buffers, rooftop and impervious surface disconnection, bioretention cells, rain gardens, rain cisterns, implementation of pollution/sediment/spill control plans, training, and other structural and non-structural actions; (2) sampling and monitoring for non-visible pollutants; (3) effluent monitoring and annual compliance reports; (4) development and adherence to a Rain Event Action Plan; (5) requirements for the post-construction period; (6) numeric action levels and effluent limits for pH and turbidity; (7) monitoring of soil characteristics on site; and (8) mandatory training under a specific curriculum. Under the updated permit, BMPs will be incorporated into the compliance action and monitoring requirements for each development site, as compared to the existing permit, where specific BMPs are implemented via a SWPPP. Under the updated permit, a SWPPP would be reviewed by the State Water Board.

California Department of Public Health Drinking Water Regulations

CDPH serves as the primary responsible agency for drinking water regulations. CDPH must adopt drinking water quality standards at least as stringent as federal standards, and may also regulate

contaminants to more stringent standards than U.S. EPA, or develop additional standards. CDPH regulations cover over 150 contaminants, including microorganisms, particulates, inorganics, natural organics, synthetic organics, radionuclides, and DBPs. The specific regulations promulgated by CDPH, in coordination with the U.S. EPA, are summarized in **Table 6-1**.

TABLE 6-1
FEDERAL AND STATE DRINKING WATER REGULATIONS

Regulation	Promulgation Year	Contaminants Regulated
National Interim Primary Drinking Water Regulations	1975–1981	Inorganics, Organics, Physical, Radioactivity, Bacteriological
National Secondary Drinking Water Regulations	1979	Inorganics, Color, Corrosivity, Odor, Foaming Agents
Phase I Standards	1987	VOCs
Phase II Standards	1991	VOCs, SOCs, IOCs
Phase V Standards	1992	VOCs, SOCs, IOCs
Surface Water Treatment Rule	1989	Microbiological and Turbidity
Total Coliform Rule	1989	Microbiological
Lead and Copper Rule	1991 / 2003	Lead, Copper
Drinking Water Source Assessment and Protection Program	1996	Source Water Protection
Information Collection Rule	1996	Microbiological and Disinfectants / DBPs
Stage 1 Disinfectants/Disinfection Byproducts Rule	1998	Disinfectants / DBPs, Precursors
Interim Enhanced Surface Water Treatment Rule	1998	Microbiological, Turbidity
Unregulated Contaminant Monitoring Rule	1999	Organics, Microbiological
Radionuclides Rule	2000	Radionuclides
Arsenic Rule	2001	Arsenic
Filter Backwash Rule	2002	Microbiological, Turbidity
Drinking Water Candidate Contaminant List	2003	Chemical, Microbiological
Stage 2 Microbiological and Disinfection Byproducts Rules	2006	Microbiological and Disinfectants / DBPs
Secondary Maximum Contaminant Levels	2006	Metals, Color, Foaming Agents, MTBE, Odor, Thiobencarb, Turbidity, TDS, and Anions
Primary MCL for Perchlorate	2007	Perchlorate
Interim Enhanced Surface Water Treatment Rule	2008	Microbiological and Turbidity

DBP = Disinfection by-product
IOC = Inorganic Compound
MCL = Maximum Contaminant Level
MTBE = methyl tertiary-butyl ether
SOC = Synthetic Organic Compound
TDS = Total Dissolved Solids
VOC = Volatile Organic Compound

6.2 Impacts and Mitigation Measures

Approach and Methods

The evaluation of impacts and mitigation measures was performed in light of current conditions in the project area, applicable regulations and guidelines, and typical construction activities and operations of anaerobic digester(AD) facilities including pre-processing and post-processing operations. In

determining the level of significance, the analysis assumed that the AD facilities would comply with relevant federal, state, and local ordinances and regulations. As discussed in Chapter 2, Project Description, the project does not consider dairy manure co-digesters or co-digesters at wastewater treatment plants (WWTP).

Disposal of digestate would in many cases require acquisition of WDRs, as discussed throughout the impact analysis below. However, some AD facilities may be installed on site at a location/facility that already maintains active WDRs. Pre-existing WDRs have a variety of site-specific requirements and are not considered in detail in the ensuing impact analysis. However, installation of new AD facilities at a facility where existing WDRs are already applicable, could require modification to the existing WDRs or require obtaining new WDRs for new waste discharges.

Thresholds of Significance

The significance criteria for this analysis were adapted from criteria presented in Appendix G of the CEQA Guidelines. The project would result in a significant impact if it would:

- Violate any water quality standards or waste discharge requirements.
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there should be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted.
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site.
- Substantially alter the existing drainage pattern of the site or area, including through alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site.
- Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff.
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.
- Place within a 100-year flood hazard area structures which would impede or redirect flood flows.
- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.
- Inundation by seiche, tsunami, or mudflow.

Based on the scope of the project and its geographical location, the project would not result in impacts related to the following criteria. No impact discussion is provided for these topics for the following reasons:

Failure of Levee or Dam. AD facilities that would be installed under the Program EIR would not require the construction of a levee or dam, and are not anticipated to result in alteration of existing levees or dams. Therefore, no increase in potential levee or dam failure would occur.

Exposure of People or Structures to Flooding. AD facilities proposed for implementation under the Program EIR are not expected to be installed within existing flood zones. In the event that an AD facility were proposed for installation within a flood zone, the facility would be required to adhere to state and local building requirements and regulations regarding construction in flood zones, including applicable building and design restrictions, and worker safety and evacuation measures. Therefore, although some facilities may be constructed in a potential inundation area, there would be no potential impact of loss, death or injury.

Placement of Housing within a 100-Year Flood Zone. Implementation of the project would not include or result in the construction of any housing. Therefore, the project would not include or result in the construction of housing within a 100-year flood zone. No impact would occur.

Impact Analysis

Impact 6.1: Construction of AD Facilities could generate loose, erodible soils and other water quality pollutants that may impair water quality. (Less than Significant)

During site grading and construction activities related to installation of AD facilities, including pre-processing and post-processing facilities, large areas of bare soil could be exposed to erosion by wind and water for extended periods of time. Bare soil surfaces are more likely to erode than vegetated areas due to the lack of dispersion, infiltration, and retention created by covering vegetation. Soil disturbance, excavation, cutting/filling, stockpiling, and grading activities could increase erosion and sedimentation to storm drains that empty to local surface waters. Construction water quality impacts are temporary and managed through the standard, industry-accepted BMPs, which are managed and monitored by the contractor conducting the work.

For individual projects that would disturb less than one acre, the amount of disturbance required for the construction of digester facilities would be considered relatively minor, and current standard construction practices would be sufficient to reduce the potential for impacting receiving waters. Thus, AD facility construction activities that disturb less than one acre would have a less-than-significant impact on water quality.

For projects that disturb more than one acre, the proponent of the project is required to comply with the revised NPDES General Construction Permit. As discussed previously, permit requirements include the following measures or their equivalent:

- Preparation of a site-specific SWPPP;
- Preparation of hazardous material spill control and countermeasure programs;

- Sampling, monitoring, and compliance reporting for stormwater runoff;
- Development and adherence to a Rain Event Action Plan;
- Adherence to numeric action levels and effluent limits for pH and turbidity;
- Monitoring of soil characteristics;
- Mandatory training under a specific curriculum; and
- Mandatory implementation of BMPs, which could include, but would not be limited to:
    - Physical barriers to prevent erosion and sedimentation including setbacks and buffers, rooftop and impervious surface disconnection, rain gardens and cisterns, and other installations;
    - Construction and maintenance of sedimentation basins;
    - Limitations on construction work during storm events;
    - Use of swales, mechanical, or chemical means of stormwater treatment during construction, including vegetated swales, bioretention cells, chemical treatments, and mechanical stormwater filters; and
    - Implementation of spill control, sediment control, and pollution control plans and training.

Adherence to these and/or other similar BMPs would be required as a condition of the permit, and would substantially reduce or prevent waterborne pollutants from entering natural waters. The specific set of BMPs would be determined prior to initiation of construction activities of a project, and a schedule for implementation, as well as a series of monitoring and compliance measures would be developed in coordination with the permitting agency, to meet CWA standards. Therefore, additional mitigation for stormwater quality is not required to protect water quality during construction, over and above that which is required by the revised NPDES General Construction Permit.

If precautions are not taken to contain contaminants, construction could produce contaminated stormwater runoff. Runoff from construction of AD facilities would be contained at the project sites, and would not be discharged to waters of the State. In addition, hazardous materials associated with construction equipment and practices, such as fuels, oils, antifreeze, coolants, and other substances, could adversely affect water quality if spilled or stored improperly. Potential chemical releases are regulated by the regional boards, Department of Toxic Substances Control, and local agencies so that water quality is unlikely to be affected.

Mitigation: None required.

Impact 6.2: The operation of AD facilities could adversely affect surface and groundwater quality. (Significant)

The operation of AD facilities for the treatment of wastes considered under this Program EIR could cause environmental degradation of surface water and groundwater quality. Reductions in groundwater quality could occur as a result of pre-processing, post-processing, and to a lesser

extent, digestion operations. These are reviewed below. Additional discussion of the activities associated with pre-processing, digestion, and post-processing are contained in Chapter 3, Project Description.

Pre-Processing

During pre-processing, digester feedstock is separated from incoming waste streams, stored, and transported to the anaerobic digester. Feedstocks could contain high levels of organic matter, sediment, nutrients, inorganic salts, and fugitive trash. Depending on the composition of the feedstock, other potential water quality pollutants may be present in small quantities, including heavy metals, hydrocarbons, and other species. During pre-processing, wash down of equipment, feedstock wetting, and handling operations may result in the loss of a small amount of feedstock material. Pollutants associated with pre-processing operations could be accidentally released from the project site or discharged during storm events, and enter surface waters or leach into groundwater. Implementation of Mitigation Measures 6.2a and 6.2b would be required to protect water quality.

Digestion

During the digestion process, digestion occurs within tanks that are designed to prevent leakage of feedstock or digestate. Therefore, potential effects on water quality during digestion would be limited to accidental spills or accidental releases of digestate. Accidental spills could occur as a result of digestion equipment malfunction, accidental release of materials from the anaerobic digester, or spills associated with the handling of chemicals used for the digestion process. Without mitigation, such spills or accidental releases could drain into surface waters or infiltrate to groundwater, either directly or during stormwater runoff events, resulting in degradation of surface water or groundwater quality. Implementation of Mitigation Measure 6-2c would be required.

Post-Processing

During post-processing, digestate is dewatered to separate residual solids and liquids. Residual solids are then disposed in a landfill, composted, or used as soil amendment for agriculture or other beneficial use. The liquid fraction of the digestate could potentially be discharged to a municipal sewer system for treatment, treated and then discharged to either surface waters pursuant to an NPDES permit or to percolation or evaporation ponds, or used for crop irrigation or other beneficial use. Therefore, potential effects on water quality depend upon the concentration of pollutants in the liquid and solid fractions of the digestate, and in the eventual end use or disposal method that is employed for digestate handling. The potential effects are reviewed in the following text.

Residual Solids

After digestion, residual solids may contain water quality pollutants. The type and concentration of pollutants in residual solids can vary substantially depending upon the feedstock and the digestion practices. In general, residual solids are expected to contain substantial amounts of organic matter and sediment, as well as significant levels of salt, nutrients, and in some cases, heavy metals, pathogens, and toxic organic and/or inorganic pollutants. Residual solids containing high levels of

heavy metals or toxins would be required to be handled as a waste and disposed of in an appropriately managed landfill where they would not have a significant potential to adversely impact surface water or groundwater.

Composting and/or direct land application as soil amendment could be an alternative management option for residual solids. Residual solids used for composting or as a soil amendment could not contain high levels of heavy metals, or other toxins. Composting of residual solids would occur at an appropriately permitted composting facility that has undergone an environmental review, and therefore would not be likely to result in a significant increase in surface or groundwater quality pollution. However, unless properly managed, land application of residual solids and compost could adversely impact the quality of surface water and groundwater. Implementation of Mitigation Measure 6.2e would be required.

Liquid Digestate

The volume and composition of liquid digestate is expected to depend substantially on the characteristics of the anaerobic digester feedstock and, to some degree, on the type of digestion process employed. In general, liquid digestate may contain elevated levels of nutrients (nitrogen and phosphorous compounds), salts (inorganic dissolved solids), microbes (some of which may be pathogenic), heavy metals, and other organic and inorganic constituents associated with the feedstock. Liquid digestate flows having high concentrations of pathogenic microbes, heavy metals, and other toxic compounds could potentially be discharged to a municipal sewer system for further treatment, or be discharged to a lined evaporation pond. Treatment at a municipal wastewater treatment plant could reduce pollutant concentrations to levels consistent with the plant's discharge permit, and therefore would not result in a significant decrease in water quality.

Discharge to an evaporation pond would result in evaporation of the water fraction of liquid digestate, and would leave behind a slurry or solid fraction, which would include any salts, sediment, heavy metals, and other pollutants that were present in the digestate. The solid fraction would be periodically removed and disposed of in an appropriate landfill or, if appropriate, be incorporated into a soil amendments or compost. Liquid from evaporation ponds could potentially leak and adversely impact groundwater quality. To ensure that evaporation ponds would be adequately lined and groundwater adequately protected during pond operation, implementation of Mitigation Measure 6.2d would be required.

Liquid digestate that does not have substantial concentrations of nutrients, salts, heavy metals, or other pollutants that could degrade groundwater, or that has been treated to remove such constituents, could potentially be discharged to percolation ponds. Disposal of digestate via percolation ponds would require a WDR, which would impose pollutant loading limitations that would generally minimize the potential for groundwater quality pollution associated with the percolation pond. Implementation of Mitigation Measure 6.2d would be required.

Liquid digestate could be discharged to an agricultural field in support of crop production pursuant to a WDR or waiver from the relevant regional board. Liquid digestate that contains high levels of heavy metals, salts, or other pollutants could not be discharged to agricultural land without a WDR

order from the appropriate regional board. The WDR order could require that the digestate be treated to reduce such constituents to levels that would not inhibit beneficial use or threaten water quality, Implementation of Mitigation Measure 6.2e would be required. For projects implemented under this Program EIR, where liquid digestate would be land applied, additional project-level review would be required in order to determine the extent of potential water-quality impacts associated with such application.

Discharge of liquid digestate to surface waters can only occur pursuant to an NPDES permit promulgated by a regional board or by the State Water Board. Adherence to the permitting requirements for such a permit would be expected to reduce or minimize the concentration of water quality pollutants discharged to surface waters. Therefore, implementation of Mitigation Measure 6.2f would be required for all projects that would include a discharge to surface water.

Mitigation Measure

Measure 6.2a: During pre-processing, all water that contacts digester feedstock, including stormwater from feedstock handling and storage facilities and water from equipment washdown and feedstock wetting, shall be contained until appropriately disposed or utilized. Best Management Practices (BMPs) may be used to reduce loading of sediment, nutrients, trash, organic matter, and other pollutants. These BMPs may include, but are not limited to, trash grates and filters, oil-water separators, mechanical filters such as sand filters, vegetated swales, engineered wastewater treatment wetlands, settling ponds, and other facilities to reduce the potential loading of pollutants into surface waters or groundwater. All discharges of stormwater are prohibited unless covered under the General Industrial Stormwater Permit, other National Pollutant Discharge Elimination System (NPDES) permit, or are exempted from NPDES permitting requirements. The NPDES permits will generally require implementation of management measures to achieve a performance standard of best available technology economically achievable (BAT) and best conventional pollutant control technology (BCT), as appropriate. The General Industrial Stormwater Permit also requires the development of a storm water pollution prevention plan (SWPPP) and a monitoring plan, in compliance with permit requirements.[3] Other liquid and solid wastes may only be discharged pursuant to an NPDES permit or waste discharge requirement (WDR) order.

Measure 6.2b: In order to minimize the amount of fugitive trash or feedstock released to surface waters, the following measures shall be implemented. When feasible, the project proponent shall preferentially select feedstocks that contain minimal amounts of trash that could become entrained in surface water, either via direct contact with stormwater flows or via other accidental release, such as due to wind. Processing of such feedstocks may, however, be unavoidable, such as in support of an AD facility that processes MSW. Therefore, the project applicant shall ensure that (1) drainage from all feedstock loading, unloading, and storage areas is contained onsite or treated to remove trash and stray feedstock, and sediment prior to release; (2) in all feedstock loading and unloading areas, and all areas where feedstock is moved by front loaders or other uncovered or uncontained transport machinery, the applicant shall ensure that mechanical sweeping and/or equivalent trash control operational procedures are performed at least daily, during operations; and (3) the facility operator shall train all employees involved in feedstock handling so as to discourage, avoid, and minimize the release of feedstock or trash during operations.

3 For more information, please refer to: http://www.swrcb.ca.gov/water_issues/programs/stormwater/industrial.shtml

Measure 6.2c: In order to minimize water quality degradation associated with accidental spills at AD facilities, the applicant for individual projects that would be implemented under the Program EIR shall require project proponents to complete and adhere to the requirements of a Spill Prevention, Control, and Countermeasure Plan (SPCC). The SPCC shall contain measures to prevent, contain, and otherwise minimize potential spills of pollutants during facility operation, in accordance with federal, state, and local requirements. Additionally, the project applicant shall adhere to the requirements and recommendations of WDRs, which would be provided for the project by the applicable regional board. Requirements under WDRs include implementation of measures to minimize water quality degradation, including but not limited to restrictions on the concentration of water quality pollutants discharged from a proposed facility, and maximum acceptable flow volumes for a given facility.

Measure 6.2d: Any proposed discharge to a pond for an individual project would require the project applicant to acquire WDRs from the appropriate regional board. The project applicant shall ensure that all ponds and discharges to such ponds adhere to all requirements under applicable WDRs. The need for pond liners in order to protect groundwater quality would be assessed during the regional board's review of the project, and requirements for pond liners would be included in the WDRs, as warranted. If appropriate, the WDRs would impose requirements for Class II surface impoundments as presented in Title 27 of the California Code of Regulations. Requirements include, but are not limited to, groundwater monitoring, double liner systems with leachate collection, water balance, a preliminary closure plan for clean closure, seismic analysis, and financial assurances. Compliance with WDRs may require the installation of facilities such as tanks and containers to store and process the digestate, the use of filter presses, and implementation of other water quality protection practices.

Measure 6.2e: This measure would reduce potential for the movement of nutrients and other pollutants to groundwater and surface water for individual projects that would employ land application for liquid digestate or residual solids. The operators of individual projects implemented under this Program EIR shall ensure that land application of liquid digestate and/or residual solids adheres to all requirements of applicable WDRs. WDR requirements include but are not limited to, groundwater monitoring, completion of an anti-degradation analysis, and in some cases best practicable treatment and control to achieve salinity reduction in materials prior to discharge to land. WDRs would be issued by the appropriate regional board, and would consider site-specific conditions and waste characteristics, in order to determine applicable control measures and procedures that protect water quality.

Measure 6.2f: This measure would reduce the potential for water quality degradation from projects that include discharge of liquid digestate to surface waters. The applicant for individual projects implemented under this Program EIR shall ensure that the discharge of liquid digestate to surface waters adheres to all NPDES permitting recommendations and requirements, as established by the appropriate regional board. Specific measures may include, but are not limited to, limitations on discharge volumes, seasonal discharge restrictions, limitations on loading rates and/or concentrations of specific constituents, and other facility-specific water quality control measures designed to protect receiving water quality and preserve beneficial uses identified in Basin Plans.

Impact Significance After Mitigation: Less than Significant

Implementation of the prescribed mitigation would reduce the potential for water quality pollution associated with operation of AD facilities that would be implemented under this Program EIR. Specific measures and regulatory limits would be employed during the permitting process, and adherence to applicable WDRs and other permitting requirements would protect the beneficial uses of waters of the State.

Impact 6.3: AD facilities could be exposed to flooding hazards. (Significant)

Many areas of California are prone to flooding, especially low-lying portions of the Central Valley, the Sacramento-San Joaquin Delta, the Russian River Watershed, low-lying coastal areas without sufficient protection from surf and/or storms, desert washes located in California's desert areas, and additional areas where levees, dams, stormwater containment, and other flood containment infrastructure is not sufficient to protect housing and other facilities. Even areas protected by levees are susceptible to flooding in the event of high-intensity storms of long duration.

The Federal Emergency Management Agency (FEMA) provides information on flood hazard and frequency for cities and counties on its Flood Insurance Rate Maps (FIRMs).[4] FEMA identifies designated zones to indicate flood hazard potential. AD facilities proposed under this project could be located in areas that have been identified as subject to 100-year floods.[5] AD facilities, including feedstock and digestate storage areas, could be damaged if located in flood hazard areas. Workers at these facilities could also be subject to injury or death as a result of flooding hazards. Given the widespread extent of potential flooding hazards in many areas of California, the risk of flooding may not be completely unavoidable. However, protection measures and design requirements can minimize potential impacts. With implementation of Mitigation Measure 6.3, the potential impacts from flooding can be reduced to less-than-significant levels.

Mitigation Measure

Measure 6.3: Individual applicants seeking coverage under this Program EIR shall ensure that, for their proposed AD facilities including pre-processing areas, feedstock storage areas, and digestate handling facilities, are protected from FEMA-defined 100-year flood events. Design measures may include, but are not limited to: facility siting, access placement, grading, elevated foundations, and site protection such as installation of levees or other protective features.

Impact Significance After Mitigation: Less than Significant

Implementation of the prescribed mitigation would ensure that individual proposed facilities are not located within 100-year floodplains, or are sufficiently protected from 100-year flood events.

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4 FEMA FIRMs are downloadable at: http://msc.fema.gov

5 A 100-year floodplain is defined as an area calculated to have a one percent chance of flooding in any given year.

Impact 6.4: Construction of AD facilities could change drainage and flooding patterns (Significant)

Construction of AD facilities would involve operation of heavy equipment, grading, earth moving, stockpiling of spoils, and other activities that would alter existing topographic and drainage features located at sites where facility installation would occur. Compaction of soils by heavy equipment could decrease the infiltration rates for surface sediments, causing increased runoff. This could in turn result in changes to drainage located onsite and, unless properly managed, result in altered or increased flooding onsite and downstream.

Installation and operation of the proposed facilities could also result in removal or realignment of minor drainages located onsite, which in most cases would eventually be tributary to natural waters. In lieu of these existing drainages, engineered swales, retention ponds, discharge channels, stormwater drains and/or other stormwater infrastructure would be installed in order to convey stormwater from AD facilities. Unless designed and managed properly, AD facilities could result in increased ponding or flooding, onsite or downstream.

Asphalt, roofs, sidewalks, concrete surfaces, and other surfaces prevent the natural drainage and infiltration of stormwater through soil. Surface water runoff has a greater volume and rate when the site is paved or otherwise covered by an impervious surface, because surface water infiltration rates are reduced or eliminated compared to undeveloped, unpaved areas. As a result, increases in impervious surfaces result in increased surface runoff volumes and peak flow rates. These can in turn produce considerable changes to downstream hydrology, as compared to pre-development conditions, resulting in increased or exacerbated flooding on site or downstream, such as by exceeding existing or proposed drainage system capacities. These impacts would be potentially significant, and implementation of Mitigation Measure 6.4 would be required.

Mitigation Measure

> **Measure 6.4:** In order to ensure that the AD facilities would not result in detrimental increases in stormwater flow or flooding on site or downstream, the Applicant for each AD facility project shall prepare a comprehensive drainage plan (prior to construction) and implement the plan during construction. The comprehensive drainage plan shall include engineered stormwater retention facility designs, such as retention basins, flood control channels, storm drainage facilities, and other features as needed to ensure that, at a minimum, no net increase in stormwater discharge would occur during a 10-year, 24-hour storm event, as a result of project implementation. Project related increases in stormwater flows shall be assessed based on proposed changes in impervious surface coverage on site, as well as proposed grading and related changes in site topography.
>
> **Impact Significance after Mitigation:** Less than Significant.
>
> The effect of potential changes in drainage and flooding patterns would be minimized on a site-by-site basis by implementation and adherence to a comprehensive drainage plan that would in turn ensure that the AD facilities would minimize potential changes in stormwater discharge rates and minimize onsite flooding.

Impact 6.5: AD facilities could require additional water supplies resulting in depletion of groundwater. (Less than Significant)

The volume of water required to operate AD facilities, including pre-processing, digestion, and post-processing, is expected to vary widely depending upon the anaerobic digester and digester feedstock's characteristics. Generally speaking, the digestion process is enabled by substantial water content during digestion. The amount of water that would need to be added in order to support digestion activities would, however, vary primarily as a function of the type of feedstock used. For instance, very wet feedstocks, such as liquid food processing wastes, may not require any additional water to support digestion. However, drier feedstocks, such as greenwaste, may require more substantial addition of water to support digestion.

For anaerobic digesters using feedstock that requires the addition of water, the total volume of water required would also be substantially influenced by the capacity of the digester. Larger capacity anaerobic digesters would generally require larger volumes of water for processing, as compared to smaller capacity digesters. Thus a larger anaerobic digester using dry feedstock is expected to have substantially higher water use requirements as compared to a smaller digester using dry or wet feedstocks.

Post-processing of liquid wastes from the anaerobic digester may require water as a diluent prior to reuse or disposal. The volume of water needed for dilution purposes is expected to vary substantially, based on project design, effluent flow rates, and levels of water quality pollutants contained in the effluent.

As discussed in Chapter 3, Project Description, most AD facilities are anticipated to be co-located with permitted solid waste facilities or located in areas zoned for industrial or solid waste handling activities, which would have existing water uses on site. The volume of water required for digester operation is expected to be minor in comparison to the total volume of water required for the indicated waste handling facilities or that should be available in industrial zoned areas. Therefore, it is assumed that digesters implemented under this Program EIR would rely on municipal water supplies, or water available onsite from sources such as wastewater produced onsite, stormwater, high-moisture feedstocks, or water made available through increased water use efficiency. Therefore, it is anticipated that AD facilities operated under this Program EIR would not require new or additional water supplies that would be sourced from groundwater. In the unlikely event that a digester implemented under this Program EIR would require the use of new or additional groundwater supplies, including the installation of new wells or increases in production of existing wells, the potential effects on groundwater levels must be evaluated separately, under subsequent environmental review. Therefore, this impact is considered less than significant.

Mitigation: None required.

Impact 6.6: AD facilities could become inundated as a result of seiche, tsunami, or mudflow. (Significant)

Although most areas of California where AD facilities would be installed are not susceptible to seiche, tsunami, or mudflow, installation of facilities in some areas could result in increased risk of inundation as a result of these hazards. Seiche occurs as a result of seismic, mass movement, or other events that cause formation of a standing wave within an enclosed water body, such as a lake, reservoir, or nearly closed embayment. Seiche can potentially result in the formation of surface waves up to several feet in height, which could result in inundation of low-lying areas located near susceptible water bodies. Tsunami are ocean-borne waves that result from seismic movement, often at a distant location. Tsunami can be transmitted across long distances, and can result in inundation of low-lying areas of California, that are in close proximity to the Pacific Ocean and associated inland bays.[6] Mudflows are mass movements of water and sediments that may occur as a result of a geologic event, such as volcanic eruption, or as a result of heavy rain and flooding across extensive areas that have been denuded of vegetation, such as during a forest fire. Mudflows in California are thus rare, but can still potentially occur in some areas, especially those areas having high risk of volcanic activity, and areas having fire-prone, often scrub type vegetation that is located on fine-grained sedimentary formations having high topographic relief. Siting of facilities in these areas could result in potentially significant impacts associated with seiche, tsunami, or mudflow. Implementation of Mitigation Measure 6.6 would be required.

Mitigation Measure

> **Measure 6.6:** To ensure that proposed AD facilities would not incur impacts associated with seiche, tsunami, or mudflow, the applicant for each individual project shall ensure that all facilities are located outside of potential risk areas for seiche, tsunami, and mudflow. In the event that a proposed facility would be sited within a potential risk area for one of these hazards, the facility shall be raised above projected maximum base inundation elevations, or shall be protected from inundation by the installation of berms, levees, or other protective facilities.
>
> **Impact Significance after Mitigation:** Less than Significant.
>
> Implementation of the proposed mitigation would ensure that AD facilities are located outside of areas that would be affected by seiche, tsunami, or mudflow, or would alternatively ensure that proposed AD facilities would be protected from such hazards.

Impact 6.7: AD facilities could contribute to cumulative impacts to water quality. (Significant)

The geographic scope of potential cumulative water quality impacts includes all of California. As discussed previously, many existing sources of surface water and groundwater have water quality impairment. For example, groundwater in the Tulare Lake Basin has been degraded by salt loading through a combination of natural processes and human activities. Surface waters along the Sacramento

6 Statewide tsunami inundation maps can be found here: http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/Inundation_Maps/Pages/Statewide_Maps.aspx

River and the Sacramento-San Joaquin Delta have been substantially affected by urban-related point and nonpoint discharges, including wastewater treatment effluents, industrial effluents, urban runoff, and agricultural runoff. Naturally intermittent water courses in metropolitan areas of southern California have become perennial streams, with dry season flows being comprised almost entirely of wastewater treatment effluent and summertime urban runoff.

On a cumulative basis, on-going activities, including waste management and energy production have the potential for additional cumulative degradation of surface water and groundwater. However, the operation of AD facilities, as required by Mitigation Measures 6.2 (a-f), would be prohibited from discharging into surface waters unless covered by a separate NPDES permit with effluent limitations to protect surface water quality. Mitigation Measures 6.2 (a-f) would also provide for protection of water quality associated with discharges of digester wastes to land, evaporation ponds, infiltration ponds, and other facilities, as described previously. Adherence to WDRs and other permit conditions, as required under Mitigation Measures 6.2 (a-f) would help to ensure that discharges from AD facilities would not degrade water quality to the point that beneficial use would be affected. Therefore, the cumulative contribution of AD facilities on water quality is not expected to be cumulatively considerable.

