SOLID WASTE SUB-ELEMENT

CITY OF SUNNYVALE
GENERAL PLAN

This Sub-Element complies with California Government Code Section 65303 and was adopted by the Sunnyvale City Council on June 4, 1996

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Sunnyvale, California

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City of Sunnyvale
Solid Waste Sub-Element
of the General Plan

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PREFACE

This Solid Waste Sub-Element establishes a policy framework for the future development of the solid waste management system in Sunnyvale. The document describes collection, recycling, disposal and other key components of the existing solid waste system. It also explains the economics of solid waste management and discusses various future issues. The meanings of the technical terms and acronyms used throughout the document are explained in the glossary shown as Appendix 1 of the Sub-Element.

Some of the future issues have long-term effects on the City. For example, the California Integrated Waste Management Act of 1989, commonly known as AB 939, requires each city and county in California to divert 25% of its solid waste from landfill by 1995 and 50% by the year 2000. It also requires each city to prepare a Source Reduction and Recycling Element (SRRE) outlining its plan to achieve the required diversion. The City was the first in the state to complete and adopt its SRRE.

The adoption of the Solid Waste Sub-Element will formalize the City's goals and financial strategies for safe collection and disposal of waste generated, as well as selection and management of source reduction and recycling programs. As discussed in the Sub-Element, the primary challenge over the next twenty years will be to integrate source reduction, recycling, and SMaRT Station recovery programs to achieve most cost-effectively the targeted level of diversion of solid waste.

In developing a document like the Solid Waste Sub-Element which directly affects businesses and residents, it is essential to gather as much information as possible on the values and preferences of the community. To this end, staff conducted public participation events aimed at reaching residential and commercial customers. These events were not designed to achieve strict statistical validity; rather they were "snap-shots" of a cross-section of the many customers for an assessment of the community's perceptions, needs and desires regarding solid waste services.

Focus group sessions were conducted in late 1995 and early 1996. The Facility Managers Meeting organized monthly by the Department of Community Development in cooperation with the Sunnyvale Chamber of Commerce was identified as the appropriate channel to reach out to Sunnyvale businesses. Staff attended the meeting in November 1995. For residential customers, a random list of residents was selected from the Utilities Billing System. Letters were sent to the residents inviting them to participate in a discussion session held at the Community Center in February 1996. City staff then followed up with

phone calls or personal visits to confirm their availability. During both meetings, the highlights of the draft Solid Waste Sub-Element were presented and current issues were discussed. Written surveys asking participants to rank the relative values they place on various aspects of solid waste management services were also conducted. Their priorities, feedback and concerns have been incorporated into the final document. Tables summarizing results from the written surveys are shown in Appendix 4.

The Solid Waste Sub-Element is a new sub-element in the Environmental Management Element of the City's General Plan. The other sub-elements of the Environmental Management Element include Water Resources, Sanitary Sewer System, Surface Runoff, Energy, Noise, and Air Quality. With careful planning, the City of Sunnyvale can preserve its environment and natural resources.

Executive Summary

Purpose

This sub-element describes the reasons for the City's involvement in solid waste management; the physical, economic, and contractual structure of the City's existing waste management endeavors; and recommends policies intended to provide the City's residents and businesses with a stable, environmentally sound solid waste management system throughout a twenty-year planning period.

Introduction

During the past ten to fifteen years, Sunnyvale's solid waste management system has undergone significant changes, most notably the startup of the City's curbside recycling service in 1982 and the evolution of that service into a comprehensive source reduction and recycling program that, by 1995, was diverting an estimated 40-45% of the City's solid waste from landfill disposal.

From 1984 to 1993, the City's solid waste was disposed of in three different landfill sites (Mountain View, Sunnyvale, and Kirby Canyon landfills), with the City-owned Sunnyvale Landfill closing its gates permanently in 1993. New federal and state environmental regulations sharply increased the cost and complexity of all aspects of the solid waste management system. The total tons of refuse landfilled decreased by 48% from 222,000 tons in 1982 to 116,000 tons in 1994; the typical monthly residential refuse collection charge increased from $3.42 in 1982 to $24.89 in 1995 to recover the City's increased cost of managing solid waste in compliance with environmental regulations.

Household Hazardous Waste drop-off events were first offered to Sunnyvale residents twice per year in 1985 and have evolved to quarterly events that include businesses that generate small quantities of hazardous waste.

July 1994 saw the start of separate collection of yard waste, reducing single-family refuse collection tonnages by 30% and producing usable mulch and soil amendments.

Finally, by constructing the Sunnyvale Materials Recovery and Transfer (SMaRT) Station in conjunction with the cities of Mountain View and Palo Alto, the City now hosts a major regional recycling and waste transfer facility that is on the leading edge of both materials recovery technology and multi-jurisdictional cooperation.

The major components of a stable solid waste management system are now in place. The City has assured itself of refuse disposal capacity until at least the year 2021 by way of a long-term contract for refuse disposal. The SMaRT

Station, with long-term funding commitments from Mountain View and Palo Alto, provides a flexible means of transporting refuse to virtually any disposal site on the West Coast. The materials recovery component of the SMaRT Station plays a major role in City compliance with a state mandate to reduce refuse disposal by 50% by the year 2000. The combination of the SMaRT Station's materials recovery capabilities and the City's existing and planned source reduction and source-separation recycling programs makes Sunnyvale one of few jurisdictions likely to achieve the 50% diversion mandate.

Financial, rather than technical issues now pose the most significant solid waste management challenges to the City. In fiscal year 1995-96 the amount budgeted to manage Sunnyvale solid waste is $22.0 million (excluding SMaRT Station and landfill expenditures which are reimbursed by the cities of Mountain View and Palo Alto), making this the largest single program budget the City has, and is exceeded only by the $32.8 million budget for the entire Department of Public Safety and the $27.1 million budget for the rest of the Department of Public Works (see Figure 1).

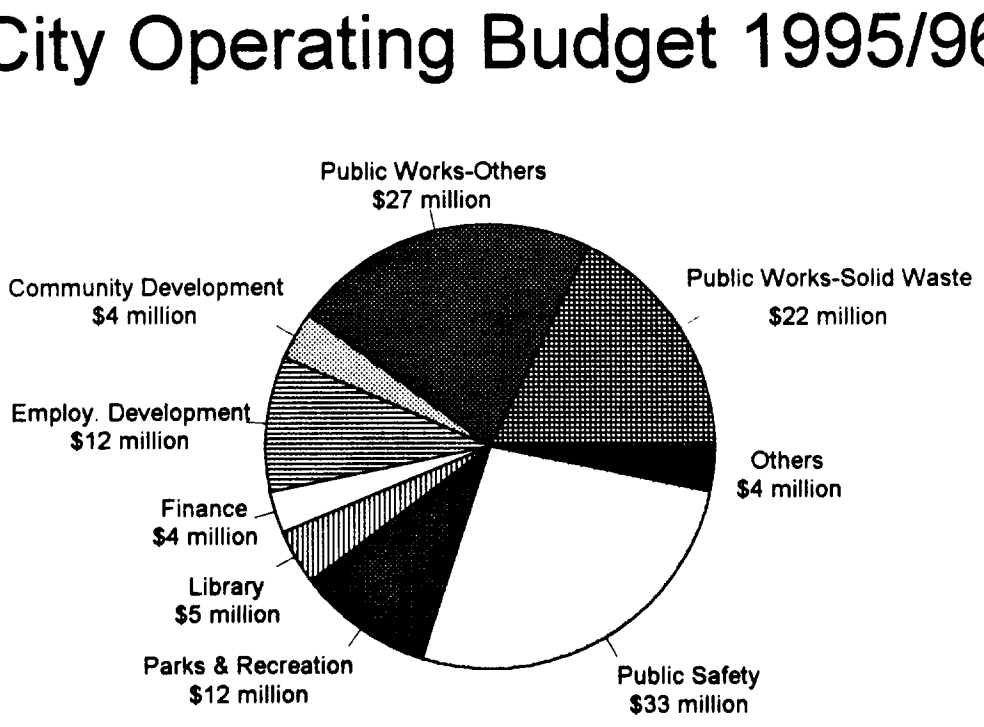


Figure 1

As refuse collection rates are driven up by the cost of recycling services and compliance with environmental mandates, businesses have been coping with those higher rates by increasing recycling to minimize their costs for refuse disposal. While these private recycling efforts help move the City toward the 50% recycling mandate, they force more fixed costs of the solid waste utility to be allocated over less refuse, further increasing rates. The City's response to this trend should focus on both reducing expenses and increasing revenues. Along with searching for efficiencies that would promote achievement of the goals articulated in this Sub-Element while helping lower solid waste management expenses over the long term, the City can seek out additional sources of revenue. Potential sources of revenue include development of new markets for existing recovered materials and searching for markets for new categories of materials to be recovered. The City can influence markets through its legislative advocacy at both the state and federal levels. Legislative directives to eliminate tradition-based barriers to use of recycled products and require minimum recycled content for key products can be effective in stimulating use of recycled products by both the private sector and public sector.

As reflected in public opinion gathered from the public participation events, community acceptance of the 50% diversion goal appears to be very strong and, in light of the substantial capital investments made thus far, it may be desirable for the City to establish its own 50% diversion goal independent of the state mandate. Whether it targets 50% or some higher or lower level of diversion, the City's primary challenge over the next twenty years will be to integrate source reduction, recycling, and SMaRT Station recovery programs to achieve most cost-effectively the targeted level of diversion of solid waste.

Existing Solid Waste Management System

Sunnyvale provides a broad range of solid waste management services to its residents and businesses by way of a municipal solid waste utility. At the present time the three major service components (collection of solid waste and recyclables, SMaRT Station operation, and disposal) are provided by private companies working under contract with the City. Costs of garbage collection service are among the top four aspects as ranked by the businesses and residents attending the focus group meetings. Each of these three contracts was awarded by a competitive procurement process designed to ensure that long-term costs to the City and its ratepayers are minimized. The key solid waste service components and their relationship to City goals are described below:

Source Reduction: The most effective way to manage solid waste is to avoid producing it in the first place. In order to reduce the generation of solid waste, the City encourages "source reduction" by providing residents with workshops on

backyard composting and making composting bins available to workshop participants (at a reduced price). A City-sponsored City-Wide Garage Sale is also held each spring in advance of the free refuse disposal services offered to residents, to encourage reuse, rather than disposal, of discarded items. The City also conducts a public information program designed to encourage source reduction behavior and promote recycling.

Recycling: Using recycled or "secondary" materials to produce consumer goods and industrial outputs reduces the environmental impact of manufacturing. Factories utilizing recycled materials generate less air and water pollution and consume less energy than comparable plants using virgin materials. When avoided landfill disposal costs are factored in, it often costs the City less to collect and recycle materials than to collect and landfill those materials. Materials can be "source separated" for recycling by the resident or business generating the waste material or separated by a centralized "materials recovery facility" after it has been collected as refuse. The City provides a variety of source separation recycling services including: curbside recycling for single-family homes, duplexes, triplexes, and mobile homes; collection of cardboard from commercial customers; commercial waste audits, recycling information, and referral services designed to link generators of recyclable materials with private sector recycling service providers; a concrete and asphalt recycling facility; and a comprehensive source separated recyclables drop-off center and a materials recovery facility at the SMaRT Station.

Household Hazardous Waste: Lack of convenient, low cost, legal disposal for household hazardous wastes leads to dangerous accumulations in homes or improper and environmentally damaging disposal in landfills or storm drains. To reduce the environmental impact and to minimize the City's long-term liability for landfill cleanup expenses, the City provides "no charge" quarterly hazardous waste drop-off events for paint, pesticides, automotive fluids, and other hazardous wastes produced by residents and small businesses.

Yard Waste Collection: Because grass clippings, tree trimmings, and other green waste make up a large portion of residential refuse and are difficult to separate out from mixed garbage, the City provides separate collection of residential yard waste. This service, initiated in 1994, has reduced nearly 30% the total refuse collected from single-family homes, duplexes, triplexes, and mobile homes. Materials collected are processed at the SMaRT Station for use as mulch and soil amendment.

Refuse Collection: In order to protect the public from the health hazards posed by accumulations of garbage and other debris, the Sunnyvale Municipal Code requires that refuse be collected at least once per week. The City contracts with a private waste hauler for collection of refuse from residences, businesses,

institutions, and construction sites in Sunnyvale. All refuse collected by this hauler is delivered to the SMaRT Station.

Materials Recovery: Although source separation recycling diverts significant quantities of sorted, high-value secondary materials from disposal, significant amounts of recyclable materials remain in refuse when it is delivered to the SMaRT Station. In order to further divert these materials from landfill disposal, refuse received from Sunnyvale, Mountain View and Palo Alto is passed through a sophisticated materials recovery process where recyclable products (paper, glass, aluminum and other metals, and plastic bottles) are removed. The materials recovery accomplished by the SMaRT Station makes this facility a key element of the City's efforts to divert 50% of its waste from disposal by the year 2000. The SMaRT Station was built by the City on City-owned land adjacent to the Sunnyvale Landfill and is operated under contract by a private company. The Station's construction was funded by the issuance of $21.3 million in revenue bonds by the City. Sunnyvale, Mountain View, and Palo Alto share the cost of the debt service on the bonds, and the SMaRT Station's materials recovery and refuse transfer operating expenses are also shared by these cities in proportion to the amount of refuse each city delivers to the facility.

Disposal: Despite the City's efforts, materials for which recycling markets do not exist or which are difficult and expensive to divert still must be disposed. Currently the most cost-effective and environmentally safe disposal alternative available to the City is in a state-of-the-art landfill. The closure of the Sunnyvale Landfill in 1993 made it necessary to haul the City's refuse 27 miles to the Kirby Canyon Landfill in southern San Jose for disposal. The SMaRT Station can consolidate the refuse from three collection trucks into one large transfer trailer for delivery to the landfill, thus promoting the efficient use of vehicles and workers for transfer of the residue from the SMaRT Station to Kirby Canyon. This landfill is designed and operated to meet the most stringent federal and state environmental regulations. The City has landfill capacity under contract through at least 2021.

Landfill Post-Closure Maintenance: Portions of the closed Sunnyvale Landfill are used for purposes related to solid waste management and may provide revenues to the solid waste enterprise fund. The landfill offers recreational open space and an energy resource in the methane contained in landfill gas. The landfill is also a long-term financial liability for the City and its ratepayers, as the City is required to monitor gas emissions and migration, groundwater quality, and the condition of the landfill surface for a minimum of thirty years.

Economics of Solid Waste Management

The City of Sunnyvale provides solid waste management services as a municipal utility. The City provides the solid waste services and facilities described above, the cost of which is charged to refuse collection ratepayers according to a cost of service rate-setting policy approved in 1993 by the City Council. The rate for each service is based on the City's cost of providing that service. The City bills residential and business customers for solid waste management charges, along with charges for City water and sewer service. Customer payments, along with revenues from sales of recyclable materials, reimbursements from the cities of Mountain View and Palo Alto, and revenues from franchise fees, leases, grants, and interest earnings are deposited in a solid waste enterprise fund. All solid waste management costs are then paid for from this fund. No General Fund (tax) monies are used to provide solid waste management services.

Future Solid Waste Management Issues

The City's solid waste management system has become much more stable and financially predictable in recent years, with the acquisition of long-term disposal capacity, completion of the SMaRT Station, and implementation of new programs designed to increase diversion of wastes from landfill disposal. However, several critical factors largely outside the City's control could have significant impacts on the system in the future. These factors and the challenges they pose are described below.

Changing Waste Stream: Both the quantity and composition of the waste stream managed by the City have changed and will continue to change over time. These changes will primarily impact the City's revenues from refuse collection customers and the sale of recyclables, thus affecting refuse collection rates.

Waste Stream Quantity: As noted above, the amount of waste disposed by the City declined 48% between 1982 and 1994, primarily due to economic changes in the City and increased recycling by industry. As waste quantities declined, the City's collection and disposal costs, which reflect large investments in solid waste infrastructure, declined more slowly than rate revenues. Fixed costs, such as the expense of landfill engineering and recycling programs, were also spread over fewer refuse collection customer accounts, thus pushing collection rates higher. While the amount of refuse collected by the City may continue to decrease, the City is not likely to see as sharp a decline as during the 1982-1994 period. Depending on population changes, economic conditions, and other factors, increases in tonnage are possible. In general, increased waste tonnage is likely to have a downward influence on future collection rates, while tonnage decreases will increase rates. A rate increase or decrease does not necessarily

translate into an increase or decrease in monthly charges to an individual customer, since the amount of refuse disposed by that customer may also change. For example, even if the rate for weekly pickup of a three cubic yard commercial bin increases, an individual customer could see a decrease in cost by reducing his/her level of service to weekly pickup of a two cubic yard bin.

Waste Stream Quality: The quality, or composition, of the waste generated in Sunnyvale is a key factor in determining the achievable level of diversion and the bottom-line cost to refuse collection ratepayers. Waste composition, and thus the overall value of the materials available to be recycled, is affected by a number of factors that remain largely out of the City's control but will affect the City's costs and ensuing rates charged to refuse collection customers. These factors include:

- Changes in the output of City industries
- Economic status and consumer confidence of City residents
- Packaging and product marketing decisions by consumer goods manufacturers
- Recycling performed by others before refuse or recyclables are collected by the City

Superfund and Flow Control: Federal law is likely to play a larger role in the City's solid waste management system than it has in the past. The federal "Superfund" site cleanup law attaches to the City a potentially unlimited liability for future cleanup of leaking disposal sites that contain waste generated in Sunnyvale. This liability exists even if the City played virtually no role in directing waste to the site. Businesses generating wastes in the City (and in some cases even individual residents) can also incur their own liability for cleanup costs under Superfund. This fact is an incentive for the City to use a strong hand in directing the flow of disposed waste to sites that are well-engineered and operated to minimize the potential for future cleanup activities.

At the same time that federal law assigns the City with virtually unlimited liability for the cleanup of sites containing waste generated in Sunnyvale, a 1994 U.S. Supreme Court decision and subsequent proposed federal legislation have the potential to reduce the City's ability to decide where Sunnyvale wastes are disposed ("flow control"). While the impact on Sunnyvale of the Court's decision in *C&A Carbone vs. Town of Clarkstown, N.Y.* is unclear, and proposed legislation to respond to the decision is still slowly moving through Congress, the *Carbone* decision places the federal government squarely into local solid waste management issues in an unprecedented manner. Regardless of how the federal flow control issue is resolved, in the future the City will be affected by national policy as never before.

Establishing a Diversion Goal: Because the State of California mandated that cities and counties must divert 50% of their solid waste by the year 2000, Sunnyvale responded with source reduction, recycling, yard waste collection, and materials recovery programs and facilities. The City expects to be near 50% diversion by 2000. However, some California cities and counties are making weak diversion efforts and are calling for a reduction in the 50% mandate. Now that Sunnyvale has invested resources and resident effort to reach 50% diversion, the City should consider making a commitment to its own diversion goal, regardless of the State standard.

Enhancing Source Reduction and Recycling Programs: Reaching 50% diversion may require enhancement of existing source reduction and recycling services and/or new services, such as adding mixed waste paper and additional plastics to the items collected at curbside, or initiating a new multifamily recycling collection program. Careful selection of the mix of services will be required to achieve the diversion goal most cost-effectively.

