Initial Study

Polystyrene Foam Disposable Food Service Ware Ordinance

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

July 2013

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Department of Planning, Building and Code Enforcement
JOSEPH HORWEDEL, DIRECTOR

PUBLIC NOTICE OF INTENT TO ADOPT A NEGATIVE DECLARATION
CITY OF SAN JOSÉ, CALIFORNIA

File No. PP13-043. Polystyrene Foam Food Service Ware Ordinance.
Project Description: The proposed Polystyrene Foam Food Service Ware Ordinance is a model ordinance that would regulate the use of polystyrene foam food service ware by restaurants and food service establishments within participating jurisdictions in Santa Clara County. The proposed ordinance would phase-out the use of expanded or extruded polystyrene (EPS) foam food service ware, as adopted by implementing jurisdictions. Restrictions on use would be phased to allow restaurants using EPS food ware to transition to alternative products. Two options for additional regulation of EPS food ware products may also be adopted by any or all of the participating cities or towns and unincorporated Santa Clara County. The two options include: 1) a restriction of sales of EPS foam food service ware in retail stores and sales outlets; and 2) a restriction of sales of EPS coolers or ice chests which are not wholly encapsulated or encased within a more durable material.

PROJECT LOCATION: The proposed model ordinance would apply to retail food vendors within the following 14 incorporated cities and towns in Santa Clara County, California: San José, Campbell, Cupertino, Gilroy, Los Altos, Los Altos Hills, Los Gatos, Milpitas, Monte Sereno, Morgan Hill, Mountain View, Santa Clara, Saratoga, and Sunnyvale. Two jurisdictions in the County that have already adopted restrictions on the use by retail food vendors of EPS foam food ware may amend their adopted ordinances to include these additional restrictions. These jurisdictions are: City of Palo Alto and County of Santa Clara (unincorporated area).

The City has performed environmental review on the project. Environmental review examines the nature and extent of any adverse effects on the environment that could occur if a project is approved and implemented. Based on the review, the City has prepared a draft Negative Declaration (ND) for this project. An ND is a statement by the City that the project will not have a significant effect on the environment.

The public is welcome to review and comment on the draft Negative Declaration.

The public comment period for this draft Negative Declaration begins on **July 10, 2013,** and ends on **August 9, 2013.**

The draft Negative Declaration, initial study, and reference documents are available online at: http://www.sanjoseca.gov/index.aspx?NID=2165 .

The documents are also available for review from 9:00 a.m. to 5:00 p.m. Monday through Friday at the City of San Jose Department of Planning, Building & Code Enforcement, located at City Hall, 200 East Santa Clara Street; and at the Dr. Martin Luther King, Jr. Main Library, located at 150 E. San Fernando Street.

For additional information, please contact John Davidson at (408)535-7895 or by e-mail at john.davidson@sanjoseca.gov .

Joseph Horwedel, Director
Planning, Building and Code Enforcement

Circulated on: 7/10/2013

John Davidson
Deputy

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Department of Planning, Building and Code Enforcement
JOSEPH HORWEDEL, DIRECTOR

NEGATIVE DECLARATION

The Director of Planning, Building and Code Enforcement has reviewed the proposed project described below to determine whether it could have a significant effect on the environment as a result of project completion. "Significant effect on the environment" means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance.

NAME OF PROJECT: Polystyrene Foam Food Service Ware Ordinance

PROJECT FILE NUMBER: PP13-043

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COUNCIL DISTRICT: Citywide

APPLICANT CONTACT INFORMATION: Ella Samonsky, City of San Jose Environmental Services Division, 200 E. Santa Clara Street, T-7, San Jose CA 95113; (408) 793-4379

FINDING:

The Director of Planning, Building & Code Enforcement finds the project described above will not have a significant effect on the environment in that the attached initial study identifies no potentially significant effects on the environment.

FINDINGS REGARDING POTENTIALLY SIGNIFICANT ENVIRONMENTAL EFFECTS:

I. **AESTHETICS.** The project will not have a significant impact on aesthetics or visual resources, and therefore no mitigation is required.

II. **AGRICULTURE AND FOREST RESOURCES.** The project will not have a significant impact on agriculture or forest resources, and therefore no mitigation is required.

III. **AIR QUALITY.** The project will not have a significant air quality impact, and therefore no mitigation is required.

IV. **BIOLOGICAL RESOURCES.** The project will not have a significant impact on biological resources, and therefore no mitigation is required.

V. **CULTURAL RESOURCES.** The project will not have a significant impact on cultural resources, and therefore no mitigation is required.

VI. **GEOLOGY AND SOILS.** The project will not have a significant impact due to geology and soils, and therefore no mitigation is required.

VII. **GREENHOUSE GAS EMISSIONS.** The project will not have a significant impact due to greenhouse gas emissions, and therefore no mitigation is required.

VIII. **HAZARDS AND HAZARDOUS MATERIALS.** The project will not have a significant hazards and hazardous materials impact, and therefore no mitigation is required.

IX. **HYDROLOGY AND WATER QUALITY.** The project will not have a significant hydrology and water quality impact, and therefore no mitigation is required.

X. **LAND USE AND PLANNING.** The project will not have a significant land use impact, and therefore no mitigation is required.

XI. **MINERAL RESOURCES.** The project will not have a significant impact on mineral resources, and therefore no mitigation is required.

XII. **NOISE.** The project will not have a significant noise impact, and therefore no mitigation is required.

XIII. **POPULATION AND HOUSING.** The project will not have a significant population and housing impact, and therefore no mitigation is required.

XIV. **PUBLIC SERVICES.** The project will not have a significant impact on public services, and therefore no mitigation is required.

XV. **RECREATION.** The project will not have a significant impact on recreation, and therefore no mitigation is required.

XVI. TRANSPORTATION / TRAFFIC. The project will not have a significant traffic impact, and therefore no mitigation is required.

XVII. UTILITIES AND SERVICE SYSTEMS. The project will not have a significant impact on utilities and service systems, and therefore no mitigation is required.

XVIII. MANDATORY FINDINGS OF SIGNIFICANCE. The project will not substantially reduce the habitat of a fish or wildlife species, be cumulatively considerable, or have a substantial adverse effect on human beings, and therefore no mitigation is required.

PUBLIC REVIEW PERIOD:

Before 5:00 p.m. on **August 9, 2013,** any person may:

1. Review the Draft Negative Declaration (ND) as an informational document only; or

2. Submit written comments regarding the information, analysis, and mitigation measures in the Draft ND. Before the ND is adopted, Planning staff will prepare written responses to any comments, and revise the Draft ND, if necessary, to reflect any concerns raised during the public review period. All written comments will be included as part of the Final ND.

Joseph Horwedel, Director
Planning, Building and Code Enforcement

Circulation period: **from July 10, 2013 to August 9, 2013.**

John Davidson
Deputy

Revised 5-6-11 jam

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SECTION 1.0 INTRODUCTION AND PURPOSE

This Initial Study of environmental impacts is being prepared to conform to the requirements of the California Environmental Quality Act (CEQA), the CEQA Guidelines (California Code of Regulations §15000 *et.seq.*) and the regulations and policies of the City of San José.

This Initial Study evaluates the potential environmental impacts that might reasonably be anticipated to result from implementation of a model **Polystyrene Foam Food Ware Ordinance** in 14 incorporated cities and towns within Santa Clara County, California.

SECTION 2.0 PROJECT INFORMATION

2.1 PROJECT TITLE

Polystyrene Foam Disposable Food Ware Ordinance

2.2 OVERVIEW OF THE PROPOSED PROJECT

The project is adoption of an ordinance regulating the use of polystyrene foam food ware by restaurants and food service establishments. The proposed Polystyrene Foam Food Service Ware Ordinance ("Proposed EPS Food Ware Ordinance") is a model ordinance that would regulate the use of polystyrene foam food service ware within participating jurisdictions in Santa Clara County. Participating jurisdictions for the model ordinance that currently do not have restrictions on expanded or extruded polystyrene (EPS) foam food ware include 14 of the 15 incorporated cities in Santa Clara County (Palo Alto and unincorporated County of Santa Clara jurisdictions already have bans in place). The Proposed Ordinance would phase-out the use of EPS foam food service ware at restaurants and food service establishments within Santa Clara County, as adopted by implementing jurisdictions.

EPS foam food ware use at restaurants and other food vendors would be prohibited in all adopting cities and towns. Restrictions on use would be phased to allow restaurants using EPS food ware to transition to alternative products.

Two options for additional regulation of EPS food ware products may also be adopted by any or all of the participating cities or towns and unincorporated Santa Clara County. The two options include: 1) a restriction of sales of EPS foam food service ware in retail stores and sales outlets; and 2) a restriction of sales of EPS coolers or ice chests which are not wholly encapsulated or encased within a more durable material. These options may be incorporated in EPS Food Ware Ordinance language for adoption by individual jurisdictions.

In the City of San José, the ordinance would consist of revisions to Chapter 9.10 of Title 9 of the City's Municipal Code to prohibit the use of polystyrene foam food ware by food vendors.

A copy of the draft model ordinance is provided in Appendix A-1. The draft ordinance for the City of Sunnyvale, which includes provisions to phase-out the sale of empty containers is provided in Appendix A-2.

2.3 PROJECT LOCATION

The proposed model ordinance would apply to retail food vendors within the following 14 incorporated cities and towns in Santa Clara County, California:

- San José
- Campbell
- Cupertino
- Gilroy
- Los Altos
- Los Altos Hills
- Los Gatos
- Milpitas
- Monte Sereno
- Morgan Hill
- Mountain View
- Santa Clara
- Saratoga
- Sunnyvale

Individual cities or towns may also add provisions that would cover retail sale of containers and/or sale of unlined polystyrene (PS) foam ice chests at retail stores. Two jurisdictions in the County that have already adopted restrictions on the use by retail food vendors of EPS foam food ware may amend their adopted ordinances to include these additional restrictions. These jurisdictions are:

- City of Palo Alto
- County of Santa Clara (unincorporated area)

The Town of Monte Sereno does not currently have retail vendors within their town limits and there is no apparent need to adopt the ordinance at this time. Residents of Monte Sereno would be affected by implementation of the ordinance in adjacent cities that do have retail vendors.

The project area is located at the southerly end of San Francisco Bay as shown on Figure 2.3-1. The 14 jurisdictions that are considering adoption of the model ordinance cover over 329 square miles, which is about one-third (32 percent) of the 1,029.1 square miles of Santa Clara County. The estimated resident population as of January 2012 within these cities and towns was 1,664,588 (about 92 percent of Santa Clara County) with about 822,525 jobs (91 percent of jobs in the County). A breakdown of residents and employment by jurisdiction is provided in Table 2.3-1.

Table 2.3-1
Jurisdictions within Santa Clara County

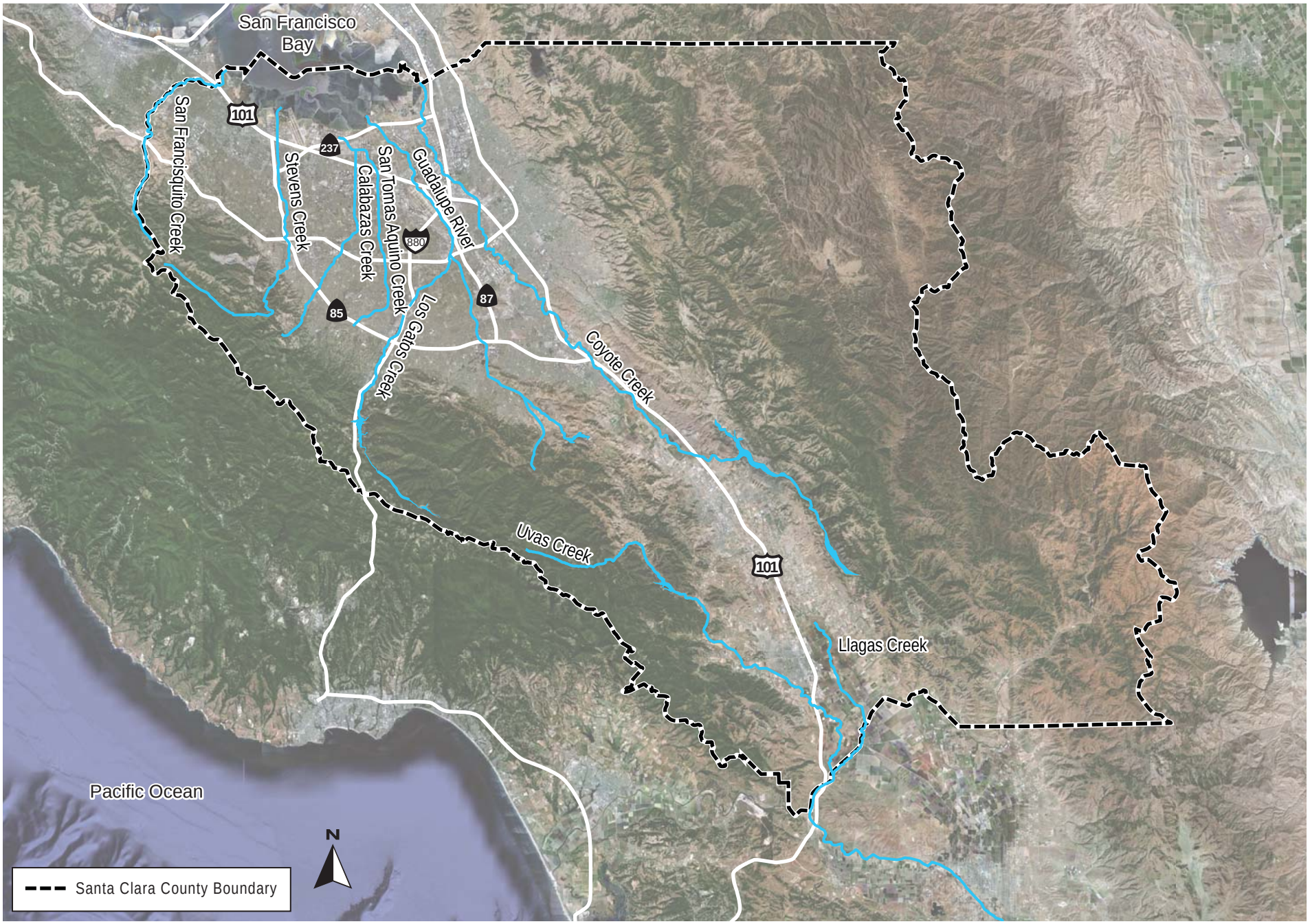
Jurisdiction	Area[1] (in square miles)	Population[2] (2012 estimates)	Employment[3] (includes Self-employed)
Participating Jurisdictions			
San José	176.5	971,372	475,766
Campbell	5.8	39,882	22,965
Cupertino	11.3	59,022	26,639
Gilroy	16.2	50,158	20,405
Los Altos	6.5	29,460	13,429
Los Altos Hills	8.8	8,027	3,472
Los Gatos	11.1	29,854	15,221
Milpitas	13.6	66,966	32,099
Monte Sereno	1.6[4]	3,373	1,747
Morgan Hill	12.9	39,127	19,192
Mountain View	12.0	75,275	43,377
Santa Clara	18.4	118,813	60,239
Saratoga	12.4	30,363	12,903
Sunnyvale	22.0	142,896	75,071
Total	329.1	1,664,588	822,525
Jurisdictions in Santa Clara County with Disposable Food Ware Ordinances (Amendments Only)			
Palo Alto	23.9	65,544	33,282
Unincorporated Santa Clara County	676.1	86,354	46,441

[1] Area data is from U.S. Census Bureau. "State & County QuickFacts." 2010. Last revised January 10, 2013. Available at: http://quickfacts.census.gov

[2] Population data is from the California Department of Finance. "E-1 Population Estimates for Cities, Counties, and the State — January 1, 2011 and 2012." May 2012. Available at: http://www.dof.ca.gov/research/demographic/reports/estimates/e-1/

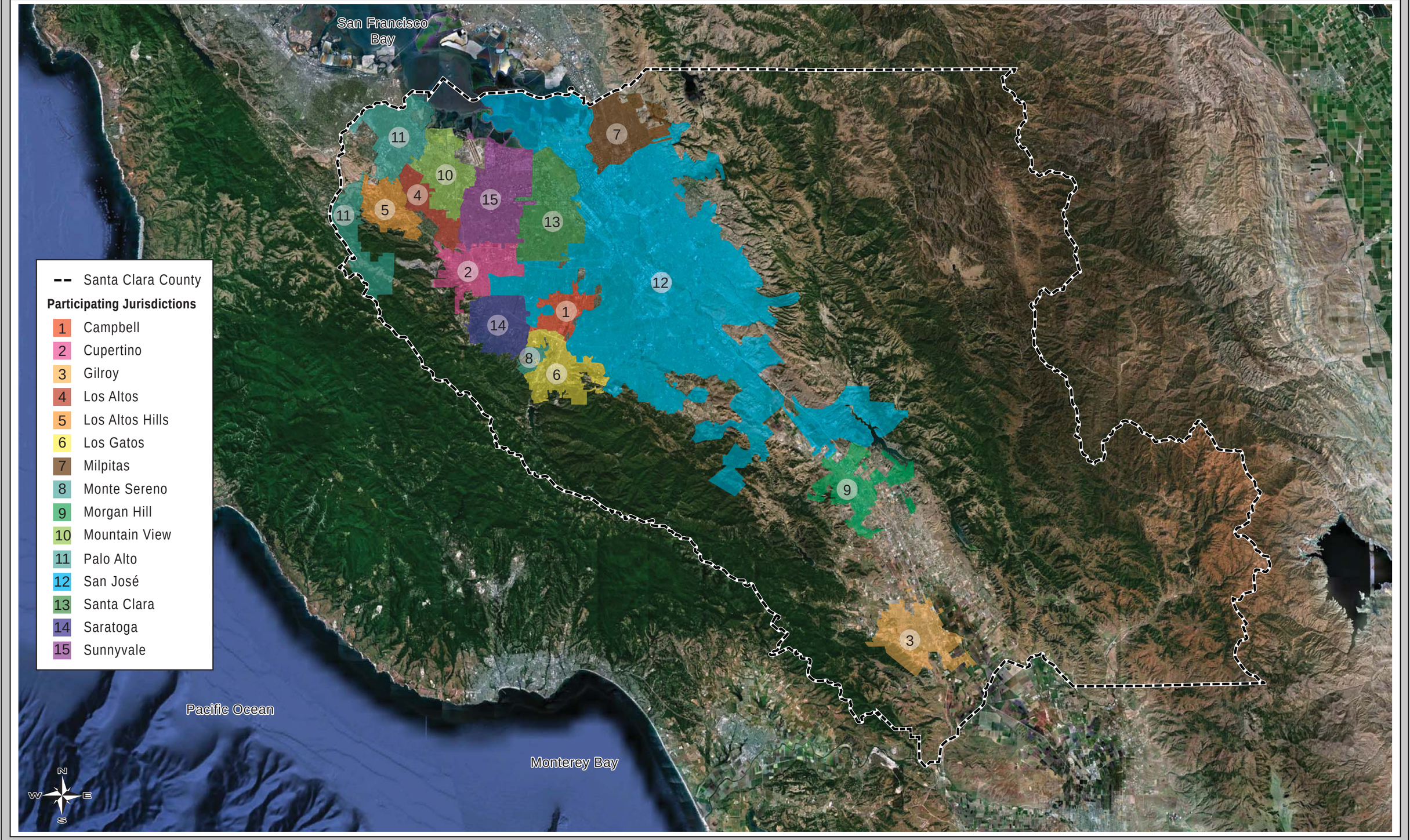
[3] Employment data from the American Community Survey 2006-2010 in: Bay Area Census. "Santa Clara County." (Plus pages for each member jurisdiction). Available at: http://www.bayareacensus.ca.gov/counties/SantaClaraCounty.htm

[4] City of Monte Sereno. "About Monte Sereno." 2012. Available at: http://asoft2013.accrisoft.com/montesereno/



REGIONAL MAP

FIGURE 2.3-1



PARTICIPATING JURISDICTIONS

FIGURE 2.3-2

EXISTING BANS

FIGURE 2.3-3

2.4 LEAD AGENCY CONTACT

John Davidson
City of San José
Department of Planning, Building, & Code Enforcement
200 E. Santa Clara Street, Third Floor
San José, CA 95113
(408) 535-7898
(408) 778-6480

2.5 PROJECT PROPONENT

City of San José
Environmental Services Division
200 E. Santa Clara Street, 10th Floor
San José, CA 95113
(408) 535-8550
Attn: Ella Samonsky

2.6 PROJECT-RELATED APPROVALS, AGREEMENTS AND PERMITS

- Municipal or County Code Amendments by each participating jurisdiction

SECTION 3.0 PROJECT DESCRIPTION

3.1 PROJECT BACKGROUND AND PURPOSE

3.1.1 What is Polystyrene Foam Food Ware?

Styrene is a carbon containing compound that can be converted to a polymer (chain of molecules) or synthetic resin through a process known as polymerization. Polystyrene is composed of a large number of the styrene monomer, or molecules ($C_6H_5CHCH_2)_n$, and is used widely to make plastic products.

Polystyrene foam is a thermoplastic material derived from petrochemicals.[1] Thermoplastic resins consist of long molecules that can be melted and solidified by heating and cooling.[2] When a blowing agent (such as pentane) is added to general purpose polystyrene resin, the material is referred to as "expandable (or "expanded") polystyrene".

Two common types of polystyrene foam are expanded polystyrene and extruded polystyrene foam. Polystyrene foam beverage cups are generally made of expanded polystyrene.[3] Common extruded polystyrene foam food service ware products include foam plates and trays, clam shells, meat trays, and egg cartons. For the purposes of this study, both expanded and extruded polystyrene foam products will be referred to as EPS, unless otherwise noted.

Photo 1: EPS Foam Food Ware

[1] "Thermoplastic" refers to a polymer (such as polyethylene or polystyrene) that becomes pliable or moldable above a specific temperature, and returns to a solid state upon cooling (Source: http://en.wikipedia.org/wiki/Thermoplastic). Petrochemicals are substances obtained by the refining and processing of petroleum or natural gas.

[2] SPI. "Definitions of Resins". Accessed April 16, 2013. <http://www.plasticsindustry.org/AboutPlastics/content.cfm?ItemNumber=656&&navItemNumber=1128>

[3] EPS food service ware is sometimes incorrectly referred to as "Styrofoam®". Although it also is composed of the same base material, polystyrene, "Styrofoam®" refers to an extruded (building) insulation product produced and marketed solely by the Dow Chemical Company.

3.1.2 What is the Purpose of Adopting an Ordinance?

The basic objectives of the proposed project are to:

- Reduce the amount of EPS foam food ware in urban litter;
- Reduce the amount of EPS foam material that reaches local water ways and ultimately, San Francisco Bay or Monterey Bay and the Pacific Ocean.
- Reduce use of a material that cannot be composted or recycled.

Photo 2: Food Ware Litter in Coyote Creek

Multiple cities in Santa Clara County, the San Francisco Bay Area, the State of California, and throughout the country are considering adoption or have adopted ordinances that ban or limit the use of EPS foam food ware. In the Bay Area and areas near the ocean, a primary concern has been the fate of EPS foam litter in the environment. EPS foam is friable, light and easily becomes airborne and/or breaks into small pieces which are hard to collect. EPS foam is also a uniquely problematic pollutant for aquatic and marine environments because it floats and is highly visible. Birds and marine wildlife are also reported to ingest these small pieces of material.

From a regulatory standpoint, the San Francisco Bay Regional Water Quality Control Board has required all Municipal Regional Permit (MRP) National Pollutant Discharge Elimination System (NPDES) permittees (cities, counties and agencies) to reduce litter entering waterways through the municipal separate storm sewer system. Some permit requirements relate to visual assessment of waterways and attainment of no visible impact due to trash.

In Santa Clara County, two jurisdictions (Palo Alto in 2009 and the County of Santa Clara in 2012) have adopted food vendor

Photo 3: Lighter Materials in a Hydrodynamic Separator within the San José Storm Drainage System

EPS foam food container bans.[4] An additional 30 cities and counties in California have enacted ordinances banning EPS foam containers at restaurants. The cities and towns of San José, Sunnyvale, Cupertino, Milpitas, Mountain View, Morgan Hill, and Los Altos in Santa Clara County have individually initiated research on the fate of EPS foam food ware in their communities and options for regulating the use of this material.

In late 2012, the City of San José approached other jurisdictions regarding the development and review of a model ordinance that could be used by cities and towns within Santa Clara County. Consideration of a model ordinance would allow for there to be uniformity in definitions and a consolidated and comprehensive environmental review process. The proposed model ordinance project is intended to address challenges associated with the collection and control of litter from single-use polystyrene foam food ware on a broad, uniform, County-wide basis.

3.2 PROJECT COMPONENTS

3.2.1 Definitions of Regulated Activities

The ordinance would prohibit the use of disposable polystyrene foam food and beverage containers for serving (dine-in) or transporting (take-out) prepared foods by food vendors within the specific jurisdictions of incorporated Santa Clara County that adopt the ordinance.

Prepared food does not include uncooked eggs, fish, meat or poultry unless provided for consumption without further food preparation (e.g., sushi).

Disposable food service ware includes, but is not limited to, plates, cups bowls, trays, and hinged or lidded containers, also known as clamshells.

Typical EPS foam food containers that would be covered by the ordinance are clamshell containers, plates and cups, as shown in Photo 4.

Photo 4: Examples of EPS foam Products Subject to the Proposed Ordinance

3.2.2 Exceptions

In the model ordinance, pre-packed food that arrives at the premises of the food vendor in a container or wrapper and is not removed from the container or wrapper before its sale or provision is not covered by the EPS food ware prohibition (e.g., ramen noodles in a EPS foam cup or pre-packaged dried fruit or vegetables sold at a grocery store).

[4] In addition, several jurisdictions, including the City of San José (City Council Policy 4-6) and Town of Los Gatos (Section 5c of the Town's Purchasing Manual), have adopted environmental procurement policies that restrict the purchase and use of EPS foam products by the city or town and/or at city or town-sponsored events.

As noted above, EPS foam food ware used for raw eggs and raw, butchered meat, fish or poultry is exempt and would not be prohibited.

3.2.3 Optional Provisions

Two options for additional regulation of EPS food ware products may also be adopted by any or all of the participating cities or towns and unincorporated Santa Clara County. The two options include: 1) a restriction of sales of EPS foam food service ware in retail stores and sales outlets; and 2) a restriction of sales of EPS coolers or ice chests which are not wholly encapsulated or encased within a more durable material.

The prohibition of sale of (empty) polystyrene foam containers and service ware by vendors (e.g., stores or business that sell goods or merchandise) would apply to a variety of sales outlets, such as grocery stores and drug stores, food service ware suppliers (e.g., restaurant supply, cash and carry, big box retailers), hardware stores and sporting goods stores (i.e., foam ice chests not encapsulated in other materials). The restrictions on EPS foam container sales would apply within the city or town limits.

These options may be incorporated in EPS Food Ware Ordinance language for adoption by individual jurisdictions.

3.2.4 Implementation

The ordinance would take effect no sooner than January 1, 2014, or 30 days following adoption by each jurisdiction. Implementation may be staggered for large food vendors (part of a chain or franchise of food vendors that operate in more than one state) and small food vendors. The ordinance would take effect for small food vendors (not part of an interstate chain or franchise) one year later.

For jurisdictions that adopt the optional provision prohibiting the sale of polystyrene foam containers and food service ware by sales outlets, implementation of the limits on sales may take place after the effective date for food vendors.

3.2.5 Exemptions

The ordinance includes provisions for exemptions due to undue hardship that may vary by jurisdiction. Exemptions would be granted on a case-by-case basis by city or town staff (e.g., Director of Environmental Services Department) and may consider unique financial or economic hardship and/or situations where no reasonably feasible available alternative exists.

SECTION 4.0 SETTING, ENVIRONMENTAL CHECKLIST AND IMPACTS

This section describes the existing environmental conditions on and near the project area, as well as environmental impacts associated with the proposed project. The environmental checklist, as recommended in the California Environmental Quality Act (CEQA) Guidelines, identifies environmental impacts that could occur if the proposed project is implemented.

The right-hand column in the checklist lists the source(s) for the answer to each question. The sources cited are identified at the end of this section.

METHODOLOGY AND APPROACH FOR IMPACT ANALYSIS

Most CEQA documents are prepared for development or planning projects, a condition in which a project proponent or agency is proposing to build something that does not currently exist. On a vacant project site, a new proposed project would create a land use and physical set of improvements that did not exist before. If the site is already developed, then the new project would replace one set of land uses and physical improvements with a new and different set. In both cases, the physical impact – an increment of physical change – is clear and distinct when compared to the existing environment.

The proposed project is the adoption and implementation of an ordinance intended to reduce the use and disposal of single-use polystyrene foam food ware. The project will not eliminate single-use food ware of all types, nor necessarily reduce the amount of food ware being used, but will reduce quantities of these products composed of *polystyrene foam* currently being used in Santa Clara County.

While the ordinance will phase-out a particular material type (PS foam), food vendors and retail customers will be allowed to choose among other readily available substitute products for each of the various food ware containers. Therefore, there will be a reasonably foreseeable shift away from EPS foam products to substitute products made of materials that would not be subject to the phase-out. The CEQA analysis in this Initial Study will focus on the environmental consequences associated with the manufacture, transport, use, and disposal of the substitute products made from allowed materials. In choosing to phase-out EPS foam food ware, each participating jurisdiction must be informed as to whether any of the substitute products has its own unacceptable unintended environmental consequences. Key questions include: to what degree will various substitute products occupy the 'void' left by banning EPS foam products, where and how are the substitutes made, are they typically disposed in landfills, composted, or recycled, and are there particular environmental issues or hazards (as compared to EPS foam products), if they become litter?

All CEQA analyses require some degree of forecasting, and that is true of the analysis in this Initial Study. The project is the adoption and implementation of a model ordinance and the following discussion of environmental impacts forecasts how businesses and consumers will comply with the ordinance, and what changes those efforts to comply might make to the physical environment. CEQA does not require that the environmental analysis engage in speculation, but that a good faith

effort be made to identify and disclose the likely direct, and reasonably foreseeable indirect, physical changes to the existing environment resulting from the project being approved.

Maximum Impact Scenario

This Initial Study analyzes the maximum impact scenario that could occur with the adoption of a polystyrene foam food ware ordinance by jurisdictions in Santa Clara County (acknowledging such an ordinance is already in effect in Palo Alto and unincorporated County areas). The maximum impact scenario is a set of assumptions about the scope of the ordinance that would likely result in the greatest amount of change, which would reasonably be assumed to result in adverse environmental impacts, including full implementation by all jurisdictions and compliance by all of the affected business vendors and other entities.[5] Failure to comply with the ordinance, for example, would not cause any change from existing conditions and would not, therefore, result in any "impact" from the project.

In addition to banning EPS foam food ware use at restaurants and other food vendors, two options for additional regulation of EPS food ware products may also be adopted by one or more of the participating cities or towns. Adoption of the model ordinance with both options, a restriction of sales of EPS foam food service ware in stores and sales outlets and a restriction of sales of EPS coolers or ice chests which are not wholly encapsulated or encased within a more durable material, would represent the maximum impact scenario.

While the following discussion of environmental effects of the maximum impact scenario assumes that all of cities and towns in Santa Clara County would adopt the ordinance with the two options as described, the most basic purpose for preparing any CEQA analysis is to provide useful information to the decision makers, who may subsequently choose to modify the project based on the Initial Study or other information. An individual jurisdiction (e.g., city or town) might, for example, decline to adopt the ordinance exactly as it is described in this Initial Study, or the various cities and towns might each adopt slightly different ordinances. CEQA allows a lead or responsible agency to approve a smaller or lesser impact project than that described in the Initial Study, or to approve a part of the project described in the Initial Study. In addition, the project may be changed in order to incorporate new elements that will further reduce or avoid adverse impacts, and it can still be covered by the same environmental review (e.g., this Initial Study).

In the discussions that follow, impacts will be discussed in the context of the entire area covered by the 14 cities and towns considering adoption of an EPS foam food ware ordinance. It also covers amendments to existing ordinances in the City of Palo Alto and unincorporated Santa Clara County. As noted above, the maximum impact scenario will entail the adoption of the model ordinance and both options by each jurisdiction. Any ordinance or set of ordinances that is implemented by anything less than the 14 cities and towns and modifications for the two jurisdictions that cover the remainder of the County would (by definition) result in less change from the existing conditions producing less impact (as well as reduced benefits in terms of the amount of EPS litter reaching waterways), and those impacts would therefore be within the impact parameters of the analysis completed in this Initial Study. If a potentially significant impact from adoption of the model ordinance is identified countywide, the discussion will also disclose whether the impact could also be

[5] The maximum impact scenario is not the same thing as a "worst case", which implies extreme conditions.

significant at the local jurisdictional level (*i.e.,* would the impact from a single city or town also be significant).

CEQA requires that an environmental impact analysis identify the impact of a proposed project upon the existing physical conditions "on the ground". "Existing" is usually defined as conditions which existing at the time the environmental analysis begins. The environmental analysis for this project was undertaken in Spring 2013. The date therefore defines the baseline period for this environmental analysis.

Baseline EPS Foam Food Ware Use

PS foam is one of a number of materials used to manufacture disposable or single-use food service ware. Precise information on the number of EPS foam cups, plates, clamshells and food trays used or distributed within the project area (i.e., within each jurisdiction or cumulatively across Santa Clara County) is not readily available from government agencies or other independent sources. In the absence of precise data, an estimate for the project area can be derived in several ways from readily available information on EPS foam food service ware: 1) manufacture, 2) occurrence in the waste disposal stream and 3) as litter. Where information is for larger sample areas (e.g., national or state) estimates are presented on a per capita basis. For smaller sample areas (e.g., an individual city or town), projected baseline rates for the project area (i.e. incorporated jurisdictions in Santa Clara County) are adjusted on both a per capita or per service population (residents + jobs) basis to reflect the influence of both residents and the daytime population of employees (refer to Appendix B for a detailed discussion of baseline estimates). As appropriate, per capita estimates for individual jurisdictions are also provided for informational purposes. The purpose of this discussion is allow for a big picture, or overall view, of the materials that would be replaced with substitute products if the model ordinance is approved and implemented.

<u>Baseline Estimates Based on EPS Foam Food Ware Production</u>

Information on the number of single use EPS foam food ware containers (e.g., cups, bowls, plates, clamshells and ice chests) used in the project area was not found to be readily available. Estimates of EPS foam food ware use were assessed based upon available information on EPS foam production and sales, waste characterization and litter studies (refer to Appendix B). EPS foam food ware used in the project area consists of an unknown mixture of products, including plates, cups, trays and clamshells. An equivalent number of items per pound for individual products can be estimated, however. One pound of EPS foam food ware would be equivalent to about:

- 46 8-inch clamshells *or*
- 53 9-inch plates *or*
- 91 16-ounce cups *or*
- 53 32-ounce cups.

Based upon a review of the categories for polystyrene resin sales and production (in the U.S., Canada and Mexico) in the 2012 Edition of *The Resin Review*, the baseline use of EPS foam food ware could range from about 1.8 pounds per capita to a high of about seven (7) pounds per capita.

Baseline Estimates Based on Waste Characterization Studies

Waste characterization studies that cover some or all of the project area include both statewide studies and studies conducted within the Cities of San José, Sunnyvale, Mountain View and Palo Alto. EPS foam food ware is a component of solid waste in the plastics category.

A waste characterization study for the residential and commercial sectors was conducted in the City of San José in March 2008.[6] Based on this waste characterization study, an estimate of annual EPS foam food ware use (not accounting for materials improperly disposed of as litter and not collected) would be up to 2,621 tons, or 5.3 pounds per capita and 3.9 pounds per service population.[7] This estimate could be a conservatively high value for EPS food ware use as the total expanded polystyrene subcategory includes some items, such as egg cartons and packing materials that would not be affected by the model ordinance.

A 2010 waste characterization report found that EPS[8] food packaging makes up an estimated 689 tons per year of waste transferred to the landfill from the cities of Sunnyvale and Mountain View after materials recovery at the Sunnyvale Materials Recovery and Transfer Station (SMaRT Station®). This is about 0.5 percent of the total waste disposed.[9] The EPS food packaging subcategory specifically included clamshells, cups, plates, and bowls. Annually, this represents approximately 6.4 pounds per year per capita or 4.1 pounds per year per service population of the two cities.[10]

Limited user surveys have been undertaken in the City of Milpitas and unincorporated Santa Clara County of businesses that use single-use disposable food containers. In a survey of 25 businesses in the City of Milpitas, about one-half (13) used EPS foam food containers. Of the businesses that use polystyrene take-out containers, the majority estimated use of more than 2,000 pieces per month of clamshells, soup cups with lids, hot drink cups, cold drink cups, plates, and other products.[11] An estimate of monthly use by food service businesses was not projected citywide, however.

Based upon local waste characterizations within Santa Clara County, EPS food ware appropriately disposed of is conservatively about 4 pounds per service population. Service population is defined as residents + jobs in a jurisdiction or area.

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[6] Cascadia Consulting Group. "City of San José Waste Characterization Study Final Report – DRAFT." May 2008. Prepared for the City of San José.

[7] Based upon an estimated population of 985,307 and a service population of 1,354,757 (985,307 residents plus 369,450 jobs) for the City of San José in 2008. (Source: City of San José. "Envision San José 2040 General Plan Final Program EIR." 2010.).

[8] Note: In some studies, the term EPS refers to all EPS foam food ware, both expanded (e.g., cups) and extruded foam (e.g., plates and clamshells). Unless otherwise noted, EPS categories in waste categorization studies includes both types of EPS foam food ware.

[9] Cascadia Consulting Group. "City of Sunnyvale Waste Characterization Report." November 2010. Prepared for the City of Sunnyvale.

[10] Based upon a combined population for the cities of Sunnyvale and Mountain View in 2010 of 214,147 persons and a service population of 337,147 (residents + jobs). (Sources: 2010 Census data and Association of Bay Area Governments. "Draft Plan Bay Area: Draft Forecast of Jobs, Population and Housing." March 2013)

[11] Cascadia Consulting Group. "Expanded Polystyrene Food Service Take-Out Container Study." April 26, 2011. Prepared for the City of Milpitas.

Baseline Estimates Based on Litter Studies

Litter is waste that is improperly discarded. Due to the aesthetic, health, and environmental effects of litter, a number of organizations and government agencies track and characterize trends in litter generation, human behavior, and fate in the environment. It is important to note that it is difficult to document and categorize litter because it is the result of human behavior (frequently impulsive behavior) and littered materials are operated on by various environmental factors, such as wind, sunshine, and rain. For example, the amount of a particular type of litter may vary on the street versus in a storm drain due to the weight and transportability of the material (e.g., EPS easily blows or washes away from a location where it is dropped). It is also difficult to compare study results because there is no one standardized methodology that is appropriate for studies in all environments (e.g., streets, highways, parks, waterways, and shorelines).

Street Litter Studies

The City of San José has conducted a number of trash characterization studies at locations throughout the City that look at counts and/or the volume of litter found in the environment. Studies conducted on city streets include:

- SAIC. *The City of San José Streets Litter 2008*. September 30, 2008. Prepared for City of San José Department of Environmental Services.
- City of San José. *Targeted Litter Assessment.* 2009.
- City of San José. *Litter Assessment Data*. 2012. Spreadsheet.

The street litter assessments completed in San José range from a random sampling of counted litter (2008 Streets Litter) to surveys of litter "hot spots" with litter counts recorded.

The 2008 street litter survey counted items of litter found at 125 randomly selected sites. EPS foam cups were found to make up 0.65 percent of the "large litter" counted. EPS foam plates and clamshells made up 0.1 and 0.05 percent respectively, for a total of 0.8 percent of EPS foam food ware. The 2009 and 2012 litter assessments used similar methodology for counting, however, they targeted areas known to accumulate litter. The 2009 targeted litter assessment included litter counts at 48 sites in the City of San José with relatively high concentrations of litter (e.g., litter "hot spots"). A total of 7,917 pieces of litter were counted from the 48 sites for an average of 165.5 items per site. At the targeted sites, the percent of total "large litter" included 1.6 percent polystyrene foam cups, 0.4 percent polystyrene foam food plates, and 0.2 percent polystyrene clamshells. Polystyrene trays, which depending on their use, may not be covered by the proposed ordinance made up about 0.2 percent of the total large litter. In 2012, litter was counted at 31 sites in the city where litter was known to accumulate. Polystyrene food ware products made up about 3.5

Comparison with Street Litter Studies Elsewhere

In a 2012 study underwritten by the American Chemistry Council Plastics Foodservice Packaging Group, Environmental Resources Planning LLC summarized the results of a number of litter characterization studies that recorded amounts of polystyrene foam food service products in urban litter. This summary included the 2008 San José street litter study. A median value of 1.5 percent of "large" litter[1] (by count) was reported to be EPS foam food ware, based upon 19 surveys between 1994 and 2008 in jurisdictions in the United States and Canada.

percent of the total litter counts. The breakdown by polystyrene food ware type was 2.2 percent polystyrene foam cups, 0.8 percent polystyrene foam food plates (rounded), and 0.1 percent polystyrene clamshells (rounded). Polystyrene foam trays were approximately 0.5 percent of the 2012 total litter count (refer to Appendix B for more detail on the results of litter assessments).

EPS foam food ware generally makes up four percent or less of total litter by any of these measures. EPS cups and plates appear to be more prevalent in these street litter assessments, where measured, than EPS clamshells. Individual subcategories (e.g., EPS foam plates, clamshells) likely are less than one percent of total litter by count. Total street litter loads citywide on an annual or other basis are not available.

Stormwater System Studies

Based upon recent studies completed by the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPP) in storm drain catch basins, approximately 3,900 cubic yards of trash that could reach creeks through the storm sewer system in the San Francisco Bay Basin is estimated to be generated annually.[12] SCVURPPP estimates that approximately eight (8) percent of this trash by volume, or 311 cubic yards, is EPS foam food ware.[13] It is important to note that this study focused on trash entering creeks via municipal storm drainage systems and does not include EPS foam litter deposited directly in waterways via wind or direct dumping.

The stormwater system studies conducted by SCVURPP do not cover the area of Santa Clara County south of Morgan Hill, including the cities of Morgan Hill and Gilroy, which drain to Monterey Bay. Available information on litter reaching waterways in this area is limited and is based upon litter collection efforts within creeks rather than the storm sewer system. Trash has been collected twice per year along several local creeks in the Morgan Hill and Gilroy areas since 2007 and the weight of trash (and recyclables) collected reported.[14] Tens of pounds to over 1,000 pounds of trash were collected at individual sites. A breakdown of the composition of trash collected (e.g., plastics, paper, EPS foam food ware) is not included in the past events results posted by the *Creek Connections Action Group*, which organizes the annual cleanups.

Summary of Litter Study Results

Data collected in some recent street and storm sewer system litter surveys provides information on the relative proportion of EPS foam food ware in litter. By all measures (volume and counts) the proportion is generally less than 10 percent by volume in stormwater system litter and ranging from less than one percent to 3.6 percent by count in street litter.

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[12] SCVURPPP. "Urban Runoff Trash Management: Reducing Impacts in Santa Clara Valley Creeks and San Francisco Bay." February 2013. Available at: <http://www.scvurppp-w2k.com/pdfs/1213/Trash_Factsheet_2012-Final_Feb.pdf>. See Table 4.9-2 in Section 4.9 Hydrology and Water Quality of this Initial Study for a breakdown of estimated trash loads in storm drain systems by jurisdiction for the SCVURPPP area (Santa Clara County north of Morgan Hill).

[13] CalRecycle lists the density of "Polystyrene blown, formed foam" as 9.62 pounds per cubic yard in a posted list of conversion factors for various types of waste. Applying this factor, would yield about 3,000 pounds of EPS foam food ware (refer to Appendix B).

[14] Creek Connections Action Group. "Past Events Results". Accessed April 24, 2013. Results for individual clean ups Available at: <http://www.cleanacreek.org/Pasteventsresults_main%20page.asp>.

As noted previously, the SCVURPP litter characterizations do not include litter directly deposited in waterways by wind or dumping and weight is generally not used in local litter studies as it does not assist with the assessment of the visibility or persistence of different types of litter in the storm drain systems and creeks.

In conclusion, the available baseline information for EPS food ware appearing as litter in Santa Clara County is:

- Street Litter: about 0.8-3.6 percent by count of large litter (four square inches in area or more) on streets based upon citywide and hot spot street litter surveys in San José; and
- Stormwater System Litter:
  - about eight (8) percent by volume based upon SCVURPP litter characterizations (i.e., trash loading) in storm drain systems discharging to creeks and waterways.[15]
  - about 311 cubic yards of EPS trash (roughly 3,000 pounds) per year in the SVURPP area.

Users and Manufacturers of EPS Foam Food Ware

The proposed model ordinance would restrict the use of single-use disposable EPS foam food ware in participating jurisdictions. A summary of the number of facilities and vendors with food handling permits in Santa Clara County is provided in Table 4.0-1. Food facilities covered by the County's permit program include restaurants, markets, bakeries, liquor stores, bars, certified farmers' markets, food service at fairs and festivals, catering trucks, hot dog carts, ice cream trucks, produce vehicles, and food vending machines.

Provisions of the ordinance, including the sale of empty EPS foam food ware and ice chests, could also apply to other vendors within the project area. The number and types of businesses and facilities are summarized in Table 4.0-2.

Secondary or Indirect Effects on Businesses

Section 15382 of the CEQA Guidelines defines a significant effect on the environment as "substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance. An economic or social change by itself shall not be considered a significant effect on the environment. A social or economic change related to a physical change may be considered in determining whether the physical change is significant."

[15] Refer to Table 4.9-2 in Section 4.9 Hydrology and Water Quality for a breakdown by jurisdiction.

Table 4.0-1: Permitted Food Vendors in Santa Clara County

Jurisdiction	Food Service[1]	Caterer	Mobile Food Facility	Grocery Stores	Other[2]
San José	2,636	49	710	617	354
Campbell	188	14	6	42	54
Cupertino	230	2	4	28	36
Gilroy	188	0	31	66	19
Los Altos	89	1	2	15	30
Los Altos Hills	4	0	0	1	0
Los Gatos	157	3	4	37	31
Milpitas	347	3	5	55	40
Monte Sereno	0	0	0	0	0
Morgan Hill	154	0	6	39	21
Mountain View	380	4	50	70	159
Palo Alto	350	0	7	40	60
Santa Clara	568	13	144	102	57
Stanford	120	0	18	3	8
Saratoga	78	0	7	13	38
Sunnyvale	449	1	10	93	57
Unincorporated Santa Clara County	56	0	118	15	67
Total	5,994	90	1,122	1,236	1,031

Source: County of Santa Clara Department of Environmental Health, Food Safety Permit Program (2013)
[1] Food Service includes restaurants, cafes, delicatessens and other locations where food is prepared on-site (e.g., delicatessens in grocery stores).
[2] Other includes: food demonstrators and short-term events.

Table 4.0-2 Summary of Businesses and Facilities That May Sell, Use or Manufacture EPS Foam Food Ware		
Information Category	**Data**	**Sources**
Consumption		
Restaurants/Food Service Vendors in Santa Clara County	• 224 gas stations with convenience stores	• U.S. Census Bureau. *2010 County Business Patterns.* 2010.
	• 8,237 permits for food service, caterers, mobile food service, and other	• County of Santa Clara Department of Environmental Health (refer to Appendix B, Table B-1)
Grocery Stores in Santa Clara County	• 1,236 grocery stores	• County of Santa Clara Department of Environmental Health, Food Safety Permit Program (refer to Appendix B, Table B-1)
Sporting Goods Stores in Santa Clara County	• 123 sporting goods stores	• U.S. Census Bureau. *2009 County Business Patterns*. 2009.
Merchandise Stores in Santa Clara County	• 42 department stores (includes discount department stores) • 71 general merchandise stores (includes warehouse clubs and supercenters)	• U.S. Census Bureau. *2010 County Business Patterns.* 2010.
Retail/Pharmacy in Santa Clara County	• 190 pharmacies and drug stores	• U.S. Census Bureau. *2010 County Business Patterns.* 2010.
Hardware Stores in Santa Clara County	• 38 hardware stores	• U.S. Census Bureau. *2010 County Business Patterns.* 2010.
Statewide Producers		
PS Foam Manufacturers	• 77 polystyrene foam manufacturers in California – 9.74 percent of value of U.S. shipments – 3,389 employees	• U.S. Census Bureau. *Industry Statistics Sampler*. 2007.