The existing regulatory environment for California, including state and federal antidegradation provisions, as well as resolutions, orders, conditional waivers, end enforcement actions promulgated by the State Water Board and regional boards, impose measures designed to protect water quality. In recent years, a large percentage of existing projects that have caused environmental impact have come under more stringent regulatory requirements, which include measures designed to reduce the impacts to surface waters and groundwater. Regional boards are also implementing various efforts aimed at reducing water quality pollution through basin planning efforts and implementation plans to achieve water quality objectives.

The AD facilities that would be developed under this project have the potential to contribute pollutants to groundwater through waste handling and disposal procedures. An analysis of the range of potential impacts to groundwater has already been presented in this chapter. As discussed under Impact 6.2, potential groundwater impacts will vary from constituent to constituent. For most constituents of concern, the addition of AD facilities with associated mitigation practices will be effective in reducing the pollutant loading that might otherwise occur.

In certain areas in California, the management of salts is critical for achieving water quality goals identified by the regional boards. For instance, salt concentrations in the San Joaquin Valley are highly managed, yet in many areas remain above existing planning goals.

Any increase in salt loading resulting from AD facility operations that could cause degradation or affect beneficial use, as defined under State Water Board Resolution No. 68-16 (see previous discussion of California State Nondegradation Policy), would be required to implement Best Practicable Treatment and Control Technology to prevent water quality degradation, or must be regulated under Title 27 of the California Code of Regulations (CCR) to install liner systems to protect beneficial uses. Measures that could be implemented in order to minimize salt loading may include control of salt loads in incoming feedstock, export of digester effluents or digestate to regional disposal

facilities, and/or on-site or off-site treatment options such as vacuum distillation or deionization for liquid effluents.

Specific treatment measures applicable to a specific project site would be identified via required coordination with the applicable regional board. Treatment would ensure that salt loads emanating from the proposed facility are consistent with regional basin planning, as promulgated by the relevant regional board. Adherence to these requirements, along with Mitigation Measures 6.2 (a-f) and 6.3, would be required.

Mitigation Measure

Measure 6.7: Implement Mitigation Measures 6.2 (a-f) and 6.3.

Impact Significance After Mitigation: Not Cumulatively Considerable

Implementation of the mitigation measures discussed in impacts 6.2 and 6.3, combined with adherence to the requirements of the California State Nondegradation Policy and CCR Title 27 would reduce the impacts to a less than significant level on an incremental project basis. With implementation of these measures, this impact would not be cumulatively considerable.

6.3 References

California Department of Water Resources (DWR), 2003. California's Groundwater Bulletin 118, Update 2003. Available at http://www.water.ca.gov/groundwater/bulletin118/gwbasin_maps_descriptions.cfm Accessed on October 5, 2010.

CHAPTER 7
Noise

7.1 Environmental Setting

Environmental Noise Fundamentals

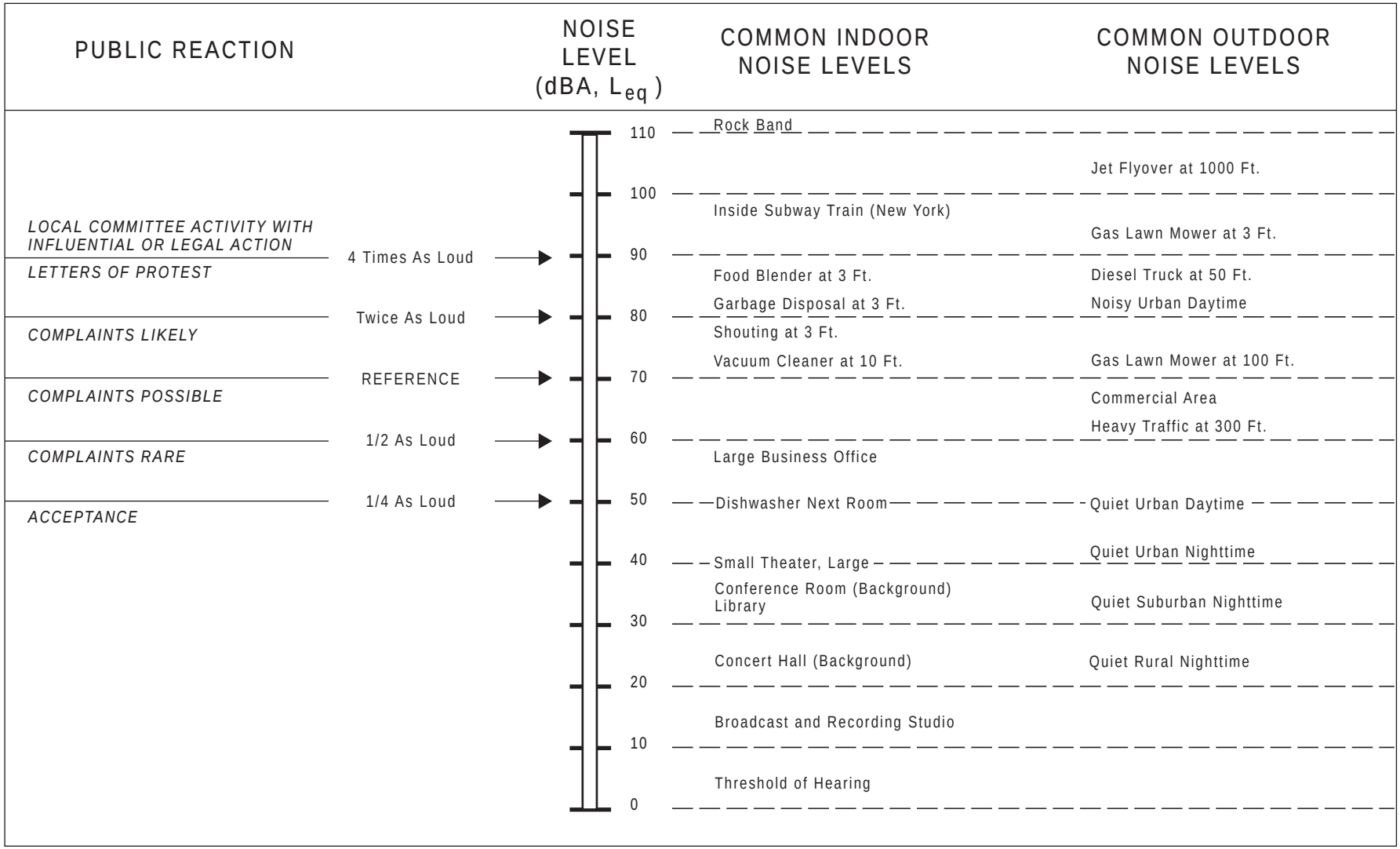
Noise is defined as unwanted sound. Sound, traveling in the form of waves from a source, exerts a sound pressure level (referred to as sound level) which is measured in decibels (dB), with zero dB corresponding roughly to the threshold of human hearing, and 120 to 140 dB corresponding to the threshold of pain. Pressure waves traveling through air exert a force registered by the human ear as sound.

Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but rather a broad band of frequencies varying in levels of magnitude (sound power). When all the audible frequencies of a sound are measured, a sound spectrum is plotted consisting of a range of frequencies spanning 20 to 20,000 Hz. The sound pressure level, therefore, constitutes the additive force exerted by a sound corresponding to the sound frequency/sound power level spectrum.

The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. As a consequence, when assessing potential noise impacts, sound is measured using an electronic filter that de-emphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear's decreased sensitivity to extremely low and extremely high frequencies. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted decibels (dBA). Frequency A-weighting follows an international standard methodology of frequency de-emphasis and is typically applied to community noise measurements. Some representative noise sources and their corresponding A-weighted noise levels are shown in **Figure 7-1**.

Noise Exposure and Community Noise

An individual's noise exposure is a measure of noise over a period of time. A noise level is a measure of noise at a given instant in time. The noise levels presented in **Figure 7-1** are representative of measured noise at a given instant in time, however, they rarely persist consistently over a long period of time. Rather, community noise varies continuously over a period of time with respect to the contributing sound sources of the community noise environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with the individual contributors unidentifiable.



SOURCE: ESA, 2007

Figure 7-1
Effect of Noise on People

The background noise level changes throughout a typical day, but does so gradually, corresponding with the addition and subtraction of distant noise sources such as traffic and atmospheric conditions. What makes community noise constantly variable throughout a day, besides the slowly changing background noise, is the addition of short duration single event noise sources (e.g., aircraft flyovers, motor vehicles, sirens), which are readily identifiable to the individual.

These successive additions of sound to the community noise environment varies the community noise level from instant to instant requiring the measurement of noise exposure over a period of time to legitimately characterize a community noise environment and evaluate cumulative noise impacts. This time-varying characteristic of environmental noise is described using statistical noise descriptors. The most frequently used noise descriptors are summarized below:

Leq	the equivalent sound level is used to describe noise over a specified period of time, typically one hour, in terms of a single numerical value. The Leq is the constant sound level which would contain the same acoustic energy as the varying sound level, during the same time period (i.e., the average noise exposure level for the given time period).
Lmax	the instantaneous maximum noise level for a specified period of time.
L50	the noise level that is equaled or exceeded 50 percent of the specified time period. The L50 represents the median sound level.
L90	the noise level that is equaled or exceeded 90 percent of the specified time period. The L90 is sometimes used to represent the background sound level.
Ldn	24-hour day and night A-weighted noise exposure level which accounts for the greater sensitivity of most people to nighttime noise by weighting noise levels at night (“penalizing” nighttime noises). Noise between 10:00 PM and 7:00 AM is weighted (penalized) by adding 10 dBA to take into account the greater annoyance of nighttime noises.
CNEL	similar to the Ldn, the Community Noise Equivalent Level (CNEL) adds a 5-dBA penalty during the evening hours between 7:00 PM and 10:00 PM in addition to a 10-dBA penalty between the hours of 10:00 PM and 7:00 AM

As a general rule, in areas where the noise environment is dominated by traffic, the Leq during the peak-hour is generally equivalent to the Ldn at that location (within +/- 2 dBA) (Caltrans, 1998).

Effects of Noise on People

The effects of noise on people can be placed into three categories:

- subjective effects of annoyance, nuisance, dissatisfaction;
- interference with activities such as speech, sleep, learning; and
- physiological effects such as hearing loss or sudden startling.

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise, or the corresponding reactions of annoyance and dissatisfaction. A

wide variation in individual thresholds of annoyance exists, and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so called "ambient noise" level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships occur (Caltrans, 1998):

- except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived;
- outside of the laboratory, a 3 dBA change is considered a just-perceivable difference;
- a change in level of at least 5 dBA is required before any noticeable change in human response would be expected; and
- a 10 dBA change is subjectively heard as approximately a doubling in loudness, and can cause adverse response.

These relationships occur in part because of the logarithmic nature of sound and the decibel system. The human ear perceives sound in a non-linear fashion, hence the decibel scale was developed. Because the decibel scale is based on logarithms, two noise sources do not combine in a simple additive fashion, rather logarithmically. For example, if two identical noise sources produce noise levels of 50 dBA the combined sound level would be 53 dBA, not 100 dBA.

Noise Attenuation

Stationary point sources of noise, including stationary mobile sources such as idling vehicles, attenuate (lessen) at a rate between 6 dBA for hard sites and 7.5 dBA for soft sites for each doubling of distance from the reference measurement. Hard sites are those with a reflective surface between the source and the receiver such as parking lots or smooth bodies of water. No excess ground attenuation is assumed for hard sites and the changes in noise levels with distance (drop-off rate) is simply the geometric spreading of the noise from the source. Soft sites have an absorptive ground surface such as soft dirt, grass or scattered bushes and trees. In addition to geometric spreading, an excess ground attenuation value of 1.5 dBA (per doubling distance) is normally assumed for soft sites. Line sources (such at traffic noise from vehicles) attenuate at a rate between 3 dBA for hard sites and 4.5 dBA for soft sites for each doubling of distance from the reference measurement (Caltrans, 1998).

Sensitive Receptors

Some land uses are considered more sensitive to ambient noise levels than others because of the amount of noise exposure (in terms of both exposure duration and insulation from noise) and the types of activities typically involved. Residences, hotels, schools, rest homes, and hospitals are generally more sensitive to noise than commercial and industrial land uses. The location of anaerobic digester (AD) facilities considered in this Program EIR would be at permitted solid waste facilities and within areas zoned for industrial or solid waste handling activities. However, these areas may

be near noise-sensitive land uses, and sensitive receptors could be located along the truck routes leading to the AD facilities.

Existing Noise Environment

The noise near AD facilities would be expected to be typical of solid waste facilities such as Material Recovery Facilities (MRFs) and transfer stations. **Table 7-1** shows reference noise levels near the tipping floor of a large-scale MRF/transfer station in the City of Industry, California. Another important noise source at large scale solid waste facilities is the noise along local access routes from trucks entering and exiting solid waste facilities. As shown in **Figure 7-2** the normal acceptable decibel range in industrial areas (including solid waste facilities) would be up to 75 dBA, CNEL and the conditionally acceptable decibel range would be up to 80 dBA, CNEL.

TABLE 7-1
REFERENCE NOISE LEVELS (DBA) 50 FEET FROM THE ENTRANCE OF TIPPING FLOOR AT THE CITY OF INDUSTRY MRF/TRANSFER STATION

Source	Lmax	L2	L8	L25	L50
Truck Movements*	75	75	75	72	-
Backup Alarm*	85	-	-	-	-
Hydraulic Pumps	73	73	70	-	-
Truck Unloading	75	75	72	-	-
Air Brake*	85	-	-	-	-
Loader	72	72	72	72	69
Conveyor	65	65	65	65	65
Alarms	82	82	79	-	-
Voices	62	62	62	62	62
Sorting	68	68	68	68	65
Sweepers*	83	83	-	-	-
Total Day	**90**	**87**	**82**	**76**	**73**
Total Night	**89**	**84**	**82**	**76**	**73**

Lmax = maximum
L2 = duration of one minute in any hour
L8 = duration of 5 minutes in any hour
L25 = duration of 15 minutes in any hour
L50 = duration of 30 minutes in any hour
The total is the logarithmic sum of all sources in all categories except the Lmax metric.
The total is the highest individual event for the Lmax metric.
The MRF/TS size analyzed for the City of Industry would have a capacity of 8,500 TPD Asterisk denotes use is restricted to between 10:00 am and 7:00 pm.

SOURCE: Gordon Bricken & Associates, 2003

Regulatory Requirements

Federal

Federal regulations establish noise limits for medium and heavy trucks (more than 4.5 tons, gross vehicle weight rating) under 40 Code of Federal Regulations (CFR), Part 205, Subpart B. The federal truck pass-by noise standard is 80 dBA at 15 meters from the vehicle pathway centerline. These controls are implemented through regulatory controls on truck manufacturers. Federal OSHA

regulations also protect workers from excessive occupational noise exposure (29 CFR § 1910.95, Code of Federal Regulations).

State

The California Department of Health Services' Office of Noise Control studied the correlation of noise levels and their effects on various land uses and published land use compatibility guidelines for the noise elements of local general plans. The guidelines are the basis for most noise element land use compatibility guidelines in California.

The land use compatibility for community noise environment chart identifies the normally acceptable range for several different land uses, as shown in **Figure 7-2** below. Persons in low-density residential settings are most sensitive to noise intrusion, with noise levels of 60 dBA CNEL and below considered "acceptable". For land uses such as schools, libraries, churches, hospitals, and parks, acceptable noise levels go up to 70 dBA CNEL. Industrial areas (including solid waste facilities) are land uses that can tolerate higher ambient noise level, with conditionally acceptable noise levels being up to 80 dBA CNEL.

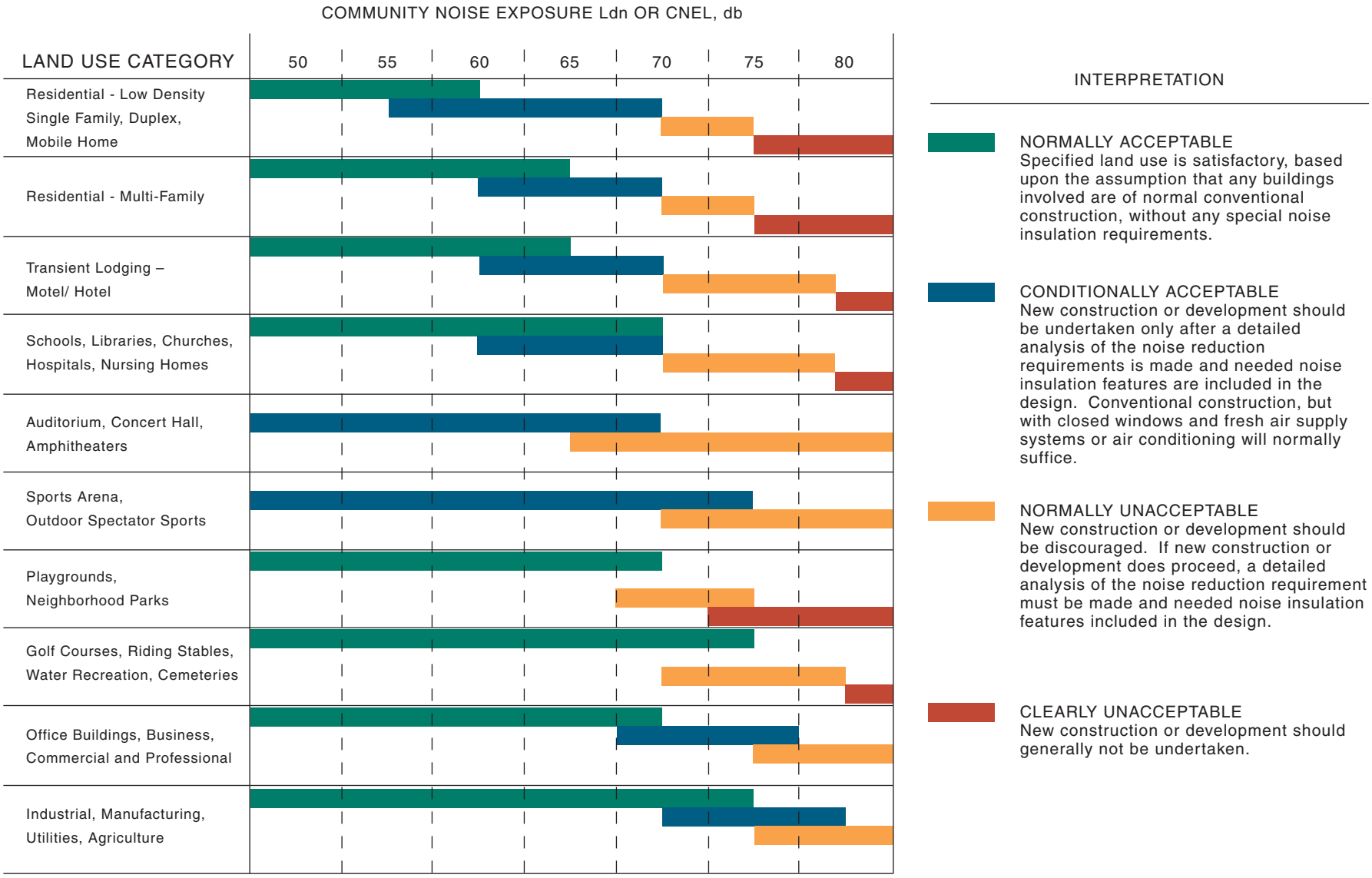
The State of California also establishes noise limits for vehicles licensed to operate on public roads. For heavy trucks, the State pass-by standard is consistent with the federal limit of 80 dB at 15 meters.

The State pass-by standard for light trucks and passenger cars (less than 4.5 tons, gross vehicle rating) is also 80 dBA at 15 meters from the centerline. These standards are implemented through controls on vehicle manufacturers and by legal sanction of vehicle operators by State and local law enforcement officials.

The State has also established noise insulation standards for new multi-family residential units, hotels, and motels that would be subject to relatively high levels of transportation-related noise. These requirements are collectively known as the California Noise Insulation Standards (Title 24, California Code of Regulations). The noise insulation standards set forth an interior standard of DNL 45 dBA in any habitable room. They require an acoustical analysis demonstrating how dwelling units have been designed to meet this interior standard where such units are proposed in areas subject to noise levels greater than DNL 60 dBA. Title 24 standards are typically enforced by local jurisdictions through the building permit application process.

Local Jurisdictions

In California, most cities and counties have noise ordinances serve as enforcement mechanisms for controlling noise. Jurisdictions also have General Plan. Noise Elements that are used as planning guidelines to ensure that long-term noise generated by a source is compatible with adjacent land uses. Both the noise ordinances and General Plan Noise Elements may include limits for industrial areas and limits for sensitive receptor noise levels.



SOURCE: State of California General Plan Guidelines, Office of Planning and Research, 1998; and ESA, 2010

Figure 7-2

Land Use Compatibility for Community Noise Environment

7.2 Impacts and Mitigation Measures

Approach and Methods

The evaluation was performed in light of applicable regulations and guidelines, and typical construction activities and operations of AD facilities. In determining the level of significance, the analysis assumed that the AD facilities would comply with relevant federal, State, and local ordinances and regulations.

Noise impacts associated with implementation of the project have been evaluated at a program level of detail using standard acoustical modeling techniques that consider typical noise levels from various equipment. Potential noise levels were then compared to typical noise ordinance standards and incompatible noise levels (see Figure 7-2).

Thresholds of Significance

CEQA defines a significant effect on the environment as a substantial, or potentially substantial, adverse change in the physical conditions of the area affected by the project. An impact related to noise would be considered significant if it would result in any of the following, which are adapted from Appendix G of the CEQA *Guidelines*:

- Exposure of persons to or generation of noise levels in excess of standards established in any applicable plan or noise ordinance, or applicable standards of other agencies;
- Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels;
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above existing levels existing without the project;
- Exposure of people residing or working in the project area to excessive noise levels, for a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport; or
- Expose people residing or working in the project area to excessive noise levels if the project is located in the vicinity of a private airstrip.

Site preparation and construction may result in ground borne vibration associated with earth movement and similar activities. Although these temporary activities may cause perceptible ground borne vibration, such impacts are anticipated to be minimal and limited to the project sites. Operation of the project would not involve any activity that would produce any substantial groundborne noise or vibration. This issue will not be further evaluated in the Program EIR.

Even if AD facilities were near an airport or private airstrip, the noise from the aircraft activities would be unlikely to expose people at the AD facility to excessive noise levels. AD facilities would

not be considered sensitive receptors with regard to noise generated by off-site activities. Any potential impact from aircraft noise would be easy to recognize and avoid during the facility siting process. This issue will not be further evaluated in the Program EIR.

Some guidance as to the significance of changes in ambient noise levels is provided by the 1992 findings of the Federal Interagency Committee on Noise (FICON), which assessed the annoyance effects of changes in ambient noise levels resulting from aircraft operations. The recommendations are based upon studies that relate aircraft noise levels to the percentage of persons highly annoyed by the noise. Annoyance is a summary measure of the general adverse reaction of people to noise that generates speech interference, sleep disturbance, or interference with the desire for a tranquil environment. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, it has been asserted that they are applicable to all sources of noise described in terms of cumulative noise exposure metrics such as the Ldn, as shown in **Table 7-2**.

TABLE 7-2
MEASURES OF SUBSTANTIAL INCREASE FOR NOISE EXPOSURE

Ambient Noise Level without Project (Ldn)	Significant Impact Assumed to Occur if the Project Increases Ambient Noise Levels By:
<60 dB	+ 5.0 dB or more
60-65 dB	+ 3.0 dB or more
>65 dB	+ 1.5 dB or more

SOURCE: Federal Interagency Committee on Noise (FICON), 1992.

The rationale for the **Table 7-1** criteria is that the quieter the ambient noise level is, the more the noise can increase (in decibels) before it causes significant annoyance.

Construction Noise

Typically, most jurisdictions in California with Noise Ordinances exempt construction noise when it occurs during daytime hours. Noise impacts from short-term construction activities could exceed noise thresholds and could result in a significant construction impact if short-term construction activity occurred outside of the daytime hours permitted by local noise ordinances.

Stationary Noise

Operational equipment, especially those that run 24-hours a day, the appropriate noise level would be in compliance with local noise ordinances; or 45 dBA at the location of the nearest sensitive receptor. See **Table7-1** above for typical equipment noise levels. Various other grinders may be used for preprocessing and can be expected to have noise levels up to an Lmax of 80 – 90 dBA at a distance of 50 feet.

Traffic Noise

The proposed project would result in a significant traffic noise impact if traffic noise would result in an increase at the location of sensitive receptors beyond levels described in **Table 7-1** above.

Impact 7.1: Construction of AD facilities could temporarily increase noise levels at nearby sensitive receptor locations or result in noise levels in excess of standards in local general plans, noise ordinances, or other applicable standards. (Significant)

Construction of facilities could generate noise at sensitive receptors that exceed local regulations and codes. The construction-related noise levels may be from, but not necessarily limited to, the use of heavy equipment at the AD site or pipeline construction areas, or vehicles transporting material to or from the construction site. Noise levels may fluctuate depending on the distance of the sensitive receptor from the construction activity and the particular type, number, and duration of uses of various pieces of construction equipment. Construction-related material haul trips would raise ambient noise levels along haul routes, depending on the number of haul trips made and types of vehicles used. **Table 7-3** shows typical noise levels during different construction stages and **Table 7-4** shows noise levels produced by various types of construction equipment.

Although construction activities would likely occur during daytime hours, construction noise could still be considered substantially disruptive to residents. However, periods of intensive noise exposure would be temporary, and noise generated by project construction would be partially masked by other background noise such as traffic noise. Note that construction noise often varies significantly on a day-to-day basis, and the noise levels shown in **Table 7-3** represent a worst-case scenario. Such worst-case scenarios would likely exist only for short periods at any particular residence on a given day. During these times, outdoor activities at the affected residences would be negatively affected by noise and indoor activities (typically 20 to 25 dBA quieter than outdoor noise levels) could be negatively affected. These construction noise levels, especially if they were to occur during the nighttime hours, could cause sleep disturbance to nearby residences. Construction noise on typical days off including Sundays and Holidays could also be annoying to nearby residences and therefore this impact would be potentially significant.

TABLE 7-3
TYPICAL NOISE LEVELS FROM CONSTRUCTION ACTIVITIES

Construction Phase	Noise Level[a] (dBA, Leq)
Ground clearing	84
Excavation	89
Foundations	78
Erection	85
Finishing	89

a Average noise levels correspond to a distance of 50 feet from the noisiest piece of equipment associated with a given phase of construction and 200 feet from the rest of the equipment associated with that phase.

SOURCE: Bolt, Baranek, and Newman, 1971; Cunniff, 1977.

TABLE 7-4
TYPICAL NOISE LEVELS FROM CONSTRUCTION EQUIPMENT

Construction Equipment	Noise Level[a] (dBA, Leq at 50 Feet)
Dump truck	88
Portable air compressor	81
Concrete mixer (truck)	85
Scraper	88
Jackhammer	88
Dozer	87
Paver	89
Generator	76
Backhoe	85
Rock Drilling	98

a Average noise levels correspond to a distance of 50 feet from the noisiest piece of equipment associated with a given phase of construction and 200 feet from the rest of the equipment associated with that phase.

SOURCE: Bolt, Baranek, and Newman, 1971; Cunniff, 1977.

Mitigation Measures

Measure 7.1a: Construction activities shall be limited to the hours between 7 a.m. and 7 p.m., Monday through Saturday, or an alternative schedule established by the local jurisdiction, or other limits to construction hours normally enforced by the local jurisdiction (see Measure 7.1d below).

Measure 7.1b: Construction equipment noise shall be minimized by muffling and shielding intakes and exhaust on construction equipment to a level no less effective than the manufacture's specifications, and by shrouding or shielding impact tools.

Measure 7.1c: Construction contractors within 750 feet of sensitive receptors shall locate fixed construction equipment, such as compressors and generators, and construction staging areas as far as possible from nearby sensitive receptors.

Measure 7.1d: Construction contractors shall comply with all local noise ordinances and regulations.

Impact Significance After Mitigation: Less than Significant

Implementation of the mitigation measures listed 7.1a-d would significantly reduce construction-related noise impacts by locating staging areas away from adjacent residences when necessary, and prohibiting construction activities during the most noise-sensitive hours of the day. Implementation of these mitigation measures would reduce this impact to less than significant.

Impact 7.2: Noise from operation of AD facilities could substantially increase ambient noise levels at nearby land uses or result in noise levels in excess of standards in local general plans, local noise ordinances, or other applicable standards. (Significant)

Stationary Noise

Operations of facilities could generate noise at sensitive receptors that exceed local regulations and codes. Operational activities associated with the project that would generate noise include pre-processing, vehicle circulation, and the operation of certain mechanical equipment such as stationary pumps, motors, compressors, fans, generators, and other equipment. Operation of pipelines would not result in any discernible noise. Noise impacts would be limited to inspection of pipelines during daytime hours and would be temporary.

Pre-processing activities include noise generating steps such as sorting and grinding. The amount of pre-processing equipment would differ from facility to facility; furthermore, pre-processing activities could occur prior to delivery to the AD facility, thus eliminating pre-processing noise at these locations. Some equipment such as electrical generators operates 24-hours a day, creating operational noise during night time hours. In areas with local general plans, ordinances, or where other applicable standards are available, they shall apply to project operations. Where regulations are not available, continuous noise levels should not exceed the constant background level (for sites near traffic noise) or 45 decibels at sensitive receptors.