City's Commercial/Industrial Recycling Role: Commercial and industrial customers generate 68% of the solid waste in Sunnyvale, and are key factors in the City's overall success at increasing recycling and reducing refuse landfilled. Commercial and industrial wastes contain, on average, more recyclable materials than residential wastes. As refuse collection rates have risen in recent years, many larger waste generators have begun having their recyclable wastes collected outside the City's franchised system. These activities are permitted under existing City practices which allow the open collection of recyclables (but not solid waste) by any vendor that a business selects. The result has been that the fixed costs of the Solid Waste Program have been spread over a smaller refuse collection revenue base. This gradual "flight" of tonnage has increased the upward pressure on refuse collection rates for the remaining customers. The most powerful argument for this option is that it is in full compliance with recent legal decisions on the ownership of recyclables. The California Supreme Court has ruled that recyclable material becomes "waste" only when it is discarded, and that any material that can be sold or given away has "value" and thus is fully protected under private property precedents.

From a City revenue perspective, the drawback of this option is that collection fee revenues decline quickly as the amount of solid waste collected is reduced, while the cost of the City's collection system declines more slowly. This approach also leaves the general provisions of the Municipal Code as the only control over the side effects of collection. While the City has contractual control over the actions of the franchised refuse collection company, it has only the Code to address complaints about spilling of materials from vehicles and noisy collections at early hours of the morning by non-franchised collectors of recyclable materials.

The City should consider establishing explicit policies regarding commercial and industrial recycling. A variety of policy alternatives to either tighten or relax the City's hold on commercial and industrial refuse are available. Tightening the City's hold would tend to lower rates for most ratepayers, but would increase costs for larger waste generators who currently have "mixed recyclables" waste hauled outside the franchised system. Relaxing the City's hold would have the opposite effect, increasing rates for most ratepayers but saving money for large generators. An intermediate option that should be considered seriously would allow mixed recyclables hauling but would require nonexclusive franchises and haulers to pay a franchise fee.

Applying New Technologies: In both the areas of collection and materials recovery, new technologies have provided opportunities to improve worker safety and reduce expenses. Solid waste collection and processing equipment is capital-intensive with a relatively long useful life. Since the best time to implement new technology is when replacing outdated equipment, there are relatively few opportunities to take advantage of the latest innovations, and each opportunity is critical. As a result, the City has two specific long-range equipment replacement plans.

The refuse collection franchise agreement includes detailed depreciation and replacement schedules showing the date at which each collection vehicle is to be replaced, along with the estimated purchase price. This schedule, which is reviewed and updated annually, allows for the orderly, cost-effective implementation of new collection technologies. Because rates are set using the same long-range planning method, this long-range equipment replacement schedule allows the future benefits of technological innovation to benefit present ratepayers.

The SMaRT Station also has a long-range plan for replacement of the various components of the City's investment in the facility. This plan includes an equipment replacement reserve that is funded by the cities of Sunnyvale, Mountain View and Palo Alto in proportion to their original investment in the SMaRT Station. Over 30 years, the fund will pay for replacement of items such as the refuse compactor and conveyors, the various components of the materials recovery facility, the roof, and the specially hardened concrete floor. Past and anticipated expenditures, inflation assumptions, and interest earnings are reviewed annually by the three cities so that contributions to the fund are maintained at a level sufficient to maintain a positive balance until the three city Memorandum of Understanding expires in 2021.

Maintaining Disposal Capacity: The fact that Sunnyvale has landfill disposal capacity under contract until 2021 should not lead to complacency. Based on the City's recent experience, it should be assumed that acquiring new disposal capacity takes a minimum of five years. To be assured that it has at least five

years of disposal capacity under contract, the City should initiate actions to arrange for sufficient capacity to accommodate present and projected needs any time that available capacity equals ten years or less.

Use of Closed Sunnyvale Landfill and Recycling Center: A variety of uses of the closed Sunnyvale Landfill are planned or currently exist. These include concrete recycling on the East Hill of the landfill; occasional use of a sludge monofill in the valley between the East and South Hills; a permanent Household Hazardous Waste drop-off facility at the Recycling Center on Carl Road; use of the Recycle Hill for 4-H animal grazing; and recreational use of the remaining landfill by walkers, joggers, bird-watchers, etc. Given the landfill's unique status as nearly 100 acres of essentially undeveloped land in a nearly built-out city, other proposals for its use are likely to be made. Decisions will need to consider physical constraints (the need to protect the clay cap, differential settlement of the surface, and the presence of landfill gas) and evaluate each proposal's ability to assist the City in achieving its solid waste diversion goal, in addition to considering more traditional issues such as potential revenues, aesthetics, and public access to open space.

Conclusion

In the past ten to fifteen years, increasingly stringent environmental regulations have been applied to refuse disposal. During the same period, recycling has replaced disposal as the public's favored method for handling discarded wastes, leading to an ambitious diversion mandate handed down from the state legislature. At the same time, the City-owned landfill, a low-cost disposal site that had been used for some 60 years, reached capacity and closed permanently.

Sunnyvale has emerged from this period with a well-developed, stable, and cost-effective solid waste management system that is a state-wide leader in diverting refuse from landfill disposal. The City has long been recognized for its leading role in solid waste management issues. As mentioned in the California Integrated Waste Management Board's 1994 Annual Report, "(t)he City of Sunnyvale is another community that has responded to the call to reduce waste. Since 1989, their waste diversion has doubled, going from about 18 percent in 1989 to nearly 40 percent today. Their efforts to invest in new waste management technologies and expand their education programs for the public are just a part of their formula for success."

The City has already in place the physical components it needs to assure compliance with environmental regulations and the state's diversion mandate, and can assure its customers of long-term refuse disposal capacity. However, the cost of achieving this condition has increased refuse collection costs for the

customers of the City-franchised solid waste system. The City's primary challenge over the next twenty years will be to integrate source reduction, recycling, and SMaRT Station recovery programs to achieve the appropriate level of diversion of solid waste in a manner that minimizes costs to the community.

Goals and Policies

Based on the findings and issues summarized above and discussed in more detail in the body of the Sub-Element, the following Goals and Policies for the management of solid waste are proposed:

Goal 3.2A. **Ensure that all municipal solid waste generated within the City is collected and transported in a manner that protects public health and safety.**

Policy 3.2A.1. Provide convenient, competitively priced solid waste collection services.

Policy 3.2A.2. Ensure that standards of Customer Service Excellence policies are met by those providing solid waste collection service.

Goal 3.2B. **Reduce solid waste disposal to 50% or less of the amount generated in 1990 (as adjusted to reflect population and economic changes) in the most cost-effective manner.**

Policy 3.2B.1. Reduce generation of solid waste by providing source reduction programs and promoting source reduction behavior.

Policy 3.2B.2. Maximize diversion of solid waste from disposal by use of demand management techniques, providing and promoting recycling programs, and encouraging private sector recycling.

Policy 3.2B.3 Meet or exceed all federal, state, and local laws and regulations concerning solid waste diversion and implementation of recycling and source reduction programs.

Policy 3.2B.4 Increase demand for recycled materials by advocating local, state and federal legislation that will increase use of recycled content products.

Goal 3.2C. **Encourage residents to maintain clean neighborhoods by preventing unsightly accumulations of discarded materials and illegal dumping of municipal solid waste.**

Policy 3.2C.1. Provide periodic opportunities for residents to dispose of refuse at discounted or no charge.

Goal 3.2D. **Dispose of solid waste generated within the City in an environmentally sound, dependable, and cost-effective manner.**

Policy 3.2D.1. Assure that the City possesses a minimum of five years of refuse disposal capacity at all times.

Policy 3.2D.2. Reduce the amount of refuse being disposed, generate recycling revenues, and minimize truck travel to the disposal site through use of the Sunnyvale Materials Recovery and Transfer (SMaRT) Station.

Goal 3.2E. **Minimize potential future City liability for wastes generated in the City.**

Policy 3.2E.1. Select disposal methods and sites for solid and hazardous wastes that incorporate technologies and practices most likely to eliminate or minimize future City liabilities.

Policy 3.2E.2. Minimize impact on future rate payers of potential liability for past disposal practices.

Policy 3.2E.3. Minimize illegal and inappropriate disposal of Household Hazardous Waste (HHW).

Policy 3.2E.4. To meet or exceed all federal, state, and local laws and regulations concerning Household Hazardous Waste (HHW) and implementation of HHW programs.

Goal 3.2F. **Maintain sound financial strategies and practices that will enable the City to provide comprehensive solid waste management services to the community while keeping refuse rates at or below countywide averages for cities using cost of service pricing.**

Policy 3.2F.1. Establish refuse collection and disposal rates in a manner that equitably allocates program costs among rate payers and promotes rate stability.

Policy 3.2F.2. To the greatest extent possible, anticipate changes required in refuse collection rates in response to changes in laws, regulations, and economic factors affecting the solid waste management system.

Policy 3.2F.3. Identify additional revenue sources and, where possible, increase revenues from solid waste programs, services, and facilities without jeopardizing program goals and customer service quality.

Goal 3.2G. Contribute to an economic development environment that is supportive of a wide variety of businesses.

Policy 3.2G.1. Provide solid waste services desired by businesses at competitive rates.

Goal 3.2H. Manage the closed Sunnyvale Landfill in a manner that protects the public health and safety and the environment, promotes enjoyable public use of the site, and assists in the achievement of other goals of the Solid Waste Sub-Element.

Policy 3.2H.1. Ensure compliance with federal, state, and local laws and regulations.

Policy 3.2H.2. Extract available resources from the refuse buried at the landfill.

Policy 3.2H.3. Provide for safe, enjoyable recreational access to portions of the landfill.

Policy 3.2H.4. Provide for facilities and activities on portions of the landfill that support achievement of the City's solid and household hazardous waste goals and policies.

Policy 3.2H.5. Generate revenues from post-closure uses of the landfill.

Community Conditions

Introduction

Solid Waste - What It Is and Where It Comes From

Solid waste consists of virtually all of the materials discarded by residents and businesses in the course of daily life, business activities, and manufacturing. It does not include hazardous wastes, medical waste, sewage, or liquids. Because accumulation of solid waste can present public health problems, the Sunnyvale Municipal Code requires all residences and business premises to subscribe to regular collection service.

In 1995, the City of Sunnyvale has a residential population of 125,600, including 50,620 households in single family, multifamily and mobile home park dwellings. According to the disposal records of the Department of Public Works, approximately 32% of the solid waste disposed from the City of Sunnyvale is generated by the residential sector.

The eight main business sectors within Sunnyvale are semiconductors, computers/communications, defense/space, business services, software, environmental, bioscience, and retail. Combined with government agencies, schools, and construction and demolition projects, these main business sectors generate approximately 68% of the solid waste in Sunnyvale.

Community Condition Indicators

The City tracks a number of statistical indicators of the well-being of the community. Solid waste statistics currently included among those indicators are the total annual tonnage of solid waste landfilled and the total annual tonnage of recyclables diverted from disposal by the City. These figures are updated annually. Additional community condition indicators may be added in accordance to the "Goals, Policies, and Action Statements" section.

Existing Solid Waste Management System

Collection of Garbage and Recyclables

Refuse Collection

The collection of solid waste in Sunnyvale is performed by a private company under contract to the City. The current franchise agreement will expire in 2004. Solid waste is collected from residences at curbside on weekdays using a combination of manual, semi-automated, and fully-automated collection vehicles.

Residents with unlimited garbage service place their trash in a black wheeled cart provided by the City which is picked up curbside weekly. Solid waste that will not fit in the wheeled cart can be placed in 32-gallon cans or plastic garbage bags. A baseline level of service is available to residents generating 32 gallons (one standard-size garbage can) or less of solid waste per week at a lower cost commensurate with this service. Rear yard collection is available for the elderly and physically disabled. Residents in most multifamily dwellings (four units or more) receive similar service as commercial and industrial customers, described below.

Solid waste is collected from commercial and industrial customers on a weekly basis using front-loading vehicles. Large roll-off boxes and compactors are collected either weekly or on an as-needed basis, using special trucks for that purpose. The solid waste that is collected is transported to the SMaRT Station. (The SMaRT Station operations are detailed in a later section.)

Disposal Programs at Discounted or No Charge

A number of disposal programs are provided periodically to residents at discounted or no charge. These programs are designed to reduce the amount of discarded materials accumulated in the community and illegal dumping activities. They include:

- *Spring/Fall Cleanups*

Spring and Fall Cleanups are "Extended Curbside Collection" events that are provided two times per year for residents in all single family homes, duplexes, triplexes, and mobile home parks in Sunnyvale. These events, normally scheduled in spring and fall, last for four weeks. During the cleanup period, residents can set out household debris for pickup on their regular garbage day for pickup at no extra charge. Extra items that will be picked up include appliances such as refrigerators, water heaters, washers and dryers, bundled carpets and tree trimmings, and extra refuse for residents subscribing to baseline service.

- *Extra Dump Weekends*

During the Spring/Fall Cleanups, the City also offers "Extra Dump Weekends." On four weekends per year (two each for spring and fall), Sunnyvale residents can dispose of their garbage and refuse at the SMaRT Station for no charge. The "Extra Dump Weekends" are for residents only and not for businesses, contractors, non-resident property owners, or other commercial establishments.

- *Neighborhood Cleanups*

In conjunction with recognized neighborhood associations, the City organizes a number of neighborhood cleanup events. The City arranges for delivery of roll-off debris boxes, typically on Fridays, to locations pre-selected by the neighborhood association. The debris boxes are emptied and returned throughout the weekends as needed, and are removed on the following Monday. These cleanup events provide a close-by and convenient disposal means for residents who do not utilize other no-cost disposal options.

Recyclables Collection

In order to meet the 50% diversion mandate, the City has implemented numerous recycling programs, for residents and businesses.

- *Residential Curbside Recycling Program*

A weekly curbside collection of newspaper, glass, metal cans, PET (#1) plastic bottles, used motor oil, oil filters and cardboard is provided to all single family, duplex, triplex, and mobile home park residences in Sunnyvale. Residents are given three plastic bins to be set out on the same day as their garbage collection. Used motor oil is collected in 1- gallon plastic jugs (also provided by the City). These collection services are provided by the City's solid waste collection contractor.

- *Residential Yard Waste Collection Program*

Single family, duplex, triplex, and mobile home park residences are provided with a gray wheeled cart for curbside yard waste pickup on their regular solid waste collection day. This program is also operated by the City's solid waste collection contractor. The collected yard waste is transported to the SMaRT Station for processing.

- *Commercial Cardboard Collection Program*

Upon request, Sunnyvale businesses are provided with weekly cardboard collection at no extra cost. Cardboard is flattened and placed into gray metal

bins. Two special front-loader trucks collect the cardboard for recycling. This collection service is also provided by the City's solid waste collection contractor.

Source Reduction Programs

The City sponsors several source reduction programs to eliminate solid waste, either before it is created or before it leaves the waste generator.

Home Composting Program

Workshops are held at the Sunnyvale Community Center and City parks on how to compost yard trimmings and food waste (with the exception of meat and dairy products). The City provides participating residents with a home composting unit. The units are made of recycled plastic and are large enough to compost yard trimmings and food waste from a typical size single family home. The composting units are sold during the workshops at 25% of retail cost to encourage participation in the program.

City-Wide Garage Sale

Each spring the City sponsors a City-Wide Garage Sale. Residents are urged to sell their unwanted furniture, clothing, and other household items, instead of sending these items to the landfill. The City publicizes the event by compiling a list of the participating households and publishing the list in the local newspaper. Residents of neighboring communities are encouraged to attend the City-Wide Garage Sale.

Materials Recovery Operations

Materials Recovery Facility: the SMaRT Station

The Sunnyvale Materials Recovery and Transfer (SMaRT) Station is the focal point for the transfer and processing of solid waste and recyclable materials collected in Sunnyvale. The Station, which opened in October 1993, is located on a nine-acre site north of Caribbean Drive. It has a total floor area of over 110,000 square feet, including a tipping floor and recycling/processing area. The City sold $21 million worth of revenue bonds to finance the design and construction of the SMaRT Station. Under the Memorandum of Understanding among the cities of Sunnyvale, Mountain View and Palo Alto, the cities will pay pre-determined shares of the debt service payment on the bonds throughout the 25-year term of the bonds.

Principal features of the Station include:

- waste tipping areas
- refuse compactor/transfer trailer loading area
- two materials recovery sorting lines
- curbside recycling unloading and processing area
- recyclables buy-back and drop-off center
- wood and yard waste processing and storage area
- hazardous waste storage building
- entrance facility including gatehouse, pay booth, and scales

The SMaRT Station has the capacity to receive and process 1500 tons of solid waste per day. The Station currently processes approximately 1000 tons per day and 260,000 tons annually. The unused capacity of the Station is available, at an appropriate price, to public or private enterprises outside the City.

Materials Recovery and Transfer Operations

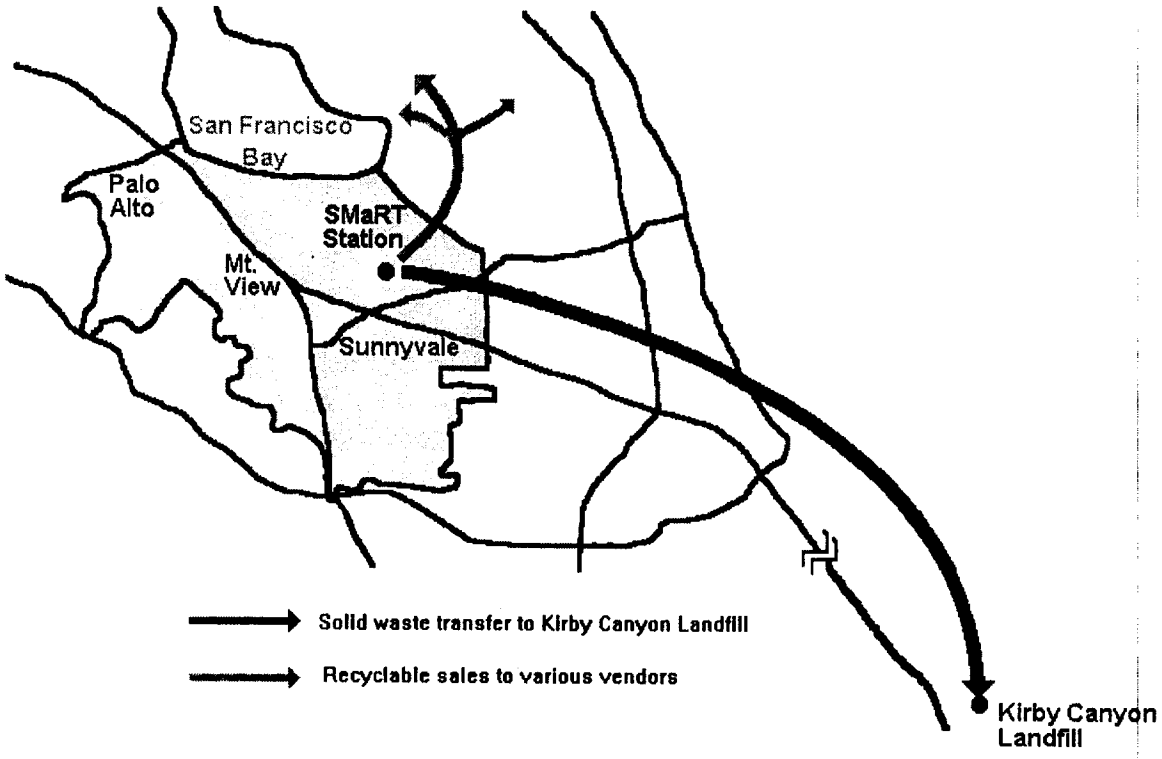
Solid waste arrives at the Station in franchised haulers' collection vehicles, City trucks, and in private autos and trucks. The composition of the waste delivered to the Station is a key factor in the level of recovery that can be achieved by sorting recyclables from refuse. The most recent waste composition study was conducted in August 1995 by Brown, Vence & Associates. Results of the study are shown in Appendix 3. Paper of various types made up the largest group of disposed waste, at 29%. Yard waste comprised 17%, although almost three-fifth of the material was separately collected by the yard waste program. Interestingly, among the residential waste stream, the one household item that makes up the largest percentage share is disposable diapers which comprised 2.7% of the residential waste (about 1000 tons of diapers per year).