Indirect or secondary effects are impacts caused by a project that occur later in time or are farther removed in distance, but are still reasonably foreseeable.[16] Secondary effects may include effects related to induced changes in patterns of land use, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems. Effects analyzed under CEQA must be related to a physical change in the environment.

The proposed project is a model ordinance that would limit the use and sale of single-use polystyrene foam food ware and ice chests in Santa Clara County. Businesses that could be affected by the ordinance include restaurants, cafes, cafeterias, limited service restaurants (such as delicatessens, sandwich shops, fast food and drive-through restaurants), grocery and convenience stores, sporting goods and drug stores (e.g., EPS foam ice chest sales), restaurant supply companies, stores that currently sell or use EPS foam food ware and companies that manufacture these products.

As described by Economic & Planning Systems, Inc., in *Economic Impact Analysis of EPS Foodware Costs* prepared for the City of San José, there is currently a cost differential between EPS foam food ware products and likely substitutes.[17] The city includes a diversity of restaurants and greater economic effects would be expected to be experienced by food vendors that currently have a heavy use of EPS foam food ware for hot liquids and smaller lower revenue restaurants. As the cost of EPS foam food ware is one of many variable costs at food related businesses, the analysis concluded that it is unlikely that the ordinance would result in substantial business failures (e.g., that in turn could result in economic blight with land use consequences).

To the extent demand for EPS foam food ware would drop within a major urban market in California, production at manufacturing facilities, especially in California, could be affected. A drop in demand from individual cities is unlikely to be substantial, however, the implementation restrictions throughout the County, in combination with other EPS foam food ware bans elsewhere, would be a noticeable change in demand. The possible cumulative indirect effects on the environment associated with a reduction in demand for products produced at EPS foam food ware manufacturing facilities are addressed in *Section 4.18.3 Cumulative Impacts* of this Initial Study.

Baseline Conclusions

In summary, the baseline estimates for the project area (Santa Clara County) are follows:

1. **Baseline for EPS food ware used annually in Santa Clara County** –
   Counts for various products (cups, plates, clamshells) that could be applied countywide are not readily available. Based upon a review of the categories for polystyrene resin sales and production in the 2012 Edition of *The Resin Review*, the baseline use of EPS foam food ware could conservatively range from about 1.8 pounds per capita to a high of about seven (7) pounds per capita on an annual basis.

2. **Baseline for EPS food ware appropriately disposed as waste annually in Santa Clara County –** Based upon waste local characterization studies within Santa Clara County, EPS

[16] CEQA Guidelines Section 15358(a)(2).
[17] Economic and Planning Systems, Inc. "Economic Impact Analysis of EPS Foodware Costs." November 2012. Prepared for the City of San José.

food ware appropriately disposed of annually is conservatively 2.9- 4.1 pounds per service population (residents+ jobs) or 5.3-6.4 pounds per capita. The per capita estimate of about six pounds per year is within the range of the estimate noted above for annual food ware use (based upon production).

3. **Baseline for EPS food ware appearing as litter in Santa Clara County –** Based upon data collected in some recent street and storm sewer system litter surveys:

   - Street Litter: about 0.8-3.6 percent by count of large litter (four square inches in area or more) on streets based upon citywide and hot spot street litter surveys in San José; and
   - Stormwater System Litter:
     - about eight (8) percent by volume based upon SCVURPP litter characterizations (i.e., trash loading) in storm drain systems discharging to creeks and waterways.[18]
     - about 311 cubic yards of EPS trash (roughly 3,000 pounds) per year in the SVURPP area.

4. **Baseline for types of businesses and activities covered by the ordinance –** The ordinance would apply to a wide range of businesses and activities within the Santa Clara County project area. Over 8,000 businesses or organizations have food handling permits from the County of Santa Clara, including restaurants, cafes, mobile food service, caterers, grocery stores, convenience stores, and special events. Other vendors whose sales would be covered activities include several hundred restaurant and food service suppliers, warehouse stores, retail/pharmacy stores, sporting goods and hardware stores.

Substitute Products

Under the proposed ordinance, food vendors and providers would be prohibited from distributing EPS foam food service ware. Businesses and other establishments are expected to replace EPS foam items with substitute products which are already in use today. These products are made from the following materials:

Plastics

Hydrocarbon polymer resins such as polypropylene (PP), polyethylene terephthalate (PET), polycarbonate (PC), and polystyrene[19] (PS) can be used to manufacture disposable foodservice ware products such as cold drinking cups, bowls, clamshells, plates, and trays. Other plastics such as polyethylene and polyvinyl chloride could be used for these products, but PP, PET, PC, and PS are already widely used by food vendors. Like EPS foam, these materials are derived from petroleum refining and processing. Though some jurisdictions do not accept soiled plastics, in general all of these plastic resins are recyclable in Santa Clara County for both residential and commercial customers.

[18] Note: These studies do not include litter directly deposited in waterways by wind or dumping.
[19] When a blowing agent is added, polystyrene can be turned into expanded polystyrene (EPS). The proposed ordinance would only prohibit foamed polystyrene.

Bioplastics

Bioplastics are derived from plants and food by-products such as corn, whey, and sugar beets. The oils and starches of these plants can be separated from the plant and converted through a series of refining processes to hydrocarbon polymer chains. The 'bio' in bioplastic refers to the plant feedstock, not to its biodegradability. That is, not all bioplastics are biodegradable.

The most common bioplastic is polylactic acid, or PLA. PLA is similar to plastics such as PP, PS, and PET and can be formed into resin pellets which are melted and molded into products such as cold cups, plates, bowls, and clamshells. Another example of a bioplastic made from the aforementioned feedstocks is polyhydroxyalkanoate (PHA). The differences between PHA and PLA, aside from their chemical structures, are the refining processes used to make them. PLA is currently the most common bioplastic and is compostable in industrial compost facilities. PLA is inert in landfills and is not designed to degrade in the marine environment. PLA and PHA bioplastics are not recyclable.

Fiber - Paperboard/Molded Pulp

Photo 5: Examples of Paperboard and Molded Pulp Products

Many disposable food service products are made from the fibers of trees, which are processed into a pulp which can then be formed into paper. Paperboard is a thick paper material that is typically lined with plastic or wax to prevent moisture absorption and to increase product strength. It is commonly used for hot and cold cups, soup bowls, and plates, though it is possible that food vendors might also use paperboard clamshells, boxes and trays.

Molded pulp products can be made from virgin (newly-produced) or recycled paper fiber and formed into clamshells, bowls, and trays. Molded pulp products are identifiable by their rough texture and they are usually not lined. Some jurisdictions recycle fiber food service products, but many dispose of them in landfills. Fiber food service ware is compostable in industrial or municipal composting facilities regardless of the coating.[20] It will degrade in a water environment and may remain inert in a landfill.

Biodegradable Plant Fiber

Many products that are made from wood fiber can also be made with fibers from sugar cane, bulrushes, and wheat. Plant fibers such as bagasse, the fibers remaining from the sugar cane pulping process, are extracted during plant processing and used to make products in ways

[20] Compost is decomposed organic material that can be incorporated with soil or fertilizers.

similar to those of molded paper products. Biodegradable products can be composted in large scale municipal or industrial compost facilities and will degrade in a water environment. For jurisdictions that do not offer composting services, plant-based biodegradable products are disposed in landfills. Biodegradable plant fiber products may remain inert in a landfill depending on the exposure to moisture.

Food vendors use a range of food service ware products made from different material types based not only on price, but also the characteristics of the material. For example hot drinks are generally not served in plastic cups because plastic cups do not insulate well and if the liquid is too hot, the cup can lose its strength. As a result, food vendors typically use either EPS foam or lined paperboard to serve hot liquids. That same food vendor may use plastic products for other foods such as salads for reasons such as price, durability, and/or customer preference.

The following table outlines the products that are likely to be substituted for EPS foam products by food vendors and retailers.

Table 4.0-3
EPS Substitute Products

PS Foam Product		**Substitutes[1]**	
Hot Cups – Coffee, tea, hot chocolate			
	Light and insulating, EPS foam hot cups may come with a plastic lid to prevent spilling. Once used, these cups are disposed in landfills.+- (*Note: Newby Island Resource Recovery recycles clean polystyrene foam that is dropped off at the landfill. All other facilities landfill EPS foam.*).		Lined paperboard is the most likely substitute material. It is durable and light, but does not insulate very well. As a result, paperboard hot cups frequently come with a corrugated sleeve. Paperboard can be composted or landfilled, and some jurisdictions do accept it for recycling. Lined biodegradable plant fiber materials could also be used to make these products, though they are not widely available today.
Cold Cups – Soda, water, smoothies, milkshakes			
	PS foam cold cups minimize "sweating," or condensation associated with the cool temperature of the liquid inside. They usually come with an opaque plastic lid and a straw. These cups may only be disposed in a landfill.		Lined paperboard and plant fiber products as well as all plastic products can function as substitute cold cups. Water resistance is a necessary characteristic of these products. Other characteristics such as weight, durability, and insulation are factors. Depending on the material, they can be recycled, composted, or in some cases must be landfilled.

Table 4.0-3
EPS Substitute Products

PS Foam Product		Substitutes[1]	
Bowls – Soups and salads			
	PS foam bowls have characteristics necessary to support liquid and solid hot and cold food including water resistance, insulation, and durability. EPS foam bowls are disposed in landfills.	 	As with hot drinks, plastic and bioplastic materials would generally not be used for soups. All materials could be used for bowls that do not hold hot liquids. Plastic bowls can be recycled and fiber bowls, depending on the material, are recyclable or compostable. PLA bowls are compostable in industrial composting facilities.
Clamshells			
 	PS foam clamshells offer some durability and are very low weight (~ 5-10 grams). Clamshells typically have one main compartment or three compartments as seen here. EPS foam clamshells must be landfilled.	 	An exact replacement of a EPS foam clamshell would likely be plastic or PLA, since foldable, closable fiber-based clamshells are not widely available. Food vendors may also choose paperboard products similar to the one shown here to substitute for clamshell packaging. Plastic products would be recycled; paper products would likely be either landfilled or composted.
Plates			
	EPS foam plates are light-weight and water resistant, though their limited durability can require users to stack two plates to prevent spilling. As with all EPS foam food service products, used EPS foam plates are not recyclable or compostable.	 	Fiber-based plates are common and would be a likely substitute for EPS foam plates. Some paper plates such as the one shown here (top) are thin and are frequently stacked by users to provide strength. Plastic or PLA plates can be used as a more durable, rigid alternative. Depending on the material, the substitutes would be landfilled, recycled, or composted.

Table 4.0-3
EPS Substitute Products

PS Foam Product		Substitutes[1]	
Trays			
	PS foam trays are light, stackable, and generally molded with multiple compartments. Used EPS foam trays are landfilled.		Substitute food trays can be made with paperboard, molded pulp, biodegradable fibers, plastics, or PLA, though plastic offers more durability than fiber-based products. Plastic food trays could be recycled and fiber-based food trays either composted or landfilled.
Ice Chests			
	PS foam ice chests are light and offer good insulation, though they break apart more easily than the available substitutes. EPS foam ice chests are disposed in landfills, though if clean may be accepted for recycling at some recycling centers.	 	At this time there are no identifiable disposable substitute ice chests. It is expected that the alternatives to EPS foam coolers are durable multi-use ice chests or cooler bags such as the products shown here. These are typically made of plastic materials and offer insulation and durability. Durable ice chests and coolers are not recyclable or compostable.

[1] Though the Substitutes column focuses mainly on plastic and paper products, plant-based plastics such as PLA and plant-based fibers such as bagasse can also provide substitutes in the same ways that plastic and paper can, respectively. Plastics are recycled when markets exist.
[a] Many images shown in this table were obtained through internet image searches and are not intended to promote a particular product or brand name.

Post-ban Usage Estimates of Food Ware Substitutes

To arrive at the estimates of potential impact from the proposed ordinance, two basic pieces of information are needed: (1) the current amount of polystyrene foam food ware used in the project area and (2) the amount of substitute single-use disposal food ware that will replace this food ware after the ordinance takes effect. The current use of EPS foam food ware is the baseline, as discussed above. The difference between those two numbers is the direct impact of the ordinance. Of necessity, all three of the numbers – existing, future, and the difference between them – are estimates and approximations from readily available information.

As challenging as it is to establish a baseline for current EPS foam food ware use within Santa Clara County, predicting the behavior of affected food vendors and retail customers once a ban is in effect in a given jurisdiction is even more problematic. It is not anticipated that by banning EPS foam food ware, the overall *amount* of single-use disposable food ware would be reduced. Rather, there should be a *shift* away from EPS foam to containers made from the various substitute materials described above. It is not possible to predict with certainty what future proportional share each substitute material (e.g. rigid plastics, bioplastics, fiber, etc.) will occupy for a given container type (e.g. clamshell, hot vs. cold cup, plate, bowl, etc.).

In evaluating its proposed food vendor ban, Palo Alto in 2009 assumed a shift to containers made from substitute materials based on a 2008 study for the City of Seattle by Herrera Consulting, Inc. evaluating the effects of a ban on EPS foam clamshells. Palo Alto projected no continued use of EPS foam and therefore distributed the Herrera estimates from EPS foam to paper and recyclable plastic, which includes compostable plastic. The City of San José, exercising reasonable discretion in its role as the lead agency evaluating the proposed model ordinance, has chosen to rely upon the assumptions developed in 2008 by Herrera Consulting, Inc. for the City of Seattle and employed by Palo Alto in its environmental review for its EPS foam food ware ban. Table 4.0-2 below is based on Table 6-14 from Herrera Environmental Consultants, Inc. (pg.6-23).

Table 4.0-4
Anticipated Shift to EPS Foam Substitutes

Type of Disposable Food Service Container	Projected Percent of Use of Disposable Food Service Container
Expanded Polystyrene	0%
Recyclable Plastic[1]	85%
Paper	15%

[1]Note: PLA plastic, which is one type of plastic substitute, is not recyclable and is compostable in industrial compost operations.

The actual shifts or split in composition between plastic and paper food containers in any of the jurisdictions may be different than the 85 percent plastic versus 15 percent paper assumed (e.g., a particular jurisdiction may experience a shift that is 81 percent plastic and 19 percent paper or 89 percent plastic and only 11 percent paper, or some other split that is predominantly plastic and to a much lesser extent paper) and may change over time and from year to year. For example, in a particular jurisdiction, the split may change from one year to the next from 81 percent plastic and 19 percent paper to 89 percent plastic and 11 percent paper. Shifts may be influenced by changes in price, product availability and as new products enter the market. For the purpose of this analysis, the assumptions used by the City of Palo Alto and in the City of Seattle provides the lead agencies' anticipated predominant shift to recyclable plastic for disposable food containers overall.

The County of Santa Clara in 2012, in evaluating its proposed food vendor ban for unincorporated areas, identified the range (consistent with Table 4.0-1 above) of available EPS food ware substitutes, but did not attempt to quantitatively predict what shift (i.e. the increased amount of a substitute material) would occur.

Life Cycle Analyses

There is a range of information available about single-use disposable food ware and its fate in the environment. Much of the information is generated by people with an economic interest in one or another of the products *or* groups with interests regarding litter in waterways and the ocean and/or recycling and composting. There is also some technical analysis that has been done in the form of life cycle analyses (LCAs) of various materials used in single-use disposal food ware. A LCA assesses the raw material production, manufacture, distribution, use, and disposal (including all intervening transportation steps) of a given product.

A review of the LCAs available on this topic is included in Appendix C. Information from these analyses is discussed in relevant sections of the Initial Study, such as *Section 4.3 Air Quality, Section 4.7 Greenhouse Gas Emissions* and *Section 4.17 Utilities and Service Systems*, along with limitations on their use.

Project Effects

In general, the effects of implementation of the proposed ordinance would be indirect effects experienced within Santa Clara County and the South San Francisco Bay Area. The proposed ordinance could result in secondary or indirect effects at more distant locations as EPS foam food ware use in the project area is transitioned to substitute materials. Project effects could include:

- Changes in criteria pollutants, toxic air contaminants or greenhouse gas emissions at manufacturing facilities, generally outside the San Francisco Bay Air Basin;
- Changes in water quality associated with waste water discharges from the manufacture of substitute products;
- A reduction in polystyrene foam in waterways and an increase of substitute products.

These possible indirect or secondary effects are discussed in *Section 4.3 Air Quality, Section 4.7 Greenhouse Gas Emissions, Section 4.8 Hazards and Hazardous Materials*, and *Section 4.9. Hydrology and Water Quality*.

4.1 AESTHETICS

4.1.1 Setting

4.1.1.1 *Visual Character Overview*

The visual character of the project area varies across the County and includes both densely developed and open, natural landscapes. The nearly flat, densely developed valley floor is framed by mountains to the east and west and San Francisco Bay to the north. Notable topographic and scenic features include the Diablo Range and Santa Cruz Mountains, riparian vegetation along major waterways including Coyote Creek, the Guadalupe River, Stevens Creek, Permanente Creek, and San Francisquito Creek, and farmland and grazing land, predominantly between the southern border of San José and Gilroy. The marshes ringing the San Francisco Bay shorelines from Palo Alto to San José are a unique, low lying feature with a mosaic of gray-green vegetation, mud flats, and salt ponds readily viewed from regional trails and some major roadways, such as segments of U.S. 101 and SR 237.

Urban development ranges from dense development in downtown areas, with moderate to high-rise buildings punctuating the skyline in San José, Palo Alto, and Mountain View, to low-density rural residential areas at the edges of foothills in Palo Alto, Los Altos Hills, Cupertino, San José, Morgan Hill and Gilroy. Most of the land within the Santa Clara Valley contains suburban and low-rise residential, office, industrial and commercial buildings within grids of roadways. Parks, schools and community centers provide open, landscaped areas within the developed areas of cities and towns.

Litter

Littering is illegal in California as defined and prohibited by California Penal Code Section 374. Regulations of the various jurisdictions within the project area also prohibit littering in their municipal codes, especially within public parks. The accumulation of litter on privately owned property that can be viewed from other properties or public streets is also generally prohibited.

Although littering is illegal, it is noticeably present in the urban, suburban and rural environments within the project area. Litter is clearly visibly from and within public road rights-of-way and along local creeks. EPS foam, which is generally white in color, can be a highly visible component of litter (Photo 6). EPS is also very buoyant and transportable so it tends to accumulate in collection points (e.g., catch basins, creek vegetation, etc.).

Major roads and freeways pass through urban areas and agricultural areas in southern Santa Clara County. The litter that occurs in agricultural fields is likely thrown from vehicles, escapes from trucks hauling garbage along these roads and freeways, or is blown or travels in stormwater or waterways from urban areas (e.g., Morgan Hill and Gilroy).

Photo 6. Light-colored food ware litter along creek.

This rural litter, therefore, is anticipated to reflect the make-up of trash and litter found along roadways and in the nearby urban areas.

From a regulatory standpoint, the San Francisco Bay Regional Water Quality Control Board has required all Municipal Regional Permit (MRP) National Pollutant Discharge Elimination System (NPDES) permittees (cities, counties and agencies) to reduce litter entering waterways through the municipal separate storm sewer system. Some permit requirements relate to visual assessment of waterways and attainment of no visible impact due to trash.

It is difficult to document and categorize litter because it is the result of human behavior (frequently impulsive behavior) and the littered material is operated on by various environmental factors, such as wind, sunlight, and rain. It is also difficult to compare study results because there is no one standardized methodology that is appropriate for studies in all environments (e.g., streets, highways, parks, waterways, and shorelines). Comparisons are further complicated by different systems or categories used to identify the materials that are littered. For example, EPS foam food ware is a type of plastic and may not be counted separately from other plastics or miscellaneous categories.

Littering Behavior and Local Characteristics of Litter

Litter is often discarded at transition points where pedestrians consuming a food (or tobacco products) discard the product before entering.[21] Litter also moves within the environment. In addition to being found along roadways and around buildings and bus stops, litter also collects in storm drains, loading docks, recreation areas, near construction sites and in retail districts. Lightweight litter such as EPS foam is easily caught in light winds and may accumulate in sheltered areas. Likewise, in urban waterways, floating litter is carried with runoff and may travel for miles or become entangled in streamside vegetation or urban infrastructure (e.g., stormwater inlets, bridges).

The City of San José has conducted a number of trash characterization studies at locations throughout the City that look at the volume and/or counts of litter found in the environment. The amount of EPS varied, with differences observed in studies of street litter (on land) versus litter in the storm drain system associated with aquatic environments. These studies appear to be applicable to urban areas in adjacent jurisdictions and include:

- SAIC. *The City of San José Streets Litter 2008*. September 30, 2008. Prepared for City of San José Department of Environmental Services.
- City of San José. *Targeted Litter Assessment.* 2009.
- City of San José. *Litter Assessment Data*. 2012. Spreadsheet.

The 2008 street litter survey counted items of litter found at 125 randomly selected sites. Litter was categorized by size and material type. EPS foam cups were found to make up 0.65 percent of the "large litter" counted. EPS foam plates and clamshells made up 0.1 and 0.05 percent respectively. This study provides a snapshot of the composition of litter on a citywide basis.

[21] Keep California Beautiful. *Litter Facts*. April 18, 2010. Accessed April 12, 2013. Available at: <http://www.keepcabeautiful.org/facts/litter-facts.html>.

Given that littering behavior results in an uneven distribution of litter in urban, suburban, and rural environments, subsequent studies in San José have focused on locations with relatively high concentrations of litter, also referred to as litter "hot spots". A 2009 street litter assessment which targeted hot spots included litter counts at 48 sites in the City of San José. A total of 7,917 pieces of litter were counted from the 48 sites for an average of 165.5 items per site. Overall, about 12.4 percent of the items were classified as fast food items and 9.5 percent were cups. The assessment also included sub-categories for several polystyrene food ware products. At the targeted sites, the percent of total "large litter" included:

- 1.6 percent polystyrene foam cups
- 0.4 percent polystyrene foam food plates
- 0.2 percent polystyrene clamshells.

Polystyrene trays made up about 0.2 percent of the total large litter.

In 2012, litter was counted at 31 targeted sites in the City of San José. Polystyrene food ware products made up about 3.5 percent of the total litter counts. The breakdown by polystyrene food ware type was:

- 2.2 percent polystyrene foam cups
- 0.8 percent polystyrene foam food plates (rounded)
- 0.1 percent polystyrene clamshells (rounded).

Polystyrene foam trays were approximately 0.5 percent of the 2012 total litter count in San José.

As a part of the Municipal Regional Stormwater Permit (MRP) issued by the San Francisco Bay Regional Water Quality Control Board, litter audits have been completed for a regional study to assess the types and amounts of trash transported via urban runoff over a larger area of Santa Clara County. The trash characterization and loading in these waterways assessments, undertaken starting in 2009, cover the portion of the project area that drains to San Francisco Bay (i.e., the jurisdictions and area of the County roughly north of Morgan Hill). Approximately 3,900 cubic yards of trash that could reach creeks in the San Francisco Bay Basin is estimated to be generated annually. Approximately eight percent of this trash by volume, or 311 cubic yards, is EPS foam food ware.

As described in Appendix B, based upon litter studies undertaken in the City of San José and within the area of the County that drains to San Francisco Bay, EPS foam food ware appearing as street litter in Santa Clara County makes up about 0.8-3.6 percent by count of large litter (four square inches in area or more) on streets (on-land environment) and about eight (8) percent by volume (uncompacted) in the storm sewer system (water environment).

4.1.2 Environmental Checklist and Discussion of Impacts

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Checklist Source(s)
Would the project:					
1. Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐	1
2. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒	1
3. Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☒	☐	1
4. Create a new source of substantial light or glare which will adversely affect day or nighttime views in the area?	☐	☐	☐	☒	1

4.1.2.1 Aesthetic Impacts

Implementation of an ordinance banning use and/or sale of EPS foam food service containers would not involve construction or modification of the physical environment that would affect a scenic vista, scenic resource or create a new source of light or glare.

Effects on the Visual Character of Litter Within the Project Area

The proposed ordinance would cause a reduction in EPS foam food ware use and is anticipated to result in an increase in the use of plastic and fiber-based substitute materials. The ordinance is not expected to cause a decline in overall consumption of disposable food service ware and consumers are not expected to litter substitute containers at a higher rate than EPS foam. The project would result in the cessation in use of a food ware material that can be highly visible, in buoyant in water, and easily becomes airborne and/or breaks into pieces which are hard to collect.

Implementation of the proposed project would result in a change in the composition of litter. The City of San José expects that about 85 percent of substitute products will be plastic and about 15 percent will be fiber-based.

Effects of Substitute Products on Litter Movement

As described in *Section 4.0* and Appendix C, substitute products for EPS foam food ware include several types of plastics and fiber-based containers. Although lighter than similar fiber or paper products, substitute plastic products, such as crystalline PS and PLA, are not as likely as EPS foam to be transported by wind off haul truck loads and along streets if deposited as litter. Because the substitute products do not crumble as readily as EPS foam and are not as likely to become airborne,

they may be more easily removed by street sweeping or maintenance activities. They also are not as buoyant in water as EPS foam. The substitute products, therefore, are not likely to be more visible than EPS foam along roadways, in retail areas, or along creeks.

Fate of Substitute Products in Waterways

Fiber-based replacement products that reach waterways would decompose in water over a period of weeks or months and would not tend to accumulate over time (also refer to *Section 4.4.1.2 Plastic Debris in the Environment).* [22] Some plastic coatings in fiber cups and containers could take longer to breakdown than the fiber material. These clear coatings would not be highly visible, however. To the extent fiber or paper substitute products replace EPS foam food ware, the amount of plastic materials reaching San Francisco Bay, Monterey Bay and the Pacific Ocean, would decrease. Overall, fiber-based replacement products would not be as persistent in the environment as EPS foam food ware.

The breakdown of plastic substitutes in water over time (due to physical action and/or sunlight) would be similar to that of EPS foam, although EPS foam may break into pieces sooner than other hard, non-foam plastic resin products. Overall, plastic substitutes would persist as visible litter for a similar period, although initially the size of the pieces could remain larger. This could facilitate their clean up, but they could be more apparent as litter.

Expected Changes in the Visibility of Litter

As discussed in *Section 4.9.1 Hydrology and Water Quality*, by count and/or volume, EPS foam food ware in the project area makes up about eight percent of litter by volume in stormwater systems, and by count often less than two to three percent of street litter (on land). While paper cups are usually several times the weight of EPS foam cups, given the estimated percentage of EPS foam food ware in litter, there would not be a substantial change in the count, volume or mass of litter in the environment. Replacing EPS foam materials with substitute products (that are currently also found in litter) would reduce the amount of EPS foam in litter; however implementation of a model ordinance would not result in a substantial change in the number or volume of litter items or trash in urban, suburban or rural areas or along waterways. To the extent substitute fiber-based products would breakdown a period of months in water, visible litter in waterways could be reduced. As the amount of visible litter is not anticipated to increase, the effect of the project would be less than significant. **(Less Than Significant Impact)**

4.1.3 Conclusion

The proposed ordinance phasing out EPS foam food ware use would not result in substantial adverse effects to a scenic vista or degrade the existing visual character or qualities of the jurisdictions implementing the ordinance. **(Less Than Significant Impact)**

[22] California Ocean Science Trust. "Plastic Debris in the California Marine Ecosystem." September 2011. Pages 23-24. Available at: <http://calost.org/pdf/science-initiatives/marine%20debris/Plastic%20Report_10-4-11.pdf>.

4.2 AGRICULTURAL AND FOREST RESOURCES

4.2.1 Setting

The project area includes both urban and rural land uses, with most farmland located in central and south Santa Clara County. The majority of the land in the incorporated limits of the participating jurisdictions in Santa Clara County is designated *Urban and Built-Up Land*.[23]

As defined in Public Resources Code 12220, "forest land" is land that can support 10-percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits.

4.2.2 Environmental Checklist and Discussion of Impacts

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Checklist Source(s)
Would the project:					
1. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒	1,4
2. Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒	1
3. Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒	1
4. Result in a loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒	1
5. Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒	1

[23] California Department of Conservation. "Santa Clara County Important Farmland 2010." June, 2011.

4.2.2.1 *Impacts to Agricultural Resources*

Litter is a contaminant that is found on agricultural land as well as in urban areas. Littered polystrene foam (PS foam) can break into pieces and disperse in the environment by wind and by water. The substitutes to EPS foam products do not break apart as readily and in the case of fiber-based products, they decompose over time in organic environments.

The proposed ordinance would not affect any designated, planned, or important farmland. Since there would be no land use development associated with the project, the project would not conflict with a Williamson Act contract. The proposed project would reduce the prevalence of EPS foam in the environment and would not adversely impact agricultural resources.

4.2.2.2 *Impacts to Forest Resources*

The use of paper fiber products is expected to increase as a result of the proposed project. The pulp used to produce paper products in the United States typically comes from recycled paper and from wood grown in managed forests for the purpose of paper product manufacturing. When trees are removed from such land, the intended purpose of which is wood production, they are replanted. Those lands are not converted to a "non-forest use," therefore the proposed project would not result in any significant impacts to forest resources.

4.2.3 Conclusion

The proposed ordinance would reduce the amount of EPS foam in the environment, which would not impact farmland of any type or conflict with Williamson Act contracts. The increased use of paper products would not contribute to the conversion of forest land to non-forest uses. **(No Impact)**

4.3 AIR QUALITY

4.3.1 Setting

4.3.1.1 *Background*

Air quality and the concentration of a given pollutant in the atmosphere are determined by the amount of pollutant released and the atmosphere's ability to transport and dilute the pollutant. The major determinants of transport and dilution are wind, atmospheric stability, terrain and for photochemical pollutants, sunshine. The project area (i.e. Santa Clara County) is within the southern portion of the San Francisco Bay Area Air Basin. The Bay Area Air Quality Management District (BAAQMD) is the regional government agency that monitors and regulates air pollution within the air basin.

4.3.1.2 *Topography and Climate*

The South Bay has significant terrain features that affect air quality. The Santa Cruz Mountains and Diablo Range on either side of the South Bay restrict horizontal dilution, and this alignment of the terrain also channels winds from the north to south, carrying pollution from the northern San Francisco Bay Peninsula toward San José and the rest of Santa Clara County.

The proximity of Santa Clara County to both the Pacific Ocean and San Francisco Bay has a moderating influence on the climate. Meteorological factors make air pollution potential in the Santa Clara Valley quite high. Northwest winds and northerly winds are most common in the project area, reflecting the orientation of the Bay and the San Francisco Peninsula.

4.3.1.3 *Regional and Local Criteria Pollutants*

Major criteria pollutants, listed in "criteria" documents by the U.S. Environmental Protection Agency (USEPA) and the California Air Resources Board (CARB) include ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, and suspended particulate matter (PM). These pollutants can have health effects such as respiratory impairment and heart/lung disease symptoms.

Violations of ambient air quality standards are based on air pollutant monitoring data and are judged for each air pollutant. The Bay Area as a whole does not meet State or Federal ambient air quality standards for ground level ozone or State standards for PM_{10} and $PM_{2.5}$. The area is considered attainment or unclassified for all other pollutants.

4.3.1.4 *Local Community Risks/Toxic Air Contaminants and Fine Particulate Matter*

Besides criteria air pollutants, there is another group of substances found in ambient air referred to as Toxic Air Contaminants (TACs). These contaminants tend to be localized and are found in relatively low concentrations in ambient air; however, they can result in adverse chronic health effects if exposure to low concentrations occurs for long periods.

Fine Particulate Matter ($PM_{2.5}$) is a complex mixture of substances that includes elements such as carbon and metals; compounds such as nitrates, organics, and sulfates; and complex mixtures such as diesel exhaust and wood smoke. Long-term and short-term exposure to $PM_{2.5}$ can cause a wide range of health effects.

Common stationary source types of TACs and $PM_{2.5}$ include gasoline stations, dry cleaners, and diesel backup generators which are subject to permit requirements. The other, often more significant, common source is motor vehicles on freeways and roads.

4.3.1.5 *Sensitive Receptors*

BAAQMD defines sensitive receptors as facilities where sensitive receptor population groups (children, the elderly, the acutely ill and the chronically ill) are likely to be located. These land uses include residences, schools, playgrounds, child-care centers, retirement homes, convalescent homes, hospitals and medicinal clinics.

4.3.1.6 *Regulatory Setting*

Federal, state, and regional agencies regulate air quality in the Bay Area Air Basin. At the federal level, the USEPA is responsible for overseeing implementation of the Federal Clean Air Act (CAA). The CARB is the state agency that regulates mobile sources throughout the state and oversees implementation of the state air quality laws and regulations, including the California Clean Air Act. The primary agency that regulates air quality in the project area is the BAAQMD. The BAAQMD has permit authority over stationary sources, acts as the primary reviewing agency for environmental documents, and develops regulations that must be consistent with or more stringent than, federal and state air quality laws and regulations.

The BAAQMD prepared and adopted the Bay Area 2010 Clean Air Plan (CAP). This CAP updates the most recent ozone plan, the 2005 Ozone Strategy. Unlike previous Bay Area CAPs, the 2010 CAP is a multi-pollutant air quality plan addressing four categories of air pollutants:

- Ground-level ozone and the key ozone precursor pollutants (reactive organic gases and nitrogen oxide), as required by State law;
- Particulate matter, primarily $PM_{2.5}$, as well as the precursors to secondary $PM_{2.5}$;
- Toxic air contaminants (TAC); and
- Greenhouse gases.

BAAQMD CEQA Air Quality Guidelines

The BAAQMD CEQA Air Quality Guidelines are intended to serve as a guide for those who prepare or evaluate air quality impact analyses for projects and plans in the San Francisco Bay Area. In June 2010, the Air District's Board of Directors adopted CEQA thresholds of significance and an update of their CEQA Guidelines. The updated CEQA Guidelines review and describe assessment methodologies, and mitigation strategies for criteria pollutants, toxic air contaminants, odors, and greenhouse gas emissions. The prior version of the guidelines was dated 1999 and the most recent amendment to the updated guidelines was in May 2011 and May 2012.

In December 2010, the California Building Industry Association (BIA) filed a lawsuit in Alameda County Superior Court challenging toxic air contaminants and $PM_{2.5}$ thresholds developed by BAAQMD for the CEQA Air Quality Guidelines (California Building Industry Association v. Bay Area Air Quality Management District, Alameda County Superior Court Case No. RG10548693). One of the identified concerns is that the widespread use of the thresholds would inhibit infill and smart growth in the urbanized Bay Area. On March 5, 2012, the Superior Court found that adoption of thresholds by the BAAQMD in its CEQA Air Quality Guidelines is a CEQA project and BAAQMD is not to disseminate officially sanctioned air quality thresholds of significance until BAAQMD fully complies with CEQA. No further findings or rulings were made on the thresholds of the updated BAAQMD Air Quality Guidelines, although BAAQMD has appealed the ruling. The City understands the effect of the lawsuit to be that BAAQMD has to prepare an environmental review document before adopting the same or revised thresholds. Given that the 2010 Guidelines are based on best available information, but are not formally in effect, both the 1999 and 2010 sets of thresholds are used in this analysis.

As part of an effort to attain and maintain ambient air quality standards for ozone and particulate matter, BAAQMD has established thresholds of significance for $PM_{2.5}$, PM_{10}, and ozone precursors (ROG and NOx). The thresholds of significance are intended to accommodate a level of growth within the air basin that would still allow the region to attain air quality standards.

4.3.1.7 *Existing Patterns of EPS foam Food Ware Use*

As discussed elsewhere in this Initial Study, the analysis is based on the assumption that with a ban in place in a given jurisdiction, there will be a shift away from EPS foam food ware to substitute containers made of fiber/paperboard, bioplastics, and recyclable plastics. Current estimates are that there are about four (4) pounds of EPS foam food containers used annually in the project area, per service population (residents +jobs) or about six (6) pounds per capita, in the incorporated jurisdictions in Santa Clara County that don't currently have a ban in place. This scenario constitutes the environmental baseline against which physical changes caused by the project are to be measured to identify project impacts.

4.3.2 Environmental Checklist and Discussion of Impacts

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Checklist Source(s)
Would the project:					
1. Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐	1,5
2. Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☒	☐	1,5,6

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Checklist Source(s)
Would the project:					
3. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is classified as non-attainment under an applicable federal or state ambient air quality standard including releasing emissions which exceed quantitative thresholds for ozone precursors?	☐	☐	☒	☐	1,5,6
4. Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐	1
5. Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐	1

Air quality impacts related to food ware (foam EPS and substitutes) include the release of emissions during the extraction of virgin resources, materials processing and product manufacturing, transport, and disposal.

4.3.2.1 *Pollutant Emissions From Production*

Emissions from resource extraction, materials processing, and manufacturing are released where those activities are currently taking place, at locations outside the project area and the Bay Area air basin. The ordinance would lead to an increase in the manufacture of substitute food ware containers from allowed materials. The facilities in the U.S manufacturing these substitute containers are subject to federal Clean Air Act regulations, as well as any applicable clean air regulations for that particular state, and so any related increase in emissions from the substitute products manufactured in the U.S. would be emissions that have been permitted in compliance with federal and any state regulations. At those facility locations where EPS foam food ware is now produced, there would be a related decrease in the emissions associated with production of foam EPS food ware containers.

A 2009 study completed by Franklin Associates on behalf of Los Angeles County found that the large majority of energy used in the manufacturing process for food ware (both foam PS and substitutes) is for electricity, and fuel for transportation is a minor source.[24] According to the Franklin Associates study, fiber/paperboard food ware requires slightly more energy than comparable containers made from foam PS or rigid plastics, yet electricity generation emits (relatively) small amounts of criteria pollutants, and so Franklin Associates concluded that a shift to food ware made from fiber/paperboard would not result in a substantial increase in criteria pollutant emissions. To the extent the ordinance results in increased use of food ware made from materials capable of being recycled, there will be reduced air pollutants associated with resource extraction of virgin materials. For these several reasons, the proposed foam EPS food ware ordinance would not be in conflict with the 2010 Bay Area Clean Air Plan and would not violate any air quality standard or contribute to any air quality violation.

[24] Franklin Associates, Ltd. "Life Cycle Inventory of 16-Ounce Disposable Hot Cups." February 19, 2009. Prepared for MicroGREEN Polymers. Pages 2-7 to 2-11.

4.3.2.2 *Pollutant Emissions From Transport*

There is a quantity of emissions generated from the delivery of all types of food ware containers to restaurants, stores, and vendors, and further emissions associated with removing those that are discarded as solid waste and with picking up those that end up as litter. Since the preparers of this Initial Study were unable to identify any delivery system dedicated only to distribution to users of food ware containers, the exact increment of energy use or pollution associated with their delivery to the location where they are given away or sold to the public is unknown.

With a ban on foam EPS food ware in place, criteria pollutants will be emitted from the transport (in the project area in Santa Clara County and elsewhere) of substitute containers made of allowed materials. However, pollutants are not expected to significantly increase compared to current emissions from the transport of EPS food ware containers, given no increase is foreseen in the overall amount of food ware containers, rather there should be a shift to non-PS containers. Some of the substitutes take up slightly less space than a comparable foamed EPS container (e.g. paper cups vs. foam EPS cups) and can be transported in a more dense arrangement allowing more cups in a given load. However, since the containers are likely to be transported to users in mixed loads with other products, there may be no reduction in trips.

Increased use and disposal of the substitute containers would not affect the number of vehicles associated with curb-side refuse pick-up in that the overall amount of food ware containers used in the project area is not expected to change, rather there will be a shift to more containers made of recyclable or compostable materials. Given there won't be a substantial change in the amount of delivery or disposal traffic, there would not be substantial changes in localized ozone concentrations nor emissions of vehicular TACs resulting from a EPS foam food ware ban.

The retail sales ban on foam EPS food ware and ice chests would have no impact on retail customer travel patterns (and related vehicular emissions) in that the retail establishments that currently offer foam EPS food ware and ice chests also now offer and are expected to continue to offer the various substitutes once the ban is in place in a given jurisdiction. There is no reason to expect substantial numbers of retail customers will regularly seek out foam EPS food ware and ice chests (rather than switch to an available substitute container material) available for sale in non-participating jurisdictions that may continue to allow their sale.

4.3.2.3 *Odors*

Foam EPS food ware does not degrade in landfills and without the presence of putresible waste in the containers (such as food items), it does not generate odors. The substitute materials, if not recycled, would either be composted or landfilled. Among the anticipated substitute materials, fiber (paperboard/molded pulp), biodegradable plant-based materials (e.g. bagasse, bulrushes, and wheat), and bioplastics (e.g. PLA) can be composted, and composting facilities can be an odor source. However, the anticipated increase in composting of substitute food ware would not require expansion of an existing or construction of a new compost facility, as discussed in *Section 4.17 Utilities and Service Systems*, therefore there would not be an increase in the exposure of sensitive receptors to odors from (existing) compost facilities.

4.3.2.4 *Construction Impacts*

The project does not involve any construction, so there would be no reasonably foreseeable air quality impacts associated with construction (*e.g.*, dust, construction equipment engine exhaust containing criteria pollutants or TACs, etc.), in San José, or elsewhere in participating jurisdictions in Santa Clara County.

4.3.3 Conclusion

The proposed ordinance phasing out EPS foam food ware will have less than significant air quality impacts. **(Less Than Significant Impact)**

4.4 BIOLOGICAL RESOURCES

4.4.1 Setting

4.4.1.1 *Biological Setting of Santa Clara County*

The project area includes a wide variety of habitat and land cover types including but not limited to grassland, serpentine, chaparral, scrub, woodland, forests, wetlands, and freshwater marshes. Agricultural areas consist of orchards, vineyards, pastures, and row crops. Development ranges from dense urban centers to suburban and rural residential areas.

The principal watersheds that drain to San Francisco Bay in Santa Clara County include the Lower Peninsula Watershed, the West Valley Watershed, the Guadalupe Watershed and the Coyote Watershed. In the southern Santa Clara Valley just northeast of Morgan Hill, the land tips and drains south via Llagas Creek and Uvas-Carnadero Creek (Uvas/Llagas Watershed) to the Pajaro River and Monterey Bay.[25] Major water bodies in the project area include Coyote, Pacheco, and Anderson Lakes, Uvas, Almaden, Lexington, and Calero Reservoirs, and the southern end of the San Francisco Bay estuary. See *Section 4.9 Hydrology and Water Quality* for a full list of waterways and water bodies in the project area.

These fresh and brackish water areas support ecologically valuable riparian vegetation that provides food, cover, and nesting sites for birds, reptiles, amphibians, and mammals. They also serve as migration corridors for wildlife. Marshes and wetlands located in the northern County, where freshwater draining from the valley enters the San Francisco Bay estuary, provide high value biotic resources to the region. The salt marshes, sloughs, and creeks near the Bay provide food and shelter for fish and wildlife, improve water quality, and reduce flooding at times of high weather events.

Special-status species are supported by these wetlands as well as by many of the other habitat types present in Santa Clara County. State and federally listed species including the California tiger salamander, California clapper rail, California Coast steelhead, California red-legged frog, salt-marsh harvest mouse, California least tern, and the salt-marsh wandering shrew are known to occur in or near the waters of the Santa Clara Valley as well as the San Francisco Bay. Litter in these waterways has the potential to negatively impact these special-status species.

4.4.1.2 *Polystyrene Foam in the Environment*

If disposed of properly, polystyrene foam (PS foam) ends in landfills where it remains inert. There are no identifiable direct post-consumer environmental impacts of EPS foam food ware if properly landfilled. There are air quality and noise impacts associated with the collection and transportation of EPS foam to the landfill, but those impacts occur as part of broader waste collection services.

The bulk of the post-consumer environmental impacts of EPS foam occur when it ends up as litter and makes its way into the marine environment. The prevalence of plastic debris in marine environments around the world is well-documented. Generally speaking, marine debris is found floating on the water surface, in the water column, on the sea floor, or washed up on beaches and

[25] Sowers, Janet M. et al. "Creek and Watershed Map of Morgan Hill & Gilroy." 2009.

coasts. Proportionally, plastic (which includes EPS foam food service ware) makes up between 60 and 80 percent of total marine debris.[26] There is not enough information available to say what proportion of oceanic plastics are EPS foam, but due to its low density, it is reasonable to expect that EPS foam that has not yet broken down in the marine environment is found on the surface or along beaches.

PS foam enters the marine environment as terrestrial litter that runs off into creeks, streams, and rivers.[27] A trash assessment compiled by the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) found that of the approximately 677,500 gallons of trash enter Santa Clara Valley creeks and shorelines each year from urban runoff. Based on data collected for this 2013 trash assessment, approximately eight percent of litter by volume is EPS foam food ware within the SVVURPPP area (see *Section 4.0 – Baseline Estimates Based on Litter Studies).*

Plastics including EPS foam do not biodegrade in the same way that organic materials such as plants and organisms do. Solar radiation and thermal oxidation causes plastic to break into smaller pieces until it is microscopic and invisible to the human eye.[28] The rate of this process depends on factors such as the composition of the product and the surface temperature. As a point of reference, EPS foam cups are estimated to take 50 years to degrade.[29]

4.4.1.3 *Biological Impacts of Polystyrene Foam*

Polystyrene foam is made by adding a blowing agent to polystyrene pellets and subjecting it to high temperatures until the blowing agent expands and becomes the foamed product. When it degrades, EPS foam degrades in ways similar to any other petroleum-based polymer such as unfoamed polystyrene, polypropylene, and PET. In this way, studies that examine the biological effects of plastics and degraded plastics reveal much about the impacts of polystyrene foam in the environment.

Plastic particles in the environment can impact organisms through mechanical interference or by causing biological and chemical effects. According to a United States Environmental Protection Agency (EPA) 2011 report:

> Physical habitat alteration is caused by the accumulation of debris in oceanic convergence zones, on beaches, and submerged benthic habitats. As debris accumulates, habitat structure may be modified, light levels may be reduced in underlying waters, and oxygen levels may

[26] Derraik, J.G.B. "The pollution of the marine environment by plastic debris: a review." 2002. Marine Pollution Bulletin 44 (2002) 842-852. See Table 1.
[27] SCVURPPP. "Urban Runoff Trash Management: Reducing Impacts in Santa Clara Valley Creeks and San Francisco Bay." February 2013. Available at: <http://www.scvurppp-w2k.com/pdfs/1213/Trash_Factsheet_2012-Final_Feb.pdf>.
[28] California Ocean Science Trust. "Plastic Debris in the California Marine Ecosystem." September 2011. Page 3. Available at: <http://calost.org/pdf/science-initiatives/marine%20debris/Plastic%20Report_10-4-11.pdf>.
[29] Ocean Conservancy. "Trash Travels." 2010. Page 23. Available at: <http://act.oceanconservancy.org/images/2010ICCReportRelease_pressPhotos/2010_ICC_Report.pdf>.

be depleted. These changes can undermine the ability of open water and benthic habitats to support marine life.[30,31]

Studies have also shown that organisms including birds, turtles, mammals, and fish ingest plastics.[32] Once ingested, plastic particles reduce food consumption and can block an organism's intestinal tract, causing internal injury and possibly death. Entanglement is another mechanical interference from plastics, though studies about entanglement tend to analyze products such as soda can rings, fishing line, and plastic bags. EPS foam food service ware may not cause entanglement problems since the products are light and break apart easily.

Plastics in the ocean can also expose organisms to persistent organic pollutants (POPs) that have adsorbed to the surface of a plastic particle.[33] Multiple studies have found that plastic fragments in the ocean contain polychlorinated biphenyls (PCBs), organochlorine pesticides such as DDT, and poly-aromatic hydrocarbons (PAHs).[34] The plastic particles did not necessarily contain these pollutants when they entered the environment, but they provided a surface on which the POPs could adsorb and transport in the marine environment. Other studies show that PCBs enter the food chain this way.[35] These contaminants, which can be released from plastics by breakdown of the plastic via ultraviolet radiation, weathering, and ingestion, have negative effects on birds and marine wildlife because they can cause reproductive failure, disease, and death.[36]

Plastic marine debris can lead to ecosystem impacts as well as impacts to individual organisms. Bacteria and algae can be transported on plastics as ocean currents carry them to new locations.[37] At any point these organisms can become detached from the plastic and if they do so in an area in which the species does not already occur, there is potential for them to reproduce and become an invasive species. This increases the risk to native species by creating new competition for habitat and resources.