Mitigation Measure

> **Measure 7.2:** AD facilities located within 2,000 feet of a sensitive receptor shall conduct a site specific noise study. If operational sound levels would exceed local regulations, or 45 dBA at a sensitive receptor (if no regulations are available), additional sound-proofing such as enclosures, muffling, shielding, or other attenuation measures shall be installed to meet the required sound level.
>
> **Impact Significance After Mitigation:** Less than Significant
>
> Implementation of the mitigation measures 7.2 would reduce operation-related noise to below local regulations, and would reduce this impact to less than significant.

Impact 7.3: AD facility operational activities associated with transportation would not increase ambient noise levels at nearby land uses. (Less than Significant)

Transportation Noise

It is not anticipated that implementation of the project would result in large numbers of new employees or truck trips. Therefore operational vehicle trip increases would be minimal and would not generate a substantial increase in noise along local roadways. Because of the low number of trips associated with the AD facilities, noise levels on roadways would not be expected to increase by more than 3 dBA. This impact would be less than significant.

Mitigation: None required.

Impact 7.4: Development of AD facilities could result in a cumulative increase in noise levels. (Significant)

Cumulative impacts refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts (CEQA Guidelines §15355).

The scope of cumulative construction noise impacts is construction noise from AD facilities, and pipelines combined with construction noise from other projects within the vicinity of the project area. This combination of noise could affect existing ambient noise conditions at or near the construction site. If construction of the project coincides with and affects the same sensitive receptors as construction noise from other projects, this cumulative impact could be significant. Mitigation Measure 7.4 would restrict construction activities to daytime hours for AD facilities, and would reduce the cumulative construction noise impact to less than significant.

The scope of cumulative operational noise impacts is operational noise from AD facilities combined with operational noise from other stationary or mobile sources in the project area. These other sources may contribute considerably to unacceptable ambient noise levels. However, with implementation of Mitigation Measure 7.4, operation of AD facilities would not result in significant increases in operational noise. Therefore, the contribution of noise from AD facilities would not contribute to any cumulative operational noise impact and would be less than significant.

Mitigation Measure

Measure 7.4: Implement Mitigation Measures 7.1a through 7.1d and Measure 7.2.

Impact Significance After Mitigation: Less than Significant

7.3 References

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CHAPTER 8
Public Services and Utilities

8.1 Environmental Setting

The following is a discussion of the impact of the project on public services and utilities. Setting information and impact analysis is provided for relevant issues including water, wastewater, stormwater drainage, solid waste, natural gas, electricity, and fire protection.

Water Supply

Potable water and non-potable water within California are supplied by many purveyors. Public or quasi-public facilities in urban/developed areas typically receive water from a municipal system and may receive reclaimed water if it is available. Public or quasi-public facilities located in urban transition areas may have on-site water facilities such as groundwater wells if water infrastructure from a municipal system has not been extended to the site.

Wastewater

Wastewater service within California may be provided by either a public or private system. Public or quasi-public facilities within urban/developed area are typically connected to a municipal system. Public or quasi-public facilities in urban transition areas may use on-site septic systems for domestic wastewater (such as restroom facilities) if wastewater infrastructure for a municipal system has not been extended to the site.

Stormwater Drainage

Urban/developed areas typically contain linked storm drain systems where stormwater is aggregated and treated by the local jurisdiction. Water quality treatment and flow reduction measures are incorporated into projects as required by local ordinances and the Regional Water Quality Control Board (RWQCB). Rural areas are not typically connected to public storm drain system and incorporate facilities on site in accordance with local ordinances and the RWQCB. These may include vegetated swales, oil/water separators, sediment detention/retention basins, among others.

Solid Waste

According to the California 2008 Statewide Solid Waste Characterization Study, approximately 35 million tons of waste are disposed annually in California landfills (CalRecycle, 2009a). The compostable organic portion comprises approximately 25% (CalRecycle, 2009b). CalRecycle is the State agency which administers programs formerly managed by the State's Integrated Waste Management Board and Division of Recycling. Under its Strategic Directive 6.1, CalRecycle seeks to reduce by 50 percent the amount of organic waste disposed in the state's landfills by 2020.

One technology for reducing organic waste in landfills is anaerobic digester (AD) facilities, for which this Program EIR has been prepared. There are currently no full-scale AD facilities in California devoted to processing the organic portion of municipal solid waste, though they are used in other countries and pilot-scale projects have been developed in California and other parts of the U.S. As discussed more extensively in Section 3.13, the proposed AD facilities could be regulated under CalRecycle's existing composting and transfer/processing regulations.

Natural Gas

Natural gas service is provided by several providers in California. The largest providers include Pacific Gas and Electric (PG&E), Southern California Gas Company, San Diego Gas and Electric (SDG&E) and Southwest Gas Corporation (CEC, 2008). Most properties in rural areas do not utilize natural gas, as they are not connected to a distribution network, though they may be located in proximity to a larger transmission pipeline. The California Energy Commission (CEC) publishes an updated map of major natural gas transmission pipelines in California on its website (CEC, 2010a).

Electricity

There are several electricity providers in California that serve both urban and rural areas. The largest providers in the State include PG&E, Southern California Edison, Los Angeles Department of Water & Power, SDG&E, and Sacramento Municipal Utility District, though there are many smaller providers (CEC, 2010b). As with natural gas, CEC publishes an update map of major electric transmission facilities.

Fire Protection

Local fire protection services are provided by many agencies within the California, including municipal fire departments, California Department of Forestry and Fire, fire districts, and volunteer departments. Services provided by fire protection services include building inspections during construction, fire suppression, emergency medical response, and hazardous materials response (CSFM, 2010).

Regulatory Requirements

Federal

There are no federal regulations which apply to this discussion.

State

California Composting and Transfer/Processing Regulations

CalRecycle's existing composting and transfer/processing regulations apply to the proposed project. These regulations are discussed in more detail in Section 3.13. CalRecycle's compostable material handling, design and operations regulatory requirements are located at Title 14 California Code of Regulations (CCR) Section 17850 et seq. The transfer/processing regulatory requirements are located at Title 14 CCR Section 17400 et seq.

California Public Utilities Commission

The California Public Utilities Commission (CPUC) primarily regulates the provision of investor owned utilities in California. These utilities include privately owned telecommunications, electric, natural gas, water, railroad, rail transit, and passenger transportation companies. The CPUC is responsible for assuring that California utility customers have safe, reliable utility services at reasonable rates, protecting utility customers from fraud, and promoting the health of California's economy (CPUC, 2010). General Order No. 112-E includes the State rules on Testing, Operation and Maintenance of Gas Gathering, Transmission and Distribution Piping Systems.

Local Jurisdictions

Local agencies that regulate public services and publicly-owned utility systems include county fire departments and fire districts, county water departments and water districts, county environmental health departments for wells and septic systems, and county flood management departments and drainage districts for flood protection and drainage services. Local agencies regulate facilities within their jurisdiction by enforcing State and local laws and ordinances. Local agencies currently adopt and enforce the 2007 California Fire Code (Title 24 California Code of Regulations Part 9; CBSC, 2010). Local jurisdictions also provide goals, objectives and policies related to public services and utilities in the jurisdiction's general plan.

8.2 Impacts and Mitigation Measures

Approach and Methods

This evaluation was performed considering the potential locations (co-located with permitted solid waste facilities or located in areas zoned for industrial or solid waste handling activities), applicable regulations and guidelines and typical construction activities and operations of AD

facilities. In determining the level of significance, the analysis assumed that the AD facilities would comply with relevant federal, State, and local laws, regulations, ordinances and guidance.

To assess potential impacts, ESA completed a literature review of documents including feasibility studies and overviews of AD facilities. ESA also consulted with members of the Technical Advisory Group for the EIR including persons currently involved in the permitting or environmental documentation for siting AD facilities.

Thresholds of Significance

An impact related to public services and utilities would be considered significant if it would result in any of the following, which are adapted from Appendix G of the CEQA *Guidelines*:

- Result in substantial adverse physical impacts associated with the provision of, or the need for, new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for fire protection, police protection, schools, parks or other public facilities
- Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board
- Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects
- Require or result in the construction of new storm water drainage facilities, or expansion of existing facilities, the construction of which could cause significant environmental effects
- Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed
- Result in a determination by the wastewater treatment provider that would serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments
- Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs
- Comply with federal, state and local statutes and regulations related to solid waste
- Require or result in the construction of new sources of energy supplies or additional energy infrastructure capacity the construction of which could cause significant environmental effects
- Conflict with applicable energy policies or standards

The discussion of environmental impacts is limited to those potential impacts that could result in some level of potentially significant environmental change, as defined by CEQA Guidelines (§15382). The following issues were evaluated to have less than significant or no impact and will not be discussed further within the EIR for the following reasons:

Police Protection. AD facilities would require law enforcement services to a similar extent as other businesses, such as patrol services and infrequent calls for service; the project does not present unique issues which would create significant demands on law enforcement services.

Schools and Parks. The proposed AD facilities are not anticipated to increase demands for schools or parks as the project is proposed to divert organics from the existing waste stream and not to induce new growth; thus, the project would not increase demands for school or park facilities.

Solid Waste Facilities. The AD process results in mass reduction of solid waste, and thus by using AD facilities, there would be a net decrease in the amount of waste which would normally be sent to landfills or other solid waste facilities. Additionally, while landfill disposal or composting is an option for disposal or reuse of digestate, there are other options including use as a soil amendment and discharge to a wastewater treatment facility which would further reduce demands on solid waste facilities from what they are currently.

Solid Waste Regulations. As discussed in Section 3.13, the proposed AD facilities could be regulated under CalRecycle's existing compostable material handling and transfer/processing regulations and thus no conflict with existing regulations would occur from the project.

Energy Policies or Standards. The project may indirectly facilitate the production of biogas and biomethane within the project area. This would be beneficial in helping to meet the California's Renewable Portfolio Standard. If a facility proposes to inject conditioned biogas into a natural gas pipeline, the developer is required to provide evidence to the purchasing utility that the biogas meets the utilities quality standards. No conflicts with existing energy policy or standards would occur and thus there would be no impact.

This chapter discusses the impacts to water, wastewater treatment and stormwater treatment facilities and utility requirements from a utilities capacity perspective. The anticipated impacts upon surface water quality and groundwater quality from AD facilities are discussed within **Chapter 6**, Hydrology.

Impact Analysis

Impact 8.1: The project would not substantially increase demands on fire protection services. (Less than Significant)

Construction and operation of AD facilities would need to adhere to the building code and the fire code adopted by the relevant local jurisdiction. Building and fire inspections would be conducted during construction of AD facilities to ensure code compliance and thereby reduce the risk of fire/explosion hazards associated with new facilities. Hazardous issues associated with biogas production and distribution are addressed in Chapter 11, Hazards and Hazardous Materials.

The project would require similar fire protection services as other businesses. Fire protection services are funded though local impact/mitigation fees and property taxes, to which the project would contribute. The on-site flare periodically required for burning excess gas may be visible at night from off-site areas leading to increased calls to the local fire district/department from concern of a potential fire; however, no physical response would be required. Because the project is not likely

to require a substantial need for additional response from local fire service providers, this impact is considered less than significant. However, calls to local fire agencies can be reduced through implementation of Mitigation Measures 10.1b and 10.3c as discussed below.

Mitigation: None required.

While no mitigation is required, Mitigation Measures 10.1b and 10.3c recommend the use of berms or landscaping to minimize views of the facility and the enclosure of flares, which would reduce the likelihood of calls from the general public related to the flare. After implementation of these mitigation measures this would remain a less-than-significant impact.

Impact 8.2: The project could potentially exceed wastewater treatment requirements of the Regional Water Quality Control Board (RWQCB). (Significant)

There are various options for reuse or disposal of the digestate by-product from operation of the proposed facilities. One option is to send a portion or all of the digestate by-product to a wastewater treatment plant via trucks or sewer line. The quality of the digestate is dependent on many factors including feedstocks used, pre-processing methods, and the specific AD technology which is in use. The digestate may require pre-treatment prior to acceptance by a municipal wastewater treatment provider, for example, to reduce biological oxygen demands or remove contaminants, in order for the wastewater treatment facility to meet the treatment/disposal requirements of the RWQCB. For this reason, this is a potentially significant issue for projects proposing to convey digestate to a wastewater treatment provider. It should be noted that AD facilities which do not propose to send digestate by-product to a wastewater treatment plant would have a less-than-significant impact.

Mitigation Measures

Measure 8.2a: Implement Mitigation Measure 8.3b if the operator does not have an existing agreement, such as for co-located facilities.

Measure 8.2b: In addition to an agreement for service, coordination with the wastewater treatment provider would be needed to determine if pre-treatment would be required to meet the RWQCB requirements for the existing wastewater treatment facility.

Impact Significance After Mitigation: Less than Significant

With an agreement for service and coordination regarding the quality of the digestate conveyed to the wastewater treatment facility, this impact would be reduced to a less-than-significant level.

Impact 8.3: The project could result in significant environmental effects from the construction and operation of new water and wastewater treatment facilities or expansion of existing facilities. (Significant)

Development of AD facilities co-located with existing permitted solid waste facilities would not increase water or wastewater treatment demands substantially above those levels already needed for the existing facilities. Potential new sources of water and wastewater treatment demands include the following:

- Water for Feedstock – Due to the high liquid content of organics, it is unlikely that a significant amount of water would be needed for pre-processing or during the AD process. Non-potable or recycled water could also be used, for example from liquid produced after dewatering digestate in the post-processing phase.
- Wastewater Treatment – The digestate (liquid and solid waste) produced from the AD facility would receive anaerobic treatment. Depending on the feedstocks and process used, the digestate may require additional treatment. A facility operator may choose to send digestate to a wastewater treatment plant which would require coordination with the wastewater treatment provider. This impact is assessed separately under Impact 8.2. There are other options for digestate disposal including disposal to agricultural crops or use as a soil amendment, and thus coordination would not be required for all cases.
- Domestic Water and Wastewater Demands for Employee Facilities (such as restrooms) – Due to the limited number of employees, these demands could be satisfied by the facilities needed for existing solid waste facilities and would not likely require additional treatment capacity.
- Water for Fire Suppression – Fire suppression demands could be satisfied by water already needed for the existing facilities.

Thus, for co-located facilities, the demand for new water and wastewater treatment and expansion facilities is anticipated to be less than significant as water and wastewater service is provided to an existing facility on-site, and the project represents a minor increase in demands.

The development of independent AD facilities could require new water and wastewater treatment facilities or connection to a municipal system. Potential new sources of water and wastewater treatment demands include water for feedstock, wastewater treatment for digestate (see Impact 8.2), domestic water/wastewater demands, and water for fire suppression as discussed above for co-located facilities. Private water and wastewater facilities (such as an on-site groundwater wells or septic systems) would need to be evaluated at the project level. It is assumed these types of facilities would be part of a project plan submitted for local site plan review and would be constructed to the standards of the applicable local jurisdiction which would reduce impacts to a less-than-significant level. For service from a municipal system, the developer would need to ensure that service is available with adequate treatment capacity and thus this impact is potentially significant.

Mitigation Measures

> **Measure 8.3a:** If the project proposes to obtain water from a water supplier (municipal system or other public water entity), the developer would enter into an agreement for service with the supplier.

Measure 8.3b: If the project proposes to obtain wastewater service from a wastewater treatment provider (municipal or other public entity), the developer would enter into an agreement for service with the provider.

Impact Significance After Mitigation: Less than Significant

Impact 8.4: The project would not result in significant environmental effects from the construction of new stormwater treatment facilities or expansion of existing facilities. (Less than Significant)

The development of an AD facility would increase impermeable surfaces. On-site water quality treatment and flow control would be needed through development of on-site stormwater treatment facilities or expansion of facilities at a co-located facility. These facilities would be sized based on the individual project and would need to be evaluated further at the project level. Stormwater facilities would be part of the project plans submitted for local site plan review and would be constructed to the standards of the applicable jurisdiction and RWQCB. As this condition must be met, the impact would be less than significant.

Mitigation: None required.

Impact 8.5: The project would not require significant levels of new or expanded water supply resources or entitlements. (Less than Significant)

As discussed in Impact 8.3, there would be little to no increase in water demands for AD facilities co-located with permitted solid waste facilities, and thus these types of facilities would have a less-than-significant effect on expanded water supplies or entitlements.

As discussed in Impact 8.3, development of independent AD facilities could create water demands for dilution of feedstock, domestic water uses and fire suppression. These demands are similar to other businesses which could be established in an industrial area. New or expanded water supply resources or entitlements could be needed for projects without access to a municipal provider which would need to establish a groundwater well. The establishment of a groundwater well would need to be evaluated at the project level. It is assumed these types of facilities would be part of a project plan submitted for local site plan review and would be constructed to the standards of the applicable local jurisdiction which would reduce impacts to a less-than-significant level. However, most facilities would not require establishment of a groundwater well as most industrial properties have or are near a municipal water connection.

Mitigation: None required.

Impact 8.6: The project could result in exceeding the capacity of a wastewater treatment provider. (Significant)

As discussed in Impact 8.3, use of a wastewater treatment provider is an option for digestate disposal in addition to demands from domestic uses (such as restrooms). As the developer would need to ensure that adequate wastewater conveyance and treatment capacity is available, this impact is potentially significant.

Mitigation Measure

> **Measure 8.6:** If the project proposes to obtain wastewater service from a wastewater treatment provider (municipal or other public entity), implement Mitigation Measure 8.3b.
>
> **Impact Significance After Mitigation:** Less than Significant

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Impact 8.7: The project could result in the construction of new energy supplies and could require additional energy infrastructure. (Significant)

The project could facilitate the construction of new energy supplies within the project area through the production of biogas as part of the AD process. The energy created from biogas at AD facilities is considered renewable. As there is currently a demand for renewable energy in California, there is a beneficial effect to providing energy from renewable resources. It is assumed that projects located in existing facilities or in industrial areas would be in proximity to electricity infrastructure, however accessing additional power on-site or generating electricity to export from the project could require additional energy infrastructure, with potentially significant impacts from construction.

The amount of energy infrastructure needed would be dependent on how the biogas is used. As an energy source, biogas may be used in internal combustion engines to produce electricity, conditioned to biomethane for use in fuel cells or in natural gas vehicles, or conditioned to biomethane for injection into natural gas pipelines. The need for additional infrastructure for each of these uses is described in greater detail below.

Biogas uses that would not require substantial off-site infrastructure improvements include the production of electricity through the combustion of biogas in internal combustion engines and the upgrading of biogas to biomethane for use in fuel cells or in natural gas vehicles. The construction of the facilities for each of these options could have less-than-significant environmental effects.

As described previously, biogas may also be conditioned to biomethane and then injected into existing and future natural gas pipelines. The conditioning of biogas could occur at AD facilities, or it may be collected as raw biogas and conditioned at an off-site facility. After processing, the biomethane would then likely need to be piped (at least short distances) from the facility to natural gas pipelines. Each of these production scenarios would require the construction of new energy infrastructure, such as pipelines, to connect to the existing gas utility network. Likewise, if biogas is converted into electricity on site and sold to a utility provider, then off-site infrastructure, or upgrades to existing off-site electrical distribution infrastructure, may be needed.

The development of new energy infrastructure or expansion of existing energy infrastructure on-site or off-site has the potential to cause significant impacts to biological, cultural, air quality, and/or other environmental resources. Typically, energy infrastructure can be located within existing easements or rights-of-way (i.e., public roads or utility easements). Specific impacts associated with off-site energy improvements would be evaluated at the project level during the local project review process. Mitigation Measure 8.7 would reduce impacts associated with the construction of off-site energy infrastructure improvements to less than significant.

Mitigation Measure

> **Measure 8.7:** Projects requiring off-site energy infrastructure must complete CEQA review for the proposed energy improvements as a separate project. Infrastructure improvements may qualify as a categorical exemption pursuant to CEQA.
>
> **Impact Significance After Mitigation:** Less than Significant

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Impact 8.8: Development of AD facilities would not contribute to cumulative impacts to public services and utilities. (Less than Significant)

AD facilities are anticipated to be dispersed throughout California similar to existing solid waste facilities. As with other types of development, the development of an AD facility may have cumulatively significant impacts when considered with other past, present and future actions in the vicinity of the project as detailed below. Implementation of the applicable mitigation measures above would reduce the project's contribution to cumulative impacts to a less-than-significant level.

Mitigation: None required.

8.3 References

California Building Standards Commission (CBSC), 2010. California Building and Fire Code, available online at: http://www.bsc.ca.gov/default.htm, accessed June 01, 2010.

California Energy Commission (CEC), 2008. California Natural Gas Detailed Utility Service Areas Map, September 2008, available online at: http://www.energy.ca.gov/maps/gasmap.html, accessed June 01, 2010.

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California Energy Commission (CEC), 2010b. California Electric Utility Service Areas Map. April 2010, available online at: http://www.energy.ca.gov/maps/maps-pdf/UTILITY_SERVICE_AREAS_DETAIL.PDF, accessed October 5, 2010.

California Public Utilities Commission (CPUC), 2010. *Electricity and Natural Gas Regulation in California*, available online at: http://www.cpuc.ca.gov/PUC/energy/, accessed April 21, 2010.

California State Fire Marshall (CSFM), 2010. Mission and Programs of the State of California Office of the State Fire Marshall, available online at: http://osfm.fire.ca.gov/, accessed June 01, 2010.

CHAPTER 9
Transportation

9.1 Environmental Setting

Regional and Local Roadways

The network of regional and local roadways in areas potentially affected by the project consists of Interstate freeways, state highways, and numerous local roads that are under the jurisdiction of a particular city or county public works department. Local roads provide access to adjacent parcels and also provide a connection between local land uses and major thoroughfares.

Public Transit

Public transit service varies from area to area throughout the state, and while buses might operate in areas potentially affected by the project, the transit service in less built-up areas tends to be less frequent than in urban areas.

Bikeways/Pedestrian Circulation

In built-up areas, bicycle facilities consist of Class I (bicycle paths), Class II (bicycle lanes, striped in roads), and Class III (bicycle routes without striping) bikeways, and pedestrian facilities consist of sidewalks and intersection crosswalks. While rural areas tend to have less of these bicycle and pedestrian facilities, bicyclists often travel on local roads without designated bikeways.

Truck Routes

Cities often develop a truck route plan, which designates truck routes to provide contractors with the preferred travel roadways to and from connecting local roadways. Typically, counties do not develop a similar system of truck routes for unincorporated areas.

Regulatory Requirements

Federal and State

The California Department of Transportation (Caltrans) is responsible for planning, designing, constructing, operating, and maintaining all State-owned roadways. Federal highway standards for interstates are implemented in California by Caltrans. Caltrans' construction practices require temporary traffic control planning "during any time the normal function of a roadway is suspended". In addition, Caltrans has the discretionary authority to issue special permits for the movement of vehicles/loads exceeding statutory limitations on the size, weight, and loading of vehicles contained in Division 15 of the California Vehicle Code. Requests for such special permits require the completion of an application for a Transportation Permit. The California Highway Patrol is notified about transportation of oversize/overweight loads.

State highway weight and load limitations are specified in the California Vehicle Code, Sections 35550 to 35559. The following general provisions would apply to the project:

- The gross weight imposed upon the highway by the wheels on any axle of a vehicle shall not exceed 20,000 pounds, and the gross weight upon any one wheel, or wheels, supporting one end of an axle, and resting upon the roadway, shall not exceed 10,500 pounds.
- The maximum wheel load is the lesser of the following: (a) the load limit established by the tire manufacturer, or (b) a load of 620 pounds per lateral inch of tire width, as determined by the manufacturer's rated tire width.

For vehicles with trailers or semi-trailer, the following provision applies:

- The gross weight imposed upon the highway by the wheels on any one axle of a vehicle shall not exceed 18,000 pounds, and the gross weight upon any one wheel, or wheels, supporting one end of an axle and resting upon the roadway, shall not exceed 9,500 pounds, except that the gross weight imposed upon the highway by the wheels on any front steering axle of a motor vehicle shall not exceed 12,500 pounds, according to California Vehicle Code Sections 35550-35559.

These weight and load limitations for state highways would also apply to county or city roadways if no limitations are specified by the local jurisdiction.

Local Jurisdictions

County and City Land Use Regulations and Ordinances

Local regulations and ordinances vary widely from area to area. Typically, local jurisdictions adopt building, grading, and erosion control ordinances, but no specific ordinances for anaerobic digester (AD) facilities. In addition, local jurisdictions typically require a traffic safety / traffic management plan for any project that includes lane closures, partial road closures, and road closures with detours. An encroachment permit is required for any work to be performed in the roadway right-of-way.

9.2 Impacts and Mitigation Measures

Approach and Methods

This chapter assesses the transportation impacts that could result from the adoption of a comprehensive program to foster the development of AD facilities that process the organic fraction of municipal solid waste and other organic wastes throughout the State of California. As described in Chapter 3, Project Description, the AD Initiative will encourage the establishment of in-vessel digester facilities co-located with permitted solid waste facilities or located in areas zoned for industrial or solid waste handling activities.

Construction and operations of AD facilities would result in increased traffic on roads that provide access to those facility sites. The traffic increases would be greatest for AD facilities developed at new locations, and less when the AD facilities are located at existing solid waste facilities that already receive and handle the mixed solid waste to be used as feedstock for the digester. Due to the geographic scale of the project area and the range of actions that fall within the scope of development of future facilities, this impact analysis was conducted at a programmatic level, and impacts are discussed on a qualitative basis. Assumptions regarding the types of transport and the types of roads used to haul materials were used to assess the overall significance of project impacts. In determining the level of significance, the analysis assumed that the facilities would comply with relevant federal, state, and local ordinances and regulations. It also is assumed that project-level analysis of transportation-related safety hazards (associated with turning movements by large trucks) would be required for site-specific facilities as they are designed and constructed.

Thresholds of Significance

CEQA defines a significant effect on the environment as a substantial, or potentially substantial, adverse change in the physical conditions of the area affected by the project. An impact related to transportation would be considered significant if it would result in any of the following, which are from Appendix G of the CEQA *Guidelines*:

- Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit;
- Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways;
- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
- Substantially increase hazards due to a design feature (e.g. sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment);
- Result in inadequate emergency access;

- Conflict with adopted policies, plans or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

Additionally, the Institute of Transportation Engineers recommends the following screening criterion for assessing the effects of development projects that create permanent traffic increases (ITE, 1991):

- In lieu of other locally preferred thresholds, a traffic access/impact study should be conducted whenever a proposed development will generate 100 or more added (new) peak direction trips to or from the site during the adjacent roadway's peak hours or the development's peak hours.

The above criterion is intended to assess the effect of a traffic mix consisting primarily of automobiles and lightweight trucks. To account for the large percentage of heavy trucks associated with the project, the threshold level would reasonably be reduced to 50 new peak-direction trips. Therefore, project-related traffic is considered significant if transporting materials to an off-site location would cause a substantial increase in traffic volumes, defined as the generation of 50 or more trips per hour. Trips using private roads are not counted because that type of travel activity would not affect state, county or other public roadways.

The following discussion of environmental impacts is limited to those potential impacts that could result in some level of potentially significant environmental change, as defined by CEQA. Implementation of the project would not affect air traffic patterns of airports in the project area (bullet 3 above). In addition, implementation of the project would neither directly or indirectly eliminate existing or planned alternative transportation corridors or facilities (e.g., bike paths, lanes, bus turnouts, etc.), include changes in policies or programs that support alternative transportation, nor construct facilities in locations in which future alternative transportation facilities are planned (bullet 6 above). Therefore, no impact would occur under either of these two categories, and these two categories are not discussed further within this section. It is noted, however, that the potential effect of project construction on bus transit service is discussed in Impact 9.1.

Impact Analysis

Impact 9.1: Construction of AD facilities would intermittently and temporarily increase traffic congestion due to vehicle trips generated by construction workers and construction vehicles on area roadways. (Significant)

Although the project being evaluated under this Program EIR does not directly include construction of specific AD facilities, general information about construction is evaluated for facilities that could be developed as a result of the project. The analysis is based on the construction of project facilities as presented in Chapter 3, Project Description. The intensity and nature of the construction activity would vary over the construction period, and the number of vehicle trips generated by that activity would similarly vary. Vehicle trips would be generated primarily by construction workers commuting to and from the AD facility sites, and by trucks hauling materials and equipment to and from the sites.

Construction equipment would be delivered to and removed from each AD facility site in phases for site clearing, grading, excavation and foundation work; structure and building construction; interior, mechanical and electrical work; and finally, for road work, utilities and site finishing / landscaping. Earthwork (cut and fill) is expected to be balanced on-site (i.e., any excavated material cut would be used as fill on-site during the construction process), resulting in no off-hauling of cut or fill material, but that assumption will need to be confirmed during site-specific design of each AD facility.

If biogas at an AD facility is delivered by pipeline offsite, construction activities could include surface preparation, excavation, trench shoring, pipeline installation, trench backfilling, and surface restoration, which may include paving if the pipelines are constructed within roadway rights-of-way. Trenches would be temporarily closed at the end of each work day, by covering with steel trench plates and installing barricades to restrict access to staging areas. Jack and bore drilling may also be required for some areas of pipeline installation.