Incoming waste is sorted manually to remove scrap metals, wood, and other bulky items. Loads that contain large quantities of recyclable materials are moved to the materials recovery area, placed on conveyor belts, and passed by sorting stations where recyclable materials such as cardboard, paper, glass, metals, and certain plastics are picked off the conveyor belt. The recovered materials are loaded into containers to be hauled to market.

The yard waste collection trucks unload in a separate wood waste room where the yard waste is further processed by a grinder and vibrating screen. The resulting products are then loaded into large trucks and hauled to an end user. These products are also made available to the public for local use.

The buy-back and drop-off center receives recyclable materials delivered by residents and businesses. These materials are combined with other materials inside the Station for further processing. For the last six months of 1995, the SMaRT Station has an overall diversion rate of 16% which resulted in a diversion of 8,797 tons of Sunnyvale's solid waste for the period.

Solid waste containing little recyclable material and the residue left over from material recovery operations are loaded into trailers for transfer to the landfill (see Map 1).



Map 1

Landfill Disposal

The solid waste generated in Sunnyvale is hauled from the SMaRT Station to the Kirby Canyon Landfill 27 miles away in south San Jose. The contract for use of the Kirby Canyon Landfill resulted from a competitive Request for Proposal process wherein seven cities in North Santa Clara County jointly requested

proposals for long-term landfill capacity. Sunnyvale, Palo Alto, and Mountain View elected to contract for use of the Kirby Canyon Landfill, which is operated by Waste Management Inc.

Sunnyvale has contracted for disposal capacity (with a maximum of 4,123,310 tons), ending on December 31, 2021 with an option to extend the disposal agreement for up to 10 years (to 2031) if the landfill operator is able to extend its land lease. This disposal agreement was signed in 1991, and the City began delivering solid waste to Kirby Canyon in 1993.

The contract establishes a base tipping fee for each ton of solid waste disposed. The tipping fee is increased for inflation on an annual basis. The tipping fee may also be adjusted to reflect changes in landfill rules and regulations. The tipping fee does not include various San Jose, county and state taxes, inspection and other fees that are passed directly through to the City by Waste Management. These taxes and fee constitute a large portion of the City's disposal expense. For example, in 1995 the total cost to dispose of a ton of garbage at Kirby Canyon Landfill is $40.83, of which $16.40 or 40% is taxes and fees. The largest of these is the $13 per ton City of San Jose Landfill Excise Tax.

Landfill Allocation Quantities

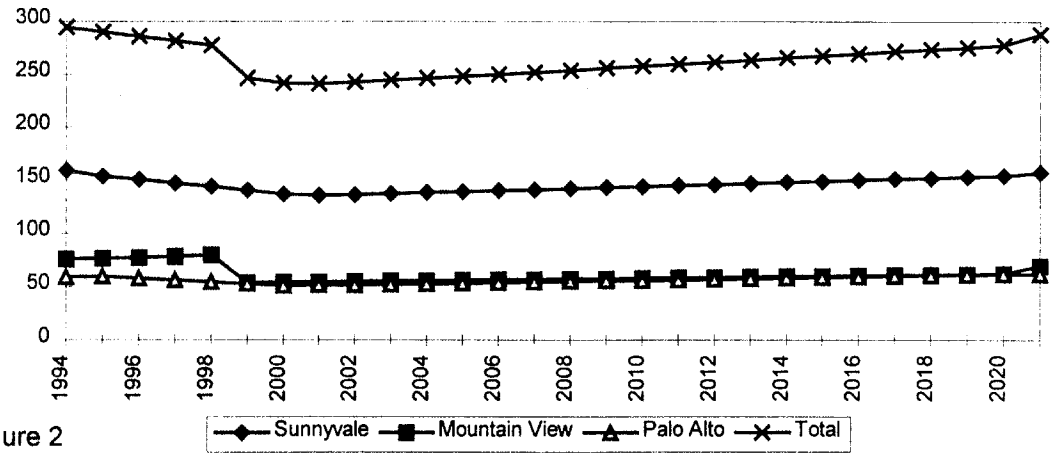


Figure 2

Through the Waste Management disposal contract, Sunnyvale has committed to deliver all residual solid waste from the SMaRT Station to the Kirby Canyon Landfill. Palo Alto and Mountain View have made similar commitments of their waste from the SMaRT Station to Kirby Canyon. Each city has estimated the quantity of solid waste that will be delivered each year, known as "Allocation

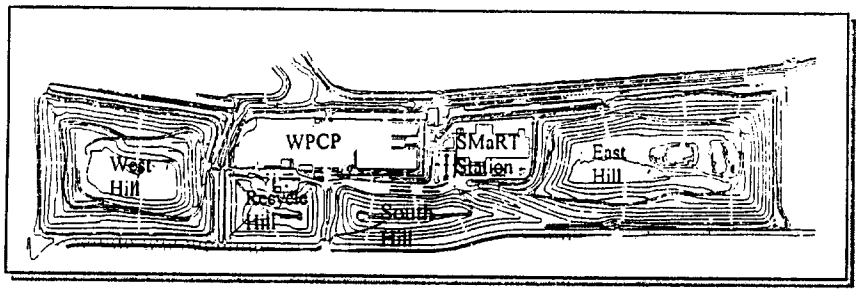
Quantities." Figure 2 shows the Allocation Quantities for the three cities. The size of the allocation quantities was based upon projections of the amount of landfill capacity each city will need through 2021. The projections take into account source reduction, recycling programs, and future economic and population growth.

Each of the three cities has agreed to a "put-or-pay" provision in their respective contracts with Waste Management. The contracts require that the three cities pay for a minimum of 75% of their total combined annual Allocation Quantities. In any years that the total tons delivered to Kirby Canyon by the three cities are less than 75% of the Allocation Quantities for that year, the cities must pay Waste Management for the difference. The capacity paid for is "banked" for future use by the cities. Through 1995 the cities have delivered sufficient waste to Kirby Canyon to satisfy their "put-or-pay" obligations.

Closed Sunnyvale Landfill and Recycling Center

Closed Sunnyvale Landfill

The closed Sunnyvale Landfill is located at the northern end of Borregas Avenue in the City of Sunnyvale (see Map 2), adjacent to the City's Water Pollution Control Plant (WPCP) and the SMaRT Station. The landfill occupies approximately 90 acres and is composed of four fill areas (hills), separated from one another and the adjacent facilities by various roadways, surface water channels, and underground utility easements. The four hills are often referred to (from east to west) as the "East Hill," "South Hill," "Recycle Hill," and "West Hill." Final heights of the hills vary from approximately 40 feet to 90 feet above sea level.



Map 2

Refuse disposal ceased in 1993. Final cover placement in compliance with state regulations commenced in 1986 and was completed in 1994. Perimeter fencing, trees, gates, and bollards remain at the site to prevent unauthorized access by automobiles and motorcycles.

Post-Closure Maintenance at the Landfill

Post-closure maintenance is composed primarily of the following activities: a) landfill gas extraction and combustion, and monitoring for subsurface landfill gas migration; b) water quality monitoring and a related groundwater migration control system; c) leachate level monitoring and periodic extraction and disposal; and d) final cover inspection and repairs as needed.

- *Landfill Gas Extraction and Combustion, and Monitoring for Subsurface Landfill Gas Migration*

A landfill gas extraction system was constructed in 1987 to comply with regulations of the Bay Area Air Quality Management District (BAAQMD). Approximately 65 extraction wells and trenches are connected by underground piping to a flare station located at the WPCP.

Potential subsurface migration of landfill gas is monitored by perimeter gas probes installed along the landfill perimeter and between the SMaRT Station and the landfill. These probes are monitored at least quarterly. In addition, approximately 90 underground conduit boxes and other locations of concern within the WPCP, former Recycling Center, SMaRT Station, and vicinity are monitored monthly.

- *Water Quality Monitoring, Extraction, and Disposal*

Groundwater quality at the site is monitored in compliance with regulations of the Regional Water Quality Control Board (RWQCB) with the goal of early detection of any potential release of harmful materials that could pollute the San Francisco Bay.

As a proactive measure to prevent landfill leaks to groundwater from entering storm sewers or nearby surface channels should leakage occur, the City installed three groundwater extraction wells in 1991. These wells, along with the naturally "flat" local groundwater gradient, were expected to provide complete isolation of groundwater from other water at the site.

- *Leachate Monitoring, Extraction, and Disposal*

As water from rainfall or other sources interacts with buried solid waste, it can become polluted with minerals and organic compounds. To prevent this leachate, or "garbage tea," from building up to levels that could move out of the

landfill, leachate elevations are monitored. In addition, a vacuum truck pumps out any leachate accumulated in any of the eight on-site leachate risers (leachate wells).

- *Final Cover Inspection and Repair*

Routine inspections of the landfill surface are conducted as required by the Post-closure Maintenance Plan for the site. Inspection criteria include: cover integrity, slope stability, erosion, cracks, exposed refuse, ponded water, and condition of vegetation. Additional inspections are conducted following significant natural events such as earthquakes and storms. Any identified problems are repaired promptly.

Current Uses at the Landfill

The landfill is currently used for passive open space, concrete and asphalt recycling, and as a potential source of fuel (landfill gas) for the planned Power Generation Facility at the WPCP. A small unfilled valley between the East and South Hills is permitted as a disposal area for dried municipal wastewater sludge produced by the WPCP. It is anticipated that a maximum of 150,000 cubic yards of sludge can be disposed of in the valley. One or two movements of sludge from the WPCP sludge drying facility to the valley are anticipated each year, with each disposal event taking one to three days to complete. Due to the dried and decomposed condition of the sludge, no odors or other negative impacts are expected. A similar but much larger sludge moving project was conducted in 1993, with no noticeable odor.

The concrete and asphalt recycling operation is located on top of the East Hill. Trucks delivering used concrete and asphalt or drivers buying the finished products enter the recycling area via the SMaRT Station entrance road.

Passive open space use at this time is limited to pedestrian trails. With the exception of the asphalt and concrete recycling area on top of the East Hill, the entire site is open to pedestrians. A pathway exists on the South Hill, and gravel perimeter roads exist around the East and West Hills. Drought-resistant grasses and wildflowers have been planted throughout the site.

When sludge filling begins, portions of the South Hill and portions of the perimeter of the East Hill will no longer be accessible for pedestrian use.

Household Hazardous Waste

Household hazardous wastes are household wastes or products that contain toxic chemicals, such as pesticides, pool chemicals, oven cleaner, paint, solvents, and batteries.

Quarterly Household Hazardous Waste Drop-Off Days

Each quarter the City sponsors a household hazardous waste drop-off event where residents are encouraged to bring their household hazardous waste. The events are held at the site of the former Sunnyvale Recycling Center. The City contracts with a private firm specializing in these events to collect the wastes delivered and transport them to a hazardous waste recycler or a permitted hazardous waste landfill or incinerator.

The City also participates in a program operated by Santa Clara County in which a drop-off event is organized monthly at various sites within the county. However, unlike the City events, residents must call the county in advance for an appointment to use these events.

Quarterly Small Quantity Generator Program

A similar hazardous waste drop-off program is provided for Sunnyvale businesses generating small quantities of hazardous waste. To participate in this program, businesses must qualify as "Conditionally Exempt Small Quantity Generators" as set forth by state and federal law. These programs are held quarterly the day before the household hazardous waste drop-off events, and businesses are encouraged to bring their small quantities of hazardous waste to the events, where they are charged at cost for the service. Companies generating large quantities of hazardous materials are required by state and federal laws to establish their own hazardous waste management programs and are not eligible for the Small Quantity Generator Program.

Customer Service and Public Education

Customer service is an essential component in all services provided by the City to residents and businesses. For example, the City has a commitment to excellence: a dedication to performing each task to the best of its ability. This is also reflected in the daily interaction between City employees and customers by treating customers with respect, maintaining accessibility to customers, and following through on requests and promises.

To ensure that this high standard of customer service is extended to operations conducted by the City's solid waste contractors, there are customer service requirements in the City's vendor contracts. For example, contractors are

required to respond to customer complaints within eight hours, and they must complete their tasks within a certain time frame after a customer order is received. The franchised garbage hauler and the SMaRT Station operator are subjected to monetary penalties if they fail to comply with these customer service standards.

The City also provides various public education programs on solid waste services. Information is passed on through utility bill inserts, the Quarterly Report, cable television announcements, the Sun Dial telephone information system, doorhangers, newspaper ads, display boards, and direct mail flyers. Residents receive semiannual reminders concerning the curbside, yard waste, and other recycling programs. Reminders concerning the cardboard recycling program are given to Sunnyvale businesses. The City assists the County staff in providing county-wide workshops on various recycling and source reduction topics. The City also coordinates speakers for local civic and environmental organizations and works with local schools to provide data and materials for classroom use.

Both residents and businesses are notified of the household hazardous waste and small quantity generator hazardous waste programs through newspaper ads, utility bill inserts, and flyers. Periodically the City provides information to residents and businesses on ways they can reduce the quantity and types of hazardous wastes they purchase and use. Literature on "safer substitutes" for commonly used household hazardous wastes is distributed throughout the community.

Economics of Solid Waste Management

The General Plan and Solid Waste Management

In Sunnyvale, the General Plan serves as the City's vision for both short- and long-term policy setting, budget planning, service delivery, and evaluation. Virtually every decision made by the City Council and every major assignment undertaken by City staff is designed to take the City one step closer to implementing its vision, goal, or plan of action. While most cities are required by state law to prepare a general plan outlining the direction of their community, few, if any, use the document like Sunnyvale does: as a foundation of all City planning and budgetary action.

The General Plan is composed of seven Elements: Transportation, Community Development, Environmental Management, Public Safety, Socio-Economic, Cultural, and Planning and Management.

Each Element has a series of Sub-Elements (e.g. Solid Waste is a Sub-Element of Environmental Management) in which long-range policy-making is developed and ultimately put into action via legislative decision (city ordinance, zoning changes, etc.) and budgetary allocations (capital improvement projects, funding of additional staff, etc.).

The City budget is viewed as a tool to implement the General Plan. It is a service-oriented budget, designed to focus on the desired level of service provided to the community at a specific cost. The City budget is designed to communicate whether services provided implement the goals, policies, and direction that the Council believes is important to the community, as reflected in the City's long-range plan.

Providing Solid Waste Service as a Municipal Utility

Solid waste management is one of the most costly expenses for the City. The Solid Waste Program has the largest budget of any City programs, at $22.0 million in Fiscal Year 1995-96, not including various expenses related to handling and disposal of waste from Mountain View and Palo Alto for which Sunnyvale is reimbursed by the other cities. The Solid Waste Program budget is exceeded only by the $32.8 million budget for the entire Department of Public Safety and the $27.2 million budget for the rest of the Department of Public Works.

Costs for refuse collection, transfer, processing, disposal, recycling, source reduction, household hazardous waste programs, post-closure maintenance of the Sunnyvale Landfill, and the costs for administering the solid waste system are all included in the Solid Waste Program budget (the costs of each major area

of the Solid Waste Program budget are shown in Figure 3). The budget for operation of the solid waste management system is developed and approved along with the entire City budget. Capital projects are budgeted as part of the City's Capital Improvement Program. Due to the high costs associated with replacing the franchised hauler's collection vehicles, the refuse collection franchise agreement includes detailed depreciation and replacement schedules showing the date at which each collection vehicle is to be replaced, along with the estimated purchase price. This schedule is reviewed annually and any changes to the type of equipment or the schedule for replacement must be approved in advance by the City.

The SMaRT Station also has a long-range plan for replacement of the various components of the City's investment in the facility. This plan includes an equipment replacement reserve that is funded by the cities of Sunnyvale, Mountain View and Palo Alto in proportion to their original investment in the SMaRT Station. Over 30 years, the fund will pay for replacement of items such as the refuse compactor and conveyors, the various components of the materials recovery facility, the roof, and the specially hardened concrete floor. Past and anticipated expenditures, inflation assumptions, and interest earnings are reviewed annually by the three cities so that contributions to the fund are maintained at a level sufficient to maintain a positive balance until the three city Memorandum of Understanding expires in 2021. The present level of contributions to this fund will not provide for the replacement of the SMaRT buildings themselves in 2021, when they will be ready for replacement or rehabilitation. Determining the future of the SMaRT Station after 2021 and how to finance its rehabilitation at that time is an issue that should be examined in conjunction with the City's review of its refuse disposal arrangements, which also potentially expire in 2021.

As with all City operations, a twenty-year budget forecast is prepared. This forecast shows the expected trends in revenues and expenses for the program. The budget is used to project the trend of future garbage rates, allowing rates to be increased incrementally to provide rate stability and predictability. At the time the budget for Fiscal Year 1995/96 was prepared, rate revenues were projected to increase by 5.06% per year through 2003/04, and by 4.55% annually thereafter.

The entire Solid Waste Program budget is funded almost entirely by user fees collected through garbage rates. Figure 4 illustrates the sources of revenue to the Solid Waste Fund (disregarding reimbursements from the cities of Mountain View and Palo Alto). In Sunnyvale, the City acts as a Municipal Utility as it provides garbage service, then bills and collects the service fees directly from the customers. Billing and collecting of garbage service fees are performed by the City's Finance Department as part of the City utility bills (which also include water and sewer fees). The funds collected are placed in the Enterprise Fund

Solid Waste Program Expenditures 1995/96

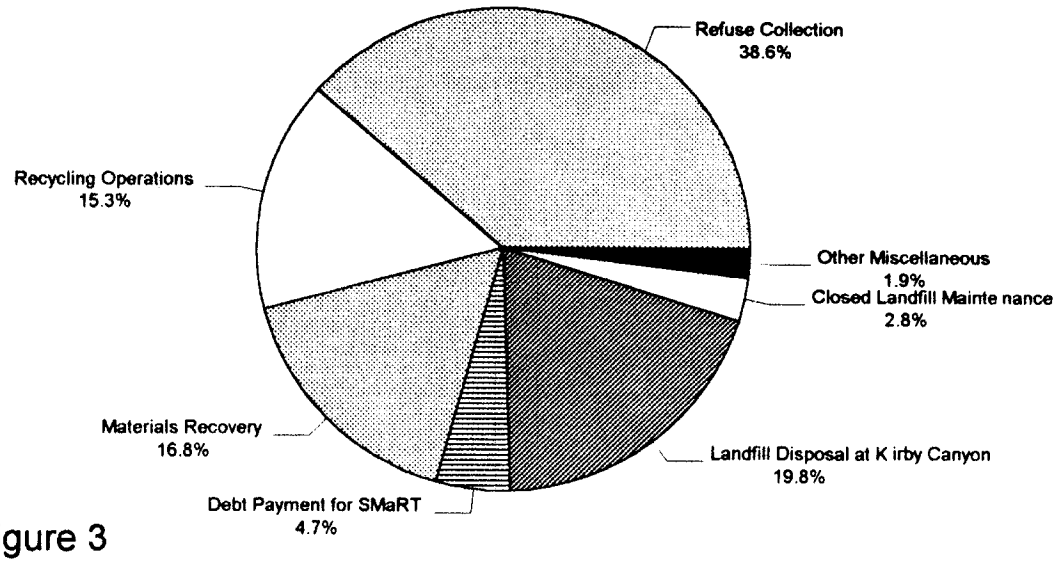


Figure 3

Solid Waste Program Revenues 1995/96

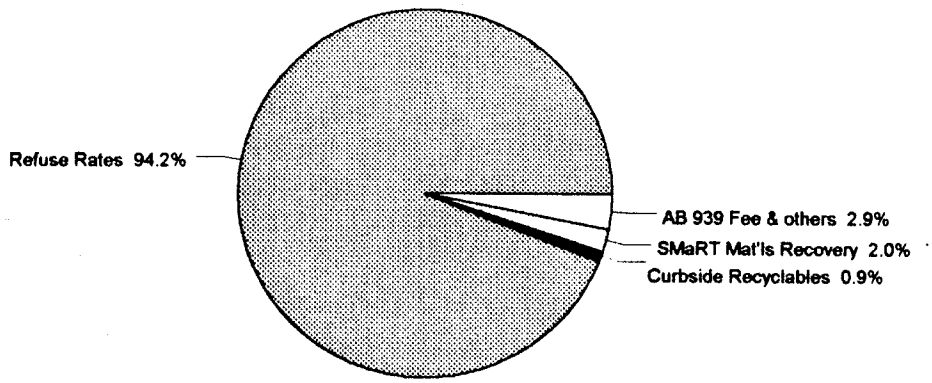


Figure 4

for Solid Waste. This Fund is managed and administered by the Solid Waste Program Manager in the Department of Public Works.