4.4.1.4 *Pre-consumption Biological Effects (PS Foam Production)*

So far the discussion of plastic and its presence in the environment has focused on litter and marine pollution, both of which occur post-consumption. Pre-consumption processes associated with EPS foam food service ware also have environmental impacts. Polystyrene is made from petroleum products which require extraction, refining, and transportation. Each step of the production process

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[30] USEPA. "Marine Debris in the North Pacific." November, 2011. Page 9. Available at: <http://www.epa.gov/region9/marine-debris/pdf/MarineDebris-NPacFinalAprvd.pdf>.
[31] Benthic habitats are found at the bottom of a body of water, such as the sand and sediment at the bottom of the ocean.
[32] See Derraik. "The pollution of the marine environment by plastic debris: a review." 2002. And: NOAA. "Plastic Marine Debris." 2011. And: AMRF. "Pelagic Plastic." 2007.
[33] Adsorption is the adhesion of molecules of gas, liquid, or dissolved solids to a surface. BTSC. "Glossary." Accessed May 1, 2013. Available at: <http://www.brownfieldstsc.org/glossary.cfm?q=1>.
[34] California Ocean Science Trust. "Plastic Debris in the California Marine Ecosystem." September 2011. Pages 23-24. Available at: <http://calost.org/pdf/science-initiatives/marine%20debris/Plastic%20Report_10-4-11.pdf>.
[35] USEPA. "Marine Debris in the North Pacific." November, 2011. Page 8. Available at: <http://www.epa.gov/region9/marine-debris/pdf/MarineDebris-NPacFinalAprvd.pdf>. And: Derraik. "The pollution of the marine environment by plastic debris: a review." 2002.
[36] Ibid, 2011.
[37] Derraik, J.G.B. "The pollution of the marine environment by plastic debris: a review." 2002. Marine Pollution Bulletin 44 (2002) 842-852.

uses energy and resources, which emits pollutants into the atmosphere and into the local environment.

The European production process for polystyrene pellets, the precursors for EPS foam products, emits carbon dioxide, CFCs, sulfur dioxide, phosphate, and particulate matter.[38] Such emissions contribute to global warming, stratospheric ozone depletion, acidification, eutrophication, and human respiratory illness, respectively. These environmental impacts would be similar to those caused by production emissions in the United States because they are generally caused by combusting fossil fuels for energy. Appendix C of this report contains more information about the pre-consumer impacts as well as the full life cycle environmental impacts of both EPS foam products and their substitutes.

Regardless of location, facilities emitting sulfur dioxide into the air or discharging phosphate into the water are subject to federal regulations under the Clean Air Act and Clean Water Act, respectively. The use of hazardous materials in production of EPS foam products are also subject to federal and state regulations (see *Section 4.8.1.1 (Hazardous Materials) Regulatory Setting)*. The Environmental Protection Agency permits a certain amount of pollution based on the size of the facility and the environment in which it exists. It requires pollution control technologies and best practices, which serve to reduce the emissions associated with the manufacturing activities.

4.4.2 Environmental Checklist and Discussion of Impacts

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Checklist Source(s)
Would the project:					
1. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or US Fish and Wildlife Service?	☐	☐	☒	☐	1,2,7
2. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or US Fish and Wildlife Service?	☐	☐	☒	☐	1,2,7

[38] PlasticsEurope. "Environmental Product Declarations of the European Plastics Manufacturers: General-Purpose Polystyrene (GPPS) and High-Impact Polystrene (HIPS)." November 2012.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Checklist Source(s)
Would the project:					
3. Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☒	☐	1,2,7
4. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, impede the use of native wildlife nursery sites?	☐	☐	☒	☐	1
5. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒	1,2,3
6. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒	1,7

The proposed ordinance would cause a reduction in EPS foam food service ware use and an increase in the use of plastic and fiber-based substitute materials. The ordinance is not expected to cause a decline in overall consumption of disposable foodservice ware or littering behavior.

As EPS foam products are replaced, an effect of the proposed project would be a change in the composition of litter and of the waste and recycling streams. There is little to no available data about how consumption has changed in other jurisdictions where EPS foam food service ware bans were passed (e.g. San Francisco, Seattle, etc.), but the City of San José expects that the majority of substitute products used will be plastic (about 85 percent), while about 15 percent will be fiber-based. (*See Post-ban Usage Estimates of Food Ware Substitutes* in the introduction to *Section 4.0 - Setting, Environmental Checklist and Impacts*)

4.4.2.1 *Fate of Substitute Materials in the Environment*

The lifetime of a substitute product in the environment depends on the product's material composition, weight, and volume. Data from the Ocean Conservancy shows that newspapers decompose in the ocean within six weeks, while cardboard boxes decompose within two months.[39] Paper food service ware products are not thicker than cardboard, so it is reasonable to expect its marine decomposition time to be approximately two months. On the other hand, paperboard

[39] Ocean Conservancy. "Trash Travels." 2010. Page 23. Available at: <http://act.oceanconservancy.org/images/2010ICCReportRelease_pressPhotos/2010_ICC_Report.pdf>.

products are frequently lined with a plastic coating, which breaks down more slowly in the environment, as described above.

The main difference between paper and plastic materials in the environment is that paper materials are biodegradable. An object is biodegradable if it can be broken down by microorganisms, especially bacteria, into natural components such as water, carbon dioxide, methane, and non-toxic residues.[40] Plastic does not biodegrade, it breaks into tiny pieces over time in the environment and can be ingested by wildlife and cause impacts similar to those described in *Section 4.4.1.3,* above. Since plastics can contain pollutants and also cause mechanical interference with wildlife, they stand to cause negative indirect effects to fish and wildlife in ways that paper products do not.

A study funded by the California Department of Resources Recycling and Recovery (CalRecycle) showed that certain PHA[41] bioplastics meet the American Society of Testing and Materials (ASTM) biodegradation standard, which requires a material sample to convert more than 30 percent of the carbon within it to carbon dioxide within six months.[42] The polylactic acid (PLA) products tested for the study did not meet the biodegradation requirements.

4.4.2.2 *Impacts of Substitute Materials in the Environment*

A much larger portion of the substitute products are expected to be plastic as opposed to fiber-based and are likely to end up in landfills and waterways just as EPS foam products do. There is insufficient information at this time to state conclusively that rigid plastics such as polypropylene, polystyrene (unfoamed), or polyethylene terephthalate (PET) cause more or less harm in the environment than EPS foam products. Ultimately, plastic products in waterways degrade into microscopic plastic pieces that behave similarly to one another and cause biological impacts similar to those described for EPS foam, above.

Some EPS foam products would be replaced with fiber-based or paper products. Since these products do not cause the indirect biological effects that plastics do (see *4.4.2.1,* above), their use in place of EPS foam would avoid the impacts that EPS foam products have in aquatic environments. **(Less Than Significant Impact)**

4.4.2.3 *Habitat Conservation Plan/Natural Communities Conservation Plan*

Six agencies in Santa Clara County are partnering to implement the Santa Clara Valley Habitat Conservation Plan/Natural Communities Conservation Plan (HCP). These agencies include the County of Santa Clara, the Cities of San José, Morgan Hill, and Gilroy, the Santa Clara Valley Transportation Authority, and the Santa Clara Valley Water District. On Friday, April 26th, the Santa Clara Valley Habitat Agency (SCVHA) was formed as the implementing agency for the plan.

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[40] Merriam-Webster. "Biodegradable." 2013. Available at: <http://www.merriam-webster.com/dictionary/biodegradable>. And: European Commission. "Green Paper: On a European Strategy on Plastic Waste in the Environment." March 7, 2013. Available at: <http://ec.europa.eu/environment/waste/pdf/green_paper/green_paper_en.pdf>.

[41] PHA = polyhydroxyalkanoate

[42] Greene, J. *Report Topic: PLA and PHA Biodegradation in the Marine Environment.* March 5, 2012. Prepared for CalRecycle. Available at: <http://www.calrecycle.ca.gov/publications/Documents/1435/2012/20121435.pdf>.

SCVHA is in the process of obtaining incidental take permits to provide coverage for future development in the plan area. The HCP will be in effect once the permits are issued and the fee schedule adopted. The wildlife species covered in the HCP are listed in Table 4.4-1. Plants species covered in the HCP are primarily or exclusively found in serpentine habitats and include Federally endangered species such as Tiburon Indian paintbrush, Coyote ceanothus, Santa Clara Valley dudleya, and Metcalf Canyon jewelflower.

Table 4.4-1
Wildlife Species Covered in the Santa Clara Valley Habitat Conservation Plan

Species	Scientific Name	Status	
		State	Federal
Bay checkerspot butterfly	*Euphydras editha bayensis*	--	FT
California tiger salamander	*Ambystoma californiense*	ST	FT
California red-legged frog	*Rana draytonii*	CSC	FT
Foothill yellow-legged frog	*Rana boylii*	CSC	--
Western pond turtle	*Clemmys marmorata*	CSC	--
Western burrowing owl	*Athene cunicularia hypogea*	CSC	MBTA
Least Bell's vireo	*Vireo bellii pusillus*	SE	FE, MBTA
Tricolored blackbird	*Agelaius tricolor*	CSC	MBTA
San Joaquin kit fox	*Vulpes macrotis mutica*	ST	FE

Status:
FT Federal Threatened FE Federal Endangered MBTA Migratory Bird Treaty Act
ST State Threatened SE State Endangered CSC California Special Concern Species

Source: Final Santa Clara Valley Habitat Conservation Plan. August 2012.

The substitution of plastic and paper-based products for EPS foam products would not have any negative impacts on species covered by the HCP. Since plastics mimic the effects of EPS foam and paper products biodegrade in the environment, the number of disposable food service items that are plastic would decline and as a result, some of the impacts to species that might accidentally ingest or otherwise be harmed by plastic products would be avoided. The ordinance, therefore, would not conflict with the provisions of the adopted HCP. **(No Impact)**

4.4.2.4 *Trees*

For more information regarding the use of trees to produce paper products, see *Section 4.2 – Agricultural and Forest Resources*. The exact effects of paper product manufacturing at unknown locations cannot be quantified by the City of San José. The life cycle analyses summarized in Appendix C show in some cases that paper products use more energy and result in higher greenhouse gas emissions than EPS foam products do. None of the life cycle studies apply directly to the project area, so making conclusions based on their results would be speculative.

Trees used to produce paper products are grown commercially in managed forests, where they are systematically harvested and replanted. Local impacts of this process can include land erosion and habitat loss, however due to the lack of biodiversity in managed forests, they are unlikely to provide habitat for special-status or listed species.

Policies and ordinances related to tree preservation apply locally, in areas that do not have commercially-managed forest resources. Local trees, which are not harvested for disposable food ware products, would not be affected by an increase in paper product use. Therefore no local tree preservation policies would be violated by the proposed project. **(No Impact)**

4.4.3 Conclusion

The proposed ordinance phasing out EPS foam food ware will have less than significant impacts to sensitive natural communities and special status species. Unfoamed plastic and EPS foam products have similar impacts and fates in the marine environment, so no new impacts are expected for those products. The substitution of paper products for EPS foam products would avoid some of the impacts to marine species currently caused by EPS foam products in the environment. (**Less Than Significant Impact)**

The proposed ordinance would not conflict with an HCP/NCCP. Increasing the use of paper products would have no effect on local trees or conflict with tree preservation policies. **(No Impact)**

4.5 CULTURAL RESOURCES

4.5.1 Setting

Cultural resources are evidence of past human occupation and activity and include both historical and archaeological resources. These resources may be located above ground, underground or underwater and have significance in history, prehistory[43], architecture or culture of the nation, State of California or local or tribal communities. Cultural resources are found throughout the project area and are generally identified in historic or cultural resources inventories maintained by the County of Santa Clara and local cities and towns and on California Register of Historical Resources (California Register) and the National Register of Historic Places (National Register).

Paleontological resources are fossils, the remains or traces of prehistoric life preserved in the geological record. They range from the well know and well publicized fossils (such as mammoth and dinosaur bones) to scientifically important fossils (such as paleobotanical remains, trace fossils, and microfossils). Potentially sensitive areas with fossil bearing sediments near the ground surface in the City of San José and surrounding areas of Santa Clara County are generally in or adjacent to foothill areas rather than the younger Holocene age deposits on the valley floor.[44]

4.5.2 Environmental Checklist and Discussion of Impacts

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Checklist Source(s)
Would the project:					
1. Cause a substantial adverse change in the significance of an historical resource as defined in §15064.5?	☐	☐	☐	☒	
2. Cause a substantial adverse change in the significance of an archaeological resource as defined in §15064.5?	☐	☐	☐	☒	
3. Directly or indirectly destroy a unique paleontological resource or site, or unique geologic feature?	☐	☐	☐	☒	
4. Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☐	☒	

The proposed project is adoption of a model ordinance that would regulate the use of single-use EPS foam food ware within participating jurisdictions in Santa Clara County. The proposed ordinance would cause a reduction in EPS foam food ware use and is anticipated to result in an increase in the use of plastic and fiber-based substitute materials. The ordinance is not expected to cause a decline

[43] Events of the past prior to written records are considered prehistory.
[44] City of San José. "Final Program EIR for the Envision San José 2040 General Plan." 2011.

in overall consumption of disposable food service ware and consumers are not expected to litter substitute containers at a higher rate than EPS foam.

Implementation of an ordinance phasing out use and/or sale of EPS foam food service containers would not involve ground disturbance of native soils, building demolition, construction, or modification of the physical environment that would affect existing historical resources, archaeological resources, paleontological resources or other buried cultural resources, either directly or indirectly. As a result the project would not result in impacts to cultural or paleontological resources. **(No Impact)**

4.5.3 Conclusion

The proposed ordinance phasing out EPS foam food ware will have no impact on cultural resources. **(No Impact)**

4.6 GEOLOGY AND SOILS

4.6.1 Setting

4.6.1.1 *Regional Geology*

The Santa Clara Valley is located within the Coast Ranges geomorphic province of California; an area characterized by northwest-trending ridges and valleys, underlain by strongly deformed sedimentary and metamorphic rocks of the Franciscan Complex. Overlying these rocks are sediments deposited during recent geologic times. The Santa Clara Valley consists of a large structural basin containing alluvial deposits derived from the Diablo Range to the east and the Santa Cruz Mountains to the west. Alluvial deposits are interbedded with bay and lacustrine (lake) deposits in the north-central region. Valley sediments were deposited as a series of coalescing alluvial fans by streams that drain the adjacent mountains. These alluvial sediments make up the groundwater aquifers of the area. Soil types in the project area include clay in low-lying areas, loam and gravelly loam in the upper portions of the valley, and eroded rocky clay loam in the foothills.

Landslides are geologic hazards in foothill areas and expansive with high shrink-swell behavior are found on both the valley floor and in hillside areas. Weak soils, such as younger Bay Mud found in the margins near San Francisco Bay, can compress under the weight of buildings and fill. Other localized geologic hazards encountered within the project area include artificial fill that has not been properly compacted and naturally-occurring asbestos in ultramafic rocks, such as serpentinite.

4.6.1.2 *Regional Seismicity and Seismic Hazards*

The San Francisco Bay Area is recognized by geologists and seismologists as one of the most seismically-active regions in the United States. Significant earthquakes occurring in the Bay Area are generally associated with crustal movement along well-defined active fault zones of the San Andreas Fault system, which spans the Coast Ranges from the Pacific Ocean to the San Joaquin Valley. Two other major active faults in the area the Hayward Fault and the Calaveras Fault, located in the hills to the north and east of the Santa Clara Valley. Hazards associated with seismic activity along regional and local faults include fault rupture, ground shaking, liquefaction, differential seismic settlement, and earthquake-induced landslides and waves in bodies of water.

4.6.2 Environmental Checklist and Discussion of Impacts

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Checklist Source(s)
Would the project:					
1. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:					1,2,8

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Checklist Source(s)
Would the project:					
a. Rupture of a known earthquake fault, as described on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? (Refer to Division of Mines and Geology Special Publication 42.)	☐	☐	☐	☒	
b. Strong seismic ground shaking?	☐	☐	☐	☒	
c. Seismic-related ground failure, including liquefaction?	☐	☐	☐	☒	
d. Landslides?	☐	☐	☐	☒	
2. Result in substantial soil erosion or the loss of topsoil?	☐	☐	☐	☒	1,2,9
3. Be located on a geologic unit or soil that is unstable, or that will become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☐	☒	1
4. Be located on expansive soil, as defined in Section 1802.3.2 of the California Building Code (2007), creating substantial risks to life or property?	☐	☐	☐	☒	1
5. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒	1

The proposed project is adoption of a model ordinance that would regulate the use of single-use EPS foam food ware within participating jurisdictions in Santa Clara County. The proposed ordinance would cause a reduction in EPS foam food ware use and is anticipated to result in an increase in the use of plastic and fiber-based substitute materials. The ordinance is not expected to cause a decline in overall consumption of disposable food service ware or change littering behavior.

The ordinance does not propose or require construction of any kind and would not expose people or structures to substantial adverse risk involving geologic hazards or conditions. For these reasons, the project would not result in any geology and soils impacts. **(No Impact)**

4.6.3 Conclusion

The proposed ordinance phasing out EPS foam food ware will have no impact on the exposure of people or structures to geologic, soils or seismic impacts. **(No Impact)**

4.7 GREENHOUSE GAS EMISSIONS

4.7.1 Setting

Unlike emissions of criteria and toxic air pollutants, which have local or regional impacts, emissions of greenhouse gases (GHGs) have a broader, global impact. Global warming associated with the "greenhouse effect" is a process whereby GHGs accumulating in the atmosphere contribute to an increase in the temperature of the earth's atmosphere. The principal GHGs contributing to global warming and associated climate change are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and fluorinated compounds. Emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the transportation, industrial and manufacturing, utility, residential, commercial, and agricultural sectors.

4.7.1.1 *Regulatory Setting*

Agencies at the international, national, state, and local levels are considering strategies to control emissions of GHG that contribute to global warming. The following plans, polices, and regulations apply to the project area.

California Assembly Bill 32

With the passage of AB 32 (Global Warming Solutions Act of 2006), the State of California made a commitment to reduce greenhouse gas (GHG) emissions to 1990 levels by 2020, which represents a 30 percent decrease over "Business-as-Usual" conditions. CARB's Discrete Early Actions include maximizing energy efficient building and appliance standards, pursuing additional efficiency efforts, including new technologies and new policy and implementation mechanisms, and pursuing comparable investment in energy efficiency by all retail providers of electricity in California (including both investor-owned and publicly-owned utilities). In addition to AB 32, Executive Order S-3-05 established a reduction target of 80 percent below 1990 levels by 2050.

In December 2008, the California Air Resources Board (CARB) approved the *Climate Change Scoping Plan,* which contains a comprehensive set of actions designed to diversify California's energy sources, save energy, and enhance public health, among other goals. Per AB 32, the Scoping Plan must be updated every five years to evaluate the AB 32 policies to ensure that California is on track to achieve the 2020 GHG reduction goal. CARB expects to consider adoption of an updated Scoping Plan document in November 2013.

California Senate Bill 375

Senate Bill 375 (SB 375), known as the Sustainable Communities Strategy and Climate Protection Act, was signed into law in September 2008. It builds on AB 32 by requiring CARB to develop regional GHG reduction targets to be achieved from the automobile and light truck sectors for 2020 and 2035 when compared to emissions in 2005. The per capita reduction targets for passenger vehicles in the San Francisco Bay Area include a seven percent reduction by 2020 and a 15 percent

reduction by 2035.[45] Consistent with the requirements of SB 375, the Metropolitan Transportation Commission is partnering with the Association of Bay Area Governments, the Bay Area Air Quality Management District, and the Bay Conservation and Development Commission to prepare the region's Sustainable Community Strategy, referred to as *Plan Bay Area*. A Draft *Plan Bay* Area was released for public review in March 2013. The regional per capita reduction targets set by SB 375 do not directly address emissions associated with the manufacture, transport, use, and disposal of commonly used products such as disposable food ware.

2010 Bay Area Clean Air Plan

The Bay Area 2010 Clean Air Plan (CAP) addresses air emissions in the San Francisco Bay Area Air Basin. One of the key objectives in the CAP is climate protection. The 2010 CAP includes emission control measures and performance objectives, consistent with the state's climate protection goals under AB 32 and SB 375, designed to reduce emissions of GHGs to 1990 levels by 2020 and 40 percent below 1990 levels by 2035.

BAAQMD CEQA Guidelines

BAAQMD identifies thresholds of significance for operational GHG emissions from stationary sources and land-use development projects in its CEQA Air Quality Guidelines. These guidelines include recommended significance thresholds, assessment methodologies, and mitigation strategies for GHG emissions. The guidelines do not, however, address emissions associated with the manufacture, transport, use, and disposal of commonly used products such as disposable food ware.

Envision San José 2040 General Plan

The *Envision San José 2040 General Plan* includes a Greenhouse Gas Reduction Strategy embedded in its policies and programs that are designed to help the City sustain its natural resources, grow efficiently, and meet State legal requirements for GHG emissions reduction. Multiple policies and actions in the *2040 General Plan* have GHG implications, including land use, housing, transportation, water usage, solid waste generation and recycling, and reuse of historic buildings. The City's Green Vision, as reflected in these policies, also has a monitoring component that allows for adaptation and adjustment of City programs and initiatives related to sustainability and associated reductions in GHG emissions. The GHG Reduction Strategy identifies GHG emissions reduction measures to be implemented by the following recycling and waste reduction strategies:

> **RWR-Q**. Extend recycling services - Green Vision Goal #5. As an estimate, divert an additional 75% of waste beyond the baseline year (2006) by 2035. CO2e from landfilled waste (2006) = 260,000 MT; 75% =200,000 MT.
>
> **MS-6.5**. Reduce the amount of waste disposed in landfills through waste prevention, reuse, and recycling of materials at venues, facilities, and special events.

[45] The emission reduction targets are for those associated with land use and transportation strategies, only. Emission reductions due to the California Low Carbon Fuel Standards or Pavley emission control standards are not included in the targets.

MS-5.Divert 100% of waste from landfills by 2022 and maintain 100% diversion through 2040.

Among the other participating jurisdictions in Santa Clara County, the other cities/towns listed in Table 4.7-1, below, have adopted or are preparing Climate Action Plans/Greenhouse Gas Reduction Strategies.

Table 4.7-1
Relevant Greenhouse Gas Plans and Policies for Participating Jurisdictions

Jurisdiction	Planning Document	Status	Relevant Policies
San José	Greenhouse Gas Reduction Strategy	Adopted. June 2011	Green Vision Goal #5; Implementation: Zero Waste Strategic Plan. As an estimate, divert an additional 75% of waste beyond the baseline year (2006) by 2035.
Gilroy	Climate Action Plan	Adopted. June 18, 2012	SW4: Ban Styrofoam and other non-biodegradable food containers in the City of Gilroy.
Los Altos	*Climate Action Plan*	*In Progress*	--
Los Gatos	Los Gatos Sustainability Plan	October 15, 2012	SW-9 – Develop policies, incentives, and design guidelines that encourage the public and private purchase and use of durable and nondurable items, including building materials, made from recycled materials or renewable resources. SW-10 Additional Waste Diversion: Aim to achieve the 75 percent waste diversion goal established by AB 341.
Milpitas	*Climate Action Plan*	May 7, 2013	Measure 11.1: Waste Diversion- A. Support the expansion of existing food waste and composting collection routes in order to provide composting services for interested residents and businesses. B. Encourage local restaurants to compost food and provide compostable to-go containers.
Morgan Hill	*Climate Action Plan*	*In Progress*	--
Mountain View	Greenhouse Gas Reduction Program	August 2012	**A:** Implement Zero-Waste Plan PW

Table 4.7-1 Relevant Greenhouse Gas Plans and Policies for Participating Jurisdictions			
Jurisdiction	**Planning Document**	**Status**	**Relevant Policies**
Santa Clara	*Climate Action Plan*	*In Progress*	--
Sunnyvale	*Climate Action Plan*	*In Progress*	*LW-1.3. Ban the use of expanded polystyrene (EPS) take-out containers at restaurants and fast-food facilities*
Other:	**Planning Document**	**Status**	**Relevant Policies**
Palo Alto	Climate Protection Plan	December, 2007	Expand collaborative efforts with targeted businesses to reduce the use of disposable items such as plastic shopping bags and take-out containers. Propose possible product bans or fees to reduce the use of products such as plastic bags and bottled water. Implement approved material bans and mandatory recycling ordinances.
Unincorporated Santa Clara County	Climate Action Plan *– Operations and Facilities*	September 2009	Establish a 75% waste diversion goal for facilities and parks. (GHG reduction of 1,525 metric tons)

4.7.2 Environmental Checklist and Discussion of Impacts

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Checklist Source(s)
Would the project:					
1. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐	1,10
2. Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐	1,2,10

4.7.2.1 *Greenhouse Gas Impacts of Substitute Products*

Prohibiting EPS foam food ware would not directly generate GHG emissions. Instead, the proposed phasing out of EPS foam food ware would indirectly generate GHG emissions associated with substitute container materials. Evaluating the greenhouse gas impacts of a disposable food service product requires an examination of the product's full life cycle. GHGs are emitted when the feedstock (e.g. petroleum or wood) is extracted, processed, manufactured into the product, and when the product is used, collected, and disposed. There are also greenhouse gas emissions from the transportation associated with each step of the product's life cycle. Because the calculation of GHG emissions for these phases depends on location-specific factors such as transportation distance and energy supply, there is an inherent uncertainty in the information available to the City of San José to quantify the emissions from products used in the project area.

The life cycle assessments (LCAs) summarized in Appendix C reveal that the greenhouse gas emissions of the substitute products are in some cases higher and in other cases lower than their EPS foam counterparts. A 2011 study funded by the Plastic Foodservice Packaging Group (PFPG) found that the life cycle of 10,000 16-ounce expanded polystyrene (EPS) cups accounts for 723 pounds of carbon dioxide. The same study found that 10,000 plastic-lined paper cups account for anywhere between 147 and 1,215 pounds of carbon dioxide emissions, depending on to what extent they decompose in landfills and whether or not a corrugated sleeve is used.[46]

Another study, this one funded by the California Department of Resources Recycling and Recovery (CalRecycle), found that when all products were landfilled, the life cycle GHG emissions for 1,000 EPS clamshells were 53.6 kilograms of carbon dioxide equivalents (kg CO_2e). The emissions from 1,000 clamshells made from substitute materials such as unfoamed polystyrene, polyethylene terephthalate (PET), polypropylene, and the biopolymer polylactic acid (PLA) were 51.8 kg, 80.7 kg, 61.1 kg, and 41.5 kg, respectively.[47] This study confirms that the GHG emissions of the substitute products range from somewhat higher to somewhat lower than EPS foam.

Other studies summarized in Appendix C show similar results. A key issue with all of the LCAs is that the assumed end of life scenario, or waste disposal path, is not consistent with the actual waste collection infrastructure in the project area. How a product is disposed accounts for a substantial portion of the product's greenhouse gas impacts, so the results of studies with end of life scenarios differing from the actual waste disposal options in the project area are difficult to apply.

For example in the aforementioned PFPG-funded study, twenty percent of the 10,000 EPS cups were assumed to be combusted for energy rather than landfilled. As a result, the EPS cups were given a credit for displaced energy production. This assumption was based on a national waste recovery average and does not reflect the circumstances in the project area. Of the waste collected in Santa

[46] Franklin Associates, Ltd. "Life Cycle Inventory of Foam Polystyrene, Paper-Based, and PLA Foodservice Products." February 4, 2011. Prepared for The Plastic Foodservice Packaging Group. Available at: <http://plasticfoodservicefacts.com/Life-Cycle-Inventory-Foodservice-Products>.
[47] Kuczenski et al. "Plastic Clamshell Container Case Study." May 15, 2012. Prepared for CalRecycle. Available at: <http://www.calrecycle.ca.gov/publications/Detail.aspx?PublicationID=1431>.

Clara County, only a small portion of the wood debris collected is incinerated for energy recovery.[48] No other types of waste collected in the project area, including plastics, are incinerated.[49]

The CalRecycle-funded study provides another example of the significance of the end of life scenario in determining a product's greenhouse gas impacts. PET was the highest impact product at 80.7 kg CO_2e/1,000 clamshells. However when the emissions were calculated with the assumption that 100 percent of the PET clamshells were recycled, the PET emissions dropped almost 50 percent making it one of the lowest impact products studied. PET is recyclable in all but one jurisdiction in the project area (see Figure 4.17-4 in *Section 4.17 Utilities and Service Systems*), which means that insofar as PET would be used as a substitute for EPS foam, the emissions associated with those products could increase or decrease depending on the rate at which they are recycled. In the project area, emissions would likely be less than calculated in this study due to the wide availability of recycling services.

These examples of the sensitivity of emissions to the end of life scenario demonstrate the inapplicability of the available information to the proposed project. Quantitative greenhouse gas analysis based on these LCAs would involve use of assumptions that are inconsistent with actual practices in the project area. There is no definitive evidence that any of the substitute products would account for significantly more greenhouse emissions than EPS foam products used in the project area.

Another key issue that is not discussed in detail here is the transportation distance assumptions for the products. Each LCA uses an average transportation distance based on a set of estimations for the region and products studied. The City of San José does not have enough information to predict exactly where the EPS foam and substitute products available in the project area come from. Furthermore, any such information would be frequently changing based on market demand, price, and the availability of supply at the time of purchase.

Therefore, the City of San José cannot conclude that replacing EPS foam food service ware with substitute products would substantially increase greenhouse gas emissions, and if substitute materials are commonly recycled, emissions may be reduced, as anticipated by the San José's GHG Reduction Strategy.

4.7.2.2 *Consistency with Statewide GHG Reduction Plans AB32 and SB 375*

The Climate Change Scoping Plan provides a comprehensive strategy to reduce statewide GHG emissions in the year 2020 consistent with the reduction targets established by AB32. Included within that strategy are actions related to GHG emissions from solid waste. According to the

[48] Samonsky, E. Associate Environmental Services Specialist. City of San José, Environmental Services Division. Personal Communication. April 11, 2013. In calendar year 2012, 15,884 tons of San José 's residential yard trimmings stream were treated as co-generation (hog) fuel. This represents 12 percent of San José 's residential yard trimmings stream.

[49] Limited amounts of specific materials from the project area may be disposed of by incineration. For example, the California Disposal Reporting System shows very small amounts of waste from Sunnyvale and other jurisdictions being burned at the Covanta waste-to-electricity plant at Crows Landing (Stanislaus County). Some amount was illegal drugs destroyed for the Sunnyvale Department of Public Safety. Waste from residential and food related businesses is not routinely disposed of by incineration, however.

Scoping Plan, GHG emissions from waste in California are one (1) percent of overall total statewide emissions.

Scoping Plan Recommended Action 15. Recycling and Waste. *Reduce methane emissions at landfills. Increase waste diversion, composting and other beneficial uses of organic materials, and mandate commercial recycling. Move toward zero-waste.*

This action strives to reduce greenhouse gas emissions by turning waste into resources. By reducing the substantial energy use associated with the acquisition of raw materials in the manufacturing stage of a product's life-cycle, a large reduction in energy consumption should be realized. As stated in the Scoping Plan, "re-introducing recyclables with intrinsic energy value back into the manufacturing process reduces greenhouse gas emissions from multiple phases of product production including extraction of raw materials, preprocessing and manufacturing. Additionally, by recovering organic materials from the waste stream, and having a vibrant composting and organic materials industry, there is an opportunity to further reduce greenhouse gas emissions through the indirect benefits associated with the reduced need for water and fertilizer for California's Agricultural sector."

Consistency: Shifting away from EPS foam food ware to substitute containers made from recyclable or compostable materials will help achieve the GHG emissions reductions assumed in the Scoping Plan for the solid waste sector given the ability for those products to be recycled or composted within the project area. To the extent food ware made from bioplastics (e.g. PLA) is landfilled rather than recycled, the carbon fixed in those inert containers will be sequestered from the active carbon cycle.

As discussed in Section 4.3 Air Quality and Section 4.16 Transportation, the shift to substitute container materials will not result in a substantial increase in trips for delivery or disposal, so there will not be a substantial increase in vehicle-generated GHG emissions, therefore the project would not conflict with Bay Area's Sustainable Community Strategy's regional targets implementing SB 375. The per capita reduction targets for passenger vehicles in the San Francisco Bay Area include a seven percent reduction by 2020 and a 15 percent reduction by 2035, and the proposed ban would have no effect on the region's ability to meet these targets for automobile and light truck sectors.

4.7.2.3 *Consistency with Local GHG Reduction Strategies*

The proposed ban would be consistent with San José's GHG Reduction Strategy by reducing the amount of EPS foam food ware waste currently being disposed in landfills, and by causing a shift to substitute materials capable of being composted or recycled. The proposed ban would also be consistent with adopted GHG Reduction Strategies (or Climate Action Plans) in Gilroy, Los Gatos, and Mountain View, and strategies/plans in development in Los Altos, Milpitas, Morgan Hill, Santa Clara, and Sunnyvale. The additional restrictions on retail sales and EPS foam ice chests would be consistent with adopted Climate Action Plans in Palo Alto and Santa Clara County**. (Less Than Significant Impact)**

4.7.3 Conclusion

The proposed phase-out of EPS foam food ware would not directly or indirectly generate substantial GHG emissions that would have a significant impact on the environment, nor would the proposed project conflict with statewide or local plans adopted to reduce GHG emissions. (**Less than Significant Impact**)

4.8 HAZARDS AND HAZARDOUS MATERIALS

The following discussion addresses hazards to people related to single-use food ware use, manufacture, and disposal. Hazardous materials, substances or materials that could adversely affect the safety of the public, handlers or carriers during use, transportation, or disposal are also specifically addressed. Environmental effects or hazards to the environment are also addressed in *Section 4.3 Air Quality, Section 4.4 Biological Resources, Section 4.9 Hydrology and Water Quality,* and *Section 4.17 Utilities and Service Systems.*

4.8.1 Setting

Hazardous materials include materials such as compressed gases, flammable liquids, oxidizers, corrosives and toxics. Hazardous materials are used and stored in most urban, suburban, and rural communities, including those within the project area. Examples of hazardous materials include gasoline and other fuels, chlorine compounds, acids, and biocides. They include substances used at a wide range of industries and businesses including manufacturing, automotive, medical and electronics. Many products containing hazardous chemicals also are routinely used and stored in homes; generally in small quantities. Hazardous materials are also shipped daily on highways, railroads, and in pipelines.

Each year, Californians generate two million tons of hazardous waste.[50] As discussed below under *Regulatory Setting,* properly handling these wastes avoids threats to public health and degradation of the environment. In addition, existing contamination from reported hazardous materials release sites (such as leaking fuel tanks) can adversely affect the environment or human health and is tracked in State of California databases, such as the GeoTracker database maintained by the State Water Resources Control Board.

Landfill and solid waste facilities include landfills, transfer stations, material recovery facilities, compositing sites, and closed disposal sites. The two environmental concerns related to landfills are the generation and control of landfill gas and water moving through landfilled materials (leachate). Transfer stations do not routinely handle materials classified as hazardous materials, although they do encounter them in waste materials during sorting and have procedures for separating and properly disposing of such materials when encountered. There are four active landfills within Santa Clara County, including Newby Island, Kirby Canyon, Zanker and Guadalupe Mines in the City of San José and transfer stations in the cities of San José, Santa Clara, Sunnyvale, and unincorporated Santa Clara County (San Martin). Landfills and other solid waste facilities are also identified in the Solid Waste Information System (SWIS) database maintained by CalRecycle.

Other hazards identified within Santa Clara County include safety zones for airports (e.g., Mineta San José International Airport, Reid-Hillview Airport, Palo Alto Airport, South County Airport and Moffett Federal Airfield in Mountain View) and very high severity hazards for wildfires in some foothill areas of San José, Morgan Hill, Saratoga, Monte Sereno, Los Gatos, and unincorporated

[50] Department of Toxic Substances Control. "DTSC: Who We Are and What We Do". Accessed May 3, 2013. Available at: <http://www.dtsc.ca.gov/InformationResources/DTSC_Overview.cfm>.

Santa Clara County.[51] Safety zones for airports are identified in Comprehensive Land Use Plans (CLUPs) for the public airports in the project area.[52]

4.8.1.1 *Health Hazards Associated with Food Ware Use and Manufacturing*

Food Container Safety

The single-use food service ware products used by vendors and available for sale to the general public within the project area are manufactured from a variety of plastic resins, paper materials, paper materials lined with plastics, and bioplastics (e.g., plastic resins produced from materials derived from plants). EPS foam is one of a number of materials used to manufacture disposable or single-use food service ware. Many of these products are made from virgin materials (i.e. newly-produced); many others contain pre-consumer and/or post-consumer recycled content. As discussed under *Regulatory Setting,* below, environmental health concerns related to single-disposable food ware include avoiding contamination of containers with heavy metals and toxic materials.

Hazardous Materials Used in Polystyrene Foam Manufacturing

Styrene

Styrene is a carbon containing compound that is converted to the polymer (chain of molecules) polystyrene through a process known as polymerization. Styrene is produced from ethylene, a flammable gas, and benzene, which is flammable and a carcinogen. Styrene is classified as flammable and it has toxic properties if inhaled or ingested. In the work place, all of these compounds have established exposure limits [e.g., Immediately Dangerous to Life or Health (IDLH), as defined by the U.S. National Institute for Occupational Safety and Health (NIOSH)] due to toxic effects from inhalation or ingestion.[53]

In addition to acute toxic effects, the literature and studies on cancer risks associated with styrene has been reviewed by the U.S. Department of Health and Human Services, National Toxicology Program in its *12th Edition Report on Carcinogens*. The report is a congressionally mandated, science-based, public health report that identifies agents, substances, mixtures, or exposures in the environment that may potentially put people in the United States at increased risk for cancer. The report uses two key categories for substances: 1) Known to be a Human Carcinogen and 2) Reasonably Anticipated to be a Human Carcinogen. The June 2011 report identified styrene, the building block of polystyrene, as "reasonably anticipated to be a human carcinogen based on limited evidence of carcinogenicity from studies in humans, sufficient evidence of carcinogenicity from studies in experimental animals, and

[51] Association of Bay Area Governments, Earthquake and Hazards Program. *Wildland Urban Interface Fire Threatened Communities*. July 2009. Accessed April 11, 2013. Available at: <http://gis3.abag.ca.gov/Website/Fire_Threat_WUI/ viewer.htm>
[52] County of Santa Clara, Planning Office. "Airport Land-Use Commission". Accessed May 3, 2013. Available at: <http://www.sccgov.org/sites/planning/PlansPrograms/ALUC/Pages/ALUC.aspx>.
[53] Occupational Health and Safety Administration. "Health and Safety Topics, Styrene". Accessed May 3, 2013. Available at: <http://www.osha.gov/SLTC/styrene/index.html>.

supporting data on mechanisms of carcinogenesis".[54] A previous review by the International Agency for Research on Cancer (IARC) concluded that that there is limited evidence in humans and experimental animals for the carcinogenicity of styrene and that overall, styrene is possibly carcinogenic to humans.[55] Styrene is a substance that is reasonably anticipated by the National Toxicology Program to be a human carcinogen and from a regulatory standpoint is not considered a known carcinogen.

Polystyrene

Polystyrene is classified as a combustible material. Polystyrene foams are produced using blowing agents that expand the polystyrene resin into foam. In expanded polystyrene production, flammables such as pentane, may be used as blowing agents. The production of extruded polystyrene may utilize hydrofluorocarbons (HFC-134a), which are regulated substances in part due to worker asphyxiation hazards.

4.8.1.2 *Regulatory Setting*

Regulation of Food Container Health Hazards

The Office of Food Additive Safety (OFAS) at the U.S. Food and Drug Administration's (FDA) Center for Food Safety and Applied Nutrition (CFSAN) regulates the manufacturing industry to ensure that food contact substances are safe.[56] The U.S. Food and Drug Administration (FDA) oversees the safety of food packaging products and chemical levels that are permitted to be used in plastic food containers. Examples of food contact substances in takeout food containers include polymers (plastic packaging materials), pigments and antioxidants used in polymers, adhesives, materials used during the manufacture of paper and paperboard, and antimicrobial agents. Under the FDA's authority, plastic packaging products must pass safety assessments that eliminate the potential substances that could pose health risks, such as BPA[57,58], to be leached into the food or beverages being stored in containers. BPA is used to make certain plastics, including polycarbonate (Plastic Recycling Symbol #7), and a variety of products, including infant and water bottles. Polystyrene and polystyrene foam are not manufactured using BPA.

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[54] Department of Health and Human Services, National Toxicology Program. "12th Report on Carcinogens (RoC)". Accessed May 3, 2013. Available at: < http://ntp.niehs.nih.gov/?objectid=03C9AF75-E1BF-FF40-DBA9EC0928DF8B15>.

[55] World Health Organization, International Agency for Research on Cancer. 2002. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans. 2002. Available at: <http://monographs.iarc.fr/ENG/Monographs/vol82/mono82.pdf>.

[56] FDA. "Regulatory Report: Assessing the Safety of Food Contact Substances". Accessed May 2, 2013. Available at: <http://www.fda.gov/Food/IngredientsPackagingLabeling/PackagingFCS/ucm064166.htm>.

[57] BPA (Bisphenol A) is a chemical used in certain food contact materials and concerns have been raised about BPA's long-term safety. Though the FDA considers current low levels of exposure as safe, it is "taking reasonable steps to reduce human exposure to BPA in the food supply" and review of BPA studies by the FDA is continuing. Source: FDA. "Bisphenol A (BPA): Use in Food Contact Application". Accessed May 3, 2013. Available at: <http://www.fda.gov/NewsEvents/PublicHealthFocus/ucm064437.htm>.

[58] BPA was recently removed from California's Proposition 65 List requiring notification to consumers. Source: California Office of Environmental Health Hazard Assessment. "Current Proposition 65 List (April 19, 2013)". Accessed May 3, 2013. Available at: < http://www.oehha.ca.gov/prop65/prop65_list/Newlist.html>.

The FDA also has regulations for the recycling of plastics into new food containers. The concerns about the safety of recycled plastics are focused on the potential for contaminants from the original products to end up in the recycled products. Regulatory requirements are outlined in the FDA prepared "Guidance for Industry: Use of Recycled Plastics in Food Packaging: Chemistry Considerations" to regulate food packaging standards for recycled plastics.[59] The FDA's main safety concerns with the use of recycled plastic materials in food-contact articles are: 1) that contaminants from the post-consumer material may appear in the final food-contact product made from the recycled material, 2) that recycled post-consumer material not regulated for food-contact use may be incorporated into food-contact packaging, and 3) that adjuvants (secondary or other agents) in the recycled plastic may not comply with the regulations for food-contact use.

Fiber-based food containers are also regulated by the FDA. Manufacture of food-contact products from reclaimed fiber must meet the criteria in Title 21 of the *Code of Federal Regulations*, Section 176.260 regarding suitable purity and other factors.

In addition to the federal regulations of the FDA, the Department of Toxic Substances Control (DTSC) is charged with implementing the requirements of the laws that are found in the California Health and Safety Code (beginning at §25214.11). These regulations cover any packaging or packaging component sold in California and prohibit the intentional introduction of toxic metals (e.g., cadmium, lead, mercury, and hexavalent chromium) into packaging and the incidental introduction of more than 100 parts per million by weight for all toxic metals.[60]

California Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986, was enacted as a ballot initiative in November 1986. The purpose of Proposition 65 is to notify consumers that they are being exposed to chemicals that are known to cause cancer and/or reproductive toxicity. The State of California Office of Environmental Health Hazard Assessment maintains a list of chemicals, known as the Proposition 65 list. Neither the styrene monomer nor polystyrene are on the current (April 19, 2013) Proposition 65 list.[61]

Regulation of Hazardous Materials Use, Disposal and Storage

There are a number of regulatory programs in place that are designed to minimize the chance for unintended releases and/or exposure of people to hazardous materials from existing contamination and/or accidental releases. Regulations include, but are not limited to:

- California Building and Fire Codes
- Hazardous Materials Storage Ordinances (Municipal and County Codes)
- California Accidental Release Prevention Program (CalARP)

[59] FDA. "Recycled Plastics in Food Packaging". Accessed May 3, 2013. Available at: <http://www.fda.gov/Food/IngredientsPackagingLabeling/PackagingFCS/RecycledPlastics/ucm093435.htm>.
[60] DTSC. "Toxics in Packaging Law". Accessed May 3, 2013. Available at: <http://www.dtsc.ca.gov/toxicsinpackaging/TIPlaw.cfm>.
[61] California Office of Environmental Health Hazard Assessment. "Current Proposition 65 List (April 13, 2013)". Accessed May 3, 2013. Available at: < http://www.oehha.ca.gov/prop65/prop65_list/Newlist.html>

- Certified Unified Program Agency (CUPA) Program (e.g., hazardous waste, fuel storage tanks, CalARP oversight; cities of Gilroy, Santa Clara, Sunnyvale, and County of Santa Clara Department of Environmental Health)
- Hazardous Waste Operations and Emergency Response - Occupational Safety and Health Administration (Cal/OSHA)
- State Water Code and Porter-Cologne Act (State Water Resources Control Board and Regional Boards)
- Federal Resource Conservation and Recovery Act and California Health and Safety Code (California Department of Toxic Substances Control)

Some of these regulatory programs set forth standards and procedures for the handling and storage of hazardous materials. Other programs set forth standards for the containment and/or neutralization of any accidental releases of hazardous materials.

4.8.2 Environmental Checklist and Discussion of Impacts

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Checklist Source(s)
Would the project:					
1. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐	1,11
2. 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?	☐	☐	☐	☒	1
3. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒	1
4. Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, will it create a significant hazard to the public or the environment?	☐	☐	☐	☒	1
5. 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, will the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒	1

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Checklist Source(s)
Would the project:					
6. For a project within the vicinity of a private airstrip, will the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒	1
7. Impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒	1
8. 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?	☐	☐	☐	☒	1,2

The ordinance does not propose or require construction of any kind. Therefore, the project would not expose people or structures to substantial adverse hazards related to existing soil or groundwater contamination, airport safety zones, or wildland fires, or impair implementation of emergency response or evacuation plans.

4.8.2.1 *Hazards Associated with Use of Substitute Products*

The proposed project is adoption of a model ordinance that would regulate the use of single-use EPS foam food ware within participating jurisdictions in Santa Clara County. The proposed ordinance would cause a reduction in EPS foam food ware use and is anticipated to result in an increase in the use of plastic and fiber-based substitute materials. The ordinance is not expected to cause a decline in overall consumption of disposable food service ware and consumers are not expected to litter substitute containers at a higher rate than EPS foam

As discussed in Appendix D, many plastic and fiber-based products already exist that could replace polystyrene foam plates, bowls, beverage cups, and clamshells. A range of plastic and bio-plastic resins can be used to manufacture these products, though the most common plastics used are polypropylene (PP), general purpose polystyrene (GPPS, unfoamed), and PET (polyethylene terephthalate).

Substitute products, including plastic and fiber-based single use food ware, are currently available on the market and currently used for serving foods and beverages. The containers themselves are not classified as hazardous substances under local, state or federal law, and substitution of these products would not directly involve the handling or transportation of hazardous materials.

The safety of the substitute products as food containers, like EPS foam food ware, is regulated by the FDA and Department of Toxic Substance Controls. Plastic materials, such as polycarbonates, that are reported to contain BPA, are not generally used in the types of single-use food ware that would

be replaced (e.g., cups, bowls, clamshells, plates, and unencapsulated ice chests), and exposure to this material and its reported associated health risks would not substantially increase under the proposed project. **(Less Than Significant Impact)**

4.8.2.2 *Secondary Impacts: Hazardous Materials Use Associated with the Manufacture of Substitute Products*

The manufacture of single-use food ware, both plastic and fiber-based, involves the use of regulated hazardous materials and the release of toxic chemicals into the environment. Substitute plastic and fiber-based products produced in the United States are readily available in California and Santa Clara County and are anticipated to be the primary substitute products used. Some containers may be manufactured outside of the United States, however, a thorough review of industries and regulations in other countries is beyond the scope of this environmental review. The basic processes of manufacturing the substitute products would be the same.