The primary offsite impacts resulting from the movement of construction trucks would include a short-term and intermittent lessening of roadway capacities due to the slower movements and larger turning radii of the trucks compared to passenger vehicles. Drivers could experience delays if they were traveling behind a heavy truck. The added traffic would be mostly apparent on the minor roadways serving the AD facility sites. Although project-related traffic is unlikely to exceed the threshold of significance of 50 or more trips per hour, project-level analysis of site-specific facilities could determine that addition of project-generated traffic would be considered substantial in relation to traffic flow conditions on local roadways. For this program level analysis, this impact is considered potentially **significant**.

Mitigation Measures

Measure 9.1: The contractor(s) will obtain any necessary road encroachment permits prior to installation of pipelines within the existing roadway right-of-way. As part of the road encroachment permit process, the contractor(s) will submit a traffic safety / traffic management plan (for work in the public right-of-way) to the agencies having jurisdiction over the affected roads. Elements of the plan will likely include, but are not necessarily limited to, the following:

- Develop circulation and detour plans to minimize impacts to local street circulation. Use haul routes minimizing truck traffic on local roadways to the extent possible. Use flaggers and/or signage to guide vehicles through and/or around the construction zone.
- To the extent feasible, and as needed to avoid adverse impacts on traffic flow, schedule truck trips outside of peak morning and evening commute hours.
- Limit lane closures during peak traffic hours to the extent possible. Restore roads and streets to normal operation by covering trenches with steel plates outside of allowed working hours or when work is not in progress.
- Limit, where possible, the pipeline construction work zone to a width that, at a minimum, maintains alternate one-way traffic flow past the construction zone.
- Install traffic control devices as specified in Caltrans' Manual of Traffic Controls for Construction and Maintenance Work Zones where needed to maintain safe

driving conditions. Use flaggers and/or signage to safely direct traffic through construction work zones.

- Coordinate with facility owners or administrators of sensitive land uses such as police and fire stations, hospitals, and schools. Provide advance notification to the facility owner or operator of the timing, location, and duration of construction activities.
- Coordinate with the local public transit providers so that bus routes or bus stops in work zones can be temporarily relocated as the service provider deems necessary.

Impact Significance After Mitigation: Less Than Significant

Implementation of Mitigation Measure 9.1 would lessen the impacts to traffic flow and congestion on area roadways to a less-than-significant level by avoiding as needed truck trips during peak commute hours, minimizing use of local roads by haul trucks, and coordinating with emergency service providers, schools, and transit providers.

Impact 9.2: AD facility operations would not substantially increase on-going (operational) traffic volumes on roadways serving the facilities. (Significant)

The AD facilities would operate 24 hours a day, but most of the digestion process would be automated, and most traffic activities limited to daytime hours. The expectation is that development of AD facilities (new facilities or located at existing solid waste facilities) would generate fewer than 50 vehicle trips (combined trucks and employee) per hour, which is the threshold of significance. For existing facilities, it is reasonable to expect that most of the traffic will already be coming to the facility, reducing the net increase in traffic volumes on area roads compared to AD facilities sited at new locations in areas zoned for industrial or solid waste handling activities. The trips generated by AD facilities would be assessed under subsequent environmental documents as specific facilities are defined and submitted for approval. As part of those assessments, mitigation measures would be identified, as needed, to reduce impacts to a less-than-significant level. For this program level analysis, this impact is considered potentially **significant**, but reliance on the site-specific analysis and identification of facility-required mitigation measures permits a program-level determination of a less-than-significant impact after mitigation.

Mitigation Measures

Measure 9.2: Measures will be imposed by applicable local agencies, as needed, to address site-specific significant traffic impacts identified during subsequent facility-specific analyses, implementation of which would reduce those impacts to a less-than-significant level.

Impact Significance After Mitigation: Less Than Significant

Implementation of Mitigation Measure 9.2 would lessen the impacts to traffic flow and congestion on area roadways to a less-than-significant level by requiring implementation of measures, as needed, to address site-specific significant traffic impacts identified during subsequent facility-specific analyses.

Impact 9.3: AD facilities could potentially cause traffic safety hazards for vehicles, bicyclists, and pedestrians on public roadways, and could increase traffic hazards due to possible road wear or to accidental spills of digestate (liquids and solids). (Significant)

Neither construction nor operation of AD facilities would likely alter the physical configuration of the existing roadway network serving the area, and would likely not introduce unsafe design features, but trucks generated by the project would interact with other vehicles on project area roadways. Creation of a construction work zone on high-volume roadways would potentially create traffic safety hazards where traffic is routed into the travel lane adjacent to the work zone. Potential conflicts could also occur between construction traffic and bicyclists and pedestrians. For this program level analysis, this impact is considered potentially **significant**.

In addition, construction activity along roads as well as heavy truck traffic delivering equipment and materials to AD facilities sites could result in road wear and damage that result in a driving safety hazard. The degree to which this impact would occur depends on the existing roadway design (pavement type and thickness) and existing condition of the road. Freeways, major arterials and collectors are designed to accommodate a mix of vehicle types, including heavy trucks. The project's impacts are expected to be negligible on those roads. However, rural roadways may not have been constructed to support the weight and use of large construction equipment. For this program level analysis, this impact is considered potentially **significant**.

The accidental spill of digestate along project-related access roads could create potential safety hazards for other motorists. Although the probability of accidental spills during the transport of materials is anticipated to be low, the consequences of a spill could be substantial, and this impact is considered potentially **significant**.

Mitigation Measures

Measure 9.3a: Implement Measure 9.1, which stipulates actions required of the contractor(s) to reduce potential traffic safety impacts to a less-than-significant level.

Measure 9.3b: Prior to construction, the contractor(s), in cooperation with the agencies having jurisdiction over the affected roadways, will survey and describe the pre-construction roadway conditions on rural roadways and residential streets. Within 30 days after construction is completed, the affected agencies will survey these same roadways and residential streets in order to identify any damage that has occurred. Roads damaged by construction will be repaired to a structural condition equal to the condition that existed prior to construction activity.

Measure 9.3c: Prior to initiation of project operations, the project sponsor(s) will submit a Spill Prevention Plan to the appropriate local agency. The Spill Prevention Plan will include, among other provisions, a requirement that each truck driver know how to carry out the emergency measures described in the Spill Prevention Plan (therefore reducing roadway hazards if an accidental spill were to occur).

Impact Significance After Mitigation: Less Than Significant

Implementation of Mitigation Measures 9.1, 9.3b and 9.3c would lessen the impacts to traffic safety on area roadways to a less than significant level by using traffic control devices to safely direct vehicular movements through the construction area, by repairing damage to roadway pavement caused by project-generated heavy trucks, and by requiring submittal of a Spill Prevention Plan, as well as by avoiding as needed truck trips during peak commute hours, minimizing use of local roads by haul trucks, and coordinating with emergency service providers, schools, and transit providers.

Impact 9.4: AD facilities could intermittently and temporarily impede access to local streets or adjacent uses (including access for emergency vehicles), as well as disruption to bicycle/pedestrian access and circulation. (Significant)

Operations of project facilities would have no effect on access to local streets or adjacent uses (including access for emergency vehicles). Nor would bicycle/pedestrian access and circulation be adversely affected by facility operations. The project could, however, result in construction of new pipelines within right-of-way of the public roadways. Such construction activity could result in road restrictions that affect the vehicle travel lanes in order to provide adequate construction work area, and could temporarily block vehicle, bicycle and pedestrian access to local streets or property driveways, including access for emergency vehicles. For this program level analysis, this impact is considered potentially **significant**.

Mitigation Measures

Measure 9.4: Implement Measure 9.1, which stipulates actions required of the contractor(s) to reduce potential access impacts to a less-than-significant level.

Impact Significance After Mitigation: Less Than Significant

Implementation of Mitigation Measure 9.1 would lessen the impacts to access to local streets or adjacent uses to a less than significant level by coordinating with emergency service providers, including advance notification of the timing, location, and duration of construction activities.

Impact 9.5: The project could contribute to cumulative impacts to traffic and transportation (traffic congestion, traffic safety, and emergency vehicle access). (Significant)

The geographic scope of potential cumulative traffic impacts includes access routes to regional and local roadways used for haul routes and construction equipment/vehicle access throughout the project area. As described under Impact 9.2, operating the facilities associated with the project is expected to generate less-than-substantial increases in traffic volumes on area roadways for various reasons, including the fact that if an AD facility were already an existing solid waste facility, most of the traffic will already be coming to the facility, reducing the net increase in traffic volumes on area roads. While the less-than-substantial increase in traffic volumes associated with individual AD facilities is reasonable for this program-level analysis, determination of the cumulative impact related to the increase in traffic volumes generated by the total number of AD facilities (of different types and

character) is speculative at this time. However, given the dispersion of truck trips over the statewide network of roads, and the fact that the vehicle trips would occur over the course of a day, the expectation is that project-related traffic would not exceed the threshold of significance of 50 or more trips per hour, and the contribution to cumulative traffic conditions would be less than significant. As described under Impact 9.2, there would be assessment of cumulative traffic increases under subsequent environmental documents as specific facilities are defined and submitted for approval. As part of those assessments, mitigation measures would be identified, as needed, to reduce impacts to a less-than-significant level.

However, constructing those facilities, also described above, could result in intermittent and temporary traffic-related impacts in the cumulative context. Traffic impacts include temporary increases in traffic congestion, increased potential for traffic safety hazards, and temporary and intermittent impedances to access.

The project has the potential to contribute to potentially significant cumulative construction-related impacts as a result of (1) cumulative projects (such as land development projects) that generate increased traffic at the same time on the same roads as would the proposed project, causing increased congestion and delays; and (2) infrastructure projects in roads that would be used by project construction workers and trucks, which could affect detour routes around project work zones or could delay project-generated vehicles past the work zones of those other projects.

Implementation of circulation and detour plans, installing traffic control devices, and scheduling (to the extent feasible) truck trips outside of peak morning and evening commute hours (as identified in Mitigation Measures 9.1, 9.3b and 9.3c) would reduce the project's contribution to the cumulative impacts. However, some traffic disruption and increased delays would still occur during project construction, even with mitigation. Given the lack of certainty about the timing (and identification) of development of AD facilities, as well as that for other projects within the AD project's vicinity (specifically projects that would overlap), it is prudent to conclude for this program-level analysis that significant cumulative traffic and circulation impacts could occur.

Mitigation Measures

Measure 9.5a: Prior to construction, the project sponsor will coordinate with the appropriate local government departments, Caltrans, and utility districts and agencies regarding the timing of construction projects that would occur near AD project sites. Specific measures to mitigate potential significant impacts will be determined as part of the interagency coordination, and could include measures such as employing flaggers during key construction periods, designating alternate haul routes, and providing more outreach and community noticing.

Measure 9.5b: Implement Mitigation Measure 9.2.

Measure 9.5c: Implement Mitigation Measures 9.1, 9.3b and 9.3c.

Impact Significance After Mitigation: Less than Significant.

Implementation of Mitigation Measure 9.5 would lessen the cumulative impacts to a less than significant level by coordinating mitigating strategies among the concurrent projects.

9.3 References

Institute of Transportation Engineers (ITE), 1991. *Traffic Access and Impact Studies for Site Development – A Recommended Practice*, 1991.

CHAPTER 10
Aesthetics

10.1 Environmental Setting

Visual Landscape

California contains a number of distinct types of landscapes with varying levels of development. For the purposes of the EIR, the visual environment has been divided into several categories based on typical land uses: urban/developed, urban transition, agricultural, and natural open space.

Urban/Developed – Urban/developed areas are typical for incorporated areas within California. These areas include existing commercial, industrial, public and/or residential uses.

Urban Transition – Urban transition or urban fringe areas are located on the edge of urban development and provide a buffer between urban and agricultural or open space uses. Transitional land uses on the edge of urban fringe areas may include commercial, industrial or public uses compatible with agricultural or open space uses.

Agricultural - Agricultural areas are typified by broad open agricultural fields including dairies, cropland, vineyards, orchards, and grazing land. Typical elements include farm structures and equipment and scattered rural residences.

Natural Open Space - Undeveloped natural areas include expanses of valleys, foothills, mountains, deserts, forests, wetlands, and coastal resources among others which are not utilized for agriculture. Some natural open space areas are designated as federal, state or local parklands or recreation areas.

Scenic Roadways

A highway may be designated scenic under California's Scenic Highway Program depending upon how much of the natural landscape can be seen by travelers, the scenic quality of the landscape, and the extent to which development intrudes upon the traveler's enjoyment of the view. The corridor protection program does not preclude development, but seeks to encourage quality development that does not degrade the scenic value of the corridor. Scenic Highways are identified as either eligible (E) for listing or officially designated (OD). A list of eligible and officially designated routes is available on the California Department of Transportation website (Caltrans, 2010).

Anaerobic Digester (AD) Facilities

Descriptions and photographs of typical wet and dry AD facility components are included within Chapter 3, Project Description.

Sensitive Receptors

Sensitive receptors subject to the potential effects of visual changes resulting from the project include travelers along local roadways and regional highways as well as residents living near new AD facilities. Given the programmatic nature of this analysis, specific locations of potential receptors cannot be identified at this time.

Regulatory Requirements

Federal

There are no federal aesthetic regulations applicable to this program.

State

California Department of Transportation – California Scenic Highways Program

California's Scenic Highway Program, run by Caltrans, was created by the Legislature in 1963. Its purpose is to protect and enhance the natural scenic beauty of California highways and adjacent corridors, through special conservation treatment. The State laws governing the Scenic Highway Program are found in the Streets and Highways Code, §260 through §263. Responsibility for the development of scenic highways, and the establishment and application of specific planning and design standards and procedures falls to State and local agencies.

Local Jurisdictions

California counties and cities have general plan documents which provide guidance and policies related to land use. Some general plans may designate scenic vistas or corridors in addition to those recognized at the state level. Local zoning ordinances establish design guidelines such as minimum setbacks, maximum height requirements, maximum density and/or landscaping requirements.

10.2 Impacts and Mitigation Measures

Approach and Methods

The following program-level evaluation of aesthetic impacts was conducted using available research and consultation with technical professionals who have visited pilot-scale and full-scale AD facilities.

The impact analysis focuses on foreseeable changes to existing conditions attributable to the project. At the program-level site-specific conditions are unknown but it is assumed that most projects would be proposed in urban/developed or urban transition areas or co-located with other solid waste facilities.

The evaluation assumes that individual projects would perform required design review (including review of minimum setbacks, maximum height requirements, maximum density and/or landscaping requirements) although specific requirements are unknown as they vary by jurisdiction. The evaluation also assumes individual projects would comply with applicable ordinances related to lighting (such as night-sky ordinances).

Thresholds of Significance

An impact related to aesthetics would be considered significant if it would result in any of the following, which are adapted from Appendix G of the CEQA *Guidelines*:

- Have a substantial adverse effect on a scenic vista;
- Substantially damage scenic resources, including but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway;
- Substantially degrade the existing visual character or quality of the site and its surroundings; or
- Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

Impact Analysis

Impact 10.1: AD facilities could have adverse effects on a scenic vista and/or scenic resources. (Significant)

If AD facilities are located in an urban/developed, urban transition, or other area with an existing permitted solid waste facility, significant effects to scenic vistas or resources would not be expected due to existing development or planned development on the site and in the vicinity. However, this impact must be evaluated further at the individual project level. At the individual project level, impacts to scenic vistas and resources could occur from construction, pre-processing equipment (grinding, screening, sorting, etc.), buildings and/or structures (digester, administrative facilities), or biogas equipment (gas boosters, fuel cells, flares, IC engines, etc). These activities and facilities could interfere with existing views of scenic vistas or resources and thus this impact is potentially significant.

Mitigation Measures

Measure 10.1a: Avoid siting AD facilities near scenic vistas and corridors designated within an applicable land use plan and the State Scenic Highway Program.

Measure 10.1b: Landscaping and/or vegetated berms should be used to minimize views of facilities from sensitive views.

Impact Significance After Mitigation: Less than Significant

Implementation of these mitigation measures would reduce impacts to scenic vistas and resources to a less-than-significant level.

Impact 10.2: AD facilities could degrade the existing visual character/quality of the site and its surroundings. (Significant)

The visual character of an AD facility would be similar to many large-scale permitted solid waste facilities. Pre-processing and post-processing may be done either on a pad or in a building. The digestion process would occur within a tank (wet processes) or other enclosed facility (dry processes). AD activities and facilities could potentially affect sensitive viewsheds such as residences or views along a scenic corridor. Potential concerns include the following:

- Litter - Any facility receiving solid waste needs to be concerned with the potential for blowing litter. This is particularly true if the facility uses an outdoor or unenclosed tipping area. Outdoor pre-processing equipment (grinding, screening, sorting, etc) can also be a source of blowing litter.
- Piling - Handling and storage of feedstock and digester byproducts can create visibly deteriorated site conditions if outdoor piling occurs.
- Buildings – AD facilities could include administrative buildings or buildings that enclose operations. These buildings have the potential to degrade visual quality based on the height and design of the buildings.
- Cylindrical Tanks (Wet processes) – The tanks that enclose wet digester processes can be large in order to hold substantial processed feedstock. These tanks have the potential to degrade the character of areas without existing facilities of this scale. An extensive literature review shows variations of tanks ranging from 20 feet to 75 feet in height. Tank size is dependent on a number of factors including planned capacity, specific technology, number of tanks and diameter. For example, based on a range of digester technologies it is estimated that an 18,000 ton per year digester would be approximately 25 to 33 feet in height (Remade Scotland, 2003). The Ecoparc Montcada in Barcelona, an example of a large AD facility, has a treatment capacity of 240,000 tons per year (Valorga International, 2011) and includes three digester tanks which are 75 feet in height (Columbia University, 2005).
- Flare - Outdoor processing of biogas could also affect surrounding views. Post-processing facilities would require an outdoor gas booster pump and flare to combust raw biogas; facilities conditioning biogas would still require flare facilities in the event of equipment failure. Effects from flare are specifically addressed in Impact 10.3.

This is a potentially significant impact to the site character that would be reduced through mitigation to less than significant.

Mitigation Measures

Measure 10.2a: Implement Mitigation Measures 10.1a and 10.1b above.

Measure 10.2b: Facilities using truck tippers or other un-enclosed unloading should consider using litter fences to manage blowing litter. Facilities should educate haulers

delivering materials to the AD facility through literature, web links, or provide training on the acceptance of waste at the facilities to minimize litter. Facility operators should develop a protocol to identify feedstocks that are severely contaminated with potential litter and reject unacceptable loads.

Measure 10.2c: Clean-up crews can be used as necessary to control litter.

Measure 10.2d: Feedstocks and digestate byproducts should be stored in enclosed facilities or processed in a timely manner to prevent visibly deteriorated site conditions.

Measure 10.2e: Project operators should consider enclosure of pre-processing operations if it provides an aesthetic and/or noise attenuating benefit.

Impact Significance After Mitigation: Less than Significant

The implementation of these mitigation measures would reduce impacts to the visual character/quality of the site and surroundings to a less-than-significant level.

Impact 10.3: AD facilities could create a new source of light or glare with adverse affects to daytime and/or nighttime views. (Significant)

Project operations may require the use of portable or permanent outdoor lighting during low light conditions or nighttime for safe operations. This may be a source of concern in light sensitive areas (such as areas near observatories, residences, roads or in rural locations). Additionally, flares from biogas processing may be visible, particularly at night. An example of a flare from an AD facility can be seen below in **Figure 10-1**. This impact is potentially significant.

Mitigation Measures

Measure 10.3a: Implement 10.1b above.

Measure 10.3b: Any lighting (portable or permanent) should be hooded and directed onto the project site. This would reduce effects to nighttime skies from uplighting, reduce glare, and prevent light from spilling onto adjoining properties and roads.

Measure 10.3c: Flares may be enclosed to reduce the visibility of flames during operation.

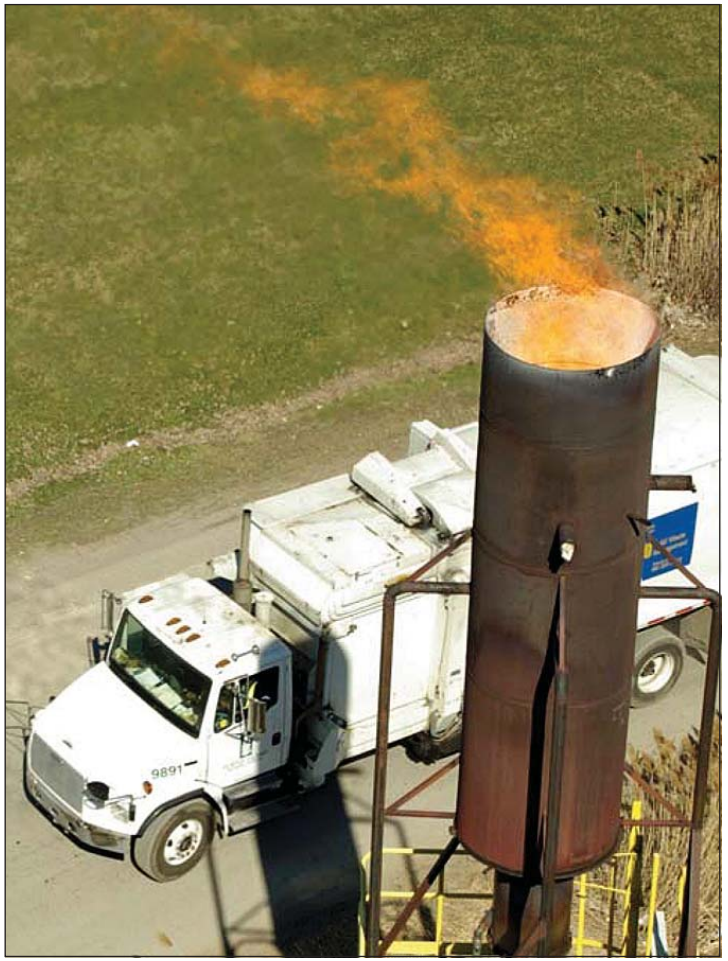
Impact Significance After Mitigation: Less than Significant

The implementation of these mitigation measures would reduce impacts from light and glare to a less-than-significant level.

Impact 10.4: The project could result in cumulative impacts to visual resources. (Significant)

Future development is guided by city and county General Plans, and other applicable planning and environmental documents. New development would be subject to the local jurisdiction's design review process and lighting regulations if established. While AD facilities would be spread throughout the State, individual projects have the potential to cumulatively impact visual resources at the project-

PHOTOGRAPH 1. Dufferin facility in Toronto, Canada (City of Toronto, 2009).



PHOTOGRAPH 2. Flare at Dufferin facility (City of Toronto, 2009).

SOURCE: ESA, 2010

Figure 10-1
Dufferin Facility Photographs

level when combined with other development in the vicinity of the proposed AD facility. For example, several projects including an AD facility may be proposed in a previously undeveloped area or within a scenic area. While these cumulative impacts have the potential to be significant, incorporation of the mitigation measures in this chapter (10.1a, 10.1b, 10.2a, 10.2b, 10.2c, 10.2d, 10.2e, 10.3a, 10.3b, 10.3c) would reduce the project's contribution to a less-than-significant level.

Mitigation Measures

Measure 10.4: Implement Mitigation Measures 10.1a, 10.1b, 10.2a, 10.2b, 10.2c, 10.2d, 10.2e, 10.3a, 10.3b, and 10.3c, above.

Impact Significance After Mitigation: Less than Significant

The implementation of these mitigation measures would reduce the project's contribution to cumulative aesthetic impacts to a less-than-significant level.

10.3 References

Caltrans, 2010. Eligible (E) And Officially Designated (OD) Routes http://www.dot.ca.gov/hq/LandArch/scenic/cahisys.htm. Last updated May 19, 2008.

California Integrated Waste Management Board, 2008. *Current Anaerobic Digestion Technologies Used for Treatment of Municipal Organic Solid Waste*. March 2008.

City of Toronto, 2009. City of Toronto Case Study in the Anaerobic Digestion of Source Separated Organic Material, Prepared by Brian Van Opstal, Manager, Operational Planning Solid Waste Management Services, City of Toronto, November 17, 2009.

Columbia University, 2005. Solid Waste Management Alternatives for the City of New York. Prepared for the New York City Economic Development Corporation by Columbia University's School of International and Public Affairs and The Earth Institute Master of Public Administration Program in Environmental Science and Policy, Spring 2005, available online at: http://www.columbia.edu/cu/mpaenvironment/pages/projects/EDC%20Submission.pdf, accessed January 7, 2011.

Humboldt Waste Management Authority, 2010. Humboldt Regional Food Waste Digester Project Description. August 4, 2010.

Remade Scotland, 2003. An Introduction to Anaerobic Digestion of Organic Wastes, November 2003, available online at: http://www.remade.org.uk/media/9102/an%20introduction%20to%20anaerobic%20digestion%20nov%202003.pdf, accessed January 7, 2011.

Valorga International, 2011. Valorga International References, Barcelona - Ecoparque II (Spain), available online at: http://www.valorgainternational.fr/en/pag8-OUR-REFERENCES.html, accessed January 7, 2011.

CHAPTER 11
Hazards and Hazardous Materials

11.1 Environmental Setting

For the purposes of this analysis, the term "hazardous materials" refers to both hazardous materials and hazardous wastes. Under federal and State laws, any material, including wastes, may be considered hazardous if it is specifically listed by statute as such or if it is toxic (causes adverse human health effects), ignitable (has the ability to burn), corrosive (causes severe burns or damage to materials), or reactive (causes explosions or generates toxic gases). The term "hazardous material" is defined as any material that, because of quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment.[1]

Potential Presence of Hazardous Materials in Soil and Groundwater

Hazardous materials, including but not limited to pesticides and herbicides, heavy metals, volatile organic compounds, oil and gas, may be present in soil and groundwater in areas where land uses have resulted in leaking fuel or chemical storage tanks or other releases of hazardous materials have occurred. Land uses that typically involve the handling of hazardous materials include commercial or industrial operations, as well as agricultural areas where soils may contain pesticides and herbicides.

Various federal, State, and local regulatory agencies maintain lists of hazardous materials sites where soil and/or groundwater contamination is known or suspected to have occurred, typically as a result of leaking storage tanks or other spills. These facilities are readily identified through regulatory agency database searches, such as the State Water Resources Control Board (SWRCB) GeoTracker online database, the California Environmental Protection Agency (CalEPA) Department of Toxic Substances Control (DTSC) Envirostor online database, and several other federal, State and local regulatory agency databases. **Table 11-1** includes these, and other database references.

For this project, a search of the GeoTracker database was conducted. This database alone identified over 60,000 cleanup sites within the California Regional Water Quality Control Board (RWQCB) regions, as shown in **Table 11-2**. These facilities included hazardous materials cleanup sites, leaking underground storage tank (LUST) cleanup sites, land disposal cleanup sites, and cleanups on military properties.

[1] State of California, Health and Safety Code, Chapter 6.95, Section 25501(o).

TABLE 11-1
DESCRIPTION OF REGULATORY AGENCY LISTS

Regulatory Agency Database List	Description
National Priorities List (NPL)	Compilation of over 1,200 sites for priority cleanup under the Federal Superfund Program.
Proposed National Priorities List (PNPL)	Sites considered for NPL listing.
Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS)	Contains data on potentially hazardous waste sites that have been reported to the USEPA by California. CERCLIS contains sites which are either proposed to or on the NPL and sites which are in the screening and assessment phase for possible inclusion on the NPL.
CERCLIS No Further Remedial Action Planned (CERC-NFRAP)	CERC-NFRAP are archived sites which indicate an assessment of the site has been completed and that the EPA has determined no further steps will be taken to list the site on NPL.
Resource Conservation and Recovery Act (RCRA) Corrective Action Plan (CORRACTS)	The Resource Conservation and Recovery Act database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste. Identifies hazardous waste handlers with RCRA corrective action activity.
Resource Conservation and Recovery Information System - Treatment, Storage or Disposal Facilities (RCRIS-TSDF)	TSDF's treat, store, or dispose of waste from sites which generate, transport, store, treat and/or dispose of hazardous waste.
RCRA Registered Large and Small Quantity Generators of Hazardous Waste (LQG/SQG)	Registered generators of hazardous waste.
Emergency Response Notification System (ERNS)	The ERNS records and stores information on reported releases of oil and hazardous substances. The source of the ERNS information is from the USEPA.
Formerly Used Defense Sites Properties (FUDS)	Includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.
Cal-Sites	Previously referred to as the Abandoned Sites Program Information System, this list identifies potential hazardous waste sites, which are then screened by the Department of Toxic Substances Control (DTSC) to evaluate the need for further action.
California Hazardous Materials Incident Report System (CHMIRS)	Spills and other incidents gathered from the California Office of Emergency Services.
Hazardous Wastes & Substances Sites List (Cortese)	Historical compilation of sites listed in the LUST, SWF/LF and CALSITES databases. No longer maintained as an active database.
Proposition 65 Records (Notify 65)	This database, maintained by the State Water Resources Control Board (SWRCB), contains facility notifications about any release that could impact drinking water and thereby expose the public to a potential health risk.
Toxic Pits Cleanup Act Sites (Toxic Pits)	Sites suspected of containing hazardous substances that have not yet been cleaned up. Maintained by SWRCB.
Solid Waste Facilities/Landfill Sites (SW/LF)	Solid waste facilities and landfills that are active, inactive or closed.
Waste Management Unit Database (WMUDS/SWAT)	Waste Management Unit Database System (WMUDS) is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units.
Leaking Storage Tanks (LUST)	List of LUSTs compiled by the SWRCB.
Registered Underground Storage Tanks (USTs)	Active UST facilities gathered from the local regulatory agencies.
Facility Inventory Database (CA FID UST)	The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board.
Hazardous Substance Storage Container Database (HIST UST)	The Hazardous Substance Storage Container Database is a historical listing of UST sites.