Garbage collection rates are established annually by the City Council. A comparison of the monthly garbage rates for a single family home in Sunnyvale and neighboring cities in 1995 is as follows:

City	Monthly Garbage Rate (unlimited or 3-can service)
Palo Alto	$51.50
Los Altos	$50.04
Cupertino	$41.30
San Jose	$37.50
Mountain View	$33.00
Sunnyvale	**$24.89**
Santa Clara	$19.40
Milpitas	$17.44

Sunnyvale bases its utility rates on the actual costs of providing service to customers. Utility rates for some other cities are not based on costs of service, and some categories of customers may subsidize other categories. For example, in the table above the Santa Clara rate does not pay for all garbage and refuse services in Santa Clara, and certain services are tax supported.

Periodically, the City reviews the methodology used to calculate the garbage collection rates to ensure that the rates reflect the actual costs of providing services. City staff constantly monitors and evaluates each component of the solid waste management system in order to deliver each service at the lowest possible cost. When new programs are considered, a cost benefit analysis is prepared to determine whether the results expected from the program justify the costs.

The cost of service methodology is also used in setting the Gate Fee at the SMaRT Station. When residents from the three cities bring in and dispose of their waste at the SMaRT Station, they will be charged a Gate Fee. The Gate Fee is determined by the volume and composition of waste materials. There are a number of waste categories, each charged at a different per cubic yard basis. The rates for these waste categories in turn are set according to the City's costs in handling, transport and disposal of the waste. Since most of these costs are weight-based, the per cubic yard Gate Fee for a waste category like concrete is much higher than that of general refuse because of its higher density.

Establishing rates tied to the cost of service also encourages residents and businesses to source reduce and recycle to avoid paying additional refuse

collection and disposal fees. This financial incentive to reduce the amount of waste generated has caused many residents and businesses to greatly reduce their waste generation and level of refuse service. The impact on the City's Solid Waste Fund over the past ten years has been a shrinking revenue base. Figure 5 illustrates how the amount of refuse landfilled has declined since 1982. During the same time, costs increased due to inflation, new source reduction and recycling services, and capital projects needed to comply with federal and state mandates to divert materials from disposal and mandates affecting closure and post-closure maintenance of the Sunnyvale Landfill. One of the greatest challenges facing the City over the next decade will be to minimize expenses in order to keep rate increases reasonable while the number of tons flowing through the system decreases.

Tons Landfilled 1982-1995

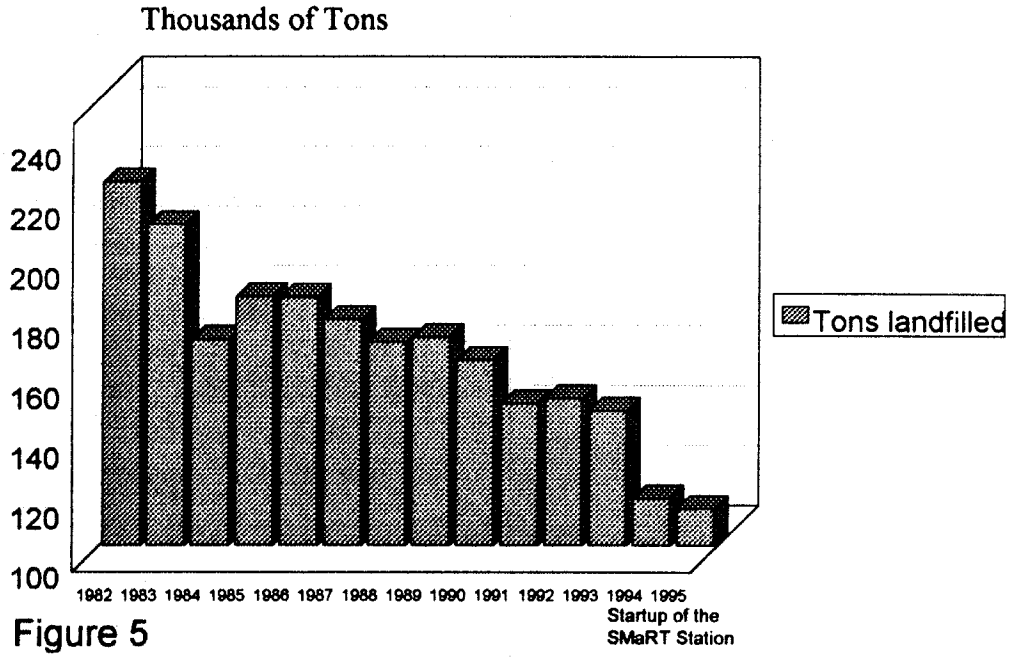


Figure 5

Role of "Demand Management" in Refuse Rate Setting

As noted above, the garbage rate structure will continue to be analyzed periodically to ensure that costs are allocated to rate-payers according to policies set by the City Council, and to verify that these policies remain valid.

The related concept of "demand management" should also underlie solid waste policy and rate-setting decisions. Demand management is the application of market-oriented principles of supply and demand to the pricing of services. The City's existing solid waste policies and practices contain many instances of the use of demand management to influence customer behavior. Some examples are:

- The collection, at no additional charge, of unlimited quantities of curbside recyclables, source-separated yard waste, and commercial cardboard encourages customer use of these services and diverts materials that have been separated from refuse. Because customer cooperation is desired, barriers to participation are kept low.

- The collection of refuse, an activity in which the City would like to see a reduction in tonnage, is charged to customers at rates that reflect both the direct cost of collecting and disposing of the refuse and the cost of recycling programs, which is allocated to customers on the basis of how much refuse they produce. This rate structure gives customers a financial incentive to reduce refuse outputs.

- By requiring only the purchase of a business license by private sector recycling companies, the City hosts a large number of private sector recycling service providers, thus encouraging businesses to reduce their waste disposal costs by recycling discarded materials.

Along with rates and policies, customer service quality plays an important role in demand management. Particularly for residents and those small businesses that may see little direct financial benefit from recycling and other diversion activities, the City should provide recycling services that are convenient and fulfilling. Residents and small businesses should be viewed as volunteers donating their time and efforts to help the City reach its solid waste diversion goals. In each step of the process, from ordering recycling containers to the collection of the recycled materials to providing promotional feedback to customers, recycling and yard waste customers should find simple, easy to follow procedures; customer should be made aware that their actions are appreciated.

The principles of demand management should continue to be applied to the City's solid waste management policies and should be incorporated into future decisions regarding rate structures, the future of the unlimited residential refuse collection service option, and provision of "free" services such as spring and fall cleanup events.

Solid Waste Management and Economic Development

Businesses are becoming increasingly aware of the cost of waste disposal. Increasing landfill costs, which lead to higher refuse collection rates, are motivating businesses to source reduce and recycle. Numerous Fortune 500 companies have adopted corporate strategies to generate "zero waste" within the next ten years. These companies view solid waste as lost profits or wasted assets. They are looking for ways to design their products and their manufacturing processes to minimize waste and reuse materials now being disposed. During the public participation event for commercial customers, many larger industries in Sunnyvale have their own comprehensive recycling programs. The City has already experienced a significant reduction in the quantity of commercial and industrial waste being disposed because of that. This trend is expected to continue, although at a slower pace, since businesses have already implemented the most cost-effective changes.

This new attitude toward reducing solid waste combined with sharp increases in the cost of refuse disposal has resulted in creation of waste reduction, reuse, and recycling programs at large companies such as Lockheed-Martin, Hewlett-Packard, AMD, Macy's, Marriott Hotels, Sun Microsystems, and Apple Computer. Through internal recycling programs, reuse of shipping containers, and other practices, such companies have sharply reduced their waste disposal. Lockheed-Martin's Sunnyvale facility, for example, has reduced its solid waste volumes by 80% through increased recycling. This voluntary reduction in the quantity of solid waste generated will impact the future quantity and composition of solid waste requiring processing and disposal in Sunnyvale.

The increased business awareness of refuse disposal costs is producing a response in the business community beyond "industrial ecology's" increased recycling and source reduction. The increasing expense of solid waste management, as reflected in higher refuse collection rates, has the potential to affect the City's efforts to attract and retain commercial and industrial facilities. Just as businesses are keenly aware of the cost of electricity and business licenses as factors in deciding where to locate, they are beginning to realize that the cost of refuse disposal can be significant and can vary depending upon where they operate.

In Santa Clara County, collection rates can vary significantly from city to city depending upon the level of solid waste management services and how each city funds its solid waste management program. For example, the cost per pickup of industrial refuse will appear to be higher in a city like Sunnyvale (which uses an enterprise fund approach to charge all solid waste costs to solid waste collection customers) than in a city that uses general fund money [tax revenues] to pay for a significant portion of the solid waste services it provides and does not regulate rates for collection of industrial refuse. The final total cost to the

industrial customer may be similar, but in another city, the industrial customer may be paying (in addition to its refuse collection charges) property taxes or a business license fee that provides post-closure maintenance for a closed landfill owned by the city, household hazardous waste events, or other solid waste programs.

In Sunnyvale no tax monies are used for this purpose and expenses for landfill post-closure maintenance are funded by the refuse collection fee. In addition, because Sunnyvale's tax revenues are not used for solid waste management, more General Fund revenue is available to fund a higher service level for other City functions such as libraries, public safety, street maintenance, parks, and so on. The advantages of the City's enterprise fund method of funding solid waste services include:

- Clear statement to the customer of all solid waste management expenses; no hidden charges, emphasizing City accountability
- Directly charges the users of the system for costs they incur, as opposed to charging on the basis of land ownership, taxable sales, or other measures that may not be related to the cost of service to a particular customer
- Allows tax revenues to be used for more appropriate general expenditures such as public safety, libraries, street maintenance, etc.

Moreover, in response to consumer demands for more recycling and more "environmental" approaches to product development, many manufacturers are now designing with an eye to recycling when their product's life is completed. Designers are also creating more durable products. The City should closely track these trends and use its knowledge in designing solid waste facilities and programs so that the facilities and programs can effectively handle the materials that will be in the waste stream in the future.

Other manufacturers respond by making household items that are more durable or reusable. This trend will also impact the quantity and types of solid waste that the City's solid waste system will be handling in future years.

Search for Efficiency and Additional Sources of Revenue

In order to deal with the shrinking waste stream and a continued increase in program expenditures, the City will need to consider various methods to increase efficiency. One way is to reduce fixed operating costs, where possible, to reflect the reduced tonnages. This cost reduction may mean eliminating refuse collection routes, switching to automated refuse collection service to reduce labor costs and other measures that will increase collection efficiency. Testing of

"single-pass" vehicles, to reduce the size of the fleet for collection of refuse, recyclable materials, and green waste, may also be considered. Such vehicles might, for example, collect refuse and recyclables in a single, multi-compartment truck. A combined refuse/recyclables collection truck was tested by the City in 1992 and found to be less cost-effective than separate vehicles. However, further advances in this area are anticipated as other communities grapple with this issue. The City should remain alert for new opportunities to reduce collection and other costs.

Other than searching for efficiency, the City can also seek out additional sources of revenue. Potential sources include development of new markets for existing recovered materials as well as searching for markets for new categories of materials to be recovered.

The closed Sunnyvale Landfill can also offer opportunities in revenue generation from its post-closure use. For example, the current concrete recycling operation on the East Hill benefits the City not only by diverting concrete and asphalt from the waste stream and hence avoiding expensive landfill disposal costs, but also by generating a per ton royalty for materials brought onto the site. Another project already underway is the Power Generation Facility at the WPCP. The planned facility will utilize digester gas from WPCP operation and landfill gas collected from the landfill to generate electricity. The power generated will be more than sufficient for the WPCP's demand and the excess can be provided to the SMaRT Station or other industrial users.

Significant physical and regulatory constraints limit future generation of revenues from use of the closed landfill. These constraints include:

- The need to protect the clay cap over the surface of the landfill and to maintain access to the cap for inspection and repair purposes.
- Differential settlement of waste materials and restrictions on use of irrigation water make placement of structures or playfields on the landfill problematic.
- The presence of landfill gas requires use of specific design and construction techniques and ongoing monitoring and maintenance to protect the public from the explosion potential and other risks posed by landfill gas.

For these reasons the closed landfill may not be suitable for some revenue-generating uses, such as office buildings that would be possible on other, non-landfill sites.

Future Solid Waste Management Issues

Changing Waste Stream

Quantity

Typically, if other factors remain the same, the quantity of solid waste generated within a city is a result of the following factors:

- Population: As the number of people living in a city increases, if there is no other change in people's behavior, waste generation increases.
- Retail sales levels: If sales increase, waste generation increases as product packaging is discarded and the articles being replaced are discarded.
- Industrial output levels: As more goods are produced, manufacturing wastes and other related wastes (advertising materials, packaging from raw materials, etc.) are produced.
- Vibrancy of the local economy: The nature of the industries located in a city and the occupancy levels of commercial and industrial properties affect the amount of waste generated.
- Real estate development, redevelopment, and remodeling: Clearing of land, demolition of existing structures, and construction all produce significant amounts of waste, which are in turn affected by interest rates, land use policies, and the general health of the local economy.
- Weather: Rainfall amounts greatly influence the amount of plant trimmings ("garden wastes") generated and the moisture content and hence weight of other types of solid waste.
- Packaging decisions by manufacturers of goods consumed in a city: Decisions made by manufacturers of goods shipped to a city from distant locations, such as detergents or restaurant supplies, increase and decrease local waste generation.
- Natural disasters (floods, freezes, earthquakes, windstorms): All such natural events increase the amount of solid waste generated.
- Community income and wealth: The more affluent and confident consumers are, the more waste they produce.

While the conventional belief that increased city growth and a healthy economy will generate additional waste is still true in general, fluctuation in waste stream quantities no longer tracks directly with economic growth or the amount of new

housing. With the advent of increased recycling and waste reduction programs, growth in the waste stream due to economic and/or population growth is offset, to varying extents, by source reduction and recycling efforts.

Quality

As with the quantity of solid waste, the composition of the City's solid waste is affected by a number of factors largely outside the City's control. The difficulty of anticipating future changes in waste composition in a twenty-year planning document is best illustrated by looking at the past twenty years and observing the significant changes in the City's waste composition. For example, in 1975, glass bottles were used extensively for soft drinks, food, shampoo, vitamins, and numerous household items. Glass recycling was still in its infancy, so glass comprised a significant portion of the waste stream. Twenty years later, the above-listed products are all available in plastic containers. The quantity of plastic in the waste stream has increased significantly and the quantity of glass has decreased.

In 1975, the typical office used electric typewriters to produce letters, memos, and reports. Bond paper and carbon sheets comprised a large portion of the waste stream from banks, insurance companies, real estate agents, and large companies. Twenty years later, computers and laser printers have replaced typewriters, along with the ubiquitous photocopying machine, making it easy for office workers to generate large numbers of copies of documents. Carbon paper has almost completely disappeared from the waste stream.

The City's solid waste system should remain flexible so it can adapt to changes in the waste stream.

"Flow Control"

As noted above, businesses, refuse collection companies, and recyclers now view the "waste stream" as a "resource stream." This trend has led to arguments over ownership of the waste, a hotly contested topic in the courts for many years that is likely to be addressed by legislation at the state and federal levels. New legislation and judicial decisions will impact the manner in which the City manages the waste stream. Changes in contracts, the City Code, and Solid Waste Program funding sources may be needed to comply with new legal decisions and adapted to address the ownership of the resource stream.

At the state level, the 1994 decision by the California Supreme Court in the case of *Waste Management of the Desert vs. Palm Springs Recycling* indicated that recyclables must be viewed as tradable commodities under the control of the waste generator if they are purchased or collected at no charge by a recycler. Sunnyvale's existing policies are consistent with the Court's ruling, but it is

expected that this expansion of "recycling rights" will continue and it is possible that some future court decision may change the City's policies.

Of far more concern, at the federal level, the U.S. Supreme Court ruling on May 16, 1994, in the case of *C&A Carbone, Inc. vs. Town of Clarkstown* declared that a local jurisdiction could not, by way of an ordinance, mandate that all of the waste within the jurisdiction be disposed at a specific facility. While the specific ruling in the *Carbone* case has little immediate impact on Sunnyvale, the Court's ruling was stated broadly and raised many questions regarding the appropriate role that a local jurisdiction should play in the solid waste management arena. The full impact of the Court's ruling and its long-term impact on the City's power to grant an exclusive franchise for refuse collection, to set customer rates, and to fund an integrated solid waste management program with user fees may depend on the ultimate resolution of a number of lawsuits filed around the country in the wake of the *Carbone* decision, as well as current federal legislation being proposed to clarify the role local government can play in solid waste management. Because it potentially threatens the City's ability to pay for source reduction, recycling, and household hazardous waste services, and the $21 million debt for the SMaRT Station, the City should take a vigorous, proactive stance toward influencing legislation on the topic of flow control.

City control over the handling of wastes generated in Sunnyvale is also of great importance to the City and its ratepayers due to the liability associated with the federal Superfund law. If refuse generated in Sunnyvale is disposed of at a site that later requires remedial cleanup, the City may have a virtually unlimited liability for the cost of that cleanup, regardless of how large or small a role the City played in handling the refuse. This fact gives critical importance to City policies that affect the ultimate disposal site for Sunnyvale refuse. Large industrial waste generators would likely be named directly in any cleanup actions, and these waste generators tend to share the City's concern about the integrity of disposal sites. During the focus group discussion, when asked to rank fourteen solid waste management issues, facility managers of six large Sunnyvale industries ranked "Avoiding long-term disposal site(s) cleanup liability" as their top concern.