Pulp used to make fiber-based substitute products is made by mechanically or chemically separating the fibers in wood or other plant materials. In some chemical pulping processes, corrosives and flammables such as sodium hydroxide and sodium sulfide are used. Bleaching chemicals can include chlorine gas, sodium hydroxide, calcium hypochlorite and peroxides. Coloring materials and coatings may also be applied to paper materials. Hazardous wastes can include halogenated solvents and other organic compounds used in degreasing and cleaning, corrosive waste, and ink waste.

Plastic substitutes, both petrochemically and biologically based, involve the production of plastic resins from organic compounds and the manufacture of individual food ware products at multiple facilities. As discussed previously for polystyrene, common input chemicals from petroleum refiners used in the production of plastic resins include ethylene, propylene, and benzene among other cyclic organic chemicals. Bioplastics use feedstock chemicals derived from renewable, plant or food by-product based sources. After production of the chemical compounds and the various plastic resins (e.g. polypropylene, general purpose polystyrene, PLA), the plastic resins are subsequently manufactured into plastic products through forming or extrusion. The hazardous materials used and waste produced at an individual facility or for a particular type of plastic substitute will depend on the feedstocks, processes, equipment in use and maintenance practices.

The U.S. Environmental Protection Agency (U.S. EPA) maintains a Toxic Release Inventory, which is a publicly available database that contains information on toxic chemical releases and waste management activities reported annually by certain industries as well as federal facilities. The TRI program also lists profiles of chemical use and releases related to the plastic and paper industry, the most recent of those posted by the U.S. EPA, are discussed below.[62]

According to the *1997 Profile of the Plastic Resin and Manmade Fiber Industries,* plastic resin manufacturing facilities released 64.1 million pounds of toxic chemicals into the environment and transferred 192.4 million pounds to other facilities for the purpose of recycling, energy recovery, treatment, or disposal, for a total of 256.5 million pounds in 1995. The top five chemicals released in

[62] U.S. EPA. "Toxic Release Inventory (TRI) Program: 2011 TRI National Analysis" Accessed: May 1, 2013. Available at: <http://www.epa.gov/tri/tridata/tri11/nationalanalysis/index.htm>.

terms of volume were ethylene, methanol, acetonitrile, propylene, and ammonia. Approximately 74 percent (48 million pounds) of the industry's releases were to the air, 21 percent (13.3 million pounds of releases were by underground injection, and the remaining five percent were released as water discharges and disposals to land. Since this profile was completed, recycling of plastic materials such as PET has increased along with source reduction measures (e.g., reducing the amount of material needed by making materials lighter) [63]. These and other measures would tend to reduce the overall waste stream of toxic materials associated with the production of virgin plastic resins on a per unit basis.

As disclosed in the *2002 Profile of the Pulp and Paper Industry, 2nd Edition*, the pulp and paper industry released and transferred a total of approximately 263.1 million pounds of toxic chemicals in 2000. Methanol represented roughly 60 percent of all pulp and paper toxic chemical releases and transfers. Other common chemicals released by the industry include ammonia, hydrochloric acid, and sulfuric acid. The pulp and paper industry released 66 percent of its total Toxic Release Inventory (by weight) to the air, approximately 22 percent to water and publicly owned treatment works (POTWs, or in other words, wastewater treatment plants), and nine percent was disposed of on land.

Single-use food ware would make up only a small portion of the discharges for the industries listed above and any change in demand related to substitutes for EPS foam food ware would affect the release of hazardous materials by these industries in an amount proportional to their occurrence. As noted above, the plastic resin and pulp and paper industries ***both*** release and transfer toxic chemicals as a result of their manufacturing activities.

Life-Cycle Assessments (LCAs) prepared for plastic and fiber-based products and summarized in Appendix C, identify that various emissions occur in both the air and water discharged as a part manufacturing of the various substitute materials. Unfortunately, no one LCA evaluated the use or release of hazardous materials for plastic and fiber-based substitutes along with EPS foam, applying the same methodology to each material type. Tabone et al. (2010) evaluated "percent of greatest impact" for the production of a range of plastic polymers using EPA's TRACI methodology. They included: petrochemical-sourced resins (including PET, general purpose polystyrene, PP, PC) and biopolymers PHA and PLA. Of the plastic resins evaluated, PET and bio-PET were reported to be highest impact for carcinogens, with general purpose polystyrene and polypropylene (PP) being in the lower range. For non-carcinogenic health hazards, general polystyrene was listed has having the greatest impact with PP having the lowest relative impact. The biopolymers PHA and PLA were somewhat higher than PP in the noncarcinogen hazards category. What is not clear or easy to assess is how the assessment tools in the TRACI methodology relate to actual emissions or discharges into the environment and what types of compounds are related to the identified impact. A second LCA which discussed emissions was prepared by Franklin Associates in 2006. It compared polystyrene foam to bleached paperboard and corregated paperboard food service products and stated that no

[63] U.S. EPA. "Wastes - Resource Conservation - Common Wastes & Materials". Accessed May 3, 2013. Available at: <http://www.epa.gov/osw/conserve/materials/plastics.htm#how>.

overall conclusions can be made about air and waterborne emissions released from the manufacture of these products because there is no "valid impact assessment methodology."[64]

In conclusion, manufacturing of both EPS foam and substitute single use food ware products involves the use, transport, storage and disposal of a range of hazardous materials, some of which have toxic properties. No one LCA or EPA industry profile reviewed provides information to assess whether, overall, one or more of the substitute products would result in the disposal or use of substantially more regulated hazardous materials such that they could create a significant hazard to the public or the environment through their routine transport, use, or disposal. As discussed in *Section 4.8.1.1. Regulatory Setting*, there are a number of regulatory programs in place that are designed to minimize the chance for unintended releases and/or exposure of people to hazardous materials. Therefore, implementation of the proposed project and the use of substitute products is not anticipated to result in a significant indirect or secondary hazards and hazardous materials impact. **(Less Than Significant Impact)**

4.8.3 Conclusion

The proposed phase-out of EPS foam food ware would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. (**Less than Significant Impact**)

The proposed phase-out of EPS foam food ware does not propose or require construction of any kind. Therefore, the project would not expose people or structures to substantial adverse hazards related to existing soil or groundwater contamination, airport safety zones, or wildland fires, or impair implementation of emergency response or evacuation plans. **(No Impact)**

[64] Franklin Associates. "Life Cycle Inventory of Polystyrene Foam, Bleached Paperboard, and Corrugated Paperboard Foodservice Products." March 2006. Prepared for the Polystyrene Packaging Council, A Part of the American Chemistry Council's Non-Durable Plastics Panel.

4.9 HYDROLOGY AND WATER QUALITY

4.9.1 Setting

4.9.1.1 *Climate*

The County of Santa Clara is located at the southern end of San Francisco Bay. The urban areas of the County are primarily situated on an alluvial plain within the Santa Clara Valley, which extends southward from San Francisco Bay to Hollister, south of Gilroy. The mountain ranges bordering the alluvial plains ringing San Francisco Bay reach over 4,000 feet in elevation. Slopes vary from essentially flat (zero to two percent) on the valley floor with steeper slopes over 15 percent in foothill areas.

The climate is a semi-arid, Mediterranean-type climate with warm, dry weather from late spring to early fall and cool, moist winters. Yearly precipitation varies, based largely on topography. The mean annual precipitation is 14-15 inches Downtown San José, increasing to 22 inches in the foothills of eastern San José. The wettest month of the year is usually January, with an average rainfall of approximately three inches.

Annual rainfall can vary due to weather altering events, such as El Niño or periodic drought. El Niño can produce a significant increase over normal rainfall and extend the duration of the wet season. In contrast, several droughts of five to seven years in duration have been documented in the San José and greater County area over the last 100 years.

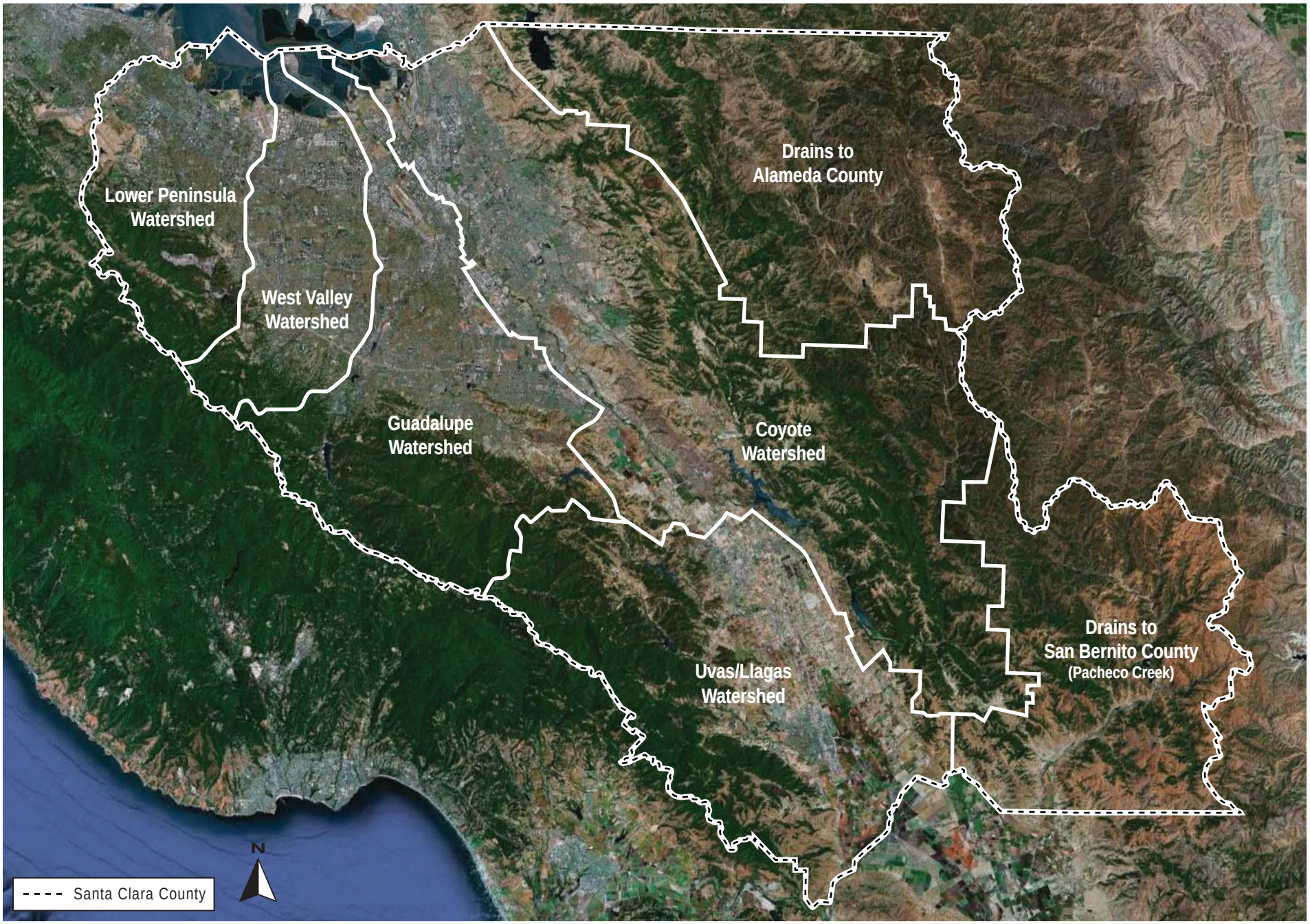
Evapotranspiration is defined as the combination of evaporation and transpiration of water from the land's surface to the atmosphere. Average annual evapotranspiration in San José is approximately 50 inches per year with potential water loss through evapotranspiration substantially higher than the mean annual precipitation.

4.9.1.2 *Surface Water Drainage*

Watersheds within the Project Area

A watershed is a land area from which water drains into a major body of water such as a stream, lake, wetland, bay or estuary, the ocean, or percolates into groundwater. Local watersheds in each jurisdiction are parts of larger, regional basins. The principal watersheds that drain to San Francisco Bay in Santa Clara County include the Lower Peninsula Watershed, the West Valley Watershed, the Guadalupe Watershed and the Coyote Watershed. In the southern Santa Clara Valley just northeast of Morgan Hill, the land tips and drains south via Llagas Creek and Uvas-Carnadero Creek (Uvas/Llagas Watershed) to the Pajaro River and Monterey Bay.[65] Each of these watersheds is made up of one or more main creeks or a river, as well as many smaller tributaries, each with its own sub-watershed. Watershed elements include not only these tributaries but also dams, reservoirs, and groundwater recharge basins. A map of the principal watersheds in Santa Clara County is shown in Figure 4.9-1. The Lower Peninsula Watershed, West Valley Watershed, Guadalupe Watershed and

[65] Sowers, Janet M. et al. "Creek and Watershed Map of Morgan Hill & Gilroy." 2009.



PRINCIPAL WATERSHEDS IN SANTA CLARA COUNTY

FIGURE 4.9-1

Coyote Watershed are part of the Santa Clara Basin, which is a sub-basin of the larger San Francisco Bay Basin. There are more than 800 miles of creeks and rivers in the Santa Clara Valley. A list of the creeks in each jurisdiction is listed in Table 4.9-1 by watershed.

Table 4.9-1
Principal Watersheds and Creeks within Participating Jurisdictions

Principal Watershed	Creeks, River, and Reservoirs within Watershed		Jurisdictions within Watershed
Lower Peninsula Watershed (98 square miles)	**Creeks:** San Francisquito* Matadero Deer Barron Adobe Permanente* Stevens*	**Reservoirs:** Stevens Creek Felt Lake	Los Altos Los Altos Hills Mountain View Palo Alto Sunnyvale Unincorporated Santa Clara County
West Valley Watershed (85 square miles)	**Creeks:** Sunnyvale West Channel Sunnyvale East Channel Calabazas Regnart Rodeo San Tomas Aquino* Saratoga*	 Wildcat Smith Caves Booker Bonjetti McElroy Sanborn Todd **Reservoirs:** None	Campbell Cupertino Monte Sereno Los Gatos Monte Sereno Saratoga San José Sunnyvale Santa Clara
Guadalupe Watershed (170 square miles)	**River and Creeks:** Guadalupe River* Guadalupe Creek Los Gatos Ross Alamitos Canoas	**Reservoirs:** Lexington Vasona Guadalupe Almaden Calero Lake Elsman	Campbell Los Gatos Monte Sereno San José Santa Clara Unincorporated Santa Clara County
Coyote Watershed (322 square miles)	**Creeks:** Los Buellis Creek Arroyo Aguague North Babb Creek South Babb Creek Wrigley-Ford Creek Willow Springs Creek Berryessa Creek Calera Creek Ruby Creek Coyote Creek* Fisher Creek Los Coches Creek	 Cribari Creek Sierra Creek Silver Creek - Upper Tularcitos Creek Crosley Creek Norwood Creek Quimby Creek Fowler Creek Evergreen Creek Yerba Buena Creek Thompson Creek	Milpitas Morgan Hill San José Unincorporated Santa Clara County

Table 4.9-1 Principal Watersheds and Creeks within Participating Jurisdictions			
Principal Watershed	**Creeks, River, and Reservoirs within Watershed**		**Jurisdictions within Watershed**
	Silver Creek*- Lower Spring Creek Splinter Valley Creek Miguelita Creek Sweigert Creek Piedmont Creek Penitencia Creek - Upper Penitencia Creek - Lower Hawk Creek Misery Creek	Flint Creek Penitencia East Channel Las Animas Creek Shingle Creek San Felipe Creek Packwood Creek Scott Creek Cochrane Channel **Reservoirs:** Coyote Anderson Lake Cunningham	
Uvas/Llagas Watershed (104 square miles)	**Creeks:** Llagas Creek Jones Creek West Little Llagas Creek Madrone Channel Crews Creek Miller Slough Pajaro River Princevalle Drain Uvas-Carnadero Creek Pacheco Creek Sargent Creek Corrallitos Creek Maple Creek Foothill Creek Tenant Creek Tick Creek Public Law 566 - Upper Public Law 566 - Lower Ortega Creek Burchell Creek Croy Creek Sycamore Creek Gavilan Creek Upper Llagas Creek Lower Llagas Creek	East Little Llagas Creek Edmundson Creek Lions Creek Little Uvas Creek Solis Creek Farman Creek Tilton Creek Pescadero Creek Eastman Canyon Creek New Creek Panther Creek Rucker Creek San Ysidro Creek South Corrallitos Creek Skillet Creek Little Arthur Creek Bodfish Creek Hayes Creek Machado Creek Paradise Creek South Morey Channel North Morey Channel Tar Creek Dewitt Creek	Gilroy Morgan Hill San José Unincorporated Santa Clara County

Table 4.9-1 Principal Watersheds and Creeks within Participating Jurisdictions			
Principal Watershed	**Creeks, River, and Reservoirs within Watershed**		**Jurisdictions within Watershed**
	Alamias Creek Milias Creek West Branch Llagas Creek Center Creek San Martin Creek Church Creek Day Creek Dexter Creek	Heron Creek Lower Miller Slough Upper Miller Slough Babbs Canyon Creek McLean Creek Live Oak Creek **Reservoirs:** Chesbro Uvas	
Source: Santa Clara Valley Water District. "Watershed Information." Accessed April 24, 2013. Available at; <http://www.valleywater.org/Services/WatershedInformation.aspx>. * = Trash-impaired Creek under Section 303(d) of the federal Clean Water Act.			

Stormwater and Urban Runoff

Stormwater is rainwater that flows across surfaces without being absorbed into soil. Urban runoff is stormwater that combines with irrigation runoff, and water from other sources in an urban setting. Hardscape (impervious) areas prevent water from being absorbed into the ground and causes stormwater to flow more quickly and in larger qualities into the storm drain system. As stormwater combines with runoff already in the system, it gathers additional volume, speed, force, and contaminants. As a result, when the urban runoff is eventually released into a creek, river or bay it can cause erosion, flooding and damage to wildlife habitat.

Stormwater runoff within the urbanized areas of the project area is discharged into local storm drains, which, in turn, flow into local creeks and either San Francisco or Monterey Bays. Generally, each local jurisdiction owns and maintains municipal storm drainage facilities within their boundaries.

Flooding and Flood Management

The Santa Clara Valley Water District (SCVWD) is responsible for providing flood protection to residences and businesses in the County from floods equal to or less than the "one percent flood." The one percent flood, also referred to as the "100-year flood" or the "base flood," is the flow of water that has a one percent chance of being equaled or exceeded in any given year. This level of risk, however, should not be confused with a flood that will occur once every 100 years, but one that might occur once every 100 years or so, on average, over a very long period of time.

Areas subject to the one percent flood are designated as Zone AE, A, AH, or AO on the Federal Emergency Management Agency (FEMA) flood maps. In Santa Clara County, designated flood

zones are generally located along the lower reaches of creeks and near San Francisco Bay (tidal flood zones). Santa Clara County has had several damaging floods over the years, most notably in 1995 and 1997 along the Guadalupe River and smaller events along San Francisquito Creek. Other waterways that are prone to flooding include, but are not limited to, Coyote Creek, Calabazas Creek, Stevens Creek, Sunnyvale east and West Channels, and East and West Little Llagas Creeks.[66]

The SCVWD has a flood management plan that involves an ongoing review of flood protection needs on all creeks in the Santa Clara Valley. A number of flood protection projects are being considered, including projects on San Francisquito Creek, tributaries of Coyote Creek (Berryessa, Upper Penitencia, and Lower Silver Creeks), the middle reaches of the Guadalupe River, and Llagas Creek. The SCVWD also maintains its flood control channels to ensure that the capacity of the channels is not substantially reduced by accumulated debris or excessive growth of vegetation.

4.9.1.3 *Groundwater Conditions*

Groundwater is an important source of water to urban and rural land uses in Santa Clara County and nearly one-half of the water used in the County is pumped from groundwater. The Santa Clara Valley Groundwater Basin is the source for all groundwater in the County, and is divided into three sub-basins: the Santa Clara Valley, Coyote Valley, and Llagas Sub-basins. Groundwater levels respond to changes in the balance between groundwater recharge[67] and withdrawal,[68] and indicate the relative amount of water stored in an aquifer at a given point in time. The SCVWD operates and maintains 18 major groundwater recharge facilities in the Santa Clara Valley and diverts water from local reservoirs and imported water to in-stream and off-stream percolation areas.[69] Water percolating in recharge ponds and creek channels enters the groundwater subbasins through these recharge areas and undergoes natural filtration as it is transmitted into deeper aquifers.

4.9.1.4 *Water Quality*

The water quality of streams, creeks, ponds, and other surface water bodies can be greatly affected by pollution carried in contaminated surface runoff. Pollutants from unidentified sources, known as "non-point" source pollutants, are washed from streets, construction sites, parking lots, and other exposed surfaces into storm drains. Surface runoff from roads in the project area is collected by storm drains and discharged into creeks and ultimately conveyed to San Francisco Bay or Monterey Bay. The runoff often contains contaminants such as oil and grease, plant and animal debris (e.g., leaves, dust, and animal feces), pesticides, litter, and heavy metals. In sufficient concentration, these pollutants have been found to adversely affect the aquatic habitats to which they drain.

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[66] SCWVD. "Local Hazard Mitigation Plan, 2012 Flood Mitigation Mailer." Accessed April 24, 2013. Available at: <http://www.valleywater.org/Programs/LHMP.aspx>.

[67] Groundwater recharge refers to the water gains within a groundwater basin. Water can be gained from direct surface water recharge (natural and artificial), deep percolation of precipitation, septic system discharges to groundwater, and deep percolation of irrigation return water.

[68] Groundwater withdrawal refers to the water uses or losses within the groundwater basin. Groundwater withdrawal can occur from direct groundwater extractions (i.e., pumping), subsurface outflow to another groundwater basin, discharges to surface water, direct consumption by plants, and direct evaporation of surface water.

[69] Santa Clara Valley Water District. "Groundwater Supply". Accessed August 30, 2010. <http://www.valleywater.org/Services/GroundwaterSupply.aspx>.

Despite progress in reducing urban contributions to pollution of the waterways of the Bay Area, the California Regional Water Quality Control Board, SF Bay RWQCB recommended changes to the list of water bodies in the state for which federal water quality standards are not attained. The US Environmental Protection Agency (EPA) approved those recommendations in 2011, and now lists 26 Bay area waterways as "trash-impaired" under Section 303(d) of the federal Clean Water Act. Within the project area these waterways include:

- Coyote Creek
- Guadalupe River
- Permanente Creek
- San Francisco Bay, Lower (shoreline)
- San Franciscquito Creek
- San Tomas Aquino Creek
- Saratoga Creek
- Silver Creek
- Stevens Creek

This listing requires implementation of locally funded remediation programs for the affected waterways. A major component of the trash identified in waterways was "floatable debris", which includes quantities of EPS foam food ware.

Stormwater from the cities of Gilroy and Morgan Hill and unincorporated San Martin drain to Llagas Creek, the Pajaro River and Monterey Bay. Pollutants of concern in these watersheds [as listed in Storm Water Management Program (SWMP) for these jurisdictions] include sediment, nutrients, heavy metals, floatables, pesticides, herbicides, non-sediment solids, pathogens, oxygen-demanding substances, petroleum hydrocarbons, polycyclic aromatic hydrocarbons, and trash.[70] The Pajaro River and Llagas Creek have been identified on the 303(d) list of impaired water bodies. Llagas Creek has been identified as an impaired water body for chloride, low dissolved oxygen, pH, E.coli and fecal coliform, electrical conductivity, sodium and total dissolved solids. The Pajaro River also has been identified as an impaired water body due to boron.

Litter and Waterways

Litter is waste that is improperly discarded. Due to the aesthetic, health, and environmental effects of litter, a number of organizations and government agencies track and characterize trends in litter generation, human behavior, and fate in the environment.

Litter (or trash), including single-use food ware, is transported to local creeks and San Francisco Bay shorelines through three primary pathways: 1) curbs/gutters, storm drain lines and open channels that are part of storm water collection systems in urban areas; 2) wind; and 3) illegal dumping into water bodies.[71] It generally is not found uniformly throughout urban or rural environments, with litter or trash "hot spots" being found at some locations due to human behavior and environmental behaviors or conditions.[72] Trash that reaches creeks can be a result of littering by individuals along roadways (motorists or pedestrians), wind blowing unsecured trash from waste containers or vehicle

[70] Cities of Gilroy, Morgan Hill and County of Santa Clara. 2010. *Revised Regional Storm Water Management Plan* (SWMP). Accessed May 8, 2013. Available at: <http://www.cityofgilroy.org/cityofgilroy/city_hall/community_development/engineering/storm_water/default.aspx>
[71] SCVURPP. "Urban Runoff Trash Management Reducing Impacts in Santa Clara Valley Creeks and San Francisco Bay." February 2013.
[72] SCVURPPP. "Trash Hot Spot Selection Final Report." 2010.

loads, and from vehicles themselves (e.g., tires and vehicle debris), among other sources.[73] Dumping directly into creeks or along roadways is also a source of litter. Littering rates can be higher at transition points, such as a bus stops or going into or out of businesses in retail areas.

As discussed in *Section 4.4, Biological Resources*, EPS foam is a concern in the environment because as a component of plastic debris, animals may mistake small pieces of EPS foam debris as food. It floats on water, is highly visible, and is easily transported by wind. It also is friable (i.e., it crumbles) and breaks into smaller pieces which can be more difficult to screen or pick up than discarded containers that remain intact.

While recognizable and of concern in litter in urban and aquatic environments, the proportion of *total litter* that is EPS foam is low (e.g., less than four percent by count for street litter and about eight percent by volume in stormwater systems). Litter characterization studies conducted locally and on a national basis have evaluated litter in the environment based upon the total count and/or volume of litter broken down into material categories, such as paper, glass, and plastic, and subcategories, such as PET beverage containers and expanded EPS food containers (refer to litter discussion in Appendix B).

In a 2012 study underwritten by the American Chemistry Council Plastics Foodservice Packaging Group, *Environmental Resources Planning LLC* summarized the results of a number of litter characterization studies, including two from San José, that recorded amounts of polystyrene foam food service products in urban litter. A median value of 1.5 percent of "large litter"[74] (by count) was reported to be EPS foam food ware, based upon 19 surveys between 1994 and 2008 in jurisdictions in the United States and Canada. One of the studies referenced, a 2008 street litter survey counted items of litter found at 125 randomly selected sites within the City of San José. EPS foam cups were found to make up 0.65 percent of the "large litter" counted. EPS foam plates and clamshells made up 0.1 and 0.05 percent respectively with an overall total of 0.8 percent EPS foam in the large litter category. In the small litter category, EPS pieces made up 1.3 percent of the total. In more recent street litter assessments within the City (2009 and 2012) the focus was on litter "hot spots", streets or public rights-of-way known to accumulate litter. Counts in the large litter category for these selected sites found:

- 1.6 – 2.2 percent polystyrene foam cups
- 0.4 – 0.8 percent polystyrene foam food plates
- 0.1 - 0.2 percent polystyrene clamshells
- 0.2-0.5 percent polystyrene trays.

Recently, as a part of the Municipal Regional Stormwater Permit (MRP) issued by the San Francisco Bay Regional Water Quality Control Board, litter estimates have been completed for a regional study to assess the types and amounts of trash transported via urban runoff. For the purposes of the study, the amount of trash in the stormwater system for each jurisdiction was estimated on a volume basis.

[73] Schultz, P. Wesley, et al. "Littering in Context: Personal and Environmental Predictors of Littering Behavior." 2011. Environment and Behavior. 45(1) (2013): 35.

[74] "Large Litter" in the San José and other litter studies referenced in the review generally consisted of litter greater than or equal to four square inches in size.

Approximately 3,900 cubic yards of trash that could reach creeks in the San Francisco Bay Basin from stormwater systems is estimated to be generated annually (refer to Table 4.9-2). Approximately eight percent of this trash by volume, or 311 cubic yards, or eight (8) percent, is estimated to be EPS foam food ware. These values are projected, in part, based upon land use types in an effort to identify baseline trash generation that is transported to waterways via urban runoff. The results of studies will be presented to the SF Bay RWQCB in 2013.

For the purposes of this Initial Study and based upon a review of available litter studies (refer to Appendix B), the environmental baseline for EPS foam food ware in within the project area is assumed to be:

- Street Litter: about 0.8-3.6 percent by count of large litter (four square inches in area or more) on streets based upon citywide and hot spot street litter surveys in San José; and
- Stormwater System Litter:
  - about eight (8) percent by volume based upon SCVURPP litter characterizations (i.e., trash loading) in storm drain systems discharging to creeks and waterways.[75]
  - about 311 cubic yards of EPS trash (roughly 3,000 pounds) per year in the SVURPP area.

Municipal and Community Litter Collection and Cleanup

Local jurisdictions within the project area conduct activities such as street sweeping and collection of trash from public trash containers as a part of efforts control and limit litter within their communities. Other activities includes organizing, publicizing or facilitating local cleanups of creeks and water ways. Cleanup events are conducted on a single-day basis (e.g., clean up days, illegal dumping response, homeless encampment removal) or throughout the year (e.g., street sweeping and routine maintenance of parks and public trash collection). SCVURPP estimates that over 600,000 gallons (80,000 cubic feet) of trash and recyclable were removed from Santa Clara Valley creeks and shorelines over a five year period by 13,000 volunteers and municipal staff during more than 580 clean up events in the project area.[76] Clean-up events sponsored by the *Creek Connections Action Group* (administered by the Santa Clara Valley Water District), such as National River and Coastal Cleanup Days, have removed trash from local water bodies, including approximately 60,00 gallons (8,000 cubic feet) in 2011-2012. Other private or community organizations that conduct cleanups of roadways, lots or creeks include *Beautiful Day* (in association with Gary Richards/Roadshow and Caltrans*), San Jose Clean Community Coalition, Save the Bay, Keep America Beautiful (Great American Clean Up), Friends of Coyote Creek, Friends of Five Wounds Trail, Save Our Trails, Guadalupe River Park Conservancy, Meet Up to Clean Up,* neighborhood associations, and service clubs. *[77,78,79]*

[75] Refer to Table 4.9-2 in Section 4.9 Hydrology and Water Quality for a breakdown by jurisdiction.
[76] SCVURPPP. "Urban Runoff Trash Management Reducing Impacts in Santa Clara Valley Creeks and San Francisco Bay." February 2013.
[77] San Jose Mercury News. "Massive Litter Cleanup of South Bay Highways Planned November 19-20." 2011. Accessed April 29, 2013. Available at: <http://www.mercurynews.com/traffic/ci_19278527>.
[78] San Jose Clean Community Coalition. "Become Part of the Clean Community". Accessed April 29, 2013. Available at: <http://plastics.americanchemistry.com/Stand-Alone-Content/SJCC.html>.
[79] Save The Bay. "Volunteer with Save the Bay". Accessed April 29, 2013. Available at: <https://www.savesfbay.org/peninsula-south-bay>.

Table 4.9-2
Estimated Volume of Trash Reaching Storm Drain Inlets[1]
(Stormwater Trash)

Jurisdiction	Estimated Volume of Trash Generated Annually[1]	Estimated Volume of EPS Foodware & Beverageware Trash Generated Annually[3]		
	Best Estimate (Gallons)	Low Estimate (Gallons)	**Best Estimate (Gallons)**	High Estimate (Gallons)
Campbell	17,186	1,025	**1,367**	1,709
Cupertino	25,292	1,509	**2,012**	2,515
Los Altos	10,393	620	**827**	1,034
Milpitas	38,302	2,285	**3,047**	3,809
Monte Sereno	426	25	**34**	42
Mountain View	44,736	2,669	**3,559**	4,449
Palo Alto	31,955	1,907	**2,542**	3,178
San José	302,474	18,048	**24,064**	30,080
Santa Clara	64,636	3,857	**5,142**	6,428
Saratoga	8,032	479	**639**	799
Sunnyvale	82,628	4,930	**6,574**	8,217
County of Santa Clara	37,425	2,233	**2,977**	3,722
Los Altos Hills	835	50	**66**	83
Los Gatos	13,224	789	**1,052**	1,315
Totals (Gallons)	**677,543**	**40,428**	**53,904**	**67,380**
Totals (Cubic Yards)	**3,904**	**233**	**311**	**388**

[1]As reported in Short-Term Trash Load Reduction Plans as a part of Baseline Trash Generation Rates Characterization in the San Francisco Bay Area.
[2]Estimates based on the total amount of uncompacted trash/EPS measured in Storm Drain inlets and CDS units (5 events) in San José and Sunnyvale. Best = percentage of EPS compared to all trash; High and low assume measurement error of (+/-) 25% when characterizing trash/EPS.
[3] Simple mulitplication of annual trash load generated and percentage EPS (low = 6 percent, best estimate = 8 percent, and high = 10 percent)
Source: Chris Sommers, EOA, Inc. for SCVURPPP. April 24, 2013.

4.9.1.5 *Regulatory Setting*

Water Quality

The federal Clean Water Act and California's Porter-Cologne Water Quality Control Act are the primary laws related to water quality. Regulations set forth by the U.S. Environmental Protection Agency (EPA) and the State Water Resources Control Board have been developed to fulfill the requirements of this legislation. EPA's regulations include the National Pollutant Discharge Elimination System (NPDES) permit program, which controls sources that discharge pollutants into the waters of the United States (e.g., streams, lakes, bays, etc.). These regulations are implemented at the regional level by the water quality control boards, which for the San José and greater Santa Clara County area north of Morgan Hill is the San Francisco Regional Water Quality Control Board (SF Bay RWQCB). The area of the County south of Llagas Road and Cochrane Road in Morgan Hill is regulated by the Central Coast Regional Water Quality Control Board (Central Coast RWQCB).[80, 81]

Basin Plans

The RWQCBs are also tasked with preparation and revision of a regional Water Quality Control Plan, also known as the Basin Plan. The Basin Plan identifies beneficial uses, which the Regional Board has specifically designated for local aquifers, streams, marshes, rivers, and the Bay, as well as the water quality objectives, and criteria that must be met to protect these uses. The RWQCBs implements the Basin Plan by issuing and enforcing waste discharge requirements to control water quality and protect beneficial uses.

The Basin Plan also describes water resource protection efforts using a watershed management approach to regulating water quality. This approach represents an expansion of the primary focus of the Basin Plan and water quality regulations from point sources of pollution to include more diffuse sources, referred to as non-point sources, such as urban stormwater and agricultural runoff.

Municipal Regional Stormwater NPDES Permit (MRP)/C.10 Requirements (SF Bay RWQCB -All Jurisdictions Except for Morgan Hill and Gilroy)

The SF Bay RWQCB has issued a Municipal Regional Stormwater NPDES Permit (Permit Number CAS612008) (MRP) for the area of Santa Clara County that drains to San Francisco Bay. In an effort to standardize stormwater management requirements throughout the region, this permit replaces the formerly separate countywide municipal stormwater permits with a regional permit for 77 Bay Area municipalities, including the all of the jurisdictions within the County of Santa Clara except the cities of Morgan Hill and Gilroy, which are within the Central Coast RWQCB and are covered by separate NPDES stormwater permits (see discussion below).

[80] State Water Resources Control Board. "State and Regional Water Boards". Accessed April 18, 2013. <http://www.waterboards.ca.gov/waterboards_map.shtml>.

[81] Historically, efforts to prevent water pollution focused on "point" sources, meaning the source of the discharge was from a single location (e.g., a sewage treatment plant, power plant, factory, etc.). More recent efforts are focusing on pollution caused by "non-point" sources, meaning the discharge comes from multiple locations. The best example of this latter category is urban storm water runoff, the source of which is a myriad of impervious surfaces (e.g., highways, rooftops, parking lots, etc.) that are found in a typical city or town.

Provision C.10.b. of the MRP requires each permittee to identify and select a required number of trash hot spots in creeks or shorelines where annual trash assessments and cleanups are required.[82] The goal of Provision C.10. is for the permittees to reduce trash loads from municipal separate storm sewer systems by 40 percent by 2014, 70 percent by 2017, and 100 percent by 2022. Provision C.10. also requires the submittal of plans and studies, which currently is an on-going process.[83] Possible approaches to achieve these ambitious targets include, but may not be limited to:

- installation of additional trash capture devices;
- enhancement of street sweeping and inlet cleaning activities;
- additional maintenance of public litter cans;
- product stewardship and source reduction actions targeting highly littered items;
- public education and outreach; and
- increased enforcement of anti-littering laws.

Small MS4s NPDES Permits
(Central Coast RWQCB - Morgan Hill and Gilroy)

The cities of Morgan Hill and Gilroy and the County of Santa Clara have prepared and adopted a Storm Water Management Plan (SWMP) and been issued the NPDES Small MS4s General Permit by the Central Coast RWQCB [Order Number 2003-0005-DWQ, Waste Discharge Identification Number (WDID#) 3-43MS03020]. These jurisdictions are designated by the EPA as Small MS4s, meaning smaller municipal separate storm sewer systems serving less than 100,000 people. The SWMP outlines a comprehensive five year plan to establish Best Management Practices (BMPs) through six Minimum Control Measures (MCMs) to help reduce the discharge of pollutants into waterways and to protect local water quality caused by storm water and urban run-off within the corporate limits of Morgan Hill and Gilroy. BMPs include Pollution Prevention/Good Housekeeping measures for residential, municipal and industrial uses to reduce trash and litter in stormwater. Program implementation under the SWMP also includes conducting trash clean up days.

NPDES Permits and Regulations for Industrial Facilities

Wastewater discharges from industrial sources may contain pollutants at levels that could affect the quality of receiving waters. The NPDES permit program establishes specific requirements for discharges from industrial sources, such as facilities that manufacture single-use food ware items and/or materials. Depending on the type of industrial manufacturing facility, more than one NPDES program may apply. For example, the stormwater that runs off from the property of an industrial facility may require an NPDES permit under the stormwater program. An industrial facility may also discharge wastewater to a municipal sewer system and be covered under the NPDES pretreatment program. The industrial facility may also discharge wastewater directly to surface water and require

[82] Santa Clara Valley Urban Runoff Pollution Prevention Program. "Trash Hot Spot Selection Final Report." July 1, 2010.
[83]San Francisco Bay Regional Water Quality Control Board. "Provision C.10 - Trash Load Reduction." Accessed April 24, 2013. Available at: <http://www.waterboards.ca.gov/rwqcb2/water_issues/programs/stormwater/MRP/Prov_C10.shtml>.

an individual or general NPDES permit. Industrial facilities, whether they discharge directly to a surface water or to a municipal sewer system, are covered by effluent limitation guidelines and standards.[84]

4.9.2 Environmental Checklist and Discussion of Impacts

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Checklist Source(s)
Would the project:					
1. Violate any water quality standards or waste discharge requirements?	☐	☐	☒	☐	1, 11
2. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there will 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 will drop to a level which will not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	☒	1,2
3. 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 will result in substantial erosion or siltation on-or off-site?	☐	☐	☐	☒	1
4. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which will result in flooding on-or off-site?	☐	☐	☐	☒	1
5. Create or contribute runoff water which will exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☐	☒	1
6. Otherwise substantially degrade water quality?	☐	☐	☒	☐	1, 11, 12, 13
7. 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?	☐	☐	☐	☒	1

[84] U.S. EPA. "NPDES Industrial and Commercial Facilities" Accessed April 30, 2013. Available at: <http://cfpub.epa.gov/npdes/home.cfm?program_id=14 >.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Checklist Source(s)
Would the project:					
8. Place within a 100-year flood hazard area structures which will impede or redirect flood flows?	☐	☐	☐	☒	1
9. 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?	☐	☐	☐	☒	1
10. Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒	1

The proposed project, which does not involve construction or development activities, would not expose people or structures to flood or inundation hazards or alter drainage patterns. The following discussion focuses on possible effects on water quality.

The proposed ordinance would cause a reduction in EPS foam food ware use and is anticipated to result in an increase in the use of plastic and fiber-based substitute materials. The ordinance is not expected to cause a decline in overall consumption of disposable food service ware and consumers are not expected to litter substitute containers at a higher rate than EPS foam.

Implementation of the proposed project would result in a change in the composition of litter. As discussed below, there is little to no available data about how consumption or litter has changed in other jurisdictions where EPS foam food ware bans were passed (e.g., San Francisco, Seattle, Palo Alto, etc.). The City of San José expects that about 85 percent will be plastic and 15 percent will be fiber-based.

4.9.2.1 *Possible Effects of an Ordinance on EPS foam Food Ware on Local Water Quality and the Implementation of the Basin Plan and NPDES MRP Requirements*

As discussed in *Section 4.9.1.4 Water Quality***,** nine waterways in Santa Clara County are considered trash-impaired. In addition, under provision C.10 of the MRP, which covers 11 of the cities and towns and portions of unincorporated Santa Clara County within the project area, permittees are tasked with reducing trash loads from municipal separate storm sewer systems by 40 percent by 2014, 70 percent by 2017, and 100 percent by 2022. The following discussion addresses how the proposed project could affect water quality from the perspective of trash in local waterways.

Only one study was found that measured EPS foam in litter after adoption of an ordinance regulating the use of EPS foam food ware. These studies were conducted for the City of San Francisco during the period 2007-2009. In the one sample year after the ordinance (2009), the relative composition of litter appeared to shift from polystyrene foam to substitute container types. Based upon this one study, a change in the availability of EPS foam food ware for single use disposal containers would shift the material composition, but not the amount (count), of street litter.

Substitute single-use food ware products are anticipated to be a mix of plastic [e.g., crystalline PS, polypropylene (PP), PET (polyethylene terephthalate), PLA(polylactic acid)] and fiber products. Substitutes for ice chests would be encapsulated EPS foam products or reusable coolers made of non-foamed plastics, such as polypropylene.

Photo 7a: Trash Rack in Morgan Hill

Photo 7b: Trash Interceptor

Effects of Substitute Products on Litter Pathways to Waterways

Although lighter than similar paper products, substitute plastic products are not as likely as EPS foam to be transported by wind off haul truck loads and along streets if deposited as litter. Because the substitute products do not crumble as readily as EPS foam and are not as likely to become airborne, they may be removed by street sweeping or maintenance activities before entering the storm water collection system or by screens or trash racks (see Photos 7a and 7b). The substitute products, therefore, are not more likely to reach waterways if inappropriately disposed of.

Fate of Substitute Products in Waterways

Fiber or paper replacement products that reach waterways would decompose in water over a period of weeks or months and would not tend to accumulate over time (also refer to *Section 4.4.1.2 Plastic Debris in the Environment)*. [85] Some plastic coatings in fiber cups and containers could take longer to breakdown than the fiber material. The breakdown of plastic substitutes in water would be similar to that of EPS foam, although EPS foam may break into pieces sooner that other hard, non-foam plastic resin products.

To the extent fiber or paper substitute products replace EPS foam food ware, the amount of plastic materials reaching San Francisco Bay, Monterey Bay and the Pacific Ocean, would decrease.

As discussed in *Section 4.9.1*, by count and volume, EPS foam food ware in the project area makes up about eight percent of litter by volume in stormwater systems, and by count on city streets often less than two to three percent. [86] While paper cups are usually several times the weight of EPS foam cups, given the relatively small percentage of EPS foam food ware in litter, there would not be a substantial change in the count, volume or mass of litter that could impact water quality of creeks and waterways, including San Francisco and Monterey Bays. Replacing this material with substitute products (that are currently also found in litter) would reduce the amount of EPS foam in litter; however it would not result in a substantial change in the number, volume, or weight of litter items or trash in waterways and would not interfere with implementation of regional plans or programs, such as the Basin Plan or NPDES municipal stormwater permits designed to protect beneficial uses and improve water quality. **(Less Than Significant Impact)**

[85] California Ocean Science Trust. "Plastic Debris in the California Marine Ecosystem." September 2011. Pages 23-24. Available at: <http://calost.org/pdf/science-initiatives/marine%20debris/Plastic%20Report_10-4-11.pdf>.
[86] Street litter studies were done using litter counts and studies of litter in storm drain catch basins and the storm drain system were done by volume, as part of compliance with the MRP NPDES permit.

4.9.2.2 *Water Quality Impacts Associated with the Manufacture of Substitute Products*

The proposed ordinance would result in a reduction in EPS foam food ware use and manufacture and is anticipated to result in a proportional increase in the manufacture and use of plastic and fiber-based substitute materials. Fiber and other plastic food ware products are currently manufactured in California, the remainder of the U.S., and internationally. Since the City of San José cannot predict exactly which materials would replace EPS foam in the local food service industry and where they would be manufactured, the following discussion is provided to generally characterize the available substitute types and to summarize what is known about their water quality impacts.

The locations of manufacturing facilities and any associated water quality impacts cannot be determined with any certainty. Much of the manufacturing is likely to occur outside of Santa Clara County, however, since there are no large petrochemical plastics or fiber processing industries in the area.

As noted in Appendix C, production of certain substitute materials such as PLA and PET can lead to increased eutrophication (i.e. increased nutrient loading) of water bodies from pollutants released during the manufacturing process and during feedstock production (for bioplastics or biodegradable fiber-based materials). See the Tabone et al., Madival et al., and the PlasticsEurope studies summarized in Appendix C.

Paper production from virgin materials also has been reported to lead to increased eutrophication (i.e., increased nutrient loading) of water bodies from pollutants released during the manufacturing process. This would occur at manufacturing plants that do not treat all of their effluent. Eutrophication can degrade water quality and lead to a decreased level of dissolved oxygen, resulting in harmful impacts to wildlife. Paper manufactured with recycled content does not generate the same quantities or types of pollution as paper manufactured from virgin materials, although it is important to note that the use of recycled content may be limited in food ware due to concerns regarding contamination. Chemicals used in paper manufacturing can also include chlorine, sodium hydroxide, chloroform, acids, solvents (tetrachloroethylene, methylene chloride), and sodium sulfide.[87]

Since PLA plastic resin is produced from plant material, some of the same eutrophication issues as paper or fiber manufacturing could apply if discharges to waterways are not controlled. Chemical compounds that have toxic properties are associated with the manufacture of petrochemicals and plastic products. Given their properties, the use and disposal of these compounds is highly regulated.

In the U.S. and a number of other countries, regulations limit industrial discharges of paper waste and manufacturing chemicals, including those under the NPDES Industrial Discharge program (refer to *Section 4.9.1.5 Regulatory Setting*). Given the relatively small shifts anticipated and existing laws and regulations governing manufacturing, especially in the U.S. and Canada, the incremental increases in throughput of substitute paper or plastic food ware products at facilities that meet current national Clean Water Act standards for water discharged back into the environment would not result in a significant impact on water quality. **(Less Than Significant Impact)**

[87] EPA. *Paper Industry*. EPA/530-SW-90-027c. Available at: <www.smallbiz-enviroweb.org/Resources/sbopubs/cdocs/c25.pdf>

4.9.3 Conclusion

The proposed phase-out on EPS foam food ware would not violate water quality standards, waste discharge requirements or otherwise substantially degrade water quality. (**Less than Significant Impact**)

The proposed phase-out of EPS foam food ware does not involve construction that would expose people or structures to flooding or inundation hazards or alter existing drainage patterns. (**No Impact**)

4.10 LAND USE

4.10.1 Setting

The 14 jurisdictions that are considering adoption of the model ordinance cover over 329 square miles, which is about one-third (32 percent) of the 1,029.1 square miles of Santa Clara County. The estimated resident population as of January 2012 within these cities and towns was 1,664,588 (about 92 percent of Santa Clara County) with about 822,525 jobs (91 percent of jobs in the County).