TABLE 11-1
DESCRIPTION OF REGULATORY AGENCY LISTS

Regulatory Agency Database List	Description
Aboveground Storage Tank database (AST)	Registered Aboveground Storage Tanks.
Statewide Environmental Evaluation and Planning System (SWEEPS)	Statewide Environmental Evaluation and Planning System (SWEEPS) is an underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1980's.
Dry Cleaners	A list of drycleaner related facilities that have EPA ID numbers.
California Spills, Leaks, Investigation and Cleanup Cost Recovery Listing (CA SLIC)	This database, maintained by the SWRCB, lists spills, leaks, investigation and cleanup costs from sites.
Haznet	The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments.
Response	Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity.
Envirostor	EnviroStor database identifies sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites.

SOURCE: EDR 2006.

TABLE 11-2
SWRCB GEOTRACKER LISTED CLEANUP SITES IN CALIFORNIA

ORGANIZATION NAME	Cleanup Program Site	LUST Cleanup Site	Land Disposal Site	Military Cleanup Site	Military Privatized Site	Military UST Site
NORTH COAST RWQCB (REGION 1)	771	2220	159	64	0	52
SAN FRANCISCO BAY RWQCB (REGION 2)	2013	10222	140	295	78	548
CENTRAL COAST RWQCB (REGION 3)	310	1963	77	107	9	311
LOS ANGELES RWQCB (REGION 4)	3334	8417	213	476	0	79
CENTRAL VALLEY RWQCB (REGION 5F)	634	2920	711	60	0	50
CENTRAL VALLEY RWQCB (REGION 5R)	183	887	44	0	0	3
CENTRAL VALLEY RWQCB (REGION 5S)	1465	4515	313	689	54	559
LAHONTAN RWQCB (REGION 6T)	80	429	26	37	0	7
LAHONTAN RWQCB (REGION 6V)	37	564	105	952	0	236
COLORADO RIVER BASIN RWQCB (REGION 7)	53	856	97	135	0	109
SANTA ANA RWQCB (REGION 8)	446	4181	163	170	0	174
SAN DIEGO RWQCB (REGION 9)	2196	3370	146	546	0	704
NO REGIONAL BOARD SPECIFIED	0	1	4	0	0	0
Total	**11522**	**40545**	**2198**	**3531**	**141**	**2832**

SOURCE: State Water Resources Control Board GeoTracker website, 2010

Anaerobic Digester and Biogas Hazards

Anaerobic digesters are confined spaces that pose a potential immediate threat to human life. They are designed to seal out oxygen making death by asphyxiation possible within seconds of entry. Further, gases such as hydrogen sulfide and ammonia accumulate inside a digester. Notably, Cal/OSHA is responsible for developing and enforcing workplace safety standards, including confined space and lockout procedures.

Biogas consists primarily of methane, carbon dioxide, with small amounts of hydrogen sulfide, and ammonia. Typically, biogas is saturated with water vapor and may have trace amounts of hydrogen, nitrogen, oxygen, dust and siloxanes (Greer, 2010). Theoretically, two-stage digester systems could be used to produce biogas richer in hydrogen if isolated after the first stage of the process, and a methane rich biogas after the second stage. Although the hydrogen rich biogas would have potentially greater concentrations of hydrogen than the typical biogas generated through anaerobic digestion, the hydrogen would still be in low concentrations and would not pose a substantial combustion hazard. There are no known commercial systems that are designed to produce hydrogen-rich biogas. However, biogas can be reformulated into hydrogen if fuel cells are used to generate heat and electricity. For the typical anaerobic digestion process, the majority of hydrogen is converted into methane through hydrogenotrophic methanogenesis. Methane is not toxic, but is classified as a simple asphyxiate, possessing a slight inhalation hazard. If breathed in high concentration, oxygen deficiency can result in serious injury or death. Biogas itself is not explosive and will not burn unless oxygen is available at low concentrations. Biogas is explosive when mixed with air in concentrations of 5 to 15 percent. A leak in a gas line can create a fire hazard if an ignition source is present and the concentration of flammable constituents is at a hazardous level, however, in open spaces biogas readily mixes with air reducing its potential to reach flammable concentrations. The risk of fire hazard is generally low because anaerobic digestion (AD) facilities and biogas transmission lines operate with very low pressures, similar to residential natural gas distribution lines. Typical construction standards for AD facilities include redundant fire safety relief valves to prevent over pressurizing, flame arresters, gas detectors and physical barriers to minimize fire and explosion hazards.

Wildfire Hazards

While all of California is subject to some degree of wildfire hazard, there are specific features that make certain areas more hazardous. The California Department of Forestry and Fire Protection (CAL FIRE) is required by law to map areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors (PRC 4201-4204 and Govt. Code 51175-89). Factors that increase an area's susceptibility to fire hazards include slope, vegetation type and condition, and atmospheric conditions. CAL FIRE has created maps of each county that depict the fire hazard severity zoning of the area. These maps can be obtained at:

http://www.fire.ca.gov/fire_prevention/fire_prevention_wildland_zones.php.

These maps identify high fire hazard areas that are subject to regulations designed to minimize fire potential and assist local planning agencies to develop policies and programs for these high risk areas.

Pathogens and Vectors

Pathogens are disease-causing organisms, such as certain bacteria, viruses and parasites. Vectors are organisms, such as flies, mosquitoes, rodents and birds that can spread disease by carrying and transferring pathogens (U.S. EPA, 1994). Vectors can transmit pathogens to humans and other hosts physically through contact or biologically by playing a specific role in the life cycle of the pathogen.

Regulatory Requirements

There are numerous federal, State, and local laws, regulations, ordinances and guidance intended to protect public health and safety and the environment. The U.S. Environmental Protection Agency (U.S. EPA), CalEPA, DTSC, RWQCB, California Air Resources Board (CARB), federal and California Occupational Safety and Health Administration (OSHA), California Department of Resources Recycling and Recovery (CalRecycle), CAL FIRE and the local oversight agencies are the major federal, State, and regional agencies that enforce these regulations. The main focus of OSHA is to prevent work-related injuries and illnesses, including from exposures to hazardous materials. CalRecycle is mandated to reduce waste, promote the management of materials to their highest and best use, and protect public health and safety and the environment (CalRecycle, 2010). CAL FIRE implements fire safety regulations. In accordance with Chapter 6.11 of the California Health and Safety Code (§ 25404, et seq.), local regulatory agencies enforce many federal and state regulatory programs through the Certified Unified Program Agency (CUPA) program, including:

- Hazardous materials business plans (Chapter 6.95 of the Health and Safety Code, §25501 et seq.).
- State Uniform Fire Code requirements (§80.103 of the Uniform Fire Code as adopted by the state fire marshal pursuant to Health and Safety Code §13143.9).
- Underground storage tanks (Chapter 6.7 of the Health and Safety Code, §25280 et seq.).
- Aboveground storage tanks (Health and Safety Code §25270.5[c]).
- Hazardous waste generator requirements (Chapter 6.5 of the Health and Safety Code, §25100 et seq.).

The following is a summary of how hazardous materials and public health and safety are regulated by applicable topic. Within each summary is a discussion of the relevant federal, State and local regulatory structure.

AD Facilities and Operations

CalRecycle regulates AD facilities as either compost facilities or transfer and processing facilities, depending upon whether the feedstock is compostable (CIWMB, 2009). Regulations

regarding solid waste facilities and compostable materials handling, operations, and regulatory requirements are established in California Code of Regulations Title 14 and can be obtained at:

http://www.calrecycle.ca.gov/Laws/Regulations/title14/default.htm.

These regulations are overseen by CalRecycle and its designated local enforcement agencies (LEAs). These regulations include, but are not limited to, the following for compost facility operations: establishes permitting and inspection requirements; prohibits acceptance of hazardous wastes, liquids and sludges; outlines general operating standards; provides for removal of contaminants from compost and feedstock; requires materials handling in a manner that minimizes vectors and prevents unauthorized access by individuals and animals; outlines pathogen reduction and sampling requirements; establishes recordkeeping and facility closure requirements.

Specific regulations that provide LEAs the means to address issues regarding vectors, odor, and other nuisances include the following for composting operations and transfer/processing operations respectively:

1. "All handling activities shall be conducted in a manner that minimizes vectors, odor impacts, litter, hazards, nuisances, and noise impacts; and minimizes human contact with, inhalation, ingestion, and transportation of dust, particulates, and pathogenic organisms" (Composting Operating Standards in CA Title 14, Division 7, Chapter 3.1, Article 6, Section 17867); and,
2. "The operator shall take adequate steps to control or prevent the propagation, harborage and attraction of flies, rodents, or other vectors, and animals, and to minimize bird attraction" (Minimum Standards for Solid Waste Handling and Disposal are in CA Title 14, Division 7, Chapter 3. Article 6.1, Section 17410.4).

LEAs perform routine inspections to certify compliance with permit conditions to ensure that State programs are effectively implemented. CalRecycle can also initiate enforcement actions in addition to, or in lieu of, the LEA.

Soil and Groundwater Contamination

Remediation of contaminated sites is generally performed under the oversight of the local CUPA, or in some instances, the RWQCB and/or DTSC. At sites where contamination is suspected or known to have occurred, the site owner is required to perform a site investigation and perform site remediation, if necessary. Site remediation or development may also be subject to regulation by other agencies. For example, if a project required dewatering near a hazardous waste site, the project sponsor might be required to obtain a permit from the municipal sewer agency before discharging the water to the sewer system, or a National Pollutant Discharge Elimination System (NPDES) permit from the RWQCB before discharging to the storm water collection system.

Worker Safety Requirements

The federal Occupational Safety and Health Administration (Fed-OSHA) and the California Occupational Safety and Health Administration (Cal-OSHA) are the agencies responsible for assuring

worker safety in the handling and use of chemicals in the workplace. The federal regulations pertaining to worker safety are contained in Title 29 of the Code of Federal Regulations (CFR), as authorized in the Occupational Safety and Health Act of 1970. They provide standards for safe workplaces and work practices, including standards relating to hazardous materials handling. In California, Cal-OSHA assumes primary responsibility for developing and enforcing workplace safety regulations; Cal-OSHA standards are generally more stringent than federal regulations.

The state regulations concerning the use of hazardous materials in the workplace are included in Title 8 of the California Code of Regulations, which contain requirements for safety training, availability of safety equipment, accident and illness prevention programs, hazardous substance exposure warnings, and emergency action and fire prevention plan preparation. Cal-OSHA also enforces hazard communication program regulations, which contain worker safety training and hazard information requirements, such as procedures for identifying and labeling hazardous substances, communicating hazard information related to hazardous substances and their handling, and preparation of health and safety plans to protect workers and employees.

At sites where hazardous materials are present, workers must receive training in hazardous materials operations and a site health and safety plan must be prepared. The health and safety plan establishes policies and procedures to protect workers and the public from exposure to potential hazards at the site.

Hazardous Materials Business Plans

State and federal laws require detailed planning to ensure that hazardous materials are properly handled, used, stored, and disposed of, and, in the event that such materials are accidentally released, to prevent or to mitigate injury to health or the environment. California's Hazardous Materials Release Response Plans and Inventory Law, sometimes called the "Business Plan Act," aims to minimize the potential for accidents involving hazardous materials and to facilitate an appropriate response to possible hazardous materials emergencies. The law requires businesses that use hazardous materials to provide inventories of those materials to designated emergency response agencies, to illustrate on a diagram where the materials are stored on-site, to prepare an emergency response plan, and to train employees to use the materials safely.

Use and Storage of Hazardous Materials

State and federal laws require detailed planning and management to ensure that hazardous materials are properly handled, used, stored, and disposed of, and, in the event that such materials are accidentally released, to reduce risks to human health and the environment. Hazardous waste regulations establish criteria for identifying, packaging, and labeling hazardous wastes; dictate the management of hazardous waste; establish permit requirements for hazardous waste treatment, storage, disposal, and transportation; and identify hazardous wastes that cannot be disposed of in landfills.

State laws governing underground storage tanks (USTs) specify requirements for permitting, monitoring, closure, and cleanup of these facilities. Regulations set forth construction and monitoring standards for existing tanks, release reporting requirements, and closure requirements. In general,

the local CUPA has regulatory authority for permitting, inspection, and removal of USTs. Any entity proposing to remove a UST must submit a closure plan to the CUPA prior to tank removal. Upon approval of the UST closure plan, the CUPA would issue a permit, oversee removal of the UST, require additional subsurface sampling if necessary, and issue a site closure letter when the appropriate removal and/or remediation has been completed. USTs are not typically associated with AD facilities; however, these regulations are relevant due to the potential of leaking USTs to affect subsurface conditions at potential project sites.

The Aboveground Petroleum Storage Act of 1990 requires facilities storing petroleum products in a single tank greater than 1,320 gallons, or facilities storing petroleum in aboveground tanks or containers with a cumulative storage capacity of greater than 1,320 gallons to file a storage statement with the State Water Board and prepare a spill prevention, control, and countermeasure plan. The plan must identify appropriate spill containment or equipment for diverting spills from sensitive areas, as well as discuss facility-specific requirements for the storage system, inspections, recordkeeping, security, and personnel training.

Transport of Hazardous Materials

The United States Department of Transportation (DOT) regulates hazardous materials transportation on all interstate roads. Within California, the state agencies with primary responsibility for enforcing federal and State regulations and for responding to transportation emergencies are the CHP and Caltrans. Together, federal and State agencies determine driver-training requirements, load labeling procedures, and container specifications. Although special requirements apply to transporting hazardous materials, requirements for transporting hazardous waste are more stringent, and hazardous waste haulers must be licensed to transport hazardous waste on public roads.

Emergency Response

California has developed an emergency response plan to coordinate emergency services provided by federal, State, and local government and private agencies. Responding to hazardous materials incidents is one part of this plan. The plan is administered by the State Office of Emergency Services (OES), which coordinates the responses of other agencies. The local Emergency Response Team (ERT) coordinates response to hazardous materials emergencies within the project area. ERT members respond and work with local fire and police agencies, emergency medical providers, California Highway Patrol (CHP), California Department of Fish and Game, and California Department of Transportation (Caltrans).

Natural Gas Pipelines

The DOT also provides oversight for the nation's natural gas pipeline transportation system. Its responsibilities are promulgated under Title 49, United States Code (USC) Chapter 601. The Pipeline and Hazardous Materials Safety Administration (PHMSA), Office of Pipeline Safety (OPS), administers the national regulatory program to ensure the safe transportation of gas and other hazardous materials by pipeline.

The OPS shares portions of this responsibility with State agency partners and others at the federal, State, and local levels. The State of California is certified under 49 USC Subtitle VIII, Chapter 601, §60105. The State has the authority to regulate intrastate natural and other gas pipeline facilities. The California Public Utilities Commission has rules governing design construction, testing, operation, and maintenance of gas gathering, transmission, and distribution piping systems (General Order No. 112-E). The State requirements for designing, constructing, testing, operating, and maintaining gas piping systems are stated in CPUC General Order Number 112. These rules incorporate the federal regulations by reference, but for natural gas pipelines, they do not impose any additional requirements affecting public safety. The federal pipeline regulations are published in Title 49 CFR, Parts 190 through 199.49 CFR 192 specifically addresses natural and other gas pipelines. These regulations include specific standards for material selection and qualification, design requirements, protection from corrosion, worker training, safety and provisions for safety standards specific to the location of the pipeline relative to population densities and sensitive land uses.

Fire Hazards

The California Uniform Fire Code (CCR, Title 24, Part 9) and local building codes establish requirements for the construction and maintenance of structures for fire safety. The National Fire Protection Association (NFPA) develops and publishes consensus codes and standards intended to minimize the possibility and effects of fire and other risks. While not regulations, these codes and standards are industry-accepted guidelines for construction and fire protection systems. NFPA Code 820 establishes the standard for fire protection in waste water treatment and collection facilities, which would be applicable to all AD facilities. Additional relevant codes include a fuel gas code, standard on explosion prevention systems, standards for fire prevention during welding, etc.

The California Public Resources Code (PRC) includes fire safety regulations that restrict the use of equipment that may produce a spark, flame, or fire; require the use of spark arrestors[2] on construction equipment that use an internal combustion engine; specify requirements for the safe use of gasoline-powered tools in fire hazard areas; and specify fire suppression equipment that must be provided onsite for various types of work in fire-prone areas during the time of high fire danger to reduce the risk of wildland fires.

Wildlife-Related Aviation Hazards

Section 503 of the Wendell H. Ford Aviation Investment and Reform Act for the 21st Century (Public Law 106-181) limits the construction or establishment of new municipal solid waste landfill (MSWLF) facilities[3] within 6 statute miles of certain public-use airports, when both the airport and the landfill meet very specific conditions. The Federal Aviation Administration (FAA) Advisory Circular No. 150/5200-34A (FAA, 2006) describes these requirements.

2 A spark arrestor is a device that prohibits exhaust gases from an internal combustion engine from passing through the impeller blades where they could cause a spark. A carbon trap is commonly used to retain carbon particles from the exhaust.

3 Municipal Solid Waste Landfill Facility is defined by the FAA Advisory Circular as "publicly or privately owned discrete area of land or an excavation that receives household waste, and that is not a land application unit, surface impoundment, injection well, or waste pile."

The U.S. EPA requires any MSWLF operator proposing a new or expanded waste disposal operation within 5 statute miles of a runway end to notify the appropriate FAA Regional Airports Division Office and the airport operator of the proposal (40 CFR 258, Criteria for Municipal Solid Waste Landfills, Section 258.10, Airport Safety). The U.S. EPA also requires owners or operators of new MSWLF units, or lateral expansions of existing MSWLF units, that are located within 10,000 feet of any airport runway end used by turbojet aircraft, or within 5,000 feet of any airport runway end used only by piston-type aircraft, to demonstrate successfully that such units are not hazards to aircraft. When new or expanded MSWLF are being proposed near airports, MSWLF operators must notify the airport operator and the FAA of the proposal as early as possible pursuant to 40 CFR 258.

FAA Advisory Circular No. 150-5200-33B (FAA, 2007) provides guidance regarding hazardous wildlife attractants near airports. Separation distances depend on the type of airport (serving piston vs. turbine powered aircraft) and the proposed land use. Guidance applies to composting operations, transfer stations, other municipal solid waste facilities and associated stormwater detention facilities. Exceptions to separation criteria for waste facilities include off-airport property composting operations and fully-enclosed transfer stations. Off-airport property composting operations that do not accept food waste or other municipal solid waste (green waste only) are permissible at distances no closer than 1,200 feet from the airport operations area. Transfer stations are compatible with safe airport operations provided these facilities (1) are not located on airport property or in the runway protection zone, and (2) meet the FAA's definition of a fully enclosed trash transfer station[4]. Facilities not meeting these requirements are subject to greater separation distances.

Pest Control

Under the State Health and Safety Code, local vector control agencies (often public health departments or mosquito abatement districts) have the authority to conduct surveillance for vectors, prevent the occurrence of vectors, and abate production of vectors. These agencies also have the authority to review, comment, and make recommendations during planning and environmental quality processes, permits, licenses, etc, regarding the potential effects related to vector production of proposed projects. Additionally, agencies have broad authority to enforce abatement of vector sources on public and private property.

11.2 Impacts and Mitigation Measures

Approach and Methods

The evaluation was performed in light of applicable laws, regulations and guidelines, and typical construction activities and operations anticipated for AD facilities. In many cases, compliance with laws, regulations, and mandatory regulatory permits prescribe actions that would reduce the adverse

[4] "These facilities should not handle or store putrescible waste outside or in a partially enclosed structure accessible to hazardous wildlife. Trash transfer facilities that are open on one or more sides; that store uncovered quantities of municipal solid waste outside, even if only for a short time; that use semi-trailers that leak or have trash clinging to the outside; or that do not control odors by ventilation and filtration systems (odor masking is not acceptable) do not meet the FAA's definition of fully enclosed trash transfer stations" (FAA, 2007).

effects of implementation of future AD facilities. Should potential impacts remain significant or potentially significant under CEQA, even after compliance with legal requirements, mitigation measures are proposed to reduce project impacts to less-than-significant levels.

Thresholds of Significance

CEQA defines a significant effect on the environment as a substantial, or potentially substantial, adverse change in the physical conditions of the area affected by the project. An impact related to hazards and hazardous materials, including fire hazards, would be considered significant if it would result in any of the following, which are adapted from Appendix G of the CEQA *Guidelines*:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;
- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one quarter mile of an existing or proposed school;
- Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code §65962.5 and, as a result, would create a significant hazard to the public or the environment;
- Be located within an area covered by an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, and would result in a safety hazard for people residing or working in the project area;
- Be located within the vicinity of a private airstrip and would result in a safety hazard for people residing or working in the project area;
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan;
- Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands; or,
- Generate vectors (flies, mosquitoes, rodents, etc) to such an extent that the applicable enforcement agency determines that any of the vectors occurs in numbers considerably in excess of those found in the surrounding environment, disseminate widely from the property, and cause harmful effects on the public health of the surrounding population.

Impact 11.1: Construction of AD facilities could result in the potential exposure of construction workers, the public and the environment to preexisting soil and/or groundwater contamination. (Significant)

Construction activities associated with development of projects could involve excavation and trenching to install AD facilities and pipelines. If hazardous materials, such as pesticides or herbicides, VOC or other hazardous materials are present in excavated soil or groundwater, hazardous materials could be released to the environment resulting in exposures to construction workers or the public to potential health risks depending on the nature and extent of any contamination encountered.

Contaminated soil or groundwater could also require disposal as a hazardous waste. This is considered a significant impact.

The greatest potential for encountering contaminated soil and groundwater during project construction would be in areas where past or current land uses have resulted in leaks from fuel or chemical storage tanks or other releases of hazardous materials have occurred. Federal, State and local agencies maintain databases of hazardous materials sites including those listed in **Table 11-1.** As shown in **Table 11-2**, the GeoTracker database identified thousands of hazardous materials sites within California. If sites with soil and/or groundwater contamination are located at or in close proximity to proposed project facilities, hazardous materials could be encountered in the subsurface during excavation and grading activities. Encountering hazardous materials in soil or groundwater during construction could further disperse existing contamination into the environment and expose construction workers or the public to contaminants, potentially resulting in health and safety risks to workers and the public.

Hazardous materials in soil and groundwater, if identified, could be managed appropriately according to applicable laws and regulations to reduce the risks associated with exposures to individuals or releases to the environment. Cal/OSHA regulations require the preparation and implementation of a site health and safety plan to protect workers who could encounter hazardous materials, ensure that construction workers have specialized training and appropriate personal protective equipment. Regulations also require that excavated materials suspected of contamination be segregated, sampled and hauled to a landfill licensed for this type of waste. If groundwater dewatering is required for excavation of subsurface facilities, the groundwater may require treatment prior to discharge, in accordance with regulations.

Mitigation Measure

Mitigation Measure 11.1: Prior to final project design and any earth disturbing activities, the applicant or agency(ies) responsible shall conduct a Phase I Environmental Site Assessment (ESA). The Phase I ESA shall be prepared by a Registered Environmental Assessor (REA) or other qualified professional to assess the potential for contaminated soil or groundwater conditions at the project site; specifically in the area proposed for construction of AD facilities. The Phase I ESA shall include a review of appropriate federal, State and local hazardous materials databases to identify hazardous waste sites at on-site and off-site locations within a one quarter mile radius of the project location. This Phase I ESA shall also include a review of existing and past land uses through aerial photographs, historical records, interviews of owners and/or operators of the property, observations during a reconnaissance site visit, and review of other relevant existing information that could identify the potential existence of contaminated soil or groundwater.

If no contaminated soil or groundwater is identified or if the Phase I ESA does not recommend any further investigation then the project applicant or agency(ies) responsible shall proceed with final project design and construction.

OR

If existing soil or groundwater contamination is identified, and if the Phase I ESA recommends further review, the applicant or agency(ies) responsible shall retain a REA to conduct follow-up sampling to characterize the contamination and to identify any required remediation that

shall be conducted consistent with applicable regulations prior to any earth disturbing activities. The environmental professional shall prepare a report that includes, but is not limited to, activities performed for the assessment, summary of anticipated contaminants and contaminant concentrations at the proposed construction site, and recommendations for appropriate handling of any contaminated materials during construction.

Impact Significance After Mitigation: Less than Significant

Mitigation Measure 11.1 requires preparation of a Phase I ESA to identify the potential for known soil or groundwater contamination on or in the vicinity of proposed construction of AD facilities. If no contamination is identified, then construction can proceed. If contaminated sites are identified that could affect construction, then the applicant shall conduct follow-up sampling to characterize soil and groundwater contamination and would conduct any remediation consistent with applicable laws, regulations, ordinances and guidance. With implementation of Mitigation Measure 11.1, and regulatory compliance, the potential for exposure to hazardous materials during construction activities would be reduced to a less-than-significant level.

Impact 11.2: Transportation, use, disposal or accidental spill of hazardous materials during construction of AD facilities would not result in the potential exposure of construction workers, the public and the environment to hazardous materials. (Less than Significant)

Construction activities would likely require use of limited quantities of hazardous materials such as fuels for construction equipment, oils, and lubricants. The types and quantities of hazardous materials would vary at each proposed AD facility. The improper use, storage, handling, transport or disposal of hazardous materials could result in accidental release of hazardous materials, thereby exposing construction workers, the public and the environment, including soil and/or ground or surface water, to hazardous materials contamination.

As discussed in the Regulatory Setting above, numerous laws and regulations govern the transport, use, storage, handling and disposal of hazardous materials to reduce the potential hazards associated with these activities. Cal/OSHA is responsible for developing and enforcing workplace safety standards, including the handling and use of hazardous materials. Transportation of hazardous materials is regulated by the DOT and Caltrans. Together, federal and State agencies determine driver-training requirements, load labeling procedures, and container specifications designed to minimize the risk of accidental release. Construction activities would also be required to comply with the California fire code to reduce the risk of potential fire hazards. The local fire agency would be responsible for enforcing the provisions of the fire code.

As described in Chapter 6, Hydrology and Water Quality, the federal Clean Water Act prohibits discharges of stormwater from construction projects unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. The State Water Resources Control Board is the permitting authority in California and has adopted a Statewide General Permit for Stormwater Discharges Associated with Construction Activity (Construction General Permit, Order No. 99-08) that encompasses one or more acres of soil disturbance. Because soil surface disturbance for AD projects would generally be greater than one acre, specific erosion control measures would be identified

as part of the NPDES permit and Storm Water Pollution Prevention Plan (SWPPP) required for construction. During construction, erosion control measures would be implemented that utilize Construction Water Quality Best Management Practices (BMPs) to avoid or minimize soil erosion and off-site sediment or hazardous materials transport. Examples of typical construction BMPs include scheduling or limiting activities to certain times of the year; installing sediment barriers such as silt fence and fiber rolls along the perimeter of the construction area; maintaining equipment and vehicles used for construction; developing and implementing a spill prevention and cleanup plan; and construction worker training. The SWPPP (and associated BMPs) would be prepared and implemented prior to commencing construction, and BMP effectiveness would be ensured through the sampling, monitoring, reporting, and record keeping requirements contained in the construction general permit.

Because numerous laws and regulations govern the transport, use, storage, handling and disposal of hazardous materials to reduce the potential hazards associated with these activities, this impact would be less than significant.

Mitigation: None required.

Impact 11.3: Transportation, use, disposal or accidental spill of hazardous materials during the operation and maintenance of AD facilities would not result in potential harmful exposures of the public or the environment to hazardous materials. (Less than Significant)

Operation and maintenance of AD facilities would involve the transport, use, storage and disposal of hazardous materials such as fuels, lubricants and hydraulic fluids for vehicles and onsite equipment. The phases of AD operations are discussed below.

Pre-Processing

Pre-processing involves the activities necessary to prepare the feedstocks for delivery into the AD vessel. Pre-processing could include screens, picking lines or mechanical removal of glass and plastic, magnetic separation, eddy current separation, and wet separation. Mixed solid wastes must be sorted prior to delivery to remove any household hazardous wastes, as these materials cannot be accepted. AD facilities would be responsible for load checking of deliveries to ensure that hazardous wastes are not received.

Digestion

As described in the project description, AD processes vary and include both dry digestion and wet digestion. These processes would take place within enclosed tanks or vessels.

Post-Processing

Digestate: Upon completion of the digestion process, the digestate would probably undergo a solids separation process. The water could also be further processed for beneficial uses (recycled) or be routed to a wastewater treatment facility. The dewatered solid digestate could require additional

aerobic curing (composting) to ensure stabilization and pathogen reduction. When cured and tested according to regulatory requirements, the digestate or compost produced with the digestate could be suitable for land application. The Waste Discharge Requirements (WDRs) for each permitted facility would set the specific criteria for digestate handling. If the solid digestate does not meet these requirements, it could require disposal at a landfill.

Biogas: The biogas resulting from the AD process could be used for internal combustion or flared. If biogas conditioning is required for use either in a fuel cell or production of liquefied biogas, scrubber facilities would be needed to clean the biogas to remove sulfides. Flushing of the scrubbers would produce sulfide effluent that would require appropriate disposal. Biogas presents an inhalation hazard that, if breathed in high concentration, can result in serious injury or death. Biogas itself is not explosive and will not burn unless oxygen is available at low concentrations.