The City's decision to enter into a long-term contract with Waste Management was driven in part by the technical qualifications of that company and the compliance of Kirby Canyon Landfill with the most recent standards for landfill construction, operation, and monitoring. Future City decisions and policies that affect where Sunnyvale wastes are disposed should likewise consider not just the immediate cost of disposal but also the potential for long-term environmental cleanup liabilities.

City Diversion Objective

A key issue the City faces in light of the state's current AB 939 diversion requirement is the City's own waste diversion policy. Should the City adopt whatever diversion goal is currently required by the state? Or should the City independently set a diversion goal that may exceed the state's minimum requirement? The City could also adopt a Legislative Action Statement promoting legislative changes in the state-mandated diversion requirements. This issue is important because the state's minimum diversion requirement may increase or decrease over time, and because it will be more cost-effective for the City to target a particular diversion level without changing the goal frequently.

The California Integrated Waste Management Board (CIWMB) has proposed regulations containing a mathematical formula to calculate the diversion achieved by each city and county in California, using the number of tons landfilled in the baseline year (1990) and in 1995. The formula calculates the total reduction in tons landfilled. It also includes an adjustment to waste generation for population changes and employment since 1990 and for inflation-adjusted increases or decreases in taxable sales. This waste generation number, calculated after the end of each year, will be compared with the actual amount of waste disposed (landfilled) to determine the percentage of waste disposed and thus the percentage diverted. The 1993 and 1994 figures calculated by City staff are shown below:

		1993	1994
	(Calculated) Waste generation	= 196,167 tons	198,238 tons
Less	(Actual) Waste landfilled	= 144,814 tons	115,601 tons
Equals	Waste diverted	= 51,353 tons	82,637 tons
	Percentage diversion:	26%	42%

Thus in 1993 the City had, two years in advance, exceeded the 25% diversion level mandated for 1995.

City staff makes an annual calculation of diversion achieved, using the CIWMB regulations and formula. In 1993, the most recent year for which all adjustment factors are available, the City's diversion rate was at 26%. As of spring 1995, the combination of City-funded recycling programs, private sector recycling programs, and materials recovery operations at the SMaRT Station has resulted in an estimated diversion of 45% of the City's solid waste, when compared against the 1990 tonnages. Figure 6 shows the tons of waste generated, disposed, and diverted for the years 1990-1994. Additions to the City-funded recycling programs may be needed to reach the 50% diversion mandate for the

year 2000. The respective diversions achieved by City-funded recycling and source-reduction programs in 1995 are as shown in Figure 7. The tonnage being diverted from landfill in 1995 by City-funded recycling and source-reduction programs is estimated to be 50,569 tons. In order to achieve the 50% diversion mandate, the diverted tonnage from City-funded programs will have to be increased significantly. This means addition of new recycling and source reduction programs and expansion of existing ones. The total City cost and the cost per diverted ton would increase as higher percentages of recovery are achieved.

At low diversion levels, programs that collect source separated materials or recyclables that have strong market demand are profitable, or if not profitable, have a low overall cost per ton. Moving diversion to higher percentages results in a higher cost per ton for diversion as the recovered materials will be more difficult to segregate and/or more difficult to market. Figure 8 illustrates this concept.

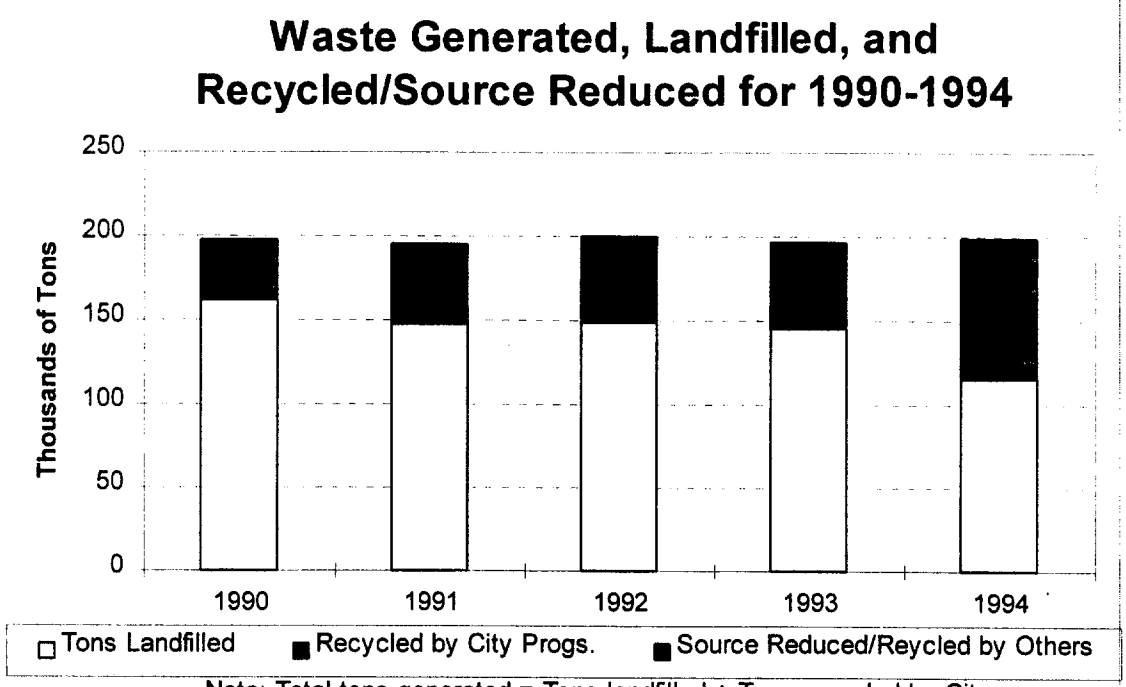


Figure 6

Note: Total tons generated = Tons landfilled + Tons recycled by City progs. + Tons source reduced/recycled by others

Diversion by City-Funded Recycling Programs in 1995

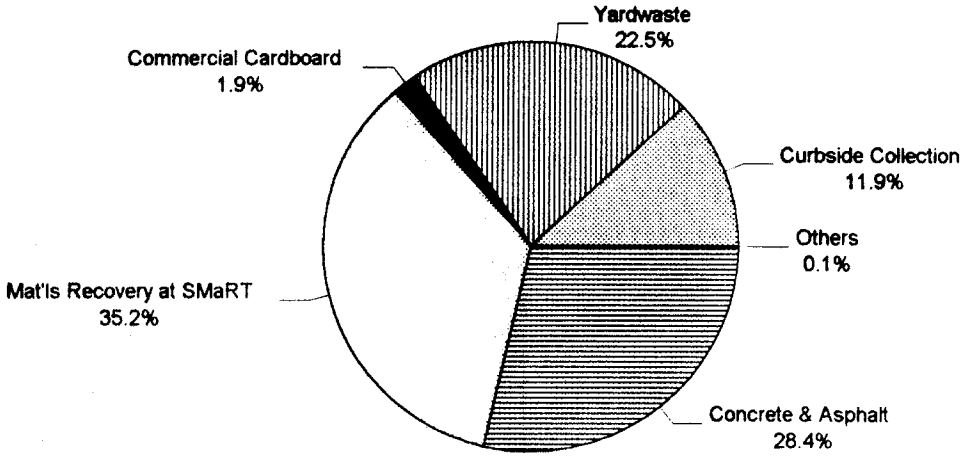


Figure 7

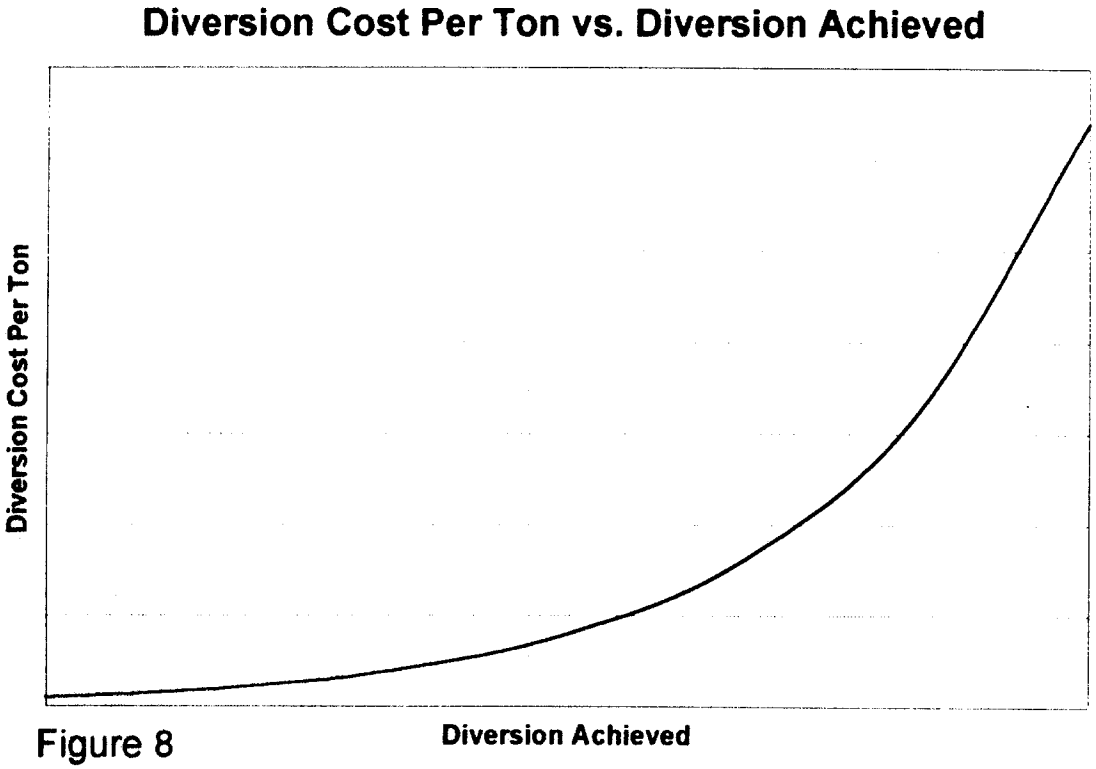


Figure 8

The City could elect to establish a policy of diverting a predetermined percentage, regardless of what the current (or proposed) legal requirement is. In this case, instead of attempting to aim for a "moving" target, the City would commit itself to a diversion level. Private business is opting for this type of policy as the price of pollution and the risk of environmental impairment from waste generation increase. Other businesses such as manufacturers, hotels, restaurants, and retail and grocery stores are finding that reduced disposal costs through recycling and waste reduction programs are essential to remaining competitive.

The Fiscal Sub-Element likens the City's approach to fiscal management to that of a business. Just as business sees a need to reduce pollution and reduce costs for waste collection and disposal, so the City could adopt its own diversion goal, which could be equal to or higher than the current State mandate (50% by the year 2000). If accomplished in partnership with businesses and residents, such a policy could result in large future savings. For example, the 1995 marginal cost to the solid waste system for transfer and disposal of one ton of solid waste was approximately $67. If a recycling or diversion program could be implemented at a cost of $67 per ton, it would be cost- effective to implement the program.

In addition, the City's Kirby Canyon contract allows the landfill operator to pass through to the City any cost increases due to regulatory changes. These cost increases will apply to incoming solid waste as well as "in place" solid waste disposed in prior years. It is likely that in the future new regulations will increase the City's costs for the "in place" solid waste. To the extent it can be predicted, this cost increase should be factored into calculations of the avoided costs of landfill when compared to the cost of additional diversion programs. Reducing the amount of solid waste for which the City is responsible in landfills in the future may be the most cost-effective way to manage the cost of complying with future environmental regulations. Any decision on adding or deleting City diversion programs should be based on analysis of the marginal costs and benefits that would be realized.

Enhancing Source Reduction and Recycling Programs

There are numerous factors affecting the City's source reduction and recycling programs. One of these is the increased investment of both foreign and domestic companies in the recycling and reuse infrastructure. During the 1970s and the early 1980s, much of the paper collected by recycling programs on the West Coast was shipped to Asia. This recycled paper represented a small percentage of the feed stock for most foreign mills and was used at low rates in U.S. paper mills. The federal income tax system was (and still is) structured to

provide depletion allowances and other tax incentives to the timber industry, so that vertical integration between domestic timber companies and domestic paper mills was common. Recycling was viewed as a "fad" by many decision-makers and few reliable sources of used paper were available to the paper industry. The vast majority of paper mills were engineered and constructed to produce paper from trees.

In the late 1980s and early 1990s, this situation changed dramatically. A decade of successful recycling programs had demonstrated that a large quantity of high quality used paper was available for use as a recycling feedstock. Timber production was restricted in some areas due to concerns over the destruction of old-growth forests and endangered species that use the forests as their habitat, thus driving up the cost of virgin raw materials traditionally used to manufacture paper. The environmental sustainability of the paper industry was questioned. In order to create markets for recycled materials, several states (including California) passed "minimum recycled content" laws requiring paper manufacturers to include a minimum quantity of recycled paper in the production of new paper.

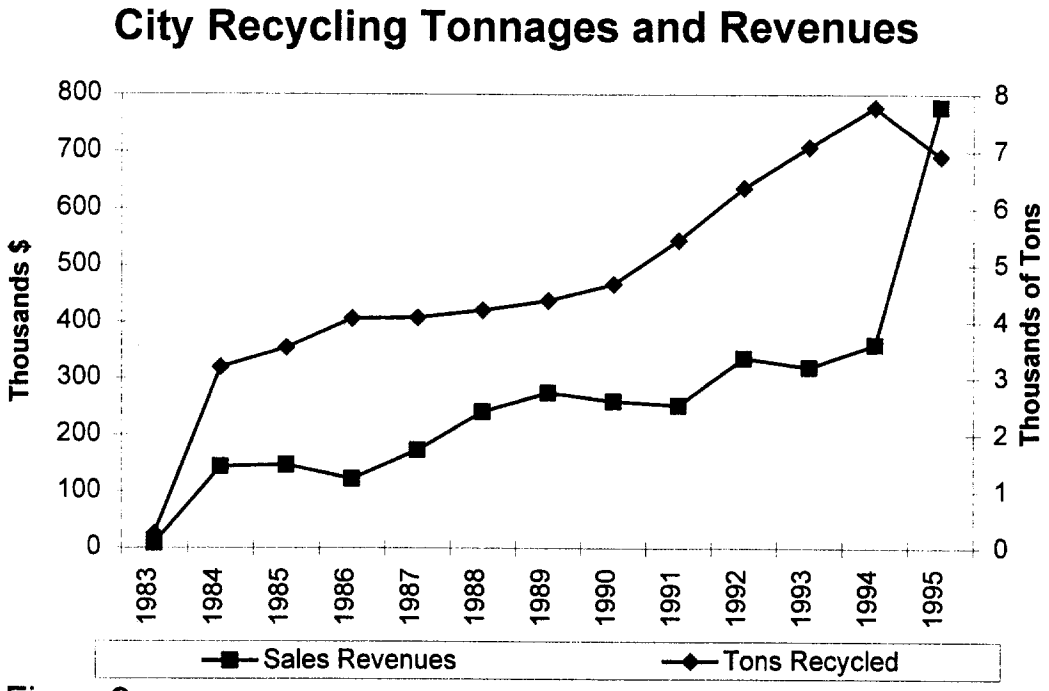
Together all of these changes led to decisions by many U.S. and foreign paper mills to retrofit their paper-making equipment to utilize used paper. This decision involved a commitment of billions of dollars industry-wide to retrofit mill equipment. It was a significant investment that changed the paper industry.

Most of these retrofits and new mill construction projects have been completed and paper mills are utilizing used papers at the highest rate ever. The huge investment in this recycling infrastructure has changed the used paper market permanently. There will now be a strong, continuous demand for used paper by both foreign and domestic paper producers. Hence the City's recycling programs can expect more reliable paper markets in the future. While used paper prices will continue to fluctuate (like any commodity traded on a global basis), it is likely that reliable markets for used paper will be available in the future.

Another factor that affects the City's solid waste management system is the market conditions for recyclables. Due to the global nature of its markets, recycling is one of the few instances in which a decision made on the other side of the globe may directly impact the City's revenues. The materials collected by the curbside recycling program and those separated at the SMaRT Station are sold either to a materials broker or directly to an end-user. The prices for glass, aluminum, cardboard, office paper, newspapers, and plastic bottles fluctuate daily like other commodities markets. Since the secondary materials markets are worldwide, events in other countries can affect the revenue the City receives for its materials. One example was when the former Soviet Union was disbanded, the stockpiled aluminum bars at Russian smelters were sold in a short period of time to raise capital. This unexpected action caused an over-supply of aluminum

in the market and the prices for both virgin and recycled aluminum fell significantly. Thus, the City received a reduced price per pound for the aluminum collected by the curbside recycling program. Once the stockpiles of aluminum in the former USSR were depleted, the market prices for recycled aluminum returned to their former levels.

This example illustrates that, even with extensive advance planning, the City will not be able to accurately predict market prices for recycled materials; revenues from sale of recyclable materials will continue to be difficult to estimate. This uncertainty in prices will, in turn, cause fluctuations in the net recycling program costs, which are partially funded by revenues from sales of recyclables. Figure 9 illustrates the loose relationship between the amount of recyclables collected by the City's programs and the revenues earned from the collected materials. With 1995's very strong markets, the graph shows that although tonnages declined due to thefts from the curb by scavengers, revenues nearly doubled due to higher values for the materials collected.



Figue 9

The City can influence markets through its legislative advocacy at both the state and federal levels. Legislative directives to eliminate tradition-based barriers to use of recycled products and require minimum recycled content for key products can be effective in stimulating use of recycled products by both the private sector and public sector. The recent increase in demand for waste paper in the United

States is at least partially a result of mandates by California and many other states that publishers use newsprint that contains a minimum level (the minimum varies from state to state) of recycled content. In response to the mandate, and others like it throughout the United States, paper manufacturers have invested heavily in retrofitting mills to produce recycled content paper, thus stimulating demand and raising prices for recycled paper.

Similarly, California's 1987 "AB 2020" beverage container redemption law has resulted in increased recycling of beverage containers The revenues generated through a point-of-purchase fee of 2.5¢ per can or bottle provide the private sector with funds to operate convenient drop off redemption centers where residents can get back their "redemption values." Curbside recycling programs, including Sunnyvale's also receive payments for beverage containers that are picked up at the curb. This revenue improves the cost effectiveness of the curbside program and lowers the bottom line cost of the program from the point of view of City rate payers.

The City should support legislative efforts to both stimulate demand for recycled content products and financially assist recycling collection programs in ways that serve to reduce the overall cost to City rate payers.

Future Commercial Recycling Issues

Approximately 68% of the City's waste stream is generated by commercial and industrial sources. Waste generated by businesses usually has more concentrated amounts of recyclable materials than household refuse. This particular waste stream presents an opportunity for implementation of recycling and source reduction programs, which has already been partially realized with existing programs.

Given the current identifiable trends, both the amount and scope of waste diversion by business is expected to increase significantly from 1995 to 2010. This increase will come about as recycling and source reduction are incorporated into manufacturing and design processes.

The increased recycling and source reduction activities of industry will impact the Sunnyvale solid waste handling system in two ways: (1) the diversion rates mandated by the CIWMB will be more easily achieved; (2) the amount of waste and the associated costs for transfer and disposal will decrease.

The most challenging aspect of these impacts will be the redesign of the existing solid waste collection infrastructure and refuse collection rate structure to accommodate the decreased solid waste flow. This task requires a high degree

of attention since both the rate of waste flows and the timing of the changes are variable. The City could pursue several options as described below in order of least to most restrictive to businesses.