Santa Clara Valley Habitat Conservation Plan/Natural Community Conservation Plan

The City of San José and several other jurisdictions considering foam EPS food ware bans are located within the Santa Clara Valley Habitat Conservation Plan/Natural Communities Conservation Plan (HCP/NCCP). The HCP/NCCP was developed through a partnership between Santa Clara County, the Cities of San José, Morgan Hill, and Gilroy, Santa Clara Valley Water District (SCVWD), Santa Clara Valley Transportation Authority (VTA), U.S. Fish and Wildlife Service (USFWS), and California Department of Fish and Wildlife (CDFW). The HCP/NCCP is intended to promote the recovery of endangered species and enhance ecological diversity and function, while accommodating planned growth in approximately 500,000 acres of southern Santa Clara County. The HCP/NCCP, which has been approved by the local partners, is not yet effective pending additional future actions by local, state, and federal agencies, anticipated to occur in the fall of 2013.

4.10.2 Environmental Checklist and Discussion of Impacts

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Checklist Source(s)
Would the project:					
1. Physically divide an established community?	☐	☐	☐	☒	1
2. Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒	1,2,10
3. Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒	1,7

Adoption of the model ordinance phasing out EPS food ware containers would lead to a shift away to substitute containers made of recyclable or compostable plastics, or fiber. The proposed project would not, therefore, physically divide established communities in participating jurisdictions throughout Santa Clara County. The proposed ban would not conflict with any applicable plan, policy, or regulation adopted by any of the participating jurisdictions as no agencies are currently

understood to have policies or regulations promoting the use of EPS food ware or discouraging use of any of the potential substitutes, many of which can be recycled or composted in certain sectors (e.g. multi-family or commercial collection).

The proposed ban would not be a covered activity under the HCP/NCCP in that it does not involve development or disturbance of land that results in loss of land cover that could be habitat to covered species, nor would it conflict with the HCP/NCCP's conservation strategies which involve protections for covered species' habitats. To the extent EPS food ware is currently appearing as litter in the environment and being ingested by (or otherwise harming) wildlife including the HCP/NCCP's covered species, a shift to substitute containers is not anticipated to create additional impacts to wildlife, as discussed in more detail in *Section 4.4 Biological Resources.* **(No Impact)**

4.10.3 Conclusion

The proposed ordinance phasing out the use of foam EPS food ware would not result in land use impacts. **(No Impact)**

4.11 MINERAL RESOURCES

4.11.1 Setting

Mineral resources found and extracted in Santa Clara County include construction aggregate deposits such as sand, gravel, and crushed stone. The only area in the City of San José that is designated by the State Mining and Geology Board under the Surface Mining and Reclamation Act of 1975 (SMARA) as containing mineral deposits which are of regional significance is Communications Hill.[88]

4.11.2 Environmental Checklist and Discussion of Impacts

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Checklist Source(s)
Would the project:					
1. Result in the loss of availability of a known mineral resource that will be of value to the region and the residents of the state?	☐	☐	☐	☒	1
2. Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒	1,2

The project would not result in the loss of availability of a known mineral resource in Santa Clara County, the state, or elsewhere, in that the project does not involve development or reservation of a particular site containing mineral resources, rather the model ordinance, if adopted by a participating jurisdiction, will result in a shift away from EPS food ware containers to substitute containers made of recyclable or compostable plastics, or fiber. The proposed project would not, therefore, result in significant adverse impacts to mineral resources.

4.11.3 Conclusion

The project would not result in impacts to known mineral resources. **(No Impact)**

[88] City of San José. *Envision San José 2040 General Plan.*

4.12 NOISE

4.12.1 Setting

Several factors influence sound as it is perceived by the human ear, including the actual level of sound, the period of exposure to the sound, the frequencies involved, and fluctuation in the noise level during exposure. Noise is measured on a "decibel" (dB) scale which serves as an index of loudness. Because the human ear cannot hear all pitches or frequencies, sound levels are frequently adjusted or weighted to correspond to human hearing. This adjusted unit is known as the "A-weighted" decibel or dBA. Further, sound is averaged over time and penalties are added to the average for noise that is generated during times that may be more disturbing to sensitive uses such as early morning, or late evening.

Since excessive noise levels can adversely affect human activities (such as conversation and sleeping) and human health, federal, state, and local governmental agencies have set forth criteria or planning goals to minimize or avoid these effects. The noise guidelines are almost always expressed using one of several noise averaging methods such as L_{eq}, DNL, or CNEL.[89] Using one of these descriptors is a way for a location's overall noise exposure to be measured, realizing of course that there are specific moments when noise levels are higher (*e.g.,* when a jet is taking off from an airport or a leafblower is operating) and specific moments when noise levels are lower (*e.g.,* during lulls in traffic flows on I-880 or in the middle of the night).

Noise in Santa Clara County related to single-use EPS foam food ware is primarily limited to truck noise from the transport of food ware to restaurants, other food vendors, and retailers.

4.12.2 Environmental Checklist and Discussion of Impacts

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Checklist Source(s)
Would the project result in:					
1. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☐	☒	1,2
2. Exposure of persons to, or generation of, excessive groundborne vibration or groundborne noise levels?	☐	☐	☐	☒	1

[89] **L_{eq}** stands for the Noise Equivalent Level and is a measurement of the average energy level intensity of noise over a given period of time such as the noisiest hour. **DNL** stands for Day-Night Level and is a 24-hour average of noise levels, with 10 dB penalties applied to noise occurring between 10:00 PM and 7:00 AM. **CNEL** stands for Community Noise Equivalent Level; it is similar to the DNL except that there is an additional five (5) dB penalty applied to noise which occurs between 7:00 PM and 10:00 PM. Generally, where traffic noise predominates, the CNEL and DNL are typically within two (2) dBA of the peak-hour L_{eq}.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Checklist Source(s)
Would the project result in:					
3. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐	1
4. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☒	1
5. 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, will the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒	1
6. For a project within the vicinity of a private airstrip, will the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒	1

The proposed EPS foam food ware ordinance does not include physical development of any kind and would not expose persons to excessive noise or groundborne vibration levels. Based on existing patterns of distribution, it is unlikely that there would be a substantial increase in truck trips delivering substitute single-use food ware to food vendors or retail stores in the project area (see *Section 4.16 Transportation*). For a discernable increase in roadway noise to occur, generally traffic volumes must double. Any additional truck trips related to the transport of substitute food ware products would not occur in great enough quantities, if at all, to result in a measurable increase in noise levels on local roadways. In addition, increased use and disposal of the substitute containers would not affect the number of vehicles associated with curb-side refuse (or recycling) pick-up in that the overall amount of food ware containers used in the project areas is not expected to change. **(Less Than Significant Impact)**

4.12.3 Conclusion

Implementation of the proposed ordinance would not result in a measurable increase in noise or vibration. **(Less Than Significant Impact)**

4.13 POPULATION AND HOUSING

4.13.1 Setting

According to the California Department of Finance estimates, the 2012 population of the 14 participating jurisdictions was 1,664,588.[90] The total 2012 population of Santa Clara County (14 participating jurisdictions plus Palo Alto and unincorporated Santa Clara County) according to these estimates was 1,816,486.

4.13.2 Environmental Checklist and Discussion of Impacts

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Checklist Source(s)
Would the project:					
1. Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒	1
2. Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒	1
3. Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒	1

The proposed ordinance to prohibit the use of disposable EPS foam food service ware would not induce any population growth, nor would it displace any number of people or housing units.

4.13.3 Conclusion

The proposed project would have no impact on population and housing. **(No Impact)**

[90] California Department of Finance. "E-1 Population Estimates for Cities, Counties, and the State – January 1, 2011 and 2012." May 2012. Available at: <http://www.dof.ca.gov/research/demographic/reports/estimates/e-1/>.

4.14 PUBLIC SERVICES

4.14.1 Setting

Public services such as police and fire protection, schools, parks, and public facilities, in the incorporated areas of Santa Clara County are operated and maintained by individual jurisdictions or by contracts with other public agencies. Services in the unincorporated areas are provided by Santa Clara County.

4.14.2 Environmental Checklist and Discussion of Impacts

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Checklist Source(s)
1. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, 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 any of the public services:					
Fire Protection?					
Police Protection?	☐	☐	☐	☒	1
Schools?	☐	☐	☐	☒	1
Parks?	☐	☐	☐	☒	1
Other Public Facilities?	☐	☐	☐	☒	1
	☐	☐	☐	☒	1

The reduced use of EPS foam caused by the proposed ordinance would correspond with an increase in the use of substitute products. This would not be expected to affect the quantity of disposable food service products used and consumers are not expected to litter substitute containers at a higher rate than EPS foam. A change in the types of disposable products used would not affect recreational or school facilities.

The proposed project would not increase the demand for police and fire services nor would it require the construction or expansion of any other public facilities.

4.14.3 Conclusion

The proposed ordinance would have no adverse physical impacts on police and fire facilities, schools, parks, or other public facilities. It would not require the construction or expansion of any new or existing public facilities. **(No Impact)**

4.15 RECREATION

4.15.1 Setting

Parks and recreational facilities within the project area are operated and maintained by the jurisdictions within it as well as the County of Santa Clara. There are also State and federally-owned recreational areas in the project area (e.g., Henry Coe State Park).

4.15.2 Environmental Checklist and Discussion of Impacts

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Checklist Source(s)
1. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility will occur or be accelerated?	☐	☐	☐	☒	1
2. Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒	1

The proposed project would reduce and aim to eliminate the use of disposable EPS foam food ware in Santa Clara County. As a result, the use of substitute products made from paper, plastic, bioplastics, and other plant materials would increase. Consumers are not expected to litter substitute containers at a higher rate than EPS foam, so overall litter in the terrestrial environment is not expected to increase. Since litter would not increase, the proposed project would not result in substantial physical deterioration of recreational facilities. **(No Impact)**

The proposed project would not increase the use of the existing neighborhood and regional parks or cause adverse physical impacts to recreational facilities.

4.15.3 Conclusion

The proposed project would not increase the use of parks or recreational facilities or require the construction of new recreational facilities. **(No Impact)**

4.16 TRANSPORTATION

4.16.1 Setting

4.16.1.1 *Existing Transportation System*

The existing transportation system within the jurisdictions in Santa Clara County includes the roadway network (e.g., freeways, expressways, a Grand Boulevard, arterials, and neighborhood streets), transit systems (light rail, buses, heavy rail), bicycle routes, and trails and pathways for pedestrians and bicycles. The transportation system is owned and maintained by local cities and towns, Santa Clara County (county expressways), the Santa Clara Valley Transportation Authority (light rail transit rights-of-way), the Santa Clara Valley Water District (some trails adjacent to waterways) and the State of California (highways and freeways and some railroad tracks).

For CEQA analyses done in Santa Clara County, traffic conditions at study intersections affected by project traffic are evaluated using level of service (LOS). Level of Service is a qualitative description of operating conditions ranging from LOS A, or free-flowing conditions with little or no delay, to LOS F, or oversaturated conditions with excessive delays. San José's policies, and those of a number of the local participating jurisdictions, identify LOS D or better as the acceptable standard for most local street operations. The Santa Clara County Congestion Management Plan (CMP) level of service standard for signalized intersections, which applies only to regional intersections designated in the CMP, is LOS E or better. The CMP methodology requires an impact analysis be done for any intersection to which a proposed project would add 10 or more vehicles per lane per hour. For freeways, the LOS standard is LOS E or better.

The jurisdictions within Santa Clara County also have a range of policies and programs that encourage and/or plan for increased use of multi-modal transportation facilities such as transit, pedestrian sidewalks and trails, and bicycle facilities.

4.16.1.2 *Delivery of EPS Foam Food Ware Products*

Single-use food ware is delivered in dedicated loads from manufacturers to regional or subregional distributors. They are then delivered to users, such as restaurants and retail outlets, as part of mixed loads of items. The vast majority of product deliveries to food service providers and retailers are provided by trucks.

4.16.1.3 *Solid Waste and Recycling Collection in the Project Area*

Solid waste and recycling collection services for residences and businesses in the project area are provided by a number of waste and recycling haulers franchised by the individual jurisdictions. Solid waste and recycling is collected on a regular basis using established routes and days of collection. Waste collection is organized by land use sectors such as single-family residential, multi-family residential, commercial, and industrial. Industrial waste is not discussed in this Initial Study because it does not contain EPS foam food service products that would be affected by the project.

Waste collected in Santa Clara County is processed and/or landfilled at any of the following landfills and transfer stations: Newby Island Resource Recovery Park, Guadalupe Rubbish Disposal Company, Kirby Canyon Landfill, Mission Trail Waste Management Transfer Station, San Martin Transfer Station, and the Sunnyvale Materials Recovery and Transfer (SMaRT) Station.[91] Newby Island recycles clean polystyrene foam that is dropped off at the landfill. All other facilities landfill EPS foam. Other materials to be recycled are hauled by truck from transfer stations or landfills to off-site locations for shipping to recyclers or composting operations, generally during off-peak hours, to avoid heavy traffic periods.

4.16.2 Environmental Checklist and Discussion of Impacts

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Checklist Source(s)
Would the project:					
1. 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?	☐	☐	☒	☐	1,2
2. 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?	☐	☐	☒	☐	1
3. 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?	☐	☐	☐	☒	1
4. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible land uses (e.g., farm equipment)?	☐	☐	☐	☒	1
5. Result in inadequate emergency access?	☐	☐	☐	☒	1

[91] Center for the Development of Recycling. *City Recycling and Garbage Services in Santa Clara County*. 2013. Available at: http://www.recyclestuff.org/Guides/CityGuide.pdf

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Checklist Source(s)
Would the project:					
6. Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☐	☒	1,2

The proposed project is adoption of a model ordinance that would regulate the use of single-use EPS foam food ware within participating jurisdictions in Santa Clara County. The proposed ordinance would cause a reduction in EPS foam food ware use and is anticipated to result in an increase in the use of plastic and fiber-based substitute materials. The ordinance is not expected to cause a decline in overall consumption of disposable food service ware and consumers are not expected to litter substitute containers at a higher rate than EPS foam.

The ordinance does not propose modifications to the transportation network or construction of new development that would generate new vehicle, bicycle or pedestrian trips.

4.16.2.1 *Impacts of Truck Trips for Delivery of Substitute Products*

Single-use food ware products are delivered in boxes or similar containers by truck to food vendors, restaurant and food service suppliers, and retail outlets throughout the project area by distributors, delivery service companies, and company fleet trucks from distribution centers. Deliveries generally are undertaken on a regular basis along with other products. Substitute food ware products identified in *Section 4.0 (Substitute Products)* and Appendix D are also currently delivered to businesses throughout Santa Clara County.

Stacked food ware products with the same capacity (e.g., 16 ounce cups, nine-inch clamshells) may have different weights, however the overall volume of delivery boxes is anticipated to be similar for EPS foam and substitute products and differences in volume are not anticipated to result in the need to dispatch additional delivery trucks. Truck trips from independent delivery service companies and company fleet trips are not anticipated to change in number due to the substitution of one type of single-use food ware (PS foam) for another. Truck trips from individual distributors could shift depending on whether or not a distributor currently sells both EPS foam food ware and the substitute products. Overall, delivery truck trips, especially during peak hours, are not anticipated to substantially increase. Therefore, the performance of the transportation system would not be adversely effected by changes in delivery truck traffic resulting from implementation of the proposed project. **(Less Than Significant Impact)**

4.16.2.2 *Impacts of Truck Trips for Solid Waste Disposal and Recycling*

The proposed ordinance would result in a shift in the composition of food service ware in the waste stream. EPS foam products would be replaced by products made from materials including: petroleum-based plastic, plant-based plastic, paperboard, molded pulp, and plant fibers.

As discussed in *Section 4.0 (Baseline)* and Appendix B, the percentage of EPS foam food ware in waste collected in San José and Sunnyvale is a small portion of the total collected solid waste. The use of substitute products would not increase the volume of single-use food ware in solid waste to the extent that additional truck trips would be required to collect waste or recyclable materials. The number of truck trips for solid waste and recycling collection would not change substantially with implementation of the ordinance.

Project traffic impacts are considered significant if they conflict with city, town or County/CMP policies related to maintenance of intersection or freeway level of service or would conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities. The project would not generate a substantial increase in peak hour traffic or modify public transit, bicycle or pedestrian facilities and therefore would not result in a significant adverse transportation impact. **(Less Than Significant Impact)**

4.16.3 Conclusion

The ordinance does not propose modifications to the transportation network or construction of new development that would generate new vehicle, bicycle or pedestrian trips or result in transportation hazards or inadequate emergency access. **(No Impact)**

The proposed ordinance would not result in a significant transportation impact due to possible modifications to truck trips. **(Less Than Significant Impact)**

4.17 UTILITIES AND SERVICE SYSTEMS

4.17.1 Setting

4.17.1.1 *Water Supply*

Water service within the project area is provided by private and municipal water suppliers. There are 13 water retailers in Santa Clara County and several special water districts. The water providers for each jurisdiction are listed in Table 4.17-1, below.

Table 4.17-1
Water Retailers for Jurisdictions within Santa Clara County

Jurisdiction	Water Retailers/Public Water Utilities
Campbell	San Jose Water Company
Cupertino	California Water Service Company
Gilroy	Gilroy Water
Los Altos	California Water Service Company
Los Altos Hills	Purissima Hills Water District, California Water Service Company
Los Gatos	San Jose Water Company
Milpitas	Milpitas Water
Monte Sereno	San Jose Water Company
Morgan Hill	Morgan Hill Water
Mountain View	Mountain View Water, California Water Service Company
Palo Alto	Palo Alto Water
San Jose	Great Oaks Water Company, San Jose Municipal Water System, San Jose Water Company
Santa Clara	Santa Clara Water Department
Saratoga	San Jose Water Company
Sunnyvale	Sunnyvale Water, California Water Service Company
Unincorporated Santa Clara County	Purissima Hills Water District Santa Clara Valley Water District and other local districts Stanford University

The Santa Clara Valley Water District manages the County's groundwater sub-basins to support pumping from aquifers which accounts for approximately 40-50 percent of the County's water supply.[92] The District also operates water supply reservoirs and groundwater recharge facilities in local watersheds and import water from the State Water Project and San Felipe Division of the Federal Central Valley Project. The San Francisco Public Utilities Commission's Hetch Hetchy Aqueduct is a third source of imported water available to eight of the water retailers in the County (e.g., Palo Alto, Mountain View, Sunnyvale, Santa Clara, San José and Milpitas, Purissima Hills Water District, and Stanford University).

[92] Santa Clara Valley Water District. "Urban Water Management Plan 2010." 2010.

4.17.1.2 *Stormwater Drainage Systems*

The cities, towns and County of Santa Clara are responsible for the development, operation, and maintenance of stormwater systems throughout their jurisdictions. Stormwater drainage systems convey runoff and prevent local flooding of streets and urban areas. They move water away from developed and rural areas to a local water body, such as a creek, river or bay. Stormwater sewer systems include stormwater inlets (storm drains) and gutters on streets as well as pipes and outfalls. Stormwater outfalls are, where the collected stormwater enters a local water body. Within the City of San José alone, there are about 30,000 storm drain inlets on City streets.[93] The various stormwater systems collect runoff water from streets and developed properties and carry it to local creeks and rivers that ultimately drain into San Francisco Bay or Monterey Bay (e.g., Gilroy, Morgan Hill and portions of southern Santa Clara County). In some rural and less developed areas, storm water runoff is conveyed in open channels or overland prior to discharge in local waterways. Creeks and rivers in each jurisdiction are listed by watershed in Table 4.9-1.

Several permits and plans govern the design and operation of municipal stormwater systems within the project area. As discussed in *Section 4.9.1.5 (Hydrology and Water Quality) Regulatory Setting*, the SF Bay RWQCB has issued a Municipal Regional Stormwater NPDES Permit (Permit Number CAS612008) (MRP) for the area of Santa Clara County that drains to San Francisco Bay. In an effort to standardize stormwater management requirements throughout the region, this permit includes all of the jurisdictions within the County of Santa Clara except the cities of Morgan Hill and Gilroy and southern portions of the County of Santa Clara, which drain to Monterey Bay and are within the Central Coast RWQCB and covered by a separate NPDES stormwater permit. An Urban Runoff Management Plan, intended to reduce polluted runoff from entering local waterways, has been adopted by the SCVWD, Santa Clara County and 13 cities and towns for the areas of the County that drain to San Francisco Bay. The Santa Clara Valley Urban Runoff Pollution Prevention Program's Urban Runoff Management Plan (URMP) consists of an area-wide plan and individual agency plans describing what the jurisdictions will do, collectively and individually, to reduce urban runoff pollution in accordance with the NPDES MRP permit.

In the southern portion of the project area, the Cities of Morgan Hill and Gilroy and the County of Santa Clara prepared and adopted a regional Storm Water Management Plan (SWMP) and were issued a NPDES Small MS4s General Permit by the Central Coast RWQCB. The SWMP outlines a comprehensive five year plan to establish Best Management Practices (BMPs) through six Minimum Control Measures (MCMs) to help reduce the discharge of pollutants into waterways and to protect local water quality effected by storm water and urban run-off. BMPs include Pollution Prevention/Good Housekeeping measures for residential, municipal and industrial uses to reduce trash and litter in stormwater. Program implementation under the SWMP also includes conducting trash clean up days.

[93] City of San José. "Watershed Maps". Accessed May 1, 2013. Available at: <http://www.sanjoseca.gov/index.aspx?NID=1868>.

4.17.1.3 *Wastewater*

Sanitary sewer service in Santa Clara County is the responsibility of municipalities and several service districts.

Sewer service consists of the transmission of municipal and industrial wastewater to a treatment facility, treatment, and then disposal of the wastewater and residual waste solids. As with water service, a number of the cities in the County operate their own local sewage collection systems and contract with one of four wastewater treatment plants to treat the effluent (refer to Table 4.17.-2).

Table 4.17-2
Sanitary Sewer Service for Jurisdictions within Santa Clara County

Jurisdiction	Served by	
	Collection	**Treatment**
Campbell	West Valley Sanitation District	San José-Santa Clara Regional Wastewater Facility (RWP)
Cupertino	Cupertino Sanitary District Rancho Rinconada	San José-Santa Clara RWP Sunnyvale Water Pollution Control Plant
Gilroy	City of Gilroy	South County Regional Wastewater Authority
Los Altos	City of Los Altos	Palo Alto Regional Water Quality Control Plant (WQCP)
Los Altos Hills	City of Los Altos (partial)	Palo Alto Regional WQCP
Los Gatos	West Valley Sanitation District	San José-Santa Clara RWP
Milpitas	City of Milpitas	San José-Santa Clara RWP
Monte Sereno	West Valley Sanitation District	San José-Santa Clara RWP
Morgan Hill	City of Morgan Hill	South County Regional Wastewater Authority
Mountain View	City of Mountain View	Palo Alto Regional WQCP
Palo Alto	City of Palo Alto	Palo Alto Regional WQCP
San José	City of San José	San José-Santa Clara RWP
Santa Clara	City of Santa Clara	San José-Santa Clara RWP
Saratoga	Cupertino Sanitary District	San José-Santa Clara RWP
Sunnyvale	City of Sunnyvale	Sunnyvale Water Pollution Control Plant
Unincorporated Santa Clara County	Various	All four treatment plants and septic systems

4.17.1.4 *Solid Waste*

Signed into law in 1989, the California Integrated Waste Management Act (AB 939) requires cities and counties to adopt and implement waste diversion programs for source reduction, recycling, and composting. Waste haulers serving the jurisdictions within Santa Clara County include West Valley Collection and Recycling, GreenWaste Recovery, Recology, Specialty Solid Waste and Recycling, Mission Trail Waste System, GreenTeam of San José, and Garden City Sanitation. These haulers are

responsible for providing waste processing services for the franchised waste stream in Santa Clara County, which includes landfilling, recyclables processing, composting, and management of household hazardous waste.

All jurisdictions in Santa Clara County met the 50 percent waste diversion goal mandated by AB 939 in 2006, the most recent year for which the diversion rates received approval.[94] In 2008, the California Integrated Waste Management Board (now the California Department of Resources Recycling and Recovery, or CalRecycle) updated the system for determining diversion goals for each city. At present, per capita landfill disposal limits are determined each year and the jurisdictions work to meet their respective goals. Fines of up to $10,000 per day may be imposed if the State decides that good faith efforts are not being made to implement the approved plan or other actions to achieve the State mandated reduction in landfill disposal of trash.

AB 939 established an integrated waste management hierarchy to guide the state and local agencies in its implementation, in order of priority: (1) source reduction, (2) recycling and composting, and (3) environmentally safe transformation and land disposal. That hierarchy was later abbreviated to "reduce, reuse, recycle", with emphasis on the overarching goal of reducing materials that are sent to disposal.

Signed in 2011, AB 341 amended AB 939 to set a goal of 75 percent solid waste diversion via source reduction, recycling, and composting, by 2020.[95] AB 341 also requires businesses that generate more than four cubic yards of commercial solid waste per week and multifamily residential dwellings (five units or more) to obtain recycling services. To meet this requirement, AB 341 also requires jurisdictions to implement commercial solid waste recycling programs.

Waste collection is organized by land use sectors such as single-family residential, multi-family residential, commercial, and industrial. Industrial waste is not discussed in this Initial Study because it does not contain EPS foam food service products that would be affected by the ordinance. Any EPS foam used by workers at an industrial facility would be disposed in a commercial waste stream, not among the byproducts of industrial processes (i.e. industrial waste).

Waste collected in Santa Clara County is processed and/or landfilled at any of the following landfills and transfer stations: Newby Island Resource Recovery Park, Guadalupe Rubbish Disposal Company, Kirby Canyon Landfill, Mission Trail Waste Management Transfer Station, San Martin Transfer Station, and the Sunnyvale Materials Recovery and Transfer (SMaRT) Station.[96] For a list of which facilities serve the participating jurisdictions, see Table 4.17-3 in *Section 4.17.2.2 Impacts to Solid Waste Disposal and Recycling*.

[94] CalRecycle. "Countywide, Regionwide, and Statewide Jurisdiction Diversion/Disposal Progress Report." 2006. Accessed May 3, 2013. Available at: <http://www.calrecycle.ca.gov/LGCentral/Reports/jurisdiction/diversiondisposal.aspx>.
[95] California, State of. *Assembly Bill No. 341.* 2011. Legislative Counsel's Digest. Available at: http://www.leginfo.ca.gov/pub/11-12/bill/asm/ab_0301-0350/ab_341_bill_20111006_chaptered.pdf
[96] Center for the Development of Recycling. *City Recycling and Garbage Services in Santa Clara County*. 2013. Available at: <http://www.recyclestuff.org/Guides/CityGuide.pdf>.

Newby Island recycles clean polystyrene foam that is dropped off at the landfill. All other facilities landfill EPS foam. A waste characterization study sponsored by the City of San José found that in 2007, 0.7 percent of residential waste in San José was EPS foam and 0.8 percent was commercial waste. At the time of the study the City was trying to recycle expanded polystyrene for residential customers, so the study also found that 0.5 percent of residential recycling was EPS foam.[97]

4.17.2 Environmental Checklist and Discussion of Impacts

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Checklist Source(s)
Would the project:					
1. Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒	1
2. 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?	☐	☐	☐	☒	1
3. Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒	1
4. Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☒	☐	1
5. Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒	1
6. Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐	1
7. Comply with federal, state and local statutes and regulations related to solid waste?	☐	☐	☐	☒	1

The proposed project is adoption and implementation of an ordinance that would restrict the use of EPS foam food ware containers. The proposed ordinance would cause a reduction in EPS foam food

[97] Cascadia Consulting Group. "City of San José Waste Characterization Study." May 2008. Prepared for the City of San José.

ware use and is anticipated to result in an increase in the use of plastic and fiber-based substitute materials. The ordinance is not expected to cause a decline in overall consumption of disposable food service ware and consumers are not expected to litter substitute containers at a higher rate than EPS foam.

4.17.2.1 *Water Supply and Wastewater Treatment Impacts*

The proposed restrictions on the use of EPS foam food ware and a shift to other types of single use food ware used in Santa Clara County would not result in substantial additional water use or wastewater generation. Plastic, but not fiber, containers that could be recycled would be rinsed by residents before placing in recycling bins.

Indirect Effects on Water Supply and Wastewater Treatment Related to Manufacture of Substitute Products

Differential water demand and wastewater generation associated with the manufacture of substitute products are possible indirect effects of the proposed project. Substitute fiber and other plastic food ware products are currently manufactured in California, the remainder of the U.S., and internationally. Since the City of San José cannot predict where substitute products would be manufactured, the following discussion is provided to generally characterize the available substitute types and to summarize what is known about their water supply and wastewater treatment impacts.

A 2011 study funded by the Plastic Foodservice Packaging Group found that EPS foam foodservice products use less water than comparable products made from paperboard or PLA. The authors note that the water use results of this study have a high level of uncertainty, however, due to a lack of water use data as well as an "inability to clearly differentiate between consumptive and non-consumptive uses of water." [98]

Studies from the European plastics industry show that water used in the production of plastic resins (prior to product manufacturing, use, and disposal) ranges from 4.79 grams of water per kilogram of polypropylene to 4.8 kilograms of water per kilogram of PET (e.g., PET production requires about 1,000 times more water per kilogram of plastic than polypropylene). The production of one kilogram of polystyrene resin requires approximately 510 grams of water.[99] See Table C-4 in Appendix C for further details on the results of these studies. Based on the results of these European life cycle inventories, the amount of water used to produce substitute plastic products can range approximately from one-hundredth of the water used to produce polystyrene to as much as ten times more.

Given the lack of definitive evidence that any one of the substitute products uses more water than EPS foam and uncertainties about the type of plastic or fiber replacements, the City of San José

[98] Franklin Associates, Ltd. "Life Cycle Inventory of Foam Polystyrene, Paper-Based, and PLA Foodservice Products." February 4, 2-11. Prepared for the Plastic Foodservice Packaging Group. See Page ES-19/

[99] PlasticsEurope. "Environmental Product Declaritions of the European Plastics Manufacturers: PETb, 2011; PP, 2008; GPPS, 2012." Available at: <http://www.plasticseurope.org/plastics-sustainability/eco-profiles/browse-by-list.aspx>

cannot conclude that the proposed project would result in a significant rise in demand for water resources, locally or in other areas.

While the exact locations of where substitutes selected by food vendors would be produced is not known, much of the manufacturing is likely to occur outside of Santa Clara County, since there are no large petrochemical plastics or fiber processing industries in the area.

The reduction of the use of EPS foam food ware and substitution with other available single use disposal food ware products would not substantially affect local water use or supply or wastewater generation or treatment for jurisdictions within the project area. Water use for manufacturing outside of Santa Clara County would be drawn from managed water resources and could involve water recycling or other measures to minimize water consumption. Similarly, wastewater generation and discharge to treatment facilities would be permitted and regulated to comply with local treatment capacity in other jurisdictions. Therefore, implementation of the project is not anticipated to result in substantial indirect water supply and wastewater treatment impacts. **(Less Than Significant Impact)**

4.17.2.2 *Impacts to Stormwater Drainage Systems*

As discussed in *Section 4.9.1.4 Water Quality***,** litter in local communities can be transported into stormwater drainage systems. Litter (or trash), including single-use food ware, is transported to stormwater drainage systems and creeks through three primary pathways: 1) curbs/gutters, storm drain lines and open channels that are part of storm water collection systems in urban areas; 2) wind; and 3) illegal dumping into water bodies.[100] Trash that reaches stormwater inlets can be a result of littering by individuals along roadways (motorists or pedestrians), wind blowing unsecured trash from waste containers or vehicle loads, and from vehicles themselves (e.g., tires and vehicle debris), among other sources.[101] The largest amounts of trash and debris are pushed into and through the storm drainage system at the end of the dry season, with the first heavy rain.

Photo 8: Trash conveyed in stormwater and dumping in Coyote Creek.

Litter can form large accumulations in stormwater systems and urban creeks, which can impact water quality and potentially hinder flood control protection (Photo 8). As noted above, the proposed

[100] SCVURPP. 2013. *Urban Runoff Trash Management Reducing Impacts in Santa Clara Valley Creeks and San Francisco Bay.* February 2013.
[101] Schultz, P. Wesley, et al. 2011. *Littering in Context: Personal and Environmental Predictors of Littering Behavior.* Environment and Behavior 2013 45:35.

ordinance would cause a reduction in EPS foam food ware use and is anticipated to result in an increase in the use of plastic and fiber-based substitute materials. The ordinance is not expected to cause a decline in overall consumption of disposable food service ware or change littering rates and the volume of litter on streets (e.g., cups and clamshells) would be similar to existing conditions. Substitute single-use food ware products are anticipated to be a mix of plastic (e.g., crystalline PS, PP, PLA) and fiber products. Substitutes for ice chests would be encapsulated EPS foam products or reusable coolers made of non-foamed plastics, such as PP.

PS foam food ware makes up about eight percent of litter reaching local waterways by volume. Therefore, the characteristics of substitute plastic and fiber products would have a low to moderate effect on required maintenance and clogging of storm drains. As discussed in *Section 4.9.2*, there are several characteristics of substitute products that could influence how much of the substitute products reach storm drains and whether they persist to clog storm drain systems at a greater rate.

Transport to Stormwater Inlets. Substitute plastic and fiber products do not break apart as easily as EPS foam food ware. Although lighter than similar paper products, substitute plastic products are not as likely as EPS foam to be transported by wind off haul truck loads and along streets if deposited as litter. Because the substitute products do not crumble as readily as EPS foam and are not as likely to become airborne, they may be removed by street sweeping or maintenance activities before entering the storm water collection system or by screens or trash racks (refer to Photo 8). The substitute products, therefore, are not more likely to reach waterways if inappropriately disposed of.

Persistence within the Stormwater System. [As discussed in *Section 4.9.1*, by count and volume, EPS foam food ware in the project area makes up about eight percent of litter by volume in stormwater systems, and by count in street litter surveys often less than two to three percent. While paper cups are usually several times the weight of EPS foam cups, given the proportion of EPS foam food ware in litter, there would not be a substantial change in the count, volume or mass of litter that could impact stormwater drainage systems. Replacing this material with substitute products (that are currently also found in litter) would reduce the amount of EPS foam in litter; however it would not result in a substantial change in the number, volume, or weight of litter items or trash in stormwater systems and would not interfere with implementation of regional plans or programs, such as the Basin Plan or NPDES municipal stormwater permits designed to protect beneficial uses and improve water quality. **(Less Than Significant Impact)**

4.17.2.3 *Impacts to Solid Waste Disposal and Recycling*

The proposed ordinance would result in a shift in the composition of food service ware waste. EPS foam products would be substituted for products made from materials including: petroleum-based plastic, plant-based plastic, paperboard, molded pulp, and plant fibers. See the introductory language in *Section 4.0 – Substitute Products* as well as Appendix D for further information on the available substitutes.

Whereas all EPS foam food ware products are landfilled, substitute products have a wide variety of waste disposal routes that they can follow based on the composition of the material and the waste

hauler. These routes are summarized in Figures 4.17-1 through 4.17-6, below. A detailed table with the information represented in these figures can be found in Appendix D.

Figures 4.17-1 through 4.17-6 show that while most jurisdictions recycle non-foam plastics, a smaller portion divert fiber-based materials to recycling or compost facilities, and those that compost bioplastics such as PLA generally only do so for certain sectors. The proposed project will reduce the quantity of EPS foam products disposed in landfills and will increase the proportion of substitute products that are recycled or composted. This is consistent with the main goals of AB 939 and AB 341, to reduce the sources of landfill trash and increase diversion via recycling, composting, and source reduction.

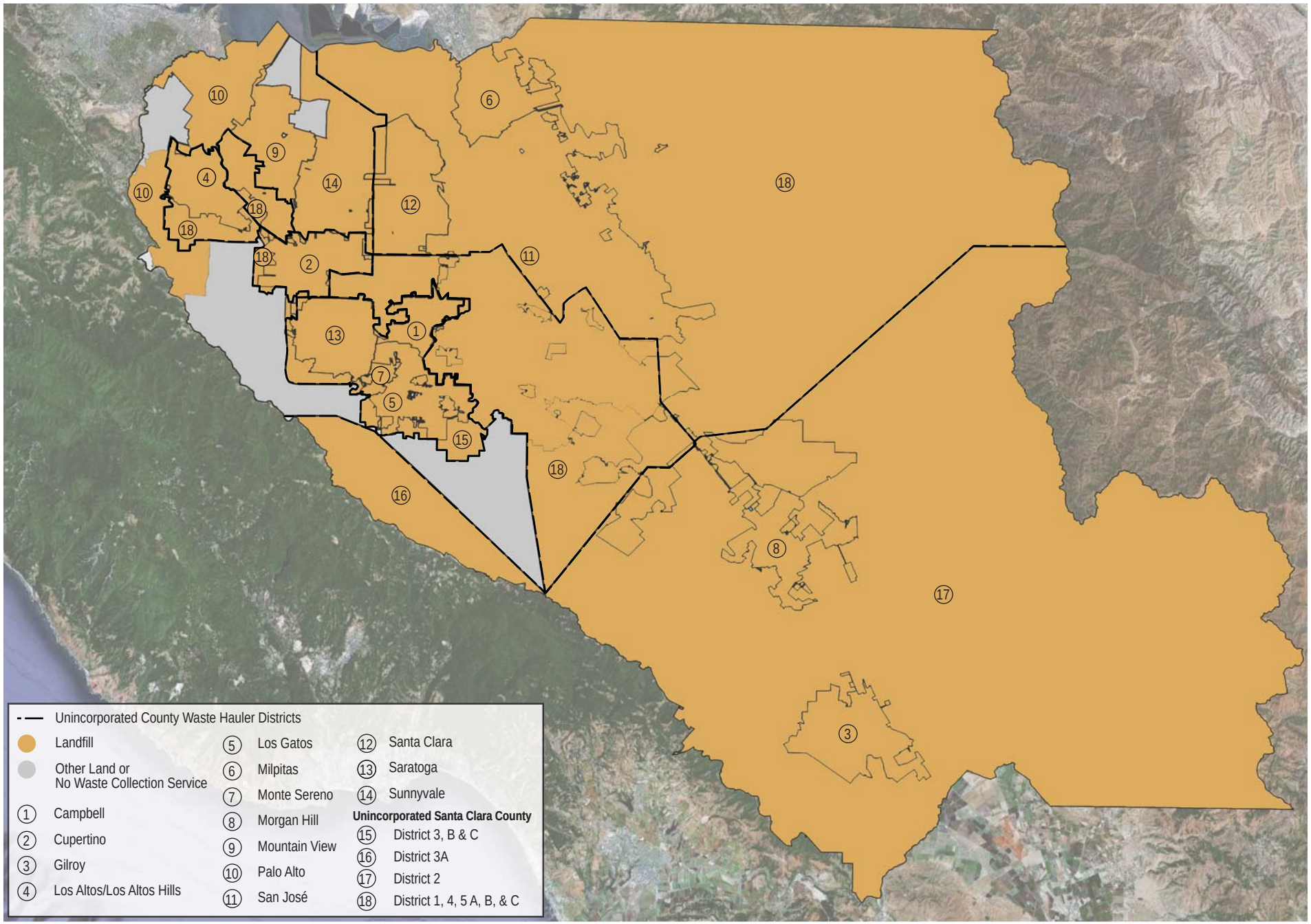
Determining how the weight and volume of waste will change, not the quantity, is fundamental to evaluating the solid waste impacts of the proposed project. Waste and recycling facilities do not have unlimited capacity and they have permits that limit the amount of material they can accept daily. A potential environmental impact would arise if the proposed project caused one or more facilities to expand their operations.

The capacity of solid waste facilities is not as affected by product volume as it is by product weight since not only are facilities permitted based on the weight of the solid waste they accept, but also because many facilities compact the waste before it is landfilled. Furthermore, according to a 2011 study funded by the Plastic Foodservice Packaging Group, the volume of solid waste for EPS foam products is in some cases greater and in others less than the volume of solid waste for substitute products.[102] This study revealed that depending on the product type (e.g. 16-ounce cup or 9-inch plate), PLA or paperboard substitutes could result in a higher or lower volume of solid waste than EPS foam. That is, paperboard products were not consistently more or less voluminous than EPS foam, and neither were the other substitutes considered. Though the City of San José expects that approximately 85 percent of substitutes would be compostable or recyclable plastic and 15 percent would be fiber-based, disposable food ware already makes up such a small percentage of the waste stream that minor changes in the volume of food ware waste would not cause existing waste disposal facilities to expand or to approach their capacities.

Based on measurements of various EPS foam products and their substitutes, as well as the product weights considered in many of the LCAs summarized in Appendix C, substitute products weigh between two and five times as much as their EPS foam counterparts.[103] In general, lined paperboard and solid PLA products tend to be the heaviest substitute disposable food ware products. The City of San José conservatively estimates annual EPS foam use at four pounds per service population or about six pounds per capita (see *Section 4 – Baseline EPS foam Food Ware Use* and Appendix B for further detail on this estimate). With a service population of 2,487,113 (excluding Palo Alto and Unincorporated Santa Clara County because they have already prohibited EPS foam food ware), the annual consumption of EPS foam food ware in the project area is approximately 5,000 tons.

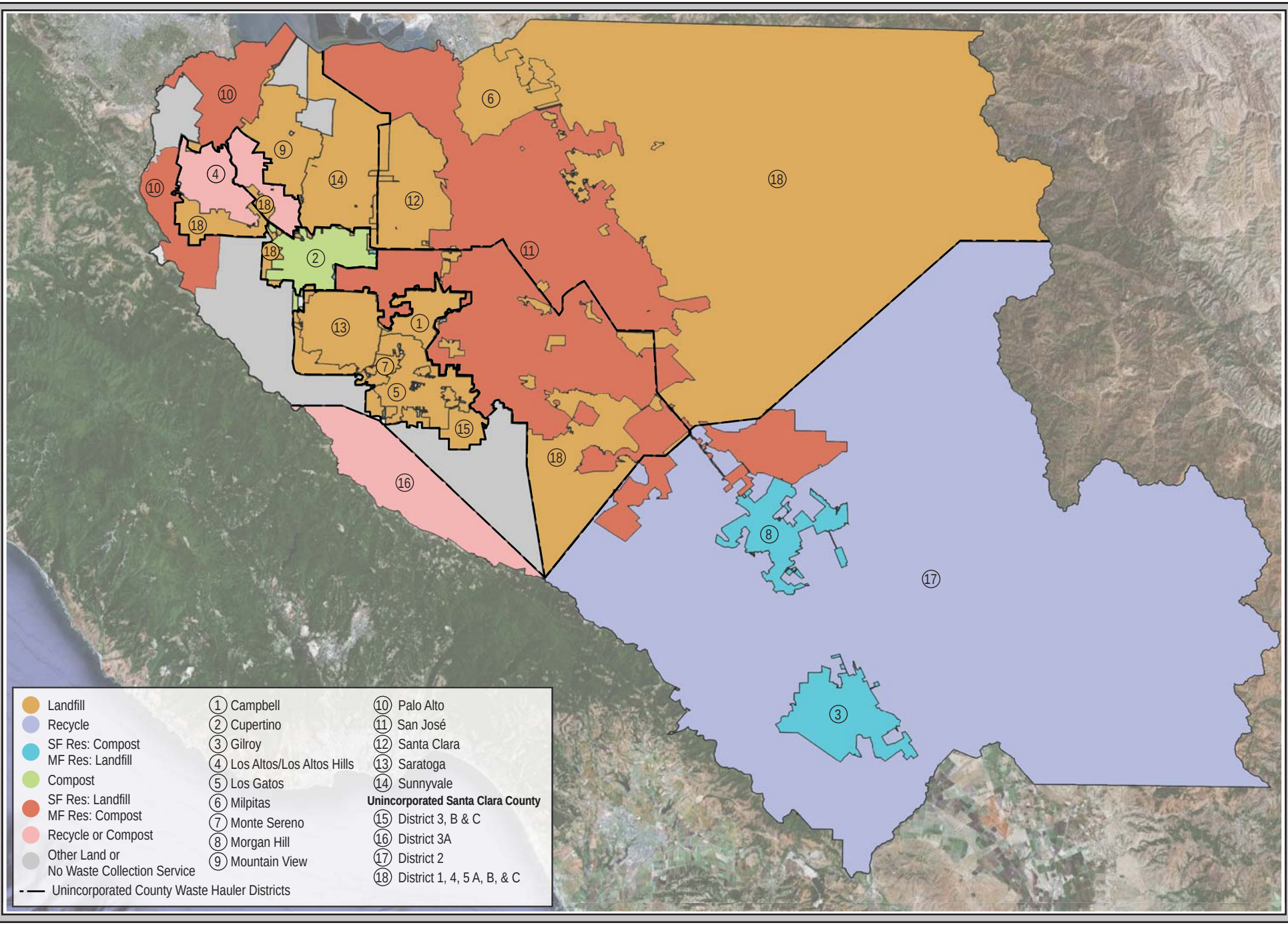
[102] Franklin Associates. "Life Cycle Inventory and Foam Polystyrene, Paper-Based, and PLA Foodservice Products." February 4, 2011. See Figures ES-9, -10, -11, -12.

[103] Product weight data from the following LCAs was used to contribute to the weight ratio estimate: Kuczenski et al., 2012. And; Franklin Associates, 2011. Additional measurements taken by David J. Powers & Associates, Inc. showed a maximum weight ratio of 5:1 for substitute products to EPS foam products.