Handling of hazardous materials and hazardous wastes is covered by federal and State laws that minimize worker safety risks from both physical and chemical hazards in the workplace. Cal/OSHA is responsible for developing and enforcing workplace safety standards, including the handling and use of hazardous materials, including gases. Workers must be trained to understand the hazards and appropriate work procedures associated with confined spaces, flammable gases, etc. Businesses that use hazardous materials are required to submit a Hazardous Materials Business Plan to the local CUPA, which performs inspections to ensure compliance with hazardous materials labeling, training, and storage regulations. For example, hazardous materials must be stored in containers according to the manufacturer's guidelines and appropriately labeled. The Material Safety Data Sheet for each chemical must be available for review. Employers must inform workers of the hazards associated with the materials they handle and maintain records documenting training. Hazardous wastes must be segregated, sampled and disposed of at appropriately licensed landfill facilities. Transportation of hazardous materials is regulated by the DOT and Caltrans. Together, federal and State agencies determine driver-training requirements, load labeling procedures, and container specifications designed to minimize the risk of accidental release.

Because numerous laws and regulations govern the transport, use, storage, handling and disposal of hazardous materials to reduce the potential hazards associated with these activities, this impact would be less than significant.

Mitigation: None required.

Impact 11.4: Operation of AD facilities could increase the risk of fire hazards due to the potential release of biogas. (Significant)

The proposed program involves the production of biogas generated through AD processes. The biogas would be captured and could be combusted in a flare, used directly in internal combustion engines to produce electricity and heat, or upgraded to biomethane through the removal of hydrogen sulfide, carbon dioxide (CO_2), and moisture. Biomethane could be used in place of natural gas for various processes, including use by utility companies. The biomethane could be transported through

pipelines to the end user. As described in the environmental setting, biogas is comprised primarily of methane, which can be flammable. Methane itself is not explosive and will not burn unless oxygen is available at low concentrations. Methane has an ignition temperature of 1,000 degrees Fahrenheit (°F) and is flammable at concentrations between 5 percent and 15 percent in air. Because methane is buoyant at atmospheric temperatures and disperses rapidly in air, unconfined mixtures of methane in air are not explosive. However, a flammable concentration within an enclosed space in the presence of an ignition source can explode, potentially resulting in property damage, injuries, and/or death. Although biogas has the potential to ignite or explode, the risk of fire hazard is generally low because all factors must be present for ignition: a methane concentration between 5 and 15 percent, generally requiring a confining space, and an ignition source. As discussed above, a leak to the atmosphere would disperse into the air rather than ignite or explode. Further, AD facilities and transmission lines operate with very low pressures, similar to residential natural gas distribution lines, which minimizes the potential for reaching flammable concentrations.

Compliance with existing safety regulations and widely-accepted industry standards would minimize the hazard to the public and the environment. With respect to the flaring of biogas and potential fire hazards associated with the storage and transport of methane and small quantities of other materials used in operations, the NFPA has established standards for fire protection which would be applicable to the construction of AD facilities. These standards have been successfully implemented by numerous wastewater treatment facilities across the country. Construction and operation of facilities would comply with the California fire code, local building codes (including requirements for the installation of fire suppression systems), and gas pipeline regulations. The local fire agency would be responsible for enforcing the provisions of the fire code. The OPS and CPUC regulate the safety of gas transmission pipelines. Standard safety features of AD facilities that would minimize the potential for exposure to biogas include leak detection systems, redundant safety relief valves, warning signals, physical barriers and safety flares to reduce excess gas capacity. Additional safety measures would prohibit the use of spark-producing equipment within a designated area surrounding flammable materials, worker safety training, routine inspections and recordkeeping.

Any biogas transmission pipelines would be designed, constructed and operated consistent with State and federal regulations to minimize the risk of rupture and accidental release. As described in the Regulatory Setting, the CPUC has rules governing design construction, testing, operation, and maintenance of gas gathering, transmission, and distribution piping systems. These rules incorporate the federal regulations by reference, but for natural gas pipelines, they do not impose any additional requirements affecting public safety. The federal pipeline regulations include specific standards for material selection and qualification, design requirements, protection from corrosion, worker training, safety and provisions for safety standards specific to the location of the pipeline relative to population densities and sensitive land uses.

The project considers AD facilities located at existing or new solid waste facilities and in areas zoned for industrial or solid waste handling activities. Due to odor and other siting considerations, AD facilities at these locations would not be expected to be adjacent to residential structures. Compliance with existing laws and regulations would reduce the potential for fires and explosions associated with AD facilities; however, in the unlikely event of a fire, it would have the potential to

expose nearby people or structures to a significant risk. This impact could be reduced to a less than significant level with implementation of Mitigation Measure 11.4.

Mitigation Measure

Mitigation Measure 11.4a: Prior to project approval, AD facility operators shall prepare and implement a Fire Safety Plan that outlines fire hazards, describes facility operations procedures to prevent ignition of fires, requires regular inspection of fire suppression systems, and provides for worker training in safety procedures as well as protocols for responding to fire incidents. The Fire Safety Plan shall be reviewed and approved by the local fire enforcement agency.

Mitigation Measure 11.4b: Implement Mitigation Measure 11.5.

Impact Significance after Mitigation: Less than significant.

Implementation of Mitigation Measure 11.4a requires worker training in fire safety procedures, reducing the potential for fire incidents and providing for prompt response in the event of a fire. Mitigation Measure 11.5 restricts locating AD facilities within one quarter mile of sensitive land use, and would reduce the potential for exposure to fire hazards.

Impact 11.5: AD facilities could be located within one quarter mile of a school resulting in potential hazards associated with accidental release of hazardous materials, including biogas. (Less than Significant)

Existing compost facilities, waste transfer facilities and landfills are typically not sited within close proximity to schools. Because AD facilities would most likely be associated with existing facilities, potential AD facilities would be unlikely to be located within one quarter mile of a school. However, as the location of AD facilities and biogas pipelines that could be constructed under this program have not been identified, it is possible that AD facilities could be located within one quarter mile of a school.

As discussed above under Impacts 11.2 and 11.3, small quantities of hazardous materials could be used in the construction and operation AD facilities. Compliance with environmental laws and regulations would reduce the potential for an accidental release of those materials to affect nearby schools. Anaerobic digesters and biogas transmission pipelines would not emit hazardous emissions, such as biogas, under normal operating conditions and biogas transmission pipelines and ancillary facilities would be designed, constructed, operated, and maintained in accordance with State and federal regulations. Although leak detection systems would minimize the potential for substantial biogas releases, any such releases would mix readily in the air and would not present a health risk at nearby properties. As a result potential fire hazards associated with siting AD facilities within one quarter mile of a school would be less than significant.

Although not required, to further reduce the magnitude of this less-than-significant impact, Mitigation Measure 11.5 recommends that AD facilities not be constructed and operated within one quarter mile of existing or proposed schools and other sensitive land uses.

Mitigation Measure

Mitigation Measure 11.5: AD facilities shall be sited at least one quarter mile from existing or proposed schools, daycare facilities, hospitals and other sensitive land uses.

Impact Significance After Mitigation: Less than Significant

Implementation of Mitigation Measure 11.5 would ensure that AD facilities would be located more than one quarter mile from sensitive land uses; therefore, further reducing the potential for exposure to hazardous materials and fire hazards.

Impact 11.6: AD facility operations could generate vectors (flies, mosquitoes, rodents, etc.) exceeding regulatory agency thresholds for the presence of vectors. (Less than Significant)

Incoming food wastes, green wastes and mixed solid wastes would be deposited on a tipping floor for sorting and pre-processing or placed directly in containers. The pre-processing operations of AD facilities could provide an attractive environment for pests such as flies, cockroaches, rodents, etc. These pests could be present in the waste material and transported to the facility or attracted to the facility from the surrounding area. Digestion and post-processing would be largely contained within vessels, diminishing the potential for vector access. Storage or aerobic curing of the digestate may occur outside of enclosed vessels, such as in windrows on adjacent parcels, which could be an attractant to vectors. It is also possible that some AD facilities may have associated stormwater detention ponds or effluent ponds which could provide a fertile mosquito breeding habitat.

Pathogens may be present in incoming waste feedstock and digestate (depending upon the temperature of digestion). Regulations for composting operations, enforced by CalRecycle, require reducing pathogen concentrations in composted material to acceptable levels. These regulations (Title 14, Chapter 3.1, Article 7) outline maximum acceptable pathogen (e.g., fecal coliform and Salmonella sp. Bacteria) concentrations and requirements for pathogen reduction at composting facilities. These requirements establish methods for enclosed vessel, windrow, and static pile composting processes to meet pathogen reduction criteria by maintaining a temperature of 55 degrees Celsius (131 degrees Fahrenheit) for varying durations, as well as sampling and record keeping criteria.

For facilities designated as compost facilities, Title 14, Chapter 3.1, Article 6, Section 17867 stipulates that "all activities shall be conducted in a manner that minimizes vectors, odor impacts, litter, hazards, nuisances and noise impacts…". If regulated as a transfer processing facility, the AD site would be required to "take adequate steps to control or prevent the propagation, harborage and attraction of flies, rodents, or other vectors, and animals, and to minimize bird attraction" (CA Title 14, Division 7, Chapter 3. Article 6.1, Section 17410.4). These articles give the LEA and CalRecycle broad discretion to ensure that AD facilities do not provide a suitable environment to promote the generation of vectors. In addition, local pest management agencies (i.e., mosquito abatement districts, environmental health departments) have the authority to inspect facilities and enforce compliance with vector control. Vector populations can be kept under control with implementation of best management practices such as enclosing waste storage areas within a building, routine cleaning, insect traps, rodent control services, chemical treatment, and minimizing stagnant waters. With compliance with existing laws and regulations, this impact would be less than significant.

Mitigation: None required.

Impact 11.7: AD facilities could be located within five miles of a public airport or private airstrip and create an aviation hazard. (Significant)

Waste disposal facilities, such as proposed AD operations that include food wastes, can provide wildlife with ideal locations for feeding, loafing, reproduction and escape. Even small facilities can produce substantial attractions for hazardous wildlife. During the past century, wildlife-aircraft strikes have resulted in the loss of hundreds of lives worldwide, as well as billions of dollars in aircraft damage.

AD facilities would include food materials that could result in increased numbers of scavenging birds at the site, thus increasing the risk of bird strikes for aircraft departing or approaching any nearby airports. The FAA Advisory Circular 150/5200-33B recommends minimum separation criteria for various land uses practices that attract wildlife in the vicinity of airports. For all airports, the FAA recommends a distance of 5 statute miles between the farthest edge of the airport's air operations area and the hazardous wildlife attractant if the attractant could cause hazardous wildlife movement into or across the approach or departure airspace. The FAA discourages the development of waste disposal and other facilities located within 5,000/10,000-feet of airports serving piston-powered and turbine-powered aircraft, respectively. For projects that are located outside the 5,000/10,000-foot criteria but within 5 statute miles of the airport's air operations area, the FAA may review development plans, proposed land-use changes or operational changes, to determine if such changes present potential wildlife hazards to aircraft operations and if further investigation is warranted.

The U.S. EPA requires any Municipal Solid Waste Landfill (MSWLF) operator proposing a new or expanded waste disposal operation within 5 statute miles of a runway end to notify the appropriate FAA Regional Airports Division Office and the airport operator of the proposal. The U.S. EPA also requires owners or operators of new MSWLF units, or lateral expansions of existing MSWLF units, that are located within 10,000 feet of any airport runway end used by turbojet aircraft, or within 5,000 feet of any airport runway end used only by piston-type aircraft, to demonstrate successfully that such units are not hazards to aircraft.

Proposed AD facilities would not be subject to the same regulations as MSWLFs; however AD facility operations could create a hazardous wildlife attractant and a potential safety hazard to aviation if located within 5 miles of an airport.

As identified in Impact 11.6, for facilities designated as compost facilities, Title 14, Chapter 3.1, Article 6, Section 17867 stipulates that "all activities shall be conducted in a manner that minimizes vectors, odor impacts, litter, hazards, nuisances and noise impacts…". If regulated as a transfer processing facility, the AD site would be required to "take adequate steps to control or prevent the propagation, harborage and attraction of flies, rodents, or other vectors, and animals, and to minimize bird attraction" (CA Title 14, Division 7, Chapter 3. Article 6.1, Section 17410.4). These

articles give the LEA and CalRecycle broad discretion to ensure that AD facilities minimize bird attraction.

This potential impact would be significant, but could be reduced to a less-than-significant level with implementation of Mitigation Measure 11.7.

Mitigation Measures

> **Mitigation Measure 11.7:** For any AD facility proposed within 5 statute miles of an airport's air operations area, the operator will notify the Federal Aviation Administration (FAA) Regional Airports Division office and the airport operator of the proposed facility as early in the process as possible. Such AD facilities must receive an FAA Determination of No Hazard prior to project approval.
>
> **Significance after Mitigation:** With FAA review and approval of proposed AD facility operations, the potential hazard to aviation safety from wildlife would be less than significant.

Impact 11.8: Development of AD facilities could contribute to cumulative impacts related to hazardous materials. (Less than Significant)

The context for potential cumulative hazards and hazardous materials impacts is projects that could result in an increased risk of exposure due to a release of hazardous materials in the project area. The potential for cumulative projects to result in a release resulting in an increased risk of exposure and the project's contribution would be limited. Exposure to existing soil and groundwater contamination is generally site-specific and depends on past, present, and future uses and existing soil, sediment, and groundwater conditions. Any hazardous materials uncovered during construction activities would be managed consistent with applicable federal, State and local laws to limit exposure and clean up the contamination. In addition, the storage, handling and transport of hazardous materials are also regulated by federal, State and local regulatory agencies to limit risk of exposure.

The contribution of the project to cumulative risk of exposure would not be considerable. While construction and operational activities could result in accidental spills or leaks in the vicinity, the extent of the contamination is not likely to extend beyond the project site boundaries due to the type and limited quantities of hazardous materials likely to be used (for example, motor fuels, hydraulic oils, paint, and lubricants). Furthermore, as identified above, all AD facility activities associated with the use, storage and transportation of hazardous materials would be required to adhere to all applicable laws and regulations. Operation of AD facilities would capture and use biogas for energy production or the gas would be flared in accordance with a local air quality permit. Handling of biogas could be hazardous due to its health risks and flammability. Compliance with existing laws and regulations and mitigation measures established for AD facilities would minimize the potential for harmful exposures to hazardous materials, fires associated with the handling of biogas, aviation safety hazards, and vector impacts.

In sum, the construction and operation of AD facilities in combination with other projects in the project area would not create a significant hazard to the public or the environment through the routine transport, use, disposal or accidental release of hazardous materials, vector population growth, and fire hazards due to the site-specific nature of the potential impacts and existing laws and regulations that minimize the risk of exposure, and implementation of mitigation measures for AD facilities in this Chapter of the Program EIR. Therefore, this is considered a less-than-significant cumulative impact.

Mitigation Measure

Mitigation Measure 11.8: Implement Mitigation Measures 11.1, 11.4, 11.5, and 11.7.

Impact Significance After Mitigation: Less than Significant

11.3 References

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CHAPTER 12
Other CEQA Considerations

12.1 Resources without Program Level Impacts

As required by CEQA, this Draft Program EIR focuses on expected significant or potentially significant environmental effects (CEQA Guidelines §15143). An NOP was prepared for the project to identify issues to be evaluated in this Draft Program EIR (**Appendix A**).

Resources identified with less than significant impacts during the Program EIR scoping process include agricultural and forest resources, biological resources, cultural resources, geology, soils, and seismicity, land use and land use planning, mineral resources, population and housing, and recreation. The NOP dismissed potential impacts in these resource areas as they are not anticipated to have potentially significant impacts at the program level, although they could require evaluation for individual projects due to the potential for local effects.

Agricultural and Forest Resources

Anaerobic digester (AD) facilities would be co-located with permitted solid waste facilities or located in areas zoned for industrial or solid waste handling activities and are not anticipated to adversely affect agricultural and forest resources. However, if an AD facility includes acquisition and development of undisturbed areas to expand the existing footprint, then impacts to agricultural and forest resources may need to be analyzed on a project-by-project basis to ensure compliance with land use zoning and that any loss of farmland or forest uses would be mitigated appropriately. Due to these site-specific considerations of individual facilities, further analysis would not apply at the statewide programmatic level.

Biological Resources

Since AD facilities would be co-located with permitted solid waste facilities or located in areas zoned for industrial or solid waste handling activities, they are not anticipated to adversely affect biological resources. However, if an AD facility includes footprint expansion onto undeveloped and undisturbed areas, then impacts to biological resources may need to be analyzed on a project-by-project basis. These analyses would be based on local species and habitats and would ensure compliance with any applicable conservation plans and that potential biological impacts would be mitigated. Due to these site-specific considerations of individual facilities, further analysis would not apply at the statewide programmatic level.

Cultural Resources

Since AD facilities would be co-located with permitted solid waste facilities or located in areas zoned for industrial or solid waste handling activities, they are not anticipated to adversely affect cultural resources. However, if an AD facility includes footprint expansion onto undeveloped and undisturbed areas, then impacts to cultural resources may need to be analyzed on a project-by-project basis. These analyses would be based on site-specific information and would determine any impacts to historical, archaeological, and paleontological resources on the site to be developed and would ensure that potential impacts to these cultural resources would be mitigated appropriately. Due to these site-specific considerations of individual facilities, further analysis would not apply at the statewide programmatic level.

Geology, Soils, and Seismicity

AD facilities would be co-located with permitted solid waste facilities or located in areas zoned for industrial or solid waste handling activities and are not anticipated to adversely affect, or be affected by, geology, soils, and seismicity. However, if an AD facility includes footprint expansion onto undeveloped and undisturbed areas, then geological, soil, and seismicity impacts may need to be analyzed on a project-by-project basis. This analysis would include a site-specific geotechnical study to comply with building requirements. Due to these site-specific considerations of individual facilities, further analysis of geology, soils, and seismicity would not apply at the statewide programmatic level.

Land Use and Land Use Planning

AD facilities would be co-located with permitted solid waste facilities or located in areas zoned for industrial or solid waste handling activities and are thus anticipated to comply with land use planning and zoning requirements. However, if an AD facility includes acquisition and development of undisturbed areas to expand the existing footprint, then compliance with applicable land use plans, policies, and regulations may need to be analyzed on a project-by-project basis. Due to these site-specific considerations of individual facilities, further analysis would not apply at the statewide programmatic level.

Mineral Resources

Since AD facilities would be co-located at solid waste facilities and within areas zoned for industrial or solid waste handling activities, it is anticipated that AD facilities would be located in areas which have previously been disturbed or developed. In this case, the AD facilities would not prohibit recovery of known mineral resources of value to the state and would not result in foreseeable loss in mineral resources. However, if an AD facility includes footprint expansion onto undeveloped and undisturbed areas, then impacts to mineral resources may need to be analyzed on a project-by-project

basis. Due to these site-specific considerations of individual facilities, further analysis would not apply at the statewide programmatic level.

Population and Housing

AD facility operation would create a small number of jobs throughout California; however, this increase would not be considered substantial. The project does not involve the construction of features (i.e., roads, residences) that would induce population growth. Biogas generated by the AD facilities would provide for an existing need for renewable energy and is not proposed to be used for new off-site developments. In addition, AD facilities would not displace residences or people, as they would be located at either existing or new permitted solid waste facilities or in areas zoned for industrial or solid waste handling activities. Less than significant impacts to existing housing and population growth would occur. The program would not result in foreseeable displacement of populations or housing.

Recreation

AD facilities would not induce population growth, restrict recreational opportunities, or increase use or demand for recreational facilities. The project description does not include recreational facilities. Considering these factors the project would not result in foreseeable significant impacts on recreation.

12.2 Cumulative Impacts

CEQA Guidelines §15130(a) requires that an EIR discuss the cumulative impacts of a project when the project's incremental effect is "cumulatively considerable," meaning that the project's incremental effects are considerable (as defined in §15065(c)). Cumulative impacts refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts (CEQA Guidelines §15355). Further, such impacts can result from individual effects which may be minor, but collectively significant over time. The discussion on cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence (CEQA Guidelines §15130(b)). CEQA Guidelines note that the cumulative impacts discussion does not need to provide as much detail as is provided in the analysis of project-only impacts and should be guided by the standards of practicality and reasonableness. Considering this, CEQA Guidelines §15130(b)(1) recommends the use of a "list" or "projection" approach in the discussion of significant cumulative impacts to adequately address cumulative impacts.

The cumulative impact analysis considered the combined effect of the proposed project and other closely related, past, present and reasonably foreseeable future projects that may be constructed or commence operation during the time of activity associated with the proposed project. The cumulative impacts of the project are analyzed in detail in the final impact discussion located in each of the environmental resource chapters (Chapters 5 – 11). Please refer to those impacts for a detailed discussion.

12.3 Growth-Inducing Impacts

The CEQA Guidelines §15126.2(d) require that an EIR evaluate the growth-inducing impacts of a proposed action (Section). A growth-inducing impact is defined by the CEQA Guidelines as:

> [T]he ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth.... It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.

A project can have direct and/or indirect growth-inducement potential. Direct growth inducement would result if a project involved construction of new housing. A project can have indirect growth-inducement potential if it would establish substantial new permanent employment opportunities (e.g., commercial, industrial or governmental enterprises) or if it would involve a substantial construction effort with substantial short-term employment opportunities and indirectly stimulate the need for additional housing and services to support the new employment demand. Similarly, under CEQA, a project would indirectly induce growth if it would remove an obstacle to additional growth and development, such as removing a constraint on a required public service. An example of this indirect effect would be the expansion of a wastewater treatment plant, which might allow for more development in service areas.

The proposed project would not result in a substantial increase in employment, and correspondingly, would not result in a substantial increase in population and associated demand for housing in the area. Mitigation of impacts resulting from the Draft Program EIR would not require the construction of any additional roadways or public services or utilities. For these reasons, the project is not anticipated to result in substantial growth inducement.

12.4 Significant and Unavoidable Environmental Impacts

CEQA §21100(b)(2) requires that any significant effect on the environment that cannot be avoided or becomes irreversible if the project is implemented must be identified in a detailed statement in the environmental impact report. CEQA Guidelines §15126.2(b) provides that an environmental impact report must discuss, preferably separately, the significant environmental effects which cannot be avoided if the proposed project is implemented. In addition, CEQA Guidelines §15093(a) requires the decision making agency to balance, as applicable, the economic, legal, social, technological, or other benefits of a proposed project against its unavoidable environmental risks when determining whether to approve a project. Benefits may include, but not be limited to, those that are region-wide or statewide. If the benefits of a proposed project outweigh the unavoidable adverse environmental effects, the adverse environmental effects may be considered: “acceptable.” If CalRecycle approves a project which would result in the occurrence of significant effects which are identified in the final EIR but are not avoided or substantially lessened, CalRecycle shall state in writing the specific reasons to support this action based on the final EIR and/or other information in the record (CEQA Guidelines §15093(b)). The Statement of Overriding Considerations shall be supported by substantial evidence in the record. CEQA Guidelines §15093 provides that if an agency

makes a Statement of Overriding Consideration the statement should be included in the record of the project approval and should be mentioned in the notice of determination. This statement does not substitute for and shall be in addition to findings that CalRecycle must make before approving a project for which the EIR was prepared (CEQA Guidelines §15091). The analyses in Chapters 5 through 11 of this Draft Program EIR identify recommended mitigation measures that could reduce all potentially significant impacts to a level that would be less than significant, therefore, CalRecycle will not have to prepare a Statement of Overriding Considerations.

12.5 Significant Irreversible Environmental Changes

Section 15126.2(c) of the CEQA Guidelines requires an EIR to describe significant irreversible environmental changes that would occur if a proposed project is implemented. The guidelines further state that:

> *Uses of nonrenewable resources during the initial and continued phases of the project may be irreversible since a large commitment of such resources makes removal or nonuse thereafter unlikely. Primary impacts and, particularly, secondary impacts [such as highway improvement which provides access to a previously inaccessible area] generally commit future generations to similar uses. Also irreversible damage can result from environmental accidents associated with the project. Irretrievable commitments of resources should be evaluated to assure that such current consumption is justified.*

The proposed project would use non–renewable fuel resources during construction and such resources would also be used to some degree for the duration of the project (i.e., some petroleum for deliveries of digestion substrates and electricity generated off-site that is used for the digester facilities). The materials in the AD facilities (i.e., steel and concrete) would also be a commitment of the degree that they would not be used if the digesters are not used in the future. The materials in the AD facilities would have some potential for reuse or recovery by recycling. However, development of AD facilities would provide the ability to process the municipal solid waste and other organic substrates to generate and capture biogas, which is a flexible renewable energy source. Overall, AD facilities should have a net positive energy condition compared to the long-haul of MSW to landfills that can be expected to lose some additional energy (compared to AD facilities) due to fugitive emissions of landfill gas. In essence, the development of the AD facilities would provide future generations access to the equipment that can generate renewable energy.

CHAPTER 13
Alternatives

13.1 Introduction

CEQA Guidelines §15126(a) requires an Environmental Impact Report (EIR) to describe a range of reasonable alternatives to 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 comparative merits of the alternatives. A range of reasonable alternatives to the project must be addressed because the EIR will identify ways to mitigate or avoid the significant effects that a project may have on the environment (CEQA Guidelines §15126.6(b)). Consideration of a range of potentially feasible alternatives promotes informed decision making and public participation. An EIR is not required to consider infeasible alternatives, but the alternatives discussion should present alternatives to the project 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 §15126.6(b)).

CEQA Guidelines §15126.2(f) provides that the range of alternatives is governed by the "rule of reason", requiring the EIR to set forth only those alternatives necessary to permit a reasoned choice. In the evaluation of alternatives, the EIR shall contain sufficient detail to allow meaningful evaluation, analysis and comparison with the project. 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 §15126.6(d)).

The EIR must evaluate a "No Project" alternative in order to provide a comparison between the impacts of approving the project with the impacts of not approving the project (CEQA Guidelines §15126.6(e)). CEQA Guidelines §15126(e) requires that the alternatives analysis must identify the "environmentally superior" alternative among those considered. If the "No Project" alternative is identified as the environmentally superior alternative, then the EIR must also identify an environmentally superior alternative among the other alternatives.

This chapter discusses the following alternatives to the project:

1. No Project Alternative
2. Co-Digestion at Wastewater Treatment Plants (WWTPs) Alternative
3. Co-Digestion at Dairy Manure Digesters Alternative
4. Increased Aerobic Composting Alternative

5. Landfill In-Ground Digester Cell Alternative
6. Bioreactor Landfill Alternative
7. Thermal Conversion Alternative
8. Source Reduction Alternative

The components of these eight alternatives are described below, including a discussion of their impacts and how they would differ from the significant impacts of the project as proposed. A discussion of the environmentally superior alternative is included in this chapter.

Factors in the Selection of Alternatives

CEQA Guidelines §15126.6(c) recommends that an EIR briefly describe the rationale for selecting the alternatives to be discussed. A reasonable range of alternatives is considered for this analysis. The following factors were considered in identifying a reasonable range of alternatives to the project:

- Does the alternative accomplish all or most of the primary project objectives?
- Is the alternative feasible, from an economic, environmental, legal, social and technological standpoint?
- Does the alternative avoid or lessen any significant environmental effects of the project?

One of the primary goals of this project is to divert organic waste from landfill disposal. There is a high diversity of organic waste in California, and it is often concentrated in areas with limited organic processing options that make it difficult to manage due to economic and environmental constraints. This geographic distribution directly affects the feasibility of organics diversion from all of the standpoints identified above; and given the high costs of transportation; the economic feasibility of organics diversion is often determined primarily by geographic considerations. The diversity of organics also plays a significant role in identifying an appropriate technology.

This is a program level EIR analyzing statewide impacts of anaerobic digester (AD) facilities, but organics management decisions are often made at the local and regional level. There is no single best, most feasible, or most environmentally benign organics management option. Ultimately, each region must analyze its own organic waste streams and determine which management options are best based on the availability of technologically and economically feasible options.

Program Objectives

As also stated in Chapter 3, Program Description, the objectives for the project covered by this Program EIR are:

- Assist in meeting CalRecycle Strategic Directive 6.1: Reduce the amount of organics in the waste stream by 50 percent by 2020.
- Support Assembly Bill 32 (AB 32), the California Global Warming Solutions Act of 2006, greenhouse gas reduction measures related to the use of AD:

  - Measures E-3. Achieve a 33 percent renewable energy mix by 2020. (AD facilities produce biogas which is a renewable energy source.)
  - RW-3. High Recycling/Zero Waste. (AD is one of five subcategories listed under this measure.)
- Assist local governments and state agencies (both lead and responsible agencies) by providing program-level analyses that will identify potential environmental effects of AD facilities and discuss mitigation measures or best management practices that can reduce or eliminate the environmental effects.

The project objectives are considered in the evaluation of each of the alternatives.

13.2 Alternatives that Were Considered but Not Further Analyzed

The CEQA Guidelines §15126.6(a) require that an EIR briefly describe the rationale for selecting the alternatives to be discussed, and suggest that an EIR also identify any alternatives that were considered by the lead agency but were rejected as infeasible (CEQA Guidelines §15126.6(c)). The following alternatives were considered, but were eliminated from further consideration and analysis for the reasons expressed below.

Bioreactor Landfill Alternative

Typical modern landfills operate on a "dry tomb" approach. This means that they are designed to exclude as much moisture as possible to limit the decomposition rate of the waste mass. Although many landfills have landfill gas systems installed to collect fugitive methane gas from the landfill, by restricting the moisture content of the mass, gas production is relatively minimized. "Bioreactor" landfills intentionally add moisture to the waste mass in an effort to accelerate anaerobic decomposition in the mass to accelerate methane production. This alternative is not further analyzed because material sent to bioreactor landfills is disposed; sending solid waste to a bioreactor landfill would not help meet the 50 percent organics diversion goal of CalRecycle Strategic Directive 6.1.