- *Open Collection of Commercial Recyclables*

This option, the existing condition, envisions the open collection of recyclables by any vendor that the waste generator (i.e. business) selects. The most powerful argument for this option is that it is in full compliance with recent legal decisions on the ownership of recyclables. The California Supreme Court has ruled that recyclable material becomes "waste" only when it is discarded, and that any material that can be sold or given away has "value" and thus is fully protected under private property precedents.

From a City revenue perspective, the drawback of this option is that collection fee revenues decline quickly as the amount of solid waste collected is reduced, while the cost of the City's collection system declines more slowly. The result is the fixed costs of the Solid Waste Program will be spread over a smaller revenue base, a fact already reflected in the refuse rate increases in recent years. This approach also leaves the general provisions of the Municipal Code as the only control over the side effects of collection. While the City has contractual control over the actions of the franchised refuse collection company, it has only the Code to address spilling of materials from vehicles and complaints about noisy collections at early hours of the morning.

- *Licensed Collection*

In this option, the City would issue licenses to recycling collection firms. The license would be issued to any company that meets normal business requirements. A license fee could be collected, but should not be so high as to be perceived as a barrier to recycling companies entering the Sunnyvale market. This approach has a high degree of compliance with recent legal decisions and still allows Sunnyvale businesses the opportunity to recycle . There are some administrative costs associated with this option. The City will still see a reduction in its collection fee revenues and upward pressure on collection rates as in the current situation. One advantage of this approach is that it provides the City with a measure of control over the quality and timing of the work provided by licensees. Another is that some, albeit small revenue would be generated to help balance the rate revenues lost as a result of a shrinking refuse customer base. Otherwise, a shrinking base of refuse ratepayer must fund mandated solid waste management expenses, including recycling programs and landfill maintenance that actually benefit all residents and businesses.

- *Multiple Nonexclusive Franchises*

The City could issue multiple nonexclusive franchises for the collection of recyclable materials. A franchise fee similar in scale to that paid by the City's current refuse-collection contractor (approximately 10% of gross revenues) could be imposed to maintain revenue from franchise fees. This revenue would help to pay for mandated solid waste management expenses that would otherwise be borne only by refuse ratepayers. Franchise fees would also put all collectors of waste materials on an even financial footing, unlike the present situation where collectors of mixed recyclables have an artificial price advantage because the refuse hauler must pay the City a franchise fee. Like the previous option, multiple franchises would provide the City with more control over the time and manner of collection activities. Potential recycling franchisees may see the franchise fee as unfair because they are not being granted an exclusive right to collect recyclables in the city. Local businesses might also have concerns about this option if it prevented them from contracting with a particular vendor or if franchised recyclers raised their collection charges. The specific requirements for becoming a franchisee would need to be carefully crafted to ensure that this system complies with California law. The City would need to commit resources to enforce the franchising requirement and fee collection.

• *Add Collection of Mixed Recyclables to the Scope of Services Provided by the City's Refuse Collection Contractor.*

This option would add the collection of source separated and mixed recyclables from businesses to the City's contract with the refuse collection contractor, with the City setting up a new lower rate schedule for these more valuable materials and competing for business with the existing service providers. It would allow businesses to have mixed recyclables collected while maintaining revenues to the City via utility fees. It would also add to the quantity of recyclable materials processed at the SMaRT Station. The City receives revenues from the sale of these materials.

• *Allow Donation or Sale of Mixed and Source Separated Recyclables to Any Recycling Company.*

Under this option, private recyclers could only collect source separated or mixed recyclables from a business if the business donated or sold the materials. If a fee for collecting these materials was charged, the business would have to use the services of the City's contract refuse collector. This option would help to maintain revenue levels for utility fees. Businesses could assert that it limits the manner in which they can deal with their mixed recyclables, limits the vendors they can use, or increases their costs. This alternative would be resisted by those haulers presently being paid by Sunnyvale businesses to collect containers of low value "mixed recyclables."

In choosing a method of structuring its system for commercial recycling, the City must be certain that it is in compliance with the law and the evolving body of case law in this area. Regardless of which option is selected (even if it is to maintain the current policy of open collection of recyclables), the City will need to consider some form of enforcement program to make sure there is no more than an incidental amount of solid waste in any mixed recyclables that are collected. The enforcement will ensure proper collection and disposal of solid waste to protect public health and safety. If a significant amount of solid waste is disposed of as "mixed recyclables" outside the City's collection system, the garbage rates for other users will increase. There are no firm industry guidelines now as to the maximum allowable percentage of solid waste residue above which a container of mixed recyclables would be considered as a container of solid waste. Industry discussion on this topic has yielded various opinions that range from 2-50% solid waste by weight.

The City's Role as a "Model Recycler"

Because much of the City's efforts in increasing business recycling revolve around encouragement of source reduction and recycling by commercial and industrial waste generators, it is important for the City itself to take a leadership role in this area. The City should clearly state its commitment to source reduction and recycling in all of its operations, and direct employees to search out opportunities to divert waste from landfill disposal. Employees should be empowered to change procedures and practices that generate waste.

Future Residential Recycling Issues

Any changes to residential recycling and source reduction programs will depend upon the City's policy concerning the diversion level to be achieved. It is likely that some additional residential recycling and source reduction programs will be required to meet the existing legislative mandate of 50% diversion by the year 2000. Potential programs must also be evaluated in terms of waste stream changes and markets. The types of programs that are being considered for implementation include expansion and modification of existing curbside recycling programs. The City will evaluate potential programs in terms of the quantity of solid waste they divert and the costs. Depending on whether the City has achieved (or exceeded) its landfill diversion goal, programs could also be eliminated or modified with more diversion achieved through the material recovery capabilities of the SMaRT Station. In all such examples, cost-effectiveness would be gained at the expense of diversion, which would decline.

- *Modification of Existing Curbside Recycling Program*

Several possible modifications are being considered for the curbside recycling program. One is to add materials to the program to increase the tons diverted. Materials that could be added in the future include:

- mixed paper (junk mail, magazines, catalogues)
- additional plastics, especially the #2 high-density polyethylene plastic used in milk and water jugs

A second possible modification would be to phase out the curbside recycling program and sort glass, metals, plastics, and paper from the residential waste stream at the SMaRT Station. This option would eliminate the cost of the curbside program. However, it would reduce the quantity of recyclables recovered from the residential waste stream, because sorting at the SMaRT Station will not capture all of the material now collected by the curbside program. This reduced diversion would take the City farther away from, not closer to, the 50% diversion mandate. The public education aspect of the existing curbside program would also be lost under this option.

A third possible modification would be to retain the curbside program but cease the collection of items that are difficult to collect at curbside but can easily be recovered at the SMaRT Station, such as cardboard. The residential cardboard can be recovered at high "capture rates" at the SMaRT Station as part of its processing operations. This change could also allow for program expansion because removing cardboard would free up room on the collection vehicle for new materials.

- *Multifamily Recycling Program*

Additional diversion could be achieved by implementing a multifamily recycling collection program. Such a program would collect newspapers, glass, plastic bottles, aluminum and steel cans, and used motor oil from multifamily dwellings in Sunnyvale, which would be provided with appropriately sized containers for storage of recyclables. Residents would place their recyclables in large containers near the solid waste bin for weekly pickup by the collection vehicles. A portion of the materials captured by a multifamily recycling collection program is currently being recovered in a more cost-effective fashion by the materials recovery process at the SMaRT Station. However, the amount of diversion required to meet the 50% by 2000 mandate may not be achievable without the additional tons that would be recovered by a multifamily collection program. Inclusion of used motor oil in such a collection program is problematic in some multifamily settings where apartment or condominium rules ban on-site automotive maintenance by residents.

A multifamily recycling program has been approved in April 1996 and is expected to begin in October 1996.

- *Source Reduction Programs*

Several potential new source reduction programs are outlined in the Sunnyvale SRRE and could be implemented in the future. The backyard composting program could be expanded to more households. A program could be started to encourage the use of, or even furnish, durable shopping bags (cotton, plastic or mesh) to residents at a nominal cost. This program would decrease the quantity of grocery bags (paper and plastic) that are discarded in Sunnyvale.

The City could also promote the use of durable items instead of disposables. Included in this public awareness campaign would be the following: Use of durable razors instead of disposables; use of lunch boxes or cloth bags instead of paper bags; use of durable containers for food storage instead of aluminum foil and plastic wrap; use of cloth diapers instead of disposables; expansion of the City-Wide Garage Sale concept to promote the reuse of furniture, appliances, and equipment by Sunnyvale residents and businesses.

- *Garbage Rate Incentives*

Residential customers are provided unlimited refuse collection, yard waste collection, and curbside recycling service under existing garbage rates. While unlimited yard waste and recycling service can be viewed as assisting the City in its diversion efforts, unlimited refuse collection is in conflict with the City's goal of diversion. By not financially penalizing the generator of larger amounts of residential refuse, the City fails to manage demand for this service. Baseline service (one can per week) is available at a lower rate, but for those customers with large families or those who produce larger amounts of waste, there is no financial incentive to source reduce, recycle, or to separate yard waste.

In the future, source reduction, recycling, and composting could be encouraged by charging a unit price for extra refuse containers placed out for collection, while still offering unlimited yard waste and curbside recycling service. This rate structure would provide an economic incentive to residents to recycle and source reduce and would also make it more cost-effective for the City to use fully automated refuse collection vehicles. If all refuse is contained in City-provided carts, the efficiency of the collection workers using automated trucks is greatly increased because the driver rarely has to leave the cab and can serve more homes in the same period of time.

A similar unit pricing system has long been in place in the commercial/industrial sector. Collection rates are structured so businesses pay more for larger solid waste containers and/or for more frequent pickups.

However, such a policy may not be well-received by some residents, especially those that generate a large amount of garbage. It may also lead to increased illegal dumping activities and increased unsightliness (possibly even increased fire risk) from garbage accumulation.

Applying New Technologies

Secondary materials markets drive the selection of materials recovery technologies used by the City. A glass bottle or newspaper is not truly "recycled" until it is made into a new product. The City's recycling programs must collect and process materials so that they meet market specifications for quality, cleanliness, contamination levels, etc.

Recycling technology is constantly changing and will continue to do so. Debates will continue over the efficacy of "source separated collection" programs (where recyclable materials are separated from other solid waste by the waste generator) versus "materials recovery" (where mixed solid waste is delivered to a central processing facility, such as the SMaRT Station, to be sorted). These two strategies can be combined into an integrated program. The City's challenge is to integrate source reduction, recycling, and SMaRT Station recovery programs to most cost-effectively achieve the appropriate level of diversion of solid waste. The key is determining whether new source separated collection programs are more cost-effective than increasing the materials recovery systems at the SMaRT Station. By combining the most efficient options in these collection, MRF/Transfer, and markets components of the system, the City can achieve the most cost-effective solid waste management system.

Modifications to the SMaRT Station

The SMaRT Station was constructed to be sufficiently flexible to handle changes to the Sunnyvale waste stream expected over time.

Future changes to the SMaRT Station may be needed to complement changes to the refuse and recyclables collection systems. For example, if the curbside recycling program is expanded, the Station may need to be modified to process the additional materials.

The Station operating procedures can also be modified to sort new materials from the waste stream as markets become available for those materials. Sorting operations at the Station are flexible and change in response to the markets available for the recovered materials.

Changes to the Solid Waste Collection System

Changes to the solid waste collection system may be warranted to increase collection efficiency, decrease costs, and improve worker safety. These changes may include expansion of automated solid waste collection, co-collection of solid waste and recyclables, and other modifications to the collection system.

- *Automated Collection*

With the City's approval, in August 1995, the solid waste collection contractor placed into service three fully automated collection vehicles. The results of a test conducted in 1994 indicated that automated solid waste collection is cost-effective in many neighborhoods of the City. The advantages of automated collection are that it speeds collection and reduces worker injuries, thus reducing workers compensation costs. A mechanized arm on the truck picks up a City-provided refuse cart, empties it into the truck, and returns the cart to the curb. The driver does not have to exit the vehicle to handle solid waste containers, except for baseline or rear yard customers, instances where the cart is out of the reach of the mechanical arm, or when additional cans or bags are set out for collection.

To achieve maximum efficiencies from automated collection, all solid waste should be in standardized containers that the mechanized arm can pick up. If the City-provided "toter" refuse carts are not used, the driver must exit the truck and pick up the cans, boxes, or bags. The additional time spent will work against the reasons for implementing automated collection, which are increasing collection efficiency and reducing driver lifting.

Unless collection day parking restrictions were implemented in order to keep parked cars at the curb from limiting the reach of the mechanical arm, some neighborhoods with heavy on-street parking may not be suitable for automated collection. However, it appears that the automated service would be feasible in many parts of the City without parking restrictions. Implementation will result in cost savings for the solid waste collection system in the future.

- *Co-collection of Solid Waste and Recyclables*

Another trend being pursued in the solid waste collection industry is the creation of vehicles to collect solid waste, yard waste, and/or recyclable materials on one truck. Depending upon solid waste and recyclable materials volumes, co-collection vehicles may be more cost-effective because only one or two trucks circulate through the residential neighborhood instead of three. The technology for these types of vehicles is still in the pilot-testing stages.

The City should continue to research and evaluate alternatives that might eliminate one of the three collection vehicles (refuse, yard waste, and curbside recycling) presently necessary to pick up solid waste from single-family homes. The use of three vehicles, while promoting good quality control for recovered materials and providing clear program identity for the yard waste and recycling collection services, does have impacts on costs and on air quality. It is possible that an alternative collection configuration might provide the City with a more cost-effective collection system without significantly reducing the quality and quantity of recovered materials. Combining more than one type of material on a single truck typically shifts costs from collection to processing and may increase or decrease the labor component of the solid waste handling system depending on the alternative. Some alternatives would require substantial investment in trucks or machinery, while others would require retraining residential customers about separating wastes from recyclables. Any changes should be timed carefully or phased in over time to avoid rapid and expensive changes to the solid waste infrastructure.

- *Route Restructures to Increase Diversion by SMaRT Station*

Existing commercial solid waste collection routes could be restructured to segregate wet wastes (e.g. restaurant and grocery store waste) from the dry, more recyclable solid waste collected at offices, banks, and retail stores. One or more commercial front-load vehicles could be assigned to collect restaurant and grocery store waste. This change could result in some minor routing inefficiencies for the "wet" collection route. However, the increased revenues from noncontaminated recyclable materials recovered at the SMaRT Station could be well worth the additional cost.

Securing Future Disposal Capacity

As noted previously, the City has contracted for landfill capacity at the Kirby Canyon Landfill through the year 2021, with an option to extend the disposal contract to the year 2031 if the site operator is able to extend its lease for use of the land. Due to a concerted five-year effort by the City in the 1980s, Sunnyvale is assured of landfill capacity for at least 26 years.

The City carefully monitors landfill use by tracking the tons delivered on a monthly basis. The amount of remaining capacity is reviewed annually. Arrangements for new disposal capacity require a five- to seven-year lead time. Therefore, when the City reaches the year 2011, or is at the point where it has ten years of capacity remaining, efforts should commence to obtain additional landfill capacity.

In light of the significant changes anticipated in the waste stream over the next two decades, the City may also choose to explore disposal alternatives earlier. There may be new technologies or lower cost facilities for handling solid waste by the time the City's capacity at the Kirby Canyon Landfill is exhausted. The following are some identified technologies and potential options for disposal of the City's waste stream.

- New private landfills may be sited and available for use. It is possible that one or more public entities may work together to open a new landfill in the Bay Area. Such a proposal is being debated in Alameda County.

- As nearby landfills reach capacity and close, many cities are using longer truck hauls (in excess of 100 miles) and hauling solid waste by rail to more distant landfills. For example, a portion of the solid waste from Napa County is being hauled by rail to a landfill in Washington state, at a price similar to the City's disposal cost at Kirby Canyon. Even though it does not have a rail spur, the SMaRT Station's refuse compactor can easily be used to load intermodal containers that could be transferred to a train for shipment to a landfill hundreds of miles away.

- Another potential option is incineration, or other more exotic energy recovery technologies, such as pyrolysis. Numerous attempts were made in the 1980s to site incineration or waste-to-energy facilities in the Bay Area. All failed due to citizen opposition and/or regulatory constraints. Existing air quality laws and hazardous waste laws effectively prohibit incineration facilities due to the air emissions and potentially hazardous ash they generate. However, advances in new pollution-control technology could change this situation in the future.

The most important criterion in selecting future disposal sites is the total disposal cost to the City. The total disposal cost includes not only the gate fees and transportation costs from the SMaRT Station; it also includes the long-term liability to the City for disposing waste at the particular site. There are federal and state regulations allowing federal and state agencies to close down and clean up a disposal site that threatens public health and safety. The agencies also have the authority to seek reimbursement for the cleanup costs from owners, operators and users of the site. For example, the U.S. Environmental Protection Agency, which is responsible for the administration of federal Superfund site cleanups, will identify all previous owners, operators and users of a Superfund site as potentially responsible parties. Regardless of the actual composition of waste delivered, each previous user will be responsible for its share of the cleanup costs (which could be over $10 million), based on the total tonnage of waste disposed at the site. This long-term liability is especially burdensome for municipal governments since they, unlike private businesses, cannot easily avoid such liability by declaring bankruptcy.

In order to minimize the long-term liability associated with disposal sites, the City should review site design and construction, management practices on checking incoming loads for hazardous substances, and other factors as part of the selection process.

Use of Closed Sunnyvale Landfill and Recycling Center

The Closed Sunnyvale Landfill

Some future uses should be extensions of current uses. For example, additional auxiliary facilities related to solid waste management may need to be developed. A wood salvage area or other form of organic material recovery might be useful in meeting the AB 939 mandate for 50% diversion from landfill disposal. Storing solid waste, recycling, or composting containers for use in various programs might be necessary or beneficial as well. These nonrecreational uses would likely be restricted to the East Hill to minimize impact on open space use of the Recycle Hill, South Hill, and West Hill.

Several other potential uses have been discussed. One is a cooperative project with 4H, which would provide a grazing location for small animals, while simultaneously reducing the cost of grass cutting and fertilization. Another option is temporary or permanent use of the site for ham or commercial radio operations, including training of citizen volunteers in emergency communications protocol and procedures. In general, any land use (including revenue generating activities) that is consistent with the existing land uses and physical constraints may be included in the mix of future uses.

The effects of the closed landfill on the owners and users of the nearby Moffett Park industrial area should be taken into account when considering future uses of the landfill. Some of the landfill's characteristics are potentially detrimental to its neighbors, while other characteristics are an asset to the nearby industrial area.

Due to its elevation and steep slopes, the landfill dominates many views in the industrial area to the south. A well-established grove of eucalyptus trees lines Caribbean Drive and Borregas Avenue north of Caribbean. These fast growing trees provide a visual screen when the landfill is viewed from the south and tend to minimize the bulk of the landfill hills. Some gaps in the line of trees have developed due to construction and the freeze of 1990. A capital project is currently underway to fill in these gaps to restore the screening effect. The City should continue to maintain the landfill screening trees to improve and maintain an attractive appearance for the landfill when it is viewed from Moffett Park.

The portions of the site that will be open to the public offer a unique open space opportunity to those using the site and the nearby levees for exercise. Striking views of the South Bay are available from the landfill, which is the highest point in Sunnyvale north of Evelyn Avenue, three miles to the south. The landfill and the surrounding waterways are habitat for a wide variety of wildlife. These attractive features are similarly beneficial to property owners and industrial occupants of Moffett Park in their efforts to attract and retain tenants and employees. Decisions on future uses of the landfill should identify and consider possible impacts on these neighbors and users of the site.