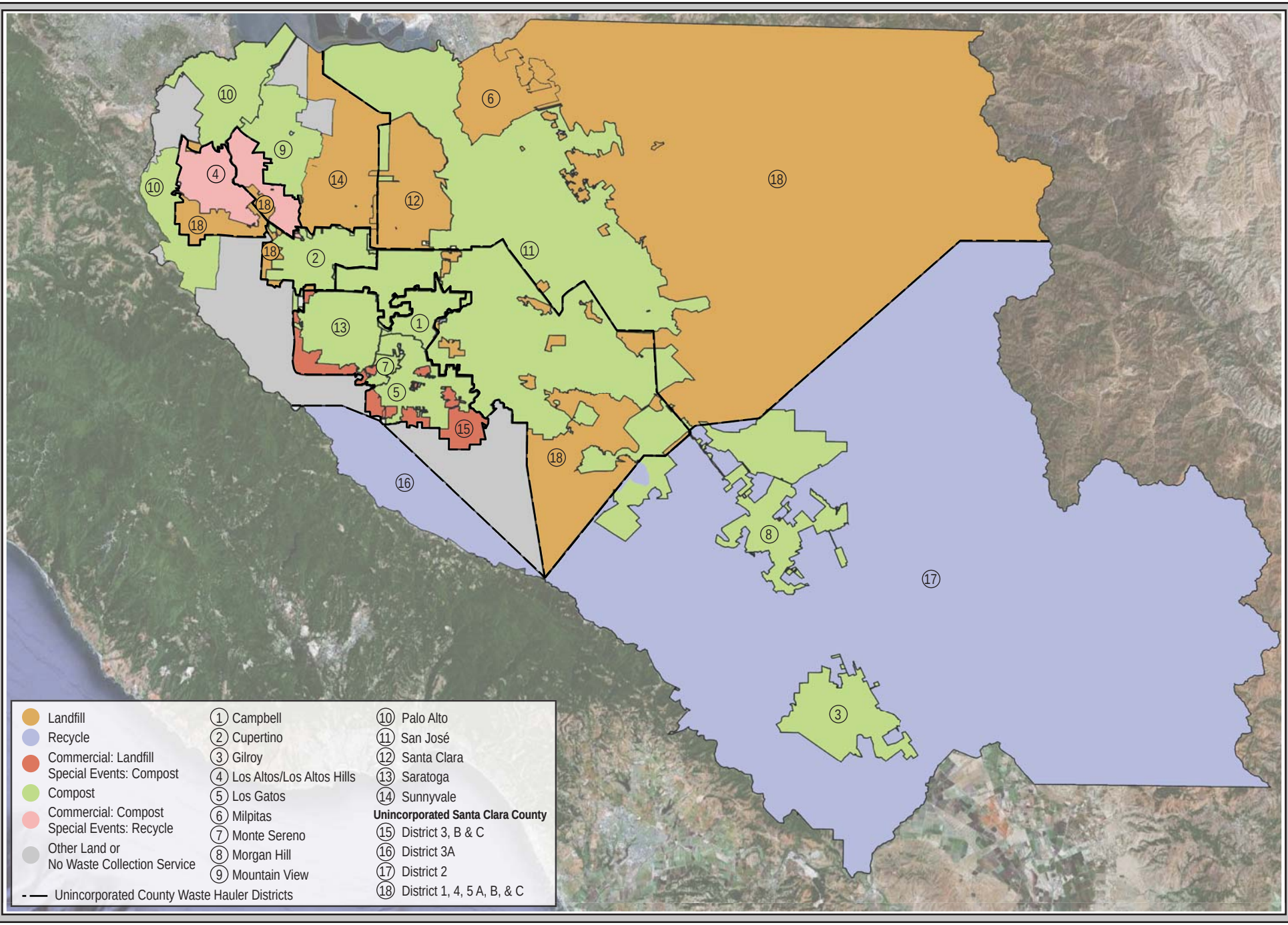


POLYSTYRENE FOAM DISPOSAL PATH (ALL SECTORS)

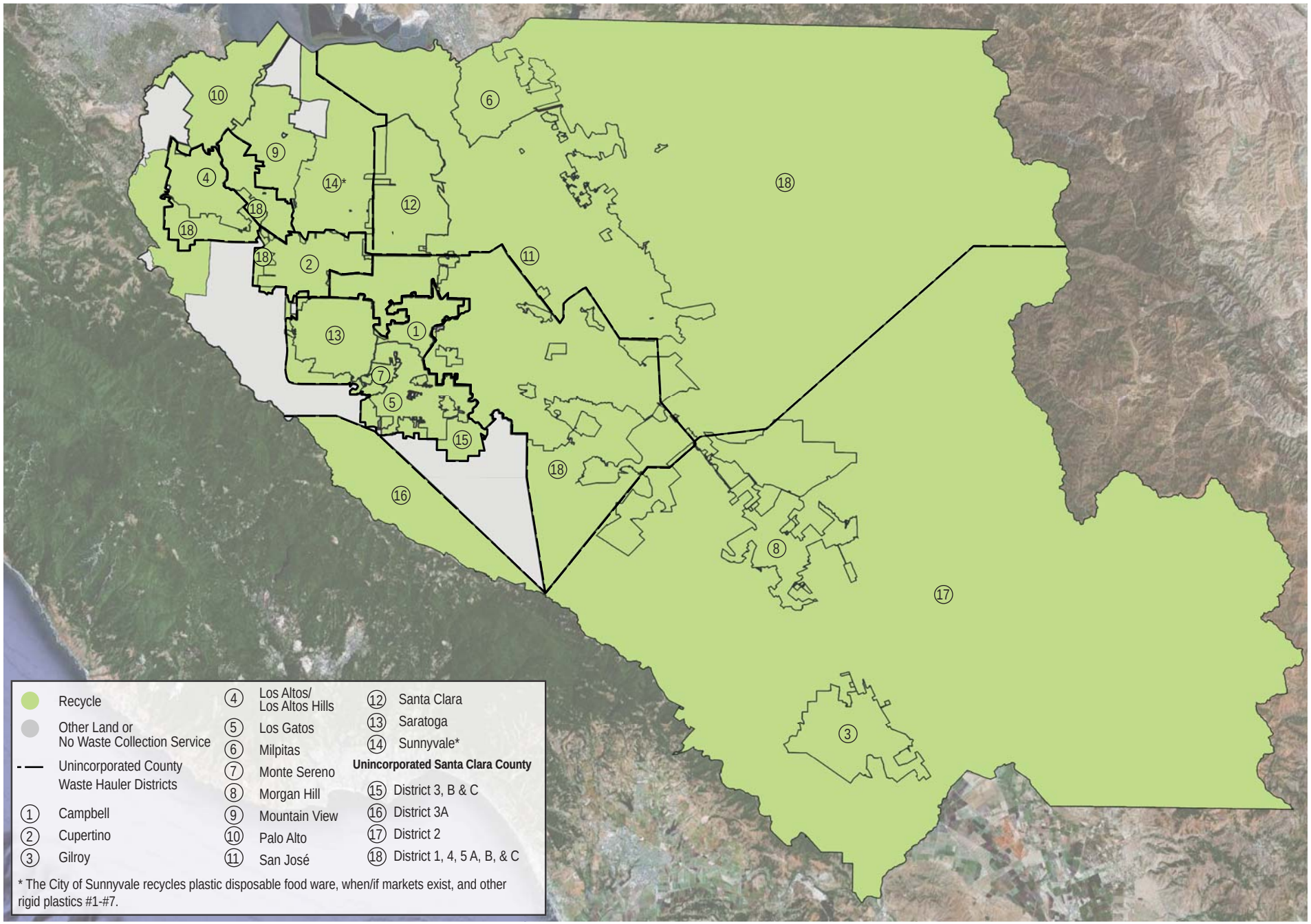
FIGURE 4.17-1



FIBER (PAPER, BAGASSE) DISPOSAL PATH (SINGLE FAMILY / MULTIFAMILY RESIDENTIAL) FIGURE 4.17-2

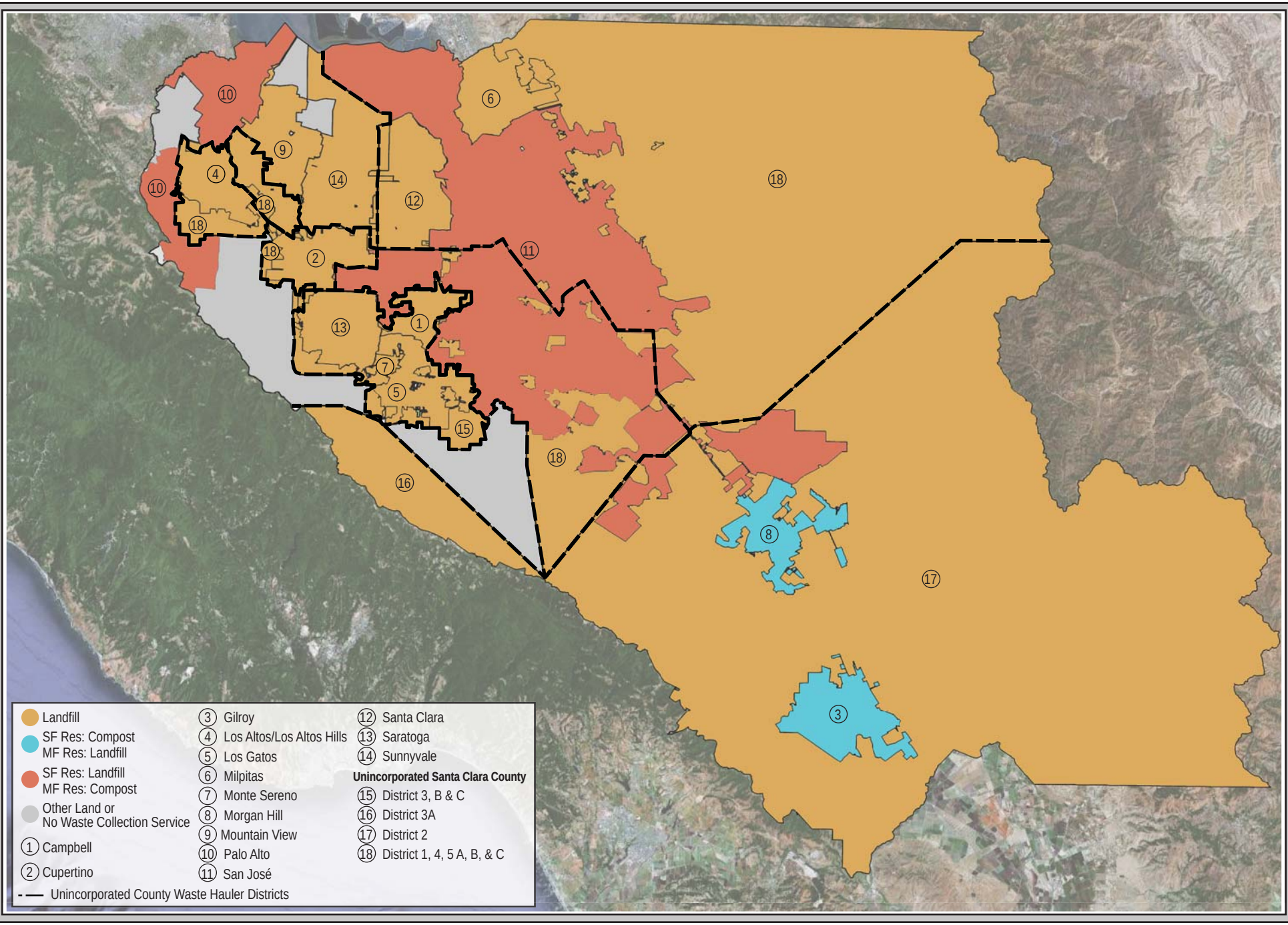


FIBER (PAPER, BAGASSE) DISPOSAL PATH (COMMERCIAL, SPECIAL EVENTS) FIGURE 4.17-3

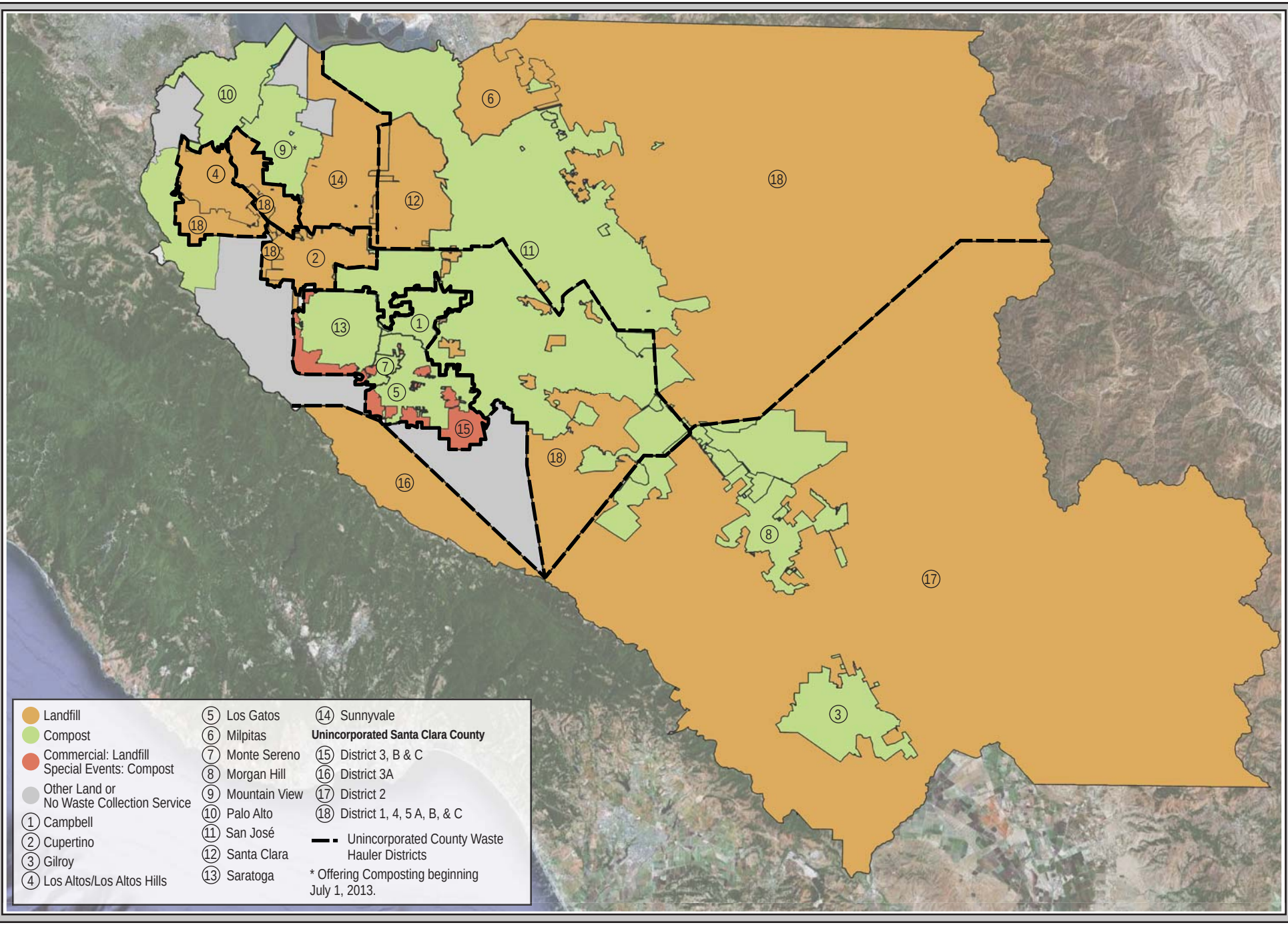


RIGID PLASTIC (PET, PP, PS) DISPOSAL PATH (ALL SECTORS)

FIGURE 4.17-4



COMPOSTABLE PLASTIC (PLA) DISPOSAL PATH (SINGLE FAMILY / MULTIFAMILY RESIDENTIAL) FIGURE 4.17-5



COMPOSTABLE PLASTIC (PLA) DISPOSAL PATH (COMMERCIAL, SPECIAL EVENTS) FIGURE 4.17-6

Table 4.17-3
Capacity of Waste Disposal and Diversion Facilities in Santa Clara County

Facility	Throughput Range (Tons/Year)	Capacity Range (Tons/Year)	Available Capacity (Tons/Year)	Jurisdictions Served
Landfills				
Guadalupe Recycling and Disposal Facility	375,000 - 499,999	1,000,000 - 1,499,999	625,000- 1,000,000	San José /Countywide
Kirby Canyon Recycling and Disposal Facility	500,000 - 749,999	750,000 - 999,999	250,000	Sunnyvale, Mountain View, Palo Alto
Newby Island Sanitary Landfill	500,000 - 749,999	1,000,000 - 1,499,999	500,000 - 750,000	Milpitas, San José
Zanker Material Processing Facility	5,000 - 24,999	100,000 - 199,999	95,000 - 175,000	Various
Recycling Facilities				
California Paperboard Corp	50,000 - 99,999	50,000 - 99,999	NA	Various
Graphic Packaging International Inc.	100,000 - 249,999	100,000 - 199,999	NA	Various
California Waste Solutions	50,000 - 99,999	100,000 - 199,999	50,000 - 100,000	Various
Golden State Fibers	10,000 - 19,999	20,000 - 39,999	10,000 - 20,000	Various
Green Team Materials Recovery	100,000 - 149,999	200,000 - 299,999	100,000 - 150,000	Los Altos Hills
Lassen Solid Waste Disposal	50,000 - 99,999	100,000 - 199,999	50,000 - 100,000	Various
Norcal MRF	10,000 – 24,999	20,000 - 49,999	10,000 - 25,000	Unincorporated Santa Clara County
Recycled Fibers – Newark Group San José Plant	20,000 - 49,999	40,000 - 99,999	20,000 - 50,000	San José and others
Smurfit-Stone Recycling	50,000 - 99,999	100,000 - 199,999	50,000 - 100,000	Various
Sunnyvale Materials Recovery and Transfer (SMaRT)	500,000 - 999,999	500,000 - 999,999	about 300,000[1]	Mountain View, Sunnyvale, Palo Alto
Zanker Material Processing Facility	150,000 - 249,999	300,000 - 499,999	150,000 - 250,000	Various
Compost Facilities				
South Valley Organic Composting Facility	40,000 - 80,000	50,000 - 100,000	10,000 - 20,000	TBD
Z-Best Composting Facility	240,000+	300,000	~60,000	Los Altos Hills and others

Source: CalRecycle. "Facility Information Toolbox: Facility List." 2013. Available at: http://www.calrecycle.ca.gov/FacIT/Facility/Search.aspx

[1] The SMaRT Station has a permitted capacity of 1,500 tons per day. In a recent Local Enforcement Agency (LEA) inspection report for the facility, the peak tonnage day was 1,052 tons (April 1, 2013), indicating an excess weekday capacity of 448 tons per day. City of Sunnyvale staff estimates a theoretical excess capacity of 316,580 tons per year, assuming seven day per week operation based upon the peak tonnage day in April 2013.

In the maximum impact scenario, all substitute products are assumed to be disposed of in a single waste disposal route (e.g. all substitutes are landfilled *or* all substitutes are recycled). Though unrealistic given the County's demonstrated compliance with California's 50 percent waste diversion requirement, use of the maximum impact scenario will demonstrate the effects of the project on the capacities of existing waste disposal facilities.

If every substitute product weighed five times more than the EPS foam products they replaced, the maximum weight ratio found in preparation of this Initial Study (see Appendix C and Footnote 103 on Page 112), then the total weight of the substitute products disposed annually would not exceed 25,000 tons. Based on available capacities listed in Table 4.17-1, even if all of these products were landfilled, composted, or recycled, the facilities in Santa Clara County have enough capacity for the maximum impact scenario.

In the maximum impact scenario, in which 25,000 tons of substitute material are all disposed via a single waste disposal path, the facilities in Santa Clara County would have adequate capacity and would not require expansion.

The potential increased weight of disposed products would not necessarily cause California Paperboard Corporation and Graphic Packaging International Inc. facilities, which according to CalRecycle have a throughput range that matches their capacity range, to expand. Both of these facilities purchase recycled paper as a feedstock to manufacture products, so they are not collectors dedicated to providing solid waste service to the participating jurisdictions. If they are at capacity at the time of waste collection, materials can be sold to other such manufacturers or sent to other recycling facilities with available capacity.

Realistically, a portion of the substitute materials would be recycled, some would be composted, and the rest landfilled. Furthermore the estimation of annual EPS foam consumption (four pounds per service population) is made based on the high end of the available data, and the maximum weight ratio of the substitute products was used to calculate the weight of substitute product waste. This means that the 25,000 tons per year estimation represents the highest conceivable weight of disposed food service ware that would replace EPS foam products. Therefore based on the conservative estimate and the available capacity of the existing facilities in the County, the proposed project's impacts to solid waste services and waste diversion services would be less than significant.

4.17.3 Conclusion

The proposed ordinance would not result in significant utilities and service systems impacts. **(Less Than Significant Impact)**

4.18 MANDATORY FINDINGS OF SIGNIFICANCE

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Checklist Source(s)
1. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☐	☒	☐	1 – 14
2. Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☐	☒	☐	1-14
3. Does the project have the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals?	☐	☐	☒	☐	1-14
4. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐	1-14

4.18.1 Project Impacts

As described in the specific sections of this report (refer to *Section 4.0 Environmental Setting, Checklist, and Discussion of Impacts, Sections 4.1-4.17*), on pages 10-113 of this Initial Study, the proposed project would not result in significant environmental impacts. The project would have no impacts in the areas of cultural resources, geology and soils, land use, minerals, population and housing, and public services. The project would have less than significant impacts in the areas of aesthetics, biological resources, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, noise, recreation, transportation, and utilities and service systems.

Compared to current baseline conditions of EPS foam food ware use and disposal in the project area, the project (i.e., ban of EPS foam food ware and shift to food ware made from substitute materials) would not degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or

animal or eliminate important examples of the major periods of California history or prehistory. **(Less Than Significant Impacts)**

4.18.2 Short-term Environmental Goals vs. Long-term Environmental Goals

The proposed project would not frustrate or conflict with long-term environmental goals in that the shift to substitute food ware materials would substantially reduce the amount of EPS foam food ware occurring in the environment as litter and disposed in landfills. EPS foam food ware persists for decades in the environment as litter and is not readily recyclable and must be disposed in landfills (where it persists indefinitely), and therefore it is in conflict with long-term environmental goals of protecting water quality and maintaining landfill capacity through increased waste diversion. Most substitute materials will be recyclable and/or compostable in support of long-term environmental goals of converting solid waste to resources. **(Less Than Significant Impacts)**

4.18.3 Cumulative Impacts

The analysis presented in this Initial Study evaluates adoption of an ordinance banning use of EPS foam food ware in all participating jurisdictions in Santa Clara County, including additional restrictions on retail sales and EPS foam ice chests in Palo Alto and unincorporated Santa Clara County (both jurisdictions already have bans on food vendor use of EPS foam food ware). Therefore, the analysis has accounted for the combined (cumulative) effects assuming participation by all jurisdictions in the county. Further, in completing the analysis for the project, the environmental analysis completed by numerous other jurisdictions was reviewed to determine whether a EPS foam food ware ban would lead to significant environmental effects in those jurisdictions. See Figure 2.3-3 depicting jurisdictions in the region that have adopted EPS foam food ware bans, including Marin, San Francisco, San Mateo, Santa Cruz, and Monterey counties. None of the jurisdictions with existing bans have found the restrictions on EPS foam food ware and shift to substitute food ware products would lead to significant environmental impacts, whether individually or in combination with past, present, or reasonably foreseeable future projects. The analysis in this Initial Study also supports the conclusion the project would cause no significant environmental impacts, whether individually, or in combination with the existing and proposed bans of other jurisdictions. **(Less Than Significant Cumulative Impacts)**

4.18.4 Direct or Indirect Adverse Effects on Human Beings

As discussed previously in this Initial Study (*Sections 4.3 Air Quality, 4.8 Hazards and Hazardous Materials, 4.9 Hydrology and Water Quality, and 4.12 Noise*), the shift to food ware containers made from substitute materials will not adversely affect humans by emitting air pollutants, releasing toxic or hazardous materials, impairing drinking water supplies, and generating substantial noise. Compared to current baseline conditions involving manufacture, transport, use, and disposal of EPS foam food ware, the proposed project would not directly or indirectly cause significant effects on human beings. **(Less Than Significant Impacts)**

CHECKLIST INFORMATION SOURCES

1. Professional judgment and expertise of the environmental specialist preparing this assessment, based upon a review of the project area and surrounding conditions, as well as a review of the draft model ordinance.

2. General Plans.
   a. City of San José . *Envision San José 2040 General Plan*
   b. County of Santa Clara. *General Plan*
   c. South County Joint Area Plan

3. Municipal and County Codes for jurisdictions within Santa Clara County.

4. California Department of Conservation. *Santa Clara County Important Farmland 2010*. Map.

5. Bay Area Air Quality Management District. *Bay Area 2010 Clean Air Plan.* September 15, 2010.

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7. Final Santa Clara Valley Habitat Conservation Plan. August 2012.

8. State of California, Alquist-Priolo Earthquake Fault Zones, and County of Santa Clara Landslide & Fault Zone Maps.

9. USDA, SCS. *Soils of Santa Clara County.*

10. Climate Action Plans/GHG Reduction Strategies (see Table 4.7-1)

11. U.S. EPA Toxics Release Inventory and Industry Profiles.

12. California Ocean Science Trust. *Plastic Debris in the California Marine Ecosystem.* September 2011.

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Appendix A

A-1: City of San José Draft Ordinance

A-2: City of Sunnyvale Draft Ordinance

DRAFT

ORDINANCE NO. _____

AN ORDINANCE OF THE CITY OF SAN JOSE AMENDING CHAPTER 9.10 OF TITLE 9 OF THE SAN JOSE MUNICIPAL CODE TO ADD A NEW PART 17 TO PROHIBIT THE USE OF POLYSTYRENE FOAM DISPOSABLE FOOD SERVICE WARE BY FOOD VENDORS

BE IT ORDAINED BY THE COUNCIL OF THE CITY OF SAN JOSE:

SECTION 1. Chapter 9.10 of Title 9 of the San Jose Municipal Code is hereby amended by adding a new Part to be numbered and entitled and to read as follows:

Part 17

Polystyrene Foam Disposable Food Service Ware

9.10.3200 Definitions.

The definitions set forth in this Section shall govern the application and interpretation of this Part 17.

A. "Director" means the director of the environmental services department or his or her designee.

B. "Disposable food service ware" means single-use disposable products used in the restaurant and food service industry for serving or transporting prepared foods and includes, but is not limited to, plates, cups, bowls, trays, and hinged or lidded containers, also known as clamshells. Disposable food service ware does not include straws, utensils or drink lids.

C. "Food vendor" means any establishment located in the City of San Jose that sells or otherwise provides prepared food for consumption on or off its premises, and includes, but is not limited to, any shop, sales outlet, restaurant, bar, pub, coffee

shop, cafeteria, caterer, convenience store, liquor store, grocery store, supermarket, delicatessen, mobile food truck, vehicle or cart, or roadside stand.

D. "Large food vendor" means a food vendor that is part of a chain or franchise of food vendors that have the same name, are substantially identical, and operate in more than one state.

E. "Polystyrene foam" means the thermoplastic petrochemical material utilizing a styrene monomer and processed by any number of techniques, including but not limited to, fusion of polymer spheres (expandable bead polystyrene), injection molding, form molding, and extrusion-blow molding (extruded foam polystyrene). The term "polystyrene foam" also includes polystyrene that has been expanded or blown using a gaseous blowing agent into a solid foam (expanded polystyrene). Polystyrene foam does not include clear or solid polystyrene known as oriented polystyrene that has not been expanded or blown using a gaseous blowing agent.

F. "Prepackaged food" means properly labeled processed food sold or otherwise provided by a food vendor that arrives at the premises of the food vendor in a container or wrapper in which the food is wholly encased, enclosed, contained or packaged and is not removed from such container or wrapper (other than an outer container or wrapper that encases, encloses, contains or packages multiple units of the food) before its sale or provision at the premises.

G. "Prepared food" means food or beverages that are serviced, packaged, cooked, chopped, sliced, mixed, brewed, frozen, squeezed or otherwise prepared. Prepared food does not include uncooked eggs, fish, meat or poultry unless provided for consumption without further food preparation.

H. "Small food vendor" means a food vendor that is not a large food vendor.

9.10.3210 <u>Polystyrene Foam Disposable Food Service Ware Prohibited.</u>

A. By January 1, 2014, no large food vendor shall sell or otherwise provide prepared food in polystyrene foam disposable food ware service.

B. By January 1, 2015, no small food vendor shall sell or otherwise provide prepared food in polystyrene foam disposable food ware service.

C. The prohibitions in paragraphs A and B do not apply to prepackaged food.

9.10.3220 Exemptions

A. Undue hardship. The director may exempt a food vendor from the prohibitions in Section 9.10.3210 on a case-by-case basis for undue hardship. For purposes of this Section, "undue hardship" means (1) situations unique to the food vendor where a suitable alternative to polystyrene foam disposable food service ware does not exist for a specific application; and/or (2) situations where no reasonably feasible available alternative exists to a specific and necessary polystyrene foam product prohibited by this part.

B. Financial hardship. The director may exempt a food vendor from the prohibitions in Section 9.10.3210 on a case-by-case basis for financial hardship. For purposes of this Section, "financial hardship" means a food vendor has been granted a financial hardship exemption from the payment of business license taxes from the director of finance pursuant to Section 4.76.345 of this code for the calendar year in which the vendor applies for an exemption from the provisions in Section 9.10.3210.

C. Exemption request.

1. A food vendor seeking an exemption for undue hardship or financial hardship shall submit a written exemption request to the director. The written exemption request shall include all information and documentation necessary for the director to make a finding that imposition of this part would cause an undue hardship or financial hardship as defined in this Section. For purposes of documenting a financial hardship, a food vendor must provide evidence that it has been granted a financial hardship exemption from the city's director of finance pursuant to Section 4.76.345 of this code.

2. The director may require the applicant to provide additional information in order to make a determination regarding the exemption request.
3. The director may grant an exemption request in whole or in part, with or without conditions, for a period of up to one year upon a finding that a food vendor seeking the exemption has demonstrated that strict application of the prohibitions in Section 9.10.3210 would cause undue hardship or financial hardship as defined in this Section.
4. If a food vendor who has been granted an exemption wishes to have the exemption extended, the vendor must re-apply for the exemption thirty (30) days prior to the expiration of the exemption and demonstrate continued undue hardship or financial hardship. Extensions may be granted for a period not to exceed one year.
5. Exemption decisions are effective immediately and are final and not subject to appeal.

SECTION 2. This ordinance shall be effective on January 1, 2014.

PASSED FOR PUBLICATION of title this _____ day of _____, 2013, by the following vote:

AYES:

NOES:

ABSENT:

DISQUALIFIED:

_____
CHUCK REED
Mayor

ATTEST:

_____
TONI J. TABER, CMC
Acting City Clerk

Chapter 5.39
ENVIRONMENTALLY ACCEPTABLE FOOD CONTAINERS AND SERVICE WARE

Sections:

5.39.010. Definitions.

Unless otherwise expressly stated, whenever used in this chapter, the following terms shall have the meanings set forth below:

(a) "Customer" means a person obtaining prepared food from a food provider.

(b) “Food container” means a container that is used, or is intended to be used, to hold prepared food. “Food container” includes, but is not limited to, a cup, bowl, plate, tray, carton, or clamshell container that is intended for single use.

(c) “Food provider” means any vendor, business, organization, entity, group or individual located in the city of Sunnyvale that offers food or beverages to the public for consumption on or off premises, regardless of whether there is a charge for the food. “Food provider” includes, but is not limited to, restaurants, retail food establishments, caterers, cafeterias, stores, shops, sales outlets, grocery stores, delicatessens, itinerant restaurants, pushcarts, and vehicular food vendors.

(d) “Food service ware” includes plates, bowls, cups, lids, straws, stirrers, forks, spoons, knives, napkins, trays, and other items primarily designed for use in consuming food.

(e) “Polystyrene foam” means a container made of blown polystyrene, and expanded and extruded foams (sometimes called Styrofoam™) which are thermoplastic petrochemical materials utilizing a styrene monomer and processed by any number of techniques including, but not limited to, fusion of monomer spheres (expanded bead polystyrene), injection molding, foam

molding, and extrusion-blown molding (extruded foam polystyrene), which is used, or is intended to be used, to hold prepared food.

(f) “Prepared food” means any food, including beverages, that is served, packaged, cooked, chopped, sliced, mixed, brewed, frozen, squeezed, or otherwise prepared for consumption, including but not limited to ready-to-eat and takeout food.

(g) “Vendor" means any store or business which sells or offers goods or merchandise, located or operating within the City of Sunnyvale.

5.39.020 Polystyrene foam containers and service ware prohibited.

(a) On or after _____, 2013, a food provider shall not dispense prepared food to a customer in a polystyrene foam food container.

(b) On or after _____, 2014, polystyrene foam food containers and polystyrene foam food service ware shall not be sold or provided by any vendor in the City of Sunnyvale.

5.39.030. Exemptions.

The following are exempt from the provisions of this Chapter:

(a) Raw eggs and raw, butchered meat, fish, or poultry that is sold from a butcher case or a similar retail appliance.

(b) A food provider may dispense prepared food to a customer using polystyrene foam containers if that food provider demonstrates, in writing, to the satisfaction of the director of environmental services that compliance with the provisions of this Chapter will impose a unique problem, not generally applicable to other persons in similar circumstances, that will result in an undue economic hardship. The director of environmental services shall put the decision to grant or deny an exemption in writing and may exempt the food vendor pursuant to this subdivision until _____, 2014, or not more than one year from the date of the demonstration, whichever date is sooner. The Director’s decision shall be final.

5.39.040. Violations.

(a) The director of environmental services has primary responsibility for enforcement of this chapter. The director of environmental services is authorized to promulgate regulations and to take any and all other actions reasonable and necessary to enforce this chapter, including,

but not limited to, investigating violations, issuing fines and entering the premises of any store during business hours.

(b) If the director of environmental services determines that a violation of this chapter has occurred, he or she will issue a written warning notice to the operator of the vendor or food provider that a violation has occurred and the potential penalties that will apply for future violations.

(c) Any vendor or food provider that violates or fails to comply with any of the requirements of this chapter after a written warning notice has been issued for that violation shall be guilty of an infraction.

(d) If a vendor or food provider has subsequent violations of this chapter that are similar in kind to the violation addressed in a written warning notice, the following penalties will be imposed and shall be payable by the operator:

(1) A fine not exceeding one hundred dollars for the first violation after the written warning notice is given;

(2) A fine not exceeding two hundred dollars for the second violation after the written warning notice is given; or

(3) A fine not exceeding five hundred dollars for the third and any subsequent violations after the written warning notice is given.

(e) A fine shall be imposed for each day a violation occurs or is allowed to continue.

(f) All fines collected pursuant to this chapter shall be deposited in the Wastewater Management Fund of the department of environmental services to assist the department with its costs of implementing and enforcing the requirements of this chapter.

(g) Any vendor or food provider who receives a written warning notice or fine may request an administrative review of the accuracy of the determination or the propriety of any fine issued, by filing a written notice of appeal with the director of environmental services no later than thirty days after receipt of a written warning notice or fine, as applicable. The notice of appeal must include all facts supporting the appeal and any statements and evidence, including copies of all written documentation and a list of any witnesses, that the appellant wishes to be considered in connection with the appeal. The appeal will be heard by a hearing officer designated by the director of environmental services. The hearing officer will conduct a hearing concerning the appeal within forty-five days from the date that the notice of appeal is filed, or on

a later date if agreed upon by the appellant and the city, and will give the appellant ten days prior written notice of the date of the hearing. The hearing officer may sustain, rescind, or modify the written warning notice or fine, as applicable, by written decision. The hearing officer will have the power to waive any portion of the fine in a manner consistent with the decision. The decision of the hearing officer is final and effective on the date of service of the written decision, is not subject to further administrative review, and constitutes the final administrative decision

Appendix B

Baseline Estimates

BASELINE ESTIMATES OF DISPOSABLE POLYSTYRENE FOAM FOOD WARE CONTAINER USE IN THE PROJECT AREA

Prepared by

David J. Powers & Associates, Inc.

For

City of San José

July 2013

ENVIRONMENTAL BASELINE

The project proposes to ban the use of expanded or extruded polystyrene (EPS) foam food service ware by restaurants and food service establishments within participating jurisdictions in Santa Clara County. Foam food service ware products generally include hot and cold cups, plates, clamshells, and in some cases food trays.[1] Some jurisdictions may also choose to adopt ordinances restricting EPS foam foodservice ware sales in stores and retail outlets. A restriction on sales of EPS foam coolers or ice chests could also be included in ordinances adopted by participating jurisdictions.

The California Environmental Quality Act (CEQA) requires that environmental analysis identify the impact of a proposed project upon the existing physical conditions 'on the ground". "Existing conditions" is usually defined as conditions that exist when the environmental analysis begins. The environmental analysis for this project was undertaken in Spring 2013. Data available in the Spring of 2013 from prior years therefore defines the baseline period for this environmental analysis.

1.0 Baseline EPS Foam Food Ware Use

EPS foam is one of a number of materials used to manufacture disposable or single-use food service ware. Precise information on the number of EPS foam cups, plates, clamshells and food trays used or distributed within the project area (i.e., within each jurisdiction or cumulatively across Santa Clara County) is not readily available from government agencies or other independent sources. In the absence of precise data, an estimate for the project area can be derived in several ways, as discussed below. The following discussion summarizes estimated baseline use projected from readily available information on EPS foam food service ware 1) manufacture, 2) occurrence in the waste disposal stream and 3) as litter. Where information is for larger sample areas (e.g., national or state) estimates are presented on a per capita basis. For smaller sample areas (e.g., an individual city or town), projected baseline rates are adjusted on a per capita or per service population (residents + employees) basis to reflect the influence of both residents and the daytime population of employees.**1.1**

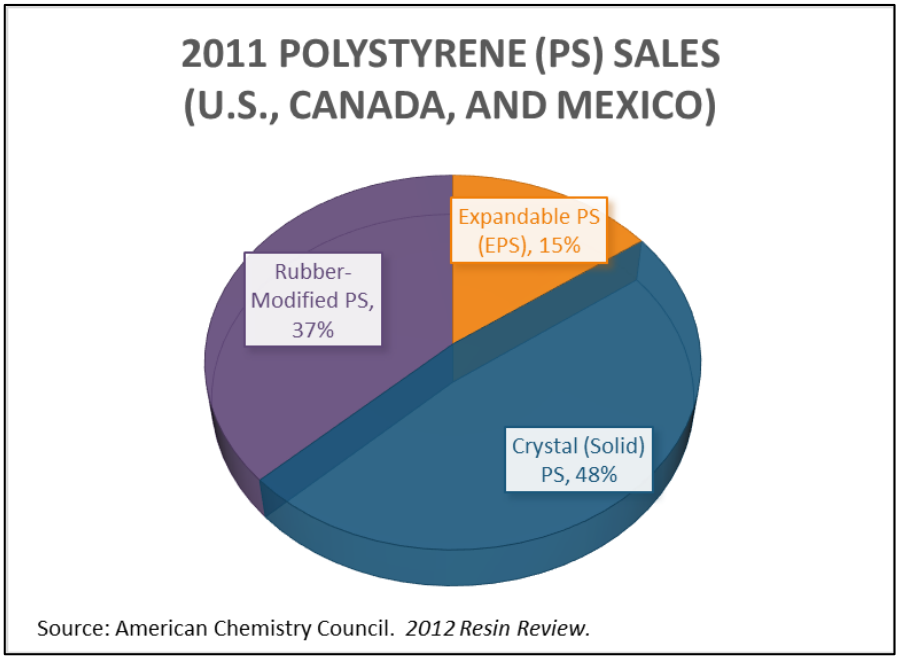
Baseline Estimates Based on EPS Foam Food Ware Production

In a 2004 report to the California State Legislature, the California Integrated Waste Management Board (now CalRecycle) estimated the statewide annual amount of polystyrene production and sales for various categories.[2] In terms of market share, an estimated 156,829 tons of EPS were used in consumer and institutional settings, This category includes: disposable food serviceware (including disposable cups) and a range of other goods such as dinner and kitchenware, toys, sporting goods, household and institutional refuse bags and film, personal care items, healthcare and medical products, hobby and graphic arts supplies (including photographic equipment and supplies), apparel,

[1] A clamshell is a foldable, closable container that holds food ranging from sandwiches to take-out dinners.
[2] California Integrated Waste Management Board. 2004. *Use and Disposal of Polystyrene in California A Report to the California Legislature*. December 2004.

footwear, luggage, buttons, lawn and garden tools, signs and displays and credit cards. It is important to note that not all of the polystyrene included in this estimate would be foamed or expanded polystyrene. These estimates were based on an extrapolation of California's share of a larger market in the 2002 Edition of *The Resin Review: The Annual Statistical Report of the U.S. Plastics Industry* prepared by the American Chemistry Council. Using 2000 census figures, annual per capita use of all polystyrene in a consumer and institutional settings in California would be about 9.3 pounds per person.[3] The percentage of food ware that makes up this category was not specified and therefore, is unknown.

In the 2012 Edition of *The Resin Review*, total sales of polystyrene to the NAFTA region (Canada, Mexico, and the United States) were listed as 4.7 billion pounds in 2011.[4] This total includes all types of polystyrene and is not limited to EPS foam.



Food packaging and food service and expandable polystyrene (EPS) sales categories were tabulated in the 2012 Resin Review, however, there was not a standalone category of single-use EPS food ware. Total sales of EPS in 2011 in the NAFTA region was 821 million pounds (about 1.8 pounds/capita), however, this amount includes exports and products other than food ware.

In comparison, EPS sales in 2010 for just the United States and Canada, were 782 million pounds, or about 2.3 pounds/capita. The percentage of EPS as a proportion of total polystyrene resin sales was about the same (15 percent).

The statistics included in the 2012 Resin Review also included data for 2007-2010 for distribution in Canada and the United States and for 2011 in the NAFTA region. Using a similar technique of adjusting values to reflect California's share based upon U.S. Census data as in the 2004 report to the California Legislature, the distribution to the major market of Consumer and Institutional uses is shown in Table B-1. For the most recent year with production data for the U.S. and Canada (2010),

[3]Based upon U.S. Census Bureau data, California's population on April 1, 2000 was about 33,871,648 persons.
[4] American Chemistry Council. 2012. *The Resin Review (The Annual Statistical Report of the North American Plastics Industry.* 2012 Edition.

the production data on a per capita basis for the Consumer and Institutional Market would be about seven (7) pounds of EPS per capita.[5]

A challenge with obtaining or using information based upon EPS foam food ware production is that information is generally collected by research firms or trade organizations on a fee basis and based upon confidential reporting. As noted in a recent report prepared by MB Public Affairs on EPS foam food ware use in New York City, food service ware sales (in dollars) were estimated from the confidential sales information provided from industry sources.[6]

Table B-1
Distribution of Polystyrene Resin to Consumer and Institutional Market
(millions of pounds)

	2007	2008	2009	2010	2011
Canada & United States	3,028	2,851	2,647	2,376	--
Canada, Mexico and United States	--	--	--	--	2,518
California	333	314	291	261	209
Santa Clara County	16	15	14	12	10

Notes: California makes up about 12 percent of the population of the United States and about 11 percent of the combined populations of the United States and Canada based U.S. and Canadian census values. California made up about eight (8) percent of the population of the United States, Canada, and Mexico in 2011.
The combined population of the United States and Canada in 2010 was about 342 million people. The combined population of the United States, Canada and Mexico (NAFTA) was about 450 million people.
Santa Clara County's population was about 4.8 percent of the total population of the State of California during this period. Population estimates for Santa Clara County for the period of 2007-2011 are from the California Department of Finance. [7]

Based upon a review of the categories for polystyrene resin sales and production in the 2012 Edition of *The Resin Review*, the baseline use of EPS foam food ware could range from about 1.8 pounds per capita to a high of about seven (7) pounds per capita.

[5] The production estimates for 2011 in the 2012 report, which include the entire NAFTA area, increased by approximately six (6) percent from 2010 when the survey area was the United States and Canada. The additional population of Mexico represents about 24 percent of the population of the United States, Canada and Mexico (the NAFTA area). Since the increase in production for the larger area does not appear proportional to the increase in population and this is the first year of reporting, the 2010 estimate likely is a more representative value for California on a per capita basis.
[6] MB Public Affairs. 2013. *Fiscal & Economic Impacts of a Ban on Plastic Foam Foodservice and Drink Containers in New York City.* March 2013. Accessed April 19, 2013. Available at: <http://www.prnewswire.com/news-releases-test/new-study-details-economic-and-environmental-costs-of-nyc-polystyrene-ban-199167951.html>. Estimates of use by number of units or by weight were not provided in this economic study.
[7] State of California, *Department of Finance, E-8 Historical Population and Housing Estimates, 2000-2010 Report, by Year.* Sacramento, California, November 2012.).

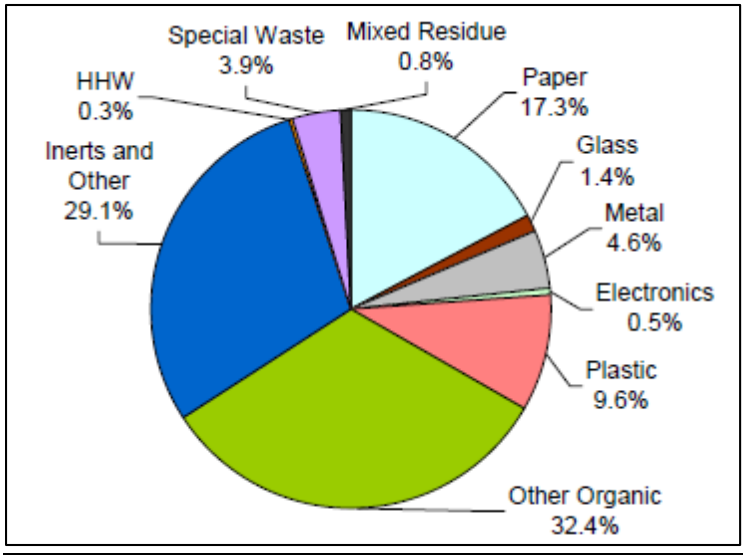
1.2 Baseline Estimates Based on Waste Characterization and Litter Studies

1.2.1 EPS Foam Food Ware in Solid Waste

Waste characterization studies that cover some or all of the project area include both statewide studies and studies conducted within the Cities of San Jose, Sunnyvale, Mountain View and Palo Alto. EPS foam food ware is a component of solid waste in the plastics category.

Statewide Waste Characterization

The State of California periodically completes waste characterization studies to assist with the implementation of waste management strategies, including waste diversion programs, improvement of existing programs, and measures to reduce greenhouse gas emissions. The most recent statewide surveys were completed in 2008.[8]



Material Classes in California's Overall Disposed Waste Stream (2008)

Source: CIWMB. 2009. 2008 Statewide Waste Characterization Study

By weight, plastics are not in the top ten types of materials disposed of in California. PS foam food ware would generally be placed in one of two subcategories: *#3-#7 Other Containers* or *Remainder/ Composite Plastic*. These subcategories include other materials such as bottles for salad dressings and vegetable oils, flexible and brittle yogurt cups, egg and other food trays, and plastic strapping that would not be limited by the ordinance. An estimated 163,008 tons of *#3-#7 Other Containers* and 1,104,719 tons of *Remainder/Composite Plastic* was disposed of in 2008. Single use EPS foam food ware uses statewide would be a subset of these two subclasses, however, as these categories

[8] CIWMB. 2009. *California 2008 Statewide Waste Characterization Study.* Prepared by Cascadia Consulting Group. Available at: < http://www.calrecycle.ca.gov/WasteChar/WasteStudies.htm>

include a wide range of other items and EPS foam is relatively light, a meaningful estimate of EPS foam food ware use cannot be made from this data.

2008 Waste Characterization Study for the City of San Jose

A waste characterization study for the residential and commercial sectors was conducted in the City of San Jose in March 2008.[9] Unlike the 2008 statewide survey, expanded polystyrene was specifically assessed. In the 2008 San Jose study the polystyrene subcategory includes food and non-food containers and packing materials. Examples included cups and plates, egg cartons, foam packing, meat trays, packing "peanuts," take-out and other food and beverage containers. A total of 1,011 tons (0.1 percent of the total) were generated by the residential sector citywide and 1,610 tons were generated by the commercial sector. These values would include some materials such as egg cartons, foam packing, meat trays and packing peanuts that would not be covered by the proposed ordinance. The study also noted that 563 tons of polystyrene was recycled; this would not include single use EPS foam food ware.

Based on this waste characterization study, an estimate of EPS foam food ware use (not accounting for materials improperly disposed of as litter and not collected) would be up to 2,621 tons, or 5.3 pounds per capita and 3.9 per service population.[10] This estimate could be a conservatively high value for EPS food ware use as the total expanded polystyrene subcategory includes some items, such as egg cartons and packing material, not effected by the model ordinance.

2010 Waste Characterization for Sunnyvale and Mountain View

A 2010 waste characterization report found that EPS[11] food packaging makes up an estimated 689 tons per year of waste transferred to the landfill from the cities of Sunnyvale and Mountain View after materials recovery at the Sunnyvale Materials Recovery and Transfer Station (SMaRT Station®). This is about 0.5 percent of the total waste disposed.[12] The EPS food packaging subcategory specifically included clamshells, cups, plates, and bowls. This represents approximately 6.4 pounds per year per capita or 4.1 pounds per year per service population of the two cities.[13]

[9] Cascadia Consulting Group. 2008. *City of San Jose Waste Characterization Study Final Report - DRAFT* May 2008.

[10] Based upon an estimated population of 985,307 and a service population of 1,354,757 (985,307 residents plus 369,450 jobs) for the City of San Jose in 2008. (Source: City of San Jose. 2010. *Envision San Jose 2030 General Plan Final Program EIR*).

[11] Note: In some studies, the term EPS refers to all PS foam food ware, both expanded (e.g., cups) and extruded foam (e.g., plates and clamshells). Unless otherwise noted, EPS categories in waste categorization studies includes both types of PS foam food ware.

[12] City of Sunnyvale. 2010. *City of Sunnyvale Waste Characterization Report.* Prepared by Cascadia Consulting Group. November 2010.

[13] Based upon a combined population for the cities of Sunnyvale and Mountain View in 2010 of 214,147 persons and a service population of 337,147 (jobs + residents. (Sources: 2010 Census data and Association of Bay Area Governments. 2013. *Draft Plan Bay Area: Draft Forecast of Jobs, Population and Housing.* March 2013)

The report also included waste survey estimates for the City of Sunnyvale alone. EPS food packaging in the waste stream was estimated at 314 tons, or 29 pounds per year per service population (140,081 residents + 75,000 jobs).