Thermal Conversion Alternative

The Thermal Conversion Alternative, including the various technologies, is discussed below in some level of detail to provide information on this subject that will be available to those that may wish to utilize the information in this EIR. It includes transformation, biomass conversion and non-combustion thermal conversion technologies (Williams, Jenkins, and Nguyen, 2003; Hacket and Williams, et al., 2004). Detailed analysis is not provided because a direct comparison of AD facilities to the Thermal Conversion Alternative technologies is not possible given that they rely on different components of the overall organics feedstock. The primary targeted organic feedstock for AD facilities is food waste which is not a primary target for thermal conversion facilities, which focus more on dryer post-MRF materials such as the paper, green waste, fossil derived organics (plastics) and wood fractions of the waste stream. The focus of the Thermal Conversion Alternative on materials that are not the key targets of AD facilities (e.g., food waste) is the

reason that the Thermal Conversion Alternative (including transformation, biomass conversion and non-combustion thermal conversion technologies) is not further analyzed in this chapter.

This alternative considers thermal systems with energy recovery and includes solid fuel combustion systems (incinerators) for direct heat or electricity production via steam cycles (e.g., mass-burn or Refuse Derived Fuel [RDF] incinerators with energy recovery) and non-combustion thermal conversion technologies (i.e., gasification or pyrolysis) that can produce a range of energy products.

In California, there are currently three commercial scale mass-burn incinerators directly combusting mixed solid waste with electricity production, and approximately 30 bioenergy facilities burning woody biomass (which includes urban wood waste, agricultural residues and forest products and thinnings) for electricity production (http://www.energy.ca.gov/biomass/index.html). In addition, there is increasing interest in non-combustion thermal conversion technologies (i.e., gasification and pyrolysis).

Thermal conversion technologies vary in terms of their efficiencies, appropriate feedstock characteristics, the products (and by-products) they produce, their capital and operating costs, and how they are treated under the state's waste and energy regulatory regimes. In addition, some technologies are designed to handle a wide range of (or mix of) organic feedstocks, while others are more limited in the range of feedstocks they can process. This is of particular importance regarding Strategic Directive 6.1, which targets the subset of organics that are currently being landfilled. These disposed organics are extremely varied in energy and moisture content, and some can be separated, processed, and decontaminated more easily than others.

Thermal conversion technologies considered in this alternative include the following processes.

Transformation

Transformation is the statutory term California uses for mass-burn incineration of mixed solid waste with heat energy recovery for electricity generation. Currently there are three transformation facilities operating in California with a total permitted capacity of approximately 6,500 tons of incoming material per day producing approximately 65 MW of electricity (CalRecycle SWIS Database, 2011 & California Biomass Collaborative).

Transformation facilities are permitted under California's solid waste regulatory infrastructure. Waste processed at these sites is considered disposed. Jurisdictions are able to use material sent to the existing transformation facilities to meet up to 10 percent of their diversion requirements under the State's waste reduction and recycling laws (PRC 41783). Transformation facilities (except the facility in Stanislaus County, which was grandfathered into the renewable program) do not qualify as renewable energy facilities under the California Energy Commission's Renewable Portfolio Standard Eligibility Commission Guidebook (CEC-300-2007-006-ED3-CMF, p. 16). Pyrolysis is identified in California law as a type of transformation. Pyrolysis produces "biochar" and a pyrolitic oil in addition to a combustible gas. Biochar is known to have nutrient and water retention characteristics that can make it a valuable soil amendment.

Given that waste processed at transformation facilities is considered disposed, does not count towards diversion (after 10 percent), and is not considered a renewable source of energy, new transformation facilities might not be constructed without changes in current policies and laws.

Biomass Conversion

Biomass conversion is the controlled combustion of woody biomass (agricultural or forest product resides or source-separated urban wood) for the purpose of heat or energy production. Governor Schwarzenegger signed Executive Order S-06-06 which set a goal for biomass to consist of 20 percent of the state's renewable energy portfolio in 2010, and to maintain that goal through 2020. Currently, biomass conversion accounts for approximately 20 percent of the state's current renewable energy generation (energy.ca.gov/biomass/index.html). In California, biomass conversion facilities are not considered a solid waste facility if only the waste types identified in PRC 40106[1] are processed.

Biomass plants in California burn agricultural wastes, forest slash, urban wood waste, and lumber from construction debris. According to the most recent California waste characterization, lumber is the second most prevalent material disposed in landfills, at almost 6 million tons per year (CIWMB, 2009).

Additional amounts of lumber could be diverted to biomass plants as there is currently an excess capacity. Diverting lumber from landfills to biomass conversion could be feasible in the short term and help meet Strategic Directive 6.1 as well as the 33 percent renewable goal.

Non-combustion Thermal Conversion Technologies

Non-combustion thermal conversion technologies refer to a range of technologies that use a combination of high heat, steam, high pressure, and oxygen- reduced environments to convert organic matter into heat and/or various products, including combustible gases, oils, and charcoals, as well as noncombustible ashes and molten slags (CIWMB, 2007). These conversion technologies are different from direct incineration of organic matter in that they utilize environments with a range of sub-stoichiometric concentrations of oxygen and thus prevent immediate combustion of the product gasses. Much like AD, the resultant products can be used for a variety of uses including combustion for energy, transportation fuels, industrial chemicals, and soil amendments. Unlike some types of AD facilities, however, non-combustion thermal conversion technologies involve temperatures sufficiently high to guarantee pathogen reduction.

[1] 40106. (a) "Biomass conversion" means the controlled combustion,when separated from other solid waste and used for producing electricity or heat, of the following materials:(1) Agricultural crop residues.(2) Bark, lawn, yard, and garden clippings.(3) Leaves, silvicultural residue, and tree and brush pruning.(4) Wood, wood chips, and wood waste.(5) Nonrecyclable pulp or nonrecyclable paper materials.(b) "Biomass conversion" does not include the controlled combustion of recyclable pulp or recyclable paper materials, or materials that contain sewage sludge, industrial sludge, medical waste, hazardous waste, or either high-level or low-level radioactive waste.(c) For purposes of this section, "nonrecyclable pulp or nonrecyclable paper materials" means either of the following, as determined by the board:(1) Paper products or fibrous materials that cannot be technically, feasibly, or legally recycled because of the manner in which the product or material has been manufactured, treated, coated, or constructed. (2) Paper products or fibrous materials that have become soiled or contaminated and as a result cannot be technically, feasibly, or legally recycled.

Gasification is a conversion technology that has been developed commercially worldwide for various applications, including generating gas from coal, oil refining, conversion of municipal solid waste (MSW) and other organic feedstocks, and charcoal production. Gasification processes have the potential to create combustible gasses and other products from the conversion of organic feedstocks, and both would likely require pre-processing to remove excess moisture from the organic feedstocks (Los Angeles County, 2007). In some cases, compression/pelletization may be required before the organic feedstocks could be thermally converted.

Pyrolysis, which is discussed above under transformation, generally operates in the near absence of oxygen and is therefore also a non-combustion thermal conversion technology.

Gasification differs from pyrolysis in that it often involves heating biomass with restricted amounts of oxygen and/or injected steam, and generally creates ash or molten slag as opposed to carbon-rich biochar (CIWMB, 2007).

Non-combustion thermal conversion facilities are capable of processing some, but not all of the organics in mixed solid wastes. Potential feedstocks for such facilities include, among others, agricultural materials, tires, or MSW (Los Angeles County, 2007). Since non-combustion thermal conversion involves driving moisture out of the feedstock, organic feedstocks such as food waste with relatively high moisture contents (around 75 percent) are not ideal feedstocks. Subsets of the organics waste stream such as mixed solid waste, yard waste and woody components of construction and demolition debris may be more suitable for non-combustion thermal conversion.

California statute distinguishes between conversion technologies for purposes of solid waste facility permitting, and diversion/disposal status. Gasification is specifically defined in California law. Gasification is also noted in the Energy Commission's Renewables Guidebook where it is listed as an eligible technology (CEC Guidebook p. 17). The Guidebook's definition of gasification mirrors definition of PRC 40117.

There are no large commercial scale non-combustion thermal conversion facilities currently constructed in the state. While these facilities may be able to help divert organics from landfill disposal, it is likely that it will take at least five years to fully construct and permit such a facility. Thus conversion technologies are part of the longer-term strategy for organics diversion.

Source Reduction Alternative

Source reduction refers to reducing the amount of waste that is generated. A Source Reduction Alternative for this project would focus on reducing the amount of organic wastes that are generated and enter the waste and recycling streams.

Opportunities to reduce food waste generation focus on improving consumer purchasing habits and food service industry practices. For instance, CalRecyle has an extensive list of "Food Service Waste Reduction Tips and Ideas" on their website (CalRecycle, 2011a). The CalRecycle website also identifies opportunities to redirect edible food that otherwise would be disposed, to food banks or other appropriate venues where it can be distributed (CalRecycle, 2011b). While many of these

programs provide a critically important service to help feed those in need, they do not address post consumer food waste generation.

There are other opportunities for source reducing organics which focus on preventing yard waste generation. CalRecyle promotes several yard waste prevention programs, including grasscycling, and xeriscaping (CalRecycle, 2011c). Grasscycling involves letting grass clippings remain on the lawn to be naturally recycled back into the soil. Grasscycling reduces grass clippings generation. Xeriscaping means landscaping with slow-growing drought tolerant plants to help conserve water and reduce yard trimmings. Both of these programs are valuable supportive measures to help achieve Strategic Directive 6.1.

While this alternative does address the target feedstocks of AD and is another approach for removing organics from landfills, it is not further considered because it is not an alternative to AD that could address the large volumes of post consumer food waste currently being landfilled.

13.3 Alternatives Selected for Further Consideration

No Project Alternative

CEQA Guidelines §15126.6(e) provides that a No Project Alternative shall also be evaluated along with its impact. According to the CEQA Guidelines, the No Project Alternative shall discuss the existing conditions at the time the Notice of Preparation was published, 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.

Under the No Project Alternative, CalRecycle would not undertake the AD Initiative. This would maintain the status quo for AD facilities with respect to CEQA and permitting. AD facilities would be required to comply with current CEQA and other regulatory requirements without the benefit of the project. Development of AD facilities would continue in its current form and would be regulated by CalRecycle, by other permits from responsible agencies (i.e., County Use Permits, air and water quality permits, etc.), and by local and regional governments through local ordinances and regulations. The potential for reducing disposal of organics at California landfills would be reduced.

Impacts

Under the No Project Alternative, the proposed AD Initiative would not be implemented, so development and permitting of AD facilities would continue in its current form. Currently there are no commercial sized AD facilities that process mixed solid wastes in California or the U.S. Future development of AD facilities would be analyzed on an individual basis, and would be subject to individual federal, State, and local laws, regulations, ordinances and guidance.

For projects constructed and operated under the No Project Alternative, the impacts resulting from the construction and operation of individual facilities would be similar to those described for the project. With the No-Project Alternative, development of individual AD facilities would generally result in impacts similar to the project impacts on air quality and greenhouse gas emissions, hydrology

and water quality, noise, public services and utilities, transportation and traffic, aesthetic resources, and hazards and hazardous materials. However, without the implementation of the AD Initiative, the pace of proposed project can be expected to be slower than with implementation of the AD Initiative. Thus, there would be fewer AD facilities and less impacts overall (see Table 13-1).

The No Project Alternative would not assist CalRecycle in Meeting the Goals of Strategic Directive 6.1; it would slow the pace of removing organic materials from landfills and it would not support the goals of AB 32 greenhouse gas reduction goals or the development of renewable fuels.

Co-Digestion at Wastewater Treatment Plants (WWTPs) Alternative

Under the Co-Digestion at WWTPs Alternative, the AD Initiative would apply to the construction and operation of co-digestion facilities at existing AD facilities at WWTPs for the diversion of organic materials from landfills and the production of biogas from organics in the waste stream.

There are over 130 wastewater treatment facilities in California currently using AD to reduce the volume of biosolids before they are land applied, composted, used as fuel, beneficially used at landfills, or otherwise disposed. Most of these facilities are capturing the biogas for its energy value. In California approximately 137 WWTPs have anaerobic digesters and these have an overall excess capacity of 15–30 percent (EBMUD, 2008).

Some of the existing WWTPs with anaerobic digesters have successfully co-digested liquid wastes, such as fats, oils, and grease (FOG), in an effort to increase biogas production. The increased biogas associated with digesting grease at treatment plants is well-documented, and these feedstocks are becoming increasingly sought after by WWTPs operating anaerobic digesters (York and Magner, 2010).

In contrast, a smaller number of WWTPs are now experimenting with adding processed source separated organics, such as municipally generated food scraps, to their existing digesters. Like grease, food waste has been documented to increase biogas production and reduce biosolids volume (EBMUD, 2008). Adding food waste to WWTPs anaerobic digesters requires pre-processing and the use of machinery not typically found at WWTPs to remove contaminants, adjust for moisture content, and reduce particle size. These steps can add to capital and operational costs.

The East Bay Municipal Utilities District, in Oakland, CA is co-digesting food waste with municipal sewage sludge and other liquid wastes. EBMUD is among the few WWTPs adding food waste and has been adding up to 40 tons per day of food waste into their digesters for extended periods of time. Other facilities, such as the Central Marin Sanitary Agency, are preparing to increase both their FOG processing capacity as well as install food waste pre-processing capacity at their WWTP. Central Marin Sanitation Agency has the excess capacity to take up to an additional 50 tons per day of food waste (Kennedy/Jenks, 2010).

Impacts

Under the Co-Digestion at WWTPs Alternative, the proposed AD Initiative would be implemented with a focus on diverting organic feedstocks to anaerobic digesters at existing WWTPs. Construction impacts would be greatly reduced because this alternative relies upon existing anaerobic digesters and post-processing infrastructure. As seen in Table 13-1, many of the potential significant impacts would be less significant than the impact of the project. The reduced impacts result from the fact that the Co-Digestion at WWTPs Alternative largely would rely upon existing infrastructure, and the overall construction would be reduced. Construction of pre-processing infrastructure would still be needed to implement the Co-Digestion at WWTPs Alternative.

For projects constructed and operated under the Co-Digestion at WWTPs Alternative, the impacts resulting from the construction would be less than the project because the WWTP digester and post-processing equipment and operations are already in place. Additional pre-processing equipment and operations would be on-going with the Co-Digestion at WWTPs Alternative.

With the Co-Digestion at WWTPs Alternative, development of individual AD facilities would generally result in impacts similar to the proposed project with regard to air quality and greenhouse gas emissions, hydrology and water quality, noise, public services and utilities, transportation and traffic, aesthetic resources, and hazards and hazardous materials. It is even possible that the pace of AD facility development could increase under the Co-Digestion at WWTPs Alternative because the AD facilities would be developed at WWTPs with significant infrastructure in place and an operational history of running AD facilities, including electrical generation in many cases.

Co-Digestion at Dairy Manure Digesters Alternative

Under the Co-Digestion at Dairy Manure Digesters Alternative, the AD Initiative would apply to the construction and operation of co-digestion facilities at dairy manure digesters for the diversion of organic materials (as co-digestion feedstocks) from California landfills and the production of biogas from organics in the waste stream. Dairies are the only confined animal feeding operations in California that have on-going experience in operating AD facilities, it would be speculative to include other types of animals in this alternative.

Some dairies in California have manure-only anaerobic digesters. Manure digesters are generally considered to increase environmental performance of dairies, particularly in terms of water quality and methane emissions. The Central Valley Regional Water Quality Control Board prepared a Program EIR for Dairy Digester and Co-digester facilities in the Central Valley (CVRWQCB, 2010a). The Dairy Manure Digester Program EIR analyzed the impacts of the construction and operation of dairy manure digester and co-digester facilities. The Program EIR and the Waste Discharge Requirements General Order for Dairies with Manure Anaerobic Digester or Co-Digester Facilities (CVRWQCB, 2010b) were approved December 10, 2010 and are both were designed to assist in the permitting of additional dairy digesters and co-digesters in the Central Valley. Both the EIR and the General Order allow for co-digester facilities at dairies, which means the manure digesters would also accept some food waste and green materials to be added to dairy manure.

In 2009, there were 1,752 dairies operating in California (CDFA, 2010). Of these, there are approximately 11 dairies with operating dairy manure digesters. As many as 10 other dairies have operated dairy manure digesters in recent years but are no longer operating. The limited number of dairy digesters is a result of marginal economic return and a challenging regulatory environment.

Some of the existing dairies have experimented with adding additional organic materials to their dairy manure digesters to capture the additional biogas potential from co-digestion. In some instances, organics from mixed solid wastes could be co-digested with dairy manure to enhance the production of biogas. Adding food waste to dairies for co-digestion would require significant pre-processing and the use of machinery not typically found at dairies to remove contaminants, adjust for moisture content, and reduce particle size. Addition of other organics (i.e., green materials) could also add new processing requirements for dairy manure digesters. These steps can add significant capital and operational costs, as well as additional permitting steps. Another concern is that dairies are often already at or near their discharge limits for land application of nutrients and salts and additional nutrients or salts in the added co-digestion organic materials (i.e., municipal food scraps) would not be feasible at some dairies (or require changes to the Nutrient Management Plans or Salt Minimization Plans) due to the existing land application loading limitations (CVRWQCB, 2010a).. Finally, while operators of dairy manure-only digesters are optimistic about the potential for adding additional co-digestion organic feedstocks, the 11 dairies currently operating manure-only digesters do not appear to have the additional capacity to process major volumes of diverted organic solid wastes now going to landfills in California. While major expansion of dairy manure-only digesters could occur, the prospect of a larger infrastructure of such facilities, to the degree they could substantially provide an option for a major portion of the organic fraction of diverted solid waste in California, is not foreseeable. Among other challenges, dairies tend to be located remote from potential sources of other feedstocks so there would be added transportation expenses.

Impacts

The following impact analysis is provided in order to compare the impacts of the Co-Digestion at Dairy Manure Digesters Alternative to the impacts of the project. See also Table 13-1, the comparison of significant effects.

The California dairy manure digester industry is relatively undeveloped, it is impossible to know the total available additional/excess capacity that may result from maturation of that industry. What is known is that the majority of this capacity is likely to develop in California's Central Valley, where approximately 80 percent of the dairy cows reside. Given the current issues with nutrients and salt accumulation in the valley, and the limited capacity for dairies to add more nutrients to their croplands, there are significant constraints on the total amount of nutrients and salt (entrained in the co-digestion organic feedstocks) that can be imported into the Central Valley. While co-digestion is an option to help increase biogas production, and thus return on investment, there are practical limits to the total amount of food waste and other organic materials that can be economically transported to and digested at dairies within the Central Valley. There are also major constraints on the use of biogas in the Central Valley. Because of the severe ozone air pollution problems in the Central Valley, current air regulations are the strictest in the nation for the emissions from engine/electrical generators that use biogas to generate electricity.

Increased Aerobic Composting Alternative

Under the Increased Aerobic Composting Alternative, the AD Initiative would apply to the construction and/or operation changes needed at existing or new compost facilities to divert more organic materials from California landfills.

There is an existing infrastructure for aerobic composting in California. According to a recent survey, (CalRecycle, 2010a) there are over 115 permitted composting facilities handling a variety of feedstocks. There are no reliable estimates of the capacity of the existing composting facilities, but CalRecycle has estimated that if the state is to achieve the goals under Strategic Directive 6.1, then an additional 100 facilities may be needed to assist in the diversion of 50 percent of organics from landfills by 2020. Most of the existing aerobic composting facilities (about 90 percent) use an outdoor turned windrow process or other similar process. Only a small percentage of the existing windrow facilities are currently handling significant quantities of food, soiled paper, and liquid waste. Technically, there is no reason that many of these facilities could not accept increased amounts of food scraps and other organics for composting.

On balance, it is likely that there will be increased aerobic composting whether or not AD capacity is developed in California. The two systems actually complement one another. Most existing aerobic composting facilities are at least somewhat limited in how much organics other than green material they can take in relation to higher carbon containing materials like yard trimmings or wood waste. AD facilities typically create a digestate, which may be feedstock for aerobic composting.

Impacts

The following impact analysis is provided in order to compare the impacts of Increased Aerobic Composting Alternative to the impacts of the project. See also Table 13-1, the comparison of significant effects.

Aerobic composting takes more land than AD, but the digestate from AD is typically either land applied or composted, so the total area needed may be very similar. Because at least some of the composting infrastructure is already developed, the amount of "new" area required could be substantially less, assuming that existing facilities can take in organics other than green material, without expanding their permitted footprint.

As shown in Table 13-1, the Increased Aerobic Composting Alternative has impacts that are equal or greater than the impacts of the project (prior to mitigation) in areas of air quality and greenhouse gases and hydrology and noise. The Increased Aerobic Composting Alternative has impacts that are equal or less than the project (prior to mitigation) in areas of noise, public services and utilities, transportation, aesthetics, and hazards and hazardous materials. As with the project, it is likely that the potentially significant impacts of the Increased Aerobic Composting Alternative could be mitigated to a level that is less than significant.

The addition of organics other than green material to an existing composting facility would have equal to or greater noise impacts as those described in the project. Increase in the types or volume of additional organics may require adding processing equipment or increasing operating hours.

The Odor Impact Minimization Plan (OIMP) would also need to be updated for the addition of new organic materials.

The most common form of aerobic composting utilizes a turned windrow methodology. This approach requires relatively large amounts of land in undeveloped areas of the state. Because the facilities are sited in more remote areas, this alternative will increase the amount of vehicle miles compared to the project. However, in most cases with the project, even if the facility (the anaerobic digester itself) is located in an urban area, the digestate created by the project will also need to be hauled to sites that will process or use it.

Landfill In-Ground Digester Cell Alternative

Under the Landfill In-Ground "Digester Cell" Alternative, the AD Initiative would apply to the construction and operation of in-ground digesters at a landfill that are limited to organic materials and which would utilize liquid injection and recirculation.

The Digester Cell is a batch system. Materials are loaded into the prepared cell in layers with impermeable (usually synthetic) covers and biogas extraction systems. Water is added and recirculated into the mass. The process consists of four distinct steps: filling, anaerobic, aerobic, and curing. Figure 13-1 shows photos of digester cell stages and Figure 13-2 shows the basic anaerobic and aerobic stages of the digester cell process. After the aerobic stage, the material is removed and the cell is prepared for another batch of untreated material. As part of ongoing research at the Yolo County Central Landfill, CalRecycle funded the creation of a unique type of "Digester Cell" which used liner materials to create a digester for yard trimmings and aged manure (CalRecycle, 2010b).

Facilities wishing to replicate the "Digester Cell" described in the report "Landfill-Based Anaerobic Digester-Compost Pilot Project at Yolo County Central Landfill" are likely to be located at existing landfills, which have the required space, earth-moving equipment, and other infrastructure needed for this type of project and perhaps most importantly, access to a lined landfill cell. While the "Digester Cell" concept could be sited anywhere with sufficient space and equipment, this analysis assumes that the process would only be at a landfill with an approved liner system.

Impacts

The following impact analysis is provided in order to compare the impacts of the Landfill In-Ground "Digester Cell" Alternative to the impacts of the project. See also Table 13-1, the matrix of effects of the alternatives.

In-ground digester cells are still experimental and much is still unknown about viable feedstocks, environmental performance, and economic feasibility. Digester cells may be able to play a role in diverting a portion of the organics stream from landfill disposal, but given the lack of demonstration on food waste, it is unclear whether these cells will be able to achieve the same levels of efficiency and environmental performance as in-vessel digesters.

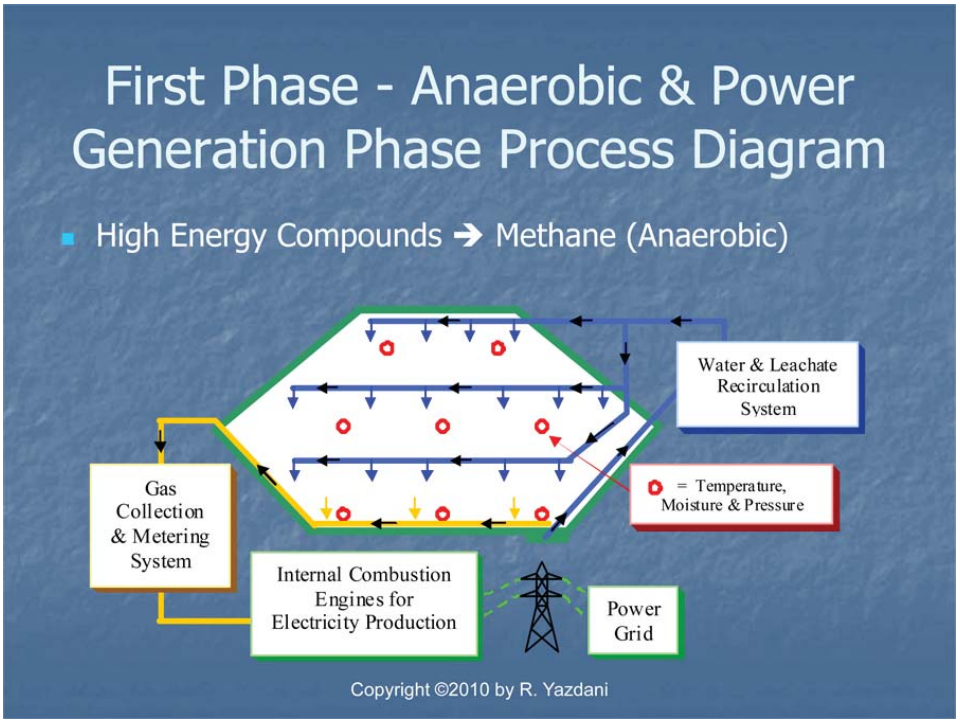
PHOTOGRAPH 1. Digester Cell project in Solon, OH.

PHOTOGRAPH 2. In-situ project material excavation (Yazdani, 2009).

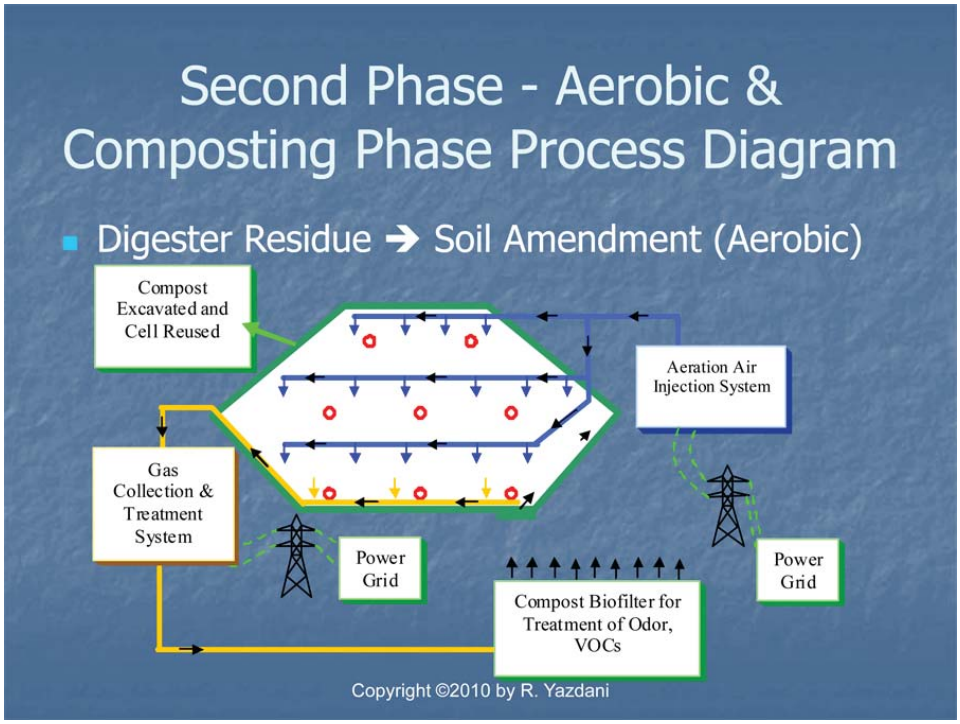
PHOTOGRAPH 3. In-situ project material excavation (Yazdani, 2009).

SOURCE: ESA, 2010

Figure 13-1
Example Digester Cells



PHOTOGRAPH 1. Yazdani Digester-CalRecycle (Yolo County, 2006).



PHOTOGRAPH 2. Yazdani Digester-CalRecycle (Yolo County, 2006).

SOURCE: ESA, 2010

Figure 13-2
Digester Cell Process Diagrams

A review of Table 13-1 shows that the Landfill In-Ground "Digester Cell" Alternative has impacts that are equal or greater than the impacts of the project (prior to mitigation) in areas of air quality and greenhouse gases and hazards and hazardous materials. The Landfill In-Ground "Digester Cell" Alternative has impacts that are equal or less than the project (prior to mitigation) in areas of hydrology, noise, public services and utilities, transportation, aesthetics, and hazards and hazardous materials.

13.4 Comparison of Alternatives

The relative impacts of the various project alternatives identified for consideration in this document, including the project and No Project Alternative, are shown in Table 13-1. Only those project effects that are identified as significant before mitigation are listed in Table 13-1. In addition, the significance of each impact is described prior to implementation of feasible mitigation measures. This is done in order to identify which alternatives would avoid or substantially lessen one or more potentially significant impacts, as required by CEQA Guidelines §15126.6(a). For the level of significance of the proposed project after mitigation, refer to Table 1-1 and the impact analysis in Chapters 5-11. Many mitigation measures identified for the project (Table 1-1) would also be feasible under the various alternatives.