The close proximity of the landfill, the SMaRT Station, the WPCP, and Baylands Park, all City facilities with a theme of environmental protection, offers an opportunity for the City to display its commitment to the environment. The City should take advantage of this opportunity by using coordinated signage and a comprehensive approach to public education and tours to demonstrate the interrelationships among the four facilities and the City's proactive approach to environmental issues.

Physical constraints on site use are significant and fall into three categories. First, the clay cap over the entire surface of the landfill should not be penetrated or damaged by land uses. Access to the clay layer for inspection and repair purposes is required by regulations that govern the site for at least 30 years following closure.

Second, differential settlement of waste materials must be accounted for in any use. Use of irrigation water will be restricted, perhaps to a lower level than is consistent with some potential uses.

Third and most importantly from a public safety perspective, landfill gas will be present at the site for at least several decades. Enclosed spaces, whether structures or parts of facilities (such as buried conduits and the aggregate beneath a concrete or asphalt surface), can potentially contain landfill gas in explosive concentrations. Attention to this concern is critical during design of post-closure land uses, and equally critical in the inspection and operational protocols for these post-closure land uses. The landfill gas collection system and other environmental control systems on the site must be protected from damage and remain accessible for repairs, adjustments, and modifications.

The Closed Recycling Center

Recycling Center operations are scheduled to be consolidated into the SMaRT Station in 1996. The City has leased a portion of the Carl Road Recycling Center site to the County of Santa Clara for use as a permanent household hazardous waste drop-off facility. This facility will provide an ongoing method for

residents to properly dispose of household hazardous wastes in between the quarterly drop-off events.

The former Sunnyvale Recycling Center site is well suited for this use. It has adequate access for entrance, materials drop-off, and exit from the property. As a first step in establishing this facility, the County will lease a portion of the site for five years and operate a BOP (batteries, oil, and paints) drop-off at the Recycling Center site. BOP materials make up the bulk of the items received at household hazardous waste events. They are also relatively inexpensive to handle and are commonly recycled, as opposed to incinerated or landfilled, as with other household hazardous wastes.

The City should consider the long-term use of the Carl Road Recycling Center site as a permanent household hazardous waste facility.

Another potential use for a portion of the Carl Road site is parking for City employees at the nearby WPCP. With minor modifications, it may be possible for the site to accommodate the household hazardous waste facility at the west end of the site and a parking lot for WPCP employees at the east end.

Conclusion

The City has long been recognized for its leading role in solid waste management issues. As mentioned in the California Integrated Waste Management Board's 1994 Annual Report, "(t)he City of Sunnyvale is another community that has responded to the call to reduce waste. Since 1989, their waste diversion has doubled, going from about 18 percent in 1989 to nearly 40 percent today. Their efforts to invest in new waste management technologies and expand their education programs for the public are just a part of their formula for success."

The City currently has a stable solid waste management system that can handle present and future waste streams. The various components have enabled the City to comply with the 25% diversion mandate two years ahead of the 1995 schedule. The City is well on its way to achieving the 50% diversion mandate by the year 2000.

However, because of the successful efforts by both the City and private businesses in source reduction and recycling, the amount of waste disposed has decreased and the downward trend is expected to continue. Since the Solid Waste Program budget is funded almost entirely by refuse rates, it is likely that future rates will rise.

The City's primary challenge over the next twenty years will be to integrate source reduction, recycling, and SMaRT Station recovery programs to achieve the appropriate level of diversion of solid waste in the most cost-effective manner.

Interrelationships with Other Sub-Elements

The General Plan of the City of Sunnyvale is composed of seven elements: Transportation, Community Development, Environmental Management, Public Safety, Socio-Economic, Cultural, and Planning and Management. The Solid Waste Sub-Element is part of the Environmental Management Element, which includes six other sub-elements: Water Resources, Sanitary Sewer System, Surface Runoff, Energy, Noise, and Air Quality.

Altogether there are a total of 24 elements or sub-elements within Sunnyvale's General Plan. The interrelationship of the Solid Waste Sub-Element with the goals and policies of those elements or sub-elements that are relevant is summarized below.

Land Use Sub-Element

The Land Use Sub-Element contains the following policies influencing or supporting the Solid Waste Sub-Element's goals:

Policy A.3: Provide for a full range of commercial uses which will respond to the service needs of the community.

Policy A.4: Provide for a variety of industrial uses and supporting commercial services.

Policy A.5: Provide for and encourage the maintenance of open space areas.

Open Space Sub-Element

The Open Space Sub-Element contains the following policy supporting the Solid Waste Sub-Element's goals:

Policy C.3: Investigate development of a system of multi-purpose trails for recreational uses.

Housing and Community Revitalization Sub-Element

The Housing and Community Revitalization Sub-Element contains the following goal and policy influencing the Solid Waste Sub-Element's goals:

Goal B: Ensure a high quality living and working environment.

Policy B.1: Continue to encourage property owners to maintain existing developments in a manner which enhances the City. Properties should be aesthetically pleasing, free from nuisances and safe from hazards.

Seismic Safety Sub-Element

The Seismic Safety Sub-Element contains the following policy supporting the Solid Waste Sub-Element's goals:

Policy B.1: Emergency Response Facilities: Maintain and construct City facilities utilized for emergency response so that they remain operable after a major seismic event.

Surface Runoff Sub-Element

The Surface Runoff Sub-Element contains the following policies influencing the Solid Waste Sub-Element's goals:

Policy A.2: Comply with regulatory requirements and participate in processes which may result in modifications to regulatory requirements.

Policy A.3: Ensure that BMPs are implemented to reduce the discharge of pollutants in storm water to the maximum extent practicable.

Policy A.5: Prevent accelerated soil erosion.

Policy D.1: Consider the impacts on the water quality of surface runoff as part of land use and development decisions and implement BMPs to minimize the total volume and rate of runoff.

Energy Sub-Element

The Energy Sub-Element contains several goals and policies influencing or supporting the Solid Waste Sub-Element's goals:

Goal G: Conserve energy by maximizing resource recovery and reuse and minimizing energy consumption in the pick-up and transport of solid waste.

Policy G.1: Consider source separation recycling programs.

Policy G.2: Consider establishing waste-to-energy facilities as part of the solid waste management plan.

Policy G.3: Minimize the consumption of nonrenewable fuel required to travel to garbage disposal sites.

Goal I: Minimize energy consumption in the provision of municipal services without affecting the quality or quantity of services.

Policy I.3: Decrease dependency on outside energy resources by increasing City produced energy.

Noise Sub-Element

The Noise Sub-Element contains several goals and policies influencing or supporting the Solid Waste Sub-Element's goals:

Goal A: **Strive to maintain or achieve a compatible noise environment for all land uses in the community.**

Policy A.1: Consider noise standards in the evaluation of land use issues and proposals.

Goal C: **Maintain or achieve acceptable limits for the levels of noise generated by land use operations and single events.**

Policy C.1: Regulate land use operations noise.

Air Quality Sub-Element

The Air Quality Sub-Element contains the following goal and policy influencing or supporting the Solid Waste Sub-Element's goals:

Goal A: **Improve Sunnyvale's air quality and reduce the exposure of its citizens to air pollutants.**

Policy A.1: Require all new development to utilize site planning to protect citizens from unnecessary exposure to air pollutants.

Socio-Economic Element

The Socio-Economic Element contains the following policy supporting the Solid Waste Sub-Element's goals:

Policy A.4: Maintain City facilities and City properties to a high standard of maintenance and promote a positive aesthetic appearance in the neighborhoods.

Recreation Sub-Element

The Recreation Sub-Element contains the following goal and policy influencing or supporting the Solid Waste Sub-Element's goals:

Goal E: **Provide and maintain recreation facilities based on community need, as well as on the ability of the City to finance, construct, maintain, and operate these facilities now and in the future.**

Policy E.1: Provide, maintain, and operate facilities such as swimming pools, tennis courts, golf courses, athletic fields, trails, parks, arts facilities, community centers, and other specialized facilities in a

safe, high quality, usable condition that will serve and meet the recreational needs of the community.

Fiscal Management Sub-Element

The Fiscal Management Sub-Element contains the following goal and policies influencing the Solid Waste Sub-Element's goals:

Goal A: Revenue: Maintain and enhance the City's revenue base.

Policy A.1: Revenue base: Maintain a diversified and stable revenue base for the City.

Policy A.2: Revenue Forecasting and Monitoring: Develop and maintain a revenue monitoring system to assist in trend analysis and revenue forecasting.

Goals, Policies, and Action Statements

Introduction

This part of the Solid Waste Sub-Element contains a set of integrated goals, policies and actions. The goals and policies reflect the overall direction in which the City wishes to advance. These goals and policies will provide guidance for decision-making when the City is confronted with specific issues and proposals. The action statements outline the specific steps the City is committed to taking in order to achieve the stated goals.

The goals, policies, and action statements within the Solid Waste Sub-Element are based on certain assumptions, which are:

- The citizens of Sunnyvale want a clean city and a healthy environment.
- The quantity and makeup of the solid waste stream generated in Sunnyvale will continue to change over time, in response to economic conditions, technology, and packaging.
- Due to the specialized equipment and expertise of the private sector, it is most efficient and cost-effective to continue to contract for solid waste collection, processing, transfer, and disposal services.
- The trend toward source reduction, design for material recovery and other solid waste reduction and recycling measures will continue to broaden and expand.

Goals, Policies, and Action Statements

Goal 3.2A. **Ensure that all municipal solid waste generated within the City is collected and transported in a manner that protects public health and safety.**

Policy 3.2A.1. Provide convenient, competitively priced solid waste collection services.

Action Statements

3.2A.1a. Establish, enforce, and periodically update collection service standards.

3.2A.1b. Provide collection services that meet the needs of elderly and disabled residents.

3.2A.1c. Evaluate methods of achieving increased efficiencies in solid waste collection.

3.2A.1d. Compile and analyze information regarding collection operations to ensure that existing operations are operated in a safe, sanitary, and efficient manner and that collection costs are necessary and reasonable.

Policy 3.2A.2. Ensure that standards of Customer Service Excellence policies are met by those providing solid waste collection service.

Action Statements

3.2A.2a. Provide and publicize convenient methods by which customer complaints can be filed.

3.2A.2b. Investigate all complaints regarding solid waste collection and maintain records of complaint resolution.

Goal 3.2B. Reduce solid waste disposal to 50% or less of the amount generated in 1990 (as adjusted to reflect population and economic changes) in the most cost-effective manner.

Policy 3.2B.1. Reduce generation of solid waste by providing source reduction programs and promoting source reduction behavior.

Action Statements

3.2B.1a. Provide source reduction programs that reduce the generation of solid waste.

3.2B.1b. Encourage and facilitate private source reduction programs, services, and facilities.

3.2B.1c. Provide comprehensive and ongoing public education programs to encourage source reduction behavior by Sunnyvale residents and businesses.

3.2B.1d. Continue to monitor the effectiveness of unlimited residential refuse collection.

Policy 3.2B.2. Maximize diversion of solid waste from disposal by use of demand management techniques, providing and promoting recycling programs, and encouraging private sector recycling.

Action Statements

3.2B.2a. Continue to use demand management in determining refuse collection rates and policies.

3.2B.2b. Provide, or facilitate the provision of, recycling collection services to residential, commercial, and industrial customers in a cost-effective way that allows achievement of the 50% diversion goal.

3.2B.2c. Provide comprehensive and ongoing public education and promotion programs to encourage residents and businesses to participate in recycling programs.

3.2B.2d. Make City facilities models of source reduction and recycling behavior by stating that all employees are expected and empowered to incorporate source reduction and recycling in their work practices.

3.2B.2e. Compile and analyze information regarding recycling and disposal amounts, program costs, and customer satisfaction to evaluate the City's progress toward achieving its disposal diversion goal.

Policy 3.2B.3. Meet or exceed all federal, state, and local laws and regulations concerning solid waste diversion and implementation of recycling and source reduction programs.

Action Statements

3.2B.3a. Periodically update the Sunnyvale Source Reduction and Recycling Element (SRRE), and perform related tasks as required by state law.

3.2B.3b. Continue to implement the source reduction and recycling programs described in the SRRE.

3.2B.3c. Continue to monitor the City's compliance with waste diversion laws and regulations.

Policy 3.2B.4. Increase demand for recycled materials by advocating local, state and federal legislation that will increase use of recycled content products.

Action Statement

3.2B.4a. Identify and support proposed laws and administrative actions that would increase the demand for and value of recycled materials in a cost effective manner.

Goal 3.2C. Encourage residents to maintain clean neighborhoods by preventing unsightly accumulations of discarded materials and illegal dumping of municipal solid waste.

Policy 3.2C.1. Provide periodic opportunities for residents to dispose of refuse at discounted or no charge.

Action Statements

3.2C.1a. Periodically provide "extended curbside collection" of bulky residential refuse.

3.2C.1b. Periodically provide City residents free disposal of refuse at the SMaRT Station.

3.2C.1c. Provide disposal services for neighborhood cleanup events.

Goal 3.2D. Dispose of solid waste generated within the City in an environmentally sound, dependable, and cost-effective manner.

Policy 3.2D.1. Assure that the City possesses a minimum of five years of refuse disposal capacity at all times.

Action Statements

3.2D.1a. Annually assess the amount of disposal capacity available with existing disposal arrangements and projected disposal amounts.

3.2D.1b. When available disposal capacity equals ten years or less, initiate actions to arrange for sufficient capacity to accommodate present and projected City needs.

Policy 3.2D.2. Reduce the amount of refuse being disposed, generate recycling revenues, and minimize truck travel to the disposal site through use of the Sunnyvale Materials Recovery and Transfer (SMaRT) Station.

Action Statements

3.2D.2a. Achieve economies of scale in the operation of the SMaRT Station.

3.2D.2b. Continue to monitor SMaRT Station operations to ensure compliance with all performance standards and regulatory requirements.

3.2D.2c. Research developments in refuse transfer, materials recovery equipment and operations, and markets for recovered materials, and implement appropriate changes to SMaRT Station equipment and operations.

Goal 3.2E. Minimize potential future City liability for wastes generated in the City.

Policy 3.2E.1. Select disposal methods and sites for solid and hazardous wastes that incorporate technologies and practices most likely to eliminate or minimize future City liabilities.

Action Statements

3.2E.1a. Obtain and review permits, reports, and other information related to disposal facilities to verify compliance with laws, regulations, and prudent practices.

3.2E.1b. Whenever practical, select to dispose of hazardous wastes by reuse, recycling, incineration, and landfilling, in that order.

Policy 3.2E.2. Minimize impact on future rate payers of potential liability for past disposal practices.

Action Statements

3.2E.2a. Evaluate existing reserve funds and potential liabilities and adopt appropriate reserve fund policies.

3.2E.2b. Seek changes to federal law to minimize the City's potential liability for disposal of municipal solid waste.

Policy 3.2E.3. Minimize illegal and inappropriate disposal of Household Hazardous Waste (HHW).

Action Statements

3.2E.3a. Encourage use of HHW source reduction practices by providing promotion and public education.

3.2E.3b. Provide and promote convenient HHW disposal services.

Policy 3.2E.4. To meet or exceed all federal, state, and local laws and regulations concerning Household Hazardous Waste (HHW) and implementation of HHW programs.

Action Statements

3.2E.4a. Periodically update the Sunnyvale Household Hazardous Waste Element (HHWE) and perform related tasks as required by state law.

3.2E.4b. Implement the HHW programs described in the HHWE.

Goal 3.2F. **Maintain sound financial strategies and practices that will enable the City to provide comprehensive solid waste management services to the community while keeping refuse rates at or below countywide averages for cities using cost of service pricing.**

Policy 3.2F.1. Establish refuse collection and disposal rates in a manner that equitably allocates program costs among rate payers and promotes rate stability.

Action Statements

3.2F.1a. Periodically restructure refuse collection and disposal rates to incorporate demand management, minimize demand for services, and reflect actual costs.

3.2F.1b. Annually survey refuse rates and rate-setting methods for comparable Santa Clara County cities to determine City's relationship to countywide averages.

Policy 3.2F.2. To the greatest extent possible, anticipate changes required in refuse collection rates in response to changes in laws, regulations, and economic factors affecting the solid waste management system.

Action Statements

3.2F.2a. Prepare budgets that reflect costs for anticipated legislation and regulations, new programs, and modifications to existing programs.

3.2F.2b. Annually establish refuse collection rates that use long-range budget projections to maximize the predictability of future rates.

3.2F.2c. Identify, and work to modify, proposed laws and legislation that have potential financial impacts on the solid waste management program.

Policy 3.2F.3. Identify additional revenue sources and, where possible, increase revenues from solid waste programs, services, and facilities without jeopardizing program goals and customer service quality.

Action Statements

3.2F.3a. Seek grant funding from the State and other sources where the cost of obtaining and maintaining the grant does not negate its value.

3.2F.3b. Identify and pursue potential customers for any unused capacity of the SMaRT Station.

3.2F.3c. Review and audit revenue sources to ensure that all appropriate revenues are being received.

3.2F.3d. Evaluate revenues of existing and proposed programs as decisions are being made regarding those programs.

Goal 3.2G. Contribute to an economic development environment that is supportive of a wide variety of businesses.

Policy 3.2G.1. Provide solid waste services desired by businesses at competitive rates.

Action Statement

3.2G.1a. Conduct periodic surveys to verify that businesses receive useful services at a competitive price.

Goal 3.2H. **Manage the closed Sunnyvale Landfill in a manner that protects the public health and safety and the environment, promotes enjoyable public use of the site, and assists in the achievement of other goals of the Solid Waste Sub-Element.**

Policy 3.2H.1. Ensure compliance with federal, state, and local laws and regulations.

Action Statements

3.2H.1a. Continue to monitor and manage leachate, groundwater, and landfill gas.

3.2H.1b. Continue to monitor and manage the landfill cap, slopes, and surface vegetation.

3.2H.1c. Maintain post-closure maintenance financial assurance mechanism in compliance with regulations.

Policy 3.2H.2. Extract available resources from the refuse buried at the landfill.

Action Statements

3.2H.2a. Provide landfill gas of a quality and at a flow rate suitable for energy recovery.

3.2H.2b. Continue to monitor new technologies for further opportunities to extract buried resources.

Policy 3.2H.3. Provide for safe, enjoyable recreational access to portions of the landfill.

Action Statements

3.2H.3a. Maintain environmental control systems to provide for safe public access to open space portions of the site.

3.2H.3b. Maintain a vegetative screen along Caribbean Drive and Borregas Ave. to enhance the aesthetics of the landfill, as viewed from the adjacent industrial area.

3.2H.3c. Provide information to visitors regarding the site's history and relationship to other nearby City-operated environmental management facilities.

Policy 3.2H.4. Provide for facilities and activities on portions of the landfill that support achievement of the City's solid and household hazardous waste goals and policies.

Action Statements

3.2H.4a. Continue to provide for concrete and asphalt recycling.

3.2H.4b. Consider long-term use of the Carl Road Recycling Center as a household hazardous waste facility.

3.2H.4c. Provide a disposal area for dried sewage sludge from the Water Pollution Control Plant.

3.2H.4d. Evaluate the benefits to the solid waste program of other waste diversion facilities and activities proposed to be located on the landfill.

Policy 3.2H.5. Generate revenues from post-closure uses of the landfill.