Other Waste Characterization or Use Studies

A recent waste characterization study completed for the City of Palo Alto sampled waste materials taken to the SMaRT Station® in the City of Sunnyvale in 2012. EPS foam (EPS) materials made up 114.3 tons or approximately 0.4 percent of waste materials from the City overall[14]. This waste characterization was completed at a time that the City's existing ordinance on foam food ware was in place. Unlike the 2010 waste categorization for Sunnyvale and Mountain View, this study did not separate EPS packaging from food ware and by definition included drinking cups, egg cartons, meat trays, packing blocks, packing peanuts, plates and bowls, and take-out containers. Sources of EPS materials in the waste stream could include allowed meat trays and containers used in residences or for food purchased outside the City. Some, but an undetermined amount of EPS materials estimated in this study would be effected by implementation of an ordinance in neighboring cities or adoption of a limit on sales of empty containers or EPS foam ice chests in the City.

Limited user surveys have been undertaken in the City of Milpitas and unincorporated Santa Clara County of businesses that use single-use disposable food containers. In a survey of 25 businesses in the City of Milpitas, about one-half (13) used EPS foam food containers. Of the businesses that use polystyrene take-out containers, the majority estimated use of more than 2,000 pieces per month of clamshells, soup cups with lids, hot drink cups, cold drink cups, plates, and other products.[15] An estimate of monthly use by food service businesses was not projected citywide, however.

The County of Santa Clara survey results were also limited by sample size and are discussed under *Baseline Estimates Used in Other Environmental Review*, below.

1.2.2 EPS Foam Food Ware in Litter

Litter is waste that is improperly discarded. Due to the aesthetic, health, and environmental effects of litter, a number of organizations and government agencies track and characterize trends in litter generation, human behavior, and fate in the environment. The following section reviews some of the results of litter studies, as they apply to the estimation of EPS foam food ware use and contribution to litter in the project area.

It is important to note that it is difficult to document and categorize litter because it is the result of human behavior (frequently impulsive behavior) and littered materials are operated on by various environmental factors, such as wind, sunshine, and rain. It is also difficult to compare study results because there is no one standardized methodology that is appropriate for studies in all environments (e.g., streets, highways, parks, waterways, and shorelines). Comparisons are further complicated by

[14] Cascadia Consulting Group. 2013. *Waste Characterization Report City of Palo Alto.*
[15] Cascadia Consulting Group. 2011. *Expanded Polystyrene Food Service Take-Out Container Study.* Prepared for the City of Milpitas. April 26, 2011.

different systems or categories used to identify the materials that are littered. For example, EPS foam food ware is a type of plastic and may not be counted separately from other plastics or miscellaneous categories.

National Litter Generation Studies and Review

Keep America Beautiful is a national organization that has funded a number of studies that characterize quantities, types, and location of litter. In a recent fact sheet, it was noted that litter is often discarded at transition points where pedestrians consuming a food (or tobacco products) discard the product before entering. [16] In addition to being found along roadways, litter also collects in storm drains, loading docks, recreation areas, near construction sites and in retail districts. A 2009 study estimated that 4,660,930 tons of litter is collected annually nationwide by cities, counties, state government, educational institutions and businesses.[17] On a per capita basis, this would be about 30 pounds of litter per person.

In a 2012 study underwritten by the American Chemistry Council Plastics Foodservice Packaging Group, Environmental Resources Planning LLC summarized the results of a number of litter characterization studies, including one from San José that recorded amounts of polystyrene foam food service products in urban street litter. A median value of 1.5 percent of "large" litter[18] (by count) was reported to be EPS foam food ware, based upon 19 surveys between 1994 and 2008 in jurisdictions in the United States and Canada.

The 2009 San Jose study of litter "hot spots" reported 2.3 percent of litter was polystyrene foam food ware, which was higher than a number of the other studies and the median value. About 0.8 percent EPS foam food ware (of total large litter) was also listed for a 2008 San Jose street litter audit. EPS foam food ware reported in the small litter category was less than the large litter category. Only studies that use techniques of characterizing EPS foam litter by count, rather than volume or weight were reviewed as the author opined that counts are

Methods of Measuring Litter in the Environment

Several different metrics are used in litter or trash assessments and in some cases more than one type of measurement is used to meet the goals or purpose of the assessment. Counts of "large" or "small" litter by category or type of material have been chosen as an appropriate metric for a number of street and roadway litter studies. Other ways to assess quantities of litter on streets or in waterways include by weight and by volume. Characterizing litter by weight can distort the proportion of each litter type by heavy items, such as wood, metal, and containers with liquids, though it provides information that is of interest in terms of litter collection, in terms most people can understand. For a recent estimate of trash loading in stormwater runoff in the South Bay Area, the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) chose to primarily use a volume metric. This was done in part to assess the visual impact of litter as well as characterizing the relative amounts of litter that could reach local waterways, including pieces of PS foam.

[16] Keep California Beautiful. *Litter Facts*. April 18, 2010. Accessed April 12, 2013. Available at: <http://www.keepcabeautiful.org/facts/litter-facts.html>.

[17] MSW Consultants. 2009. *2009 National Visible Litter Survey and Litter Cost Study.* Prepared for Keep America Beautiful, Inc. September 18, 2009.

[18] "Large Litter" in the San Jose and other litter studies referenced in the review generally consisted of litter greater than or equal to four square inches in size.

more precise and have lower variability than surveys by volume or weight (unless tallies are also included). The review of national and Canadian litter counts concluded that EPS foam food ware is a small proportion (1.5 percent) of litter.

City of San Francisco Street Litter Audits

Audits of litter on streets in the City of San Francisco were conducted in 2007, 2008, and 2009. Litter was categorized by size and material type.[19] Litter was classified as "large litter" for those items over four (4) square inches in size or as "small litter" for items less than 4 square inches. In the large litter category, paper and fiber[20] materials contributed the largest component (46 – 54 percent percent) of the total large litter. Plastic materials, including unidentified miscellaneous plastic litter that is weathered and could not be identified with certainty, were the second most significant material type in the large litter category. In the small litter category, glass and cigarette butts were in the top two by number of items. Polystyrene foam pieces made up one percent of the counted small litter in 2009.

At the time of the 2009 litter audit two types of items, retail plastic bags and polystyrene packaging materials, were regulated under the municipal code. Ordinances regulating the use of these products were not in place at the time of the first audit in 2007. Both retail plastic bags and polystyrene litter decreased as a percentage of total large litter between 2007 and 2009. In the analysis of litter observations by major category, the percent of polystyrene cups making up "large litter" decreased between 2007 and 2009 while paper and plastic cups increased (HDR at p. 41).

These litter audits observed the number of pieces of litter at selected sites and do not provide an estimate of total numbers or weight of food service ware in litter citywide. The results for the one sample year after implementation of an ordinance on EPS foam food ware appears to show a decrease in the number of polystyrene cups while other cups increased in frequency. In other words, it appears that in 2009 there was a shift from EPS foam to substitutes, but no change in the overall amount of food ware litter.

City of San Jose Litter and Trash Characterization Studies

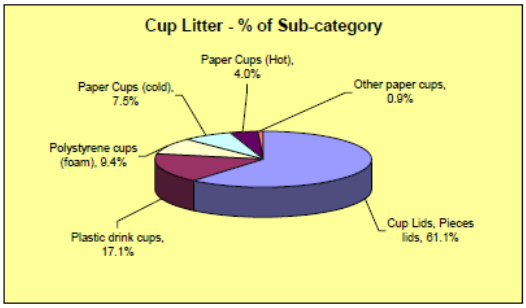
The City of San Jose has conducted a number of trash characterization studies at locations throughout the City that look at the volume, counts, and/or weight of litter found in the environment. These studies include:

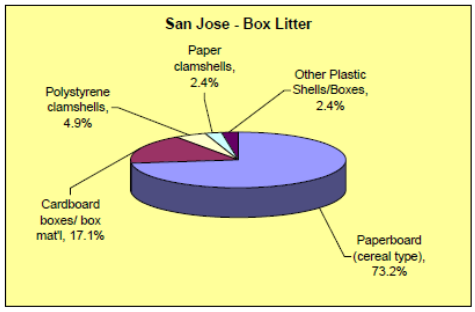
- SAIC. 2008. *The City of San Jose Streets Litter 2008*. Prepared for City of San Jose Department of Environmental Services. September 30, 2008.
- City of San Jose. 2009. *Targeted Litter Assessment.*
- City of San Jose. 2012. *Litter Assessment Data*. Spreadsheet.

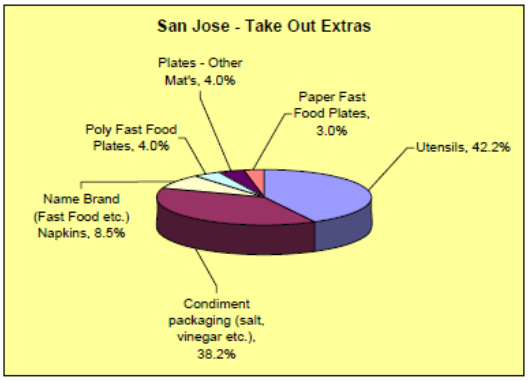
[19] HDR. 2009. *The City of San Francisco Streets Litter Re-Audit 2009.* Prepared for the City of San Francisco San Francisco Environment Department. September 2009.
[20] Fiber based litter included paper, paperboard, cardboard, towels, napkins, newspapers, books, flyers, printed materials, business forms, stationary, paper packaging, and paper bags.

The 2008 street litter survey counted items of litter found at 125 randomly selected sites. Like the studies conducted for the City of San Francisco, litter was categorized by size and material type. EPS foam cups were found to make up 0.65 percent of the "large litter" counted. EPS foam plates and clamshells made up 0.1 and 0.05 percent respectively, for a total of 0.8 percent of EPS foam food ware.

The relative breakdown of EPS foam food ware within three categories, cups, plates and boxes in the 2008 study provides some insight into other products reported in 2008. These breakdowns are shown below.







Categories of Litter Reported at Selected San Jose Locations
By Litter Count (2008)
Source: SAIC, 2008.

The 2009 targeted litter assessment included litter counts at 48 sites in the City of San José with relatively high concentrations of litter (e.g., litter "hot spots"). The goal was to quantify and characterize litter found at these hot spot sites. A total of 7,917 pieces of litter were counted from the 48 sites for an average of 165.5 items per site. Overall, about 12.4 percent of the items were classified as fast food items and 9.5 percent were cups. The assessment also included sub-categories for several polystyrene food ware products. At the targeted sites, the percent of total "large litter" included:

- 1.6 percent polystyrene foam cups
- 0.4 percent polystyrene foam food plates
- 0.2 percent polystyrene clamshells.

Polystyrene trays, which depending on their use, may not be covered by the proposed ordinance made up about 0.2 percent of the total large litter.

In 2012, litter was counted at 31 sites in the city. Polystyrene food ware products made up about 3.5 percent of the total litter counts. The breakdown by polystyrene food ware type was:

- 2.2 percent polystyrene foam cups
- 0.8 percent polystyrene foam food plates (rounded)
- 0.1 percent polystyrene clamshells (rounded).

Polystyrene foam trays were approximately 0.5 percent of the 2012 total litter count.

In summary, the street litter assessments completed in San Jose range from a random sampling of counted litter to surveys of litter "hot spots" with litter counts recorded. EPS foam food ware generally makes up four percent or less of total litter. EPS cups and plates appear to be more prevalent in these assessments, where measured, than EPS clamshells. Individual subcategories (e.g., EPS foam plates, clamshells) likely are less than one percent of total litter by count, volume or weight. The 2008 study, using random samples, provides the most representative assessment of litter citywide, while the other assessments focus on areas where litter has found to be more prevalent or concentrated.

NPDES Audits and Studies

Trash characterization and loading in waterways has been addressed in a number of recent studies undertaken starting in 2009 in the portion of the project area that drains to San Francisco Bay (i.e., the jurisdictions and area of the County roughly north of Morgan Hill). As a part of the Municipal Regional Stormwater Permit (MRP) issued by the San Francisco Bay Regional Water Quality Control Board, litter audits have been completed for a regional study to assess the types and amounts of trash transported via urban runoff.

Trash, including single-use food ware, is transported to local creeks and San Francisco Bay shorelines through three primary pathways: 1) curbs/gutters, storm drain lines and open channels that are part of storm water collection systems in urban areas; 2) wind; and 3) illegal dumping into water bodies.[21]

Preliminary findings for each of the Santa Clara County MRP co-permittees are summarized in Table B-2. Approximately 3,900 cubic yards of trash that could reach creeks in the San Francisco Bay Basin is estimated to be generated annually. SCVURPPP estimates that approximately eight percent of this trash by volume, or 311 cubic yards, is EPS foam food ware. These values are projected, in part, based upon land use types in an effort to identify baseline trash generation that is transported to waterways via urban runoff. The results of studies will be presented to the SF Bay RWQCB in 2013.

[21] SCVURPP. 2013. *Urban Runoff Trash Management Reducing Impacts in Santa Clara Valley Creeks and San Francisco Bay*. February 2013.

Table B-2
Estimated Volume of Trash Reaching Storm Drain Inlets[1]
(Stormwater Trash)

Jurisdiction	Estimated Volume of Trash Generated Annually[1]	Estimated Volume of EPS Foodware & Beverageware Trash Generated Annually[3]		
	Best Estimate (Gallons)	Low Estimate (Gallons)	**Best Estimate (Gallons)**	High Estimate (Gallons)
Campbell	17,186	1,025	**1,367**	1,709
Cupertino	25,292	1,509	**2,012**	2,515
Los Altos	10,393	620	**827**	1,034
Milpitas	38,302	2,285	**3,047**	3,809
Monte Sereno	426	25	**34**	42
Mountain View	44,736	2,669	**3,559**	4,449
Palo Alto	31,955	1,907	**2,542**	3,178
San Jose	302,474	18,048	**24,064**	30,080
Santa Clara	64,636	3,857	**5,142**	6,428
Saratoga	8,032	479	**639**	799
Sunnyvale	82,628	4,930	**6,574**	8,217
County of Santa Clara	37,425	2,233	**2,977**	3,722
Los Altos Hills	835	50	**66**	83
Los Gatos	13,224	789	**1,052**	1,315
Totals (Gallons)	**677,543**	**40,428**	**53,904**	**67,380**
Totals (Cubic Yards)	**3,904**	**233**	**311**	**388**

[1]As reported in Short-Term Trash Load Reduction Plans as a part of Baseline Trash Generation Rates Characterization in the San Francisco Bay Area.

[2]Estimates based on the total amount of uncompacted trash/EPS measured in Storm Drain inlets and CDS units (5 events) in San Jose and Sunnyvale. Best = percentage of EPS compared to all trash; High and low assume measurement error of (+/-) 25% when characterizing trash/EPS.

[3] Simple multiplication of annual trash load generated and percentage EPS (low = 6 percent, best estimate = 8 percent, and high = 10 percent)

Source: Chris Sommers, EOA, Inc. for SCVURPPP. April 24, 2013.

Information on Litter in the South Santa Clara County Area

The area of Santa Clara County south of Morgan Hill, including the cities of Morgan Hill and Gilroy, drain to Monterey Bay and have not been covered by trash and litter assessments and characterization conducted as a part of the MRP under the NPDES program. Trash has been collected twice per year along several local creeks on an annual basis since 2007 and the weight of trash (and recyclables) collected reported.[22] Tens of pounds to over 1,000 pounds of trash were collected at individual sites. A breakdown of the composition of trash collected (e.g., plastics, paper, EPS foam food ware) is not included in the past events results posted by the *Creek Connections Action Group*, which organizes the annual cleanups. The City of Morgan Hill also periodically conducts a trash collection along creeks as part of an annual City Beautification event.[23] Trash collection locations have included Llagas Creek, Chesbro Reservoir, Anderson Lake and West Little Llagas Creek in the Morgan Hill area and Coyote Lake, Uvas Reservoir, Uvas Creek and Upper Miller Slough near Gilroy.

Conclusions Regarding Baseline EPS Foam Food Ware Quantities in Litter

Data collected in some recent street and creek litter surveys provides information on the relative proportion of EPS foam food ware in total litter. By all measures (count and volume) the proportion is generally less than 10 percent by volume in stormwater systems and ranging from less than one percent to 3.6 percent by count in street litter.

There are several challenges with using litter surveys to estimate the amount of EPS foam food ware use not captured by waste characterization studies. First, the material surveyed may not have been deposited within a measurable time frame, such as a month or year. Second, litter studies in urban settings are generally conducted to count pieces of litter and/or the volume of litter in order to assess visual impacts or provide information for collection or minimization efforts and the results are not extrapolated to a community wide basis. Third, due to the fact that some litter is more friable (e.g., EPS foam breaks into pieces more readily that crystalline EPS or fiber products), counts of litter, especially in storm drains and creeks, makes estimates by weight or numbers of whole cups, clamshells or plates difficult, if not infeasible.

The recent survey conducted for SCVURPPP as part of a regional characterization of trash reaching creeks estimates 311 cubic yards of uncompacted polystyrene foam food ware trash for the jurisdictions covered by the SF Bay RWQCB's MRP in Santa Clara County (this area does not include south county areas from Morgan Hill south). Assuming the density of this uncompacted litter would be similar to that of collected waste, the estimated 311 cubic yards of expanded polystyrene foam could weigh about 3,000 pounds (or 1.5 tons).[24] This would be a conservatively

[22] Creek Connections Action Group. "Past Events Results". Accessed April 24, 2013. Results for individual clean ups Available at: <http://www.cleanacreek.org/Pasteventsresults_main%20page.asp>.
[23] City of Morgan Hill. "City Beautification Day 2011". Accessed April 25, 2013. Available at: <http://www.morgan-hill.ca.gov/index.aspx?NID=1002&ART=3302&ADMIN=1>.
[24] The weight of expanded polystyrene materials are variable. One manufacturer of non-food products offers expanded PS foam insulation at densities ranging from 0.7 – 3 pounds per square foot (Source: American Insulation Corporation. "What is EPS?". Available at: http://insulationcorp.com/eps/)/). CalRecycle lists the density of "Polystyrene blown, formed foam" as 9.62 pounds per cubic yard in a posted list of conversion factors for various

high estimate of the weight of EPS foam food ware in stormwater system litter extrapolated from the data if the spaces between items was greater than those for the CalRecycle waste conversion factors. On a weight and volume basis, the amount of EPS foam food ware found in litter transported in storm drain systems appears to be a fraction of the approximately four pounds per service population of EPS foam food ware properly disposed of and collected by various jurisdictions in the project area. Several thousand tons of annual EPS foam food ware were tabulated for three jurisdictions, Sunnyvale, Mountain View and San Jose, in waste characterization studies discussed previously. Therefore, the addition of EPS foam food ware found as litter would not substantially effect per service population estimates of use by weight.

In conclusion, the baseline for EPS food ware appearing as litter in Santa Clara County is:

- Street Litter: about 0.8-3.6 percent by count of large litter (four square inches in area or more) on streets based upon citywide and hot spot street litter surveys in San José; and
- Stormwater System Litter:
  - about eight (8) percent by volume based upon SCVURPP litter characterizations (i.e., trash loading) in storm drain systems discharging to creeks and waterways.[25]
  - about 311 cubic yards of EPS trash (roughly 3,000 pounds) per year in the SVURPP area.

While the PC foam trash in storm drain systems is roughly equivalent to about 3,000 pounds for the SCVURPP area, it should be noted that the SCVURPP litter characterizations do not include litter directly deposited in waterways by wind or dumping. Weight is generally not used in local litter studies as it does not assist with the assessment of the visibility or persistence of different types of litter in the storm drain systems and creeks.

types of waste (Available at: http://www.calrecycle.ca.gov/LGCentral/Library/DSG/Irecycl.htm). The estimate of 3,000 pounds is made using the density of 9.62 pounds per cubic yard.

[25] Refer to Table B-2 for a breakdown by jurisdiction.

1.3 Baseline Estimates Used in Other Environmental Review

1.3.1 County of Santa Clara

The County of Santa Clara conducted a telephone survey in 2011 and contacted approximately 80 percent of the 60 food service vendors in unincorporated areas of the County.[26] Use of EPS food and beverage containers at these vendors would be restricted by the then proposed Expanded Polystyrene Food and Beverage Containers Ordinance. Nineteen of the 29 vendors who participated in the survey did not use food containers or cups made from EPS. Use of EPS food containers by eight vendors ranged from a low of 50 to a high of 300 per month while use of cups by nine vendors ranged from 30 to 450. As the sample size was limited, the County concluded it was not possible to make an estimate of the total volume of EPS containers used by vendors in the unincorporated area of the County. A likely annual usage of 100,000 to 150,000 units was stated with the qualification that it was based on a limited response.

1.3.2 City of Fremont

Based in part upon a 2008 waste characterization study, the City of Fremont estimated that approximately 15% of plastic containers (129.1 tons) in the waste stream were expanded polystyrene food containers.[27] Assuming a population of approximately 209,257 in 2008,[28] that would represent approximately 1.2 pounds per person per year. On a service population basis, this estimate would be about 0.9 pounds (per residents + employees), assuming about 94,240 jobs within the City in 2008. On a per capita and service population basis, this would be lower than the estimates derived above for San Jose and Sunnyvale/Mountain View.

1.3.3 County of San Mateo

In a 2010 Notice of Intent to Adopt a Negative Declaration, a total of 2,696 food vendor business were reported in the County of San Mateo and these businesses were estimated to consume 351,500 units of polystyrene-based food ware containers, such as cups, clamshells and plates. The basis for this estimate was not listed.[29]

[26] County of Santa Clara. 2012. *Expanded Polystyrene Food and Beverage Containers Ordinance.* April 12. 2012. p.9.
[27] City of Fremont. *Expanded Polystyrene Food Service Ware Ban Draft Negative Declaration.* April 2010.
[28] State of California, *Department of Finance, E-8 Historical Population and Housing Estimates, 2000-2010 Report, by Year.* Sacramento, California, November 2012.
[29] County of San Mateo. 2010. Notice of Intent to Adopt a Negative Declaration for the *Ordinance Prohibiting Food Vendors From Using Polystyrene-Based Disposable Food Containers.*

1.4 Summary of EPS Foam Food Ware Annual Use Estimates

Information on the number single use EPS foam food ware containers (e.g., cups, bowls, plates, clamshells and ice chests) used in the project area was not found to be readily available. Estimates of EPS foam food ware use were assessed based upon available information on EPS foam production and sales, waste characterization and litter studies and are summarized in Table B-3.

Challenges were encountered where EPS foam and/or food ware information was not separately characterized and where the units measured (such as litter counts) could not reliably be projected to the various uses with the jurisdictions in the project area.

An industrywide review of polystyrene resin production which covered the years 2007-2011 and the United States and Canada (and Mexico in 2011) unfortunately did not include a specific category for EPS foam food ware. The EPS category and institutional and consumer categories, which both include food ware, were examined and a per capita use estimate of 1.8 pounds per person of EPS in 2011 within the U.S., Canada, and Mexico made. Uncertainties include the amount of foam food ware (e.g., versus building insulation) within this category as well as the possible differences in per capita use between Santa Clara County and Canada and Mexico, which were included in the sales information.

Local waste characterization studies completed in 2008 and 2010 contain appropriate information on the weight of EPS foam food ware that can be averaged on a per service population (jobs + residents) basis. The use of the service population metric is appropriate in this case as single-use food ware is used by both residents and workers and in most of the larger communities in the project area there are considerable numbers of workers that use single use food ware who commute and do not reside within those jurisdictions. There is some uncertainty in the estimates where the percentage of EPS foam food ware was estimated (City of Fremont) or where some EPS foam food ware that would not be covered by the ordinance was included (2008 San Jose Waste Characterization).

Available litter studies did not generally attempt to quantify the weight, volume or counts of litter across an entire community or region. Recent surveys prepared for SCVURPP estimate that EPS foam food ware contributes about 133 cubic yards of uncompressed materials to litter in creeks that drain within the project area to San Francisco Bay (with just over 90 percent of the service population). By weight, this would not result in a discernable change in estimated EPS foam wood ware use based on 2008 and 2010 waste characterization studies undertaken for San Jose, Sunnyvale and Mountain View. In other words, for the purposes of estimating the magnitude of EPS foam food ware use within the project area, it appears that most EPS foam food ware use is captured in the rates derived from waste characterization studies.

Table B-3
Summary of EPS Foam Food Ware Use Best Estimates

Source	Tons	Population	Service Population	Rate per Capita (pounds)	Rate per Service Population (pounds)
Estimate for 2011 Derived from EPS Sales in 2012 Resin Review[1]	410,500 (821 million pounds)	453 million (U.S., Canada, and Mexico)	--	about 1.8	--
2008 San Jose Waste Characterization[2]	2,621	985,307	1,354,757	5.3	3.9
2010 Sunnyvale Waste Characterization	314 (survey of collected waste)	140,081 (Sunnyvale)	215,081 (Sunnyvale)	4.5	2.9
	689 (survey of residual waste from Sunnyvale and Mountain View after sorting)	214,147 (Sunnyvale: 140,081, Mountain View: 74,066)	337,147 [Sunnyvale: 215,081, Mountain View: 122,066}	6.4	4.1
2008 Fremont Waste Characterization Estimate	129.1	209,257	303,497[3]	1.2	0.9
Range of Estimates	**--**	**--**	**--**	**1.2 – 6.4**	**0.9 -4.1**

[1]Also includes EPS other than food ware.
[2]Includes other EPS foam products, such as egg cartons and packing peanuts.
[3]Includes interpolated estimate of jobs in 2008 from ABAG Projections 2009.

EPS foam food ware used in the project area consists of an unknown mixture of products, including plates, cups, trays and clamshells. An equivalent number of items per pound for individual products can be estimated, however. As shown in Table B-4, one pound of EPS foam food ware per service population would be equivalent to about:

- 46, 8-inch clamshells *or*
- 53, 9-inch plates *or*
- 91 16- ounce cups *or*
- 53 32-ounce cups

Table B-4
Equivalent Number of PS Foam Food Ware Clamshells or Cups

PS Foam Product	Item Size	Measured Weight (grams)	Weight (in Pounds)	Number of Items per Pound	Number of Items per 4 pounds[5]
Clamshell[1]	8-inch	10	0.022	46	182
Plate[2]	9-inch	8.5	0.019	53	211
Cup[3]	16 ounce	5	0.011	91	364
Cup[4]	32-ounce	8.8	0.019	53	211

[1] Manufacturer: DART Corporation
[2] Weight data from: Horvath, A. & Chester, M. *Greenhouse Gas Emissions of Expanded Polystyrene Food Containers and Alternative Products Used in Los Angeles County.* July 14, 2009.
[3] Manufacturer: DART Corporation for the Jamba Juice Company.
[4] Weight data from: Franklin Associates, Ltd. *Life Cycle Inventory of Foam Polystyrene, Paper-Based, and PLA Foodservice Products.* February 4, 2011.
[5] Items per pound and Items per 4 pounds may not correspond exactly due to rounding. The baseline use of PS foam food ware in the project area is conservatively estimated at about four pounds per service population (residents + employees).

2.0 USERS AND MANUFACTURERS OF EPS FOAM FOOD WARE

The proposed model ordinance would restrict the use of single-use disposable EPS foam food ware in participating jurisdictions. A summary of the number of facilities and vendors with food handling permits in Santa Clara County is provided in Table B-4. Food facilities covered by the County's permit program include restaurants, markets, bakeries, liquor stores, bars, certified farmers' markets, food service at fairs and festivals, catering trucks, hot dog carts, ice cream trucks, produce vehicles, and food vending machines.

Provisions of the ordinance, including the sale of empty EPS foam food ware and ice chests, could also apply to other vendors within the project area. The number and types of businesses and facilities are summarized in Table B-5.

Manufacture of EPS foam food ware would not be restricted under the ordinance, however, manufacturing facilities within the State of California could experience a change in demand for EPS foam food ware products with implementation of existing or reasonably foreseeable EPS foam food ware ordinances in County of Santa Clara and throughout California. The number of EPS foam manufacturers in 2007 are also listed.

Table B-5: Permitted Food Vendors in Santa Clara County

Jurisdiction	Food Service[1]	Caterer	Mobile Food Facility	Grocery Stores	Other[2]
San Jose	2,636	49	710	617	354
Campbell	188	14	6	42	54
Cupertino	230	2	4	28	36
Gilroy	188	0	31	66	19
Los Altos	89	1	2	15	30
Los Altos Hills	4	0	0	1	0
Los Gatos	157	3	4	37	31
Milpitas	347	3	5	55	40
Monte Sereno	0	0	0	0	0
Morgan Hill	154	0	6	39	21
Mountain View	380	4	50	70	159
Palo Alto	350	0	7	40	60
Santa Clara	568	13	144	102	57
Stanford	120	0	18	3	8
Saratoga	78	0	7	13	38
Sunnyvale	449	1	10	93	57
Unincorporated Santa Clara County	56	0	118	15	67
Total	5,994	90	1,122	1,236	1,031

Source: County of Santa Clara Department of Environmental Health, Food Safety Permit Program (2013)
[1] Food Service includes restaurants, cafes, delicatessens and other locations where food is prepared on-site (e.g., delicatessens in grocery stores).
[2]Other includes: food demonstrators and short-term events.

Table B-5
Summary of Businesses and Facilities That May Sell, Use or Manufacture EPS Foam Food Ware

Information Category	Data	Sources
Consumption		
Restaurants/Food Service Vendors in Santa Clara County	• 224 gas stations with convenience stores	• U.S. Census Bureau. *2010 County Business Patterns.* 2010.
	• 8,237 permits for food service, caterers, mobile food service, and other	• County of Santa Clara Department of Environmental Health (refer to Table A-1)
Grocery Stores	• 1,236	• County of Santa Clara Department of Environmental Health, Food Safety Permit Program (refer to Table A-1)
Sporting Goods Stores in Santa Clara County	• 123 sporting goods stores	• U.S. Census Bureau. *2009 County Business Patterns*. 2009.
Merchandise Stores in Santa Clara County	• 42 department stores (includes discount department stores) • 71 general merchandise stores (includes warehouse clubs and supercenters)	• U.S. Census Bureau. *2010 County Business Patterns.* 2010.
Retail/Pharmacy	• 190 pharmacies and drug stores	• U.S. Census Bureau. *2010 County Business Patterns.* 2010.
Hardware Stores in Santa Clara County	• 38 hardware stores	• U.S. Census Bureau. *2010 County Business Patterns.* 2010.
Statewide Producers		
PS Foam Manufacturers	• 77 Polystyrene foam manufacturers in California – 9.74 percent of value of U.S. shipments – 3,389 employees	• U.S. Census Bureau. *Industry Statistics Sampler*. 2007.

3.0 BASELINE CONCLUSIONS

In summary, the baseline estimates for the project area (Santa Clara County) are follows:

1. **Baseline for EPS food ware <u>used</u> annually in Santa Clara County** –
   Counts for various products (cups, plates, clamshells) that could be applied countywide are not readily available. Based upon a review of the categories for polystyrene resin sales and production in the 2012 Edition of *The Resin Review*, the baseline use of EPS foam food ware could conservatively range from about 1.8 pounds per capita to a high of about seven (7) pounds per capita per year.

2. **Baseline for EPS food ware appropriately disposed as <u>waste</u> annually in Santa Clara County –** Based upon waste local characterization studies within Santa Clara County, EPS food ware appropriately disposed of annually is conservatively 2.9-4.1 pounds per service population (residents + jobs) or 5.3-6.4 pounds per capita per year. The per capita estimate of about six pounds per year is within the range of the estimate noted above for food ware used (based upon production).

3. **Baseline for EPS food ware appearing as <u>litter</u> in Santa Clara County-**

   - Street Litter: about 0.8-3.6 percent by count of large litter (four square inches in area or more) on streets based upon citywide and hot spot street litter surveys in San José; and
   - Stormwater System Litter:
     - about eight (8) percent by volume based upon SCVURPP litter characterizations (i.e., trash loading) in storm drain systems discharging to creeks and waterways.[30]
     - about 311 cubic yards of EPS trash (roughly 3,000 pounds) per year in the SVURPP area.

4. **Baseline for types of businesses and activities covered by the ordinance –**
   The ordinance would apply to a wide range of businesses and activities within the Santa Clara County project area. Over 8,000 businesses or organizations have food handling permits from the County of Santa Clara, including restaurants, cafes, mobile food service, caterers, grocery stores, convenience stores, and one-time. Other vendors whose sales would be covered activities include several hundred restaurant and food service suppliers, warehouse stores, retail/pharmacy stores, sporting goods and hardware stores.

[30] Refer to Table 4.9-2 in Section 4.9 Hydrology and Water Quality for a breakdown by jurisdiction.

Appendix C

Summary of Life Cycle Assessments (LCAs)

A SUMMARY OF LIFE CYCLE ASSESSMENTS (LCAs) AND LIFE CYCLE INVENTORIES (LCIs)

Prepared by

David J. Powers & Associates, Inc.

For

City of San José

June 2013

LIFE CYCLE ASSESSMENTS AND INVENTORIES

A life cycle assessment (LCA) is a process used to assess the environmental impact of a given product throughout its lifespan. A LCA assesses the raw material production, manufacture, distribution, use, and disposal (including all intervening transportation steps) of a given product. The methodology for completing a LCA is standardized by the International Organization for Standardization (ISO).[1]

A life cycle inventory (LCI) is a study of the inputs and outputs for a product system and is typically a part of a comprehensive LCA. Raw materials and resource inputs as well as emissions to water, air, and land are accounted for. An LCI identifies the outputs without trying to analyze the impacts to an environmental system. For example an LCI would show how many kilograms of carbon dioxide, methane, and nitrous oxide are produced in a manufacturing process but would not calculate assess the global warming impacts that would result from those emissions.

LCAs are useful because they provide specific analysis and quantifiable results for the purpose of assessing environmental impacts of a given product. However, the LCA process is complex and involves many variables that can differ from report to report. Each LCA assumes different parameters and system boundaries in its calculations, and utilizes a unique set of data to reach its conclusions. Often, LCAs are completed in different regions of the world that have unique environmental factors such as transportation distances and composition of energy supply that may not apply elsewhere. Similar issues arise with LCIs. For these reasons, the results contained in LCAs and LCIs consulted for this Initial Study may not precisely reflect conditions in Santa Clara County.

Due to the variations and limitations involved in the LCA/LCI process, direct comparisons between the results of two or more studies involve a level of uncertainty. Many environmental impacts occur on a local or regional scale, and the location of those impacts is difficult to define. However, by examining the results of several LCAs and LCIs, it is possible to get a reasonable range of the likely impacts associated with a given product over the course of its lifetime such that a qualitative comparison of impacts can be presented.

Summaries of the relevant studies consulted in this Initial Study are provided in this Appendix. Materials referenced in the discussions are defined in Table C-1, below.

[1] ISO standards 14040:2006 and 14044:2006 establish the principles, framework, requirements, and guidelines for LCAs. International Organization for Standardization. "ISO standards for life cycle assessment to promote sustainable development." July 7, 2006. Accessed April 9, 2013. Available at: <http://www.iso.org/iso/home/news_index/news_archive/news.htm?refid=Ref1019>

Table: C-1 Abbreviations for Food Container Materials	
Acronym	**Material Type**
EPS	Expanded or Extruded Polystyrene
GPPS or PS	General Purpose Polystyrene
HDPE	High-Density Polyethylene
LDPE	Low-Density Polyethylene
PC	Polycarbonate
PET	Polyethylene Terephthalate
PHA	Polyhydroxyalkanoate
PLA	Polylactic Acid
PP	Polypropylene
PVC	Polyvinyl Chloride

LCA/LCI Summaries:

- Tabone et al. *Sustainability Metrics: Life Cycle Assessment and Green Design in Polymers.* 2010.
- Madival et al. *Assessment of the environmental profile of PLA, PET, and PS clamshell containers using LCA methodology.* 2009.
- Franklin Associates. *Life Cycle Inventory of Foam Polystyrene, Paper-based, and PLA Foodservice Products*. 2011.
- Kuczenski et al. *Plastic Clamshell Container Case Study*. 2012.
- PlasticsEurope. *Environmental Product Declarations of the European Plastics Manufacturers*. 2008-2012.
- Zabaniotou, A. & Kassidi, E. *Life cycle assessment applied to egg packaging made from polystyrene and recycled paper.* 2002.
- Franklin Associates. *Life Cycle Inventory of 16-ounce Disposable Cups*. 2009.
- PE Americas. *Comparative Life Cycle Assessment Ingeo™ biopolymer, PET, PP Drinking Cups*. 2009.

Tabone et al.
Sustainability Metrics: Life Cycle Assessment and Green Design in Polymers

Authors: Michaelangelo D. Tabone, James J. Cregg, Eric J. Beckman, Amy E. Landis

Sponsor: University of Pittsburgh, Department of Civil and Environmental Engineering

Date: September 2, 2010

Products Analyzed: PET, HDPE, LDPE, PP, PC, PVC, GPPS, PLA-G (general process), PLA-NW (NatureWorks LLC), PHA-G (general process), PHA-S (corn stover), B-PET (hybrid bio/petroleum)

Functional Unit: One liter of polymer contained in pellets (prior to product molding)

Impact Categories: Acidification, Carcinogenicity, Ecotoxicity, Energy Use, Eutrophication, Global Warming, Non-carcinogenicity, Ozone Depletion, Respiratory Effects, Smog, Fossil Fuel Depletion

Summary:

The report assesses the environmental impacts of each polymer's production as well as its adherence to green design principles. The scope of the study is "cradle-to-gate," meaning that the study only compares impacts resulting from the production of each plastic and not the use or disposal. The analysis was broken down into the impact categories listed above, and normalized so that impacts are compared relative to the greatest impact exhibited by a product for each impact category. A chart displaying the relative impacts is available within the LCA, but is not reproduced here.

The LCAs for the study show that the production of biopolymers such as PLA and PHA has lower global warming potential than the production of traditional plastics. However because of the fertilizer use and pesticide use where the feedstocks are grown, as well as the chemical processing steps where the polymer is produced, biopolymer production results in greater eutrophication, eco-toxicity, and human health impacts.

Polypropylene (PP) is the best performer based on the LCAs primarily because its production releases very little benzene and $PM_{2.5}$, and was also the least energy demanding of the products considered. Benzene is classified as a known human carcinogen by the U.S. Environmental Protection Agency.[2]

[2] United States Environmental Protection Agency. "Benzene." January 2012. Accessed April 23, 2013. Available at: http://www.epa.gov/ttnatw01/hlthef/benzene.html

Limitations in Application of the LCA to Santa Clara County:

The Tabone et al. LCA offers a low potential for bias compared to other LCAs because it was funded by a University and published in an academic journal. Though the calculated releases of benzene, toluene and $PM_{2.5}$ show relative performance of the studied polymers, they lack the context necessary to conclude that one or more may have a substantially greater impact than the other.

The study does not directly apply to the proposed project because it does not consider the full life cycle of the products (resins). The "Cradle-to-Gate" scope means that the manufacturing of specific products, as well as the use and disposal of the products is not considered. As a result, some materials such as polylactic acid may appear to have greater impacts relative to other materials since their potential for material recovery via compost and reuse is not incorporated into the impact calculation.

Another issue with the LCA is that impacts are analyzed based on the European average for emissions resulting from crude oil and natural gas extraction, processing, and transportation. Emissions associated with these processes could differ in the United States due to the distances to the feedstock and the transportation methods used to deliver it to the manufacturing facilities. Along with the differences in energy supply between Europe and the United States, these factors are evidence that the results of these LCAs would likely differ if calculated using United States data and assumptions.

Applications of the LCA to Santa Clara County:

Tabone et al. show that in order to manufacture one liter of polymer in pellets, between 60 and 150 megajoules of energy are expended depending on the material. PP is the least energy intensive of the studied products, polystyrene is close to the average, and PET and PC are the highest. Though the results of the study's calculations cannot be extrapolated to make quantitative conclusions about the production of these polymers, it is helpful to know that the energy required to produce the range of plastic substitutes to EPS foam is within one order of magnitude.

Ultimately, the impacts analyzed in this study such as eutrophication, carcinogenicity, acidification, smog, and eco-toxicity, are regional in nature. Since the content of the report does not specify the exact locations of the steps in polymer production, the locations of the impacts are undetermined. These impacts are likely to occur outside of Santa Clara County since there is not a large petrochemical processing industry in the area. While the study gives a broad picture of the relative impacts of resin production and the issues that arise from it, no conclusions can be drawn about environmental impacts in Santa Clara County.

Conclusion:

When one considers the end of life scenario, the extra steps required to foam GPPS, and the small range of energy demands for all substitutes, it becomes clear that this LCA does not show that any one substitute requires so much energy that its use in place of polystyrene foam would create a substantial increase in energy use and associated greenhouse gas emissions.

Madival et al.
Assessment of the environmental profile of PLA, PET and PS clamshell containers using LCA methodology

Authors: Santosh Madival, Rafael Auras, Sher Paul Singh, and Ramani Narayan

Sponsor: Michigan State University, Department of Chemical Engineering and Material Science

Date: May 23, 2009

Products Analyzed: PLA (NatureWorks LLC), PET, and PS Clamshells

Functional Unit: 1,000 containers with a capacity of 0.4536 kg (1lb) each for strawberries

Impact Categories: Global Warming (CO_2), Acidification (SO_2), Ozone Depletion (CFC-11), Eutrophication (PO_4), Respiratory Organics (ethylene), Respiratory Inorganics ($PM_{2.5}$), Ecotoxicity (TEG[3]), Energy Use, Land Occupation

Summary:

The goal of this study was to compare the environmental impacts of PLA, PET and PS thermoformed containers used for strawberry packaging. The Madival et al. LCA is a "cradle-to-cradle" study that includes in its impact evaluation the extraction of the raw material, the resin production process, container formation, and end-of-life disposal. The LCA also includes shipping distance and transportation impacts for each product.

The report looked at "Cradle-to-Gate" (i.e. resin production) impacts first and found that PLA had the greatest impact related to respiratory inorganics such as $PM_{2.5}$. PET production was found to have the highest impacts in all production impact categories except for respiratory inorganics, respiratory organics, and aquatic acidification. The study attributes this to the greater weight of the PET containers and the transportation distance of the resin.

The study includes a "Cradle-to-Grave" impact assessment which is summarized in Table C-2 below. As with the Cradle-to-Gate component of the study, polystyrene (not expanded) did not have the biggest impact in any of the categories.

[3] TEG = triethylene glycol

Table C-2
Madival et al. Strawberry Clamshell LCA
Impact assessment values for 1,000 PLA, PET, and PS Containers

Impact Category	PLA	PET	PS
Global warming, kg CO_2	735	763	730
Aquatic acidification, kg SO_2	5.66	4.97	4.87
Ozone layer depletion, kg CFC-11	9.15×10^{-5}	9.48×10^{-5}	8.71×10^{-5}
Aquatic eutrophication, kg PO_4	0.0886	0.1480	0.0819
Respiratory organics, kg ethylene	1.33	1.29	1.24
Respiratory inorganics, kg $PM_{2.5}$	1.31	1.26	1.22
Aquatic ecotoxicity, water, kg TEG	257,000	266,000	260,000
Energy, MJ surplus	13,400	14,000	13,500
Land occupation, m^2org.arable[a]	10.3	11.0	9.8

[a] m^2org.arable = square meters equivalent of organic arable land.

Limitations in Application of the LCA to Santa Clara County:

The Madival et al. study does not consider composting as a possible end-of-life scenario for food containers because at the time of the study, emissions data was not available. While composting emissions data may continue to be unavailable, it is important to take into account all disposal paths, especially when considering a PLA material. This is because when plastics made from plant feedstocks are composted, the carbon that went into the material is released back into the atmosphere, and the greenhouse gas impacts of the product change. Bioplastics are generally inert in landfills and act as a carbon sink in those scenarios. Multiple cities in Santa Clara County including San José have access to industrial scale composting facilities and could divert PLA containers to compost rather than to the landfill.

The Madival et al. LCA evaluates four end-of-life scenarios as well as the 'current condition.' The current scenario for disposal paths used in the study is based on the average U.S. municipal waste stream for polymers, which in 2005 resulted in 76.5 percent of polymers being landfilled and 23.5 percent being incinerated. Since the cities of Santa Clara County do not incinerate waste and since almost all of them offer a robust recycling program for disposable food ware plastics, these end-of-life assumptions are not representative of the project area.

The study incorporates renewable energy credits purchased by NatureWorks LLC into the calculation of PLA greenhouse gas impacts. The integrity and reliability of the renewable energy credits is not vetted in this study so it is not clear to what extent they actually reduce global warming impacts. Furthermore the purchase of energy credits is the practice of one company (NatureWorks) and is not representative of all PLA products.

Finally, and perhaps most importantly, the LCA does not consider any of the food containers that would be affected by the proposed project. Produce-containing clamshells such as those considered in the study are not made from polystyrene foam, so they would not be affected by the project. It

would be difficult to extrapolate the results of this impact assessment to apply to the food containers subject to the proposed ordinance since products differ substantially in weight and volume.

Applications of the LCA to Santa Clara County:

The Madival et al. strawberry clamshells study demonstrates the similarities between the life cycle impacts of PLA, PET, and PS products. No one product has an environmental impact substantially greater than another. The study also indicates that the land use and eutrophication issues typically associated with PLA products may be overstated, since PLA accounts for less phosphate release and land occupation than PET.

Conclusion:

Three similar products made from PLA, PET, and PS have life cycle environmental impacts on par with one another. When composting is not considered as an end-of-life scenario for PLA, its greenhouse gas impacts are comparable to polystyrene (unfoamed).

Franklin Associates
Life Cycle Inventory of Foam Polystyrene, Paper-based, and PLA Foodservice Products

Author: Franklin Associates

Sponsor: American Chemistry Council

Date: February 2011

Products Analyzed:

- 16-oz hot cups (EPS foam, LDPE-coated bleached paperboard, PLA-coated paperboard, corrugated sleeve),
- 32-oz cold cups (EPS foam, LDPE-coated paperboard, wax-coated bleached paperboard, PLA 1, PLA 2),
- 9-inch high-grade (heavy-duty) plates (GPPS foam, LDPE-coated bleached paperboard, solid PLA, molded pulp)
- 9-inch Lightweight plates (GPPS foam, LDPE-coated paperboard)
- 5-inch sandwich-clamshells (GPPS foam, fluted paperboard, solid PLA)

Functional Unit: 10,000 product units

Impact Categories: Energy (process, transportation, energy of material resource, and end of life credit), solid waste, greenhouse gases, water use

Summary:

In 2011, Franklin Associates Ltd. updated a 2006 Life Cycle Inventory in order to include an evaluation of the carbon footprint and water use of PLA food service products along with those of EPS foam and paperboard products. The scope of the report was "cradle-to-grave" and included energy credits for the various products based on their end-of-life scenarios and the national average for waste incineration (20 percent was used in this study). The PLA products studied were made by NatureWorks LLC of Blair, Nebraska.

The study found that polystyrene foam products use less energy, generate less solid waste (by weight), and use less water than comparable products made from paperboard or PLA.[4] The greenhouse gas and solid waste by volume impacts were mixed, with EPS foam products generally performing in the middle of the pack.

[4] Since data sources did not distinguish between consumptive use of cooling water and recirculating use of cooling water, water is defined as *use* rather than *consumption*.

Limitations in Application of the LCI to Santa Clara County:

Similar to the Madival et al. LCA (2009), this LCI is limited by the inclusion of an energy credit for waste-to-energy (WTE) combustion of 20 percent of the products. Credit is also given for landfill gas recovery from decomposition of the paperboard products. Since these assumptions are made based on national data from the U.S. Environmental Protection Agency, they do not necessarily apply to Santa Clara County.

The analysis of product carbon footprints includes estimates of carbon dioxide from WTE, methane from decomposition, electricity displaced by WTE, landfill gas recovery, and carbon sequestration from landfilled biomass-derived material that does not decompose. These assumptions are fundamental to the outcome of the greenhouse gas analysis in the LCI, particularly for paperboard products. No plastic or paper products collected in Santa Clara County are incinerated and landfill gas recovery is limited.

Another problem with applying the results of this LCI to products consumed in Santa Clara County is that the weights of the products studied in the report are based on the averages calculated for the original 2006 study as well as some PLA product samples. The study includes a disclaimer on the first page of the executive summary that says in boldface print:

> "…the results of this study should *not* be used to draw general conclusions about comparative results for the full range of product weights available in each product category."