Ability to Achieve Project Objectives

Table 13-2 shows the ability of each alternative to achieve the project objectives. While the proposed project meets all the objectives, the evaluation in Table 13-2 shows that none of the alternatives meet all the project objectives.

Environmentally Superior Alternative

CEQA Guidelines §15126.6(d) requires that an EIR include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project. CEQA Guidelines §15126(e) requires that the alternatives analysis must identify the "environmentally superior" alternative among those considered. If the "No Project" alternative is identified as the environmentally superior alternative, then the EIR must also identify an environmentally superior alternative among the other alternatives. The analysis in this chapter clearly shows that the No Project Alternative is not the environmentally superior alternative. While it has less impact than the project for several impacts because no AD construction impacts would occur, it completely fails to achieve any of the primary environmental benefits of the project. Tables 13-1 and 13-2 were reviewed in considering the environmental benefits of the other Alternatives. A review of Table 13-1 indicates that the most of the alternatives have several impacts that are less significant than the project and some impacts than are rated potentially greater (more adverse) than the impacts of the proposed project. Table 13-1 indicates that the Co-Digestion at Dairy Manure Digesters Alternative is not the environmentally superior alternative; as there are more impacts for this alternative that are rated potentially greater (more adverse) than the proposed project.

TABLE 13-1
PROJECT ALTERNATIVES: COMPARISON OF SIGNIFICANT EFFECTS[1]

	No Project Alternative	Co-Digestion at Wastewater Treatment Plants (WWTPs) Alternative	Co-Digestion at Dairy Manure Digesters Alternative	Increased Aerobic Composting Alternative	Landfill In-Ground Digester Cell Alternative
5. Air Quality and Greenhouse Gas					
Impact 5.1: Construction and operations of AD facilities within California would result in emissions of criteria air pollutants at levels that could substantially contribute to a potential violation of applicable air quality standards or to nonattainment conditions.	LS	LS	PG	E/PG	PG
Impact 5.2: Operation of AD facilities in California could create objectionable odors affecting a substantial number of people.	LS	LS	E	E/PG	E
Impact 5.3: Construction and operation of AD facilities in California could lead to increases in chronic exposure of sensitive receptors in the vicinity to certain toxic air contaminants from stationary and mobile sources.	LS	E	LS	E	E
Impact 5.5: Development of AD facilities in California, together with anticipated cumulative development in the area, would contribute to regional criteria pollutants.	E	E	PG	E	E
6. Hydrology					
Impact 6.2: The operation of AD facilities could adversely affect surface and groundwater quality.	LS	LS	PG	PG	PG
Impact 6.3: AD facilities could be exposed to flooding hazards.	LS	E	PG	PG	PG
Impact 6.4: Construction of AD facilities could change drainage and flooding patterns.	LS	LS	E	E	PG
Impact 6.6: Digesters and associated facilities could become inundated as a result of seiche, tsunami, or mudflow.	LS	LS	LS	E	E
Impact 6.7: AD facilities could contribute to cumulative impacts to water quality.	LS	E	PG	PG	LS
7. Noise					
Impact 7.1: Construction of AD facilities could temporarily increase noise levels at nearby sensitive receptor locations or result in noise levels in excess of standards in local general plans, noise ordinance, or other applicable standards.	LS	LS	PG	E	E
Impact 7.2: Noise from operation of AD facilities could substantially increase ambient noise levels at nearby land uses or result in noise levels in excess of standards in local general plans, local noise ordinances, or other applicable standards.	LS	LS	E	PG	LS
Impact 7.4: Development of AD facilities could result in a cumulative increase in noise levels.	E	E	E	E	LS
8. Public Services and Utilities					
Impact 8.2: The project could potentially exceed wastewater treatment requirements of the Regional Water Quality Control Board.	LS	LS/PG	PG	LS	LS
Impact 8.3: The project could result in significant environmental effects from the construction and operation of new water and wastewater treatment facilities or expansion of existing facilities.	LS	LS/PG	LS	LS	LS

PG Potentially Greater impact than project LS Less Significant impact than project E Equal impact to the project

TABLE 13-1
PROJECT ALTERNATIVES: COMPARISON OF SIGNIFICANT EFFECTS[1]

	No Project Alternative	Co-Digestion at Wastewater Treatment Plants (WWTPs) Alternative	Co-Digestion at Dairy Manure Digesters Alternative	Increased Aerobic Composting Alternative	Landfill In-Ground Digester Cell Alternative
Impact 8.6: The project could result in exceeding the capacity of a wastewater treatment provider.	LS	LS/PG	LS	LS	LS
Impact 8.7: The project could result in the construction of new energy supplies and could require additional energy infrastructure.	LS	E	PG	LS	LS
9. Transportation					
Impact 9.1: Construction of AD facilities would intermittently and temporarily increase traffic congestion due to vehicle trips generated by construction workers and construction vehicles on area roadways.	LS	LS	E	E	LS
Impact 9.2: AD facility operations would not substantially increase on-going (operational) traffic volumes on roadways serving the facilities.	E	LS/E	E	E	LS
Impact 9.3: AD facilities could potentially cause traffic safety hazards for vehicles, bicyclists, and pedestrians on public roadways, and could increase traffic hazards due to possible road wear or to accidental spills of digestate (liquids and solids).	LS	LS	E	E	E
Impact 9.4: AD facilities could intermittently and temporarily impede access to local streets or adjacent uses (including access for emergency vehicles), as well as disruption to bicycle/pedestrian access and circulation.	LS	LS	PG	E	LS
Impact 9.5: The project could contribute to cumulative impacts to traffic and transportation (traffic congestion, traffic safety, and emergency vehicle access).	E	LS	E	E	LS
10. Aesthetics					
Impact 10.1: AD facilities could have adverse effects on a scenic vista and/or scenic resources.	LS	LS	E	LS	LS
Impact 10.2: AD facilities could degrade the existing visual character/quality of the site and its surroundings.	LS	LS	LS	LS	LS
Impact 10.3: AD facilities could create a new source of light or glare with adverse affects to daytime and/or nighttime views.	LS	LS	PG	LS	LS
Impact 10.4: The project could result in cumulative impacts to visual resources.	E	E	E	LS	LS
11. Hazards and Hazardous Materials					
Impact 11.1: Construction of AD facilities could result in the potential exposure of construction workers, the public and the environment to preexisting soil and/or groundwater contamination.	LS	LS	LS	LS	E
Impact 11.4 Operation of AD facilities could increase the risk of fire hazards due to the potential release of biogas.	LS	E	E	LS	E
Impact 11.7: AD facilities could be located within five miles of a public airport or private airstrip and create an aviation hazard.	LS	E	E	E/PG	LS

1. The significance of each impact is described prior to implementation of feasible mitigation measures.

SOURCE: Environmental Science Associates, 2011

PG Potentially Greater impact than project LS Less Significant impact than project E Equal impact to the project

TABLE 13-2
PROJECT ALTERNATIVES: COMPARISON OF ABILITY TO ACHIEVE PROJECT OBJECTIVES

	Proposed Project	No Project Alternative	Co-Digestion at Existing Wastewater Treatment Plants (WWTPs) Alternative	Co-Digestion at Dairies Alternative	Increased Aerobic Composting Alternative	Landfill In-Ground Digester Cell Alternative
Objective 1 – Assist in meeting CalRecycle Strategic Directive 6.1: Reduce the amount of organics in the waste stream by 50 percent by 2020.	✓	0	✓	✓ - 0	✓	✓ - 0
Objective 2 – Support Assembly Bill 32 (AB 32), the California Global Warming Solutions Act of 2006, greenhouse gas reduction measures related to the use of anaerobic digestion: • Measures E-3. Achieve a 33 percent renewable energy mix by 2020. (AD facilities produce biogas which is a renewable energy source.) • RW-3. High Recycling/Zero Waste. (anaerobic digestion is one of five subcategories listed under this measure.)	✓	0	✓ - 0	✓ - 0	✓ - 0	✓ - 0
Objective 3 – Assist local governments and state agencies (both lead and responsible agencies) by providing program-level analyses that will identify potential environmental effects of AD facilities and discuss mitigation measures or best management practices that can reduce or eliminate the environmental effects.	✓	0	0	0	0	0

✓ Alternative substantially achieves objective
0 Alternative does not achieve objective
✓ - 0 Alternative meets the objective but only to a limited degree
SOURCE: Environmental Science Associates, 2011

The analysis (Table 13-2) indicates that only the Increased Aerobic Composting Alternative and the Co-Digestion at Existing WWTPs Alternative substantially meet Objective 1 in the short term (substantially assist in reducing the amount of organics in the waste stream by 50 percent by 2020). Other alternatives will assist in meeting this objective but not as substantially in the short-term. None of the alternatives substantially meet Objectives 2 and 3.

Given the comparison of alternatives, only the Increased Aerobic Composting Alternative and the Co-Digestion at Existing WWTPs Alternative are promising for being able to substantially assist in reducing the amount of organics in the waste stream by 2020 (Objective 1). Between the two alternatives that could substantially reduce organics, the Increased Aerobic Composting Alternative would appear to have more flexibility in expanding existing facilities or adding new facilities to handle the increased organic materials. While WWTPs could use any current excess capacity they have to digest the additional organics, once that capacity is maximized, it would be a major step for a WWTP to add a new AD facility to their facility for the purpose of digesting municipal organic solid wastes, which is not the primary role of WWTPs. Therefore, compared to the alternatives analyzed in this chapter, the Aerobic Composting Alternative is the environmentally superior alternative because it is most likely to result in substantial reductions in organics in the waste stream by 2020. However, it should be noted that the proposed project (the AD Initiative) could substantially achieve all the project objectives and could be implemented with mitigation measures that would reduce most of the project impacts to a level that would be less than significant.

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CHAPTER 14
EIR Authors and Organizations/Persons Consulted

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14.3 Organizations/Persons Consulted

The organizations and persons consulted, and other referenced reports and materials can be found in the reference sections at the end of each chapter of this Draft Program EIR.

14.4 List of NOP Comment Letters

Comments received in response to the NOP were considered during preparation of the Draft Program EIR. Listed below are the agencies and persons that responded to the NOP for the preparation of the CalRecycle Statewide Anaerobic Digester Facilities Draft Program EIR:

Comment Letters:

- Riverside County Waste Management Department
- Humboldt County Waste Management Authority
- County of San Diego, Department of Planning and Land Use
- Santa Barbara County Air Pollution Control District
- South Coast Air Quality Management District
- City of San Diego, Solid Waste Local Enforcement Agency
- California Department of Food and Agriculture Animal Health and Food Safety Services (Meat and Poultry Inspection Branch)
- County of Fresno, Department of Public Health, Environmental Health Division

CHAPTER 15
Acronyms and Glossary

15.1 Acronyms

AB	Assembly Bill
AD	Anaerobic Digestion or Digester. In this Program EIR, AD is used as the acronym in referring to the Anaerobic Digester Facilities (AD Facilities) and the Anaerobic Digestion Initiative (AD Initiative).
APCDs	Air Pollution Control Districts
AQMDs	Air Quality Management Districts
AQMPs	Air Quality Management Plans
BACT	Best Available Control Technology
BMPs	best management practices
CAA	Clean Air Act
CalEPA	California Environmental Protection Agency
CAL FIRE	California Department of Forestry and Fire Protection
Caltrans	California Department of Transportation
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CAT	Climate Action Team
CCAA	California Clear Air Act
CCR	California Code of Regulations
CDFA	California Department of Food and Agriculture
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CH_4	Methane

CHP	California Highway Patrol
CNEL	Community Noise Equivalent Level
CNG	Compressed Natural Gas
CO	Carbon monoxide
CO_2	carbon dioxide
CO_2e	CO_2 equivalents
CPUC	California Public Utilities Commission
CUPA	Certified Unified Program Agency
CVRWQCB	Central Valley Regional Water Quality Control Board
CWA	Clean Water Act
dB	decibels
dBA	A-weighted decibels
DOT	U.S. Department of Transportation
DPM	diesel particulate matter
DTSC	Department of Toxic Substances Control
EIR	Environmental Impact Report (California)
EPA	U.S. Environmental Protection Agency
ERT	Emergency Response Team
ESA	Environmental Site Assessment
FEMA	Federal Emergency Management Agency
FICON	Federal Interagency Committee on Noise
FIP	Federal Implementation Plan
FOG	Fats, oils and greases
GHG	Greenhouse Gas
GWP	Global Warming Potential
H_2S	Hydrogen Sulfide
HAPs	Hazardous Air Pollutants
HARP	Hot spots Analysis Reporting Program
HFC	Hydrofluorocarbons
Hz	hertz

IC	Internal Combustion
IPCC	International Panel on Climate Change
LEA	Local Enforcement Agency
LNG	Liquefied Natural Gas
LUST	Leaking Underground Storage Tanks
MCL	Maximum Contaminant Level
MMRP	Mitigation Monitoring and Reporting Program
MSW	Municipal Solid Waste
NAAQS	National Ambient Air Quality Standards
NESHAPs	National Emission Standards for Hazardous Air Pollutants
NFPA	National Fire Protection Association
N_2O	Nitrous Oxide
NOI	Notice of Intent
NO	Nitric Oxide
NOP	Notice of Preparation
NOx	Nitrogen oxides
NO_2	Nitrogen Dioxide
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
OEHHA	Office of Environmental Health Hazard Assessment
OES	California State Office of Emergency Services
OMP	Odor Management Plan
OPR	Governor's Office of Planning and Research
OPS	Office of Pipeline Safety
OSHA	Occupational Safety and Health Administration
PAH	Polycyclic Aromatic Hydrocarbons
PFC	Perfluorocarbons
PHMSA	Pipeline and Hazardous Materials Safety Administration
PG&E	Pacific Gas and Electric Company
PM10	particulate matter of less than 10 microns in size

PM2.5	particulate matter of less than 2.5 microns
PNPL	Proposed National Priorities List
PRC	California Public Resources Code
RCRA	Resource Conservation and Recovery Act
REA	Registered Environmental Assessor
RELs	Reference Exposure Levels
RWQCB	Regional Water Quality Control Board
ROG	Reactive organic gases
RPS	Renewable Portfolio Standards
SB	Senate Bill
SF_6	Sulfur Hexafluoride
SIP	State Implementation Plan
SMUD	Sacramento Metropolitan Utilities District
SO_2	Sulfur Dioxide
SOx	Sulfur Oxides
SWRCB	State Water Resources Control Board
SWPPP	Stormwater pollution prevention plan
TAC	Toxic Air contaminant
TAG	Technical Advisory Group
TDS	total dissolved solids
TMDL	Total Maximum Daily Loads
UC	University of California
USC	United States Code
UST	Underground storage tanks
US EPA	U.S. Environmental Protection Agency
VOC	Volatile Organic Compounds

15.2 Glossary of Terms[1]

Alternative daily cover	Material other than soil used to cover the surface of active landfills at the end of each day to control diseases, fires, odors, etc.
Anaerobic digester	A dedicated unit process for controlling the anaerobic decomposition of organic material. Typically consists of one or more enclosed, temperature controlled tanks with material handling equipment designed to prevent the introduction of oxygen from the atmosphere.
Biomixer	A rotating drum often with a trommel screen used for size reduction and pretreatment of the organic fraction in mixed MSW for sorting. Can be aerated to encourage biological breakdown. Can be operated at retention times from several hours to several days.
Bioreactor-landfill	A landfill operated as a bioreactor using leachate recycling (or other management schemes) to increase the rate of organic decomposition and biogas production. Not to be confused with anaerobic digester.
Compost	Compost here refers to stabilized and screened organic material ready for horticultural or agricultural use. If anaerobically digested material is used as compost, it must be biologically stabilized, typically through aeration and maturation.
Continuously stirred tank reactor	A digester configuration in which the entire digester contents are mixed to create a homogeneous slurry.
Hydraulic retention time	The average length of time liquids and soluble compounds remain in a reactor. Increasing the HRT allows more contact time between substrate and bacteria but requires slower feeding and/or larger reactor volume.
Mechanically separated OFMSW	Organic material separated from the mixed waste stream by mechanical means (i.e., trommels, screens, shredders, magnets, density dependent mechanisms). Isolating the OFMSW from mixed waste is less effective using mechanical separation as compared with source separation.
Municipal solid waste	MSW includes all of the solid wastes that are generated from residential (homes and apartments) sources, commercial and business establishments, institutional facilities, construction and

[1] Amended from: CIWMB, *Current Anaerobic Digestion Technologies Used for Treatment of Municipal Organic Solid Waste*. March 2008.

	demolition activities, municipal services, and treatment plant sites. Hazardous wastes are generally not considered MSW. Some regions or countries consider only residential solid waste as MSW.
Organic fraction of municipal solid waste	The biogenic fraction of MSW. OFMSW can be removed from the waste stream at the source (source-separation), or downstream by mechanical separation, picking lines a combination of the two. The wood and paper fraction is more recalcitrant to biological degradation and is therefore not desired for biochemical conversion feedstocks.
Plug flow digester	A digester in which materials enter at one end and push older materials toward the opposite end. Plug flow digesters do not usually have internal mixers, and the breakdown of organic matter naturally segregates itself along the length of the digester.
Pre-treatment	In reference to municipal solid waste, pre-treatment can refer to any process used to treat the raw MSW stream before disposal. This includes separation, drying, comminuting, hydrolysis, biological treatment, heating, pyrolysis, and others.
Solids retention time	The average length of time solid material remains in a reactor. SRT and HRT are equal for complete mix and plug flow reactors. Some two-stage reactor concepts and UASB reactors decouple HRT from the SRT allowing the solids to have longer contact time with microbes while maintaining smaller reactor volume and higher throughput.
Source-separated OFMSW	Organic solid waste separated at the source (i.e., not mixed in with the other solid wastes). Often comes from municipal curbside recycling programs in which yard waste and sometimes kitchen scraps are collected separately from the rest of the MSW stream. The precise composition of source-separated OFMSW can change significantly depending on the collection scheme used.
Total solids	The amount of solid material (or dry matter) remaining after removing moisture from a sample. Usually expressed as a percentage of the as-received or wet weight. Moisture content plus total solids (both expressed as percentage of wet weight) equals 100 percent.
Volatile solids	The amount of combustible material in a sample (the remainder is ash). The value is usually reported as a percentage of the total solids, but may occasionally be given as a fraction of the wet weight. Volatile solids is used as an indicator or proxy for the

biodegradability of a material, though recalcitrant biomass (i.e., lignin) which is part of the volatile solids is less digestible. Because of the simplicity of the measurement procedure, it is commonly reported in the AD literature.

Appendix A
Notice of Preparation

DEPARTMENT OF RESOURCES RECYCLING AND RECOVERY

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NOTICE OF PREPARATION

To: Interested Agencies and Individuals and the Office of Planning and Research

Subject: **Notice of Preparation of a Draft Statewide Program Environmental Impact Report for Anaerobic Digester Facilities for the Treatment of Municipal Organic Solid Waste**

The California Department of Resources Recycling and Recovery (CalRecycle) will be the lead agency for preparation of a Statewide Program Environmental Impact Report (Program EIR) for anaerobic digester facilities for the treatment of the organic fraction of Municipal Solid Waste (AD facilities) in accordance with the California Environmental Quality Act (CEQA). This Notice of Preparation (NOP) provides responsible and trustee agencies and the public with information describing the project and its potential environmental effects. Pursuant to CEQA Section 21080.4(a) and Section 15082 of the State CEQA Guidelines, responsible and trustee agencies and members of the public are asked to provide written comments regarding the scope and content of the Program EIR.

Public and Agency Comment: Public agencies may use the Program EIR prepared by CalRecycle when considering approval of individual projects for AD facilities within their jurisdictions. If you are a Responsible Agency or Trustee Agency, CalRecycle needs to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. CalRecycle is also interested in the views of members of the public as to the desired scope and content of the environmental information in the Program EIR.

The preliminary project description and a list of environmental issues to be addressed in the Program EIR are contained in the attached materials. The NOP and attached materials will also be available on the CalRecycle web site (www.CalRecycle.ca.gov/SWFacilities) after the documents are published by the State Clearinghouse.

Due to the time limits mandated by State law, the response of Responsible Agencies and Trustee Agencies must be sent to CalRecycle at the earliest possible date **but not later than 30 days after receipt of this notice**. Responses should include a contact name at your agency and be sent to:

CalRecycle
Attn: Ken Decio
P.O. Box 4025
1001 I Street
Sacramento, CA 95812-4025

If you have any questions regarding this matter, please contact Ken Decio at (916) 341-6313.

Ken Decio, Senior Integrated Waste Management Specialist April 30, 2010

STATEWIDE PROGRAM EIR FOR ANAEROBIC DIGESTER FACILITIES FOR THE TREATMENT OF MUNICIPAL ORGANIC SOLID WASTE

Introduction

Compostable organic materials comprise approximately 25 percent of the solid waste stream disposed in California landfills.[1] CalRecycle Strategic Directive 6.1 calls for a 50 percent reduction in the amount of organics being disposed in landfills by 2020. An additional 10-15 million tons of organics will need to be composted or recycled annually to achieve this goal, requiring the siting of new and expansion of existing organic diversion facilities.

Currently there are no commercial-scale anaerobic digester (AD) facilities processing organics in California; however, interest in developing AD facilities for organic processing is growing, and CalRecycle anticipates that AD facilities will be developed across the state to meet the increasing need to divert organic waste from landfills. CalRecycle is preparing this Statewide Program Environmental Impact Report (EIR) to assess the potential environmental effects that may result from the development of AD facilities in California. The results of the Program EIR will inform future policy considerations related to AD facilities and provide background information on AD technologies, potential impacts and mitigation measures. This information will also assist state and local agencies in preparing site-specific environmental documentation that may be required for AD facility applications and/or permits submitted to CalRecycle, regulatory agencies and local jurisdictions. In the event CalRecycle or other public agencies adopt regulations or ordinances relating to regulating or permitting AD facilities, the EIR will also provide useful information and can serve as the basis for analyzing the environmental effects of those projects.

The project has several objectives including the following:

[1] CalRecycle, 2009. Organics Policy Roadmap and Schedule. Available online at: <http://www.ciwmb.ca.gov/Organics/RoadMap08/default.htm>. Accessed 04/07/10.

- Assist in meeting CalRecycle Strategic Directive 6.1: Reduce the amount of organics in the waste stream by 50 percent by 2020.

- Support Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006, greenhouse gas reduction measures related to anaerobic digestion:

  Measures E-3. Achieve a 33 percent renewable energy mix by 2020. (AD facilities produce biogas which is a renewable energy source.)

  RW-3. High Recycling/Zero Waste. (Anaerobic digestion is one of five subcategories listed under this measure.)

- Assist local governments and state agencies (both lead and responsible agencies) by providing program-level analyses that will identify potential environmental effects of AD facilities and discuss mitigation measures or best management practices that can reduce or eliminate the environmental effects.

Background

Anaerobic digestion is the biological decomposition of organic matter with little or no oxygen. The anaerobic digestion process occurs naturally in marshes and wetlands. There are a variety of controlled systems where anaerobic technology is currently utilized in the United States including wastewater treatment facilities and dairy manure digesters. In other countries (primarily Europe), anaerobic technology is utilized in municipal solid waste digesters to produce energy and to reduce the volume of solid waste that must be landfilled.

Anaerobic digester facilities that process solid waste produce biogas and digestate (liquids and solids). The biogas consists primarily of methane (CH_4), which can be used for energy, and carbon dioxide (CO_2), with small amounts of hydrogen sulfide (H_2S), and ammonia (NH_3). Typically, biogas is saturated with water vapor and may have trace amounts of hydrogen (H_2), nitrogen (N_2), oxygen (O_2), dust and siloxanes.[2] Residual products from anaerobic digestion are liquid and solid residuals (digestate).

Project Description

CalRecycle formed a Technical Advisory Group (TAG) to discuss the project description and environmental issues to be considered in the Program EIR. The TAG includes state and regional regulatory agencies, solid waste industry representatives, AD facility developer representatives, and local jurisdictions. The following project description incorporates input from the TAG regarding facilities and feedstocks which should be considered in the Program EIR.

[2] Greer, Diane, 2010. *Fundamentals of Biogas Conditioning and Upgrading*. Biocycle Journal. February 2010.

Facilities and Feedstocks to be Analyzed in the Program EIR

The scope of the project description has been focused on the objective of reducing the organic content of the solid wastes that are disposed in municipal solid waste landfills.

AD Facilities included: In-vessel digester facilities which are located at permitted solid waste facilities and within industrial areas.

AD Facilities not included: Dairy digesters and wastewater treatment plant digesters and co-digesters. In-ground digester cell technology, though not included in the project, will be discussed and evaluated as an alternative to in-vessel digestion. An example of the in-ground digester cell is the landfill-based anaerobic digester-compost pilot project developed at the Yolo County Central Landfill.

Feedstock materials included: Food waste, green material, and mixed solid waste. The food and green material categories are intended to be inclusive and not limited by current regulatory definitions or collection methods – so "food" includes cannery waste, meat, poultry, fish, cheese waste, food processing waste, etc., and "green material" includes urban, agricultural, crop residues, contaminated green materials, etc. Use of manure will be considered as a seed material for the purpose of increasing digester efficiency, but not as a primary waste stream to be evaluated.

Feedstock materials not included: Biosolids, food waste co-digested at wastewater treatment plants or dairy digesters, and hazardous waste.

Technologies

There are several technology choices for commercial AD facilities. The EIR will allow for flexibility in technology choices at the local level. The project will analyze the environmental effects of different digestion technologies, including one-stage continuous, two-stage continuous and batch systems. The project will evaluate both wet (low solids) and dry (high solids) processes. Although there is no set standard, generally wet processes have less than 15% total solids concentration and dry processes have 15 to 40% total solids concentration. A good description of the range of these technologies that the Program EIR will evaluate is included in a March 2008 CIWMB report, *Current Anaerobic Digestion Technologies Used for Treatment of Municipal Organic Solid Waste*.

Processes

The technologies listed above share the following main processes which the Program EIR will evaluate: pre-processing, digestion and post-processing.

Pre-Processing. Pre-processing includes feedstock receiving, storage of feedstocks, all processing steps required to prepare the feedstock for the digester, and the process of feedstock delivery into the digester.

Digestion. Within the digester, decomposition occurs in four phases: hydroloysis, acidogenesis, acetogenesis, and methanogenesis.

Post Processing. The byproducts of the anaerobic digestion process are digestate and biogas. The digestate is a liquid which is further processed or dewatered resulting in separate liquid and solid byproducts. Options for handling the liquid byproduct depend on its quality and can include reuse in the digestion process, discharge to surface waters, percolation ponds, evaporation ponds, sanitary sewers, or beneficial use as irrigation water. The solid byproduct can be aerobically composted, used as feedstock for energy production facilities or disposed of in landfills. Biogas generated from the anaerobic digestion process can be used as a fuel for a cogeneration system, compressed or liquefied for use as a fuel commodity, or injected into a gas grid or combusted in a flare. For each gas use alternative, specific gas conditioning measures would be required.

Environmental Issues

This section discusses the environmental issue areas which will be evaluated at a program level within the Program EIR. The following lists incorporate input from the TAG which reviewed a preliminary summary of potential environmental impacts. The lists also incorporate a review of the analysis completed for the Notice of Preparation and Initial Study for the Central Valley Dairy Digester and Co-digester Facilities Program EIR, which was released March 2010 by the Central Valley Regional Water Quality Control Board.

The EIR will analyze the following environmental issues areas for which the project may have potentially significant impacts at the program level (specific areas of concern include, but are not limited to, the issues identified in parenthesis):

- Aesthetics (litter, light, glare)
- Air Quality (criteria pollutants, odors, fugitive emissions)
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials (fuels, lubricants, spillage, contaminated feedstocks, equipment, explosions/fire, vector control, airport consistency)
- Hydrology and Water Quality (washwater, stormwater runoff, condensate, effluent disposal)
- Noise (traffic noise and equipment noise)
- Public Services and Utilities (water, wastewater, solid waste, energy use/creation, gas)
- Transportation and Traffic (level of service and roadway impacts from trucks)
- Cumulative Impacts

The following environmental issue areas will be discussed in much less detail as they are not anticipated to have potentially significant impacts at the program level, although they could require evaluation for individual projects due to the potential for local effects:

- Agricultural and Forest Resources
- Biological Resources
- Cultural Resources
- Geology, Soils and Seismicity
- Land Use and Land Use Planning
- Mineral Resources
- Population and Housing
- Recreation

Appendix B

Anaerobic Digester Facility Photographs

ESA

PHOTOGRAPH 1 – UC Davis Biogas Plant (CIWMB, 2008).

PHOTOGRAPH 2 – Wet AD Plant in Leubeck, Germany (Anaerobic-digestion.com, 2010).

PHOTOGRAPH 3 – Dufferin Organics Processing Facility, Toronto, Canada (CCI-TBN Toronto Inc., 2009)

SOURCE: ESA, 2010

Figure B-1
Anaerobic Digester Facilities Photographs

PHOTOGRAPH 1. AD chambers, Munich, Germany.

PHOTOGRAPH 2. Fermenter Plant in Bennati, Italy.

PHOTOGRAPH 3. Indoor AD facility, Munich, Germany.

SOURCE: ESA, 2010

Figure B-2
Anaerobic Digester Facilities Photographs

PHOTOGRAPH 1 – Pulper at Dufferin facility (City of Toronto, 2009).

PHOTOGRAPH 2 – Inside the pulper (City of Toronto, 2009).

PHOTOGRAPH 3 – Mixed solid waste.

SOURCE: ESA, 2010

Figure B-3
Anaerobic Digester Facilities Photographs