Action Statements

3.2H.5a. Periodically evaluate the possibility of increasing revenues generated by existing facilities located on the landfill.

3.2H.5b. Evaluate the suitability and revenue potential of proposed revenue-generating uses of the landfill.

Appendix 1. Glossary of Acronyms and Technical Terms

Automated Refuse Collection

Collection of residential refuse using a truck equipped with a mechanized arm that lifts, empties, and returns refuse carts to the curb without requiring the driver to leave the truck cab.

BAAQMD

Bay Area Air Quality Management District, the nine-county regional agency that manages air quality issues on behalf of the state.

BMP

Best Management Practices are management practices promulgated by the Santa Clara Nonpoint Source Pollution Control Program to prevent storm water pollution. Facilities, including various City operations, covered under the Industrial Storm Water General Permit for the Santa Clara Valley have to implement BMPs as part of their Storm Water Pollution Prevention Programs.

BOP

A drop-off facility for Batteries, Oil, and Paints to be located at the former Recycling Center and operated by the County of Santa Clara. The facility will serve residents in the county.

Bollard

A well-anchored vertical post made of metal, wood, or recycled plastic lumber that is installed in such a location as to protect structures and machinery from being struck by vehicles, or to prevent vehicles from entering unauthorized areas such as the landfill.

Buy Recycled

Purchase by individuals, private companies, and government agencies of products manufactured from recycled feedstocks.

Capture Rate

A measure of the efficiency with which various materials can be diverted from disposal by a recycling or materials recovery process.

CIWMB

California Integrated Waste Management Board, the state agency charged with enforcing the state laws related to solid waste disposal facilities and diversion of waste from disposal.

Conditionally Exempt Small Quantity Generator (CESQG)

A business that produces less than 100 kilograms (220 pounds) per month of hazardous waste. CESQGs are regulated differently than larger generators of hazardous waste.

Debris Box (also Roll-off Box)

A large, open-topped metal box ranging in size from 7 to 50 cubic yards in size and designed to hold loose refuse. Debris boxes are commonly used to receive wastes generated by demolition and construction projects. Both the box and its contents are picked up by a winch-equipped truck and transported to a disposal site to be emptied.

Feedstock

Raw material required for an industrial process.

Final Cover

The engineered "cap" of soil, compacted clay, and topsoil that seals the landfill surface. Current federal standards require a total thickness of four feet for final cover.

Flow Control

The use by local government of an ordinance, a contract, franchise agreement provisions, or economic incentives to direct the flow of refuse or recyclable materials to a specific solid waste disposal or materials recovery facility.

Franchise

A right, granted by the City to a private company, to provide a service that makes private use of public rights of way. Examples of franchises granted by the City include those for refuse collection, electricity, telephone, and taxi service. A franchise may be exclusive (only one service provider) or nonexclusive (multiple service providers).

Franchise Fee

A fee paid to the City by a private company for the right to make use of City rights of way (primarily streets) in the course of doing business under a franchise granted by the City.

Hazardous Waste

Waste material that is toxic, ignitable, corrosive, or reactive as defined by state and federal law. Many wastes (e.g. automotive oil filters, household batteries, latex paint) are considered hazardous under state law but not federal law. The hazardous waste category does not include medical waste, asbestos, or radioactive materials, each of which is separately regulated.

Household Hazardous Waste

Hazardous waste generated at residences. Common household hazardous wastes include used motor oil and other automotive fluids, paint, batteries, pesticides, pool chemicals, waxes, and cleaners.

Intermodal Container

A large cargo container capable of being shipped by truck, rail, or cargo ship and easily moved from one "mode" of shipment to another by way of a crane or forklift truck.

Landfill Gas

A gas, composed of methane, carbon dioxide, nitrogen, and trace gases, that is generated by the decomposition of landfilled refuse by anaerobic bacteria (bacteria that thrive in the absence of oxygen). Landfill gas (LFG) usually has a very unpleasant odor, although it may be odorless. Some LFG contains trace amounts of toxic compounds. At some concentrations, LFG is flammable or explosive. Its energy content can be recovered by burning it to generate electricity and heat, or by converting it into a liquid fuel.

Landfill Gas Migration

The movement of landfill gas laterally through soils, pipeline trenches, or subsurface structures. Landfill gas is very mobile and can build up to explosive levels in enclosed spaces if it is not captured by a landfill gas extraction system or vented from enclosed spaces.

Leachate

Liquid that has percolated through or drained from landfilled refuse.

Materials Recovery

The sorting of recyclable materials from mixed solid waste at a central processing facility such as the SMaRT Station.

MRF

Materials Recovery Facility

Post-closure Maintenance Plan

A written plan, prepared by an engineer and subject to approval by various regulatory agencies, that identifies the monitoring and maintenance activities to be carried on after closure of a landfill.

Power Generation Facility

A set of large internal combustion engines to be installed at the WPCP that will use LFG to fuel the production of electricity.

Recycling

The use of discarded materials in the manufacture of new products.

Reuse

The reemployment of an item that would otherwise be recycled or disposed. Examples of reuse include: washing and refilling milk and soda bottles; sale or donation of used furniture, clothing, and appliances; and salvage and resale of construction materials from demolition and remodeling projects.

RWQCB

Regional Water Quality Control Board. The regional agency that enforces state standards designed to protect the quality of groundwater and surface water, including San Francisco Bay.

Secondary Material

Industrial feedstock composed of previously used materials.

Semi-automated Refuse Collection

Collection of residential refuse using a truck equipped with a hydraulic tipper. Refuse carts are moved to the truck by the driver, manually attached to the tipper, and emptied automatically.

SMaRT Station

Sunnyvale Materials Recovery and Transfer Station. Owned by the City of Sunnyvale and located at 301 Carl Road, the $24.3 million SMaRT Station receives refuse and recyclable materials generated in the cities of Mountain View, Palo Alto, and Sunnyvale, sorts recyclable materials from the refuse, and transfers the residue 27 miles to the Kirby Canyon Landfill for disposal.

Solid Waste

All solid, semisolid, and liquid wastes, including garbage, compostable materials, trash, refuse, rubbish, ashes, industrial wastes, demolition and construction wastes, discarded home and industrial appliances, dewatered sewage sludge, and manure. Solid waste does not include hazardous waste or household

hazardous waste, medical waste, radioactive waste, sewage, or abandoned vehicles.

Source Reduction

Decreased generation of solid waste resulting from reduced product weight or volume, increased product life, product repair, and decreased consumption.

Source Separation

The sorting of recyclable materials from other solid waste by the waste generator.

SRRE

Source Reduction and Recycling Element. AB 939 requires each city and county in the state to prepare a long-term planning document called the SRRE, describing how the jurisdiction will achieve the mandated diversion of its solid waste.

Sunnyvale WPCP

Sunnyvale Water Pollution Control Plant. The WPCP, which treats sanitary sewer waste water, is adjacent to the SMaRT Station.

Tipping Fee

The fee paid for disposal of refuse at a transfer station or landfill.

Transfer Station

A facility where solid waste is transferred from refuse collection trucks to larger "transfer" trucks for transportation to a distant landfill.

Virgin Material

Industrial feedstock obtained by mining ores, cutting trees, or otherwise extracting a resource from its natural setting.

Appendix 2. Legislation on Solid Waste Management

A. Recycling and Source Reduction

AB 939 was signed into law in 1989. It requires each city and county in California to divert 25% of their solid waste from landfill by 1995 and to divert 50% by the year 2000. These diversion mandates will be measured against the baseline quantity of solid waste landfilled by each city and county in 1990. AB 939 compliance is monitored by the California Integrated Waste Management Board (CIWMB). Cities are required to file periodic progress reports with the CIWMB. Cities that fail to comply with AB 939 may be subject to a fine of up to $10,000 per day.

AB 939 required each city and county to prepare a Source Reduction and Recycling Element (SRRE) describing how the jurisdiction planned to achieve the mandated levels of diversion. Sunnyvale was the first city in the state to adopt its SRRE. The SRRE states that Sunnyvale plans to achieve the 25% and 50% diversion levels by implementing programs in three categories: source reduction, reuse, and recycling.

Another bill related to recycling, AB 2020, requires that a specified number of recycling drop off centers be established in specific areas of the state. Due to the city-wide curbside program, the number of drop-off centers for Sunnyvale was reduced by the California Department of Conservation, which monitors the program. This agency administers the other programs established by AB 2020 (including the California Redemption Value program to encourage recycling of beverage containers) plus grant and loan programs to encourage the use of recycled materials by industry.

B. Landfills and Transfer Stations

The federal Subtitle D regulations, under the Resource Conservation and Recovery Act, stipulate siting, construction, and operating standards for solid waste facilities. These standards are implemented in California by the CIWMB and the State Water Resources Control Board (SWRCB).

The CIWMB designates Local Enforcement Agencies (LEAs) to perform routine inspections and enforcement actions on its behalf. For the Sunnyvale Landfill and the SMaRT Station, the LEA is the Department of Environmental Health, County of Santa Clara. The LEA inspects operating landfills and transfer stations weekly and closed landfills quarterly.

The SWRCB also delegates its responsibilities at the regional level to various Regional Water Quality Control Boards (RWQCBs). The RWQCBs are required

to ensure adequate protection of water quality and state-wide uniformity in siting, operation, and closure of waste disposal sites. Sunnyvale is within the jurisdiction of the San Francisco Bay Region RWQCB.

In addition to the Subtitle D federal standards, the CIWMB, the RWQCB, and the Bay Area Air Quality Management District also have permitting authority for landfills and transfer stations. Permits must be obtained from each agency prior to constructing or operating a landfill or transfer station. These permits are renewed on a regular basis.

State law also requires each landfill owner/operator to submit evidence of their ability to fund the closure and post-closure maintenance of the landfill. Funds for this purpose must be placed into an account to ensure proper environmental protection measures are undertaken upon landfill closure.

C. Buy-Recycled

State and federal laws have been promulgated to require public agencies and private businesses to buy products made with recycled content. The purpose of these laws is to create market demand for the recycled materials that are collected by recycling programs.

State law requires certain state agencies to purchase office products and paper containing recycled content. State law also requires that certain products used in the state (such as newsprint) include a minimum percentage of recycled paper.

D. Hazardous Wastes

The City's program for management of hazardous wastes is described in the Public Safety Element of the General Plan. The City's solid waste management staff coordinates with the Public Safety Department to ensure proper handling of any hazardous waste that is discovered at the SMaRT Station or by the refuse collection contractor.

AB 939 mentioned above also requires each city and county in California to prepare a Household Hazardous Waste Element (HHWE) identifying programs which would divert household hazardous waste (HHW) from landfilling and ensure their safe treatment and disposal. The City prepared a HHWE along with its SRRE in 1991. However changes in state law and regulations required that the HHWE be formatted as a separate document. The HHWE has since been revised and resubmitted for approval by CIWMB.

The solid waste management program is responsible for operating several programs to encourage proper disposal of household hazardous waste and other hazardous waste generated in Sunnyvale. These programs include the Household Hazardous Waste Drop-off Program for Sunnyvale residents, a similar Small Quantity Generator Program for Sunnyvale businesses generating small quantities of hazardous wastes, curbside collection of used motor oil from residents, and a used motor oil, oil filter, and antifreeze drop-off at the SMaRT Station.

These programs must comply with federal, state, and local laws concerning the handling of hazardous waste.

E. Public Health and Safety

Sunnyvale Municipal Code Section 8.16 contains specific requirements for solid waste collection to protect public health and safety. The Municipal Code requires solid waste to be collected on a weekly basis from all residences and businesses. The Code requires solid waste to be stored and placed for collection in specified types of containers to prevent leakage, odor, and blowing refuse. Only contractor(s) licensed and permitted by the City to collect and haul solid waste may do so in Sunnyvale.

Appendix 3. Results from Waste Composition Study, August 1995

Material Type	Sunnyvale			
	Residential	Commercial	Industrial	Total
Cardboard	0.65%	1.90%	1.60%	4.15%
Cardboard(C)	0.92%	0.85%	0.21%	1.98%
Newspaper	0.73%	2.74%	0.40%	3.88%
Newspaper (C)	0.29%	0.78%	0.03%	1.11%
Mixed Waste Paper	1.69%	2.22%	1.88%	5.80%
Mixed Waste Paper (C)	1.55%	2.38%	0.29%	4.22%
High Grade	0.12%	0.46%	0.77%	1.34%
High Grade (C)	0.04%	0.07%	0.03%	0.14%
Other Paper	2.61%	3.07%	0.80%	6.48%
Aluminum Cans	0.07%	0.16%	0.02%	0.25%
Tin Cans	0.22%	0.33%	0.01%	0.56%
Ferrous Metals	0.34%	1.08%	0.31%	1.72%
Non-Fer. Alum. Scrap	0.09%	0.15%	0.01%	0.25%
Bi-Metals	0.07%	0.02%	0.01%	0.10%
CA Redemption Glass	0.16%	0.28%	0.07%	0.51%
Non-Recyclable Glass	0.02%	0.09%	0.00%	0.11%
Other Recyclable Glass	0.30%	0.59%	0.09%	0.98%
Refill. Glass Container	0.00%	0.00%	0.00%	0.00%
1 - PET	0.14%	0.13%	0.02%	0.30%
2 - HDPE	0.31%	0.34%	0.08%	0.72%
3 - PVC	0.01%	0.07%	0.00%	0.08%
4 - LDPE	0.00%	0.02%	0.00%	0.03%
5 - Polypropylene	0.03%	0.08%	0.00%	0.11%
6 - Polystyrene	0.13%	0.26%	0.12%	0.52%
Films	1.28%	2.04%	0.48%	3.80%
Other Plastic	0.56%	0.76%	0.14%	1.46%
Yard Waste-Shrubby	0.30%	0.28%	4.04%	4.63%
Yard Waste-Leafy	0.55%	1.45%	0.20%	2.20%
Yard Waste-Collected	10.31%	0.00%	0.00%	10.31%
Wood Waste	0.62%	0.90%	3.48%	5.00%
Agricultural Crop Residue	0.00%	0.00%	0.00%	0.00%
Manure	0.00%	1.60%	0.00%	1.60%
Food Waste	3.56%	3.23%	0.41%	7.19%
Textiles	1.11%	1.84%	0.71%	3.67%
Leather	0.00%	0.01%	0.00%	0.01%
Household Haz. Waste	0.11%	0.09%	0.05%	0.25%
Inert Solids	0.15%	0.84%	0.43%	1.42%
Diapers	0.97%	0.74%	0.01%	1.72%
Tires & Rubber	0.07%	0.08%	0.04%	0.19%
White Goods	0.00%	0.13%	0.00%	0.13%
Remainder	6.34%	8.25%	6.49%	21.09%
Total	36.46%	40.29%	23.24%	100.00%
Total Tons	2,169.40	2,397.12	1,382.59	5,949.11

Sunnyvale SRRE Subwastestreams

Material	Residential	Commercial	Industrial
PAPER	**23.60%**	**35.93%**	**25.88%**
OCC/Kraft	4.30%	6.83%	7.78%
Mixed Paper	8.90%	11.43%	9.34%
Newspaper	2.81%	8.74%	1.88%
High Grade	0.45%	1.30%	3.44%
Magazines/Glossy Ins.	0.00%	0.00%	0.00%
Other Paper	7.15%	7.63%	3.44%
PLASTIC	**6.76%**	**9.22%**	**3.63%**
Film	3.52%	5.07%	2.06%
HDPE	0.84%	0.84%	0.34%
PET	0.40%	0.33%	0.08%
Polystyrene	0.36%	0.66%	0.52%
Other Plastic	1.64%	2.32%	0.63%
FOOD	9.77%	8.00%	1.75%
YARD WASTE	30.63%	4.30%	18.24%
WOOD	1.71%	2.22%	14.96%
TEXTILE/LEATHER	3.06%	4.59%	3.08%
RUBBER/TIRES	0.19%	0.19%	0.18%
AGRI.CROP RESIDUE	0.00%	0.00%	0.00%
MANURE	0.01%	3.97%	0.00%
OTHER ORGANICS	0.00%	0.00%	0.00%
METALS	**2.17%**	**4.30%**	**1.51%**
Tin F&B Cans	0.61%	0.82%	0.04%
Other Ferrous	0.93%	2.67%	1.32%
Bi-Metal Cans	0.20%	0.05%	0.03%
Aluminum Cans	0.19%	0.40%	0.08%
Non-Ferrous	0.24%	0.37%	0.05%
Other Aluminum	0.00%	0.00%	0.00%
GLASS	**1.32%**	**2.36%**	**0.72%**
Redeemable Beverage	0.43%	0.69%	0.30%
Non-Redeemable	0.00%	0.00%	0.00%
Other Recyclable	0.83%	1.46%	0.41%
Other Non-Recyclable	0.06%	0.21%	0.01%
OTHER INERTS	0.41%	2.07%	1.86%
OTHER WASTES	**0.30%**	**0.55%**	**0.22%**
Appliances/White Goods	0.00%	0.33%	0.00%
Other Hazardous Waste	0.00%	0.00%	0.00%
Household Hazardous Waste	0.30%	0.22%	0.22%
REMAINDER	20.06%	22.30%	27.98%
Total	100.00%	100.00%	100.00%

Appendix 4. Survey results from Public Participation Events

Solid Waste Sub-Element						
Commercial Focus Group Meeting - November 15, 1995						
Choices	Values ranking					Score
Avoiding long-term disposal site(s) cleanup liability	1	1	1	5	2	65
Environmental integrity of disposal site and image of disposal company	2	2	5	7	1	58
Collection service reliability	3	9	2	2	6	53
Collection service cost	7	5	4	4	5	50
Ability to choose from among multiple collection vendors	6	7	6	1	10	45
Speed of response to special service requests	4	4	14	3	9	41
Percentage of my company's waste that is actually recycled	12	3	11	6	4	39
Billings that are easy to understand and provide cost breakdowns	10	6	3	11	13	32
Corporate ethics / reputation / image of collection company	13	8	9	10	3	32
Confidentiality of materials disposed or recycled	8	13	8	8	7	31
Flexibility / variety of collection container sizes and services	5	14	10	9	11	26
Appearance and cleanliness of containers, trucks, and workers	14	12	7	12	8	22
Understanding basis of refuse collection rates charged by the City	9	10	12	14	12	18
User friendliness of service ordering system	11	11	13	13	14	13
Others						
* Please note that participants were asked to rank the fourteen solid waste management issues from 1 to 14. The highest priority item will be given a score of 14 and 1 for the lowest. Items in the above list have been sorted in descending order by their respective scores						

Solid Waste Sub-Element					
Residential Focus Group Meeting - February 27, 1996					
Choices	Values ranking				Score
Collection service cost	2	2	2	4.5	33.5
Collection service reliability	6	1	4	4.5	28.5
Environmental integrity of disposal site and image of disposal company	3	6	7	1	27
Billings that are easy to understand and provide cost breakdowns	7	3	3	7	24
Appearance and cleanliness of containers, trucks, and workers	8	4	1	8.5	22.5
Percentage of waste that is actually recycled	1	9	6	8.5	19.5
Corporate ethics / reputation / image of collection company	4	7	10	4.5	18.5
Flexibility / variety of collection container sizes and services	9	10	5	2	18
Confidentiality of materials disposed or recycled	5	5	8	10	16
User friendliness of service ordering system	10	8	9	4.5	12.5
* Please note that participants were asked to rank the ten solid waste management issues from 1 to 10. The highest priority item will be given a score of 10 and 1 for the lowest. Items in the above list have been sorted in descending order by their respective scores.					