Since the proposed project would apply to polystyrene foam foodservice products of all weights and volumes, applying the results of this study to all products would be in conflict with the disclaimer made at the beginning of the report.

Applications of the LCI to Santa Clara County:

According to this LCI, bioplastics such as PLA have much lower greenhouse gas impacts when they are landfilled rather than incinerated. This is because the atmospheric carbon that went into the corn feedstocks would be sequestered when PLA products are landfilled. On the other hand, the study shows that the most sustainable end-of-life scenario for EPS foam products, which are made from hydrocarbons extracted from petroleum, is incineration.

Conclusion:

Due to its high air content and low density, EPS foam creates less solid waste by weight than paperboard or PLA products. By volume, EPS foam generates approximately as much solid waste as paperboard products. The use of corrugated sleeves for paperboard hot cups causes them to have much higher solid waste and energy impacts.

Kuczenski et al.
Plastic Clamshell Container Case Study

Authors: Brandon Kuczenski, Roland Geyer, Matthew Trujillo

Sponsor: California Department of Resources Recycling and Recovery (CalRecycle)

Date: May 2012

Products Analyzed: EPS, GPPS, PET, PP, and PLA clamshell containers

Functional Unit: 1,000 clamshell containers

Impact Categories: Energy Use, Greenhouse Gas Emissions

Summary:

This study was prepared in 2012 to support CalRecycle's efforts in greenhouse gas emissions accounting as the State of California implements AB 32, the State's global warming law. The report studied the full life-cycle of clamshell containers by calculating "cradle-to-gate" greenhouse gas emissions, forward logistics (transportation and distribution) emissions, end-of-life management emissions, and emissions reductions from displaced production due to recycling.

Results of this LCA show that PLA clamshells have the lowest greenhouse gas (GHG) emissions when all product types are landfilled. If PLA is composted, it emits nearly as much as the most carbon-intensive plastic, PET. PET has the highest pre-consumer greenhouse gas emissions and the highest if landfilled, but it has the lowest impacts when it is assumed that the containers are recycled in-State. EPS foam is among the lowest in energy demand. The results are shown in more detail in Table C-3, below.

Table C-3
Kuczenski et al. Plastic Clamshell Container Study
Life-cycle greenhouse gas emissions and energy demand for different polymers

Material	No-Recovery Total	In-State Recovery Total[a]
Greenhouse Gas Emissions (kg CO_2e per 1,000 clamshells)		
EPS Foam	53.6	64.4-69.9[b]
GPPS	51.8	50.0-50.9[b]
PET	80.7	43.0-51.2[b]
PP	61.1	57.9-59.5[b]
PLA	41.5	77.2
Energy (Megajoules per 1,000 clamshells)		
EPS Foam	1,222	963-993[b]
GPPS	1,169	1,012-1,189[b]
PET	2,040	979-1,705[b]
PP	1,846	1,568-1,882[b]
PLA	1,802	1,806

[a] This scenario calculates the greenhouse gas emissions of the products if they are recovered rather than landfilled. For non-recyclable materials, this means either waste-to-energy conversion (EPS foam) or in the case of PLA, composting.
[b] Ranges provided reflect two mutually-exclusive end-of-life pathways. The former number indicates the environmental benefits through avoided production and landfilling; the latter indicates the environmental benefits through displaced economic activity.

Limitations in Application of the LCA to Santa Clara County:

The primary reason why this LCA does not completely apply to the proposed project is that it models life-cycle emissions of the products for scenarios in which either 100 percent of the products are landfilled or 100 percent are recovered through diversion including: waste-to-energy conversion, recycling, and/or composting. Neither of these scenarios resembles the real life-cycle of clamshell containers in Santa Clara County. Therefore, the calculated emissions per 1,000 clamshells in this study are not an accurate estimate of the actual emissions associated with clamshells in the project area.

Another issue with the LCA is that it only studies clamshell containers, whereas the proposed project would apply to all disposable foam foodservice ware. The emissions associated with disposable cups and plates could vary based on the production processes, the distance required to transport the materials to their respective manufacturing sites, and the recovery options available for the products.

Applications of the LCA to Santa Clara County:

This study provides further evidence about the role of the end-of-life scenario in evaluating PLA products' greenhouse gas impacts. When PLA products are landfilled, they can sequester carbon from the active carbon cycle to the geologic carbon cycle. Based on this study, when composted, the

greenhouse gas emissions associated with PLA nearly double. In contrast, the greenhouse gas emissions associated with PET decline by nearly 50 percent when PET is recycled. Polypropylene impacts are reduced by recycling as well, though not to the same degree as the impacts of PET.

As stated above, the end-of-life scenarios considered do not represent the current waste disposal situation in Santa Clara County. However they do show the best and worst case scenarios for each plastic clamshell. In the case of EPS foam clamshells, which are not recovered in the project area, the estimation for greenhouse gas emissions and energy use is likely the best estimate of any of the LCAs described in this Appendix.

Conclusion:

Regardless of end-of-life scenario, GPPS clamshells have lower greenhouse gas emissions, and PET clamshells can as well depending on to what extent they are recycled. The study clearly shows that PP clamshells have greater greenhouse gas impacts than EPS foam clamshells do. If landfilled, PLA clamshells also have much lower greenhouse gas impacts than their EPS foam counterparts. Therefore, replacing EPS foam clamshells with plastic substitutes has the potential to reduce greenhouse gas impacts if PET is recycled at a high rate and PLA is landfilled.

PlasticsEurope
Environmental Product Declarations of the European Plastics Manufacturers

Author: PlasticsEurope – Association of Plastics Manufacturers

Sponsor: PlasticsEurope – Association of Plastics Manufacturers

Dates: 2008 - 2012

Types of Plastic Analyzed: GPPS, LDPE, HDPE, PP, and PET

Functional unit: One kilogram (kg) of each type of polymer

Impact Categories: Non-Renewable Materials (minerals, fossil fuels, and uranium), Renewable Materials (biomass), Water Use in Processing, Non-renewable Energy Resources, Renewable Energy Resources (biomass), Waste (non-hazardous, hazardous), Global Warming Potential, Ozone Depletion Potential, Acidification Potential, Petrochemical Ozone Creation Potential, Nutrification Potential (eutrophication), Dust/Particulate Matter, Total Particulate Matter

Summary:

The plastics industry in Europe prepared ISO 14025 compliant life cycle inventories (LCIs) for a number of plastic resins.[5] These analyses identify the impacts from production of various types of plastics. The LCIs do not include the impacts of turning the plastic pellet feedstocks into completed food containers, but they do allow for a comparison of the impacts from the production of each type of plastic most commonly used for cups, plates, and clamshells.

According to the PlasticsEurope data, PET pellet production has substantially greater emissions and water use than unfoamed GPPS and PP pellet production does. Production of PET pellets requires ten times more water than GPPS (unfoamed) pellets and approximately 1,000 times more water than the production of PP pellets. The acidification potential of PET, as measured in sulfur dioxide equivalents, is close to three times greater than that of GPPS. Dust and particulate matter emissions from PET production are ten times greater than GPPS production. Table C-4 contains more in-depth results of the LCIs.

[5] ISO is the International Organization for Standardization. ISO 14025:2006 establishes principles for the use of environmental information, primarily intended for use in business-to-business communication, but their use in business-to-consumer communication under certain conditions is not precluded.

Table C-4:
PlasticsEurope: Excerpts from Life Cycle Inventories
Polymer Comparisons

Indicator	LDPE	HDPE	PP	PET	GPPS
Non-renewable materials					
•Minerals	4.2g	2.6g	1.8g	2.9g	-
•Fossil fuels	1,591.3g	1,595.7g	1,564.5g	1,715.0g	-
•Uranium	0.009g	0.006g	0.005g	0.009g	-
Renewable materials (biomass)	10.79g	8.70g	5.13g	15.34g	-
Water use in processing	2,934g	3.38g	4.79g	4,828g	510g
Non-renewable energy resources as upper heating value					
•For energy	25.3MJ	21.7MJ	20.4MJ	42.5 MJ	33.96-37.96 MJ
•For feedstock	51.6MJ	54.3MJ	52.6MJ	39.8 MJ	44.3-48.3 MJ
Renewable energy resources (biomass)					
•For energy	1.2MJ	0.8MJ	0.4MJ	0.6MJ	0.52MJ
•For feedstock	0	0	0	0	0
Waste					
•Non-hazardous	0.034kg	0.032kg	0.024kg	0.089kg	0.015kg
•Hazardous	0.005kg	0.006kg	0.005kg	0.004kg	0.00055kg
Global Warming Potential	2.13kg CO_2eq	1.96 kg CO_2eq	2.00kg CO_2eq	3.49 kg CO_2eq	2.25kg CO_2eq
Ozone Depletion Potential	n/a	n/a	n/a	n/a	0.000016g CFC-11 eq
Acidification Potential	7.74g SO_2eq	6.39g SO_2eq	6.13g SO_2eq	15.59g SO_2eq	5.38g SO_2eq
Petrochemical Ozone Creation Potential	1.19g ethene eq	1.23g ethene eq	0.92g ethene eq	2.43g ethene eq	0.85 g ethene eq
Nutrification Potential (eutrophication)	0.50g PO_4eq	0.43g PO_4eq	0.74g PO_4eq	1.03g PO_4eq	0.48g PO_4eq
Dust/Particulate Matter	0.69g PM_{10}	0.64g PM_{10}	0.59g PM_{10}	1.94g PM_{10}	0.15g PM_{10}
Total Particulate Matter	0.70g	0.64g	0.60g	1.95g	0.17g PM_{10}

g = grams kg = kilograms n/a = entries are below quantification limit
mj = megajoules eq = equivalent

Limitations in Application of the LCIs to Santa Clara County:

The LCIs contain a cradle-to-gate analysis, meaning they only consider environmental effects resulting from the manufacturing process up until the material leaves the factory. The reports do not include analysis of environmental effects related to creating, using, or disposing food containers. The information is provided in this Initial Study because it is among the best available for all of the plastic feedstocks under discussion, and it allows comparison between the materials; it is not similar or comparable to the complete life cycle analyses discussed elsewhere in this Initial Study, which generally address more than just the source materials.

Additionally, the reports state that the information was gathered from European processors and manufacturers. This information may or may not be the same as the processing done for the products available to the American food service industry. Air and water emissions regulations differ between Europe and the United States. The type of energy sources used to produce electricity play a substantial role in determining the environmental impact of plastic production, and that differs between Europe and the United States too.

Applications of the LCIs to Santa Clara County:

The data supporting the PlasticsEurope LCIs was provided by various plastics producers in the European industry and represents the industry averages. In the case of GPPS, the data covers 95 percent of the European GPPS production capacity.[6] Since the LCA data covers so much of the European industry, factors such as electricity sources and transportation distances which are typically variable should be more constant and allow for comparison of the production impacts of each pellet. Thus the data in Table C-4 and summarized on page 16, above, provides a fairly accurate comparison of PET, GPPS, PP, and HDPE/LDPE.

Conclusions:

When the sources of energy and transportation distances are relatively constant, the production of PET resin pellets results in substantially higher water use, global warming potential, acidification, and particulate matter emissions. However as demonstrated by other LCAs summarized in this appendix, product manufacturing, consumption, and end-of-life stages of plastic products is determinative of the product's life cycle impacts. Therefore the outcomes of these LCIs cannot be used to say decisively that one product has a greater environmental impact than another.

[6] PlasticsEurope. "Environmental Product Declarations of the European Plastics Manufacturers: General Purpose Polystyrene (GPPS) and High-Impact Polystyrene (HIPS)." November 2012. Page 3. Available at: http://www.plasticseurope.org/plastics-sustainability/eco-profiles/browse-by-list.aspx

Zabaniotou, A. & Kassidi, E.
Life cycle assessment applied to egg packaging made from polystyrene and recycled paper

Authors: A. Zabaniotou, E. Kassidi

Sponsor: Aristotle University of Thessaloniki

Date: October 25, 2002

Products Analyzed: 6-egg eggcup containers (EPS foam and recycled paper)

Functional Unit: 50,000 6-egg eggcups (1.1 metric tons recycled paper, 0.75 metric tons polystyrene)

Impact Categories: Greenhouse Warming Potential, Ozone Depletion Potential, Acidification Potential, Nutrient Enrichment, Summer Smog, Winter Smog, Carcinogenic Substances, Heavy Metals

Summary:

This 2002 LCA studied the material and energy inputs and subsequent air and water emissions from the production of eggcup packaging. In this way the study was more like an LCI than an LCA. The systems studied are in Greece and Europe, and the study uses data derived from other European countries. This LCI does not include the transportation, distribution, use, or disposal phases of the product life cycles; therefore it is a "Cradle-to-Gate" study.

Zabaniotou and Kassidi found that polystyrene foam eggcup production produced seven times more NO_x and 16 times more SO_x than the production of recycled paper eggcups. Recycled paper eggcup production resulted in twice as much solid waste and twice as much heavy metal waste (e.g. lead, cadmium, and nickel). Relevant data from the study is provided in Table C-5, below.

Table C-5
Zabanioutou & Kassidi Eggcup Container Study
Selected Material Input and Emissions Data

	Polystyrene Foam	Recycled Paper
Raw Materials		
Fuel	718 m^3	358 m^3
Natural Gas	715 m^3	18.5 m^3
Waste Paper	-	1,500 kg
Energy Feedstock		
Total Energy	*84,548 MJ*	*38,288 MJ*
Air Emissions		
CH_4 (methane)	3.4 kg	1.6 kg
CO_2 (carbon dioxide)	2,952.5 kg	1,788.0 kg
N_2O (Nitrous oxide)	11.5 g	16.3 g
NO_x (Nitrogen oxides)	32.7 kg	4.2 kg
SO_x (Sulfur oxides)	95.0 kg	5.8 kg

Limitations in Application of the LCI to Santa Clara County:

This LCI has limited relevance for the proposed project, because it does not include any products that would be affected by the proposed project. It is included in this Appendix because there is a small amount of available life cycle information about the environmental impacts of paper food packaging production.

The main issues with this LCI are the lack of definitions, the geographic region studied, and assumptions made for the data. For example, the study does not define the quantity of recycled content used in the paper eggcups, so the reader is left to assume that they are made of 100 percent recycled paper. One of the measurements, 'fuel,' is also undefined. Fuel is implied to mean a petrochemical, but it is measured in kilograms and cubic meters in two separate places in the study, which means it could be a solid, liquid, or gaseous petroleum product.

Zabaniotou and Kassidi study eggcups in Greece and polystyrene production in Europe. The transportation of raw materials as well as the composition of the energy supply in Europe likely differs from the production of eggcups sold in the United States. The authors also note that the data used for their calculations was not readily available, so they relied on a European model that represents the average European production scenario.

Applications of the LCI to Santa Clara County:

The results of the study can be used at a general level to compare EPS foam and recycled paper, but it would be speculative to make any conclusions about cups, plates, bowls, and clamshell containers based on the eggcup study. This study shows that to produce 1.1 metric tons of recycled paper eggcup containers, 1.5 metric tons of recycled paper is used. The study does not provide enough context to show whether 73 percent efficiency feedstock efficiency is representative of recycled paper products in general.

Conclusions:

The scope of this study and the data used to support the calculations have limited applications for the proposed ordinance. This study supports the hypothesis that producing products with recycled paper requires less energy than producing EPS foam products, but it does not prove it conclusively for the products used in the project area.

Franklin Associates
Life Cycle Inventory of 16-ounce Disposable Cups

Author: Franklin Associates

Sponsor: MicroGREEN Polymers

Date: February 19, 2009

Products Analyzed: EPS cup, LDPE-coated Paperboard cup, LDPE-coated Paperboard cup + corrugated sleeve, and RPET SMX (recycled PET solid-state microcellular expansion) foam

Functional Unit: 10,000 16-ounce cups

Impact Categories: Solid waste (weight and volume), Energy, Global Warming Potential

Summary:

In 2009 Franklin Associates prepared a Life Cycle Inventory for MicroGREEN Polymers, the producers of the RPET SMX foam cup. The LCI compares the RPET cup to polystyrene foam and coated paperboard cups. The study includes the impacts associated with the packaging for the cups as well. Two ISO-compliant approaches are used to model the effects of recycled-content and end-of-life recycling. The data included below is from the "Postconsumer free" approach that allocates the impacts of disposal to the current system unless the product can be recycled, in which case the ultimate burdens leave the studied system. The alternative approach assumes subsequent uses for all products, but since it does not resemble the waste disposal system in the project area it is not included here.

The report found that RPET SMX and EPS foam cups had lower impacts in all categories than coated paperboard cups, with or without sleeves. Packaging for EPS foam cups resulted in the greatest impacts across all categories when compared to the packaging of other products. The data summarized in Table C-6 below does not incorporate energy credits for the products since the end-of-life assumptions made in the study do not reflect the actual end-of-life scenarios in Santa Clara County (e.g. energy credit for incinerating EPS foam).

Table C-6 Franklin Associates 16-oz Hot Cup Study Life Cycle Impacts of 10,000 Cups – Postconsumer Free Approach				
	Total Energy (Million Btu)	**Global Warming Potential** (Pounds of CO_2e)	**Solid Waste (Weight)** (Pounds)	**Solid Waste (Volume)** (Cubic feet)
RPET SMX	4.65	768	205	8.66
EPS	7.46	780	136	10.49
Coated Paperboard	8.62	798	354	10.65
Coated Paperboard + Corrugated Sleeve	10.34	1,215	483	14.70

Limitations in Application of the LCI to Santa Clara County:

This study assumes that EPS foam and paperboard products were made entirely from virgin materials whereas the RPET is modeled to contain 100 percent post-consumer resin. Coated paperboard cups can include post-consumer recycled content, which would affect the environmental emissions from their production.

The study also relies on the Franklin Associates database for corrugated packaging using industry average data. Data for EPS foam resin production comes from the U.S. LCI database and data for RPET SMX production comes from MicroGREEN, the sponsor of the study. These data sources introduce the potential for bias, which could weigh the results in favor of the sponsors of the study.

The difficulty in applying this study to the proposed project arises out of the fact that the functional unit is 10,000 hot cups. At this time, the City of San José does not have the information necessary to estimate how many of each type of EPS foam product are used in the project area. The life cycle impacts of clamshells, plates, and bowls, are likely different than the 16-ounce hot cups studied. This makes it difficult to extrapolate from the results and apply any quantitative analysis to the proposed project and the substitute products.

Applications of the LCI to Santa Clara County:

This study shows that while paperboard cups and EPS foam cups yield similar volumes of solid waste when disposed, paperboard is much heavier and results in slightly greater greenhouse gas emissions. The effects of the corrugated sleeve on the impacts of paperboard hot cups are substantial; corrugated sleeves cause an approximately 50 percent increase in global warming potential and a 40 percent increase in the volume of solid waste. Since most people use corrugated sleeves when drinking hot beverages from paper cups, it is reasonable to assume that the two should be evaluated together when considering hot cups.

Conclusion:

The corrugated sleeves used with coated paperboard hot cups account for a substantial portion of the greenhouse gas and solid waste impacts of the cups. While the greenhouse gas emission margins between 16-ounce paperboard cups and EPS foam cups are small, it is reasonable to conclude based on this study that paperboard cups with corrugated sleeves account for greater greenhouse gas emissions than EPS foam cups.

PE Americas
Comparative Life Cycle Assessment Ingeo™ biopolymer, PET, PP Drinking Cups

Author: PE Americas

Sponsor: NatureWorks LLC & Starbucks

Date: December 12, 2009

Products Analyzed: Ingeo™ PLA, PET, and PP

Functional Unit: One 16-ounce cold drinking cup and flat lid

Impact Categories: Energy Use, Global Warming Potential, Acidification Potential, Eutrophication Potential, Summer Smog, Water Use,

Summary:

In 2009, PE Americas prepared this study for Starbucks, which was considering integrating sustainable packaging materials into its cold beverage cup designs. Starbucks currently uses PET cups and lids, but could replace it with the NatureWorks Ingeo™ biopolymer. Polypropylene is also included in the study. This LCA evaluates the cradle-to-gate production of the polymer pellets, the transportation and conversion of the pellets, the transportation of the cups and lids to Starbucks shops, and disposal of the cups into landfills. Two different weights are considered for both PP and PLA products. Data was not available for energy used in Ingeo™ production, so Ingeo™ is modeled based on the information as provided for PP and PET. Since the results are presented graphically and do not include specific data points, the impact results are provided in the table below based on relative rank.

The results of the study show that the PET cup and lid have the highest energy use, global warming potential, and photochemical ozone creation potential (summer smog) of the products considered. The Ingeo™ 14.4g cup and 2.32g lid combination with the PET energy data applied has the greatest acidification and eutrophication potential and also uses the most water. In general, the traditional plastics (PET and PP) have more impacts related to energy, smog, and global warming than the Ingeo™ products do. On the other hand, the Ingeo™ products use more water and cause more water quality impacts than traditional plastics.

Table C-7
PE Americas Cold Cup LCA
Relative Performance of One 16-oz Drinking Cup and Lid

	PET	Polypropylene		Ingeo™			
	15.5g/2.5g	13.18g/2.12g	12.73g/2.05g	13.6g / 2.19g		14.4g / 2.32g	
				PET[b]	PP[b]	PET[b]	PP[b]
Energy	**1**	2	3	5	**7**	4	6
GWP	**1**	2	3	5	**7**	4	6
Acidification	4	6	**7**	2	5	**1**	3
Eutrophication	5	6	**7**	3	4	**1**	2
Summer Smog	**1**	3	6	4	**7**	2	5
Water Use	4	5	**6**	2[c]	3	**1**	2[c]

[a] Rankings are in order of greatest to lowest impact. For example, PET uses the most energy, whereas the 14.4g/2.32g Ingeo™ (with PET energy data) uses the most water. A '7' represents the most favorable outcome for the products studied.
[b] The PET and PP scenarios for the Ingeo™ polymer apply production energy data for PET and PP to the Ingeo™ production process.
[c] These two products' life cycles use approximately the same amount of water.

Limitations in Application of the LCA to Santa Clara County:

This study examines very specific transportation and production scenarios associated with Starbucks cups and lids. All pellets are assumed to be transported to a Solo Cup Company facility (manufacturer of Starbucks cups) and all final products are assumed to be transported to a Starbucks distribution center. Thus the study does not apply to all products that would be affected by the proposed project.

Another limitation of the study is the lack of energy data for Ingeo™ production. Assuming that the energy used for Ingeo™ is similar or identical to the energy used for PET and PP serves a comparative purpose, but does not provide a definitive result about which products use the most energy or have the biggest impacts.

Finally, the study assumes that all products are landfilled. This simplifies the comparison, however it is not representative of the current waste disposal options available in Santa Clara County. Many people favor PLA products because they assume they will be composted (an end-of-life scenario that actually increases the greenhouse impacts of PLA products). Though the industrial composting capacity of the County is limited, it is not insignificant. Also, PET and PP are both widely recycled in California and are accepted at recycling facilities in Santa Clara County.

Applications of LCA to Santa Clara County:

Though Starbucks does not use or distribute polystyrene foam food ware at its stores, the results of this study reveal the differing environmental impacts between substitute product materials. PET has the highest energy use and global warming potential of the polymer materials, which is similar to the results of other studies summarized in this Appendix. The Ingeo™ PLA products perform well in those categories, but those results could be different if they were assumed to be landfilled and if measured energy data from its production were used in the LCA.

The PLA products considered in this study use the most water and have the biggest impacts on water quality. This is most likely due to the production of the corn feedstock, which typically involves the use of pesticides and fertilizers.

One thing this study shows clearly is that for two products of the same material type, the lighter the product the lower the impact. This makes sense since they both use the same materials and weight reflects the amount of feedstock used to make the product.

Conclusions:

The assumed end-of-life scenario for the products in this study lends bias to the PLA products. PET is typically recycled and PLA can be composted in many parts of Santa Clara County. Under those circumstances, PET would have lower energy use and PLA would have a higher global warming potential. Therefore the results of this study should not be applied to the proposed project.

Appendix D

Summary of Available Information On Disposable Food Containers

A SUMMARY OF AVAILABLE INFORMATION ON DISPOSABLE FOOD CONTAINERS

Prepared by

David J. Powers & Associates, Inc.

For

City of San José

July 2013

DISPOSABLE FOOD WARE

The project proposes to ban the use of expanded or extruded polystyrene (EPS) foam food service ware by individuals, restaurants, and other entities within participating jurisdictions in Santa Clara County. Foam food service ware products generally include hot and cold cups, bowls, plates, clamshells, and in some cases food trays.[1] Some jurisdictions may also choose to adopt ordinances restricting EPS foam food ware sales in stores and retail outlets. A restriction on sales of EPS foam coolers or ice chests could also be included in ordinances adopted by participating jurisdictions.

The City of San José and other participating jurisdictions are not proposing to specify which materials must be used as alternatives to EPS foam containers, and there are a wide variety of substitutes available for purchase both locally and on the internet. The result of the proposed project would be a decrease in the use of EPS foam, though overall use of disposable food service ware is not expected to decrease.

The food service ware products identified during preparation of this Initial Study and available for sale to the general public include a variety of plastics, paper materials, paper materials lined with plastics, and bioplastics. Many of these products are made from virgin materials (i.e. newly-produced); many others contain pre-consumer and/or post-consumer recycled content. Predicting which substitutes would be selected by food vendors and consumers is not as straight-forward as looking at the price because the characteristics of the materials (e.g. durability, water resistance, insulation) are also factors in the selection process.

As with EPS foam food service ware, the environmental impacts of the substitutes arise from raw material extraction and processing, product manufacturing, the use and disposal of the products, and the transportation associated with each step of the product life-cycle. Since the City of San José cannot predict exactly which materials would replace EPS foam in the local food service industry, the following discussion is provided to characterize the available substitutes and to summarize what is known about their environmental impacts.

[1] A clamshell is a foldable, closable container that holds food ranging from sandwiches to take-out dinners.

Plastic Products

Many plastic products already exist that could replace polystyrene foam plates, bowls, cold drink cups, lids, and clamshells. A range of plastic resins can be used to manufacture these products, though the most common plastics used are polypropylene (PP), general purpose polystyrene (GPPS, unfoamed), and PET (polyethylene terephthalate). In most jurisdictions within Santa Clara County, these plastic materials are recyclable regardless of food contamination and are used widely along with EPS foam. Other plastics that could be used to produce foodservice ware include polyvinyl chloride (PVC), low-density and high-density polyethylene (LDPE and HDPE), and polycarbonate (PC).

The European plastics industry prepared Life Cycle Inventories (LCIs) for a number of plastic resins including GPPS. Though the LCIs do not include the impacts of turning the resins into completed products, they allow for a comparison of the impacts of manufacturing each type of plastic commonly used for food ware.

The data used for these LCIs is from European plastic manufacturers, which may or may not closely resemble processes used by the manufacturers that produce the disposable food ware available to United States buyers. For example, one of the biggest differences between manufacturers can be the sources of energy used for the production process. Using electricity from coal versus electricity from nuclear power would substantially alter the impacts from plastic production.

The following data from the European plastics industry is provided because it is among the best available for all of the plastic resin feedstocks under discussion, and because it allows comparison of materials. Data from other studies is provided in Appendix C of this Initial Study as well as later in this Appendix.

Table D-1:
PlasticsEurope: Excerpts from Life Cycle Inventories
Plastic Comparisons

Indicator	LDPE	HDPE	PP	PET	GPPS
Non-renewable materials					
•Minerals	4.2g	2.6g	1.8g	2.9g	*Data not available*
•Fossil fuels	1,591.3g	1,595.7g	1,564.5g	1,715.0g	
•Uranium	0.009g	0.006g	0.005g	0.009g	
Renewable materials (biomass)	10.79g	8.70g	5.13g	15.34g	*Data not available*
Water use in processing	2,934g	3.38g	4.79g	4,828g	510g
Non-renewable energy resources as upper heating value					
•For energy	25.3MJ	21.7MJ	20.4MJ	42.5 MJ	33.96-37.96 MJ
•For feedstock	51.6MJ	54.3MJ	52.6MJ	39.8 MJ	44.3-48.3 MJ
Renewable energy resources (biomass)					
•For energy	1.2MJ	0.8MJ	0.4MJ	0.6MJ	0.52MJ
•For feedstock	0	0	0	0	0

g = grams
MJ = megajoules

The information in Table D-1 shows environmental performance indicators associated with the manufacture of one kilogram (kg) of each type of plastic indicated. It is not possible, based on the information available to the City of San José, to state that one of these five plastic resins results in a much greater environmental impact than the other. There is not enough context for the manufacturing activities to know how applicable they are to products sold and used in the United States and Santa Clara County.

Polystyrene (PS) and PET appear to use comparable amounts of energy for production, however PS uses much less water and generally has smaller environmental impacts. The production of polypropylene (PP) uses much less water and energy than PS or PET do, however it uses more non-renewable energy resources for its feedstock than PS does.

Paper Products

Paper products are commonplace among disposable food service ware used by consumers and food vendors. Cold cups, hot cups, and bowls are usually made of paperboard lined with either wax or a thin layer of polyethylene. The lining acts as a non-porous layer and prevents the paper from absorbing fluids in the food. Hot cups are typically used along with a corrugated sleeve in order to insulate the user's hands from the temperature of the cup.

Plates and clamshells can also be made with paperboard, though most are made from molded pulp or fiber that can also be lined. Paper products can be produced with virgin pulp or recycled pulp (pre-consumer and/or post-consumer) or a combination of the two.

There is limited information available about the life cycle environmental impacts of paper food service ware products. The information below comes from studies sponsored by the plastics industry and one academic study that examines eggcups, a product which would not be affected by the proposed ordinance. See Appendix C for further details on these studies.

Table D-2
Zabanioutou & Kassidi Eggcup Container Study
Material Input and Emissions Data
For 50,000 6-egg Eggcup Containers

	Polystyrene Foam	Recycled Paper
Raw Materials		
Fuel	718 m^3	358 m^3
Natural Gas	715 m^3	18.5 m^3
Waste Paper	-	1,500 kg
Total Energy	84,548 MJ	38,288 MJ
Air Emissions		
CH_4 (methane)	3.4 kg	1.6 kg
CO_2 (carbon dioxide)	2,952.5 kg	1,788.0 kg
N_2O (Nitrous oxide)	11.5 g	16.3 g
NO_x (Nitrogen oxides)	32.7 kg	4.2 kg
SO_x (Sulfur oxides)	95.0 kg	5.8 kg

Based on Zabanioutou and Kassidi's study of the life cycle of eggcup containers in Greece, recycled paper requires much less raw material and energy than polystyrene does. As a result it causes fewer nitrogen and sulfur oxides and greenhouse gases to be released. The study shows that recycled paper eggcup production results in more nitrous oxide emissions than polystyrene foam eggcup production does. The applications of this study to the proposed ordinance are limited by its scope, but it shows some of the key emissions from the manufacturing process.

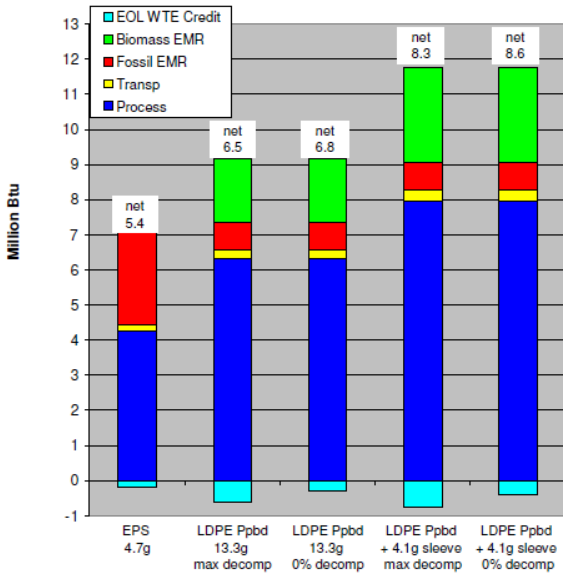
Two studies by Franklin Associates conclude that paperboard products have higher life-cycle environmental impacts than polystyrene foam. One of the two studies was sponsored by MicroGREEN Polymers to compare their 16-ounce recycled PET hot cup to similar EPS foam and paperboard cups. The data from this 2009 report is shown in Table D-3 below.

Table D-3 Franklin Associates 16-oz Hot Cup Study Life Cycle Impacts of 10,000 Cups – Postconsumer Free Approach				
	Total Energy (Million Btu)	**Global Warming Potential** (Pounds of CO_2e)	**Solid Waste (Weight)** (Pounds)	**Solid Waste (Volume)** (Cubic feet)
RPET SMX	4.65	768	205	8.66
EPS	7.46	780	136	10.49
Coated Paperboard	8.62	798	354	10.65
Coated Paperboard + Corrugated Sleeve	10.34	1,215	483	14.70

According to this study, coated paperboard hot cups with a corrugated sleeve require the use of almost 50 percent more energy than EPS foam cups during their life-cycle. They also yield far greater waste both by weight and by volume.

A separate 2011 study by Franklin Associates and sponsored by the American Chemistry Council shows that 16-ounce low-density polyethylene (LDPE) coated paperboard hot cups use more energy than EPS cups do. Other impact categories discussed in the 2011 study such as solid waste and global warming potential show similar results.

Figure D-1: Select Data from 2011 Franklin Associates LCA
Energy for 16-oz Hot Cups (10,000 average weight cups)



Each life cycle assessment or inventory uses different parameters that limit the applicability of the life cycle analysis to the products being studied. Paper products generally seem to require more energy and generate more waste than EPS foam, though their performance can depend on recycled content and the disposal path. Paper products are also compostable and biodegrade in the marine environment.

Bio-based Products

A recent trend in the disposable food service ware industry has been to make products out of materials derived from plants such as corn, sugar cane, and wheat. Two bio-based materials, polylactic acid (PLA) and bagasse, provide alternatives to plastic and paper, respectively. Polylactic acid is a polymer derived from corn starch and for a long time was only produced by NatureWorks LLC in Blair, Nebraska. That is changing as more producers enter the market. Bagasse is a dry fibrous residue that remains after juice is extracted from the crushed stalks of sugar cane.

Since PLA and bagasse can serve as substitutes for plastic and paper, they can substitute for PS foam food service ware products in ways similar to plastic and paper products. According to WorldCentric, a manufacturer of bio-based foodservice ware, producing bio-based materials uses much less energy and water than producing EPS foam. On the other hand, producing bio-based products uses more water than producing substitute plastic products. Table D-4 from their website is shown below.

Table D-4
WorldCentric Eco-profiles for different materials

Manufacturing One Pound of the Material	Energy Used (kWh)	Water Used (gals)	Solid Waste (lbs)	CO_2 Emissions (lbs)
Wheat-Straw	0.66	13.33	n/a	0.69
Sugarcane Bagasse	1.73	14.41	n/a	1.71
Corn PLA	5.37	8.29	0.042	1.3
Virgin Coated Paperboard (SBS)	5.2	12.38	2.33	3.2
100% Recycled Paperboard (SBS)	3.06	3.53	1.34	1.71
PET (Polyethylene)	10.28	7.45	0.087	2.81
PP (Polypropylene)	9.34	5.12	0.029	1.67
EPS (Polystyrene / Styrofoam)	11.28	20.54	0.113	2.51

[a] Source: WorldCentric. "Energy Savings." 2013. Accessed April 17, 2013. Available at: http://www.worldcentric.org/sustainability/energy-savings
- All eco-profiles for plastics are referenced through PlasticsEurope
- Ingeo™ PLA eco-profile data is referenced from NatureWorks LLC
- Paperboard data is referenced from Environmental Paper Network Calculator
- Since Sugar Cane and Wheat Straw fiber are discarded agricultural by-products and the plants not grown exclusively for making compostable tableware products, WorldCentric only takes energy & resource and emissions data from field to factory gate.
- Bagasse and Wheat Straw data is actual manufacturing data.

The WorldCentric eco-profiles do not include the impacts associated with the manufacture, transportation, use, and disposal of the products, which could substantially alter the results. The profiles also treat sugar cane and wheat straw fiber as by-products, so the calculations do not include the energy and water used to grow the sugar cane and wheat straw.

Further information on the life cycle impacts of bio-based products can be found in Appendix C of this Initial Study.

Divertability

The waste disposal paths available to consumers within the project area vary based on the jurisdiction and waste collection provider. The end-of-life scenario for a given product plays an important role in determining its environmental impact. For example when a plastic product is recycled and reused, it displaces a certain amount of plastic that would otherwise need to be newly-produced. The environmental benefits of that displacement are credited to the recycled product, reducing its individual environmental impact. On the other hand if that plastic product is landfilled, then none of the energy or resources that were expended for its production are recovered.

The end of life scenario of a product is an especially important factor in determining the greenhouse gas impacts of PLA products. According to Kuczenski et al., PLA remains inert in landfills but can release its full carbon content as carbon dioxide in municipal and commercial composting facilities.[2] Since PLA is made from plants, plants which capture atmospheric carbon in order to grow, if it is landfilled it serves as a carbon sink. However if PLA is composted then the carbon that was initially captured by the plants is ultimately released back into the atmosphere, which recycles carbon that has been part of the 'active' carbon cycle (as opposed to carbon from petroleum fossil fuels released from the 'geologic' carbon cycle (as opposed to carbon from petroleum fossil fuels released from the 'geologic' carbon cycle) and does not represent a net change in atmospheric carbon levels.

There are no facilities in Santa Clara County that incinerate waste and convert the heat into electricity or another form of usable energy. Some facilities perform methane recovery, but in general if a product is landfilled then the energy and resources that are contained in the product are also disposed. The following table indicates the waste disposal paths that would be followed by EPS foam and substitute foodservice products made from plastics, fibers, and compostable plastics. Some jurisdictions are in the process of adding composting programs or testing composting programs for various sectors.

[2] Kuczenski et al. "Plastic Clamshell Container Case Study." May, 2012. Page 8.

Table D-5
Food Service Ware Disposal Path by Material Type and Sector for Jurisdictions in Santa Clara County

		Material Type			
Jurisdiction	**Sector**	**EPS Foam**	**Rigid Plastic (PET, PP, PS)**	**Fiber (Paper, Bagasse)**	**Compostable Plastic (PLA)**
San Jose	Single Family Residential (SF Res)	**Landfill**	**Recycled** *If source separated*	**Landfill**	**Landfill**
	Multi-Family Residential (MF Res)	**Landfill**	**Recycled** *Source separated or post-collection MSW (Municipal Solid Waste) processing*	**Composted** *Post-collection MSW processing*	**Compostable** *Post-collection MSW processing*
	Commercial (Comm)	**Landfill**	**Recycled**	**Composted** *Post-collection processing*	**Potentially Compostable**
	Special Events	**Landfill**	**Recycled**	**Composted** *If source separated*	**Composted** *If source separated*
Campbell, Los Gatos, Monte Sereno, Saratoga	SF Res	**Landfill**	**Recycled** *if source separated*	**Landfill**	**Landfill**
	MF Res	**Landfill**	**Recycled** *if source separated*	**Landfill**	**Landfill**
	Comm	**Landfill**	**Recycled** *if source separated*	**Composted** *if source separated*	**Composted** *if source separated*
	Special Events	**Landfill**	**Recycled** *if source separated*	**Composted** *if source separated*	**Composted** *if source separated*
Cupertino	SF Res	**Landfill**	**Recycled**	**Composted** *Post Collection if source separated*	**Landfill**
	MF Res	**Landfill**	**Recycled**	**Composted** *Post Collection if source separated*	**Landfill**
	Comm	**Landfill**	**Recycled**	**Composted** *Post Collection if source separated*	**Landfill**
	Special Events	**Landfill**	**Recycled**	**Composted** *Post Collection*	**Landfill**

Table D-5
Food Service Ware Disposal Path by Material Type and Sector for Jurisdictions in Santa Clara County

		Material Type			
Jurisdiction	**Sector**	**EPS Foam**	**Rigid Plastic (PET, PP, PS)**	**Fiber (Paper, Bagasse)**	**Compostable Plastic (PLA)**
Gilroy	SF Res	**Landfill**	**Recycled**	**Composted** *if source separated in organics cart*	**Composted** *if source separated in organics cart*
	MF Res	**Landfill**	**Recycled**	**Landfill**	**Landfill**
	Comm	**Landfill**	**Recycled**	**Composted** *if source separated in organics cart*[1]	**Composted** *if source separated in organics cart*[1]
	Special Events	**Landfill**	**Recycled**	**Composted** *if source separated by event organizer*	**Composted** *if source separated by event organizer*
Los Altos	SF Res	**Landfill**	**Recycled**	**Recycled/ Composted**[2]	**Landfill**
	MF Res	**Landfill**	**Recycled**	**Recycled/ Composted**[2]	**Landfill**
	Comm	**Landfill**	**Recycled**	**Recycled/ Composted**[2]	**Landfill**
	Special Events	**Landfill**	**Recycled**	**Recycled/ Composted**[2]	**Landfill**
Milpitas	SF Res	**Landfill**	**Recycled**	**Landfill**	**Landfill**
	MF Res	**Landfill**	**Recycled**	**Landfill**	**Landfill**
	Comm	**Landfill**	**Recycled**	**Landfill**	**Landfill**
	Special Events	**Landfill**	**Recycled**	**Landfill**	**Landfill**
Morgan Hill	SF Res	**Landfill**	**Recycled**	**Composted** *if source separated in organics cart*	**Composted** *if source separated in organics cart*
	MF Res	**Landfill**	**Recycled**	**Landfill**	**Landfill**
	Comm	**Landfill**	**Recycled**	**Composted** *if source separated in organics cart*[1]	**Composted** *if source separated in organics cart*[1]
	Special Events	**Landfill**	**Recycled**	**Composted** *if source separated by event organizer*	**Composted** *if source separated by event organizer*

Table D-5 Food Service Ware Disposal Path by Material Type and Sector for Jurisdictions in Santa Clara County					
		Material Type			
Jurisdiction	**Sector**	**EPS Foam**	**Rigid Plastic (PET, PP, PS)**	**Fiber (Paper, Bagasse)**	**Compostable Plastic (PLA)**
Mountain View[3]	SF Res	**Landfill**	**Recycled** *Source separated or post-collection MSW processing*	**Landfill**	**Landfill**
	MF Res	**Landfill**	**Recycled** *Source separated or post-collection MSW processing*	**Landfill**	**Landfill**
	Comm	**Landfill**	**Recycled**	**Composted or Landfill** *if source separated*[4]	**Composted or Landfill** *if source separated*[4]
	Special Events	**Landfill**	**Recycled**	**Composted** *if source separated*	**Composted** *if source separated*
Palo Alto	SF Res	**Landfill**	**Recycled**	**Landfill** *compost pilot*	**Landfill** *compost pilot*
	MF Res	**Landfill**	**Recycled**	**Composted** *if source separated*	**Composted** *if source separated*
	Comm	**Landfill**	**Recycled**	**Composted** *if source separated*	**Potentially Compostable** *if source separated*
	Special Events	**Landfill**	**Recycled**	**Composted** *if source separated*	**Composted** *if source separated*
Santa Clara	SF Res	**Landfill**	**Recycled**	**Landfill** *clean paper recycled*	**Landfill**
	MF Res	**Landfill**	**Recycled**	**Landfill** *clean paper recycled*	**Landfill**
	Comm	**Landfill**	**Recycled**	**Landfill** *clean paper recycled*	**Landfill**
	Special Events	**Landfill**	**Recycled**	**Landfill** *clean paper recycled*	**Landfill**
Sunnyvale	SF Res	**Landfill**	**Recycled**[5]	**Landfill**	**Landfill**
	MF Res	**Landfill**	**Recycled**[5]	**Landfill**	**Landfill**
	Comm	**Landfill**	**Recycled**[5]	**Composted** *if participant in food scrap pilot program only*	**Composted** *if participant in food scrap pilot program only*
	Special Events	**Landfill**	**Recycled**[5]	**Composted** *if source separated; Annual Art and Wine Festival Only*	**Composted** *if source separated; Annual Art and Wine Festival Only*

Table D-5
Food Service Ware Disposal Path by Material Type and Sector for Jurisdictions in Santa Clara County

		Material Type			
Jurisdiction	**Sector**	**EPS Foam**	**Rigid Plastic (PET, PP, PS)**	**Fiber (Paper, Bagasse)**	**Compostable Plastic (PLA)**
Uninc. County, Districts 1, 4, 5 A,B, & C	SF Res	**Landfill**	**Recycled**	**Landfill**	**Landfill**
	MF Res	**Landfill**	**Recycled**	**Landfill**	**Landfill**
	Comm	**Landfill**	**Recycled**	**Landfill**	**Landfill**
	Special Events	**Landfill**	**Recycled**	**Landfill**	**Landfill**
Uninc. County, District 2	SF Res	**Landfill**	**Recycled**	**Recycled** *if source separated*	**Landfill**
	MF Res	**Landfill**	**Recycled**	**Recycled** *if source separated*	**Landfill**
	Comm	**Landfill**	**Recycled**	**Recycled** *if source separated*	**Landfill**
	Special Events	**Landfill**	**Recycled**	**Recycled** *if source separated*	**Landfill**
Uninc. County, District 3A	SF Res	**Landfill**	**Recycled**	**Recycled**[6]	**Landfill**
	MF Res	**Landfill**	**Recycled**	**Recycled**[6]	**Landfill**
	Comm	**Landfill**	**Recycled**	**Recycled**[6]	**Landfill**
	Special Events	**n/a**	**n/a**	**n/a**	**n/a**
Uninc. County, District 3, B & C	SF Res	**Landfill**	**Recycled** *if source separated*	**Landfill**	**Landfill**
	MF Res	**Landfill**	**Recycled** *if source separated*	**Landfill**	**Landfill**
	Comm	**Landfill**	**Recycled** *if source separated*	**Landfill**	**Landfill**
	Special Events	**Landfill**	**Recycled** *if source separated*	**Composted** *if source separated*	**Composted** *if source separated*

[1] Gilroy and Morgan Hill: only 3-4 businesses currently have organics collection.
[2] Los Altos: paper is recycled or composted depending on type (e.g. clean or soiled), Bagasse is composted.
[3] Mountain View: rigid plastic clamshells not accepted for recycling.
[4] Mountain View: composting program available to all businesses beginning July 1, 2013.
[5] Single-use disposable plastic foodservice ware is recycled when/if markets exist. Other rigid plastics (#1-#7) are recycled.
[6] District 3a: Processed MSW fiber is composted, mixed recycled fiber is recycled.

Coolers/Ice Chests

Jurisdictions within the project area may prohibit the sale of expanded polystyrene coolers or ice chests along with EPS foam food service ware. EPS foam ice chests tend to range in volume from 22 to 30 quarts, or enough to hold 24 12-ounce cans. At this time, the City of San José is unable to identify any disposable substitutes that might be used in place of EPS foam coolers. Therefore it is expected that people would use either durable plastic ice chests or insulated bag coolers as alternatives.

Information on the environmental impacts of ice chests is sparse, and the City could not find any life-cycle analyses or inventories to document the impacts of substitute containers. As shown above, polystyrene foam containers consistently weigh less than their plastic counterparts. It is reasonable to assume that durable plastic substitute coolers are heavier than EPS foam coolers of similar sizes. Not only do durable plastic coolers weigh more than comparable EPS foam coolers, they also can be much larger. For example, Wal-Mart offers a 150-quart Rubbermaid ice chest, which offers a volume more than five times greater than the typical EPS foam ice chest.

Based on weight and the information presented in this appendix, it seems that the production of a polystyrene foam ice chest would have fewer environmental impacts than the production a durable plastic ice chest. When looking at the full life-cycle of the two, it is less clear. Durable plastic coolers are intended for reuse over many years whereas EPS foam coolers may be used as few as one or two times. The longer a durable plastic cooler is used, the better its environmental performance will be relative to an EPS foam cooler.

With regards to the end of life phase, neither product is recyclable or compostable, so both would end up in landfills when disposed of properly. If improperly disposed, polystyrene foam coolers would be more likely to break into pieces and disperse in the terrestrial or marine environment than durable coolers. This is due to the fact that EPS foam coolers are made of small PS foam beads that can break apart from physical impacts as well as erosive forces from water, sand, and wind.